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September Features . . .

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Don't Forget – September Is National Honey Month

Kim Flottum photo taken at the National Honey Show in London.

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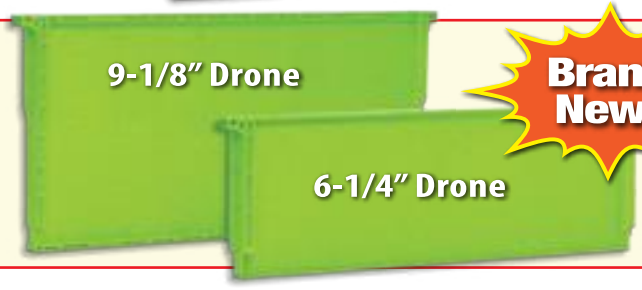

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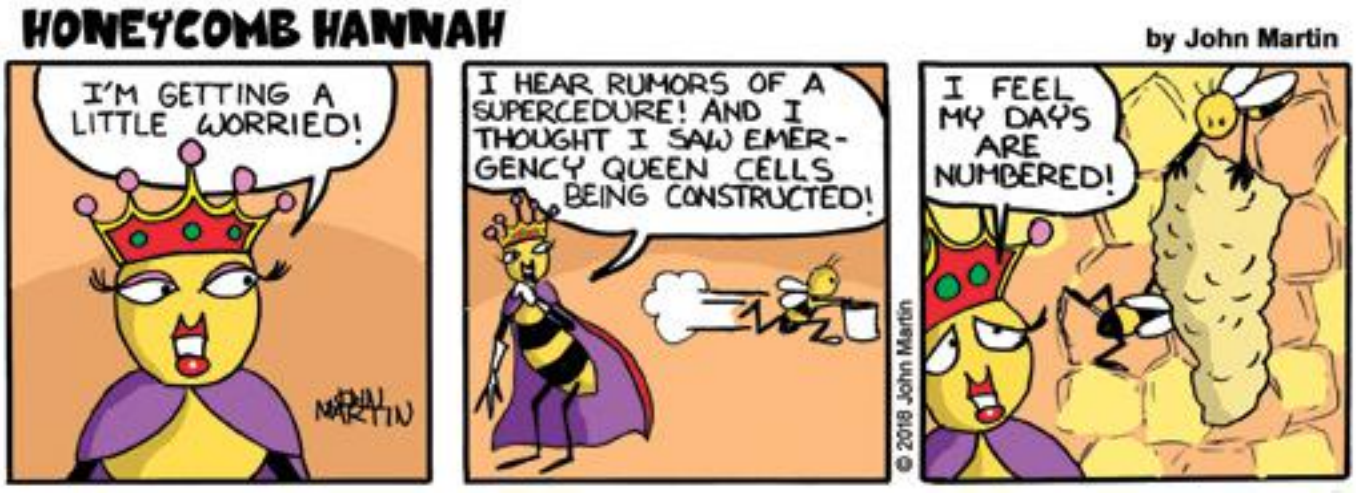
In Every Month –



NOW your best choice to preserve your bees' well-being

Reduction in overwintering losses[1]

Support bees' intestinal well-being

[1]Charistos, L, Parashos, N & Hatjina, F (2015) Long term effects of a food supplement HiveAlive™ on honey bee colony strength and Nosema ceranae spore counts, Journal of Apicultural Research

> I have been very impressed with the product so far. I work closely with another local beekeeper and follow similar treatment protocols. He takes my hives to CA for almond pollination. Early in the fall both of us had losses of 20%, but around Thanksgiving when I was helping him get things packed up I noticed his hive strength was much less than mine. As a result he has also incurred greater losses. One main difference in our operations is HiveAlive.
>
> **Steve S. (200 colonies, Michigan)**

> The colonies we fed with HiveAlive last year had only 15% loss so far compared to the 25% for the rest. They appeared to build up very well. There were 75 that we started from packages on 4/7 and split into 300 on 6/10. My close beekeeper friend who runs about 300 colonies bought the same packages of bees on 4/7. He did split them, although not the same buildup. He did not use HiveAlive. He has about 35% loss on those so far. He plans to buy some this week.
>
> **Nick S. (1,000 colonies, New York)**

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Poison Pollen

Colony Collapse – Relative to the situation over the past two years it goes like this. In the Spring, April, May and June the bees raise a lot of brood that develop into adult bees. Then in July when the corn pollinates, soybeans and dry beans bloom – brood by the frames dies at two to five days after the eggs hatch. From my observation the systemic pesticides applied to the seed are in the plant and blooms (kills bugs, kills bees) at a level toxic to the brood.

As a result in six to eight weeks after pollination there are no adult bees emerging after three weeks. I have then noticed a reduced population of adult bees, as field bees are short lived, leaving no replacement in the hive. In a short time the hive becomes beeless, full of honey with frames full of dead very young brood.

This Spring my son took honey filled frames to start packages. They did not raise any brood to maturity and died. We need tests to confirm he presence of the toxic chemicals in fresh and stored pollen and honey.

Is this what is happening to your bees?

Ted Falkenberg
Harbor Beach, MI
Teddyshoney@yahoo.com

Editor's Note: *For a review of this subject go to* ***www.beeculture.com/Toms-podcast-special/****. You'll see Tom Theobald's 2010 story entitled "Pesticide Blowout." Plus listen to his podcast at* ***www.beekeepingtoday.com****, sponsored by* Bee Culture *magazine.*

Project Apis m Webinar

Lots of good information and worth while getting up at 4:00 a.m. in the morning.

Took a few notes: interesting that planting flowers is cheaper in the long run than feeding supplements.

John Miller saved $40,000 by following the scientific advise. This could have implications for the continuation of our pathogens program.

Wintering indoors? Some of our beekeepers are playing with insulating hives. We do not get snow where we are, just wind and rain during Winter but the chill factor is right down there. A few commercial beekeepers have polystyrene hives and have noticed the bees use less honey during the Winter and build up quicker in the Spring.

Also checked out the website. Interesting. Currently we in New Zealand are looking to set our priorities for research and it's good to know what has been researched and whether the research will reflect the same thing here. We don't overlap on our research as there not a great deal of money.

Thank you.

Frank Lindsay
New Zealand

Initiative for Nationwide Detection of Ss1 (INDES)

At the University of Wisconsin-Stout, we are investigating a potential new bacterial disease of honey bees which may be transmitted by *Varroa* destructor mites. Our studies led to the discovery and reporting of the *Serratia marcescens* strain sicaria (Ss1), a new bacterial threat to hives. A link to the study published in PLOS-One follows: **http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0167752**

The UW-Stout INDES program is working to obtain fresh samples of *Varroa destructor* mites from across the U.S. for analyses of Ss1. The goal of this study is to provide a clearer understanding of locations where Ss1 is appearing in the U.S. to better understand its potential impact on bee health in this country. Samples of mites obtained will be examined for Ss1 without charge and confidential testing results will be provided to those submitting samples. Please consider participating in the study by providing a sample of mites from your hive or hives.

If you are interested in providing a sample of *Varroa* mites for testing or have any questions about our work, we would appreciate hearing from

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you by email at **stacys5929@my.uwstout.edu.** Specific collection and shipment instructions and responses to questions will be provided in our response to your communication.

Jim Burritt,
And the INDES Testing Team

Relates To Bullying

I could sure relate to Albert Chubak's editorial, ***"Bullying-If It's Different Is It Wrong?"*** in the June magazine. I spend a great deal of time on beekeeping social media sites and it can sometimes get intense. Over the years I have developed a specific method of communicating on social media when it comes to beekeeping. I will clearly state when it is my opinion. Never afraid to add a smilie face if I am "attempting" to be humorous. Do not get into what I call a "spitting match" with anyone, do not argue over the internet. One excellent way to comment on an ongoing post is to agree with someone else's comment in the post then add your comment. The most important piece of advice I can give is to use certain general words, I call disclaimer words. Like – usually, most of the time, generally, under normal conditions, commonly, naturally, in most cases. Write like there is no such thing as "always" and "never" in beekeeping. In my opinion, anyone can talk about bees but communicating effectively about beekeeping on social media takes skill.

Ernie Schmidt
Olympia, WA

Chemical Free or Not

In the grand scheme of beekeepers, I suppose many of you would call me a "New-bee." I am just starting my fifth year as a keeper of bees, and I feel like I am learning all the time. I have read many books, with a wide range of opinions about best practices. I wait eagerly for my *Bee Culture* and *American Bee Journal* to arrive each month. But, as I read those bee journals, I am discouraged to find some very negative attitudes about chemical-free beekeeping.

Don't get me wrong. I do not discount the impact of the *Varroa* mite, and I am working hard to manage my mites. I have treated for mites with Thymol and formic acid. As a very new beekeeper I was scared not to treat based on what I was hearing from fellow bee keepers. But my goal is to use minimum chemical treatment, and someday even be a chemical-treatment free beekeeper, so this past year I decided to try some integrated pest management and treat only those hives that seemed to be at significant risk. Toward that end I am using screened bottom boards, pulling drone comb, and taking brood breaks. Last year I used the brood breaks unintentionally, when all three of my over wintered hives swarmed! This year my breaks were intentional, as I pulled the queens out of my over wintered hives, to make splits or nucs, allowing them each to re-queen. Later this summer I will pull queens from the splits to let them do the same. I also leave all the Fall honey to my bees, so that I can minimize how dependent they will be on me for supplementation with sugar syrup in the Fall or Winter feeding. I don't know how important that is, but it just seems logical that the best food for healthy bees has got to be what they make for themselves from their natural food sources. I do periodic mite counts, and last year at the end of the Summer, I had mite counts of 1/100 or below in six of my eight hives. One hive I did not count, as it was so clearly failing, and it was gone by end of September. One hive, despite the fact that it appeared to be going strong, had a count of over 10/100. That was the only hive I treated with Formic acid in August. I subsequently re-queened that hive this Spring.

I ultimately treated 1 additional hive in September because the mite count had increased from 1/100 to 2/100 bees, and I got nervous. But when the temperatures unexpectedly rose into the mid 90s during treatment, I lost all the brood and the queen. Many beekeeper told me I would lose my hives since I didn't treat, but I treated only two of seven hives that were alive and kicking at end of Summer, and lost only one of those, which I killed myself with formic acid. I live in Illinois, a state that reports 40-50% annual bee loses and counting the hive the didn't make it past September, I lost 25% of my hives this past

year, and half of that 25% was lost DUE to treatment, not from lack of treatment. I suspect many of my 100% treating beekeeper colleagues did not do as well.

So, when I read in the bee publications that chemical-treatment free beekeepers are responsible for losses of those who are treating with chemicals, that does not seem fair. When virgin queens fly from my survivor hives, hives who are doing well with non-chemical integrated pest management, I would much rather they breed with drones coming from similar hives, rather than drones bred from bees with no inherent ability to manage *Varroa*, who are surviving only because their keeper is routinely treating them with chemicals to control their mites. So, maybe the chemical treating beekeepers are killing my hives with their "drone bombs". . . But in all seriousness, I think both extremes of opinion are over simplifying a complex problem that unquestionably has multiple contributors which include *Varroa*, and chemicals in the hive, both those we add and those that our bees bring in with them when they forage, and probably other factors we may not even have begun to understand yet.

Becky Green
Springfield, IL

Kudos on Kim & Jim

I've enjoyed many of your webinars since you hooked up with Jim Tew, and just want to say what a pleasure it is to watch you guys. I know there's lots of behind-the-scenes technical work involved, especially for a live in-the-field show like you did today in Jim's beeyard, and I really appreciate all the effort you (and

the tech staffers!) put into sharing your apiaries and experiences with the rest of us in the nationwide virtual beekeeper community. Even though Jim's final comments indicated he felt today's show was a bust, it's really a feel-good hour for me just to watch you two talk bees on a warm Summer afternoon, and to be a virtual visitor just hanging out with two such good friends.

Please pass my thanks along to Jim and the techies. And by all means, keep up the great work!

Ed Wagstaff
Lafayette, CA

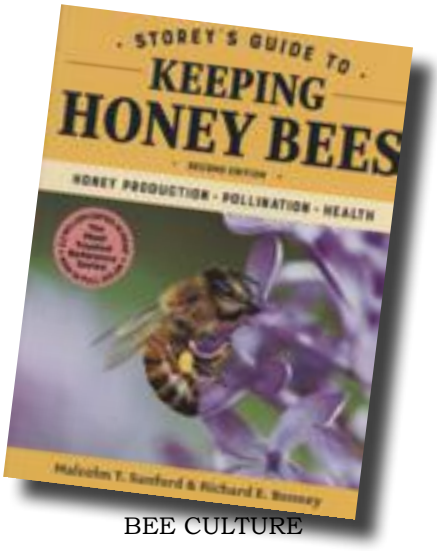
New For The Fall –

Beehive Alchemy: Projects and Recipes Using Honey, Beeswax, Propolis, and Pollen to make your own soap, candles and more. Petra Ahnert. Published by Quarry Books. ISBN 9781631594915. 160 pgs, 8" x 10.5", color throughout, paperback, $24.99.

Petra Ahnert's name might be familiar because she is the author of Beeswax Alchemy, available everywhere and an excellent book on using beeswax for anything beeswax can be used for. Her new book expands even further on the uses of beeswax, but now she brings in a whole new set of tools – propolis and pollen. Introductory chapters include how honey, beeswax and propolis are made by the bees and harvested by beekeepers, just for background. Then there are chapters on the Alchemy for the body - making soap, lip balm, body butter, beard balm, salves, lotions and creams. Plus propolis toothpaste and lozenges are explored. Then there's Alchemy of Light, where she looks again at candles, but through a different lens, making hand dipped candles, tapers, tealights and votives and pillar candles. Alchemy for the home includes furniture polish, wood conditioner, food wraps, scented melts and sealing wax. Plus encaustic painting and batik fabrics are made up, too. Cookies and candies, desserts, ice cream, appetizers, fermented foods and beverages round out the rest of the book. There's something for everybody here, and if you teach classes, this works well as a text. Get one and see. – *Kim Flottum*

Storey's Guide To Keeping Honey Bees. Second Edition. Malcolm T. Sanford & Richard E. Bonney. Published by Storey Publishing. ISBN 9781612129785. 212 pgs, 7" x 9", color throughout, soft cover, $24.95.

This is an updated edition of the original by Richard Bonney, who was a contributor to our magazine years ago. He wrote two books that Storey published more than 20 years ago. Then Storey Publishing convinced Malcolm Sanford to combine and update those two books about eight years ago, using much of what Richard contributed, but adding much more updated material. Now, he's added even more, and Storey has done a much better job of design. This book starts as a beginner's book with chapters on history, biology, locations, what equipment to get and getting bees. It moves on to seasonal management, harvesting honey and doing pollination for profit. It covers all the diseases and pests, and offers good ID of all of them. It touches on top bar and long hives, but offers essentially no management information, only that they exist. The strength of this book, however, lies in sharing the resources in the beekeeping world that are available. Pollination contracts, beekeeping ordinances, and references and equipment dealers, and books galore. This is due, I'm quite sure, to the fact that Malcolm spent a career in University Extension, where gathering and sharing information was a way of life. That skill, and experience, shows here. – *Kim Flottum*



Hive Tracks beekeeping software has released a new layout option that includes new menus and navigation, more features, enhanced data visualization tools, and a responsive layout for all platforms.

The new version includes a number of value added features including:

- The community feature that brings beekeeping clubs, classes and friends together on the Hive Tracks platform to share information and insight with one another.
- A simplified hive health measure called the Healthy Colony Checklist that is putting the beekeeping community on the path to bee data standards which are the foundation for bee data analytics.
- The ability to record varroa loads for each hive and monitor those loads over time both individually and collectively. Hive Tracks also joined with the Mite-a-thon and MiteCheck projects to give users the ability to share varroa load data they collected automatically with the MiteCheck web site.

For more information visit **https://hivetracks.com/**.

The Buzz Ballpoint Pen by Retro 51

Bee the Change for Endangered Honeybees, While Writing Stylishly

Retro 51's new Buzz pen is a honey of a writing instrument – especially if you have a sweet spot for protecting America's wildlife, not to mention our food chain.

The elegantly-tapered, ergonomic Buzz pen is fun to hold and use, with a twist top, acid-etched honeycomb texture, printed bees and antique copper accents.

Best of all, a portion of every purchase is donated to NW Honeybee Habitat Restoration, a not-for-profit dedicated to honeybee survival. The organization creates safe, pesticide-free spaces where tiny pollinators can live and thrive.

Buzz is part of Retro 51's Tornado Rescue Ballpoint Pen collection, which supports 501c3 organizations focused on animal welfare.

Each pen arrives in a matching, educational tube, which makes it one sweet gift. Pens are refillable with Retro 51 ballpoint and/or rollerball cartridges, so they're also earth-friendly.

Buzz's MSRP is $50. For a list of dealers, visit **Retro51.com**, where "life is too short to carry an ugly pen."

For more information, contact Joanne Levine, Lekas & Levine, at 847.327.9530 or **Joannepr@aol.com**.

The Millerbees Bucket Tilter is for tilting three to five gallon buckets with bottom gates, to get the last few bottles of Honey or other liquid out without getting the debris floating on the top or the debris that sank to the bottom. The bucket should not be tilted until the honey or other liquid has been emptied to just above the bottom gate. Then the center of gravity will be low enough to tilt the bucket and get the last of the honey or other liquid out, but not the debris.

Three versions are offered. Bucket not included. One version fully assembled ready to use $45. Another version, all parts included except nails. assembly is required by the purchaser $25. Also, a hardware kit that includes the "nine-ply", plywood part that has the precision radiused slot already cut, all the hardware (except nails), detailed drawings and instructions on how to make the other wood parts; which can all be cut on a table saw. $10.

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INNER COVER

Actually, It's All About The Honey

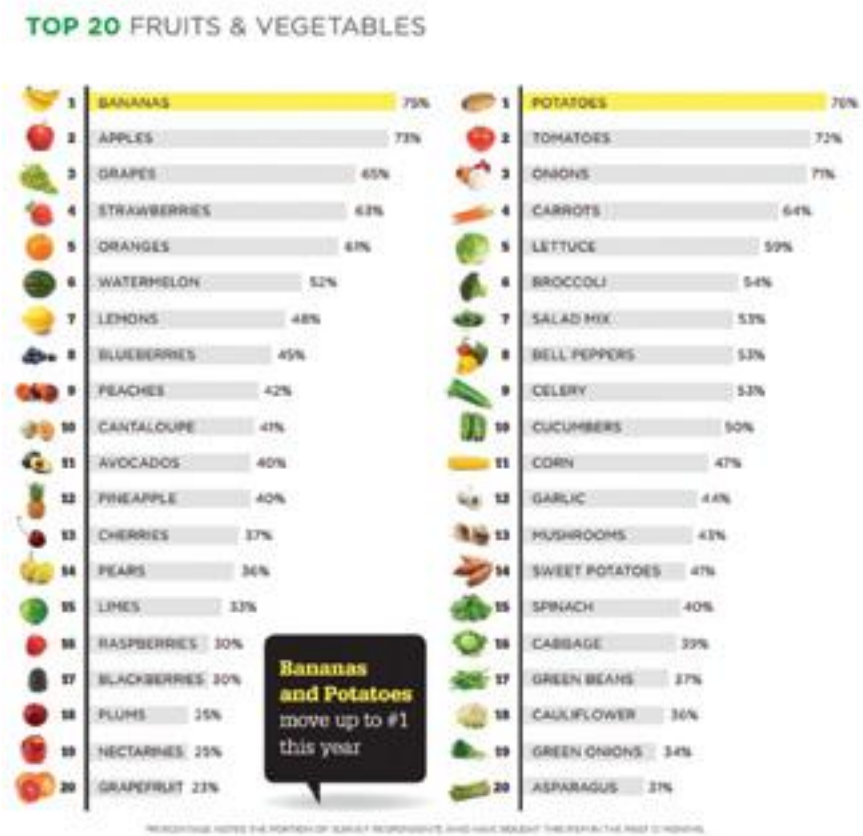
A while ago I was talking about where food comes from and Mexico is certainly one of the places a lot of our food comes from. In 2016 fruit and veggie imports from there were right at 10 million metric tons, with a value of $12.4 billion. That comes to 43% of our fruit and veggie imports and 54% of our other ag imports. When you look at what actually comes in, more than 50% of the bell peppers, limes, mangoes, pineapples, papayas, asparagus, avocados, kiwi, artichokes, blackberries, garlic, cukes, squash, bananas, blue berries, tomatoes and eggplant that we eat comes from there. Now, look at the info graphic on this page on what people buy, and where the fruit and veggies on this list, fall on that list.

It's pretty obvious that there has to be bees in Mexico to produce what they do, so they can export all that food to the U.S. And there are bees in Mexico. In fact, Mexico is the sixth largest honey producer in the world. In 2015 they exported 61,801 tons of honey, mostly to Germany, the U.S., the UK and Saudi Arabia, worth just over $100 million. Their 42,000 beekeepers run 1.9 million colonies. In 2017 we imported 2.3 million pounds of honey from Mexico, out of a total of 447.6 million pounds from all countries (Mexico is only 0.5% of that total), and so far in 2018, as of May, we have imported 1.96 million pounds from Mexico out of a total from all countries of 142.9 million pounds. Clearly, they are a small player in our honey import market. But their 1.92 million colonies, compared to our 2.8 million or so means they have right about 70% of the colonies we do, and they don't have an almond crop to pollinate – so – it must be all the other crops they have that their bees are pollinating. So, with about 70% of our bees, they are producing about 50% of the food we are importing from all countries.

But aren't Africanized bees the dominant bee in Mexico? Yes, apparently so, but also apparently so are that the opinions of the beekeepers there are mixed about this. Some, reasonably, don't like working with aggressive bees, while others claim that AHB are far more efficient pollinators than the more docile European bees since they forage more often, earlier and later, and at greater distances than those tamer bees. From all reports, the arrival of AHB does not appear to have had any impact on crop yields in Mexico.

Well, this isn't about Mexico, its beekeepers or the food they export to us. What this is really about is the fact that we continue to hear the "every third bite, bees are disappearing, end of the world" claims made by just about everybody.

Although the "every third bite" may be true (I haven't really examined that statement), it is true that every third bite doesn't come from the U.S., nor is it pollinated by U.S. honey bees. With only a few exceptions, not a whole lot of what we eat is pollinated by U.S. honey bees. Some, absolutely, yes, no question, and growers are glad they are available. But are they willing to pay what they apparently are worth? The complaint there is that they, too, have unfair import competition so the



Infographic by The Producer.

prices for pollination they can afford have to stay low. The other half of that story is that beekeepers, after almonds, need a place to go until the snow back home melts so why not give free (or nearly free) pollination to some post-almond crop growers and both benefit from the opportunity.

There is no doubt that keeping bees is more expensive than it was 50 years ago, but bees in beehives are not disappearing. If you look carefully at the USDA NASS Colonies report analyzed in this issue, it's plain to see that the number of colonies of bees managed by beekeepers has remained relatively constant for the last three years, with normal, expected quarterly changes to accommodate pollination contracts, sales of bees, and wintering schedules. Yes, individual colonies and even whole operations sometimes collapse, but our industry has not collapsed. The numbers show it hasn't. And, when you look at replacing those colonies that are lost, about half are replaced each year with bees from the same outfit, and only about half are actually new bees. This has been the story of lost hives since bees have been in boxes. The numbers show that beekeepers are using more colonies for pollination every season, producing more bees to build on their own business and to sell to other beekeepers every season and putting their energy, time and resources into producing profitable products, rather than unprofitable honey.

U.S. beekeepers have adapted to the fact that the U.S. does not value U.S. honey, primarily because of the price. Rather, U.S. buyers, at all levels, have put price first. Quality? Sometimes.

How little do they value U.S. honey? From the July USDA AMS National Honey Report, honey coming in from Argentina was being bought for between $1.28 and $1.39, from Brazil $2.17 for orange blossom and $1.66 - $1.95 for organic, from Brazil $0.87 to $1.01 and Vietnam from $0.85 - $1.14. Canada honey was at $1.40. Across all colors and kinds of US honey, the average price was $2.03, with a range of $1.65 - $2.75. All this was in volumes of 10,000 pounds or greater. There is no doubt honey is a commodity.

So rather than butt heads with the cheap labor markets and questionable quality of honey from Vietnam, India and Brazil (Mexican honey sells in the U.S. at the same, and often higher prices than U.S. honey because much of it is organic), U.S. beekeepers are producing products that produce profits.

Think about this. I can pollinate one, maybe a few crops in the spring, which puts a stress on my bees, and money in the bank early, and that's a given. Plowing a field puts stress on a farmer's tractor, keeping chickens in a coop and pen is more stressful on the chicken than free range, tiny farrowing pens are more stressful on sowing pigs than wide open spaces, and simply harvesting honey is more stressful on a colony than letting them have it all. But all these things put money in the bank. Some managed stresses are part of living for livestock.

So when I'm done pollinating, I can move by bees (another stress) to a location, hopefully free of agricultural chemicals (another stress), and with enough forage to last the season. There, my bees can forage, raise kids, live life to its fullest. I can, in the meantime, make the choice to manage those bees to make as much honey as possible, which I can later sell for something like $2.50/lb in a barrel to a packer, broker or whoever later in the season. Or, I can manage those bees to simply make bees, which they are going to do anyway, using the honey I would have harvested. So, how much did you pay for that three pound package last spring – something like $150?

So I can make honey for $2.50 a pound, or I can make bees for $50 a pound, have more than enough bees to pollinate next spring because I know some won't make it through the winter and the ongoing stress of moving a couple of times, and do it again next spring. And still be in business.

So, losses. And recovery. And numbers of colonies. Losses are somewhat higher, overall, than before *Varroa*, but recovery rates not only make up but exceed losses, and numbers of colonies are steady. Keeping bees is different, certainly. But the world has not ended.

Look at the numbers.

•

It's National Honey Month. Did you forget? Honey has been kind of lost the past few years. The National Honey Board does a good job of getting the word out all year long, but the popular press is more interested in the "Every Third Bite" story about bees and beekeeping (The "If it bleeds it leads" editorial philosophy hasn't died, you know). And anyway, eight out of every ten bites of honey that get eaten in the U.S. come from off shore, so why get all excited about promoting Ukraine honey?

And that's too bad. The honey we harvested this year is some of the best we've had in a long time. There was a great locust flow early, and that was followed by an even better basswood flow, and right now the goldenrod smell in the backyard is so thick you can cut it with a hive tool. What a wonderful fragrance. A long time friend used to say the smell of goldenrod honey curing was the smell of money. He was right. He's still right.

Local honey is still a money maker. You won't sell barrels of it, but you can sell cases of it because the buyer knows you, knows your bees, knows your honey and knows your honey is good. Not as good as mine, mind you, but pretty good all the same.

Put a big "Local Honey" sign on your farm market stand, on your label, just in your yard, so people know where to look, where to get good, local honey, from bees that are doing just fine, thank you.

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It's Summers Time –

Medina, Monarchs, Plants and September

Kim and I have been home most of the Summer of 2018. Now that doesn't mean we have slowed down any, we've just been trying to tackle some of the projects around home. It's amazing though, how quickly the time gets away from you. We were late with the garden mostly because of weather, but partly because of being too busy last Summer to finish up the garden and prepare for this year. Hopefully, we'll do better this year.

We've had a few tomatoes, but waiting on everything else and hoping the weather holds and we have a nice long, hot end to the Summer. Lots of beans are coming up and lots of squash and lots of peppers – both hot and mild.

We both are crazy about plants of all kinds, so that's taken up a lot of our time at home – working on getting the different flower beds in shape.

Being home has also allowed us to participate in some of the activities going on right here in Medina. For a number of years in a row Medina has been voted by *Ohio Magazine* one of the best cities in Ohio to live in. It's a great place. I fell in love with it almost 40 years ago when I first moved here.

On a bright sunny Saturday morning in late July Kim and I attended a ceremony to dedicate Medina's 9/11 Memorial. It was a nine-year project that was spear headed by a past mayor who did not live to see it complete. It sits right next to our Fire Station – very appropriate, don't you think.

The setting for the memorial is beautiful. It also honors the 40 that died in the plane crash in PA. There are 40 boxwoods planted around the memorial itself which contains a piece of the towers. There are picnic tables, beautiful plants and a shelter perfect for spending some quiet time.

There are several of these information boards at the Memorial – good for teaching our children about the history.

In our yard are lots of milkweed plants and they're not very attractive – to me they look like big weeds. So every year we compromise. I take out a few that show up in my perennial bed that I'm working on and leave most of them. So, this year Kim actually spotted one Monarch larva and capture it. We fed it the milkweed leaves and after a few days it spun its chrysalis and then one day there was a monarch on the dining room floor. Two cats were sitting there watching it and at first I was afraid they might have damaged it. But we put back in the jar with the lid, gave it a bit of time and a bit of sugar syrup and shortly after that off it went.

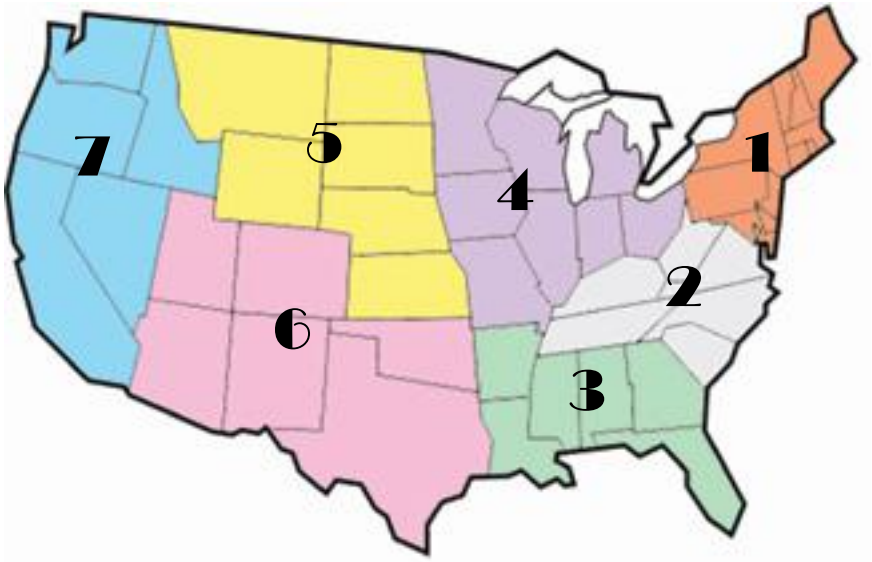
The first week of August Kim and I went to Holden Arboretum in Kirtland, Ohio and spent a day learning about Pollinator Habitats. This workshop was sponsored by Pollinator Partnership. We listened to several speakers talk about how to set up pollinator habitats – what is needed, what works best, large and small scale. After lunch we took an hour long walk around a very small portion of the grounds. It's huge! We'll be going back when we can spend a whole day just walking around.

Another cool thing that happened at home. Kim has a plant called "Mother-In-Law Tongue" – *Sansevieria.* I've heard it called other names. In fact we have a bunch of them and they are all blooming. Now Kim says that in all his years of being a plant guy he's never had one bloom. This plant has a history. The original plant came from one that his mother had. She's been gone almost 40 years now and Kim has transplanted hundreds of plants from that one. We've given them away to everyone we know. So we like to think that a little piece of his mother has traveled the country.

September has snuck up on us again. The month that is part Summer, part Fall here in the midwest. All of the children are back in school, the leaves will very soon start to turn and fall, cooler nights – and don't forget it's National Honey Month.

We're lucky here in northeast Ohio to have the dramatic season changes. Enjoy your Fall, whatever it looks like.

SEPTEMBER – REGIONAL HONEY PRICE REPORT



We have the USDA NASS Colonies report this month on colony losses, stressors and such (see Where The Girls Are, pg 21) and we know there are, essentially three groups that work to report and analyze such data. BIP has their annual survey of colony losses for winter and summer, USDA NASS has their survey done quarterly on losses, and, yes, we have our survey, taken annually, looking at Winter and Spring losses, Spring and Summer honey crops, an overview of Summer weather and just to make it interesting, queen replacement numbers for Spring and Summer. When looking at Winter losses, it's tough to compare apples to apples for these three surveys since our timelines are different. You can check out the BIP data at **https://beeinformed.org/results-categories/colony-loss/** that show an overall winter loss of 30%. This quarter's USDA NASS report, https://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1943 shows winter loss at between 15 – 16%. Following is Bee Culture's winter loss data, by region.

Region 1 – 40% loss; Region 2 – 28%, Region 3 – 17%, Region 4 – 17%, here's the kicker, Region 5 – 50%, Region 6 – 37% and Region 7 – 54%. Taken overall, our Winter loss data comes to 35%. So take your pick, depending on where you live. How did you do this Winter?

Summer loss, so far this year, hasn't been measured by BIP but will be soon, and the USDA NASS data indicate a 10% loss between April and June. We measured April through July, and our Summer losses, by region are; Region 1 – 3%, Region 2 – 4%, Region 3 – 5%, Region 4 – 3%, Region 5 – 6%, Region 6 – 10% and Region 7 – 6%. Overall Summer losses were – 5.3%, almost half of the USDA NASS numbers. So, our reporters had about twice the Winter loss of the USDA survey and just a tad over the BIP Winter loss data. Recall, the timelines of what's Winter, what's Summer are different so that will affect the data of each survey.

Overall, the Summer crop this year is average to just below average across all regions, so you would expect a typical crop this Fall, hopefully above the 147 million pound crop of last season. Finally, one of the most troublesome issues of management lately has been queen losses, for a multitude of reasons. We asked about queen replacement so far this season because of failure, not because they simply wanted to. 75% of our reporters have replaced 10% or fewer of their queens so far this season because of failure. That is an encouraging number, and we hope it continues.

	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	1.87	2.19	2.41	2.56	2.27	2.26	3.00	1.74-3.05	2.32	2.32	2.23	2.22
55 Gal. Drum, Ambr	1.68	2.16	2.16	2.45	2.09	2.14	2.09	1.35-2.70	2.16	2.16	2.08	2.12
60# Light (retail)	222.78	183.80	172.50	199.35	211.84	205.62	211.84	160.00-280.00	203.68	3.39	195.46	208.53
60# Amber (retail)	219.05	184.33	170.00	194.35	207.50	200.24	235.00	160.00-265.00	202.50	3.37	192.47	200.72
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	87.59	75.31	99.60	65.33	57.84	90.00	86.69	57.60-123.70	82.72	6.89	87.71	87.32
1# 24/case	129.46	107.03	125.94	116.13	131.72	112.73	120.38	45.00-192.00	122.26	5.09	126.79	128.69
2# 12/case	116.93	94.67	111.54	105.80	57.72	107.94	117.13	57.72-192.00	109.40	4.56	112.61	112.74
12.oz. Plas. 24/cs	106.24	97.38	78.00	82.33	78.00	111.60	84.00	36.00-175.00	96.80	5.38	99.52	101.06
5# 6/case	132.89	108.56	186.00	133.50	107.28	122.22	139.33	90.00-210.00	128.66	4.29	128.77	127.95
Quarts 12/case	172.49	144.71	129.61	181.33	158.50	154.70	144.00	114.00-250.00	153.51	4.26	151.89	152.12
Pints 12/case	106.94	92.71	75.75	107.33	111.00	82.65	84.00	65.00-160.00	93.27	5.18	99.52	93.22
RETAIL SHELF PRICES												
1/2#	5.45	4.39	4.88	3.62	4.30	3.92	6.00	2.46-9.00	4.77	9.53	4.94	4.74
12 oz. Plastic	6.43	5.25	5.50	5.10	4.93	6.23	6.85	3.79-12.00	5.81	7.75	6.12	5.84
1# Glass/Plastic	7.50	6.95	7.70	6.13	6.82	6.75	8.92	4.00-14.00	7.18	7.18	7.46	7.39
2# Glass/Plastic	13.46	10.88	12.60	10.98	11.77	9.88	16.00	7.99-21.00	12.17	6.08	12.51	12.60
Pint	12.41	9.92	9.42	9.22	10.00	9.58	9.20	6.65-16.00	10.02	6.68	10.22	10.45
Quart	18.84	17.05	17.22	15.67	15.28	17.45	19.83	8.00-32.00	17.32	5.77	17.88	17.04
5# Glass/Plastic	28.54	25.40	33.75	24.00	22.55	23.35	27.84	15.00-43.25	26.56	5.31	26.43	26.99
1# Cream	9.28	8.33	10.01	6.00	8.00	5.99	10.01	5.99-16.00	9.03	9.03	9.40	9.29
1# Cut Comb	12.10	9.25	9.00	9.44	12.50	9.00	12.88	6.00-24.00	10.75	10.75	11.61	11.54
Ross Round	9.02	6.75	9.32	9.00	9.32	10.25	12.49	6.50-12.49	9.14	12.18	9.33	9.56
Wholesale Wax (Lt)	7.72	5.13	6.50	7.18	6.00	5.88	9.67	3.00-15.00	7.06	-	6.44	5.94
Wholesale Wax (Dk)	7.23	4.75	2.55	6.63	7.51	3.50	10.00	2.55-15.00	6.25	-	5.77	5.39
Pollination Fee/Col.	86.00	76.00	52.50	85.00	80.00	90.00	93.39	45.00-160.00	84.29	-	86.96	87.58

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Where The Girls Are

Kim **Flottum**

2018 USDA NASS Colonies Report

This is the third year this report has been published, beginning in 2015. Below is the summary from USDA NASS surveyers on their report, which refers to all the data they collected on numbers, stressors, more than and fewer than five colony beekeepers, losses, revonated colonies and the rest. You can find the complete report on the USDA NASS web page.

From The Report – **January 1 Honey Bee Colonies Down Slightly for Operations with Five or More Colonies**

Honey bee colonies for operations with five or more colonies in the United States on January 1, 2018 totaled 2.63 million colonies, down slightly from January 1, 2017. The number of colonies in the United States on April 1, 2018 was 2.69 million colonies. During 2017, honey bee colonies on January 1, April 1, July 1, and October 1 were 2.64 million, 2.69 million, 2.99 million, and 2.85 million colonies, respectively.

Honey bee colonies lost for operations with five or more colonies from January through March 2018, was 425 thousand colonies, or 16 percent. The number of colonies lost during the quarter of April through June 2018 was 270 thousand colonies, or 10 percent. During the quarter of October through December 2017, colonies lost totaled 425 thousand colonies, or 15 percent, the highest of any quarter in 2017. The quarter in 2017 with the lowest number of colonies lost was April through June, with 286 thousand colonies lost, or 11 percent.

Honey bee colonies added for operations with five or more colonies from January through March 2018 was 513 thousand colonies. The number of colonies added during the quarter of April through June 2018 was 726 thousand. During the quarter of April through June 2017, 613 thousand colonies were added, the highest number of honey bee colonies added for any quarter of 2017. The quarter of October through December 2017 added 205 thousand colonies, the least number of honey bee colonies added for any quarter of 2017.

Honey bee colonies renovated for operations with five or more colonies from January through March 2018 was 289 thousand colonies, or 11 percent. During the quarter of April through June 2018, 715 thousand colonies, or 27 percent, were renovated. The quarter in 2017 with the highest number of colonies renovated was April through June with 763 thousand colonies renovated, or 28 percent. The quarter in 2017 with the lowest number of colonies renovated was October through December 2017, with 214 thousand or eight percent. Renovated colonies are those that were requeened or received new honey bees through a nuc or package.

Varroa Mites Top Colony Stressor for Operations with Five or More Colonies

Varroa mites were the number one stressor for operations with five or more colonies during all quarters of 2017. The quarter of October through December 2017 had the highest percentage of colonies reported to be affected by *Varroa* mites at 55.3 percent. The percent of colonies reported to be affected by *Varroa* mites during January through March 2018 and April through June 2018 are 40.8 percent and 53.4 percent, respectively.

Colonies Lost with Colony Collapse Disorder Symptoms Up 15 Percent for Operations with Five or More Colonies

Honey bee colonies lost with Colony Collapse Disorder symptoms on operations with five or more colonies was 77.8 thousand colonies from January through March 2018. This is a 15 percent increase from the same quarter of 2017. Colonies lost with Colony Collapse Disorder symptoms were reported to meet all of the following criteria: 1) Little to no build-up of dead bees in the hive or at the hive entrance 2) Rapid loss of adult honey bee population despite the presence of queen, capped brood, and food reserves 3) Absence or delayed robbing of the food reserves 4) Loss not attributable to *Varroa* or nosema loads.

January 1 Honey Bee Colonies Down Nine Percent for Operations with Less than Five Colonies

Honey bee colonies for operations with less than five colonies in the United States on January 1, 2017 totaled 40.0 thousand down nine percent from January 1, 2016. During 2017, honey bee colonies on April 1, July 1, and October 1 were 35.0 thousand, 43.0 thousand, and 39.0 thousand, respectively.

Honey bee colonies lost for operations with less than five colonies during the quarter of January through March 2017 was 13.5 thousand colonies, the highest number of honey bee colonies lost during any quarter for 2017. The quarter in 2017 with the least number of colonies lost was April through June, with 4.20 thousand colonies.

Honey bee colonies added for operations with less than five colonies during the quarter of April through June 2017 was 12.5 thousand colonies, the highest number of honey bee colonies added during any quarter of 2017. The quarter in 2017 with the least number of colonies added was October through December, with 960 colonies.

Honey bee colonies renovated for operations with less than five colonies during the quarter of April through June 2017 was 4.40 thousand colonies, the highest number of honey bee colonies renovated during any quarter of 2017. The quarter in 2017 with the least number of colonies renovated was October through December, with 1.10 thousand colonies.

Varroa Mites Top Colony Stressor for Operations with Less than Five Colonies

During 2017, the highest reported colony stressor was *Varroa* mites, with 26.3 percent of the colonies reported to be affected. This is a five percent increase from the previous year.

Colonies Lost with Colony Collapse Disorder Symptoms for Operations with Less than Five Colonies Up Nine Percent

Honey bee colonies lost with Colony Collapse Disorder symptoms on operations with less than five colonies was 6.00 thousand colonies during 2017, a nine percent increase from 2016. Colonies lost with Colony Collapse Disorder symptoms were reported to meet all of the following criteria: 1) Little to no build-up of dead bees in the hive or at the hive entrance 2) Rapid loss of adult honey bee population despite the presence of queen, capped brood, and food reserves 3) Absence or delayed robbing of the food reserves 4) Loss not attributable to varroa or nosema loads.

What *Bee Culture* has done here is to review side by side comparisons for all three years, looking at colony numbers each quarter in Figure 1. The percent figure to the right of each colony number is the **Difference** from the average over all the years there is data from for each quarter. For instance, in January 2015 there was 5.4% more colonies than the four year average for January.

It will be interesting to see how the July and October numbers for 2018 play out. It's also interesting to note the consistency of colony numbers by quarterly count. The very first count, in January 2015 is barely over 5% above the average of January each year, with the rest showing less than 4% variance for each count. With between 3.7 and 3.1 million colonies, that's a small difference each season. You can almost, but not quite, tell what month the count was taken by the number of colonies counted. It would seem the beekeeping industry pretty much has how many colonies it needs over the course of a year figured out.

With the focus of keeping bees shifting from producing

Figure 1.

Colony Numbers by Quarter

Year	January	Dif	April	Dif	July	Dif	October	Dif
2015	2824610	**+5.4%**	2849500	**+3.2%**	3132880	**+.01%**	2874760	**-1.6%**
2016	2619940	**-2.3%**	2801470	**+1.5%**	3181180	**+2.5%**	3032060	**+3.9%**
2017	2641090	**-2.0%**	2694150	**-2.4%**	2994500	**-3.5%**	2849770	**-2.4%**
2018	2631220	**-1.8%**	2692660	**-2.4%**	---		---	
AVG	**2679215**		**2759445**		**3102853**		**2918863**	

Figure 2

Top 10 Honey Producing States 2017
Listing each of the top 10 honey producing states, and the % of the Total Top 10 Colonies

State	1/17	%	4/17	%	7/17	%	10/17	%	1/18	%	4/18	%
ND	50000	2.5	115000	5.8	470000	23.3	410000	21	64000	3.1	720003.3	
SD	21000	1.0	30000	1.5	152000	7.5	111000	5.7	23000	1.1	105000	>1
CA	1170000	57.6	980000	49.8	590000	29.3	680000	34.7	1150000	57	1140000	54.8
MT	18500	>0.1	47000	2.4	154000	7.6	115000	5.9	35000	1.7	50000	2.4
FL	260000	12.8	245000	12.3	176000	8.7	180000	9.2	245000	12.0	270000	13.0
TX	275000	13.6	345000	17.4	104000	5.2	127000	6.5	205000	10.2	305000	14.2
MN	27000	1.3	32000	1.6	136000	6.7	98000	5.0	39000	1.9	69000	3.3
ID	95000	4.7	61000	3.1	89000	4.4	113000	5.8	164000	8.1	60000	2.9
LA	44000	2.2	56000	2.8	64000	2.2	58000	3.0	50000	2.5	45000	2.3
WA	68000	3.4	75000	3.8	82000	4.1	66000	3.4	44000	3.2	55000	2.5
US Total	**2641090**		**2694150**		**2994500**		**2849770**		**2631220**		**2692660**	
Top10 Total	2028500		1986000		2017000		1958000		2019000		2174000	
% Of US Total	76.8%		73.7%		67.4%		68.7%		76.7%		80.7%	

Figure 3

Top Ten Producing States Each Year

2011			2012			2013			2014			2015			2016			2017		
State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	X1000 Col	X1000 Prod lbs	State	X1000 Col	X1000 Prod lbs	State	X1000 Col	X1000 Prod lbs
ND	460	32.6	ND	495	34.2	ND	480	33.2	ND	490	42.1	ND	490	36.2	ND	485	37.7	ND	455	33.7
CA	370	17.7	SD	270	17.0	MT	159	14.9	SD	230	24.4	SD	290	19.1	SD	280	19.9	SD	255	14.3
SD	250	16.5	FL	199	12.7	SD	265	14.8	FL	245	14.7	MT	146	12.1	MT	159	12.2	CA	335	13.7
MT	145	13.3	CA	340	11.9	FL	220	13.4	MT	162	14.3	FL	220	11.8	CA	310	11.2	MT	145	10.4
FL	180	10.9	MN	130	8.7	CA	330	10.8	CA	320	12.5	TX	126	8.3	FL	215	10.8	FL	205	8.8
MN	120	6.3	MT	149	7.7	MN	130	7.5	TX	116	9.0	MN	122	8.2	TX	133	9.3	TX	120	7.9
MI	74	4.7	TX	95	4.9	TX	106	6.2	MN	132	7.9	CA	275	8.2	MN	124	7.3	MN	126	7.8
TX	78	4.5	MI	76	4.3	LA	50	4.9	MI	91	5.7	MI	90	5.2	MI	89	5.3	ID	95	4.2
WI	57	3.6	WI	63	4.3	WI	59	3.5	GA	73	4.5	LA	44	4.3	LA	50	4.3	LA	43	3.5
GA	65	2.8	LA	41	3.5	GA	67	3.3	LA	48	4.0	NY	58	3.5	GA	96	3.7	WA	77	3.5
Total	1799	112.9		1858	109.1		1866	112.5		1957	139.1		1861	117.4		1941	121.8		1850	107.8
All Sts.	2491	148.4		2624	144.4		2640	149.5		2740	178.3		2660	156.5		2775	161.8		2669	147.6
% of Tot.	72.2%	76.1%		71%	76%		71%	75%		71%	78%		70%	75%		70%	75%		69	73%

Figure 4

	2015		2016		2017	
	>5	5+	>5	5+	>5	5+
X1000 # Colonies	23	2.66	24	2.775	20	2.67
Yield/Colony #s	31.3	58.9	31.9	58.3	30	55.3
Production x1000 lbs.	720	156.5	766	161.9	599	147.6
Queen Costs	-	-	33	19	14	34
Pkg. Cost $	-	-	109	89	76	117
Nuc Cost $	-	-	122	117	107	138
Other Income x 1000	173	406.0	242	486.3	163.1	435
Varroa Control Cost/ Colony $	11.48	6.06	10.92	5.77	15.65	6.46
Workers x 1000	19	23	19	24	19	22
Feed Cost/Colony $	24.30	18.90	20.08	18.13	26.9	19.8

more honey to producing more bees one wonders if this pattern will shift. And with more almonds coming online every February will the January number shift too? If you depend on the beekeeping industry, following these numbers should be important.

But the importance of honey to commercial, and certainly backyard beekeepers hasn't disappeared, so we took a look at honey production in light of this quarterly report, and in particular we looked at the top 10 honey producing states during each quarter. These top 10 states, in 2017, produced just over 76% of the U.S. honey crop, so they certainly should be examined. And it should be no surprise that over the course of a year, right about 76% of US colonies reside in these states, at least part of the year. And that's what makes this an interesting picture to look at. Because there is a seasonal flow of colonies in these states you can see when the honey producing season is in each of these states.

The data in Figure 3 is taken from the May, 2018 issue of *Bee Culture* showing the top 10 honey producing states for the past seven years, how many colonies each had at the Annual January 1 colony count, and how much honey was produced in each state each year. Note that these 10 states, each year, produce three quarters of the honey produced in the U.S. Now, because of the new quarterly reports, we are able to see how colony movement facilitates production, and reacts.

Figure 4 is also taken from the May, 2018 issue of this magazine to review colony counts and other factors affecting beekeepers with fewer than five, and more than five colonies.

Combined, these our figures give a pretty good picture of the U.S. Beekeeping industry. And with this quarterly report the picture is getting clearer and better defined over time. After talking to several migratory commercial beekeepers this picture was pretty much imagined, but now there are better actual numbers. For growers, who have only some of this picture, they now have better prediction tools for next season, looking at what has been, and, pretty much, what will be.

Finally, let's look at quarterly colony losses between the January - March quarter 2016 and the April - June 2018 Quarter

Year	Quarter	Colonies	Colonies Lost	Percent Lost	Colonies Added
2016	Jan – Mar	2,619,940	416,100	16	571,800
2017	Jan – Mar	2,641,090	398,650	15	478,240
2018	Jan – Mar	2,631,220	425,220	16	512,940
2016	Apr – June	2,801,470	329,820	12	736,290
2017	Apr – June	2,694,150	285,590	11	613,360
2018	Apr – June	2,692,660	270,000	10	725,650
2016	July – Sept	3,181,180	397,290	12	217,320
2017	July – Sept	2,994,500	394,810	13	284,370
2016	Oct – Dec	3,032,060	502,350	17	124,660
2017	Oct – Dec	2,849,770	424,860	15	204510

We listed these quarters this way so you can see losses in same quarters for each year, and, the number of colonies used to replace, and even build on the numbers after quarterly losses. It's clear there are fewer losses between April and September than during the October through March time frame. No surprises here, actually, but you can calculate the costs of replace 10 percent of your colonies comparted to replace 17 percent. A figure not shown here is something called renovated colonies, or those that were lost, but brought back to be useful, splits, swarms and the like. This number across all quarters is roughly half or better than the number of reported lost colonies, so generally at the end of each quarter there are more colonies than at the beginning. What isn't figured in these numbers is the cost of replacement or renovation. A good example is California in the October – December 2017 quarter. They lost 155,000 colonies, added 90,000 and renovated 104,000 colonies for a net gain of 39,000 to get ready for the Almonds. Still, the question is where are those 20% – 50% losses we hear about every time you read an article in the popular press? BC

FOUND IN TRANSLATION

Convergent Ways To Expose And Fight Mites

Jay **Evans**, USDA Beltsville Bee Lab

I highlighted three months ago the challenges needed to select for and maintain specific desired traits in honey bees while not losing ground on others, e.g., work on *Varroa*-sensitive hygiene (VSH) and other resistance traits (**https://www.beeculture.com/found-in-translation-15/**). The last couple months have seen at least four advances in identifying and selecting these desirable traits. One study compiled insights from four of the best known *Varroa*-resistant populations, looking for common traits that arise and are maintained when bees are either actively bred for low mite loads or develop mite resistance naturally. These include sustainable mite populations in Norway, Sweden (Gotland) and France. In all cases, a behavioral component appears to help these lineages keep mite levels in check. This study, by Melissa Oddie and colleagues, takes one aspect of hygienic behavior and isolates it from similar defenses (Rapid parallel evolution overcomes global honey bee parasite, *Scientific Reports,* 2018, **https://www.nature.com/articles/s41598-018-26001-7**). The trait they chose was the frequency of cell uncapping and recapping, without removing brood. Interestingly, simply uncapping the cells and letting bees recap them led to a substantial increase in non-reproductive mites. While they used a creative method to do this in quantity (soaking a piece of linen with wax, letting it adhere to caps and then ripping the lids off), this is not a method beekeepers will do much. Still, it gives insights into the benefits of uncapping, *per se***.** As another creative tool, they recognized that cells that had been uncapped at some point during development showed a characteristic dimple that could be seen and documented at the very end of development. This neat trait allowed them to simply screen mature pupae for mite loads and then infer whether they had been uncapped at some point (saving the eyes of countless students who would otherwise have to stare at an observation hive with capped brood). As expected, the four resistant stocks showed significantly higher recapping rates during development, 3-4-fold more often than the susceptible stocks. Recapping was focused on mite-infested brood, but even non-infested brood was recapped at a higher rate in resistant stock, suggesting a general tendency to look under the hood, or perhaps the presence of other diseases that triggered hygienic behavior. Importantly, the uncapped brood used in these experiments came from a homogeneous set of donor colonies. In other words, it was not that the diseased brood in hygienic colonies were yelling (smelling) louder, but that the workers uncapping and then recapping their cells were somehow more attuned and active. Perhaps the recapping 'dimple' can be used by bee breeders as another strategy to breed resistant stock.

Hasan Al Toufailia and colleagues in England recently confirmed experimentally that a key for honey bee hygienics is the ability to recognize what is going on with capped brood ("*Both hygienic and non-hygienic honey bee,* Apis mellifera, *colonies remove dead and diseased larvae from open brood cells",* **http://dx.doi.org/10.1098/rstb.2017.0201**). In their study, all open brood that was freeze-killed was removed by worker bees within a day, in all lineages of bees studied. This was true across a set of 20 colonies showing a wide spectrum of hygienic tendencies (53%-100% removal of freeze-killed and sealed brood). Similarly, when the youngest larvae were exposed to *Ascosphaera apis*, the causative agent for chalkbrood disease, all exposed larvae were removed pre-capping. In contrast, when larvae were exposed to *A. apis* closer to capping only around 30% ('medium-aged' larvae) and 15% (larger larvae inoculated a day before capping) were uncapped and removed by workers. Some of these differences in brood removal might reflect resilience of older larvae toward chalkbrood, but the authors argue that colony-level differences in hygienics likely led some colonies to miss or ignore capped disease larvae. So, the hunt needs to be on what makes nurse bees more attuned to their stressed younger sisters while those sisters are covered by a layer of wax.

Seo Hyun Kim and colleagues made headway on determining the cues hygienic worker bees recognize in diseased capped brood. In their 2018 study ("*Honey bees performing varroa sensitive hygiene remove the most mite-compromised bees from highly infested patches of brood*", Apidologie, 10.1007/s13592-017-0559-6), bees were more likely to uncap brood to check things out when mite foundresses were not only reproductive but actively so. This has been demonstrated as a key trait of VSH in the past (see work by Marla Spivak and colleagues in the Journal of Neurobiology, 2003, **https://doi.org/10.1002/neu.10219**), but the current study pushes the science forward by showing exactly when and perhaps how mite reproduction triggers uncapping. Cells with mite offspring, even tiny protonymphs,

were uncapped twice as often as cells with just a mite foundress or a foundress with eggs. Once a cell was uncapped, it was more likely that neighboring cells would be uncapped even when accounting for their own mite levels, so bees seemed to be accurately predicting that mites cluster somewhat in small regions of the comb.

Finally, Alison McAfee and colleagues in Vancouver quantified the abilities of two volatile chemicals, β-ocimene and oleic acid, to trigger hygienic behavior by worker bees. While it is not perceived by our noses, oleic acid is a widely used indicator of death throughout the arthropods (insects, crustaceans, mites and the like), meaning that members of these groups have been using this cue to avoid their own demise for 400+ million years ("The ancient chemistry of avoiding risks of predation and disease" **Evolutionary Biology**, 2009, **https://link.springer.com/article/10.1007/s11692-009-9069-4**). Other than confirming once again that death stinks, how can these results be used to advance bee breeding? One way is to recognize exactly how bees perceive these two molecules and then determine whether this mechanism can be enhanced via breeding. McAfee and colleagues are well on the way to doing just that, by exploiting a remarkable set of specific proteins that help bees and all of us smell our environment. These aptly named odorant binding proteins (OBPs) are diverse in honey bees and are involved in many aspects of their communication, often being triggered by single molecules that fit them just right. Two OBPs, OBP16 and OBP18, seem to react to β-ocimene and oleic acid and hence are targets for breeding more perceptive bees. The discovery that decades of excellent work on hygienic behavior in honey bees can be refined to specific cues is truly exciting and these insights should aid breeding efforts against some of the worst honey bee foes. BC

BeeWeek In Brussels

Why Americans Should Care

Introduction

From June 26-28, 2018 the European Parliament hosted the seventh annual BeeWeek in Brussels, Belgium. I was fortunate enough to have been invited to attend and present during the events of that week. While many may think that what happens in Europe or the rest of the world does not impact us here, this article addresses all the reasons why we should care and how what they are doing there may affect beekeepers everywhere, even in the U.S.

First I will discuss why we should care about these events, then I will give an overview of some of the events at BeeWeek I found most interesting from a technological point of view then end with some concluding thoughts.

Why we should care about these events

The primary purpose of BeeWeek is to draw attention to some of the problems that bees and beekeepers face, and to educate the legislatures and staff in the European Parliament, who participate in making and enforcing regulations across Europe, about what they can do to help the bees. This year the theme was focused on how farmers and beekeepers can work together to address these problems.

Due to political, geographic, historical and structural differences between the U.S. and the E.U., not everything that is being talked about in Brussels is immediately relevant in the U.S. However, there are many problems they are facing that are similar to the ones we are facing here. In some areas, there may be things they can learn from what we are doing; in other ways, there are things we can learn from their efforts to address similar problems in new ways. I will expand on a few reasons in the next subsections.

Joseph Cazier outside the European Parliament at the start of BeeWeek 2018.

Cultural Legacy and Diversity in Beekeeping

One of the reasons it is important to pay attention to what they are doing for the bees around the world, including Europe is the diversity of types and approaches to beekeeping that exist in Europe. For example, consider that there are 28 member states in the E.U. with very different cultural, language, and economic differences among them. Several of these countries have different approaches and histories with beekeeping. Some of them, like Turkey[1], can show evidence of keeping bees in their region for almost 10,000 years.

By contrast, most of the bees in the U.S., as well as the craft and approach, were imported from places like Europe a few hundred years ago. While there are still regional and cultural differences in parts of the U.S. in our approach to beekeeping, there is a much greater dispersion of approaches throughout the different countries and cultures of Europe than the U.S. due to their history, geography, and beekeeping culture.

For example, though it is roughly half the size of the United States by land mass, the European Union is about half again as large in terms of total population. There are also about 600,000 beekeepers across Europe compared to around 200,000 in the U.S.

By observing how these different groups address beekeepers' problems and recording what works in different circumstances, Europe, and really the rest of the world too, can become a laboratory for helping us identify best practices for some of the issues we face in the U.S.

Food Security

We depend on the rest of the world, including Europe, for a significant portion of our food supply, especially to improve the timing and variety of foods available to us. Our world is connected like it has never been before. In a typical week, the average American eats food grown, packaged and processed from all over the world. Whether it comes from Europe or elsewhere, imported food gives us more variety and availability. Some of it is healthy like fresh fruits and vegetables, some less so like processed foods amalgamated from food derivatives.

While we can support and praise the local food movement, there are limits to the variety and timing of the foods that can be grown in any given region. If we

[1]Technically Turkey is not currently a member of the European Union, though proximate in geography. However it is an example of the long history and diversity of beekeeping in that region of the world.

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One of the reasons it is important to pay attention to what they are doing for the bees around the world, including Europe is the diversity of types and approaches to beekeeping that exist in Europe.

value the ability to choose what we eat and when, we should want all parts of the world's agriculture sector to be productive.

Additionally, it is not hard to imagine the escalation of conflict that would arise globally if we lost a significant supply of our food due to bee loss in an important part of the world. Losing bees anywhere would be a threat to our global food security and ultimately our physical and economic security too. (See the June 2018 *Inner Cover* by Kim Flottum for additional information on our sources of food.)

Different Legal Systems for Food Production

Europe, as well as other parts of the world, has a different approach to regulating agriculture and agricultural products than we do in the U.S. Most notably for beekeepers is their near total ban on neonicotinoid pesticides currently being implemented in the E.U.[2] For those of us in the U.S. concerned about bees who suspect that neonicotinoids pose a risk to our bees, this ban will give us data to watch if such an action makes a difference to bee health on a grand scale. Similarly, their reluctance to allow genetically modified organisms (GMOs) into their farms and markets will act as a large scale natural experiment that can help us better understand the role of GMOs, if any, in declining bee health.

Overview from events at BeeWeek

As you might expect from a meeting organized by a policy and law-making group similar to our U.S. Congress, there were a fair amount of political events and discussions taking place during BeeWeek, particularly around the *Common Agricultural Policy (CAP),* legislation similar to our farm bill. However there were many other activities too. As a data scientist who loves bees, I am going to focus on the parts of the conference that I think are both the most relevant to us in the U.S. and can help us on our path to build a *Genius Hive* as I outlined in the April 2018 issue of *Bee Culture.* Here are a few of the highlights:

EFSA

I was particularly impressed by some of the work being done by the *European Food and Safety Authority (EFSA)*, led by Tobin Robinson and Simon More. This group was highly active at the conference and also in their activities to help address the problems that beekeepers face across Europe.

In particular, this group is leading a consortium of partners to harmonize, collect, and store European data on bees. Their efforts parallel, but are distinct from, some of the efforts of HiveTracks and others to collect and harmonize data from lay beekeepers in a "citizen science" effort to understand and adapt to the problems bees face.

Nonetheless these efforts are very important and complementary in trying to use technology and data to help save the bees. As I understood their presentations, they are primarily focused on rigorous scientific data collection with the goal of collecting all of the data they can from scientists across Europe, particularly those receiving government funding, and then storing the data in a known format that can be combined with that of other scientists for deeper analysis.

This is a critical step on the path to the *Genius Hive*. Though their data will be relatively small in volume (compared with the Big Data needed in predictive analytics), it will have a very high degree of quality and be very targeted to addressing problems selected for funding to address. Theirs will also be very rigorous scientific studies both of the original data and any meta-analysis (wide scale aggregated analysis of the underlying data), which will help answer some very important questions with rigor and confidence.

ApisRAM

Being developed by Chris Topping, a research professor for Bioscience at Aarhus University in Denmark, ApisRAM is a sophisticated risk assessment model for bees. Through a detailed breakdown of how a hive works and how it interacts with the environment, Chris is building a scalable computer simulation of the hive that could give us insight into how a hive interacts with the rest of the ecosystem around it. This system aims to simulate interactions between various components of the ecosystem and hive and will help predict complex system dynamics.

Once tested and validated, this type of model will ultimately help us better understand the factors impacting the health of a hive, or a network of hives across the world. It will also help us to better understand how changes in our current ecosystem might affect bees worldwide, giving us time to adapt and try to prevent problems or optimize opportunities for healthier bees. Supported by EFSA mentioned in the section above, I think this model, though not perfect, still has a lot of

A meeting session during BeeWeek.

[2]https://www.theguardian.com/environment/2018/apr/27/eu-agrees-total-ban-on-bee-harming-pesticides

The problems that bees and beekeepers face today are bigger than any of us. It will take knowledge, experience, and efforts from all of us to solve them in a satisfactory way.

potential to help us know what actions can most help the bees in both Europe and the U.S.

Varroa Alert System

My good friend Michael Rubinigg, Ph.D and Science Officer for the Austrian Beekeeping Federation, gave a very impressive presentation of his organization's (Biene Österreich) efforts to use crowdsourced data from their Austrian beekeepers to collect data and send out early alerts to regional beekpeers of problems like *Varroa* that are coming so they can take actions to prevent them or mitigate their impact.

This type of translational scientific outreach, with the help of crowdsourced data, is exactly where modern technology can offer the most benefit to our world's beekeepers. This type of outreach not only lets you understand what is happening, but does so in a way that is timely and relevant to our beekeepers and helps them change the outcome instead of just understanding it later. I am hoping to find ways to collaborate with Dr. Rubinigg and others to greatly increase these services worldwide.

Ecological Monitoring with Hives

This topic was a little different than the others. While most were focused on saving the bees from changes in our world, this idea was the reverse: using beehives to detect and monitor the changes and threats to our world and local environment. The idea was presented by Dr. Kim Nguyen from the University of Liege in Belgium. Through his start up, BeeODiversity[3], he is using bees to collect pollen from the region and then testing that pollen for environmental toxins and contaminants. He can then map his results and take additional measurements over time to detect changes in the regional environment.

He demonstrated how he was able to use his hives to measure contaminants like arsenic, lead, and pesticides in a region more efficiently and effectively than traditional methods. This seems like a nice way to use our hives as sentinels to environmental problems in our regions, as bio-sensors if you will, which can help us understand not only the environment, but also how it is affecting our hives. It might also turn out to be a nice business model for him.

BeeXML

BeeXML is the brainchild of Walter Haefeker, President of the European Beekeepers Association, though I had the privilege of presenting the concept during BeeWeek. The idea is to develop a worldwide standard for collecting, storing, and transmitting data related to bees using XML, a language similar to HTML that allows for the transfer of data in a standard format along with its meaning.

A map of the countries in the European Union.

If this were achieved and adopted, it would pave the way to collecting and analyzing the big data needed to really help our beekeepers worldwide and build the Genius Hive. This is such an important issue that I plan to write more on this topic in next month's article.

Conclusion

BeeWeek is an international event. However, it is about more than BeeWeek. The problems that bees and beekeepers face today are bigger than any of us. It will take knowledge, experience, and efforts from all of us to solve them in a satisfactory way. It is about resiliency. In order to be resilient and overcome the challenges beekeepers face and take advantage of future opportunities, we need to focus on the best knowledge and information that can help us, not where that knowledge comes from.

As we wrestle with these issues in the U.S., there are good things happening on a global scale. It would be good for us to learn from all of the people working on these issues and see how they can help each of us be more resilient and effective in our beekeeping operations.

Finally, special thanks to a *Board of Trustees International Travel* grant from Appalachian State University for supporting the cost of the travel and to *Project Apis m.* for supporting the research aiming to use technology to help beekeepers everywhere with a Healthy Hives 2020 grant. I would also like to thank *Bee Culture* for providing a venue to share these ideas. These efforts would not have been possible without visionary groups like these providing support and resources to make progress toward building a Genius Hive and share that progress with all of you. BC

Joseph Cazier is the Chief Analytics Officer for HiveTracks.com and the Executive Director of the Center for Analytics Research and Education (CARE) at Appalachian University. You can reach him at ***joseph@hivetracks.com****.*

[3]http://www.beeodiversity.com/en/

NOD
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Best Management Practices for Overwintering

1 Feed

Colonies should be fed thick syrup (either 2:1 sugar/water or 70% sucrose). It is hard work for a Honey bee colony to concentrate the sugar feed so that they can store it for winter. Thick syrup requires less work (i.e. less time and energy) from the bees. The honey frames should be on both sides of, and above, the cluster in a Langstroth or vertically comparable hive structure. The closer the feed, the more efficient the bees are at fueling their thermogenesis.

2 Treat

Monitor Varroa Mite levels throughout the beekeeping season and treat when local economic thresholds are met. Mite Away Quick Strips® and Formic Pro® are two organic options that kill the Varroa mite where it reproduces, under the brood cap. Both treatment options leave no residues so beekeepers can use it safely during the honey flow. Varroa levels going into winter should be at their lowest. Both treatment options provide the highest efficacy of Varroa mite kill. We recommend the full dose option for this time of year and treatment session.

3 Wrap

During winter, moisture can build up inside a hive that is not properly ventilated. Honeybees can help to moderate the cold, but they won't be able to properly keep house if it is wet and cold. The Bee Cozy winter hive wrap allows sufficient ventilation for your hives: air moves up through the vent at the bottom, and out through the top. Place an Inner Cover Pad between the inner and outer covers; deep inner covers work best. Having an Inner Cover Pad + Bee Cozy winter hive wrap will provide the extra insulating layer to support the bees in retaining heat.

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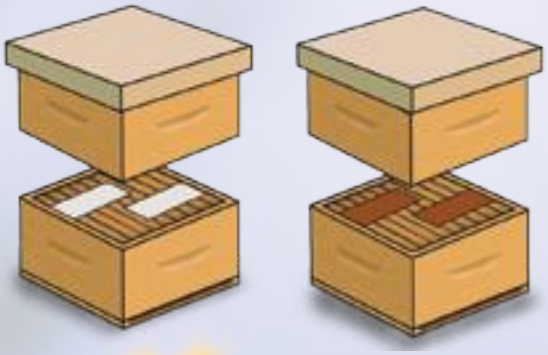

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United States Department of Agriculture
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Apiculture Pilot Insurance Program

What Is It And How Can I Enroll?

Brittney **Goodrich**

The Apiculture Pilot Insurance Program (API) is insurance offered through the United States Department of Agriculture (USDA) Risk Management Agency (RMA) meant to insure beekeepers against lower than average rainfall which could negatively affect honey production. API was at first piloted in a few states, and expanded to include all 48 contiguous states in July of 2017. API participation rates throughout the country are relatively low, and many beekeepers I've talked to are unaware of the program or are skeptical of it. This article provides an overview of the API program and references if you want to learn more about it.

API is a type of index insurance, meaning policies are not based on actual production or loss, rather payments are triggered by low precipitation relative to a chosen coverage level. Payments and coverage are based on a grid system, where grids cover an area of 0.25 degrees latitude by 0.25 degrees longitude (roughly 17 miles x 17 miles at the equator). An API policy is based on the specific grid (or grids) in which colonies are located. Rainfall index values are calculated by a weighted average of nearby National Oceanic and Atmospheric Administration (NOAA) weather stations, and are reported in relation to historical average rainfall in that grid.

So, what do current participation rates look like in the API program? Table 1 details the regional participation in API in 2018, where the honey producing regions are defined in Figure 1. In 2018, 811,249 colonies in the U.S. are insured with this program. Using the number of colonies in the U.S. on July 1, 2016, this amounts to just over 25% of total U.S. colonies insured. The western region of the U.S. has by far the most colonies enrolled in API, with a majority of those colonies (72%) being insured in California.

Before getting into the components of an API policy, I think it's helpful to outline some common insurance jargon.

Indemnity: The amount of money you collect when the rainfall index falls below your chosen coverage level.

Premium: The amount of money you must pay for your API insurance policy.

Subsidy: The portion of your premium that the Federal Crop Insurance Corporation will pay.

To participate in API, producers must make a number of decisions.

1. **Insured Colonies:** Beekeepers must choose the number of colonies that will be insured. Not all of a beekeeper's colonies need to be insured. There is also no minimum number of colonies necessary, so small beekeeping operations may participate. Knowing that most commercial beekeepers are migratory, it is important to note that you cannot insure the same colonies across multiple grids.
2. **Two-month Index Interval and Percentages of Value:** The crux of the API insurance lies in the choices of coverage level and two-month intervals. Producers must choose two-month intervals in which they want

Figure 1. *U.S. Honey Producing Regions (Bee Culture Regional Honey Price Report)*

Region	Colonies Insured	Number of Policies	Average Colonies/Policy
Great Plains	100,347	386	260
North Central	16,891	42	402
Southeast	160,199	481	333
Southwest	33,561	87	386
West	496,718	909	546
East	2,031	9	226
Northeast	1,502	4	376
Total	811,249	1,918	423

Table 1. *2018 API Participation by Region (Source: USDA RMA Summary of Business Reports and Data, 2018)*

Location	Hand County, South Dakota
Grid ID	29824
Coverage Level	80%
Productivity Factor	130%
Insured Colonies	400

Policy Information	
County Base Value (Per Colony)	$133.31
$/Colony Amount of Protection	($133.31 x 130% x 80%)= $138.64
Total Policy Protection	($138.64 x 400 colonies)=$55,456
Subsidy level	55%
Total Premium (Per Colony)	$14.53
Premium Subsidy (Per Colony)	($14.53x55%)= $7.99
Beekeeper Premium (Per Colony)	($14.53-7.99)= $6.54

Month Interval	Jan-Feb	Feb-Mar	Mar-Apr	Apr-May	May-Jun	Jun-Jul	Jul-Aug	Aug-Sep	Sep-Oct	Oct-Nov	Nov-Dec
Percentage of Value	0%		0%		40%		60%		0%	0%	0%

***Note: This is an example for illustration purposes only! It does not necessarily represent an optimal risk management strategy for a beekeeper in this grid.

Table 2. *Example 2018 API Policy (Green colored boxes represent beekeeper inputs)*

to insure against low rainfall. Two-month intervals run from January-February to November-December, and a participant cannot choose overlapping intervals, i.e., March-April and April-May. The participant must also place a percentage of value into each chosen interval to represent the portion of total insured value which is dependent on rainfall during that two-month interval. A beekeeper's placement of percentages of value would likely reflect the ranking of which month intervals matter most for honey production.

3. **Coverage Level:** The coverage level chosen determines the percentage of average historical rainfall at which insurance coverage kicks in. The possible coverage levels are 70, 75, 80, 85, or 90%. For example, if a participant chooses 90% coverage and January-February and March-April intervals, an indemnity would be paid if the rainfall index in either January-February or March-April falls below 90% of the historical average.

Subsidy levels differ depending on the coverage level chosen. Subsidy levels range from 51-59%, with the lowest coverage level (70%) receiving the highest subsidy level (59%).

4. **Productivity Factor:** Beekeepers can adjust the value insured by adjusting the productivity factor. USDA RMA estimates county base values using a five-year rolling average of state honey yields and the national average honey price. Participants can update the county base values to better reflect the value in their own operation by adjusting the productivity factor within the range 60-150%.

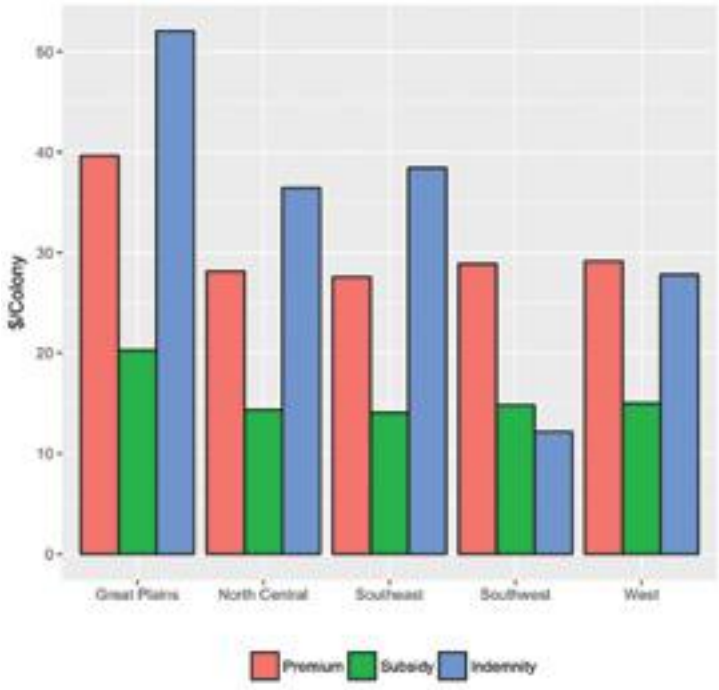

Figure 4. *Regional Average API Premium, Subsidy, and Indemnity Rates, $/Colony (Soutce: USDA RMA Summary of Business Reports and Data, 2017)*

Table 2 shows an example of a 2018 API policy option for a South Dakota honey producer who believes the months of June and July are most influential for honey production. In the example, the beekeeper would receive an indemnity if the rainfall index in either May-June or July-August falls below the coverage level of 80%. The county base value for this policy is $133.31. The producer believes this value is too low so he chooses a productivity factor of 130% to increase his insured dollar value.

There are trade-offs with choosing the insured dollar value and coverage levels. The higher the coverage level, the higher cost of the insurance but the higher chance of a collected indemnity. Similarly, the higher the insured amount, the higher the cost of the insurance but also the higher the indemnity amount paid out with low rainfall.

In addition to varying based on coverage level and insured value, API insurance premiums vary depending on the month intervals chosen and geographical location. Figures 2 and 3 display 2018 average premiums per colony by the two-month interval chosen in each region (East and Northeast regions were omitted due to the low number of policies purchased in those regions). The Great Plains, North Central and Southeast regions have similar seasonal trends in rainfall, so in these areas, premiums are significantly higher in the winter than during the spring and summer. The West and Southwest regions differ significantly from the other regions in rainfall patterns, so premiums look much more sporadic throughout the year. In fact, the West region sees premium patterns nearly opposite of those found in figure 2, with high premiums during the summer and low premiums during the winter months.

Figure 4 depicts average per-colony premiums, subsidies, and indemnities for each region in 2017. On average in 2017, participating beekeepers in all regions received more in indemnity than they paid out in premiums (after accounting for the subsidy). This payout from low precipitation is meant to offset decreases

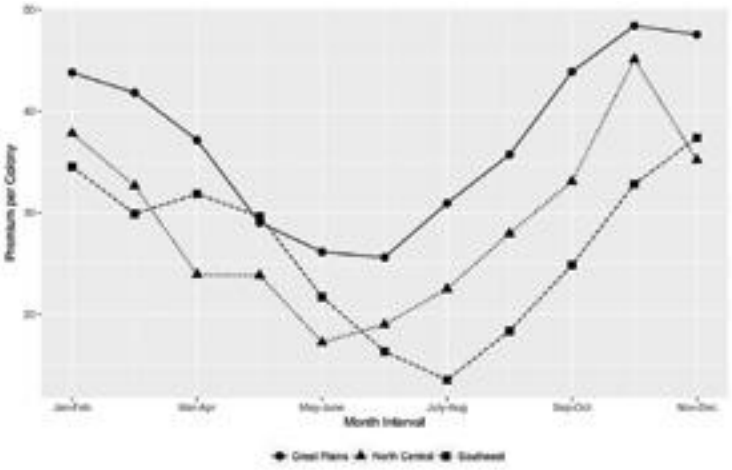

Figure 2. *2018 Regional Average Per-Colony Premium for Colonies Enrolled in API by Choice of Two-month Interval, Great Plains, North Central, and Southeast (Source: USDA RMA Summary of Business Reports and Data, 2018)*

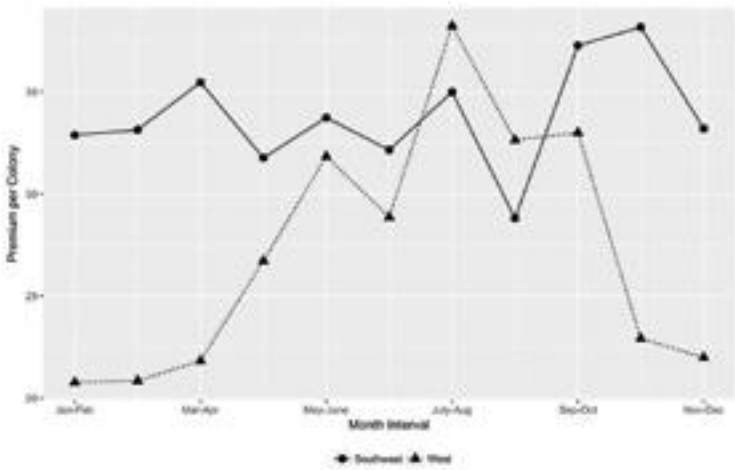

Figure 3. *2018 Regional Average Per-Colony Premium for Colonies Enrolled in API by Choice of Two-month Interval, Southwest and West (Source: USDA RMA Summary of Business Reports and Data, 2018)*

in revenue and increases in costs due to low honey production. In a high rainfall year, average indemnities may be less than premiums paid in by beekeepers. It is presumed that higher than average rainfall will result in higher than average honey production, so beekeeping revenues would be higher and/or costs of feeding lower.

USDA RMA provides a useful online decision tool (see reference below) that producers can access to find their grid, explore policy options and costs, and plot out historical rainfall indices and policy outcomes. API insurance can be purchased by any authorized crop insurance agent (see link below for agent locator). The enrollment deadline for 2019 API is November 15, 2018, and the premium payment deadline is September 1, 2019.

API has potential to be a useful risk management tool for beekeepers, especially at the current subsidy rates. API is not set up to insure against all factors influencing honey production, so it should not be used as the only tool for managing risk. I encourage you to look into this product for your operation. See the following resources for more information. BC

General API Policy Info: https://www.rma.usda.gov/policies/ri-vi/apiculture.html

API Grid Locator: http://maps.agforceusa.com/api/ri/

API Decision tool: http://api.agforceusa.com/ri

Crop Insurance Agent Locator: https://prodwebnlb.rma.usda.gov/apps/AgentLocator/#/

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A Closer LOOK

OXALIC ACID VARROA TREATMENTS

Clarence **Collison**

Standard Oxalic Acid treatments, techniques and results.

Oxalic Acid (OA) is a natural constituent of honey and very effective against the *Varroa* mite, *Varroa destructor* (Rashid et al. 2011). Uses of oxalic acid for the control of *Varroa* have been rapidly increasing in recent years. Three different treatment techniques (i.e. trickling, evaporation or sublimation, and spraying) have been developed and tested for the application of OA against the mite (Rademacher and Harz 2006). **Trickling Treatment** – Using a syringe or a similar applicator, oxalic acid dehydrate solution is trickled directly onto the bees in the spaces between combs, normally when colonies are in the broodless phase. This application is quick (about one minute per hive), cost effective and easy. **Sublimation Treatment** – Oxalic acid dehydrate in the form of crystals, gelatin capsules or tablets are heat-evaporated (sublimated) with different types of evaporators, predominantly during the broodless period. This application takes about four minutes per hive and requires complex equipment. **Spraying Treatment** – Solutions of oxalic acid dehydrate are sprayed onto the bees on both sides of each comb and the bees resting on the hive walls; spraying is normally carried out during the broodless period. This application takes four to five minutes per hive.

Laboratory bioassays were performed to characterize the acute contact toxicity of oxalic acid to *Varroa* mites and their honey bee hosts. Specifically, glass-vial residual bioassays were conducted to determine the lethal concentration of oxalic acid for the mite, and topical applications of oxalic acid in acetone were conducted to determine the lethal dose for honey bees. The results indicate that oxalic acid has a low acute toxicity to honey bees and a high acute toxicity to mites. The toxicity data will help guide scientists in delivering optimum dosages of oxalic acid to the parasite and its host, and will be useful in making treatment recommendations (Aliano et al. 2006).

Nine divided hives were constructed to study the distribution of oxalic acid. Experimental colonies were split into two equal, queenright sections with one of three divider types. The first divider allowed trophallaxis to occur between adult bees on each side, but did not allow bee-to-contact. The second divider did not allow trophallaxis or bee-to-bee contact. The third divider allowed both bee-to-bee contact and trophallaxis between the two sides. All three dividers allowed gas exchange of volatile materials. The objective was to investigate factors that contribute to the distribution of oxalic acid in a hive by monitoring mite mortality. Forty ml of a 3.5% oxalic acid sugar water solution was trickled on one side of the divider. Sticky boards were used to quantify mite fall before, during, and after OA treatment on both treated and untreated sides. Trophallactic interactions and fumigation did not significantly influence the distribution of oxalic acid. Bee-to-bee contact was the primary route for oxalic acid distribution (Aliano and Ellis 2008).

Three oxalic acid solutions were applied to 24 colonies to test acaricidal effects on the mites. Daily natural mite drop per colony averaged 0.52. Higher mite mortality (18.33) was found after three August OA treatments. The mean efficacy's of the three water solutions of OA/sucrose (w/w) 3.4%/47.6%, 3.7%/26.1%, and 2.9%/31.9% applied in the presence of brood, was 52.28%, 40.66% and 39.16 %, respectively. A significantly higher efficacy was recorded when 3.4%/47.6%, was applied in comparison to 2.9%/31.9% solution. There was no difference in efficacy between OA solutions administered during a broodless period on October 28. The average efficacy in all colonies was 99.44%. The results suggest that OA has limited acaricidal effect in colonies with brood, but it is highly effective in a broodless period (Gregorc and Planinc 2001).

Twenty-four colonies were used to monitor the efficacy of a solution of 2.9% oxalic acid and 31.9% sugar against *Varroa* mites. Mite mortality was established prior to and after oxalic treatments, which were conducted in August and September. The treatments resulted in 37% mite mortality as opposed to 1.11% in the controls. Oxalic acid treatment conducted in September on previously untreated colonies resulted in 25% mite mortality.

Oxalic acid treatments in October and November resulted in approximately 97% mite mortality. These

results again suggest that oxalic acid is effective during the broodless period and less effective when applied to colonies with capped broods (Gregorc and Planinc 2002).

The toxicity of various concentrations of oxalic acid dihydrate (OA) in aqueous and sucrose solutions to *Varroa* mites and to honey bees was assessed using submersion tests of caged bees and by spraying bees in colonies with and without brood (Toomemaa et al. 2010). An aqueous solution of 0.5% OA gave effective control of the mite and was non-toxic to bees whereas higher concentrations of OA (1.0-2.0%) were highly toxic to bees. Submersion tests into solutions with 0.1% OA were acaricidal both in aqueous (59.9 %) and in 50% sucrose solution (71.1%) whereas concentrations of 0.2-0.5% OA were highly effective; OA in sucrose solution was more toxic to bees than OA in the aqueous solution. Spraying with 0.5% OA solution at a dose of 25 ml per comb in May 2003 and in April 2004 was 99.01-99.42% effective in mite control in Estonian standard one box long beehives with 22 frames (each 414 x 277 mm, area 1000 cm^2 per comb side). Most mites fell after the first spraying. In Autumn, spraying test colonies that had little capped brood once or twice with a 0.5% OA solution gave effective mite control (92.94% and 91.84%, respectively) with no noticeable toxicity to bees.

Two oxalic acid treatments were given to five colonies in autumn and five colonies in Spring. In each treatment, colonies were treated every seven days for four weeks with a 3% sprayed oxalic acid. Another five colonies in each season served as controls and were sprayed only with water. Efficacy of OA in autumn was 94% and in spring was 73%. A long-term study of the colonies for three to four months after the last application of oxalic acid showed a statistically significant negative effect of the acid on brood development. In addition, three queens died in the treated colonies (Higes et al. 1999).

Rashid et al. (2011) evaluated fall OA treatments in Islamabad, Pakistan. Colonies were divided into four groups of five colonies each. Oxalic acid was applied in sugar syrup with 4.2, 3.2 and 2.1% concentrations. The OA with different concentrations was trickled directly on the adult bees in between two frames using a syringe applied three times on different dates at five day intervals. Average mite efficacy of OA with 3.2, 4.2 and 2.1% was 95, 81 and 46%, respectively. No queens were lost, and there was no adult bee mortality in any of the colonies during the experiment. They concluded that 3.2% OA concentration is very effective in controlling mites and can be used without any side effects during the broodless condition.

The effects of OA administered by the trickling method on brood development of honey bee colonies were evaluated (a) by observing the development of marked cells of young (<3 days old) and old (>3 days old) larvae, and (b) by measuring the area of open brood for several weeks post application. Oxalic acid, dissolved in a 50% sugar solution, with an end concentration of 3% w/v oxalic acid, was applied twice by the trickling method during Summer to 10 colonies. A high percentage of young (12.6% and 9.5%) and old honey bee larvae (10.6% and 5.6%) were removed from their cells after the first and second oxalic acid applications, respectively. The surface of the open brood area was also reduced by 17.5% after the two oxalic acid applications and stayed low for about two months. For the same period of time the open brood area in 10 control colonies increased by 34.5%. The two oxalic acid applications removed 60 ± 12% of *Varroa* mites adhering to adult honey bees, while the natural fall of mites measured in control colonies (for a period of 40 days) was 32 ± 4%. Combining the detrimental effect on brood development with the low relative effectiveness on *Varroa* removal, oxalic acid application by the trickling method when open brood is present is not as safe as has been regarded in the past. Consideration needs to be given to the use of different sugar and oxalic acid concentrations in the treatment solution in order to minimize its adverse effects on open honey bee brood (Hatjina and Haristos 2005).

Toufailia et al. (2015) determined the efficacy of the natural chemical oxalic acid in killing phoretic *Varroa* mites on adult worker bees under field conditions in southern England. They compared three oxalic acid application methods (trickling, spraying and sublimation) at three or four (sublimation) doses, using 110 broodless colonies in early January 2013. Treatment efficacy was assessed by extracting mites from samples of c. 270 worker bees collected immediately before and 10 days after treatment. All three methods could give high *Varroa* mortality, c. 93-95%, using 2.25 g OA per colony. However, sublimation was superior as it gave higher mortality at lower doses (.56 or 1.125 g per colony; trickling 57% mortality; spraying 86%; sublimation 97%). Sublimation using 2.25 g of OA also resulted in three and 12 times less worker bee mortality in the 10 days after application than either trickling or spraying, respectively, and lower colony mortality four months later in mid Spring. Colonies treated via sublimation also had greater brood area four months later than colonies treated via trickling, spraying or control colonies. A second trial in December 2013 treated 89 broodless colonies with 2.25 g OA via sublimation to confirm the previous results. *Varroa* mortality was 97.6% and 98% of the colonies survived until Spring. This confirms that applying OA via sublimation in broodless honey bee colonies in Winter

Oxalic Acid has a low acute toxicity to honey bees and a high acute toxicity to mites.

is a highly effective way of controlling *Varroa* mites and causes no harm to the colonies.

Some experiments have shown that a single spray with OA in aqueous or sucrose solution is considerably more effective than trickling (Brødsgaard et al. 1999; Bahreini 2003), indicating that greater wetting of bees increases the effectiveness of the oxalic acid in mite control. Toomemaa et al. (2010) using submersion tests also showed the importance of thorough wetting for good mite control. A lower concentration may be considerably less effective in trickling due to less contact of the solution with the bees and mites.

Honey bee colonies in five apiaries were divided into three groups to test if the concentration or the total amount of oxalic acid applied for *Varroa* control determines treatment efficacy when trickling OA for *Varroa* mite control (Fries 2001). The treatment groups were 30 ml sugar solution (1:1 weight: volume), 30 ml 3.2% OA in sugar solution and 60 ml 1.6% OA in sugar solution. The results clearly demonstrate that it is the concentration of oxalic acid that is critical for high mite efficacy, rather than the total amount of oxalic acid used. The results also confirm earlier results from trials under Swedish and Norwegian conditions that 30 ml 3.2% for normal sized colonies can be used for mite control with good results without obvious adverse effects on bee colonies over Winter. Fries (2001) found that trickling a 1.6% oxalic acid solution at a higher dose (60 ml per colony), was 92.2% effective. Although concentrations of <4.6% have been tolerated well by bees in experiments by several researchers, in some experiments colonies have been weakened considerably following a single trickling treatment.

Rademacher et al. (2017) investigated lethal and sublethal effects of oxalic acid on individually treated honey bees kept in cages under laboratory conditions as well as the distribution in the colony. After oral application, bee mortality occurred at relatively low concentrations (No Observed Adverse Effect Level (NOAEL)) 50 µg/bee; (Lowest Observed Adverse Effect Level (LOAEL)) 75µg/bee compared to the dermal treatment (NOAEL 212.5 µg/bee; LOAEL 250 µg/bee). The dosage used in regular treatment via dermal application (circa 175 µg/bee) is below the LOAEL, referring to mortality derived in the laboratory. However, the treatment with oxalic acid dehydrate caused sublethal effects: this could be demonstrated in an increased responsiveness to water, decreased longevity and a reduction in pH-values in the digestive system and the hemolymph (blood). The shift towards stronger acidity after treatment confirms that damage to the epithelial tissue and organs is likely to be caused by hyperacidity. The distribution of OA within a colony was shown by macro-computed tomography; it is rapid and consistent. The increased density of the individual bee was continuous for at least 14 days after treatment indicating the presence of oxalic acid dehydrate in the hive even long after a treatment.

Oxalic Acid is effective during the broodless period and less effective when applied to colonies with capped brood.

Numerous studies have investigated using oxalic acid to control *Varroa* mites in honey bee colonies. In contrast, techniques for treating package bees with oxalic acid have not been investigated. The goal of this study was to develop a protocol for using OA to reduce mite infestation in package bees (Aliano and Ellis 2009). They made 97 mini packages of *Varroa*-infested adult bees. Each package contained 1,613 ± 18 bees and 92 ± 3 mites, and represented an experimental unit. They prepared a 2.8% solution of OA by mixing 35 g OA with 1liter of sugar water (sugar:water =1:1; w:w). Eight treatments were assigned to the packages based on previous laboratory bioassays that characterized the acute contact toxicity of OA to mites and bees. They administered the treatments by spraying the OA solution directly on the bees through the mesh screen cage using a pressurized air brush and quantified mite and bee mortality over a 10-day period. Their results support applying an optimum volume of 3.0 ml of a 2.8% OA solution per 1,000 bees to packages for effective mite control with minimal adult bee mortality. The outcome of their research provides beekeepers and package bee shippers guidance for using OA to reduce mite populations in package bees. BC

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Go With What We Know!

Jennifer **Berry**

Last year, a new method of using oxalic acid (OA) was publicized by Randy Oliver, Scientific Beekeeper. According to his updates, he was having pretty good results with the new method. Beekeepers, along with myself, became hopeful that this new formulation would be the silver bullet we've all been waiting for. Not only did it look promising in controlling mites, but it was easy to mix, apparently had no adverse side effects to bees, brood or queens, had no wax or honey contamination issues and finally, it was cheap. It consists of mixing OA crystals with food grade vegetable glycerin, applying the mixture to a delivery matrix (shop towels or cardboard strips) and then placing the material in the hive. After just a few short months, it quickly became a popular method for treating mites. Because of its popularity and wide spread use among beekeepers, it drew the attention of the EPA and USDA, along with myself.

At that time, this method had only been tested on the west coast, where it is hot and dry. We needed to test whether this method would work in a hot and humid environment as well. Plus, we needed a large-scale study that included multiple apiaries. So, I contacted Randy, and after numerous phone calls, and emails between a gaggle of folks, an experimental design was formulated to a) test the efficacy of the new method, b) was it detrimental to bees/brood/queens, and c) was OA being absorbed into honey. Once we were all in agreement, it was time to get to work. The UGA Bee Lab crew, along with the Auburn University Bee Lab folks, traveled to South and North Georgia collecting data for days at a time. All total, 17 people were involved setting up the experiment, collecting and analyzing the data.

In October 2017, I published an article briefly discussing the study but at that time, we had not completed analyzing the data. We were still hopeful we could have results within a few months but unfortunately, we were a bit too optimistic. The data set was very large and took us much longer to analyze than we had anticipated. Before we get to the results, here's a recap of the project.

The study: With the number of colonies involved, we asked two commercial beekeepers, Shearer Turton, (Dream Haven Farms), and Bob Binnie, (Blue Ridge Honey Company), if they would be willing to donate the use of their colonies and help us collect data for the study. Thankfully, they both agreed, since our UGA colonies were already involved in one study or another.

The protocol: For our Southern trial, there were four treatment groups, each with 50 colonies/group. Two of the groups received the delivery matrix (shop towels) (Photo1) with the OA mixture at different concentrations; one with 12g and the other with 18g. The towels were applied to the top bars inside the brood chamber. The other two groups were the controls; one with shop towels and glycerin only and the other with nothing at all.

It took 10 people three days to number, weigh, calculate bee & brood amounts (colony assessments), collect 300 bees in alcohol and apply the shop towels in all of the 200 colonies. Doing colony assessments gives us beginning bees and brood populations. This will test to see if the treatment has any detrimental effects on the bees. The 300 bees collected in alcohol gives us beginning mite numbers (to test if the product is actually working). Twenty four days later in July we traveled back down to Cordele and collected the same data as before, along with % of the towels removed. This gave us ending data for comparison. We were encouraged to see numerous dead mites scattered about on the folds of the paper towels.

The next month we headed North to Lakemont Georgia and repeated the same process of data collection.

Results: Even though these results are still preliminary, we do not recommend using this method for reducing mite populations in honey bee colonies. Why? Because the data didn't show any significant decrease in mite levels in the 12g or 18g extended release method. The reason I am saying "preliminary" results is we are going to repeat the study. Actually, we will start in early July, and plans are to alter the study protocol just slightly. My fear is (which has been substantiated through personal conversations, and emails) there are numerous beekeepers out there using this unapproved, illegal method of applying OA. Some say it is working, some say it's not, some say it isn't harmful to the bees, some say it is. That is why we need to continue to examine, experimentally, with numerous colonies, in different regions, to see whether or not this method works. Otherwise, potentially lots of bees will succumb to mites, lots of beekeepers will be out of money and lots of folks will be unhappy.

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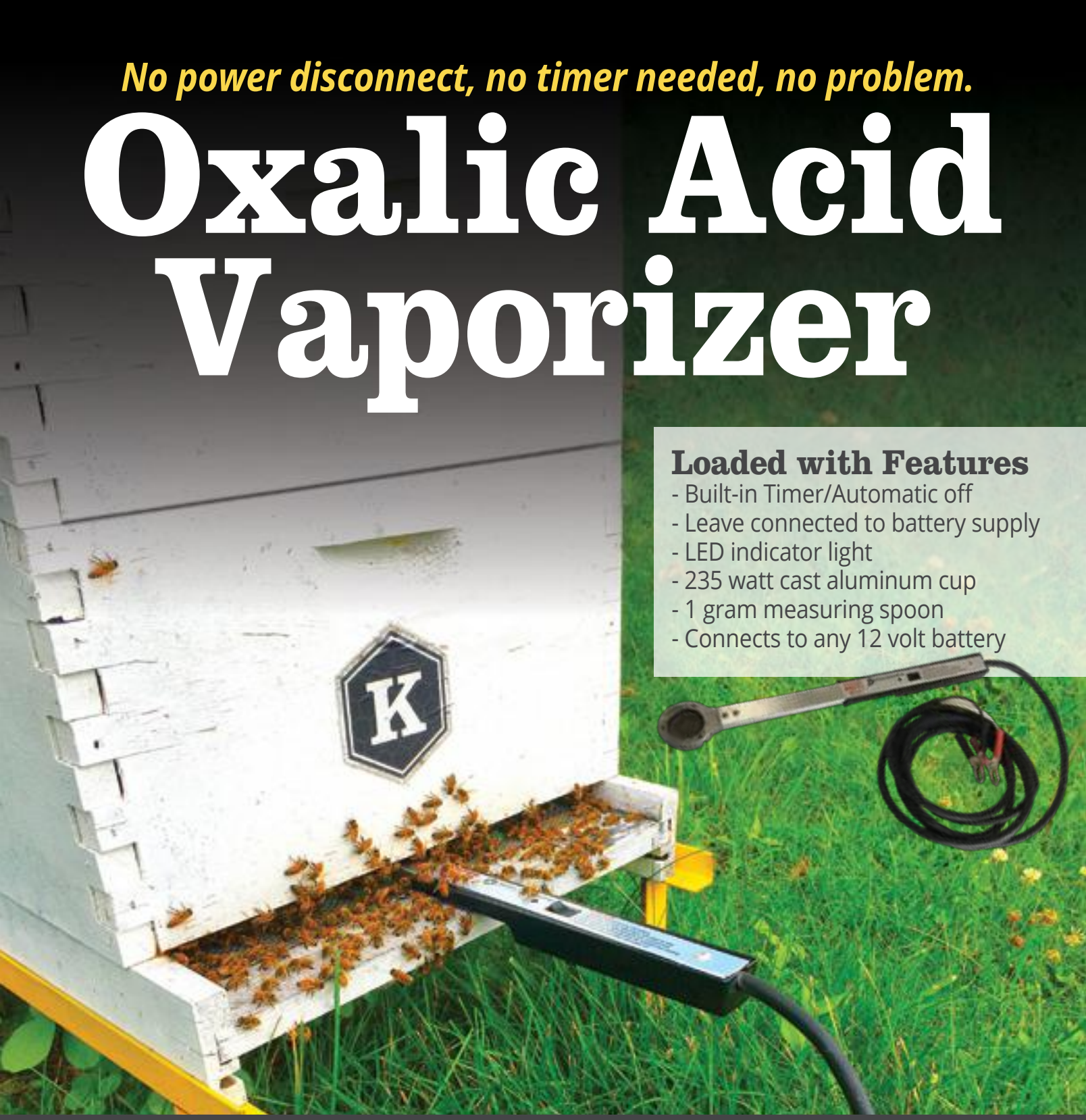

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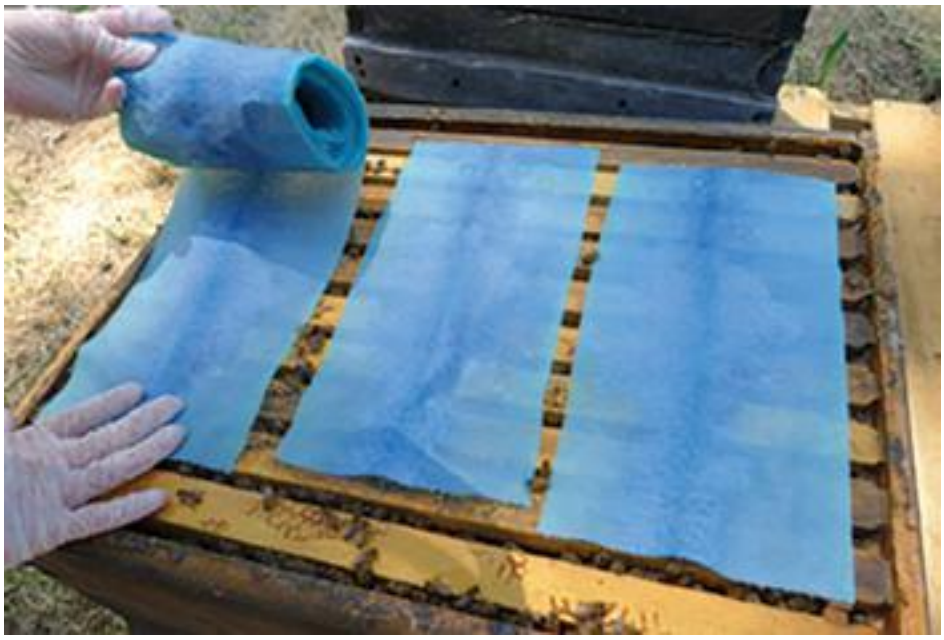
and cheaper, if it doesn't work, then what's the point? We do know that the three approved methods of applying OA significantly kills mites, and does not harm bees or humans if applied according to directions. Even though I've written about this before, I would like to revisit it again. The three methods approved for use in honey bee colonies are trickle (dribble), vaporization (sublimation) and spraying (spraying). All three can be used on existing colonies, packages or swarms. The two most popular methods are the trickle and vaporization method. The trickle method is prepared by mixing the OA with a sugar water solution and then trickling the solution down between each frame (seam), directly onto the bees when temperatures are between 35-50°.



The bees must be in a tight cluster in order to distribute the OA from bee to bee. Any mite coming in contact with the solution, will perish. The second is to heat the OA until it vaporizes into a gas (sublime). This is accomplished by placing the OA crystals into the plate, and then connecting the metal wand or vaporizer to an electrical source. The plate heats up, melting and vaporizing the acid. The vapor will permeate the hive and when it comes in contact with the mites, kills them. Yeah!!! The method that we prefer is the sublimation method. It takes a bit more time to use the wand than to trickle, however, it's not as hard on the bees and it works better.

You can also spray (mist) packages or swarms with the same mixture of OA and sugar syrup used for the trickle method, but we don't recommend this method because it is very hard on the bees. Why? Because you have to hold them in a cool, dark location for 24 hours prior to spraying. Once tightly clustered, the bees must be sprayed with sugar syrup several hours prior to applying the OA, to ensure that their honey stomachs will be full. Otherwise, they will ingest the OA sugar syrup mixture, which can cause harm or worse, kill the bees. After spraying with the OA mixture, you must hold the bees for an additional 72 hours. If you want to remove mites from your packages, there is a much easier and less harmful method. Once you install the package, wait a few days, and vaporize after sundown. Caution, make sure you don't wait too long because you don't want any capped brood present. Why don't we want capped brood?

All three of these methods (or any method for that matter) are most effective if they kill at least 90% of the mites in the colony. Otherwise, mites and more importantly, viruses (which are the real culprit) will continue to reproduce and overwhelm the colony. This can only be achieved if the colony is void of capped brood and the mites are phoretic (crawling around on the frames or adult bees). If there is capped brood, then, the majority of mites are under the protective wax capping and will not be exposed to the OA. This is why applications are most effective when no brood is present.

During the Winter months, queens usually "shut down" or at least have slowed down brood production. This natural brood break is an easy opportunity for us to decrease mite loads, so we don't want to miss our chance. But wait! What about now, today, this Summer, when mite populations are on the rise (compromising the health of our colonies), yet colonies are full of brood? Reducing mite populations will only help our girls going into Winter. Bees weakened by viruses enhanced by the mites will not live as long. Bees produced to survive the Winter (Winter bees) need to live longer than the Summer bees, so by reducing mites & virus loads now, it's gives our girls a fighting chance for Winter survival.

Over the years, I've discussed a way to make a colony broodless by simply caging the queen. Well, caging a queen is not that simple, so after serious thought, much pondering and contemplation, I've come up with a better, simplified method of getting a colony free of capped brood. Ok, actually it wasn't completely my idea; Jay Hendrix, Master Beekeeper here in the state of Georgia, emailed me, asking a question that has proven to be a great solution. His question was; why not just exclude the queen in a super for 14 days, and then treat on day 21? Brilliant! Of course! Here's the plan of action to rid our girls of these nasty parasites & viruses during the brood rearing season.

1. Find the queen and exclude her in a super above the brood nest.
2. In the super with the queen, place one or two frames of drawn comb for her to lay in and fill the rest with honey or pollen frames, or frames with just foundation. By giving her frames that are undrawn or already filled with honey or pollen, it will inhibit her ability to lay a ton of eggs.
3. 14 days later, remove the excluder, releasing the queen.
4. Check for queen cells below the excluder just in case the bees have produced any.

5. Remove frames above the excluder which contain brood and – see below
6. 21 days after excluding the queen (seven days after removing the excluder), vaporize colonies with OA at sundown when all the bees (and mites) are home from their foraging trips.

What to do with the brood frames that the queen was allowed to lay in for the 14 days, the ones above the queen excluder? If you only have one or two colonies, or you don't want anymore colonies, you can sacrifice the brood by freezing the frames. Or, you can take those frames with brood and bees and make a "walk away" split. You can either place a queen cell in this split or allow the bees to raise their own queen, then 21 days after you made the split and all the brood has emerged, you can vaporize with OA.

Some may still question why 14 days, 21 days, etc.? It takes 21 days from egg to an emerging adult worker bee and it takes eight days from egg to capped brood. By breaking the brood cycle, we are able to take advantage of the time between when the egg is laid and the brood is sealed under the protective wax cap. The mite enters the cell just prior to the larvae being capped, so we need to catch the mite BEFORE she enters the cells to reproduce. This is why we treat when there is no capped brood, so all the mites will be exposed to the acid. By shutting down the queen for 14 days, there will be no capped brood on day 21 when we treat with OA, however, there will be capped brood soon afterwards, so make sure to count the days properly.

In our area, the Piedmont region of Georgia, the best time to use OA is during the cold winter months (January) when hopefully the queen has "shut down" and there is little to no brood. The next time would be during the summer months when we "shut down" the queen and force a brood break. We can also take advantage when we requeen a colony or when a colony has swarmed. Quick reminder, when using OA, all "human" consumable honey must be removed from the colony. Usually by the end of July most honey flows have ceased in our region of Georgia.

Recently, I was asked to speak to one of our local Georgia bee associations and the topic they chose was "when searching the Internet, how do we know if the information is correct or not". At first I thought, "what a great subject", but as I researched it further, I realized this was not going to be an easy task. First off, there is a ton of information out there concerning bees, plus, as I narrowed my search to just videos, I came across a pile of them that were flat out WRONG, not to mention illegal. Bad information was more wide spread than I first thought. For instance, I typed in, "how to control *Varroa*" and focused on the top ten video hits. Out of those, only one, ONE was legal, has been tested and we know works. That was using oxalic acid in a vaporizer.

I'm sure you have heard the saying "the label is the law." Well it is, and as silly as it may seem at times, that label, the one found on a can, jar, container, or bag is there for a reason. In the case of beekeeping it is there to protect you, the bees, and the environment, so please, use what has been tested, what is legal and what works. There are plenty of proven options out there that **work** so we don't have to reinvent the wheel, take a chance with our health or the health of the bees. Mother Nature will thank you.

Take good care of you and your bees. BC

Jennifer Berry is the Research Leader at the University of Georgia Bee Lab in Athens.

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MOTHER EARTH NEWS FAIR

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In the May issue of this magazine (**www.beeculture.com/bigger-picture-24/**), Jessica Louque tells us about her day job, working as a research specialist, testing agricultural chemicals for what harm they may do to honey bees in every way imaginable. She and her husband are, essentially, a contract research company. If you have the May issue available, I suggest you re-read that article so the information is fresh in your mind. If you don't, you can read it on our web page at www.BeeCulture.com/bigger-picture-24/. In the article she details a brief history of the various pesticides that have been, and are being used in the ag industry. And she addresses the other side of this – the antagonism of the beekeeping industry toward essentially any and all pesticides, pesticide companies, pesticide applicators and pesticide researchers. One of our readers took the time to address this article and what it says and wrote a letter to the Editor. That letter is printed here. In detail, the writer expresses the major arguments used in this debate by the non-chemical side of agriculture. In

Letter To The Editor

In the May 2018 issue of *Bee Culture*, Jessica Louque talks about beekeepers' need to be educated about pesticides and how we would have to deal with much worse if we had to go back to those old, much worse pesticides. When I started keeping bees, several decades ago, a three pound package could be purchased for five dollars. I lived through those days of much worse pesticides. When neonics came on the market is when my beekeeping started to go to hell. The difference between then and now is the chem-seed corporations control the seed supply. Those worse pesticides were only used when it was necessary and then applied with the honey bees in mind. They were not a continuous threat as systemic neonics are now. As for farmers loving neonics, in almost all cases, they don't have a choice, since Bayer-Monsanto and Syngenta control the seed supply, and it's take it or leave it as far as neonics go.

It used to be that we trusted the USDA and our universities to do the research. We can no longer do so because of multi-million dollar donations by chem-seed corporations to the universities.

Jessica Louque talks about research that supports her position. When she talks about "our" research, what research is she talking about? We always need to find out who funded the research. Is she talking about chem-seed corporation research? In research done for the USDA, Jonathon Lundgren and others found that, in the north central region of the U.S., there was no practical reason to use neonic seed treatment on soybeans, yield wise or money wise. The seed treatment was not effective against aphids which feed on soybeans, but the seed treatment did kill the Asian beetles which feed on the aphids.

USDA research has shown that honey bees do work soybeans and can increase soybean yields. The pesticide research was done at the SD State University office of the USDA. Jonathon Lundgren was harassed until he quit the USDA. At the time, the president of SD State University was on the Board of Monsanto. This is conflict of interest.

People of the U.S. have been taken in by a huge scam conducted by the chem-seed corporations. They have done this by buying off influential people and this includes our politicians and our universities. They have circumvented our environmental laws that were put in place to protect us.

The U.S. Geological Survey has found that all of IA's surface water is contaminated with neonics, and neonics are even being found in ground water. The danger is that it is working its way into our aquifers. Neonics are in our drinking water and this water is what we use to make up sugar syrup to feed our bees. USDA research has shown that neonics knock out the resistance that honey bees have for viruses spread by *Varroa* mites. No research ever done has shown neonics to be harmless to humans and the same goes for glyphosate (Round-up).Both are neuro toxins. Both are in our food and our water. Big Ag farmers could get along without neonics. It would take a significant mind shift for farmers to stop using the carcinogen glyphosate (Round-up).

When the previous farm bill was passed, there was big talk about saving family farms. There were attempts to put a cap on government payments to farmers. Even though amendments to do so passed both houses of Congress, they did not become law – thanks to Big Ag corporations. Family farmers went out of business. The Ground Hogs out bid them, bidding up the rent and buying the land. These Big Ag farmers spray after planting to control weeds. Then they cry about low crop prices and want the taxpayers to bail them out. While this is going on beekeepers are trying to keep their honey bees alive with ever increasing costs and less forage available.

Where I live in IA, the countryside was, a few short decades ago, filled with family farmers, five or six to the square mile. Not so anymore. Farmsteads with buildings, homes and windbreaks have been burned and bulldozed so the land can be farmed Big Ag style. The rumor is that farmers are feeding the world. The truth is they are feeding the multi-national chem-seed corporations and equipment manufacturers.

Then along comes Jessica Louque who would have us believe she is a beekeeper and has our best interests at heart. Let's consider the possibility of a conflict of interest. We need to keep in mind that Jessica and her husband are members of the National Alliance of Independent Crop Consultants (NAICC). "The primary mission of these professionals is implementing scientific and technological advances to enhance environmental sustainability and profitability on clients' farms. Services provided – generally include field trials to test the efficacy of agricultural products, residue studies, and environmental fate tests performed to support applications to the Environmental Protection Agency for pesticide registration permits." [emphasis mine] (**http://naicc.org/about/background/**)

Page 10 of the July 2018 Iowa Honey Producers Association newsletter has a reprint of an article that can be found at this link **www.theguardian.com/environment/2018/apr/27/eu-agrees-total-ban-on-bee-harming-pesticides**. The scientists in the European Union acknowledge the link to pesticide use and declining bee health. These pesticides harm human health too. The research has been done that shows this, but the big Ag chemical companies totally disregard this data. They are only concerned with their profits, and not the welfare of the people or the environment.

Ivan Rickers, Westside, IA

response, Jessica wrote her article this month about this letter to the Editor, and she went a step further and had one of her Auditors, those people who keep her honest, respond to it also. Both responses are here. There is no doubt that agricultural chemicals can be dangerous to bees, to people and to the environment. The crux of this issue, in my opinion, is not the chemicals, but those responsible for their exposure to our environment. I encourage you to read all three of these letters for a better understanding of this issue. *Kim Flottum, Editor*.

BIGGER PICTURE

Jessica **Louque**

Conspiracies and Science

Originally this month's column was going to be a discussion on Tier II tunnel studies and how they are managed. However, after a lot of response on an earlier piece where I wrote about pesticide testing, I thought it was a better idea to go over some of those responses. I do appreciate the positive responses that were sent in, but they weren't all positive. Mr. Ivan Rickers submitted one of the longer responses and is also published in this edition. There seemed to be some amount of either skepticism or confusion over some of the points I made, and I will be using Mr. Ricker's response as the basis to go a bit more in depth to cover some of the more consistent criticisms. Let me start here by his accusation that I'd have you believe that I'm a beekeeper. That was pretty specifically just in his, but I can say with a lot of confidence that I highly doubt there are many people in the United States that have more experience than I do with beekeeping and spending time inside a colony. I can only think of one person that might have worked in colonies more than me and she is from Germany. I'm not sure which part disqualified me from being a beekeeper – if it was the beekeeping for research, doing honey bee research and not pretending that all pesticides kill bees, or only hobby beekeeping on the side instead of doing it as our main source of income. If anyone else is skeptical of this or is curious about how we do our Colony Condition Assessments, feel free to harass Kim and I'm sure we could schedule something at a meeting sometime (in the off season, of course). I would have offered to do something at the Summer meeting this year but there's just no time between having our first field season in our own company, building a new house and trying to move, putting the kids in a new school district, and getting Henry moved into college and making it to most (if not all) of his soccer games is already well over my threshold.

One of the bigger complaints was that some readers felt that I was biased in my opinions towards the ag-chem companies or giving you "propaganda." The reason I wrote that article was to try to give everyone a look into the science world that makes these decisions on the larger scale. We're a pretty small community because the studies are incredibly difficult and intense, to say the least. A lot of people can't do it, or won't do it, or just don't know they can't do it. Most of the dissention towards the article seemed to be of the mind that if I didn't agree with their idea, then I must be wrong. Another researcher has pointed out to me various times in the past that people who disagree with your ideas are the ones you should listen to the most, rather than the ones that agree with you. If they have a compelling argument, you may want to start changing your own opinions because they might be wrong. I don't consider my column to be "opinion" because it is the truth rather than an assumption. To clarify on a few points here, when I say "our research" I generally mean research that I personally have overseen or worked with the Study Director to complete.

(Un)beekeeping with duct tape on my veil because I like my suit.

I'm not sure if my random pontification on birds and homesteading threw some people off on how I became a writer for this magazine in the first place, or if some people just haven't been reading as long. My dentist, who is a beekeeper, had *Bee Culture* in his waiting room and never knew I wrote a column because he'd never read it. In the meantime, it was overlooked or not explained well that my career was directing honey bee studies for pesticide registration in the U.S., Canada, and occasionally Europe. In the past I have worked for companies like Eurofins and Smithers Viscient, which was not a secret and I didn't think it came across as such. We started our own company because we wanted to have more control over the work that we did, but I stand by the work that I've done at both of those companies. I'm also not sure why there would be suspicion about my membership to NAICC, as it's pretty well known that our work is specifically for pesticide registration. Perhaps a better explanation as to the severity of falsifying data might explain this particular issue a little

Letter To the Editor

I realize that I make my living in an industry that is often maligned and misunderstood by the general public, media, and even the people we serve. I have worked in commercial research for 30 years, starting in pharmaceutical-regulated research, and transitioning into agrochemical research in 1989 – when the Environmental Protection Agency (EPA) issued their first set of regulatory criteria directly pertaining to agrochemical research, with the revision of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), otherwise known in our circle as the Good Laboratory Practice Standards (GLPs). I am also a long time member of the National Alliance of Independent Crop Consultants, (NAICC), and I was troubled by a recent letter to the editor from Ivan Rickers regarding our industry and this national organization. While Mr. Rickers is entitled to his opinions, being a GLP/quality assurance consultant in this field, I am only concerned with the truth and would like to address some of Mr. Rickers' comments regarding "Big Ag", commercial research, and the NAICC organization.

I am proud of the work the agricultural industry does. I stand behind this research. Often times the work that is conducted is proprietary in nature and therefore is not made public until the results are submitted to the EPA for registration purposes. This can lead to misunderstandings by those not directly engaged in the research that we conduct. Since its inception in December of 1970, the focus of the EPA was protection of our natural resources.

Since the early days of the twentieth century, America has been in the forefront of production and protection of crops for the world. Without any regulation, crop protectants were applied whenever there was a pest pressure on a crop. But it is Federal Regulation that drives the research we conduct today, not the fancy of big industry. The US government began this process in 1910 with the issuance of the Federal Insecticide Act, which was aimed at protecting farmers from being sold ineffective pesticides. This was further enhanced in 1947 when FIFRA was enacted and the US Department of Agriculture (USDA) was given oversight of this law which addressed manufacturing and labelling of pesticides. The EPA, at its inception, took over control of this regulation and oversight. Then regulations like the clean water and air acts, TSCA, RCRA and FQPA - to name a few – were passed and became significant factors that impact pesticide use in the US. Manufacturers of pesticides are constantly reacting to federal mandates and consumer whims in order to provide chemicals that are efficacious, environmentally friendly, and safe for human consumption.

GLPs, specifically, are the regulations we follow for all agchem research today. Being a QA Officer, my role is to, independent of the study conduct; evaluate the research being performed by any contract research organization (CRO) whether it be in the field or the laboratory. I do not care what the outcome is for any study as long as the work is accurate and complete. I assure that the study is conducted in compliance with all federal regulations, follows the GLP-required study protocol and CRO standard operating procedures. My inspections are documented, provided to the research management, and are reported to the EPA. "Big Ag" is required to follow all of the same rules and no one company has an advantage over another when conducting field research.

When a molecule is developed that has pesticide properties, it must go through a significant battery of testing in the lab before it is even experimented with in the field. The mechanics of the molecule are determined; the toxicity to non-target organisms is determined; the environmental fate (conducted in controlled laboratory settings) is conducted. All of these tests are conducted and submitted to EPA. The final tests are those where the product is applied in field setting, under controlled and restricted conditions, to evaluate the performance under expected use conditions. Rates, handling precautions, and restrictions are all determined in these studies. Bad news is reported - the QA officer assures of that. It takes years of testing of any product before it is allowed to be used in the US, Canada, the EU, etc . . .

Pesticide research is a complicated process that has many safeguards in place to assure that the results are legitimate and that all data are reported, not only the numbers that look "good." The Quality Assurance Unit (QAU) is one of these safeguards. Research conducted in the U.S., or across the world, that is going to support the registration of any product cannot be conducted without QAU oversight. Studies usually are not even considered for review if they are non-compliant with GLPs. Within my niche in this business is a cadre of trained professionals that have been in the field or lab and know the laws and science inside and out. We all take our roles seriously, and whether the QAU is a consultant, or an in-house employee at a CRO, or even pesticide manufacturer, we all review studies in the same light. The rules apply equally to all research. Studies simply do not slip by the QAU without significant review and confirmation. The QAU professional not only knows the regulatory requirements, but the science as well, and we all pride ourselves on our professional and personal integrity. And we are small part of the this industry, but our reputations are known and our membership is a professional organization, like NAICC or SQA, is a source of comradery and pride.

The NAICC is the organization that addresses the needs of this industry. At our annual meetings, all facets of the industry meet for training, marketing, and recognition. From the QAU professionals, to CRO owners and scientists, to pesticide manufacturers, to equipment manufacturers all come together to share ideas and work towards better industry. There are no nefarious plans being made on how to make more money or use more products on the crops. We are all concerned with safety. We all are working together to make sure our crops and protected from pests and disease, we investigate better methods of application, and we train the next generation of research professionals.

Currently I am an independent consultant working for the pesticide manufacturers, CROs, and analytical facilities that conduct this research. I do my job because I care, and I get hired because of my reputation as a fair and thorough inspector. As I said, I am not trying to tip the balance in one direction or another – I am only concerned that the truth is unveiled. I have never come across a situation where I was made to compromise my values or my interpretations of the results. I stand behind every single audit I've ever conducted, and I have worked in conjunction with the federal inspectors at the EPA to assure compliance on all phases of research.

So to set the record straight with one example Mr. Rickers cited: glyphosate. In his letter he referred to glyphosate as a "carcinogen" and that "no research ever done" has shown it is harmless to humans; while this is an attention grabbing statement, unfortunately, it is inaccurate. Glyphosate has been in use since 1974. In a 1994 report from Cornell University, which collated all of the research for that 20 year span, concluded that glyphosate had no acute or chronic toxicity effect in mammals (rats oral tox LD50 was 5600mg/kg, goat was +10,000mg/kg, 500m/kg/day in dogs showed no chronic effects – an average human would have to consume more than 12 ounces of technical grade material for an LD50 dose!) Aside from being an eye irritant, glyphosate showed no reproductive health or teratogenic effects. While slightly toxic to birds in high does, it is non-toxic to fish and honey bees. A comprehensive review of data conducted for the European Union and published in 2017 found no significant evidence of carcinogenic properties as well. And glyphosate is not a neurotoxin. There is insufficient evidence to rule this molecule carcinogenic, primarily because the molecule is poorly absorbed and is excreted without being metabolized. Glyphosate is one of those rare materials that comes along and changes the world, for the better.

I agree debate is a positive aspect of our business. And sometimes people will skew the truth to get the attention of the reader; however, these speculative (at best) accusations against my industry are uncalled for. I fail to see how claiming big agchem is a detriment to the environment, family farming, and commercial research. Let's debate the issues with logic and fact. Together we can all make this a better industry.

Randy Fuller, Quality Assurance Consultant, IntegriQual, LLC

better (besides the letter written in by Randy Fuller, who is one of the first auditors in a line of multiple people who inspect our studies).

To be completely honest, it would be better for business to be anti-pesticide. That's what gets us work. I can't tell you how many times we've had to do a couple hundred thousand dollars' worth of testing on a product that really didn't have any major effects on bees just because some activist-minded groups complained about it in an effort to either get publicity, public outrage to further an agenda, or just as an overall lack of science comprehension. It really does not serve any beneficial purpose for me to try to educate naysayers or to dissuade complainers because they are literally fueling my industry for pesticide testing. However, it goes against my ability to keep my mouth shut to not try to explain how we do work and why we do it. I don't really consider myself an ag-chem proponent or a beekeeper proponent from a business perspective. Pesticides can be extremely useful and safe if they are used properly. Most major instances of colony mortality resulted in gross negligence on behalf of the applicator, either through a complete disregard of the label or a misunderstanding of the application process. Part of our work is testing different application methods of a pesticide to determine if spraying at a specific time of day or a different application (foliar vs. soil drench) may have a lesser impact. The label is there for a reason, and it is not just a suggestion. We help create that label to make it safe and using it in a different way practically guarantees that something bad is going to happen.

Let's pretend that we had a pesticide that was incredibly toxic at the expected label rate no matter how we applied it. If we altered the data we produce to make it appear that the pesticide was safer than it really is, Bobby and I could be in court right along with the owner of that pesticide when they get sued since we gave them the data that was used to create the label. Besides this, we could be fined by the EPA, have our facility shut down, go to prison, or lose our reputation and client base. No thank you to all of these. I don't like anyone enough to go to prison for you, and I like to buy shoes too much to lose my main source of income. My goal is always to produce the best quality data possible. I really don't care if it shows that a pesticide can murder entire colonies upon exposure or can only kill bees if they fall into it and drown, as long as my study was good and the data is reproducible. On top of this is my undying wish to never be wrong. It does occasionally happen (or so Bobby tells me) but my life's goal is to not be wrong. It may be interpreted from this statement that I am stubborn and would have a refusal to change my opinion on various topics. While I am ridiculously stubborn (sometimes to a fault), I don't mind being corrected if the correction is explained because it keeps me from being wrong in the future.

For the topic of neonics, as well as the basis of some arguments, let me start off by saying if we as a beekeeping nation could sue *Varroa*, we would likely have enough money in varroacide research to have that problem better under control. You don't get books and publicity and a soapbox when you complain about *Varroa*, but there is nothing under the sun that is as detrimental to colonies as *Varroa* mites. There have been numerous articles published on *Varroa*, but it sounds like it might be time for a "history of *Varroa*" to be out and about in the future. The downfall of current beekeeping came about with the onset of *Varroa* mites and the ridiculous expense and monitoring associated with it. *Varroa* can carry more diseases than I think we have been able to solidly prove at this point, cause stunted growth in larvae, and make it difficult for bees to be able to fight off other "invaders" like chemical exposure, Nosema, or other pests and diseases. The benefits of neonics is something I cover more in a presentation mode, and it's not something I think is necessary here because any data I share with you would come either from the companies who own those chemicals, or from farmers who buy them. Even if I showed the data that gives the differences in crop yield and cost with and without application of this chemical class, people who already don't believe they are useful will not have their minds changed. In the meantime, banning neonics just makes more money for these ag-chem companies because the older chemicals replace them in the field. These older chemicals are more expensive, harder to produce, and incredibly more toxic to humans.

On the last topic for the time being, I guess it is a discussion of what my goal is by discussing the research side. I don't think I ever said I had anyone's "best interests at heart" whether beekeeper or otherwise. As I said before, it's probably better for business if beekeepers keep complaining. I do think it's in my best interest to try to educate people because every time I hear people saying things that fall into the "conspiracy theory" category or making statements that either aren't scientifically based or are parroted versions of someone else's opinion, it makes me want to slam my head into a wall. I definitely don't think all pesticides are safe for bees. In fact, saying something that kills insects is safe for other insects is generally a stupid assumption, unless you know enough about that class of pesticides to understand that it only targets specific insects (like caterpillars, or beetles, or flies, etc.). That's the part where education comes in. I know which fields are going to be sprayed with something that's going to make me move my bees before an application, and which ones are fine to leave for the Summer. That's the part that's beneficial for beekeepers to understand, and that's what I hope everyone can get out of this. There are literally millions of dollars being spent to figure out how to make pesticides as safe as they can be, but what the consumer does with them is out of the hands of the maker.

If anybody has some specific questions about my industry, please feel free to send them in. If I get enough I'll do a Q&A edition in an upcoming column. BC

Jessica Louque and her husband, Bobby run Louque Agricultural Enterprises, a contract research business specializing in apicultural studies.

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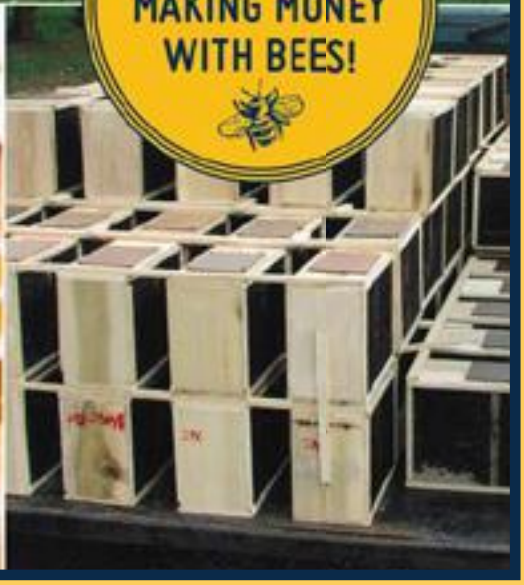

Ross **Conrad**

A World Without Pollinators

Imagining The Unimaginable

There is a quote attributed to Albert Einstein circulating that you may have come across: "If the bee disappeared off the face of the Earth, man would only have four years left to live."

I have searched for the source of this quote in Einstein's writings and have been unable to verify its authenticity. The best I have been able to discover is that the earliest this quote seems to have appeared in print was in a French pamphlet back in the 1990s. It appears that someone wanted to make a point, and since Einstein was a really smart guy and people tend to listen to what he had to say, this quote was falsely attributed to him.

Why would someone do such a thing? Well, even back in the 1990s, there were indications that pollinators were in trouble from a cocktail of threats. Pests and diseases have long been a challenge for beekeepers. Thankfully, today there are all kinds of tested and approved treatments to address pest and disease issues. Lack of adequate forage, the result of development, land fragmentation and industrial agricultural practices that rely on monoculture plantings, can be overcome with supplemental feeding. More challenging are the issues that beekeepers can't do much to address immediately. These include: climate destabilization resulting primarily from the burning of fossil fuels; and pesticides that also happen to make the issues of pests, diseases, lack of proper nutrition and climate change worse.

Prophesies that predict the disappearance of bees may come across as alarming and negative, but they play an important role. A prophesy can inspire a change in attitude and action that will prevent a dire prediction from coming true. In this way, scientists and the findings of solid peer-reviewed scientific inquiry takes on the role of the modern-day prophet and prophesy. And yet, despite it being obvious for over two decades that pollinators are in deep trouble, their general situation continues to decline. Sure, managed honey bee colony numbers in the U.S. have increased 10-15% or so over the past decade, but scientific indicators suggest that wild pollinators and insects are declining dramatically. (Burkle 2013) The most recent example being a German study that found a 75% decline in insect biomass in protected wildlife habitats over the past 27 years. (Hallmann 2017)

The importance of pollinators

The honey bee is usually credited with pollinating the major crops in the United States and beekeepers tend to be well aware of the importance of honey bee pollination. But often folks are not fully aware that native bees, butterflies, moths, and flies are also important pollinators of crops, sometimes even more critical than the honey bee. (Roubik 1995; Buchmann & Nabhan 1996; Klein 2007; Winfree 2007; Holzschuh 2012) So, what can we expect in our future should pollinators be in short supply? Science provides us with some clues as to what such a future may look like.

The Economics of Pollination Services

One of the first and most obvious answers to what we can expect when pollinators become scarce are economic impacts, especially in the main stay of the beekeeping industry: migratory pollination services. Pollinators provide billions of dollars in economic benefits. Unfortunately, it is difficult to assign monetary value to pollination services, given that these services are not traded in the marketplace, the value of pollinator services differ widely depending on methods, crops being pollinated, the scale of the pollination operation, and the value of money which changes constantly with shifting markets, especially during financial crises. One thing we do know is that in a world with fewer wild pollinators, demand for managed honey bees can be expected to increase. (Garibaldi 2013)

When demand goes up, it is typically accompanied by resulting price increases. Pollinator fees paid by growers have recently hit all-time highs and this trend can be expected to increase in the future. The experience of New Zealand's

The Successful Prophesy Is One That Does *Not* Come True

beekeepers suggest that as honey bee colonies become more valuable, beekeepers and society in general can expect to incur additional costs and expenses related to bee hive theft, and related crimes. (Reuters 2017) As the cost beekeepers have to pay to maintain their hives, harvest the honey and bring it to market increase, honey prices (along with the price of beeswax and other hive products) can be expected to go up as well.

Human Nutritional and Health Impacts

The world has already seen instances of crop yield reductions that have occurred due to pollinator scarcity. (Allen-Wardell 1998) These include well documented pollinator related reductions in blueberry production (Kevan 1977) and reports of Brazil nut declines in South America. (Mori 1992) Global instances of starvation and hunger, which are already a serious problem, can be expected to increase in a world with fewer pollinators.

Another potential impact of pollinator loss is its effect on the nutritional composition of pollinated crops. The majority of the available dietary fats, Vitamins A, C and E, and a significant amount of minerals like calcium and iron are a result of animal-pollinated crops worldwide. Given that approximately a third of our food requires non-wind pollination; we can expect that there will be less nutritious food available in a world with fewer pollinators. (Eilers 2011; Chaplin-Kramer 2014) This can be expected to aggravate the nutritional deficiencies that already exist and severely impact human health on a global scale. Since about half the human population suffers from nutritional deficiencies, (Lynch 2011; Holick 2008; Stabler 2004, Black 2003) the additional nutritional stress that a lack of pollinators will cause may prove to be catastrophic.

Vitamin and mineral supplements are not always a practical substitute for the loss or reduction of the nutrients we get from our food. Synthetically fabricated food supplements are only available to about 25% of the world's people, primarily in developed nations. The remaining 75% of the world's human population rely largely on pollinator dependent fruits, nuts and seeds for their vitamins and minerals.

The heart felt beauty that pollinators can evoke is just one of the many gifts that will be lost if the current pattern of pollinator decline around the world is not reversed. Alice Eckles photo

The same is true when it comes to medicine. Most of the medicine's used world-wide originate from botanical sources or are plant based. This is also true for 75% of the world's people that rely on local herbs and plants for healing and health.

Ecological Collapse

As noted above, the advanced, wealthy nations of the first world have the resources to help mitigate some of the damage and harm that a drastic decline in pollinator populations can be expected to produce. The wealth of the first world will undoubtedly help developed countries off-set wild pollinator loss to some extent by allowing their beekeeping industries to increase managed honey bee colony numbers when possible. It is unlikely however, that even such first world efforts can fully mitigate the loss of ecological stability that wild pollinators provide. Not only can we expect to see dramatic declines in insect eating birds, bats, fish and insects, but the decrease in the numbers and health of pollinator dependent plants that will accompany pollinator decline will have a direct impact on herbivore populations. (Buchmann & Nabhan 1996) Since the collapse of entire ecosystems on a large scale is a new experience for modern man, we really don't know what to expect and what the full impacts of significant pollinator loss might be. An accurate assessment of changes in pollinator populations and the impact on biodiversity and ecosystems are difficult to monitor and track because of the lack of baseline data on species' ecology and distributions. (Alan Cox 2000)

Resource Scarcity and Increased Conflicts

As food, medicine and areas that can support healthy pollinator populations become scarcer, human history indicates that intensified competition for these resources is likely to lead to increased conflicts and wars between nations. (Ide 2015; United Nations 2012; Kennedy 2001; Maxwell 2000) This is despite the fact that historically the world has always relied on cooperation, resource sharing and community to make survival and peace possible. The packs of wolves, flocks of birds, schools of fish and herds of buffalo found in nature are just a few examples of the natural law that says that groups cooperating together provide individuals within the group a better chance of survival than when individuals go it alone.

Confronting the Potential for Disaster

The potential impacts of pollinator decline are horrifying to contemplate. Unfortunately, there are many people that don't want to know that truth about the state of our pollinators. They are determined to remain oblivious to the reality around us, blindly ensconsed in multiple layers of denial. All too often when beekeepers, politicians, researchers and the general public are presented with the issue of pollinator loss, they appear to listen but are taken aback and have the almost knee-

jerk response of "I don't want to hear about the problems." Depending on their position in society, the response tends to be either, "Just tell me the solutions. Tell me what to do," or "I have the answer. This is the solution." A prime example of this is the continual reference to *Varroa* mites as the primary cause of today's honey bee woes by so many of the beekeeping industry's most celebrated and respected scientists and researchers.

In far too many cases, I suspect that such responses do not originate from sincere comprehension or desire to make change happen, but from a wish to evade the gravity of the situation through excuses, or meaningless, or perfunctory actions that make little difference so as to not have to look deeply into the frightening abyss of the problem. When a person takes pollinator decline seriously enough to look at all the evidence and begins to question our nation's pesticide practices for instance, they are often labeled fear mongers, as if extreme concern over the mass die-off and extinction of our pollinators and the potential collapse of the ecosystem is somehow an inappropriate response. Such accusations suggest that the whole truth about these realities should not be told, and if they are, the bearer of bad tidings should be ashamed of themselves. Alternatively concerned beekeepers are often denigrated and labelled ignorant of the science, which we are told by the chemical industry and apologists, is settled.

At such times it is good to remember the value of fear, which is a natural human response to a threat of harm. Rather than discounting, denying or being ashamed of our fear, we should pay attention to it since its purpose is to warn us of danger and prompt us to take action to protect ourselves. We can allow fear to paralyze us, or we can use it to empower and motivate us. The idea that better nutrition, *Varroa* treatments, drugs for diseases, pesticide monitoring and evaluation, and attempts at genetic improvement are not solving the current state of pollinator decline and reversing colony collapse is tantamount to admitting defeat, and the idea of defeat is very un-American. Yet it is our very willingness to embrace defeat, powerlessness, failure and loss of control, that can offer "salvation," not from colony loss and pollinator decline, but "salvation" from continuing to deny that pollinator loss is happening all around us daily despite our best efforts to date.

Remember, if we don't change the path we are on, we will end up exactly where we are headed. The question now is, are we willing to listen to our modern day prophesies? BC

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Chelifers As *Varroa* Control Agents

Hans-Jürgen **Ratsch**[1], Jens **Clausen**[2], Bernhard **Huchzermeyer**[3], Johannes **Leng**[4], Laurin **Mathes**[4], Petra **Hoppe**[1]

Pseudoscorpions May Be The Answer

Abstract

Due to the use of pesticides in agriculture, but also due to *Varroa* mites, the pressure on bee colonies has steadily increased in the last decades. The application of organic acids against *Varroa* mites increases the pressure on the bees. The project tried to use chelifer cancroides as *Varroa* control agents and collected data on the number of fallen *Varroa* mites during eight months in 2017. It compared colonies in wooden hives equipped with chelifers with control colonies in wooden hives and in Styrofoam hives in 13 test stands around the city of Hanover, Germany. The number of fallen *Varroa* mites in the wooden hives with chelifers was found to be significantly lower than in the wooden hives without chelifers.

The approach taken by Torben Schiffer in Hamburg to control the *Varroa* mites by symbiotic coexistence of chelifers *(Chelifer cancroides, Arthropoda, Arachnida, Pseudoscorpionida)* and bees seemed promising to us. Meikle mentions the possible use of pseudoscorpion to reduce the number of *Varroa* mites, but points out that there is still no field research available. Donovan and Paul point out that chelifers historically used to live in hives. Only by the introduction of hives made of sawn and therefore smooth wood or later Styrofoam hives, any space in the beehive in which chelifers could have retreated or nest disappeared. As long as bees were kept in straw baskets or hives made of coarse wood, this was still possible. The type of hives that are used is therefore crucial for the ability to work with chelifers.

Chelifer getting ready to eat that Varroa.

If chelifers are successfully located in beehives, they will hunt for *Varroa* mites and other prey and they will stab it, poison it and suck it out. Each pseudoscorpion can consume one to nine *Varroa* mites per day. Van Toor demonstrated by DNA analysis that pseudoscorpions *(Chelifer cancroides)* actually do consume *Varroa* mites in beehives.

However, it is also important to offer suitable places for the chelifers to retreat and build nests. Chelifers prefer dry environments. Schiffer therefore recommends hives made from wood instead of Styrofoam because relative humidity in Styrofoam hives has been found to be very high. He has converted frames into shelters for chelifers. These frames are filled with rough wood, behind which the chelifers live.

Van Toor, who has also been researching the symbiosis of chelifers and bees is also using frames filled with wood as dwellings for the chelifers. Initial experiments with New Zealand pseudoscorpions *(Nesochernes gracilis)* showed that although these pseudoscorpions ate *Varroa* mites under laboratory conditions and could be successfully bred, they were quickly extracted from the hives by the bees. Even in new trials with *Chelifer cancroides*, van Toor has not yet been able to significantly reduce the number of *Varroa*. However, his findings indicate that a more precise understanding of the hunting behavior and feed preferences of the chelifers might be important, and the choice of the right prey, as well as the correct design of the housing of the chelifers, seem to be critical for the success of the symbiosis to control *Varroa*.

In the context of temperature and humidity in the hive Tautz and Heidinger point to the large moisture-regulating effect of deadwood, which bees would naturally find in their habitat. Also the results of Schiffer (2013b) suggest clear advantages of wooden hives.

Photo by Torben Schiffers, Hobox (honey bee online studies), Hamburg.

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Material and Methods

The objective of the project was to measure the impact of chelifers on the development of *Varroa* mite populations in bee colonies. To achieve statistical power it was decided to place three hives on each of 13 locations in the Region of Hanover. One of these hives would be made of wood and equipped with 150 chelifers, one other would also be of wood and the third one would be a standard Styrofoam hive.

In order to measure the intensity of *Varroa* infestation of the bee colonies, the number of mites dropped from each hive on drawers below the hive was recorded weekly. The number of mites falling in this way is related to the actual infestation of the respective hive and was repeatedly used as an indicator of the *Varroa* infestation (Spivak 1996, Ostiguy and Sammataro 2000, Guzman-Novoa et al. 2012).The number of *Varroa* mites falling out of each hive was measured from week 34 in 2016 up to and including week three in 2018.

Chelifers

To equip 13 hives with 150 pseudoscorpions each it was necessary to get hold of about 2.000 chelifers. Since chelifers are not a marketable product, they were collected on farms in the region. The most promising places for the collection of chelifers were found on farms with animal husbandry, e. g. below hay and straw stocks above stables. Particular success was achieved in a sheep pen. Hay or straw was cleared out of the attics. Especially under boards lying around there, the chelifers were found in very similar situations to those described by Schiffer (2013 a) in the description of his catching method.

The chelifers were transported in jars or small buckets with lids. The collected chelifers were kept in four terrariums in an attic until they were brought into the bee colonies. Together with the animals themselves, substrate (hay, straw, brittle wood) was brought along and filled into the terrariums. From the organisms contained in this substrate, the chelifers have also continued to feed. In addition, potential feed (e. g. silverfish, dust lice and mites) were swept off boards with a feather and put into the terrariums. Potential predators (e. g. larger arachnids, centipedes, mealworms and meal beetles) were sorted out as far as possible.

In addition, the chelifers were fed with flightless fruit flies, wax moths and wax moths-larvae from pet shops. Old honeycombs were put into the terrarium, so that the wax moths in the terrarium of the chelifers could propagate and did not have to be bought permanently. This worked very well and so the chelifers had permanent wax moths-larvae available as feed. The overpopulation of wax moths and their larvae, which we observed in earlier attempts to breed wax moth-larvae as feeding animals in the school, did not build up.

A disadvantage in keeping chelifers "on stock" in terrariums can be cannibalistic behavior, especially when there is a lack of food. De Andrade and Gnaspini (2002, p. 615) described the extent of cannibalism among chelifers in captivity as small; they indicated a cannibalism rate of 1%. Within the scope of the project, however, up to 2,000 chelifers were kept in four 40 x 100 cm terrariums, which were thickly filled with substrate. According to the project team member's impression, and without accurate counts and balance sheets, the number of chelifers ultimately recaptured from the terrariums was noticeably smaller than the number of chelifers inserted into the terrariums.

Following the initiative of two schoolgirls, who wanted to work on breeding of chelifers, we accommodated 10 animals each in a terrarium of approx. 30 x 60 cm in the school in September 2016. In the Spring of 2017 nests and nymphs were first observed in the terrarium. In March 2018, a census was carried out, which resulted in a stock of 24 chelifers. With the considerably lower stocking density compared to terrariums with up to 500 chelifers, it is clear that the propagation rate did exceed the rate of cannibalism in the long term.

Hives

Our goal in designing hives for the project was to create a breeding area that is as suitable as possible for the common life of bees and chelifers, but to leave space for frames and bees as far as possible unchanged. The aim was to ensure that, in the event of success of the project, beekeepers wishing to work with chelifers would only have to procure or change part of their material. This would reduce the costs of the switchover and thus reduce the barriers to the application of the idea.

For the reason of more favorable humidity (Mathes & Wiegand 2017) wooden hives have been chosen to house the chelifers. In addition, results of Schiffer (2013a) indicate that the electrostatic charge of Styrofoam restricts the orientation sense of chelifers and thus Styrofoam hives do not represent a good habitat for them.

In addition to the space for the honeycombs of the bees, retreat and incubation areas for the chelifers had to be created. Since chelifers live hidden under wood or straw, it seemed expedient to create areas within the hives and to fill them with a "nesting mixture" of straw and brittle, but dry and not too rotten wood, partly also with tree bark. Frames were additionally placed close to the sides of the hive body, which were tensioned with wire mesh (6x6 mm) and filled with the nesting mixture.

The hive body was converted in such a way that the front and rear sides of the body were partially sawn out. Afterwards, a new wall was placed further outwards and any gaps were closed with strips. The cavity, which is now accessible from the inside, was filled with the nesting mixture described above and closed from the inside by wire mesh to prevent the nesting material from being discharged by the bees. Additionally, alterations were made to make the hives watertight and to improve the insulation. Since the hives for the chelifers were specially prepared the treatment of hives with chelifers was not randomized but was restricted to the prepared hives.

Test stands and measurement

The 13 test stations were located in and around the city of Hanover in different ecosystems: gardens (3), city park (2), meadow (1), flowering strips (2), fallow land (2), forest (2) as well as in the city of Hanover at the location of the school (1). In each test stand, all three types of hives were placed side by side.

The mites and other material in the drawer was collected weekly by a research assistant, put in a sample

jar, labeled with the respective number of location and hive number and counted by the research class at school. The counting was always supervised by the teacher Hans-Jürgen Ratsch, who helped the students with insecure cases and checked the plausibility of the results. The class was specifically trained by Prof. Bernd Huchzermeyer. During the counting process, several special features such as dead bees or dead chelifers were detected.

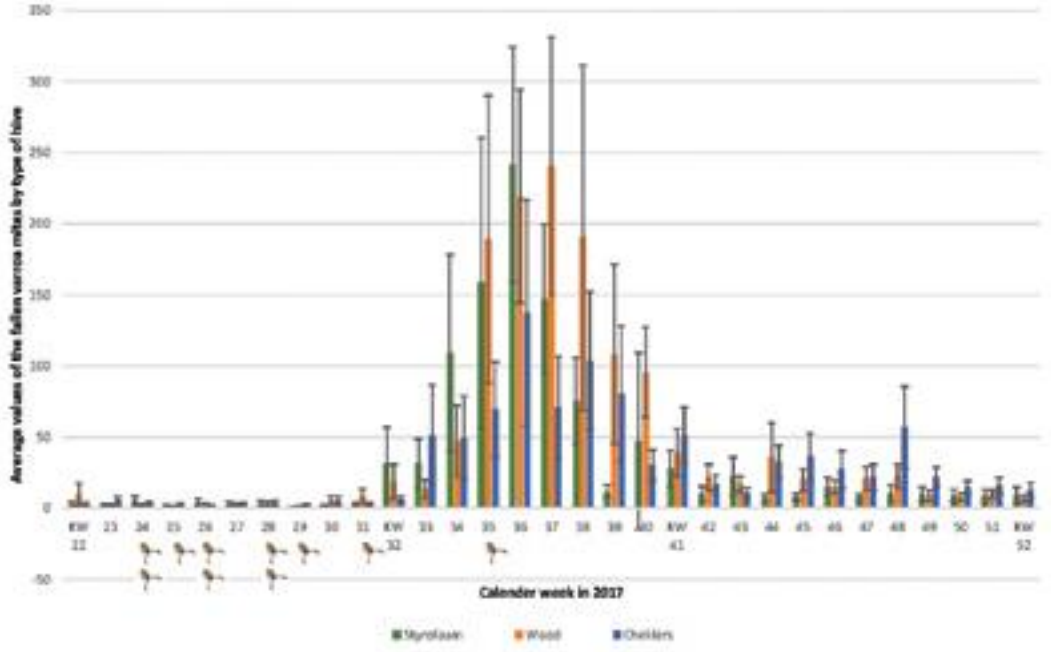
In the course of the second half of 2016, numerous changes were made to the test stands. In spring 2017 bee colonies who died in the Winter were replaced and chelifers were collected and put into the hives. From week 22 in 2017 onwards valuable data was continuously available.

Results

Finally, the number of fallen *Varroa* mites could be successfully determined for nine remaining stands with two wooden and one polystyrene hive each for weeks 22 to 52. From week 33 to week 52 the colonies at the location M (Negenborner Wald) were added. Six data points were excluded after a treatment of two colonies with formic acid.

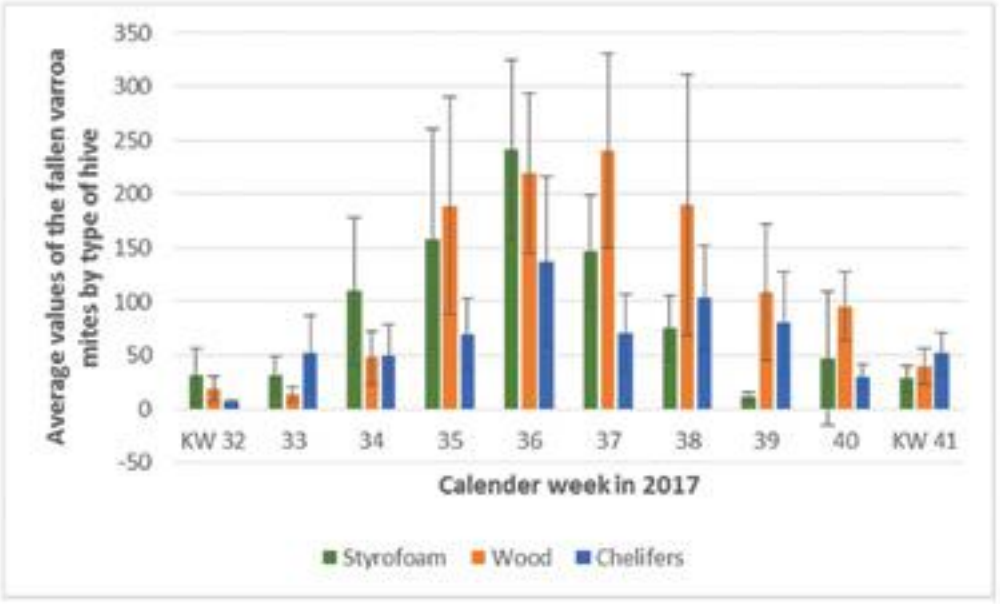
The following figure 1 shows the average values and standard deviation of the fallen *Varroa* mites by type of hive counted in the calendar weeks 22 to 52 per bee colony. Figure 2 shows the enlarged section of the time from the beginning of August (week 32) to mid-October (week 41).

Figure 1. *Average values and standard deviation of the fallen* Varroa *mites by type of hive counted in the calendar weeks 22 to 52.*



Source: own representation, the chelifers mark the weeks in which they were introduced into the colonies.

Figure 2. *Average values and standard deviation of the fallen* Varroa *mites by type of hive counted in the calendar weeks 32 to 41.*



Source: own representation

Discussion

The data collected appear plausible in the light of other sources. Oliver (2018), for example, publishes values of mite fall per colony in 24 hours and during a full year. The data refers to a temperate climate of medium latitude. The highest numbers of mite fall in September, offset the highest numbers of bee brood and bees in early Summer. All our mite counts remain in the range of mite counts as documented by Oliver (2018).

Based on the basically plausible results, it can be concluded that the statistically significant result, that the *Varroa* infestation in the hives with chelifers is lower, is neither a coincidence nor a measurement error. This holds true at least for a comparison with the wooden hive. Rather, with the necessary statistical power, it has been proven that the intensity of the *Varroa* infection can be effectively reduced by introducing chelifers into appropriately prepared wooden hives. BC

Acknowledgements:

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Frank **Linton**

OBSERVATION HIVES

You Should Have Some. You'll Be A Better Beekeeper When You Do.

It is an unpalatable fact: Beekeeping is a knowledge-intensive activity. You can no more become a good beekeeper by inspecting a few colonies every ten days than you can learn a language by taking a class every ten days, or get into shape by going to the gym every 10 days. And until you have learned enough to enable your colonies to flourish, under your inexpert care they will continue to die.

It is not necessary, though, to kill your colonies while you learn from them. There is a better way, a simpler way, to vastly increase your facetime with honey bees and your knowledge of them. By installing a glass observation beehive in your home you can see what your bees are doing all day, every day, every season, all year round. You can see what, and how, and when they do each of the myriad activities that honey bees engage in. And by taking this step you will position yourself to learn a lot about bees; you will become a better beekeeper – almost automatically.

As beekeeper Michael Bush puts it "Every beekeeper should have an observation hive. Not only for what you will learn about bees, but for what you can tell, day to day, about what is happening in your other hives".

You might think that installing an observation hive in your house (or in your office, or garage, or on your deck) is a lot of work. But it doesn't have to be. And hive inspections could not be easier, the hive is transparent! When the hive does need work, you close it up and take it outside. So, as long as you ensure that it is easy to close and easy to move, you are all set.

I suggest you purchase your first observation hive from one of the vendors listed below. Later, you may want to design and build your own hive. There are many sizes and qualities to choose from on the market. I strongly suggest you select an observation hive that uses the same frames as the ones you use in your other hives, to make exchanging them easy. Also, I suggest that you select an observation hive that is only one frame wide. If the hive is two frames wide, the activities you most want to see will take place between the frames, hidden from you.

Remember, the purpose of this hive is your education, not honey production, so making the bees' activities as visible as possible should be a goal in selecting your observation hive. For the same reason, the bee space between the comb and the glass should not be excessive as you cannot see events in the comb beneath two or three layers of bees. This problem can be mitigated somewhat by controlling the number of bees in the hive.

As you review the selection of observation hives, think about where you will install it. Consider the needs of those with whom you share your living/working space. Choose a location where you can easily see the hive and supply the hive with a strong light. I have had my observation hive in my guest bedroom, in my office, on my deck, and – when I lived by myself, in my dining room. If you put the hive out of doors, it should always be in the shade and the nighttime temperatures should drop below 65F only briefly.

Some visitors have compared my observation hive to a fish tank, and in the sense that the fish and bees' activities are easily viewable, that is true. A major difference, though, is that bees are foragers and the fish are not. You don't need to connect your fish tank to a lake, but you do have to connect your observation hive to the outdoors. The easiest way to do this is to put a board in a window, put a hole in the board, and put a tube from the hive to the hole. For a tube, I use a 1" diameter clear plastic pipe from a hardware store. The pipe is easily straightened (or bent, if needed) by putting it in hot water briefly. For a board I use a 2"x4", cut to fit snugly into the window and painted to match the window frame. I use a hole drill (also from the hardware store) to cut the hole for the pipe. Finally, since the window no longer closes or seals completely, pick up some insulation to seal any gaps. Another item you need to think about when setting up your hive is the hive stand. The ones from your bee yard will not do! I use a bookshelf from Ikea, the one that's 42 inches high is just right for me. They come in all sizes. When my hive was in the guest bedroom I used a bureau, on the deck I used a table. The key point is to set things up for comfortable viewing.

One good thing about using a bookshelf as a hive stand is that you can put all your beekeeping books and magazines there and refer to them as you look at the bees. There's a lot going on and you'll want to understand what it is that you are seeing. To supplement your observations, several books describing honey bee biology are a must.

Stock the hive with a frame of nurse bees and eggs from one of your standard hives. Watch them raise a queen. Watch the queen depart on mating flights. Watch her begin to lay. Watch the population change over time. Watch them swarm – if you live where swarms are not a nuisance. Otherwise, watch carefully, and split the colony before it swarms; adding frames of brood to your other hives, or restarting the observation hive with a frame of eggs and nurse bees again. Feed them as necessary.

One of the best things about having an observation hives is the opportunity to bring additional senses into play. Not only can you see the bees, but you can also hear them. The sound they make changes all the time, and every time it does, I glance up to see what's going on. Besides that, you can smell them, you can smell the nectar they bring in, the clean fresh odors of a healthy colony, and the less pleasant odors of an unhealthy one. Finally, you can feel the temperatures in various parts of the hive, the warm brood nest, the cooler honey super, and the temperature of the breeze coming through the entrance.

Earlier I mentioned that as long as you ensure that your observation hive is easy to close and easy to move, you are all set. To work your hive, close it up and take it outside. Once outside, open it up and set the frames into a nuc box. Clean up the observation hive and do whatever you need to do with the bees. Then, quickly set the frames (and bees) back into the observation hive, close it up, take it inside, and reconnect the tube.

Occasionally you will have to clean the glass because the bees cover it with propolis and add bits of comb to it.

Observation Hives for the Public

Observation hives are valuable educational tools for two very different audiences, beekeepers and the public.

Two kinds of observation hive are used for public education, temporary portable hives, and permanently fixed hives.

Beekeepers take temporary portable observation hives to farmers markets, street fairs, school visits, and the like. These are typically single-frame hives, with or without the queen. The bees and comb in these hives are often pulled from a production hive and returned to it on the same day.

These hives are used to "show and tell" about honey bees, beekeeping, pollinators, environmental issues, etc., and to attract attention to the table or booth where the hive is located.

Several temporary portable observation hives are available from beekeeping suppliers' catalogs for use in public outreach, along with a variety of informative materials. You may also be able to borrow a portable observation hive and other outreach materials from your local beekeeper's association. Contact your association's Outreach Coordinator.

In contrast, permanently fixed observation hives are found in nature centers, museums, and other public educational sites. These hives require more attention than a standard hive because the colony must be kept healthy and visually appealing. Also, to be successful, a permanent public observation hive requires the coordinated efforts of a team comprised of several roles, only one of which is the beekeeper. For example:

- Someone to check the hive daily, feed it as needed, and notify the beekeeper when further attention is necessary
- Someone knowledgeable to respond to visitor's questions,
- A docent to provide 'tours' or demos of the observation hive,
- An exhibit designer/builder. Many themed exhibits can be constructed around an observation hive.

Suggestions for removing propolis include alcohol, WD-40, oven cleaner, Krud Cutter, and others. Be sure the glass is free of any trace of these before putting the bees back into the hive.

You will have the opportunity to see the effects of *Varroa* mites, wax moths, small hive beetles, and other parasites, pests, and predators, as well as the effects of the treatments you apply. Plan ahead; will the methods you use on your other hives be acceptable in your house? If not, come up with suitable alternatives.

For more information, a web page focused on observation hives for beekeepers is: **http://thebeepeeker.com.** That's bee peeker, get it? BC

For in-depth knowledge, try a book:

I recommend the one I wrote: *The Observation Hive Handbook: Studying Honey Bees at Home*,

An older book, also good and still available, is: *Observation Hives*, by Thomas Webster and Dewey Caron,

If you enjoy woodworking, there's: *Observation Hives: Design and Construction*, by William Middendorf.

Here is a partial list of observation hive vendors, inclusion or omission does not imply endorsement or its opposite. The best observation hive for you is the one that best fits your situation (Amazon, etsy, and eBay are also worth a look):

Betterbee **https://www.betterbee.com/educational-tools/oh1-observation-hive.asp**

Bonterra: **http://www.bonterrabees.com/**

Brushy Mountain: http://www.brushymountainbeefarm.com/Ulster-Observation-Hive

Dadant: **https://www.dadant.com/catalog/catalogsearch/result/?q=observation**

Draper: http://www.draperbee.com/catalog/page7.htm

Kelly: https://www.kelleybees.com/observation-hive.html

Mann Lake: **https://www.mannlakeltd.com/observation-hive**

Pigeon Mountain: http://www.pigeonmountaintrading.com/shop/hives/observation-hives.html

Windows in Full-Size Hives

Some full-sized hives such as Flow Hives, Slovenian AZ hives, and top bar hives come with windows in their ends or sides. These viewing ports make it possible to see a bit of what's going on inside the hive and the advantage of a full-size hive is that the bees in it are a full-size colony. One issue is the need to travel to the apiary to observe the bees' behaviors, but the more significant issue is that with a window in a full-size hive, you get to see only the ends of the comb or the comb at the side of the hive. These viewing ports are better for a status check than they are for viewing bee or colony behaviors.

[The material in these sidebars originally appeared on **montgomerycountybeekeepers.com**]

*Frank Linton, Ed.D, is an EAS-certified Master Beekeeper. He is the author of The Observation Hive Handbook. Version 2 is now available from the Cornell University Press. Frank hosts the websites **http://thebeepeeker.com**, a guide to observation hives and **http://colonymonitoring.com**, a guide to colony monitoring technology.*

Build A Migratory Top Cover

Ed **Simon**

You have been keeping bees for several years and really enjoy the hobby. You have built you honey customers up to a decent number and now find that you cannot keep them supplied all year around. This is a great situation to be in but now you must solve a supply problem.

After considerable thought, you decide to step up from a hobbyist beekeeper and increase the number of your hives. Until now you have been building your own equipment and find it enjoyable, satisfying and less expensive than buying ready-made equipment. You know that increasing the number of hives will make a change in the way you both work your hives and how you build your equipment.

This scenario was just like the situation a friend, Ron Stevenson, was in when he decided to expand the number of hives in his apiary from twelve to forty.

Some of the decisions he made about his operation were:

1) Change from telescoping covers to migratory covers for the following reasons.
   a) A migratory cover is cheaper to build than a telescoping cover
   b) A migratory cover is much easier to build than a telescoping cover
   c) An inner cover is no longer needed

   The reason for an inner cover is so the bees can't use propolis to glue the telescoping cover to the hive body.
   d) One less item to store (no inner cover to store)
   e) Smaller storage space was required
   f) Accessing the bees only required the removal of one cover.
   g) One less item to keep track of (no inner cover)
2) Stay with using individual bottom boards and not change to migratory pallets.

Stevenson was not going to ship his bees anywhere during the Winter therefore:

   a) Individual bottom boards allow for more flexible placement of the hives.
   b) A simplified design made for easier and cheaper construction.
3) Additional honey supers and additional brood boxes would be made as required.
4) Stevenson would use the current equipment until it either wore out and needed to be replaced or it became cumbersome to maintain two styles of equipment.
5) Because of the cost and labor required, any equipment falling into disrepair would be further evaluated and would possibly be disposed of as opposed to repairing.

Stevenson's current and the projected minimum inventory was:

Item	Current Inventory	Projected #	Need # More
Top cover	12	40	28
Inner covers	12	0	0
Honey Supers (medium)	40	120	80
Frames - medium	400	1200	800
Queen Separators	12	40	28
Brood boxes (deep)	24	80	56
Frames - deep	240	800	560
Bottom Boards	12	40	28

With a goal established and space available to store the additional equipment, Stevenson asked me to help with his expansion. I had previously manufactured a lot of equipment and acquired some expertise in small volume manufacturing with monetary constraints. This situation needed a piece of equipment I had not included in my book *Bee Equipment Essentials*. As a result, this article will provide the building of migratory tops. All with the emphasis on volume construction and economy.

Migratory Top

These instructions describe the assembly of a batch of 10 migratory top units. Ten units were chosen because ten migratory tops can be cut from one 4' x 8' sheet of plywood.

Parts

1. ½" x 16½" x 22" - Pressure treated plywood (4 ply preferred) – Top (10) (1 per top)
2. ¾" x 1½" x 16½" - Lip (20) (2 per top)
3. ¼" x ??? x 20½"' Lath - side rim (20) (2 per top) (See instructions)
4. ¼" x ??? x ???"' Lath - end rim (20) (2 per top) (See instructions)
5. Paint, Glue and Nails/Screws/Staples

Note: The 16½" dimension for parts #1 and #2 are ¼" larger than needed for an exact fit. This allows a little leeway for the placement of the top on the hive. If you want an exact fit, use a 16¼" dimension. The 22" length of part #1 is overly generous to allow for inconsistent manufacturing and eventual warping of the top.

Note: If you are really going to get serious about constructing your own bee keeping equipment, I recommend investing in a good compressor and an air driven stapler. The time saved and the ease of assembly it provides makes the purchase well worth it. I made a mistake and delayed the purchase of compressor/stapler setup until I was overwhelmed by the time required when using nails and screws to build equipment.

Considerations

Both the length and the width of the cover are generous. This was done on purpose, to allow for easy placement of the cover after the hive bodies have been in use for years and are no longer in pristine condition.

The ½" thickness, pressure treated plywood for the migratory top was decided upon as a compromise using the following factors for evaluation.

1) Longevity – treated plywood should last longer than non-treated plywood
2) Thickness – ½" thickness plywood weighs about 1/3rd less than ¾" plywood or boards.
3) Thickness – ⅜" Plywood will warp more the ½" plywood
4) Thickness – 4 ply plywood warps less than 3 ply plywood

Construction

Step #1 – Cut out the top (Part #1).

The ½" x 4' x 8' plywood sheet needs to be cut into to 22" x 16½" pieces. An easy way is to cut five 16½" x 4' sections first. This reduces the plywood into easily manipulated sections. Then cut each section into two 22" x 16½" pieces. See the drawing for the layout of 4' x 8' sheet of plywood.

Hint: Cut the pieces on saw horses in the backyard or driveway to eliminate the clean-up of the sawdust.

Note: Some home improvement stores will cut the wood for you for free or for a minimum charge. If you purchase the wood early on a Sunday morning, when they are not busy, you will get better, quicker and more accommodating service.

Step #2 – Cut the lips (Parts #2) – two pieces per top.

Rip a ¾" piece of lumber to the width required for the lips on your cover.

Note: The width of the lip should not and I repeat **NOT** be wide enough so that when the cover is installed it touches or covers the handholds on the hive bodies.

Hint: If you are also making deep brood boxes and have saved the pieces trimmed from the 1" x 12" boards, you can use these pieces for the lips. These pieces should be about 1½" wide.

Step #3 – Attach the front and back lips to the underside of the top.

Select the smoothest surface for the top of the top and then using glue and staple, nails or screws attach the end lips to the bottom surface at each end.

Step #4 – Cut the lath side rims (Parts #3) - two pieces per top.

Set a stop-block on your radial arm saw and cut 20 pieces of lath 20½" long.

Hint: Measure the distance between the lips of your top. Cut the length ⅛" shorter than needed for an exact fit, this adds just enough wiggle room to allow for inexact measurements and assembly without compromising the structure.

Note: Lath is available in most lumber stores. Unfortunately, it is not of consistent size and quality. It is cheap and is usually sold in bundles of 25 or 50 pieces. Each piece is about ¼" thick and is usually 4-foot long. Choose a bundle that is consistent in thickness and of decent quality. The width of the strips does not make any difference.

Note: By adding the lath to the underside of the top you do two things. You add rigidity to the top which helps resist warping. It also provides a small space above the frames in the same manner as an inner cover does.

Step #5 – Add the side rims (Parts #3) to the underside of the top.

Glue and staple or nail the lath cut in a previous step to the underside of the cover.

Step #6 – Cut the lath end rims (Parts #4) - two pieces per top.

Measure the distance between the side rims that you installed in the previous step.

Set a stop-block on you saw and cut 20 pieces of lath ?? inches long.

Step #7 – Add the end rims to the underside of the top

Glue and staple or nail the lath cut in the previous step to the ends on the underside of the cover. Although lath is usually 1½" wide it is not always consistent, you may need to make minor adjustments to get them to fit.

Step #8 – Paint the cover

Using the external latex paint you got from the recycling center, paint the cover.

Two coats of paint are needed, you should be extremely careful about covering the end grains of the lips and the side grain of the plywood and lathe.

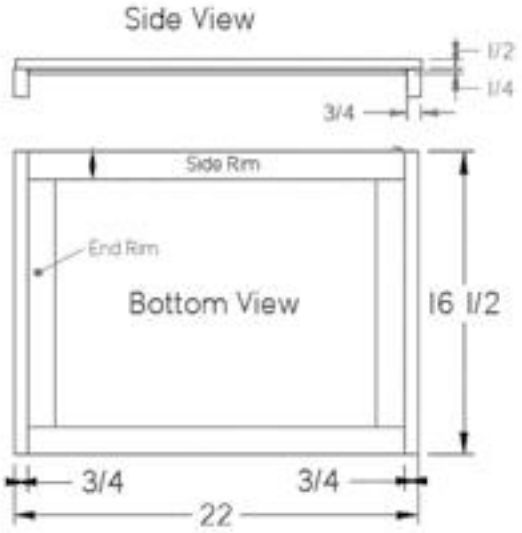


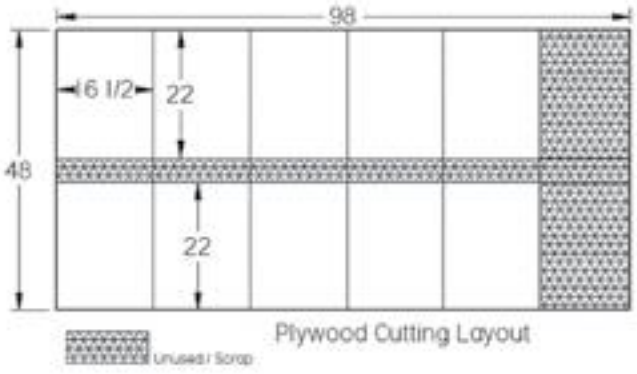
Conclusion

Cheap, easy and fast to build, this migratory top will last for a decent time. Warping can be a problem, but considering the ease of assembly and the cost, it is easier to replace a unit than to mess around trying to fix it.

Drawings – Migratory Top

Note: The 16½" dimension is ¼" larger than needed for an exact fit. This allows a little leeway for the placement of the top on the hive. If you want an exact fit, use a 16¼" dimension. 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***.

Planning A Honey Show

Rules, Classes, Judges, Records, Workers

This preparing is not about making your honey ready for a show but how bee associations can start to have one or improve their honey show. Local clubs and state associations frequently hold their individual honey shows in autumn, after the busy bee season. Beekeepers have harvested their honey and decisions are being made about show entries.

Every show needs a Show Chairman. First we will consider the Chairman's tasks for inaugurating a first honey show for an association. In some ways starting a show may be more difficult than if the association has had one for a number of years. Is there a nearby club that holds a honey show? If you, who volunteered to be the first Show Chairman, have never attended it, then plan to do just that. Explain to that Chairman that you would like to visit so that you could see everything that is involved. However, a honey show, especially a first one, needs time for planning and for publicity. So your honey show will have to be much later, perhaps even the following year.

Beekeepers know when their nectar flows happen. That is the time to put honey supers on. However if they do not know a show is on the club's program they cannot make plans for entering certain classes, for example cut-comb. It requires thin surplus foundation in its honey super. It would be possible to start with a small, simple show with a few classes for extracted honey, probably the most common product beekeepers have. The show can then be expanded the next year by adding such classes as creamed honey and cut-comb.

A successful show needs entries, lots of entries. One entry in a class is not really competition. A single entry should not be given an award if it does not deserve one. Mediocrity should never be awarded. To get the entries publicity is necessary. The members of the club need to be encouraged to enter. Does the association have a newsletter? Many do not. Some clubs may send out information for a summer potluck picnic or perhaps a Christmas party. Ways will have to be found to get information to **all** the club members, not just once or twice, but frequently enough to keep up the interest. Although it is possible to give information at club meetings, not all the membership can attend.

By the way, are the members being told about the **real** purpose of agricultural shows. Yes, honey is an agricultural product, just like corn or wheat or apples. The real purpose is actually learning to improve the product for market. Even if a beekeeper with a couple of hives just gives friends and relatives some honey, that jar of honey should not have bee parts floating around in it.

Now to start planning. Classes need to be established. Extracted (liquid) honey can be classified into seven different color groupings: water white, extra white, white, extra light amber, light amber, amber, dark. For a local club show it is definitely not necessary to offer a class for each of these seven different colors. Some parts of the U.S. do not have a plant source for water white, or perhaps for dark. Choose colors appropriate to the club's nectar sources.

Other honey classes, such as chunk honey, creamed honey, cut-comb, round sections can be offered. It might be valuable to ask members if they produce any of these and if so, would they enter the show. For a club's first honey show it is wise to fit classes for what the beekeepers would want to enter. The show can always expand the number of classes as interest grows.

One class, with its origins in the UK and brought here with Welsh judging, is the Black Jar class. Honey is usually presented in a small jar painted black on the outside or the honey is poured into a small black container so that its color and any impurities cannot be seen. The winner is the one that tastes the best to the judge. Yes, it is subjective. But that has not influenced its popularity.

Some beeswax entries can be offered. A common class is for a block of wax. Frequently the weight is specified, such as a one-pound or a two-pound block. Candle classes can be for a pair of molded tapers, a pair of dipped, or artistic candles. Photography classes have become

Ann **Harman**



enormously popular in shows today. For a first show, one class for photographs may be suitable but if overwhelmed with entries it should then be divided. One class could be for beeyard or meadow scenes, another with a beekeeper doing something in a beeyard or closeups of bees doing something.

Once the initial classes have been decided then it will be necessary to decide the judging. In the U.S. at the moment there are now two judging methods. One would be the most common, using score sheets with points assigned for various criteria, such as moisture content in liquid honey. Measurements would be taken with a refractometer and jars of liquid honey viewed through a polariscope for crystals and debris. Other classes, such as for creamed honey and beeswax classes, would also have numerical scores for various criteria. The other judging method, used now in limited areas, is the Welsh system. To become a judge of this system an exam must be passed. Comments about the quality of the entry, whether honey or wax or photography, are recorded on a card and are not given numerical points. Generally a refractometer is not used. Viewing for crystals and debris in liquid honey is done by shining a flashlight through the jar. Flavor of honey is considered important although this is very subjective, depending on the judge's taste preferences.

The show information will require some Rules plus the list of Classes and any other information that is important for anyone entering. Rules will state times for entering and for removing entries. An important rule is the one that states that only one entry per person, family or apiary is allowed in each class. This gives everyone an equal entry. In the list of Classes it should state the type of container and how many; for example one, one-pound queenline-type jar with metal or plastic cap. Creamed honey and chunk honey will specify wide-mouth, barrel or straight round jars. Review the Rules and Classes information from nearby clubs with honey shows.

At this point you have decided to have a honey show for your club. One class, or possibly two classes, have become popular. Many children are now participating in beekeeping. The younger ones are working with their parents. Quite a number of teenagers are the beekeepers in the family. Classes for youths are included in some shows. Entry criteria would have to be established – perhaps by age or whether independent or with parents. You will need to determine interest in youth classes.

Show classes and judging methods have been established. It is time to start recruiting some helpers. First could be someone to take care of publicity! The success of the show depends on getting members to enter. Now where to find judges and score sheets? Contact several local clubs that do have honey shows for this information. Yes, you may have to offer a judge money for transportation.

Money! You will need to work with your club's treasurer. Let's see what you might need money for. Yes, transportation for a judge, but do you plan to give ribbons, at least for first, second and third? It might be possible to have donations of equipment from beekeeping suppliers for any special prizes you decide to offer. Fortunately your regular meeting room will be suitable for having a small show. However it might be wise to check if it would be available if you plan to have your show on a day different from the regular meeting one. There could be some extra charge for it. You may need some money to make sufficient copies of score sheets and entry forms. Some associations now have their entry forms online if they have a website. Someone entering can fill out the form, print it and bring it to the show along with their entries. Helpers (and you will need them) are simply volunteers and a "thank you" will have to be sufficient. You



do not want the honey show to be an expense that will drain the club's treasury.

What do the Helpers do? The judge, even from a long distance away, should not have contact with the people entering. Therefore, one or two Helpers take in the entries, check the filled-out form, assign a number, place number sticker or tag on entry. Then another Helper(s) takes the entries to the appropriate table. Sometimes these Helpers are provided with the simple lightweight white cotton gloves that are available at hardware stores. The tables for entries should have signs indicating the separate classes. Helpers can assist the judge who will indicate what is needed during the judging. At least one Helper can be useful for cleanup after the show is finished and all the entries have been removed.

One item you can consider is a Suggestion Box. Put a nice big label on it "Suggestions Welcome!" Put a small pile of paper and several pens or pencils next to it and place it near where people are delivering and picking up their entries. Yes, you might get some grumbles from someone who did not win but read through all the suggestions anyway.

If you have space, having a table near the Entry Table can help smooth entering the show. Beekeepers tend to bring their (very precious) entries in a cardboard box crammed with all sorts of packing materials. They need a place to unpack and retrieve the entries from all the wrappings. Unpacking also takes a bit of time. The "unpacking table" really makes entering the show much easier for all.

Oh yes! Be prepared for a catastrophe. They are very rare but can happen, particularly if the show is in very limited space. An open jar of liquid honey gets tipped over. A minor flood on the table, but be quick! before it drips onto the floor. Give profuse apologies to the exhibitor and be certain that it was judged fairly even if only two-thirds of a jar remains.

Every show, new or well-established, needs a Show Chairman whose work for the following year actually begins immediately after the current show. That is the best time to review what went right and, more importantly, what went wrong. You do not want the "went wrongs" to appear again for the next show. Contact **all** the people who helped with the show. First you want to thank every single one. Remember, they missed parts of the day's meeting program or activities and you will need helpers next year. Ask them for their "rights and wrongs." Their input on the "rights and wrongs" is valuable. They will make next year's show even better. Thank the Helpers for any suggestions they may have.

Keep records! Whether it is the first show or the umpteenth show, those records should be kept and considered important enough to be passed along to future Chairmen. How many people entered, how many entries in each class? If one particular class shows declining entries each year until just one or two enter, then perhaps that class should be dropped – for lack of interest. However you may wish to ask the members if they can think of a different reason. If a class, such as photography is increasing numbers then perhaps one class should be divided into different categories. Is there any interest in some of the different classes held at other shows? Arts and Crafts? Gadgets? A simple quick survey could be taken of all the members. Yes, some will never be interested in entering but you just might get some suggestions that would improve the honey show.

How does a club's honey show improve marketing? Remember, that is the original purpose. When an entrant finds out – from an experienced honey judge, not from a loving relative – that the liquid honey had weird crystals and a couple of dead bees or was bottled at 19.5% water and will probably ferment, or that the creamed honey was just as runny as if it were liquid – improvement of the product will take place. Then the beekeeper's honey can start to earn a bit of money for the beekeeper. The honey can take its place at the farmers market or in a small shop. Equipment and new queens cost money. Let award-winning honey become a part of beekeeping. BC

Ann Harman runs honey shows, judges honey and teaches others how to do a honey show. She lives in Flint Hill, Virginia.

All photos are from the National Honey Show in the UK.

Connie **Krochmal**

Chicory

Chicory (*Cichorium intybus*) is a common wayfarer that occurs over much of North America. The plant is most common in the East and Central states and along the Pacific Coast. Elsewhere, it can be somewhat scattered.

A member of the daisy family, this bee plant naturalized after being introduced to the New World during the Colonial Era. The sun loving species was originally native to North Africa, Asia Minor, and Europe.

It frequents grasslands, weedy areas, disturbed sites, meadows, lawns, waste places, fencerows, roadsides, and fields – especially stony ones. On occasion, the plant has even been known to spring up in cracks of sidewalks and pavement.

This species is most common at low elevations. It is featured in many wildflower guides although the plant isn't a native. Chicory doesn't appear to be quite as aggressive as some other naturalized plants. However, the seeds are spread by the wind. The roots also enable this to spread.

The plant goes by various other common names. These include blue sailors, blue daisy, blue endive, bunk, common chicory, blue dandelion, ragged sailors, and coffee-weed. It is sometimes called succory. Derived from Latin, this translates as "to run under" in reference to the deep roots.

Bee Value of Chicory

The blossoms of all chicory types are eagerly worked by bees for pollen and nectar. This is listed as a major bee plant in the Northeast, the Southeast, the North Central region, the Plains, the Southwest, most of the West, and Florida. It is considered a minor bee plant in some areas of the Northwest.

One reason that chicory is a valuable bee plant is that it blooms for an extended period. Flowers are typically present from about mid-Summer into Fall, mostly from late June to October, depending on location. These blooms often appear when little else is available for the bees.

This herb produces white pollen. The nectar flow is best during rainy weather. However, it remains a reliable nectar source even during drought.

Chicory has long been recognized as a honey plant. This yellow honey can develop greenish tinges when it granulates. It has a flavor much like that of chicory-flavored coffee.

Growing Chicory

Although some might regard chicory as an invasive, the fact remains that certain types of this plant are grown for specific purposes. For that reason, I'm including details on its culture. Hardy to zone three, the common chicory is sometimes grown in herb gardens, wildflower meadows, and Biblical gardens. This is also grown as a fodder – especially for sheep.

The plant is also cultivated for the roots, which are used as a coffee flavoring or substitute. For that purpose, it is grown commercially in Germany and England.

The chicories that are most widely grown are the large-rooted varieties and those used for salads with radicchio being an example. For the most part, the latter is cultivated as a cool season annual crop since the salad-type chicories tend to bolt in hot weather. Assuming this doesn't bolt the first year, the plants will typically survive the Winter and bear blossoms the following year.

This crop is easy to grow. As a perennial, this is best planted in early Spring or Fall since the seeds will germinate best at those times. The plant adapts to most soils that are neutral to lime rich. But, it prefers a light, evenly moist, deep, well drained, reasonably fertile soil, such as deep loams. However, the plant will grow in poor soils.

Plant chicory seeds after the date of the last expected Spring frost. As a perennial, these should be spaced about 1½ to two feet apart. Sprouting within one to three weeks, they germinate best at 65-75°F.

Cover to a depth of ¼ to ½ inch deep, depending on the soil type. For wildflower meadows, one wildflower seed catalog recommends sowing five pounds of seeds per acre. Most seed catalogs offer a wide variety of chicory seeds, including those suitable for salads, wild flower meadows, and herb gardens. Johnny's is one source.

In addition, seeds for Magdeburgh (sometimes spelled Madgeburg) chicory, a special variety grown for the large roots that can reach a foot or more in length, is also available. These roots are dried, roasted, and ground and used primarily for coffee-like beverages. This variety features entire leaves and generally blooms the first year.

Description of Common Chicory

This straggly herb is occasionally a biennial, but is normally a perennial. The plant has been known to live a decade.

Reaching up to 1½ foot in length, the much branched root features small rootlets along the sides. This can be either reddish or yellow. It is slender – only an inch or so thick. Releasing a sap when broken, the root is spindle-shaped.

Chicory is a deep rooted, upright plant with spreading branches. Depending on growing conditions, it can reach three to six feet in height with a 2½ foot spread.

The hollow, stiff, reddish to green stems are covered with soft hairs or bristles. Typically grooved, angular, and cylindrical, these exude a milky sap when broken. As the plant ages, they tend to become woody. The upper portions of the plant are largely leafless.

The foliage can sometimes be quite similar to that of dandelions. However, it is easy to identify chicory by the long, stiff hairs found along the ribs on the undersides of the leaves.

With long petioles, chicory leaves taper to a point. They're deep green and alternate. These can be unlobed to deeply lobed. The leaf size varies according to the growing conditions as well as its location on the plant.

The main leaves are the lower or basal ones. Narrowly oval, these form a rosette. They can reach three to 10 inches or so in length.

Generally lobed and toothed, the basal foliage ranges from smooth to rough and hairy. The lobes are quite deep and resemble those of dandelions in some cases. Once the flowering process begins, the lower leaves will begin to wither.

The upper or stem leaves differ greatly in comparison to the lower ones. The former typically arise later, assuming the plant's needs for moisture and nutrients are met.

Quite reduced in size so they can resemble bracts, the

stalkless, alternate, pointed, upper foliage is somewhat clasping. Although this is mostly entire, it can sometimes be sparsely toothed. The shape varies from oblong or oblong-lanceolate to lance-like.

The flowering stalk dies at the end of the season with a new one arising the following year. Up to two inches wide, the blossoms consist of fringed, strap-shaped ray flowers held well above the basal foliage. Five decorative teeth appear along the tips of the flowers.

The blooms on the lower portion of the stem tend to open earlier in the season. These are quite similar to dandelion blossoms except for the color. Chicory bears large, showy blooms that are generally sky blue to bright azure blue or blue-violet. In some varieties, they can occasionally be white or pink.

Lasting only a single day, the flowers are quickly replaced by new ones. Chicory blossoms can appear either solitary or in small, flat heads containing two to four blooms. They're borne mostly on ridged, short, rigid, stiff, hairy, axillary flower stems. Sometimes, these can be terminal. The bracts surrounding the blossoms are sometimes covered with very tiny hairs or spines.

Chicory is so regular in its flowering habit that it is often planted in floral clock gardens. These open with the sun and close by noon on sunny, bright days. They emerge later in the morning or remain open for most of the day during cloudy weather. The flowers move in the direction of the sun.

In Germany at one time, children reportedly would pick a chicory flower and place it into an ant hill. When the ants emerge from their nest, they release formic acid as a defensive measure, thereby causing the blue flowers to turn bright red due to the change in pH.

The Many Uses of Chicory

In addition to its role as a bee plant, this species has many culinary and non-culinary uses. Chicory is a source of Vitamin A, B, and C. The leaves and roots have been used for medicinal purposes since ancient times.

Both the leaves and roots are edible. The former, which are eaten raw and cooked, are slightly more bitter than that of endive. The young foliage is preferred as this is generally milder flavored. The dried leaves are made into a tea.

Livestock also eat chicory. However, if milk cows consume very large quantities, the butter and milk can sometimes have a bitter taste. The leaves can be mixed into horse feed. Goldfinches are particularly fond of chicory seeds.

Chicory roots can be ground and used as a flour. Chewing gum has been made from the milky sap extracted from the root. The plant has even been served as a dye.

History of Chicory

This has been used as a food plant since ancient times. The ancient Greeks, Romans, and Egyptians consumed the leaves in salads and as a vegetable.

Pliny the Elder, a Roman writer and naturalist, wrote about the plant's many uses. He described how Romans blanched and forced the plant. Apicius, the Roman gourmand and author of a Roman cookbook, included a recipe for chicory served with a sauce.

Historically, the leaves have traditionally been used as one of the bitter herbs that accompany the pascal lamb. It is mentioned in the Bible for that purpose. The earliest record of chicory's cultivation in Europe was in the 13th century.

John Parkinson, author of "A Garden of Pleasant Flowers," which was published in 1629, recommended the plant for kitchen gardens. He described chicory as having many deeply lobed narrow leaves. Charles Dickens wrote about the cultivation of the plant in the 19th century.

One of the first mentions of chicory in the American colonies was in 1631. Chicory seed was on the list of seeds shipped to John Winthrop Jr. on July 26th of that year. The early colonists grew this mainly as a fodder or hay for their farm animals, including horses, cows, and sheep. Chicory was also planted by Thomas Jefferson and Governor James Bowdoin in Massachusetts for animals.

At one time in our nation's history, merchants were routinely adding such large quantities of chicory root to coffee that consumers began to complain. As a result, coffee dealers were later required to list the percentage of chicory on their coffee packages. During World War II when coffee became quite scarce, Americans drank coffee-like chicory drinks.

Related Species

Sometimes called escarole, endive (*Cichorium endivia)* is a related species that looks quite similar to chicory in many respects. This is also a good bee plant. It yields much nectar and pollen. Bees are fond of endive blossoms.

Depending on the weather and climate, endive can be either an annual or biennial. Typically, this survives the Winter and blooms the second year. Like chicory, this can also be grown as a salad green.

The endive plant is almost identical to chicory except for the leaves being almost smooth with slightly more shallow lobes on the basal foliage. The upper leaves are somewhat clasping, and range from oval to lance-like.

The flower stem of endive is markedly swollen below the base of the blossom. Endive flower heads largely resemble those of chicory, and open at the same time. Either blue to purple, these appear along the length of the stems.

Hardy to zone three, endive is tolerant of frost. It has a tendency to bolt during extremely hot weather. Suitable for most any soils, this prefers an evenly moist soil with a pH of 5.8 to 7.0. It needs full sun.

Endive was eaten by the Greeks and Egyptians by around 200 B.C. and later by the Romans. It was mentioned in the writings of Pliny the Elder, Columella, and Ovid. BC

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Beeyard Thoughts, Observations, and Updates

A surprise bear attack on a hive of mine

A few months ago, a lone wandering male bear made big time news in NE Ohio. For many years, young male bears have been expanding their range back into Ohio from NW Pennsylvania. These events are rare; therefore, comments were made by most media sources. However, no one got really worked up about these sightings.

Then a young bear showed up in the Akron/Canton area, about thirty miles from my home. This young bear experienced high human population and traffic congestion. Much like the old *Killer Bee* angst, a good deal of fear spread. People were concerned for pets that had never encountered such a formidable predator.

Bear sightings were in all the news, and we were all kept abreast of where the bear had wandered. As I had learned while reading about bear behavior for an upcoming trip to Yellowstone, these animals are wide wandering animals. A range for a foraging bear is measured in square miles. These animals can really get around in a short time.

Literally, I interrupt this developing article for a news break.

I had just responded to my wife's call for assistance with a water hose leak, when with my terrible hearing, I perceived a low level consistent roar. I asked my wife what was that noise and just before she said "bees!," I realized I was hearing a swarm – a big one. Today is July 13. Why is a swarm coming in? Is it my bees or are they free? I was completely unprepared to hive this large late season swarm. This swarm story is still unfolding. I have never done this before, but essentially, I am developing two articles at one time.

I am trying to write about bear activities as I periodically run back to a nearby apple tree to monitor this large, skittish swarm that is reluctantly entering my hive box. You can guess what next month's article will address -late season swarms.

I now return to the bear article in progress.

This young bear-guy was on the move. He was covering significant distances and seemed to be in a hurry to get nowhere. Now move to chapter two of this NE Ohio bear story.

I was in my mobile phone store, when a familiar-looking guy said, *"Dr. Tew, how is it going? Bees still in good shape?"* As I expected, he was a local beekeeper who had attended many of my workshops when I was working for the Ohio State University.

He said, "*You know that bear that has been all the talk? He found my beehives and destroyed them all."* I was surprised to learn that fact. The bear had moved about 18 miles south from the Akron area. What are the chances in all that territory of that bear finding the hives of beekeeper Glen T.? We talked about the mess and the cleanup, and I offered all the sympathy I could. My last (and only) bear attack was about 35 years ago when a friend of mine and I kept bees in Quebec, Canada.

The last known Ohio wild bear was killed in 1850. If I may speak for many Ohioans, we don't have a lot of bear behavior experience – with anything but certainly not our bees. My name was called for my phone repair work, so Glen and I parted ways. I didn't hear anything more about the bear for a while.

Maybe a week later and with modest fanfare, the bear was reported to have been killed on an interstate highway – once again near Akron. Wow! What a bear-trip that was. For a brief moment, Ohio was like other states that deal with these large animals. But now, the Ohio bear had been accidentally killed. We could all go outside again.

The Canadian bee caper

I mentioned my Canadian bee/bear experience. It happened maybe 35 to 40 years ago. I was new to Ohio and had formed a friendship with a fellow worker who had a cottage in the wilds of Quebec. After visiting the cottage a couple of times and being as consumed with bees as I was, I concocted a light-weight idea. My friend and I would start a bee operation at his cottage.

I'm in the yellow vest. My friend is fighting blackflies.

This is the hot hive that had to be moved.

For Canadians who may be reading this piece, please know that life and regulations were much different all those years ago. All I needed was an Ohio driver's license to cross the border (and return). To take my daughters along, all my wife and I had to do was answer *"yes"* when the border control agent asked if the girls were our legal children. Although I hope not, my friend and I may have broken Canadian regulations; however, this project was lunacy in a bucket. We unintentionally did several things wrong.

As I recall parts of this story – that for many years I tried to forget – we took 15 packages and 45 deeps, along with necessary tops, bottoms, and inner covers. Our plan was for the first year to be a building year so we would haul supers the next year. The yard was in a beautiful, remote area. How could these colonies not thrive?

This was a young man's folly. It was a huge expenditure of energy and money *(money that I really did not have.)* My friend made multiple trips per year to his property. I frequently went along on the 15 hour run – essentially non-stop except for fuel, food, and toilets.

Remember that there were no mites at this time. We were sailing along in the bee world. We speculated that these colonies would be full-sized, honey producing colonies in just a single season. (I know. I know, but we were young beekeepers) We were going to make some kind of money.

The hives sat directly on the ground. We were loaded on the first trip. Much like hauling supplies to the space station, we were to provide hive stands and paint on the second trip. The bees and the surrounds were both beautiful. This was truly an adventure of epic proportions.

The finished yard in a stand of Quaking Aspens and near a beautiful lake.

As we left the area, we stopped by one last time before starting the long drive to Ohio. All looked good. As we admired our work, I noted large animal tracks in our yard. I don't know. Moose? If it was deer, it was a very large deer. I had a premonition. Wondering what the natural enemies of such large animals were, I asked my co-beekeeper if bears were here. He was quick and decisive. No. No bears in in many, many years. That was the answer I wanted to believe.

The call.

It must have been six – maybe eight weeks before the call came. We were told that the two of us seemingly had bee equipment scattered all over Quebec. The caller said no colonies were left standing, and there were no flying bees. He said it looked like a total loss. Indeed, it was.

No trip was planned for weeks. By the time we got there, maybe three months had passed. Unusual for me, I did not snap a single photo. It was too embarrassing and disheartening. It was immediately clear that this project was dead. We lived too far away to use electric fencing or other measures. We were done. We had wasted our money and time.

Beehive furniture

We didn't haul anything back. Frames became kindling. But the forty-five boxes became shelving, improvised tables, and cabinets. As it were, the beehive motif looked good at the cottage. What stories those boxes could have told if only they could talk.

My bear experiences

Other than memories, the 45 deep hive bodies are all that remain of the Canadian bee caper. I have sat in on the bear experiences of others. I have photographed bear-proofed yards in Florida, and I have chatted with various Maine beekeepers who routinely deal with bears. It was passing conversations. I didn't have bear problems. I was just being polite.

Do you remember?

Some of you may remember a particularly hot hive I wrote about last year. It buzzed and stung my neighbor –

who decided he had mowed over a yellowjacket nest. It was a big deal for me. My bees were attacking innocent people. I went to extremes writing and remedying the situation.

I finally moved the colony (originally a swarm that came to my yard) about 40 miles away. That ended my problems with my home yard. I had made a split so I moved that too.

Last Winter passed. The parent colony survived very well, but the split did not make it. I supered the remaining colony and noted that it was still a very hot hive. But in rural wilds, a hot hive should have a better chance of surviving. Everything seemed solved.

I did not see this one coming

During the middle of June, literally, out of the blue, my friend, who has a cabin in rural Ohio, sent me the following photo of my bees.

For a brief moment, I did not think, *"bear."* But rather I had the silly thought that it took some tough kids to vandalize that hive. Then, as though I was a slow learner, it hit me that there was more than one bear in my general area. There was more than one Ohio bear. Almost immediately, I was struck with the irony that I now understood – much better – the shock and surprise that Glen T. felt when he was telling me his story.

My only bear experience was the story I told above. I instantly assumed that there were no survivor bees. Though we couldn't go that day, we did make the trip two days later. My friend's bees were packages while mine was an overwintered unit with more brood and honey. It bore the brunt of the attack. One of my friend's package colonies seemed to have served as an appetizer.

What a storied colony

This colony came to me as a foreign swarm. It tormented my neighbor. It made casual visits to my apiary unenjoyable. It was a difficult move to a different location, and it had never produced any surplus honey. Now, it had suffered a serious bear attack.

The bees fought back

To all who routinely deal with bears, I realize that a one hive/one bear situation is amusing. Truthfully? I hope I don't have any more experiences like this. But apparently, the bees did put up a fight. For all the bear/bee people out there, did this attack happen during the day, during the night or either? I ask this because the bear had created what I have named "bear tunnels."

These tunnels are areas away from the colony and back in the brush. As I pushed into these secluded areas, I took a moment to wonder what I should do if the animal was still there. All appeared quiet. Due to weed recovery and rain, the crime appeared to have happened several days before. I pushed on into all of these areas to get my frames and hive bodies. These "tunnels" look like the one in the following photo.

Yet another surprise

After clearing the tunnels and accumulating all the busted equipment, I turned to the process of reassembling the hive – more as a neatening process than a bee management process. There were a few demoralized bees flying around. Heavy rain had drenched everything. Mosquitoes were attacking in unnerving numbers.

Unlike my Canadian Bear/Bee experience, the bees underneath this hive body were locked and loaded.

I tossed a bottom board into place, put an empty deep atop it, and picked up the hive body with a few bees showing. Wow – underneath that deep was about two pounds of hungry, wet survivor bees that had NOT capitulated. With that brief touch, I set off a stinging firestorm. It was time to move – fast – from the area. I was unprepared for this attack. I knew there were some bees there but so far all had been lethargic and unresponsive. That all changed when I rolled that hive body over. They were immediately in high defense mode. I was in *"abandon the area"* mode.

The odor

Throughout the clean-up event, there was a sour, compost, odd odor. My friend and I estimated that it had been three days since the bear had been there. Maybe it was spilled honey, dead brood, rain, or forest compost providing the odor. I don't know. Did the bear have something to do with the smell in the area?

It was a rainy day. I had suddenly been stung several times and through it all was a strange earthy odor of compost, I suppose. Cleaning this mess was no better than cleaning winter-kill colonies.

Finally –

Presently, the colony is not in good shape. From my friend's description, I suspect it is queenless. It had no food stores and all brood was destroyed. I didn't like this colony, but I never intended for this to happen to it. Should I just cut my losses and let it go?

Clearly, as I finish this piece, I can say that this is not a how-to article on dealing with bears. These are my first time experiences, and the surprises that came with those experiences. Is the bear coming back. Certainly, I don't know. Electric fences? Is the cost worth it. The cottage? Should we always be on bear-alert? And don't you know, bears are protected in Ohio. Beehives are not. Where is this new bear business going to end? BC

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University, Emeritus Faculty, Entomology, The Ohio State University; **Tewbee2@gmail.com**; **http://www.onetew.com; One Tew Bee** RSS Feed (**www.onetew.com/feed/**); **http://www.facebook.com/tewbee2; @onetewbee**

Now a big hog can move surprisingly fast. But two young, 40-pound pigs with their first taste of freedom (because I failed to close a gate) were downright speed demons. In fact, as they stopped and looked back at me while I cursed the blackberries and briars that hindered me but helped them, these two pigs seem to grin, demonically.

During this whole episode of escaped pigs, my wife's poppaw Lowry was riding around in his Ford Bronoc, acting as a mobile incident command as neighbors phoned in reports to him on movements and sightings. He would deploy Wayne, a local farmer, or myself through whistles or hand signals. The pigs raced through the woods, then the pasture, then the oat field, then our neighbor's woods, then our other neighbor's woods, then back through the oat field.

Thankfully Wayne had a secret weapon, a blue healer named Sally that accompanied him everywhere. As Lowry, Wayne, and I tried to coordinate our movements and conserve what little energy we had left, Sally was indefatigable in pursuit. Wayne parlayed orders, "Sick 'em, Sally, Sic 'em!" After several hours of chasing, the stars finally aligned. I had gotten in front of the pigs, and Sally was driving them toward me. A big fallen oak, tangled and wrapped in green briar, was a barricade sent by God. Sally penned a tired piglet against the oak and I dove. I laid on the piglet with all my weight, face full of briars, Sally barking hysterically, the pig squealing, and Wayne yelling "Hold 'em, Stephen, Hold 'em!'"

And I held him. The other pig was still on the loose but it was almost dark. Wayne said that perhaps the lost pig would smell the others and come back, which it did. But I didn't know what to think. I was glad that we caught the one pig, but disappointed about the other, and embarrassed about the whole situation. As he left that evening, Wayne told me that that there are two truths about raising livestock: "Eventually some are going to die on you, and eventually they're going to get out. If a man ain't prepared to deal with those facts, he don't need to be raising livestock." That wouldn't be the last time he would tell me that.

So why is a story about pigs in a beekeeping magazine? It is a roundabout way to introduce Wayne's truths about raising livestock. Bees are as much livestock as pigs or cows, and as such some colonies are going to die on you – and some are going to get lost in a neighbor's swimming pool. This time of year many new (and old) beekeepers experience dead bees for the first (and bazillionth) time. It comes with the territory. A learning curve exists to keeping any type of livestock alive, bees especially. On his way to becoming one of the founders of modern beekeeping, Dr. Charles Miller lost 48 of 50 hives in his eighth year of beekeeping and 16 out of 19 the very next year.

Bad years happen, bees die, but don't give up. When all optimism is gone, when your soul is as black and charred as the inside of the smoker, then you're closer than you realize (and certainly a lot closer than when you started) to figuring out how to keep bees alive. The first few years of beekeeping often involve naiveté and mistakes of ignorance, followed by a year or two of delusion and mistakes of neglect. Then an epiphany occurs and mistakes of good intention and overcorrecting follow. This is a most dangerous point. You will feel like you're doing everything you should be doing, and you'll be righteously indignant that your stupid bees would rather commit suicide than live under your leadership. You'll want to dowse thousands of dollars' worth of wretched, worthless, God-forsaken bee supplies in diesel. Don't light the match. You may not realize it, but you're about to put it all together, to figure out the learning curve.

Or think of it this way: you're just following Dr. Miller's footsteps. After his two disastrous years, Miller successfully overwintered eight out of eight and 19 out of 22 in the following two years. So in the midst of dead or AWOL bees, just remember you're on track to being one of the greatest beekeepers of all time. BC

A Beekeeping Truth

Stephen **Bishop**

SUCCESSFUL BEEKEEPING

Poverty is the mother of all inventions, and men learn by experience – How to Winter 72 eight-frame colonies in one circle of six towers each housing 12 colonies in insulated boxes. Winter packing and ventilation – truths, myths, and laws of physics.

Bill **Ruzicka**

In the August issue you read how we prepare our hives for Winter. Today we go through long line of many changes that took me to the successful wintering I'm doing today. But remember without the August prep and FORMIC ACID MITEGONE mite treatment, no packing can do miracles. It is the whole process which saves your bees.

In 1980 the 100 hive outfit I bought had 22 hives alive. My mentor wintered his hives in groups of four wrapped and covered with paper backed 3½" fiberglass insulation. On top was ¼" tar coated plywood bent over four feeder pails under insulation and tied with ropes in a dome. In the snow it look like heaps of hay forgotten in the field.

As a young buck who knows better, I did the same thing but put all 22 hives in two rows back to back, side to side. I put the feeders on top. Not having enough money for plywood, I found an old tarp and covered the whole thing and tie it down using old tires like the guys use on hay.

FIRST EXPERIENCE: Learned was about drifting. At the end of each big pack I had four extremely strong colonies, then some weaker and some extremely week in middle.

Four pack.

I also learned that the insulation would be unusable next year. You can boost weak hives from strong ones, and that carrying single hives in pollination is a very hard work which I will not do again. Therefore I had to come up with some other system. Fortunately the place I worked as engineer WESTERN STAR TRUCK PLANT had a lot of scrap pallets, had odd sizes of plywood and short 2x4s and much more. My grad paper was written on the use of Aircraft scrap material in other sectors of national industry, Simply Sanford and Son if you remember that show.

I also bought 100 packages and decided to go commercial. I brought in a D8 and carved up a big flat bee yard from my property and started to utilize the scrap from Western Star. All pieces were smaller and odd to use in construction, they were low quality or eastern hard wood, but well suited for beekeeping as you see on pictures: Transmission pallets were best for hive supports, they were a foot high to accommodate shafts and being of eastern hardwood many are in use still now.

I promised myself I was never again going to carry hives one by one into orchards. I converted my old 61 GM into ¾ ton rear axle, installed a hydraulic system with electric command and set up the "four pack" system.

The plywood from plant and other wood scrap made the bottom boards and migratory covers for two and four hives packs.

EXPERIENCE: four packs weigh 800 lbs and cannot be stolen and cannot be moved without a crane.

Doubles can be lifted by two men and used in pairs as four packs, but two men can carry double and only one got stolen in those years. The plywood from plant was also great to make the winter boxes. As you can see in the next picture they were reworked many times.

The first version was for the double high with the feeder pail on top:

EXPERIENCE Temperature and air pressure changes pushed and spilled feed out, drowning weak colonies.

I also started to experiment with wintering nucs but decided to do all with std. deep frames. On lower picture you see how I made three color three frames units in one box with ¼" slots for divider boards and dry top feeders. Feed main hives early and put the nucs on top of main hives but that required to raise wintering boxes to accommodate insulation blanket on top and provide entrances for six nucs in row in front.

EXPERIENCE: Not too great. Try something else.

As I was dissatisfied with feeder pails and needed nucs. So I created a wooden inner feeder replacing two tandard frames. When put on standard bottom board with strip of carpet in middle I had two to four frame mating nucs. Please note that the feeder has two compartments joined by ½" gap under center divider and that the top half is open to the right and the closer one to the left. The higher sides form the letter "S" so when carpet is put on the top the two nucs are sealed separately. We would have 550 of these, providing 1100 mating units to ensure our new generation as all old queens were sold with SWARMS.

If one did not mate, we just moved the feeder to the side and had eight frame colonies if both mated we caught and sold one and then made an eight framer.

The feeder can be moved to any position creating from three frame mating nuc to six frame wintering unit and two frame space behind the feeder through which I could

feed the lower hive through 1½" hole plugged by screen.

Please note the screened entrance 2" x 3/8" high.

We wintered our 560 hives in two deep and six framer on top, in our winter boxes for many years. We fed in late February early March both colonies moving feeder back and adding two frames to the six frame unit to have 10 frame pollination unit in early April.

THIS Lasted till 1996 when the disaster struck.

A beekeeper from the Peace River region had a Kelowna beekeeper Winter and use for pollination 500 of his hives and he left his partner infected with AFB.

The guy in Kelowna obviously was not too careful and by mid Summer his 100 hives were fully infected and committed to burn by local inspector. He wanted to save them so he went to get a burning permit which he knew will be denied. Our provincial "wizard" comes with a solution to bury the infected comb in the garbage dump. They dug a hole for the first load and buried it. There was no hole for the second load and the 3rd load so the guy just dumped it into the garbage. Unfortunately, I had a yard with 40 honey producing and 40 six-framer just on east side of dump ¼ mile from dump site. My main breeding yard with 40 honey producing colonies and 100 six-framers ½ mile to the west and Gorge yard and home yard a mile to west and north. At 4pm I received a call from the dump foreman" Bill please come all my people are being killed by bees". When I arrived there was the biggest black cloud of bees over the dumped equipment robbing it. Having just a veil with me I got on the D-8 smashed all bee equipment and bees and buried it under other garbage. I went home mixed barrel of light feed with oxytet and started to drench hives in all four yards each week and checking them and burned few I suspected.

OXYTET WILL NOT CURE AFB BUT IT WILL PREVENT INFECTING four to seven DAY OLD LARVA and prevent forming of scales as long as it is present but once you stop and if there are scales the spread of AFB will be fast.

We decided to feed OXITED until late Fall but withdrew it after and did not feed any in February feed.

The February – March feed was mainly done to feed the drugs which I cannot do, to be able to check all hives find any scales and dispose of infected colonies to have whole outfit clean.

Therefore, I decided not to feed. I increased the wintering weight of two high and give to top units eight frames.

In late March I had our provincial "wizard" to summon all BC inspectors and we went through all colonies comb by comb: We were clean.

EXPERIENCE: All bad things sometimes produce a good result:

I NEVER FED IN FEBRUARY - MARCH AGAIN.

I just feed to my wintering weight and Winter on top eight framers. This brings us to the next section:

Winter packing and ventilation: Truths, myths, and laws of physics.

When I was taking apart the Winter packs in Spring, I noticed that the top eight-framers were many times much stronger than the double colonies below. They did not have any moisture problems, regardless that the screened holes which should have provided warm air from lower colonies were plugged and sealed.

The only difference was the lower colonies had

In-hive feeder.

Winter Entrances and wood top covers acting also as nucs bottoms the nucs did have carpets on top and 3½" fiberglass insulation pillow on top for all four units. They were all in a Winter pack covered by asphalt painted plywood.

It was the time to put my thinking cap on. Remember the meteorology lessons of my flying days, and the adiabatic functions of gases of my university years.

ASK YOURSELF QUESTIONS:

WHY WE HAVE WINTER ENTRANCES? The only reason I could accept was that in lands of Winter blizzards the lower entrance can get plugged, and bees can use upper entrance to go for cleansing flights.

In years of early feeding I also practiced cleaning of lower entrances. There was some debris but the entrances never got plugged by snow. Therefore that reason did not apply.

WILL YOU IN YOUR HOUSE OPEN THE FRONT DOOR AND UPPER WINDOW AND LEAVE IT OPEN ALL WINTER? I would not! It would cost me a fortune in heating. **Why we do it to the bees?**

The Winter entrance and Winter cover with its space above tops of frames creates a stove and chimney out of the hive. The colony and cluster is the heater, the fuel is honey, and the heated air is going out the chimney "the Winter entrance".

THE MYTH...SOMEONE TOLD US THAT THIS TAKES OUT THE MOISTURE OUT OF HIVES.

Truth: In my early years needing money I offered the removal of feral colonies in trees and walls. I helped to cut down two. All had a lot of bees and honey but only one entrance, usually at the bottom. On one occasion, in the wall of old cold storage house, where the double wall was two feet apart and filled with saw dust that had settled down, there were two knot holes but the upper one was plugged with propolis.

I also saw colonies hanging under rock overhangs in Arizona. Do you know how cold it is there? But combs are attached directly to the rock, there is no space above frames so each space between combs has its own heat control. Fresh air enters at bottom and gets heated to

Packing and assembling.

brood temperature of 34-35°C. I do not know if the bees know the laws of physics but they apply.

As many times as they heat the air up, that many times they lower the relative humidity of air.

Bees get in nice dry fresh air, and a lot of times they have to bring in water to maintain 55% humidity required by brood, otherwise larva will dry and die.

I confirmed this in designing Mitegone. I measured temperature between the frame and wall of hive adjacent to next hive in April when outside temperatures were as low as below freezing. In the morning humidity at the entrance is 100% and as high as 25°C and 40% humidity in late mid day. The temperature and humidity inside was constant 26-28°C and 55% humidity on strong hives covering most of upper box combs.

At the same time I was conducting Test of "WINTER ENTRANCE FUNCTION.

To be scientifically and statistically correct all 260 lower hives in all yards were divided into two groups A & B.

Group A was wintered with WINTER ENTRANCE with existing wood Inner cover also acting as upper colony bottom board without any screen connection and 1"upper entrance holes in the winter box were open.

Group B was wintered without WINTER ENTRANCE given carpet on top of hive with upper colony on it. The Winter entrance holes in packs were permanently plugged and insulated.

To eliminate location position and yard differences, in each yard one circle of 20 hives had group A on inside circle and the other on outside.

RESULTS: while none of strong hives in neither group had any problem of moisture the hives with Winter entrances consumed 90-95% of their stores while Group B without Winter Entrances had 25-30%

Stores left (Equivalent of two to three Frames) our Winter loses were 5-7% and on weak and dead colonies other problems mildew and rot was occasionally found.

EXPERIENCE: Winter entrances in our area do not provide any help with moisture control and cause large consumption of stores.

Please note that bottom of Okanagan Valley is prone to valley cloud being miserable ugly foggy wet below cloud and sunny cold above. This saves our orchards from freezing.

I have not used Winter entrances since then.

The circle of 72 eight-frames.

An open tower.

WHERE IS THE MOISTURE PROBLEM COMING FROM? Answer is the CONDENSATION.

In feral colonies and my hives the air enters by bottom entrance as it is heated it bsorbs moisture, becomes heavy and moves to the bottom of the box. Just last week I talked to people on Vancouver Island who were asking: How their insulated hives without Winter entrances but fully open screened bottoms will effect the MiteGone acid treatment? It will lower efficacy but the use of monitoring trays will increase it. I asked if they have the moisture problem they say no and I agree. In both hives walls and tops are kept warm so condensation cannot occur and wet heavy air flows out the bottom.

What happens in non insulated WINTER ENTRANCE HIVE? The air enters in bottom, gets heated and absorbs moisture. When this air gets into contact with cold outside walls or the inner or top cover the moisture in air condenses on these surfaces and drips back to the hives causing problems you all know.

How to Winter 72 – eight-frame colonies in one circle of six towers each housing 12 colonies in insulated boxes

On 20th of September at 9 am. All hives are uncovered, the Summer covers loaded to go home. They were all treated and fed to wintering weight and are ready to be packed.

First the front circle is on standard board being cleaned and leveled so the towers are straight and solid.

All other hives are on nuc bottoms housing eight frames colonies and feeder so we can feed the last missing feed to proper wintering weight.

As the hives are brought in the towers are growing up.

The Winter packs are brought in and assembled around them. The narrow fronts are screwed onto sides with four screws and 3½" insulation bath are put on top.

Here you have it finished. A yard with top covers and mounted on bear fence activated by 27000 volts. BC

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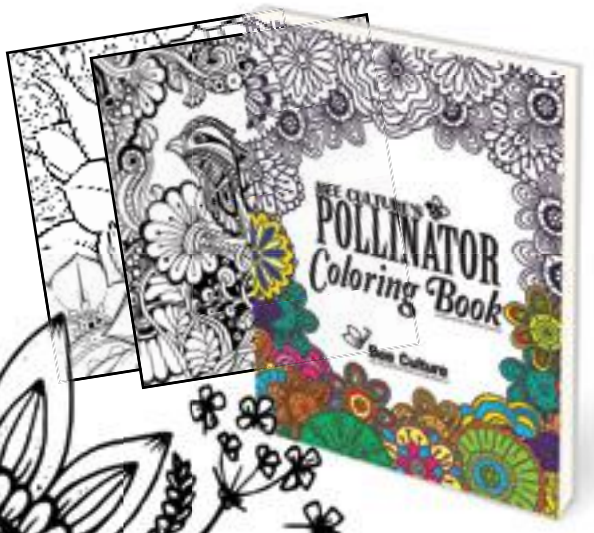

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The Magazine Of American Beekeeping

GLEANINGS

September 2018 • ALL THE NEWS THAT FITS

OBITUARY

Billy Marvin Davis passed away peacefully on July 16, 2018 at the Alder Center in Aldie, Virginia.

Billy was born on April 22, 1938 in Bay Springs, Mississippi. He was the eldest son of Perry and Janie Davis. He graduated from Shady Grove High School in Laurel, MS in 1956 after serving as Student Body President and received the award as the outstanding high school senior in Jones County. He joined the Marine Corps and served in the reserves from 1956-1960 achieving the rank of Sergeant. Billy graduated from Mississippi State University with a BS in Education where he was recognized for his leadership and contributions to the School of Education by Who's Who in American Colleges and Universities. After graduation Billy taught school, worked on the family farm and attended Jackson School of Law at night. He received his LLB in 1965 and practiced law in Biloxi/Ocean Springs, MS. In 1971 he returned to the family farm. During the next 10 years he became active in several agricultural organizations to protect and support the American farmer, lobbying at both the local and national level.

After the family farm was no longer a viable business, he resettled to Leesburg, Virginia in the early 80s, where he continued his commitment to agriculture through farm management, livestock breeding and teaching. He rekindled his love of beekeeping which he learned from his father into an educational program for new beekeepers which has grown into a statewide program educating over 600 new beekeepers each year. Through his untiring efforts, Billy led the development of a queen breeding operation to find a strain of bees that would be resistant to the parasites that are the primary cause of the decline of the honeybee population. This eventually led to the formation of a not-for-profit corporation, Sustainable Honeybee Program which continues his work. Billy is recognized as a Master Beekeeper by the Eastern Apicultural

Society and has received multiple awards from beekeeping organizations for his efforts in education of beekeepers at all levels.

Survivors include four children Sheri Chandler, Scotchie Davis, Shannon Gregory and Stan Davis all living in Mississippi, six grandchildren and three great-grandchildren. He is also survived by a sister, Linda Ann Overby and brother, Perry Mikell Davis.

Billy was a much loved member of the congregation at Roszell Chapel United Methodist Church. A memorial service as held at August 11. Please visit their website, www.hallfh.com to express condolences or for further information.

Please consider a donation in remembrance of Billy Davis to the honey bee research program at EAS at www.easternapiculture.org or to Sustainable Honeybee Program, Inc., P.O. Box 467, Alexandria, VA 22313-0467, or to Roszell Chapel UMC, PO Box 380, Philomont, VA 20131.

BELATED OBITUARIES

Halifax County, Virginia Beekeeper's Association lost two Charter Members in 2017. Reverend Albert Allen Blanks passed away January 18, 2017 at the age of 95 and William Walker Jones died June 21, 2017 at the age of 90. Both beekeepers helped to organize and serve the Halifax, Virginia Association for over the 33 years of its existence. They are both sadly missed.

Reverend Albert Allen Blanks – At the time of his death, Allen was survived by his wife Janie, one son, four daughters, one step-daughter, and one daughter-in-law. One son preceded him in death. He was also survived by one brother and five sisters, nine grandchildren and 15 great-grandchildren. Allen was a WWII navy veteran serving in the Pacific Island campaigns.

Allen was long recognized as a mentor of beekeeping skills in Halifax County, other Southside and Central Virginia Associations, and beyond. During his 70 plus years beekeeping, Allen provided pollination services on fruit and produce. He was a State of Virginia Bee Inspector for many years and served on the Virginia Board of Plant Pollination. He was also active in various national and international apiculture meetings and events. Allen was named the State of Virginia Langstroth Beekeeper Of The Year in 2007.

William Walker Jones – William is survived by his wife Tine, one daughter and three sons, seven grandchildren and nine great-grandchildren. He was preceded in death by his parents, three brothers and one sister. William served his country in the U.S. Navy during the Korean Conflict. He was an active member of the Halifax County, Virginia and the the State of Virginia Beekeepers Associations for over 30 years. He served as a mentor to new beekeepers during his many years in beekeeping and coordinated and helped instruct new beekeeper training classes and hive building workshops.

William was a member of the Masonic Lodge, Shriners and was a very active member and past president of State of Virginia Gideon's International.

More Fruit Using A Drone

Dropcopter, a drone AG start-up based in California and Central New York, recently made headlines as the first company to successfully pollinate almonds, cherries and apples using drones.As of July 4th. The company has released results from its 2018 third party studies which report a massive increase in almonds and cherries as well as surprising developments for apples.

Depending on environmental conditions which dictate the effectiveness of bees, the company has demonstrated an effective increase of 25% to 60% pollination set (cherries and almonds). It means that in cold weather, and during bee shortages there's a viable alternative to dependency on insect pollination.

What Dropcopter's controlled Apple trial has shown is that the artificial cross-pollination of "King blooms" has increased the size (diameter) of the crop to be harvested. Bigger fruit equals better price.

Using Dropcopter's methods a farmer can ensure that these "King blooms" are pollinated as soon as they open. A farmer can effectively "dial-in" the amount of pollination, maximizing their sizing to get the greatest return for their crop. Learn more at **http://dropcopter.com/**

CALENDAR

♦INTERNATIONAL♦

8th EurBee Congress of Apidology, Ghent Belgium, September 18-20. The venue is the Campus Ledeganck of Gent University.

For information visit **www.eurbee2018/org**.

Propolis In Human & Bee Health will be held September 28-29 at the Park-Hotel, Moskva, Sofia, Bulgaria.

For more details, registration and abstract submission visit **www.propolisconference2018. cim.bg**.

Cuba Beekeepers Tour 2018 will be November 10-18.

Featured will be visits to apiaries, queen rearing, processing plants, research centers and more.

For more information please contact Benita Lubic CTC, President, Transeair Travel LLC, 2813 McKinley Place NW, Washington, DC 20015; 202-362-6100, 202-362-7411 Fax; **blubic@aol.com**

♦ALABAMA♦

Alabama Beekeepers Association Annual Fall Conference will be held September 21-22 at the Clanton Conference & Performing Arts Center, 1850 Lay Dam Road, Clanton.

Speakers include Jim Tew, Steve Payne, Lance Wilson and Brutz English.

Please register early to help with planning food, name tags, chairs, etc. Fee is $45/two days and $25/one day. If you register after September 12 the fee is $55/two days and $30/one day.

For more information visit **www.alabamabeekeepers.com** or contact Bonnie at 205.559.2451.

♦COLORADO♦

The CO State Beekeepers Association meets October 27 in Castle Rock at the Douglas County Fairgrounds.

Speakers include Diana Cox-Foster and Tina Sebestyen plus the award-winning film *Last of the Honey Hunters*, about gathering honey in Nepal.

Details and registration at **www. Coloradobeekeepers.org**.

♦CONNECTICUT♦

Southern New England Beekeepers' Assembly will be November 17 at Groton Inn, Groton, CT. Registration is $55, late registration, $75.

Speakers are Jay Evans, Rebecca Masterman and Larry Connor.

For information and to register visit **www.sneba.com**.

Back Yard Beekeepers – each month hands on inspection workshops, bee school, mentor program and more.

Speakers include September 25, Richard Coles; October 30, Dewey Caron; November 27, Bill Hesbach.

For information **visit www.backyardbeekeepers.com**.

♦GEORGIA♦

Georgia Beekeepers Association Meeting will be September 27-29 at the Forsyth Conference Center in Cumming.

Keynote speakers include Maryann Frazier, Jerry Hayes, Izzy Hill, and Julianna Rangel. In additional there will be a catered dinner with guest lecturer, 12 breakout sessions covering a wide variety of topics. We will have our annual honey show and a large group of beekeeper suppliers.

For information visit **www.gabeekeeping.com**.

♦MASSACHUSETTS♦

Mass Bee Fall Meeting will be November 17 in Bristol County.

Speakers are Jamie Ellis and Sam Ramsey.

For information visit **www.massbee.com**.

♦NEW YORK♦

Community Celebration of National Honey Month September 8 at Adams Fairacre Farms, 160 Old Post Road, Wappingers Falls, 9:00 a.m. to 4:00 p.m.

Lectures/vendors/displays/discussions/crating/bee kool bee school for kids.

For more information visit **www.adamsfarms.com or all 8453554.4306.**

Empire State Honey Producers Association Fall Meeting – ESHPA 150th Anniversary – will be November 1-3 at the Hilton Embassy Suites-Destiny USA, Syracure.

Speakers are Jay Evans, Diana Cox-Foster, Richard Ball, Emma Mullen, Scott McArt, Dennis vanEngelsdorp.

For more information and to register visit **ESHPA.org** or contact Angel Conway, 315.263.7501.

♦OHIO♦

Lorain County Beekeepers, How To Collect, Process, Clean and Store Propolis, November 9, presented by Jeannie Saum, at Life Church, Grafton. Meeting starts at 7:00 p.m.

For information **www.loraincountybeekeepers.org.**

♦OREGON♦

The Oregon State Beekeepers Association Fall Conference will be held October 26-28 at the Salem Convention Center, Salem.

Speakers includ Jennifer Berry, Anna Childers, Danielle Downey, Michelle Flenniken, Krispn Given, Steve Pernal, Ramesh Sagili and more. There will be beginning classes and a large vendor area.

For information visit **www.orsba.org.**

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Despite a fire ban here in western Colorado, on July 3 some yahoos shooting illegal tracer rounds at the Basalt rifle range set off a wildfire. So far it's burned three homes, one of Derrick's apiaries, and over 6,000 acres. They brought in 450 firefighters, including hot shot crews from Oregon to do the dirty and dangerous ground work, while helicopters drop water and slurry bombers lay down retardant. Five hundred homes in and around Basalt got evacuated. As of this writing, on July 10, the blaze is 40 percent contained and expected to burn for weeks.

The unintentional arsonists are a couple of dumb kids, if 23 is still a kid. To me they're kids. Now some of the good citizens of Eagle County are demanding that these unfortunates be drawn and quartered. I get this. I also get it that kids pull some real bonehead stunts. I did a few things I'm not too proud of. I closed the bar more than once, but I never killed anybody on the highway, and I never spent the night in jail. Just lucky, I guess.

Unfortunately, you can't undo the past. Now those fire starters have to pay their debt to society. But it could have gone the other way, you know. They could have fired those tracer rounds and not started a fire. But their luck ran out.

I'm sorry about Derrick's bees. He didn't deserve this. When I worked for Paul, a cheat grass fire scorched a hillside and so thoroughly destroyed a bee yard that you couldn't tell that bees had ever been there. The only evidence was a handful of nails and a few metal hive parts.

Our local fire ban extends not only to campfires but to charcoal grills, fireworks and outdoor smoking. In all the public service announcements, nobody's said a thing about bee smokers.

Without smoke, honey bees can be difficult. Without it, I work carefully and try to do just the minimum, i.e., pop a lid, put on a super, and don't dig around too much. Gloves help.

You don't want to tempt fate and light your smoker when there's a fire ban. I won't say I've never done it, because sometimes bees need smoke. But that doesn't make it right. Around here, cheat grass takes over non-irrigated land and crowds out everything else. It starts out green in the spring, then dries out and turns brown by mid-summer or even earlier. When it's fully cured it burns like gasoline.

So you wouldn't want to drop your smoker in some cheat grass and have the lid pop off and embers spill out. If you started a fire, you'd be as guilty as those kids at the rifle range. You, salt-of-the-earth-good-guy beekeeper! The press would crucify you. You might make national news. And of course you'd have the rest of your life to kick yourself.

Fires and smokers aren't my only problems. A bear breached a solar-powered woven-wire electric fence the other night. He knocked over four hives but only ate a couple. Interestingly, he hauled the brood supers out of the yard and scraped off the brood and honey outside the apiary perimeter.

After I cleaned up the mess, Pepper the blue heeler and I spent the night in the car next to the bee yard. I fell asleep about 10:30, and at 11, Pepper growled. I didn't hear or see anything outside, but in the morning I found where the bear had pushed down the fence at the same location where he climbed over before.

The next thing I did was buy a voltmeter. I'd been checking the fence the cowboy way – holding a blade of green grass and touching it to the fence to feel for a shock. Clearly the cowboy way didn't work. When I used my new voltmeter to check the fence, it read 4,500 volts. Five thousand is considered minimum to keep out a bear.

For a good electric fence you need a good ground connection. Let's say you inadvertently touch the fence. You feel the shock as the electric charge passes through you into the earth, thence to the ground rod, and back to the charger. Complete circuit, and you're part of it. Dry earth makes a poor connection from you or an animal to the ground rod and is often the reason fences sometimes don't keep out bears.

I used the weed eater to clear out the weeds and cheat grass under the fence. Then I laid chicken wire on the ground around the outside of the bear fence and wired it to my series of ground rods. This meant that the bear would have to stand on the grounded chicken wire to climb over the fence again. My fence pop went up to 5,500 volts.

The Parks and Wildlife officer came by to take a look. In Colorado, the state reimburses beekeepers for game damage if the apiary has an electric fence. He sent me the paperwork to file a claim. The state pays $200 for a destroyed hive, but I'd rather have my bees back.

The bear hasn't returned, so far. It's been 10 days. The incident was my fault, really, but I'm getting compensated for it. I guess I'm just plain lucky.

Ed **Colby**

Good Luck Bad Luck

As of August 8, the fire had burned 12,588 acres and was 90% contained.

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John Miller - John owns Miller Honey Farms which is based in Blackfoot ID but also has locations in Gackle, ND and Newcastle, CA. Like many commercial beekeepers, John trucks his bees to several states for pollination but what John does differently from most is he winters his bees in advanced wintering buildings in North Dakota; something which is virtually unheard of in the commercial beekeeping industry. Come listen to how he makes it all come together into a successful operation.

Ray Olivarez – Carefully chosen locations in Northern California, Montana and Hawaii's Big Island allow Olivarez Honey Bees to offer customers premium-quality queens and bees year-round. OHB is surely one of the largest package and queen providers in the US with specialty climate controlled trailers that allow them to truck packages across the country. In addition to selling queens and packages, Ray's team also provides almond pollination and produces honey. To top it all off they offer a retail store to die for and host a large "Hobby Day" every spring. Sure to be a fascinating 4 hours hearing just how they do it the OHB way.

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