

Oct 2016

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The Magazine Of American Beekeeping  
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Paying member = Current ABF, AHPA and CHC dues-paying members. Rates are in US dollars. Non-member rates include a basic one-year membership to both ABF and AHPA.

### SCHEDULE AT A GLANCE

(subject to change)

#### Tuesday, January 10

All Day: Board and Committee Meetings

#### Wednesday, January 11

All Day: General Session

Noon: Tradeshow Opens

Evening: Welcome Reception & Honey Queen Candidate Entertainment

#### Thursday, January 12

All Day: Track Sessions for Beginning, Serious Sideline and Commercial Beekeepers

All Day: Tradeshow

Lunch: Auxiliary Lunch/Meeting\*

Evening: Social Activity – Moody Gardens Rainforest\*

#### Friday, January 13

Morning: Kids and Bees Program

All Day: General Session

All Day: Tradeshow

Lunch: Foundation for the Preservation of Honey Bees Lunch/Meeting\*

Afternoon: ABF Business Meeting

Afternoon: 2017 Honey Show Live Auction

Evening: AHPA Banquet\*

#### Saturday, January 14

Morning: Commercial Beekeepers Breakfast/Meeting

Morning: AHPA Business Meeting

All Day: Concurrent Hands-On Workshops

Evening: ABF/CHC Banquet with the Coronation of the 2017 American Honey Queen and Princess\*

\*Additional Charges (Registration Fee Applies)



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# Bee Culture

The Magazine Of American Beekeeping

*It's Not Too Late To  
Sign Up!*

## A CASE FOR (LOCAL) HONEY

Our Case of Honey is drawing a group of insightful participants. Speakers committed so far include **Gene McCune**, McCune Family Apiaries, Ohio; **Dan Conlon**, Warm Colors Apiaries, Massachusetts; **Bob Binnie**, Blue Ridge Honey Company, Georgia; **Dave Shenefield**, Clover Blossom Honey, Indiana; **Steve Conlon**, ThistleDew Honey, West Virginia; **Joann Dunlevey** RS, Food Safety Specialist, Ohio Dept. of Ag; **Margaret Lombard**, CEO of The National Honey Board, Colorado, plus **Geoff Martinak** and **Collin Stone** from International Honey and their travelling extractor semi and **Roger Starks**, Howalt-McDowell Insurance and Risk Management.

This well rounded group has all aspects of this topic well covered. US Producers, Packers, Producer/Packers, Marketing, and all the new Food Safety rules, regulations and risk factors from both Federal and State level perspectives.

New this year will be a Friday Night Social held in *Bee Culture's* Conference Center, the location of the Two day Conference on Saturday and Sunday. It's a low-key, meet and greet with the speakers and attendees from 5:00 pm to 7:00 pm on Friday where you can pick up your folders with speaker profiles, conference agenda, and lots of information on Medina's dining and shopping opportunities. Supper afterwards is on your own but you'll have plenty of places to choose from, and lots of people to join with.

Tuition is **\$150.00** per person which includes the Friday night social and classes and an exceptional lunch on Saturday and Sunday.

Friday Night Social, October 21, and classes and lunch Saturday and Sunday October 22 & 23, *Bee Culture's* Conference Center, 640 W. Liberty St., Medina, Ohio.

Mark Your Calendars Now!  
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at

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# Bee Culture

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*So you want to grow your own business. Come to Medina, Ohio in October and we'll show you how.*

Bee Culture Event

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*It's Not Too Late To Sign Up!*



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

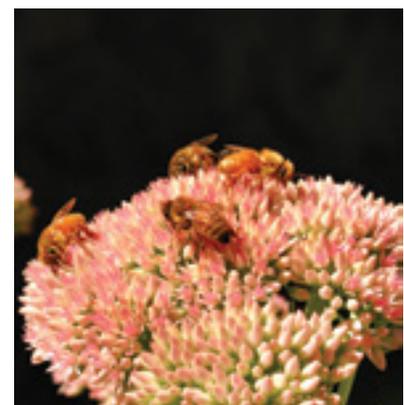
#### Subscription Information

U.S., one year, \$25; two years, \$48. Newsstand price: \$4.99. All other countries, (U.S. Currency only), \$20.00 per year additional for postage. Digital Edition \$15. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), October 2016, Volume 144, Issue 10, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Subscriptions, Book Orders – 800.289.7668, Ext. 3220 • [www.BeeCulture.com](http://www.BeeCulture.com) • [subscriptions@BeeCulture.com](mailto:subscriptions@BeeCulture.com)

Advertising – 800.289.7668, Ext. 3216; [JNewcombe@BeeCulture.com](mailto:JNewcombe@BeeCulture.com)

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*This month's cover photo of several honey bees on sedum was taken by Fred Gimeno from Wheat Ridge, CO.*

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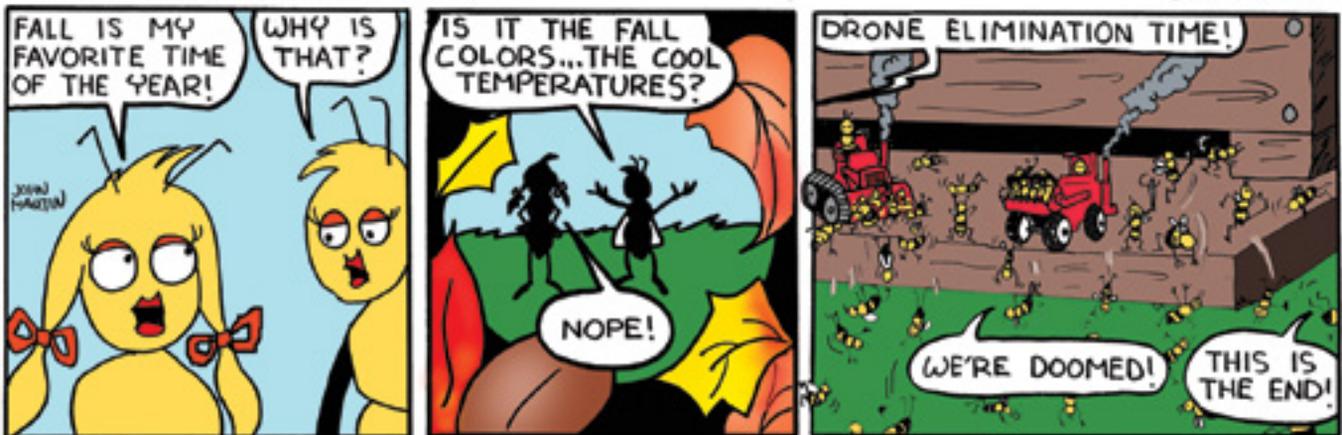


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## Starting Queen Rearing And Common Sense

My name is Kevin Gross, a beekeeper in northeast Alabama utilizing a natural approach and managing about 20 hives since 2010.

I listened to your June 15 webinar "Common Sense Natural Beekeeping" last night and enjoyed it very much. I think you are spot on with what you shared in the webinar.

I am especially interested in the comment you made regarding groups of beekeepers working in a cooperative fashion having some success with improving their stock toward locally adapted and more resistant.

If possible, can you please forward me contact information for folks involved in those groups?

I would love to learn more as to how they are going about it.

Kevin Gross

The Heartland Honey Bee Breeders Cooperative evolved over a period of about three years, 2010 to 2013.

The core group who provide the catalyst for the group found each other during Queen Rearing training in Ohio, Indiana and HAS. We discovered that each of us have a passion about saving the honey bee through a breeding program.

We exchange genetics and info within the HHBCC member states, assist Greg Hunt and Krispn Given with the Insemination Fest the first

couple weeks of June developing Breeder Queens, then sending the Breeder Queens into the HHBCC member states to the State Queen Producers.

One key item to understand, the HHBCC is independent of any other group or state organization.

Each state has a Queen Producers Association which must be independent of the State Beekeepers Association. Keeps politics to a Minimum.

It's a collaborative group of like minded Beekeepers that are obsessed rather than interested in developing lines of bees with several grooming traits.

To start an organization like HHBCC you must find like minded Beekeepers who are all leaders with many years of beekeeping experience also Queen production experience and willing to take time to learn breeder Queen management, who can work together, keeping agendas and egos under control. Mutual Trust is a must.

Be willing to give presentations to sell the concept to Beekeepers in the states the HHBCC members are in.

Continuous Improvement is on going.

THE HHBCC member states are beginning to take Virgin Queens to Purdue during the II fest To Produce Breeder queens, then grafting from the breeder queens ASAP, for evaluation over the fall buildup then overwintering.

That is a global view of the HHBCC, the Different State Queen

## Bee Culture

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producers and our customers, all the Beekeepers in the U.S.

HHBCC member states are Indiana, West Virginia, Pennsylvania, Michigan, Tennessee, Illinois, Kentucky and Ohio.

Developing a Web site and a Face Book Page is a must.

There is a lot more Beekeepers need to understand and plan for, if they decide to start a multi-state Honey Bee Breeders Cooperative.

I'll be glad to take questions.

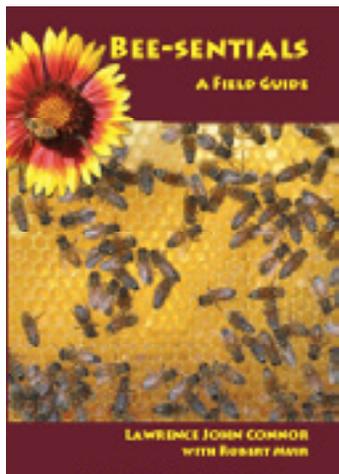
Dwight Wells

Dwells85@woh.rr.com

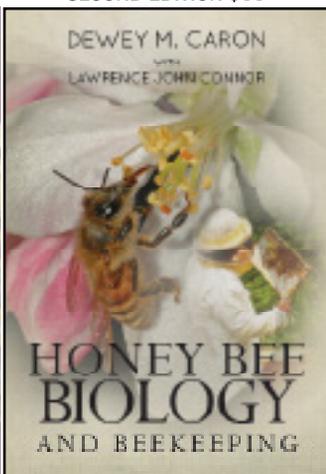
## Chemistry of Honey

In the August 2016 issue of the *Bee Culture* magazine is the article by Sharla Riddle entitled "The Chemistry of Honey." It is very informative, but I would like to point out that one term is not correct, i.e. *hydrosopic*. The term is *hygroscopic* – the ability honey to absorb moisture from the air

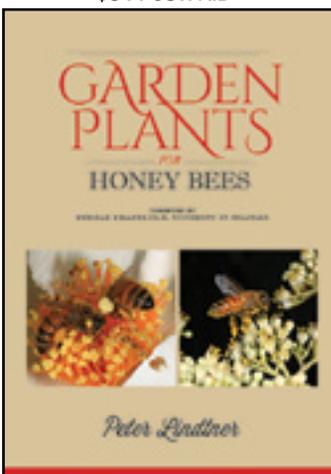
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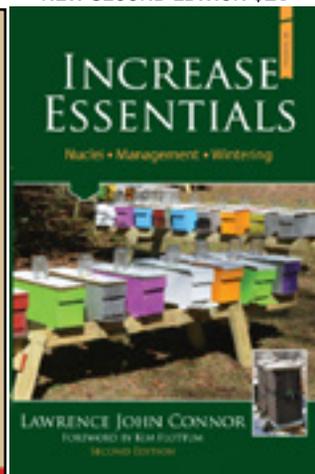
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(reference *ABC & XYZ of BEE CULTURE*). I know that you are well aware of the correct term, but thought that your readers should be informed.

Ross Englehart

## Climate Change?

I recently let my subscription to *Bee Culture* run out, unfortunately missing a few issues. After resubscribing, I finally received the August 2016 issue yesterday. I must say I'm disappointed in the content allowed in the Mailbox section, specifically the back and forth on climate change. Tom Chester's letter in the August issue was condescending at a minimum and never mentioned the words "bee," "honey," or "hive." In fact, it wasn't about beekeeping at all, instead laced with left-wing, right-wing, liberal, and conservative rhetoric. Didn't I subscribe to *Bee Culture* magazine and don't we get enough of the politically divisive content everywhere else? If there

ever was an exemplary microcosm of a group of people having different opinions, ideas, and practices towards furthering a common goal, that is the love for bees, the beekeeping community would be it. *Bee Culture*, you can surely do better to keep your magazine about beekeeping.

Jim Cody  
Crawfordsville, IN

## Hearing Aids And Stings

I read in the July issue about Richard Brewster's experience with his hearing aids and getting stung. I had a similar experience the first time I wore mine near the hives. I had never been attacked by my bees before and they came after my ears and stung me there. As I was running away and slapping at my ears I knocked the hearing aids out and lost both of them in the field. I never found them and fortunately I only had to pay the deductible



(\$250) to get new ones!

Joe Bates  
Falmouth, ME

## Stepping Down

After much thought and consideration, I have decided to resign from the position of Maine State Apiarist effective July 16, 2016. This decision did not come easy after working for the Maine Departments of Agriculture, Conservation & Forestry and with beekeepers and growers during the last 33 years.

The beekeeping industry and

## It Speaks For Itself –





## New Zealand Bee Coin

This coin is a collectible and they are only making 1500 World wide. I think this coin will only gain in value. Anyway whether it does or not it is a cool coin for beekeepers to own in my humble opinion.

After exchange rate coin costs about \$108. They have already sold some on EBay for \$150/U.S. So if you're going to order, order from New Zealand Stamps and Coins and get the exchange rate.

For information check out this link at Catch The Buzz [http://www.bee-culture.com/catch-buzz-first-hexagonal-coin-features-honey-bee-resin-inclusion/?utm\\_source=Catch+The+Buzz&utm\\_campaign=5e04f2a982-Catch\\_The\\_Buzz\\_4\\_29\\_2015&utm\\_medium=email&utm\\_term=0\\_0272f190ab-5e04f2a982-331962805](http://www.bee-culture.com/catch-buzz-first-hexagonal-coin-features-honey-bee-resin-inclusion/?utm_source=Catch+The+Buzz&utm_campaign=5e04f2a982-Catch_The_Buzz_4_29_2015&utm_medium=email&utm_term=0_0272f190ab-5e04f2a982-331962805).

Gary Stelzner  
Winlock, WA

growers who depend upon honey bees and beekeepers for crop pollination have faced a number of challenges during the past 31 years. Despite these obstacles, beekeepers and growers have worked together to produce numerous commodities for the world's growing population.

I am not retiring as I'm not old enough (can you believe that!) and will continue to work with honey bees and beekeepers. For the near future, I will manage my bees for honey production and be involved with a honey bee research project. I'm certain that some of our paths will cross in the future.

I want to thank all of you for your support over the years. It has been a privilege to work both with and for you. In some instances, I have had the good fortune to have worked with three generations of family beekeepers. I wish all of you the best.

Tony Jadcak  
Maine State Apiarist



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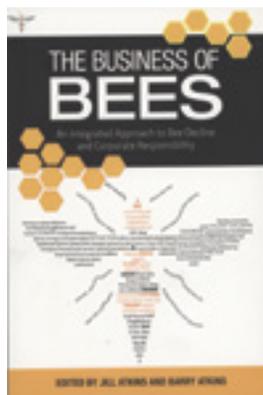
effortlessly tracks hive vital signs to increase honey yield and reduce colony loss. The innovative and cost-effective honey bee hive monitoring system allows beekeepers to track the health and productivity of their bees more effectively than ever before. The wireless solution seamlessly tracks the vital signs of honeybee colonies enabling data driven hive maintenance and ensuring healthier honeybee populations.

The Bee Certain system integrates sensors monitoring hive weight, along with the temperature

and humidity inside and outside the hive, into a real-time data stream of the critical vital signs of hive health. The wireless system installs easily, without hive modifications and automatically stores two years of data for up to 50 hives on a single system recorder. Beekeepers can easily access graphical views of the data over time through a web browser on a personal computer, tablet or smart phone.

The Bee Certain starter system consists of a weight sensor, hive monitor and environmental monitors (temperature and humidity) and one system recorder. The turn-key solution allows the beekeeper to monitor honey production and consumption throughout the year, while tracking the vital signs of temperature and humidity inside and outside the hive. This integrated look at hive health and productivity can reduce the need for intrusive manual inspections and alert the beekeeper if a visual inspection or other preventative action is needed to save under-performing hives.

Visit the Bee Certain website at <http://bee-certain.com/> for **additional information**. Also, see the ad on Page 47 of this issue.



*The Business Of Bees. An integrated approach to bee decline and corporate responsibility.* Edited by Jill Atkins and Barry Atkins. Published by Greenleaf Publishing. [www.greenleaf-publishing.com](http://www.greenleaf-publishing.com). ISBN 978-1-78353-435-7. Soft cover, B&W line drawings/charts. 6.25" x 9.25", 351 pgs. \$55.00.

This is not a book about keeping bees, but it is about beekeeping. It has little to do with the economics of a beekeeping operation, or the role a beekeeper may play in a local economy. What it does do, however, is look at a much bigger picture of the industry of bees, and the roles that corporations and governments play in the issues of honey bee decline, and examines what the impact will be on consumers, companies, stock markets and global society in general. It addresses inputs from academics in accounting, science and humanities and practitioners in the finance industry. To do this, the editors look at examples from Japan and the bumblebee industry, the Ontario controversy and pesticides and the UK's experience with providing habitat at the government level. It

*Continued on Next Page*

**Apicare** has been on the market for two years now, and we have had some beekeepers using it for longer to great benefit. The Apicare program when used properly has removed the threat of viruses, helps protect and lowers the risk from nosema, Aids in digestion, and can help neutralize the threat of pesticide build up. These are just some of the total benefits of the program that we have seen in numerous operations of large scale beekeepers down to beekeepers of just one to five hives, including BIP and USDA testing.

Some of the beekeepers have even ran independent tests on the nosema levels in their hives while on the Apicare system, showing it does remove the threat of Nosema in a hive, this is a great find as the need of antibiotics is removed in favor of a natural solution that stimulates the beneficial gut bacteria instead of destroying it, which also leads to a stronger immune system throughout the hive, reducing stress throughout the colony thus leading to more uniform role regulation and hive stability. Having people that will testify to the results, pictures of absolutely perfect hives, tests done by respected laboratories is all wonderful to have and be able to present, but the ultimate opinion is your own and this is a system that will not let you down.

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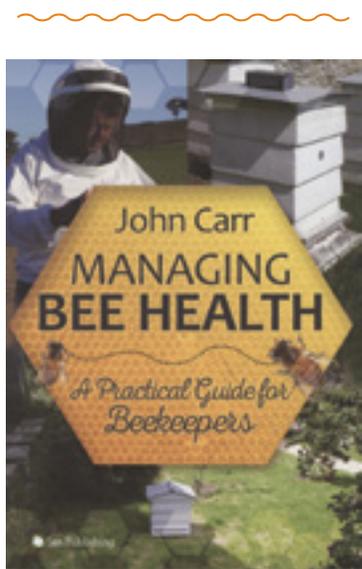
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then addresses specifics in accounting from the US, UK, South Africa, Sweden and Germany. It concludes with an integrated approach, on a global level, of reversing the decline, first by examining the reasons, then the inputs all levels of society could make in doing so.

This is not a light-read how-to beekeeping book by any stretch of the imagination. However, if you are part of a corporation that has a vested interest in some level of pollination, have input at some level of government that benefits from this, or contribute to an academic level of research, the information in this book is a remarkable jumping off place to begin.

Kim Flottum



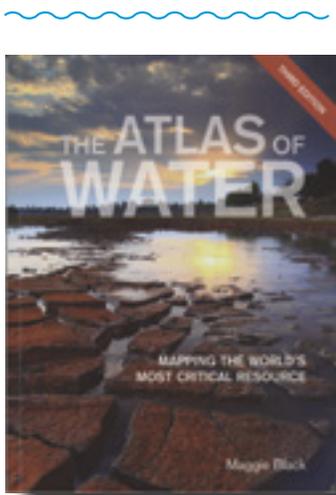
*Managing Bee Health. A Practical Guide for Beekeepers.* John Carr, B.V.Sc., Ph.D., Dipl. E.C.P.H.M., M.R.C.V.S. 5m Publishing, Sheffield, UK. ISBN 978-1-910455-03-6. Soft cover, color throughout, 6.75" x 9.5", 373 pgs. \$60.00 from Northern Bee Books.

The author is a population medicine veterinary surgeon and has taught bee medicine at several universities around the world. He's from the UK, and that's where the emphasis of this book lies – managing global bee health problems from a UK perspective. But wait a minute. Every global bee health problem there is, is only a plane ride away from the US, and if you read the Q&A article in this month's issue, pretty much all of us are going to have to start talking to veterinarians

on a somewhat routine basis beginning next year. So, this book isn't that far removed.

The publisher says this book is for beekeepers, advisors, and veterinarians. And it works for all three groups. Especially vets here in the US who aren't beekeepers. It starts with anatomy, moves on to nutrition, then details causes of disease, pathogen entry, and then spends time on treatments of ailments. This is from a global perspective so many (most) of the treatments recommended aren't available in the US. Then it looks at managing the health of both brood and adults, and then the whole hive itself. There's some basic beekeeping info like examining a hive and the hive through the year, feeding, honey, pollen, the queen and a lot on IPM. This isn't a beginner's book, but rather information for those who have to deal with these issues on a regular basis. If bees put food on your table, this is a book to consider having on that table too.

Kim Flottum



*The Atlas of Water. Mapping The World's Most Critical Resource. Third Edition.* Maggie Black. Published by University Of California Press. ISBN 978-0520-29203-1. Soft cover, color throughout, 128 pgs., \$24.95.

If water is part of your day, you'll want a copy of this book. This updated third edition covers the topic in extreme detail. Maggie Black, who has written on this subject in several books and papers for international organizations, has extensive global experience measuring the water that we have and will have, and quantifying the quality of what exists and

the threats to that quality.

She starts looking at distribution, availability, demand, supply and the competition and conflict arising from not having enough and a brief look at our environmental security by way of aquatic ecosystems. Climate change has a hand in this and she looks at ice and snow melt, flooding, droughts, and rivers. Of course we all raise a glass but how much is there to raise, water for food, sanitation, and hygiene are important. Then there's the water we use for irrigation, fisheries, industry, energy and even water for sale to be considered. She examines damaged water – dams, pollution, industrialization and even habitats.

The book is jampacked with world maps showing where, how, who, when and why water is in trouble, and the people who need it are too. And if you are a figure freak, there are stats for 375 countries on how much water per person is used, and what it is used for – agriculture, industry, and municipal along with a multitude of other stats on use, by whom and where.

Nope. Not a beekeeping book. But try and keep bees alive without water. Good luck.

Kim Flottum



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Absorbs moisture in the hive



Temperature—Hot Box (Item No. 9011A) Acts  
as an insulator. Bee Cozy (Item No. 9013, 9014)  
Provides a windbreak and protects the hive from  
freezing temperatures



Humidity Monitoring—Broodminder (Item No.  
9020) Checks the humidity level in the hive.  
Bluetooth Accessible



Nosema Prevention—Fumagilin B (Item No.  
96, 97, 98) Exclusive nosema treatment and  
preventative

Your hive needs  
60-100 pounds of  
honey to survive  
the winter

Moisture causes  
condensation which  
will drip onto the  
cluster causing a  
sudden drop in  
temperature

Poor ventilation  
causes mildewing  
and molding which  
can sour the honey  
causing nosema

Feed your bees  
until the first frost  
or until they quit  
taking feed.  
Whichever  
comes first

### November Beekeeping 101 Class

Saturday, November 5th 2016

9:00 AM - 4:00 PM CST

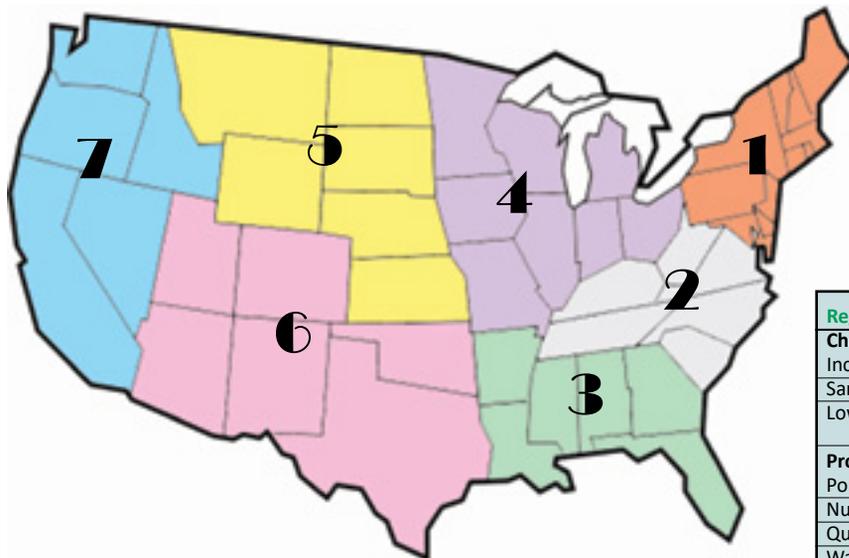
General topics of Beginning Beekeeping  
Onsite Instructor, Jake Osborne

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# OCTOBER - REGIONAL HONEY PRICE REPORT



With honey prices all over the map, depending on where you live, we went to our reporters and asked about what their local markets were doing, what they intend to do about prices for this year's crop, and if they were going to make any changes in their product mix because of the unstable market. We also asked about the weather that was, and what they thought the weather to be doing, and any management challenges this will bring.

The chart shows the per cent of reporters from each region that will change, or not change their strategies because of price, or weather this summer. The first is pricing, then changing product mix to accommodate their business, next is how much rain this summer, then how good was the honey crop and finally what will they be doing to help the bees from now to spring. Of all of these, it's interesting note the attention paid to feeding and checking queens. A lesson here, certainly.

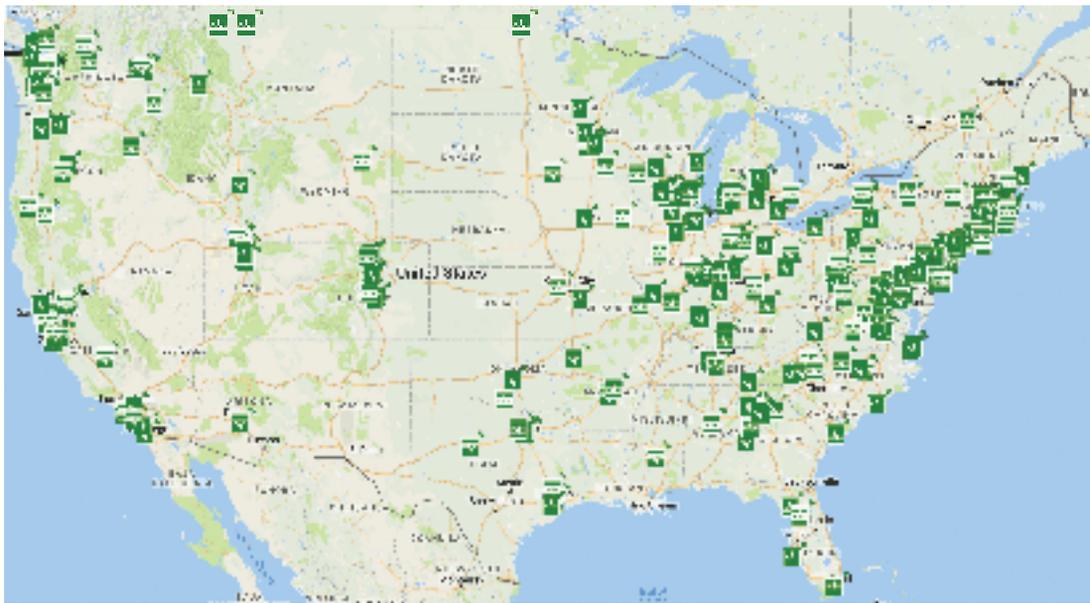
Region	1	2	3	4	5	6	7
<b>Change Prices</b>							
Increase	12	9	8	33	14	36	7
Same	75	91	92	66	57	64	93
Lower	13	0	0	0	0	9	0
<b>Product Mix Change</b>							
Pollination	3	0	0	8	0	27	14
Nucs	9	0	7	17	0	0	7
Queens	3	9	0	7	0	0	7
Wax	24	0	0	0	0	0	0
No change	60	91	92	83	100	91	86
<b>Precipitation This Season</b>							
Too little	73	36	15	25	14	9	7
Average	27	36	54	58	27	45	57
Too much	0	27	31	17	57	46	29
<b>Honey Crop This Season</b>							
None	0	0	8	0	0	9	7
Poor	46	54	23	13	71	27	29
Average	38	45	69	25	29	45	50
Above	15	0	0	42	0	0	7
<b>Will Have To</b>							
Feed sugar	78	9	54	33	86	54	71
Feed protein	52	18	38	25	86	45	57
Combine	20	36	31	17	57	54	36
Check queens	83	72	77	50	85	72	57

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	\$/lb	Last Month	Last Year
<b>EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS</b>												
55 Gal. Drum, Light	1.55	2.03	2.30	2.73	2.23	2.19	2.57	1.25-3.80	2.27	2.27	2.26	2.21
55 Gal. Drum, Ambr	1.63	1.98	2.13	2.60	2.25	1.96	2.70	1.25-3.50	2.12	2.12	2.18	2.31
60# Light (retail)	214.22	171.76	203.75	199.08	171.00	195.10	254.00	106.80-300.00	205.81	3.43	218.59	203.23
60# Amber (retail)	218.44	170.12	193.00	193.09	202.64	187.20	252.00	105.60-300.00	202.48	3.37	217.64	201.50
<b>WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS</b>												
1/2# 24/case	90.53	75.00	88.00	57.98	70.20	95.76	110.00	40.00-120.00	83.08	6.92	81.37	80.33
1# 24/case	133.52	107.78	129.89	101.88	118.72	126.58	147.60	84.00-192.00	124.28	5.18	119.60	116.47
2# 12/case	119.41	95.40	117.18	95.56	106.86	105.16	115.33	76.80-168.00	110.67	4.61	104.49	106.57
12.oz. Plas. 24/cs	111.98	86.49	97.00	85.71	74.40	110.10	103.60	64.80-168.00	99.08	5.50	96.47	96.81
5# 6/case	141.75	110.50	148.20	110.57	102.30	123.56	151.00	84.00-204.00	129.45	4.32	120.86	122.39
Quarts 12/case	182.52	132.40	126.72	134.59	155.32	145.18	178.50	108.00-280.00	149.32	4.15	141.21	135.74
Pints 12/case	107.44	92.60	69.60	86.22	111.00	82.16	105.50	54.00-144.00	91.94	5.11	91.70	93.13
<b>RETAIL SHELF PRICES</b>												
1/2#	5.28	4.11	4.20	3.42	3.90	3.99	5.83	2.09-8.00	4.55	9.09	4.44	4.27
12 oz. Plastic	6.38	5.19	4.96	5.21	5.11	6.31	7.62	3.00-9.50	5.83	7.77	5.75	5.46
1# Glass/Plastic	7.61	6.62	7.13	6.42	5.95	6.28	9.71	3.00-12.00	7.20	7.20	6.89	6.72
2# Glass/Plastic	13.72	10.56	12.63	11.52	9.46	10.15	14.23	6.00-22.00	12.35	6.17	11.59	11.58
Pint	11.44	8.91	7.64	10.12	8.50	10.10	12.92	4.50-17.70	9.84	6.56	10.43	10.14
Quart	18.35	16.03	13.94	16.59	15.52	16.46	19.54	8.00-31.29	16.72	5.57	16.63	15.83
5# Glass/Plastic	27.81	24.33	34.67	25.73	21.78	25.72	32.50	15.00-41.00	26.80	5.36	25.84	25.51
1# Cream	9.42	8.19	9.68	7.65	10.14	5.60	11.00	4.99-16.00	8.86	8.86	8.64	8.63
1# Cut Comb	12.22	9.40	8.33	9.61	9.00	6.50	15.33	5.00-20.00	10.75	10.75	9.63	10.61
Ross Round	9.33	6.67	8.97	9.17	8.97	9.50	9.60	6.00-12.00	8.94	11.91	8.90	9.45
Wholesale Wax (Lt)	7.77	5.25	5.08	5.70	5.00	5.38	6.44	3.00-12.00	6.16	-	6.09	5.88
Wholesale Wax (Dk)	7.17	4.79	4.28	5.40	5.79	3.00	4.75	2.00-10.00	5.58	-	5.60	5.51
Pollination Fee/Col.	93.18	76.00	62.00	70.00	80.00	90.00	77.00	30.00-145.00	79.12	-	80.00	83.99

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# INNER COVER

It was a good garden season this year. Appropriate rain in the spring, but then dry, dry, dry all of June, July and the first week

of August. But irrigation is both a science and an art, and we kept it all both well fed and well watered, and everything except the cucumbers simply thrived. Except the weeds,

which simply didn't exist this year. There were tomatoes certainly – a dozen different kinds, green and yellow beans, five or six kinds of summer squash, and lots of both the big green sweets and the way-too-hot-to-even-consider peppers. We've been eating high off the (vegetable) hog since mid-June.

In early August the faucet was turned back on and the rains returned. Some days lots of it. So some days you didn't get to pick and some days you picked a lot. It was one of those pick a lot days, after supper one humid, hazy, cloudy, damp mid-August evening while reaching for a ripe, juicy, very red and ready globe buried down and beneath a plant grown to Redwood status, with multiple stems, and intertwined branches with branches with more branches all bearing fruit, that I inadvertently grabbed a Praying Mantis rather than the tomato I was reaching for. I was, as you can imagine immediately told in no uncertain terms that messing with a Mantis was not a good thing to do.

Back when I was growing tomatoes, squash, corn, eggplant, pumpkins, apples, cukes, peppers, asparagus and rhubarb for a living there was an unwritten rule about tomatoes. If you didn't have ripe tomatoes (and sweet corn) by July 4th, and if a tomato plant (or pepper plant) didn't produce a bushel of tomatoes (or peppers) by season's end you simply weren't good enough to be called a grower. You were a picker maybe, but not a grower. Back in the day pickers were just plant havers, not real farmers. I don't know the metrics anymore but I still apply those measures to our garden. So our plants back then got pretty big. We didn't stake or cage them or pinch much (removing those rascally extra branches growing out from the leaf axils), and we simply let them sprawl all over. We had lots of room so that wasn't a problem and picking took a bit more work but we produced a bushel of tomatoes, or more, on every plant, even considering the few that got stepped on or rotted out by lying on the ground.

That was then. We don't have that kind of room now, or at least we don't take that kind of room now because we don't have the tractors, cultivators and crew to do that kind of work, so we squeeze things together a lot, and we don't plow or cultivate much, just rototill a row and put the plants in the row, a cage around the plants when they are small, and drive in and fasten a good sized stake to hold the cage for extra support. Then we cover it all with a layer of cardboard and inches and inches of straw. We still don't pinch too many suckers when they form, so the plants get pretty big and because they are in that cage they can get really squeezed. I don't think you could drive a car, well, a small car through our garden because of the huge plants, the tomato cages that try to hold them and the stakes that hold the cages and the squash and cucumber vines tangling everything together. This makes for less work managing the plants during the season, even with the few insect pests we get and the occasional outbreak of fungal or bacterial problems that happen sometimes because everything is so crowded, but the dry year worked to our advantage there. And it does make more work picking them as the fruit ripens. But there's lots more fruit to pick because there's more branches that produce blossoms. It's a time, space, production balancing act. It works.

So it can be an adventure when you go to pick tomatoes because the fruit gets buried under a ton of foliage and you have to lift and pry and shove stems and branches and leaves aside so you can see what's at the bottom of the plant. And there's always, always two or 10 just ripe and ready to pick

tomatoes down there waiting for freedom. Often they get wedged between two or more stems and you have to argue with the stems, the stake, the cage and other tomatoes, while those leaves above are in your face. And sometimes you can see the tomato way down there, but you have to kind of twist and turn and wend your way down to it without really seeing where your hand is going. That's when it gets interesting. Sometimes there are other things down there besides tomatoes. Praying Mantids, for instance.

As I pushed my hand toward that nearly out-of-reach perfectly ripe tomato, I had to grab and move a very thick branch. The Mantis was hanging onto the underside of the branch and I grabbed the two together. The Mantis lunged out toward my hand, striking the side of my hand just below my little finger – where it's kind of tender. Immediately I thought I'd been stung by a – yellow jacket, bumblebee, honey bee – something – because the pain was sharp, intense and immediate. But as I very quickly backed out of that tomato plant, the pain had essentially disappeared by the time I got back on my knees. I looked at where the wound should be, but there wasn't a mark to be seen. I bent over again and looked into the crater I'd created trying to reach that perfectly perfect tomato and there, looking up at me with a snarl, front legs waving like a boxer, head twisting and turning, anten-

## Mantids, Mites And Queens

nae swirling, rear legs stomping on the stem just daring me to try that again, was this beautiful, menacing, dangerous Mantid. See that spine on its front leg? I got stuck with that when it struck out at me at what felt like about 100 pounds/sq in pressure. But it wasn't quite that hard. It didn't even break the skin.

I looked around, and just beneath the branch it was standing on were about 50 or so what appeared to be immature Brown Marmorated stink bugs, all lustfully sucking away on a tomato even further down that I hadn't seen. The Mantid was stalking them when I so carelessly got in the way I guess. They scattered pretty fast when I moved the stem again, unaware, it seems, how close to being a Mantid's supper they had been. Ok, so I let the Mantid be a Mantid, and silently urged him/her to keep eating those pesky tomato eating bugs. Everybody has to eat something...whether its tomatoes or stink bugs. I'll stick to the tomatoes, and let the Mantid stick it to the stink bugs.

It was also a good honey season this year. That dry warm weather early on got things going, and the locust flow was outstanding, followed by a terrific basswood crop. I kept them apart so now have some of each sitting in pails waiting to be bottled. When it dried up during the hot part of Summer the clover came on strong and kept things going when nothing else was producing, and late Summer produced a good, but not great, crop of golden honey plant and goldenrod for overwintering. I got a formic treatment in there in late Summer and the mite population looks mighty low – can't find any in a couple of hives after multiple alcohol washes and fewer than two in the rest – with one exception.

There's that nuc that kept throwing queens all Summer. I had, I think, about six or so in there in the last five months and none of them stayed. Queenless, queenless, queenless, all Summer long. I'd introduce a queen in a cage, leave her there for a week or 10 days, things looked fine, everybody happy, re-

lease here and she's gone in less than a week. Lots of brood, then some brood, then no queen. Try, try again. After paying for a couple I said, OK, you don't like mine, raise your own. And they put out queen cells to die for. Lots, every time. And, to change the mix, I always added a frame with eggs from another hive to mess with the genetics of what got raised. And they made cells from that too. And then they tore them all down – either just before they emerged, or right after the new queen emerged and they killed her, too. Either way, no queen again. This colony had a death wish.

So then I tested for mites again, just to see. And guess who had a boatload. Now, because egg laying and brood rearing were spotty all summer, I'm guessing there were more mites outside of cells than in



them, which is the reverse of normal. But 12 mites? Really?

So. Now the real world of the 'organism is the beeyard' comes home. Do as I say, or what?

When that queenless colony finally crashes in, say late September or early October because there's no brood to speak of, there's lots of mites with nowhere to go but on adults, and deformed wing started to be seen in late August in that, and only that colony, what, do you suppose, will happen? Those bees will leave home just as fast as they can get out of Dodge and go – where? They'll find a home in any of the 10 other colonies within 50 yards of where they take off from. In fact, all but one is visible from the front door of that queenless wreck.

So, just treat the down and out-ter? Or treat them all so when it

crashes and the bees (and the mites they take with them) are all exposed to the same treatment in every colony, no matter where they go and that's it for the mites. Or, just treat the one?

This is when you'd like to have a dozen beeyards so you could try a few things like this. It's expensive to treat everybody. And it's not healthy to be introducing any kind of poison into a box full of bees.

There's one other option. Isolation. Pick that sick sucker up and move it a bunch of miles away and treat just that colony, and leave the rest alone since they all seem to be doing fine. That's the best option I think, if it is an option. I'll let you know how it turns out . . .

One thing that the above situation brings up is developing bees that get along with the mites. Call it resistance, ankle biters, Russians, local, feral, whatever, there are bees that deal with the mites pretty well. A bunch of groups in several states have formed consortiums that share stock, test each other's stock, work with outsiders who also have bees that seem to deal with this. They bring in known resis-

tant/tough/hardy/whatever you want to call them stock from Universities and breeders, mix them with what they've found and keep narrowing down their stock, narrowing it down, down to something that stays alive. Or mostly stays alive.

Finding these producers is one thing. Finding producers that still have queens in June is another thing, but if you start now, you can find sources that will, and you'll be set. But here's the question. There's a group in the Ohio/Indiana/West Virginia region that does this, and I suspect they'd be pretty well adapted to northern Ohio. Pretty well. West Virginia Winters and Cleveland Winters tend toward being just a tad different. But I urge you to take a look at our mailbox this month for a

*Continued on Page 84*

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# It's Summers Time -

## Labor Day Weekend

As I write this we have just finished up Labor Day weekend 2016 - can you believe it. Although it sort of signals the official end to Summer you can't tell that around here. We've had 90+° days all week. It's supposed to let up a little bit this weekend which will be nice.

Kim and I had a great Labor Day weekend. We took the Friday and Tuesday off on either end so we had five days off. Mostly we stayed around home trying to catch up on all of the projects that we get so behind on. You can see from the photos I think we accomplished a lot.

We did take Friday afternoon off and went to see the new *Ben Hur* movie - just not the same as Charlton Heston. It wasn't bad though - great chariot races. And it was nice and cool in the movie theater - probably the bigger motivation for going.

We spent a good bit of time outside getting a handle on the garden and processing all of the vegetables that needed attention. And of course pulling weeds, although that cardboard and straw thing really cut down on that activity. Our young guys were out mulching and trimming and picking up sticks. It was good just being outside, all of us working together.

I did get to mow over the weekend too - a task I actually enjoy. I haven't had to mow much at all, mostly because it's been so dry. Then I popped a tire - on an Osage Orange stick, I'm sure. So we got that fixed and then the mower wouldn't run. So we finally got it back from the shop - tires fixed, blades sharpened and running good.

You've heard about our tomatoes - each year we go a little crazy. And this year they all did really well. So over the weekend I also spent time making lots of salsa in varying degrees of 'hotness' - some not hot at all for Kim, some with a little heat for the guys and a little hotter for me and a batch of 'super hot' for my son Grant.



are nice and the peppers are pretty and colorful. The peppers did really well this year also. So we had lots to share and lots to make salsa with. If you know Kim at all you've probably heard him say that 'food shouldn't hurt'. He obviously doesn't care for the really hot peppers.

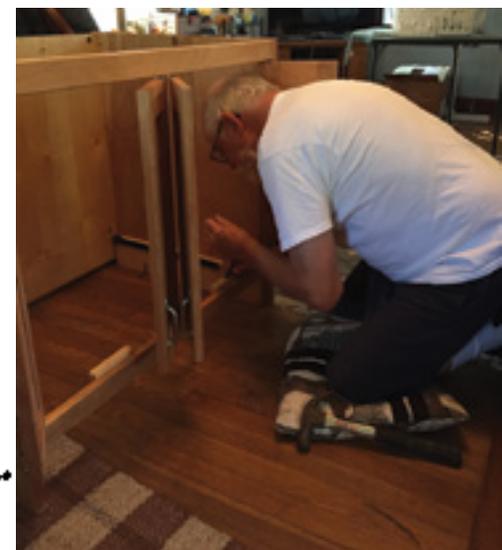
Basil is a favorite at our house also. We grow all the different varieties we can find and have fresh basil all Summer long. When it's time to be done we chop up what's left in the food processor, mix in some garlic and a little bit of olive oil to hold it together. Then I freeze it in ice cube trays and when it's frozen put it in ziploc bags and pop it in the freezer. This Winter we'll have wonderful tomato/basil soup - lots of tomatoe juice went in the freezer also - and chili.

We did tackle a couple of inside projects too. We bought a kitchen island that of course you have to put together. Fortunately, Kim and I work really well together and didn't hurt each other at all while working on the island. It's quite a project and we'll finish it up this weekend because Wednesday arrived and it was time to get back to work and make sure we got your October issue to the printer on time.

And our friend Jim is coming right along with the addition to the chicken coop. We'll be all ready for more chicks and ducks next Spring. This coop will have two sections where I can keep babies or sick ones isolated easily or open up to one big coop. I'm looking forward to that. We're holding steady at 17 hens right now.

I hope you've had a good Summer and that your bees are doing well and that you got a lot of honey this year. We've been smelling the goldenrod that our bees are processing, so that's a good sign. Maybe they'll make enough for us and them.

*Stacy Summers*



Honey bees perform the waggle dance on the comb within a nest to inform other foragers of the location of a newly discovered food source but the dance is also performed by scout bees on the swarm cluster after swarming indicating potential nest sites. There could be many individual bees directing their fellow scouts to such sites but amazingly, after a vigorous debate, the bees come to unanimous agreement before moving to their new home. This model of democracy is discussed by Tom Seeley in his excellent book, *Honeybee Democracy* and he goes further than that stating that there are lessons we humans can learn from the bees in our decision making groups.

If you have ever served on a committee you will know that it can be frustrating at times! With all those human egos present many of us have put our foot in it and said the wrong thing at times so any help we can get from our bees is most welcome in my mind!

So, before I sum up Seeley's 'Five Habits of Highly Effective Groups', that he has learned from honey bees perhaps we should pause and reflect on what type of team member or leader we have been in the past. As chairman of my Local Association I know I found it difficult chairing meetings so I am definitely going to try some of the following ideas.

**Lesson 1** is to comprise the group of individuals with shared interests and mutual respect. This seems easy to do but the mutual respect part of it isn't so easy as one wrong word can upset a fellow member and any ill-feeling can grow into a monster of unsurmountable proportion, and you may not even be aware of it.

The house hunting bees exemplify a group with shared interests as the genetic success of each bee depends on the fate of the entire colony and no individual bee succeeds unless the whole colony survives and reproduces. Looking at human groups Seeley uses the example of Town Meetings in America as good practice as the moderator (chair) in his example asks the meeting to pause for a moment's silence at the start out of respect for the exercise in democracy they are taking part in and to prevent tempers flaring he asks

# DEMO

## What we can learn

Tony Harris

everyone to address their comments and opinions directly to him.

**Lesson 2** is to minimise the leader's influence on the group thinking. This is a difficult one for us humans as it goes against the belief that the leader is in charge but a domineering leader is in Seeley's opinion one of the greatest threats to good decision making in groups.

The bees choose their new home without a leader influencing or telling them what to do.

Each scout bee has her say by means of the waggle dance, and if she convinces another scout, that scout has a look at her proposed home, and if she likes it, does a waggle to influence others. This continues until all scouts agree on their new home. This has been compared to the single

transferable vote system that is used in some elections, every opinion is taken into consideration.

According to Seeley a leader should be as impartial as possible as any actions or comments can lead to a premature consensus by the group as its members consciously or unconsciously seek to please their leader. He suggests that the main aim of a leader should be to tap the collective knowledge of the group.

**Lesson 3** is to seek diverse solutions to the problem. The house hunting bees demonstrate the effectiveness of a large and diverse search committee with hundreds of individual scout bees exploring an area of about three miles looking for the ideal home. When a potential nest site is found the scout bee returns to the cluster and reports her discovery



# ORACY

## Learn from the bees.

with the waggle dance. If we relate this to human groups it is the same as putting another option on the table for further discussion. Seeley suggests allocating explorative work to individuals to report back and to create a social environment in which group members feel comfortable contributing.

**Lesson 4** is to aggregate the group's knowledge through debate. According to Seeley, the greatest challenge faced by a group that makes decisions democratically is to know how to turn the knowledge and opinions of the many members into a single choice for the group as a whole.

How do the house hunting bees reach consensus? We have already seen that the turbulent debate amongst scout bees supporting

different options (nest sites) is at the heart of it. These groups compete to gain additional members from a pool of scout bees who are not yet committed to a site. Whichever group first attracts a quorum of supporters wins the competition and when they eventually leave for their new home they are in complete agreement about the flight path.

In running his faculty meetings Seeley encourages frank debate and most importantly group members are encouraged to form their own opinions and register their views independently. They do this by secret ballots as he feels it is important to get each person's independent opinion, free from peer pressure that could influence them.

**Lesson 5** is to use quorum

responses for cohesion, accuracy and speed. The house hunting bees show us a clever way to make an accurate consensus decision while also saving some time. They do this by the scout bees making sharp changes in their behaviour when a threshold number (quorum) of individuals support one of the alternatives. They return to the swarm cluster to perform piping signals and this induces the many thousands of non-scout bees to warm their flight muscles in preparation for flight to the chosen site. Seeley suggests the piping also tells the scout bees from the other non-chosen sites to stop advertising and visiting these sights and this also speeds up the consensus. He calls this behaviour 'quorum response' and suggests it can also help human groups. Seeley's faculty meetings are often faced with major decisions where a unanimous decision, one way or the other is required and he introduced a system of taking straw polls, by secret ballot, periodically during the discussion to see if they are near consensus. If the poll reveals they are far from unanimity then more careful debate is needed but if it reveals they are close to an agreement, the few supporting the minority position normally realise that a collective decision has essentially been made, that prolonging the debate is pointless and that it is best to switch to the majority position so that consensus can be reached. This is exactly what the bees do and Seeley claims that this and the other procedures he has introduced, learnt from the bees, has improved the decision making in the group he leads.

Of course, we humans often use other tactics in dealing with a leader we don't like by carrying out a *coup de tat*, often resulting in an imaginary knife between the shoulder blades, but that just shows how far behind the honeybees we are in our democratic process! **BC**

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*Tony Harris, NDB is a Scottish Expert Beemaster from Morayshire.*





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# A Closer LOOK

## SPERM VIABILITY

Clarence Collison

*The survival of a honey bee colony depends, in part, on the reproductive success of the queen, which in turn depends on the viability of sperm produced by drones with which the queen mates.*

The health of honey bee queens is closely linked to colony performance as a single queen is normally responsible for all egg laying and brood production within the colony. In the U.S. in recent years, queens have been failing at a high rate; with 50% or greater of queens replaced in colonies within six months when historically a queen might live one to two years or even longer. This high rate of queen failure coincides with the high mortality rates of colonies in the U.S., some years with 50% of colonies dying. Pettis et al. (2016) surveyed sperm viability in U.S. queens to determine if sperm viability plays a role in queen or colony failure. Wide variation was observed in sperm viability from four sets of queens removed from colonies that beekeepers rated as in good health (n=12; average viability = 92%), were being replaced as part of normal management (n=28; 57%), or where rated as failing (n=18 and 19; 54% and 55%). Two additional paired set of queens showed a statistically significant difference in viability between colonies rated by the beekeepers as failing or in good health from the same apiaries. Queens removed from colonies rated in good health averaged high viability (ca. 85%) while those rated as failing or in poor health had significantly lower viability (ca. 50%). Thus low sperm viability was indicative of, or linked to, colony performance.

To further explore the source of low sperm viability, six commercial queen breeders were surveyed and wide variation in viability (range 60-90%) was documented between breeders. This variability could originate from the drones the queens mate with or temperature extremes that queens are exposed to during shipment. The role of shipping temperature as a possible explanation for low sperm viability was investigated. They documented during shipment queens are exposed to temperature spikes (<8 and > 40°C; 46.4-104°F) and these spikes can kill 50% or more of the sperm stored in queen spermathecae in live queens. Laboratory studies were conducted to further explore the role of temperature extremes on sperm viability. A set of 60 queens were obtained via United Parcel Service from a single queen breeder and randomly subdivided and subjected to either 4°C for one, two, or four hours or 40°C for one or four hours with control queens held at 30°C (86°F). Following temperature exposures, all queens were held an additional six days at 30°C to allow time for any detrimental effects on sperm to be realized. On day seven all queens were sacrificed and sperm viability measured. The laboratory exposure of queens

to extreme temperatures resulted in significant reductions in sperm viability after only one or two hours at either high or low temperatures. Exposures longer than one to two hours at 4°C or 40°C did not result in additional increased mortality. Clearly low sperm viability is linked to colony performance and laboratory and field data provide evidence that temperature extremes are a potential causative factor (Pettis et al. 2016).

Tarpy and Olivarez (2014) investigated how sperm viability within a queen's spermatheca changed over time. Their results show that sperm viability decreases over time while stored in the queen's spermathecae. This pattern could have several potential explanations, such as differential use of live vs. dead sperm (i.e., as a queen lays fertilized eggs using live sperm, the proportion of dead sperm increases as a function of sperm use) or possibly increased physiological stress of long-term sperm storage that results in sperm mortality.

Another source of low sperm viability within the spermatheca may be associated with the drones that the queen mates with. Czekońska et al. (2013) compared the volume of semen and viability of spermatozoa collected from drones at ages 15, 20, 25, and 30 days. The drones originated from different queens and were reared in different environments. Semen volume was determined by measuring the filled

*“Exposure to miticides during development severely compromises queen’s reproductive health.”*

length of a capillary. Percentages of live and dead spermatozoa were determined by SYBR-14/propidium iodine fluorescence staining and flow cytometry. The volume of semen collected from drones ranged from 0.5 to 1.3  $\mu$ L. The mean volume of semen significantly decreased with drone age. Sperm viability increased significantly with drone age.

The survival of a honey bee colony depends, in part, on the reproductive success of the queen, which in turn depends on the viability of sperm produced by drones with which the queen mates. Colony success also depends on management of the ectoparasitic bee mite, *Varroa destructor*, which has historically been achieved using miticides that may also impact honey bee health. Previous work has demonstrated that the exposure of drone honey bees to miticidal Checkmite+™ strips (coumaphos) can result in decreased sperm viability. Johnson et al. (2013) applied a range of sublethal doses of six miticides (tau-fluvalinate, coumaphos, fenpyroximate, amitraz, thymol and oxalic acid) to one to four day old adult drones. The drones were returned to their home colony and re-collected two to three weeks later to assess sperm viability using SYBR14 and propidium iodide stains. Counts of live and dead sperm were automated using the EBImage library in the R statistical environment. Sperm viability was not affected by any of the six miticide treatments, which suggests that acute miticide exposure in adult drones has little

effect on drones' reproductive potential. However, two of the six miticides tested had an effect on drone recapture rate: fenpyroximate reduced and thymol increased the likelihood of drone recapture. These results suggest that future research on the effect of pesticides to drone sperm viability should focus on exposure in the immature stages and that beekeepers concerned with drone reproductive health may be able to safely apply miticides when only adult drones are present.

Numerous factors appear to cause the honey bee population declines that have been experienced in recent years; parasites, pathogens, malnutrition and pesticides. Residues of the organophosphate acaricide coumaphos, and the neonicotinoid insecticide imidacloprid, widely used to combat *Varroa* mites and for crop protection in agriculture, respectively, have been detected in wax, pollen and comb samples. Chaimanee et al. (2016) assessed the effects of these compounds at different doses on the viability of sperm stored in the queen's spermatheca. Their results demonstrated that sub-lethal doses of imidacloprid (0.02 ppm) decreased sperm viability by 50%, seven days after treatment. Sperm viability was a downward trend (about 33%) in queens treated with high doses of coumaphos (100 ppm), but there was not a significant difference. The expression of genes that are involved in development, immune responses and detoxification in queens and workers exposed to chemicals was measured by qPCR analysis. The data showed that expression levels of specific genes were triggered one day after treatment. The expression levels of P450 subfamily genes, CYP306A1, CYP4G11 and CYP6AS14 were decreased in honey bee queens treated with low doses of coumaphos (5 ppm) and imidacloprid (0.02 ppm). Moreover, these two compounds suppressed the expression of genes related to antioxidation, immunity and development in queens at day one. Up-regulation of antioxidants by these compounds in worker bees was observed at day 1. Coumaphos also caused a repression of CYP306A1 and CYP4G11 in workers. Antioxidants appear to prevent chemical damage to the honey bee. They also found that deformed wing virus (DWW) replication increased in workers treated with imidacloprid. This research clearly demonstrated that chemical exposure can affect sperm viability in queen honey bees.

Burley et al. (2008) examined the potential impacts of coumaphos, fluvalinate and Apilife VAR (Thymol) on drone honey bee sperm viability over time. Drones were reared in colonies that had been treated with each miticide by using the dose recommended on the label. Drones from each miticide treatment were collected and semen samples were pooled. The pooled samples from each treatment were subdivided and analyzed for periods of up to 6 weeks. Random samples were taken from each treatment (n= 6 pools) over the six-week period. Sperm viability was measured using dual-fluorescent staining techniques. The exposure of drones to coumaphos during development and sexual maturation significantly reduced sperm viability for all six weeks.




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Sperm viability significantly decreased from the initial sample to week one in control colonies, and a significant decrease in sperm viability was observed from week five to week six in all treatments and control. Coumaphos not only decreases the viability of sperm produced by drones exposed to it, but it has also been shown to cause lethal and sublethal effects to queens, including lowered mean number of spermatozoa contained in the spermatheca of queens after mating (Haarmann et al. 2002). Decreasing amounts of sperm entering the spermatheca of coumaphos exposed queens along with lowered sperm viability of exposed drones could lead to queen failure.

For several years, *Varroa* mites were controlled primarily with two in-hive miticides: the pyrethroid tau-fluvalinate (Apistan) and the organophosphate coumaphos (Checkmite+). Various studies have revealed that the exposure of honey bee colonies to sublethal levels of these chemicals can lead to colony wide health problems. Rangel and Tarpy (2015) looked at the combined effects of fluvalinate and coumaphos on the reproductive health of honey bee queens. They did so by raising queens in either miticide-free beeswax or beeswax containing known concentrations of both coumaphos and fluvalinate. Upon their emergence and successful mating, they took several standard measures of queen's reproductive health. They found that queens reared in miticide-laden beeswax were not significantly smaller in size, but the spermatheca analysis showed significantly lower sperm counts and viability, and higher mating frequency, compared to queens reared in miticide-free beeswax. Their results indicated that exposure to miticides during development severely compromises queen's reproductive health. Their findings also demonstrated the importance of the potentially detrimental combined effects of common in-hive miticides on colony health.

Many other factors may ultimately affect the fertility of the drones. Peng et al. (2015) found that all drones fed with *Nosema apis* spores consequently developed an infection, which they were able to confirm by the presence of morphological changes that became visible in the midgut of infected compared to non-infected drones. They found that the midguts of newly hatched, non-infected drones appeared transparent and remained translucent as drones matured. In contrast, as the infected drones matured, their midguts developed substantial swelling, lost their transparency and changed their color to a grey-white. Microscopic inspections confirmed that the epithelial cells of the midguts of infected drones were filled with *N. apis* spores and they could observe large numbers of newly-released spores from burst cells. When they compared dissected accessory glands and accessory testes of infected and non-infected drones, they did not find any of the morphological signs of infection as was described for the midgut tissue. They did not find any *N. apis* spores to be present in the sexual organs of infected drones of any age, neither within the tissue nor in the lumen containing either sperm or seminal fluid. This observation was confirmed histologically when comparing the sexual tracts of non-infected and infected drones of different ages. The muscular tissue surrounding the accessory gland and its epithelial cell layer gradually degenerated with increasing drone age, which was not the case for the muscular tissue surrounding the accessory testes. Peng et al.

(2015) was able to show that *Nosema apis* is able to infect drones and that these infections built up to a point where they induced significant costs for males. They found a reduction in fertility and life span as drones aged, as well as ejaculate of infected drones became contaminated with *Nosema* spores.

Disease may also affect the reproductive health and longevity of queens. Pettis et al. (2016) in their survey of commercially produced queens checked for three pathogens: Deformed Wing Virus (DWV), *Nosema ceranae*, and Black Queen Cell Virus (BQCV). All three pathogens were present in queen stocks from each breeder with the exception of BQCV being absent from the queens from breeder five. In general, queens had high prevalence of DWV followed by *Nosema ceranae* and low prevalence of BQCV.

Queen honey bees artificially inseminated using semen with 46% or more live spermatozoa consistently laid all fertilized eggs in normal worker brood patterns at three to four weeks after insemination. However, queen producers that might use stored semen to preserve breeder stock would want to rear daughter queens throughout a season, longer than these experimental queens were observed. To determine how long queens inseminated with low viability semen continue to produce worker brood, sister queens were inseminated with various mixtures of fresh and freeze-killed semen, or were allowed to mate naturally. Colonies were evaluated for area of comb with all stages of brood, the percentage of worker vs. drone offspring in sealed brood, and the number of empty cells in a representative area of sealed

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brood once a month for five to six months, at midwinter, and again the following Spring. One queen of 22 queens inseminated with 75% or more fresh semen became a partial drone layer by mid Winter, only two of the 21 queens inseminated with half fresh semen ran out of sperm, but three of five of queens with 25% fresh semen were laying some proportion of unfertilized eggs. Preserved semen that has 50% or better viable sperm can be used to inseminate queens that will function as well as a fully mated queen for at least one season, such that a breeder could rear many daughter queens and incorporate desirable genotypes into a breeding program (Collins 2004). **BC**

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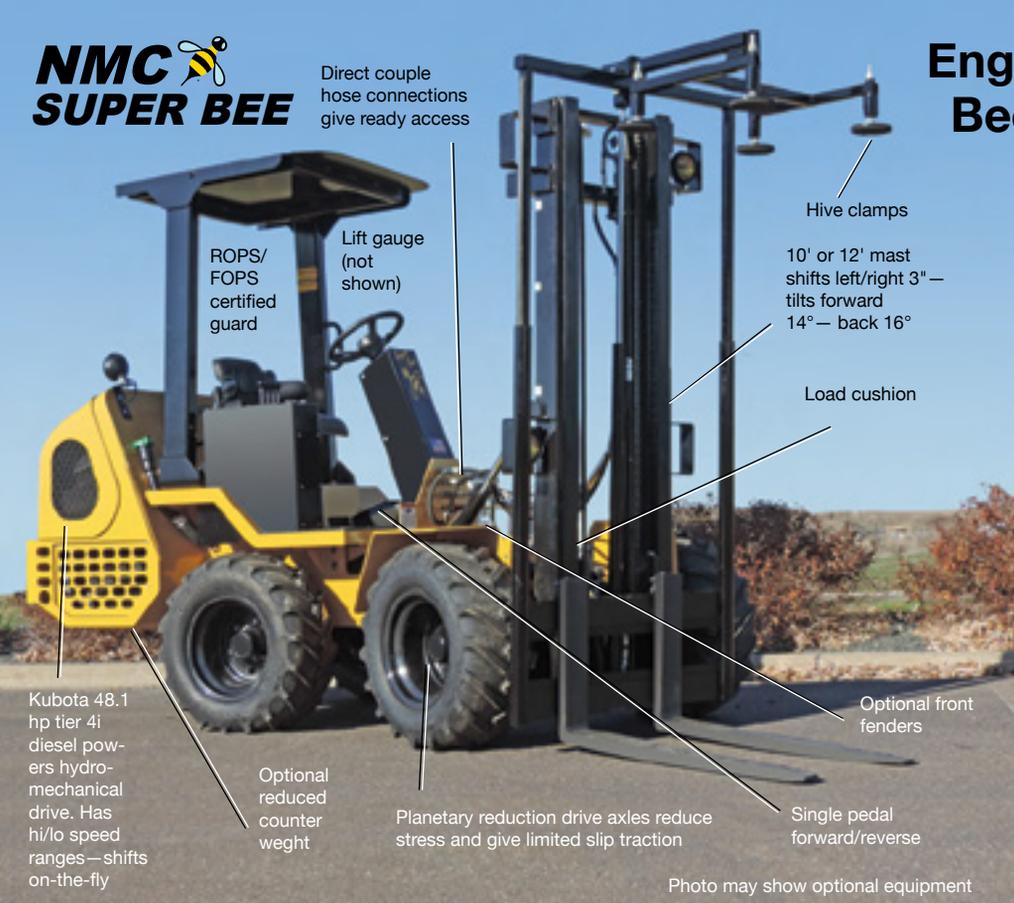
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The Third International Conference on Pollinator Biology, Health & Policy, held July 18-20, 2016 at Pennsylvania State University was supported by 20 sponsors across the beekeeping, scientific, and crop production and protection stakeholder entities. Sponsors supported student scholarships to the conference, as well as speaker fees and travel costs.

Dr. Christina Grozinger, summed up the previous two conferences, stating “In previous conferences we learned there are a lot of ways to kill bees.” This conference featured new research, published and soon to be published research, from around the world hoping to answer, “how can we keep bees alive?”

Sonny Ramaswamy, Director of the National Institute of Food and Agriculture (NIFA) opened the International Conference expressing the “need to corral all of the technologies necessary to address nutritional security at the global level.” He stated there is “a suite of contributors to pollinator losses: biotic and abiotic. Our path forward will include: transformative discoveries, 21<sup>st</sup> Century extension, farming systems, education, policies, regulation, and marketing, human dimensions, and communications. We need new approaches, and new opportunities at the cellular level, community level, and organismal level.” He suggested using the “Cochran collaboration,” taking the reductionist things and bringing them together to understand the whole system.” We need a “convergence singularity to bring together all of the constraints of angst, policies, public pressure, and regulations.” He encouraged others to read Pope Francis’ Encyclical Letter, “Laudato Si’ of the Holy Father Francis, On Care For Our Common Home, May 24, 2015. Read the Pope’s Encyclical it gives “street-cred” to pollinator research and concern from a trusted resource. You need people who are trusted, have credibility, and can engage with the public” in order to engage the public and mitigate the angst.”

Dr. Rachael Winfree from the Department of Ecology, Evolution, and Natural Resources at Rutgers University opened the conference the second day discussing, What can pollinators tell us about biodiversity and ecosystem services in real-world landscapes?

She reviewed the scientific literature to determine that “species richness does matter for ecosystem function.” The ecosystem contains different species richness, species identity, and abundance for different environmental conditions. But why does this matter?

“Complimentarity is a mechanism wherein biodiversity increases ecosystem services.” In a 2013 study by Garibaldi it was found that fruit set in a crop increases with the number of species pollinating that field. A study of pumpkins found the crop yield was better with pollination. Temperature affected pollinators visiting watermelons, and different types of bees have different temperature visitation times increasing pollination. So, if one bee was constrained due to the temperature another bee picked up the pollination task: one bee complimenting the work of another.

Through diversity of pollinators, research has found pollination “facilitation;” honey bees tend to work down the row, and native bees cross the rows in orchards aiding in needed cross pollination. “Response diversity” in pollination comes from redundancy which leads to a reliable function (similar to redundancy in engineering);

# Observations From The International Pollinator Research Conference

Michele Colopy

55 native bee species pollinate cranberries in New Jersey providing the necessary redundancy to insure pollination.

Research has determined bees respond differently to their environment. Real world landscapes often have strong dominance of some species. While experiments are designed to have an equal number of species, which does not reflect the real-world. In the real world species often turnover, or die-off with a few species becoming dominant.

In Dr. Winfree’s study of watermelon, cranberry and blueberry she found large numbers of species not pollinating, while a small number of species were doing the most pollinating. In a study in the Netherlands they found 2% of the bee species were doing 80% of the crop pollination eliciting functional dominance. However, trying to separate the roles of dominance for the watermelon, cranberry, and blueberry in the real world we simply cannot remove the dominance of species. If there is no dominance, then more species would be needed. You do need more species due to species turnover, but dominance will suppress species turnover.

Ninety percent of plant species must be pollinated to reproduce, the ecosystem services of pollinators contribute greatly to crops and wild plants. In a 2015 global study of conservation people acknowledged oxygen, water, and food have enormous value, yet there is less evidence that people take conservation action to protect water, oxygen and food.

Dr. Winfree also addressed how to motivate people to take local actions, not just global. “Marginal values and local cost benefit analysis affect decision making.” Cost benefit analysis study on the value of native bees on crops near pollinator habitat started as a negative, but by year four, research determined farmers can break-even, by year 10 their blueberry yield increased. However, more research is needed on the cost benefit of



pollinators to support a change in human behavior. “The value of global ecosystem service is highly valuable, but people are irrational, and determining what motivates them is key to making change. Economics motivates people. If people pay for something they feel they do not have to be concerned about its welfare. And yet, we have people planting pollinator habitat not knowing the “cost benefit;” so, what motivated them?” Yet, not everything has to have a financial value – what about the intrinsic value – the diversity value, the balance value? “The public will respond to intrinsic value. We have a moral obligation to biodiversity.”

The third day of the conference began with Dr. Gene R. Robinson’s discussion of “Understanding the Relationship Between Genes and Social Behavior: Lessons from the Honey Bee” Dr. Robinson is from the Carl R. Woese Institute for Genomic Biology, Department of Entomology, Neuroscience Program at the University of Illinois at Urbana-Champaign. Interestingly, seventeen percent of the conference presenters/researchers worked under Dr. Robinson. He discussed the power of social evolution: language, agriculture, warfare, and in the case of bees the social aspect of foraging which is a \$30B per year ecosystem service.

His review of the scientific literature found a close relationship between brain gene expression and behavior, genetic toolkits for behavior, and striking individual differences in foraging behavior.

*In previous conferences we learned there are a lot of ways to kill bees.” This conference featured new research, published and soon to be published research, from around the world hoping to answer, “how can we keep bees alive?”*

The classic view of neuroscience is genes influence behavior. The new view of neuroscience is social information influences altered brain and behavior. For example, relative to bees, a Scout bee will:

- seek food independently
- abandon a profitable food source to keep on scouting
- has an inherited tendency to scout
- scouts have distinct neurogenic signature
- gene expression predicts neurochemical enhancement of scouting.

In gene expression, RNA and pheromones can alter behavior. Bees know where the nectar and pollen are at different points of the day, with the finding of 1329 genes differentially expressed in one study. In a honey bee dance

language study the waggle dance communicates distance, direction, and value to other bees, bees measure distance by optic flow (scenery that passes by them) postulating there are distance genes (thinking genes), and distance responsive gene expression was found in mushroom bodies and optic lobes of the bees. Examining weaker behavior states, weaker or transcriptomic states, nurse bees and foragers – longer work time spent in these tasks, saw 1200 genes expressed by the bees. While bees serving as guards or undertakers – maybe a day or two of work in these jobs- only 19 genes were expressed. There are even different genes expressed due to the type of intruder to a hive.

However, Dr. Robinson noted the differences appearing between native and managed bees.

A study found Octopamine makes bees dance more. It makes solitary insects eat more.

It makes honey bees dance more to share the good food source with others.

The study of “yellow 57” showed individual specialization of a water forager bee. She took 10 trips per hour for three minutes per trip collecting water at a creek, for her entire 17 day foraging career. Elite foragers were revealed using RFID chips determining “20% of foragers did five times more than 50% of the foragers. If you remove those 20% of bees, other bees step up their game, and fill that void with their reserve force.” Research has shown bees will make between one and 18 orientation flights before foraging begins depending on the individual bee. Some bees need more orientation flights than others.

In an in-hive observation study the social interactions of the honey bees was evident.

The “Party bee” who accomplished much in its short life had:

533 interactions with bee partners  
922 interactions total.

The “Lonely bee” experienced only 23 interaction partners, and a total of 24 interactions,

The Queen however, had 700+ interaction partners, and 4000+ interactions due to the nature of her function. The close relationship between brain gene expression and specific behavioral states; social regulation of brain gene expression; control of social behavior by context-dependent rewiring of brain transcriptional regulatory networks; evolutionarily conserved genetic toolkits for social behavior that span insects, fish and mammals; and evolutionarily labile pathways that subserve “me to we” transitions from the regulation of selfish to cooperative behavior are all important in understanding honey bees and native pollinators.

This conference was an opportunity to share global knowledge of transformative discoveries, improve 21<sup>st</sup> Century extension, adapt farming systems, increase education, adjust policies, regulation, and marketing, address the human dimensions, and facilitate communications bringing them together to understand the whole system, the ecosystem services, and intrinsic value of pollinators. **BC**

You can read the abstracts of the presentations at <https://custom.cvent.com/18A6750208F1461A8000EA09BA931C3A/files/e59e8f07c1fb44bea61700bb63f47ef9.pdf>



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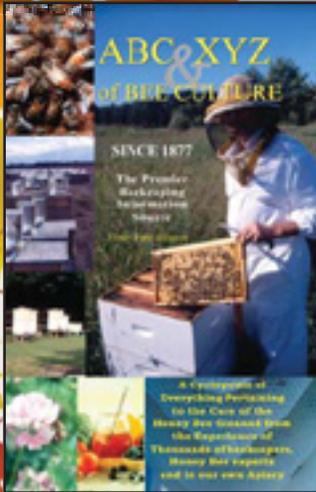
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# Bee Culture

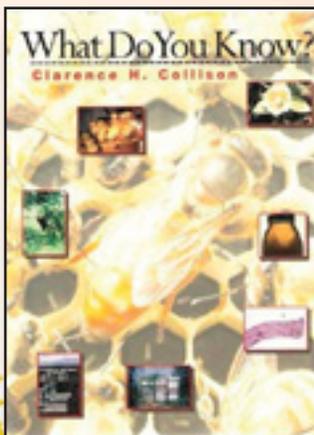
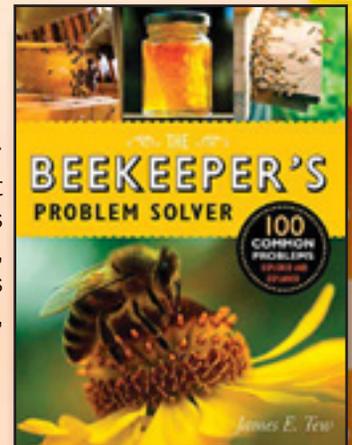


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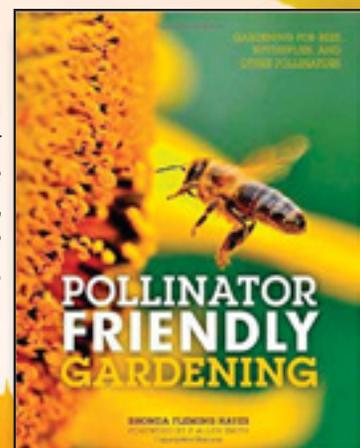


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# Processing Propolis

## Part I

Ross Conrad

The crisp cool Autumn weather arrives at a time when the color of the leaves change, mice build nests in well-protected warm places, and bees finish plugging up the cracks in their hives with propolis in anticipation of Winter.

The term propolis, (aka bee glue) originated with the Greeks who often observed a sticky resinous substance around the entrance to their hives. In Greek, “Pro” means coming before or in front of, and “Polis” is the Greek word for city or a body of citizens. Thus, propolis is what one could expect to find at the entrance to the city of the bees. Today beekeepers will often observe that the bees will use propolis to restrict or narrow the entrance to the hive to make it easier to defend. Honey bees use propolis as both a building material and as a way to sterilize and disinfect the cavity that contains the colony. This is because, as we will explore in this two part series, propolis is among the most powerful antimicrobial substances found in nature.

Honey bees make propolis out of the resins they collect from deciduous trees such as cottonwood, birch, alder and poplar (aspen). As these trees bud, they exude these resins around the bud in order to protect is from fungi and other diseases. Foraging bees utilize their pollen baskets (corbicula) to carry globs of propolis resins back to the hive. Unlike with pollen however, foragers require the help of other bees within the colony to help them remove the sticky resins from their hind legs so it may be used by the colony.

### Composition

Over 240 compounds have been reported to have been extracted from honey bee propolis. While the composition of propolis will differ somewhat depending on which trees the bees gather the resins from, the typical composition tends to be approximately 45-55% resins, 25-35% waxes and fatty acids,

10% essential oils and aromatic compounds (phenolics), which includes vanillin and gives propolis the wonderful vanilla-like smell, and 5% pollen. An additional 5% or so of the constituents of propolis are other organic compounds such as flavonoids (or bioflavonoids collectively known as Vitamin P and citrin). There are even minor components of propolis that researchers have, to date, been unable to identify at all. When warm, propolis is as sticky as chewing gum, but it becomes hard and brittle when cold.

### Production

Research indicates that conditions which stimulate the collection of propolis by a colony of bees include: rough surfaces within the hive, cracks and crevices within the hive that are smaller than the 5/16<sup>th</sup> of an inch bee space and not suitable for building comb, drafts and light coming into the hive in unwanted places, and disease infections.

Beekeeping supply companies often sell traps that can be used to collect propolis. The trap consists of a thin plastic sheet that has narrow slits cut into it and replaces the inner cover on the hive. Over time bees will fill the narrow slits in the plastic when the outer cover is flat on

the hive, however, leaving the outer cover propped up to allow light and air in through the top of the hive will encourage the bees to plug up the holes in the propolis trap faster.

Once the trap is plugged up with propolis it is put in a bag and placed in a freezer for at least a few hours. Immediately upon removal from the freezer the trap (still inside the bag) is banged against a hard surface such as a table top, or simply contorted and gently bent back and forth in order to cause the brittle propolis to crack, break and fall from the trap.

Propolis can be collected by catching the hive scrapings when cleaning out the honey supers during the honey harvest as well. Unlike propolis collected from a trap, hive scrapings will tend to contain contaminants such as bits of wax, wood, dead bees, etc. One way these contaminants can be removed from the propolis by soaking the scrapings in a pail of water. Dead bees, pieces of wood and bees wax will tend to float while the propolis will tend to sink, allowing the beekeeper to separate out the majority of contaminants.

Another way to clean propolis hive scrapings is to place the propolis scrapings into an oven-proof container. The scrapings are covered with two to three inches of water and placed in an oven at 200°F. The contents of the container should be baked for at least two hours and stirred often in order to release any wax that may be trapped within the mass of propolis. The melted wax, pieces of wood, etc., will float to the surface of the water while the propolis will stick to the bottom of the container. After the container is removed from the oven and cooled,

*Propolis is available in several forms including raw (chunks), powdered (usually encapsulated or mixed with honey) and as a tincture.*





*Honey bees may use propolis to reduce the size of the entrance to their hive making it easier to defend, and also to create a welcome mat that helps to sterilize the feet of all who enter.*

the waxy layer on the surface of the water can be removed and the water carefully poured off to reveal the colored propolis mass beneath it. The container of propolis can then be frozen and when the propolis is brittle, it can be chipped out of the container. The cleaned propolis pieces should be spread out on a sheet of paper or cardboard to dry before placing then into storage.

As noted, honey bees use propolis as an extension of their immune system and rely upon it to keep healthy. I believe this is one of the primary reasons that when the genome mapping of the honey bee was conducted, it was found that bees have far fewer genes dedicated to immune response than any of the other insects that had also undergone genome mapping. The utilization of propolis by the colony appears to have eliminated the need for bees to invest biological energy in the development of a more robust immune system within the body of each bee. As a result, I don't like to take propolis from my hives since doing so may decrease the overall health and vitality of the bees. However as we shall see, the profound health benefits that propolis can provide for humans compels me to collect propolis, but typically only from the honey supers that are being harvested in the honey house. Additionally, since I don't want to do the extra work of cleaning it, I only collect and put aside chunks of pure propolis rather than try to capture all the propolis in the scrapings, etc. As a result, the amount of propolis I produce annually is rather small and

results in only two-to-three dozen bottles of propolis alcohol tincture.

### **Processing**

While propolis can be found in many products from toothpaste and skin creams to healing salves, herbal tinctures, syrups and elixirs, propolis does not require any processing (other than cleaning) in order for it to be used. For gum, dental, or sore throat issues simply tuck a chunk of raw propolis between the gum and cheek and suck on it. This is the simplest way to use it, although its benefits may be limited and it may stick to your teeth if you are not careful. Here are some of the more usual commercially available forms that pure processed propolis can be found in.

#### *Powdered in capsule or tablet form*

Before turning the propolis into powder, it must be cleaned such as described above. One way to turn chunks of propolis into powder is to freeze it for at least a few hours, along with a hand grinder or mortar and pestle. As soon as the propolis and grinder are removed from the freezer, the propolis should be ground up. A hand-powered grinder is preferable to an electric grinder since a hand grinder will not heat up as fast when in use, reducing the speed with which the propolis will become sticky and gum up the grinder.

While large companies may make tablets out of propolis, small producers may purchase capsules that can be used to encapsulate the powdered propolis. Alternatively, powdered propolis can be mixed with

raw honey to make an especially tasty medicine. Since the propolis will tend to float to the top of liquid honey, it is best to use honey that is either naturally crystallized or in the process of crystallizing in order to capture and keep the propolis suspended in and throughout the honey.

#### *Tinctures or Extracts*

It is relatively easy to make propolis extracts or tinctures and they can be prepared with minimal time investment with only two ingredients: propolis and an appropriate solvent.

Choosing the correct solvent is very important, especially if the product is to be used for human consumption. For the highest quality extract, ethanol (also called grain alcohol, pure alcohol or ethyl alcohol  $C_2H_6O$ ) is used, however any food grade alcohol that is at least 130 proof (65% alcohol) will work well.

Ideally propolis is ground into a powder prior to making a tincture or extract from it. This is done in order to maximize the surface area of the propolis for the solvent to work on. I have found however, that large unbroken chunks of propolis will dissolve when using grain alcohol to make tinctures, eliminating the work of grinding up the propolis beforehand.

To make the tincture, place the alcohol and propolis into a watertight container, seal the top and shake briefly. Shaking should be repeated once or twice a day, and the mixture left soaking in the alcohol for one-to-two weeks for best results.

After a couple weeks, the extract is ready and may be filtered through a clean and very fine cloth, paper filter or cotton ball. The remains of the first filtration can be soaked in alcohol again for an additional extract, however it may not be quite as potent as the first extract.

The finished tincture will be a clear liquid, free of particles and dark brown or slightly reddish in color. It is best bottled in clean, dark, airtight bottles for long-term storage. When a tincture with a high concentration of propolis is desired one can simply add more propolis and less solvent to the container and the filtering process can be eliminated. Rather than filter the resulting liquid, the extract is simply poured off allowing some of the fine particles that do not fully dissolve and collect in the

bottom of the soaking container to be transferred into the final storage container. Additionally, the container of the final propolis tincture can be left out with a porous cover (such as cheese cloth) in order to allow some of the solvent to evaporate over time increasing the percentage of propolis in the final product and reducing the ethanol content.

Denatured, rubbing or methyl alcohol should never be used if the final product is intended for internal human consumption since toxins are added to such alcohols in order to make them unpalatable and prevent ingestion. To be safe, the only time that rubbing alcohol may be used to produce a propolis tincture is when the resulting tincture is to be applied to beekeeping equipment in order to 'pre-propolize' it for honey bee use, as is done by some biodynamic beekeepers. However since there are different types of denatured alcohols intended for different purposes and the chemicals added to denature alcohol may be poisonous to bees, caution should be taken and such extracts should only be used to preserve the outside of the hive, reserving only extracts appropriate for human consumption for use on the inner surfaces of hive bodies and supers.

#### *Aqueous (Water) or Hydrolyzed Propolis*

For individuals that wish to avoid alcohol, a water extract may be desirable. Aqueous extracts can be obtained by soaking propolis in water or boiling it in water. When boiling, some of the propolis' aromatic compounds may be lost however. Even though the yield of active and medicinal ingredients is generally lower than when making an alcohol

*Is it possible that generations of beekeepers who have bred and preferred bees that don't gum up the hive with lots of propolis, allowing for easy hive manipulations, has made today's managed colonies more vulnerable to disease?*



tincture, water extracts have been shown to have powerful bactericidal and fungicidal effects. All other processing, filtering, etc. is the same as described above. Water extracts of propolis should be refrigerated in order to suppress the growth of mold.

#### *Oil Extract*

An oil extract of propolis may be obtained by filling a pot with propolis and any food grade oil (coconut, sunflower, olive, etc.) or even with butter. The contents of

the pan are gently heated in a water bath and stirred constantly for about 10 minutes. The resulting extract can be filtered and stored in sealed containers in the dark.

Propolis extracts are also obtained by using other solvents such as *vegetable glycerin* or *Propylene Glycol*. Even though the alcohol process results in the most potent extract, it does not mean it will be the best for all uses and situations. For example, water extracts are preferred when treating eye infections since it is not advisable to put alcohol or oil in the eyes for obvious reasons. Oil extracts on the other hand are recommended for mouth and gum problems, and may be best for external use on people or babies with sensitive skin.

Next month we will explore the many medicinal benefits and uses of propolis for man and animals. **BC**

Ross Conrad is the author of *Natural Beekeeping: Organic Approaches to Modern Apiculture*, 2<sup>nd</sup> Edition



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*A beekeeper in Missouri writes:*

This is my third year as a beekeeper, and I have been trying to be treatment free. However, every year I lose my bees over the Winter. I have now determined that my only hive has high numbers of mites (*Varroa*), and I really do not wish to lose this hive. I am prepared to treat, and soon. I read that oxalic acid is an organic treatment for mites. And I have purchased some, and am prepared to treat my hives next week. Will this solve my *Varroa* problem? (Bee Culture readers: I received this question in mid-August.)

*Phil replies:*

As a biologist I make a living from beekeeping and have for 20 years now, but my connection with bees is deeper than that and my interest in them more than financial or scientific. For me, beekeeping is both a family tradition and a cultural one, rooted in my ties to Eastern Kentucky. It's also a satisfying, contemplative experience. In the early days of Spring, I watch the thermometer and can't wait to get up to the apiary just to "crack the lids" and see how my little charges have made it through the Winter. When true Spring arrives, I love to spend mild, sunny mornings in the beeyard with a book and a pipe, even when there's really nothing I need to do in the hives. I know the appeal of the slow-paced in an up-to-the-minute world, of real sights, sounds and smells when virtual reality presses around us, of maintaining some contact with nature in our daily lives. I understand why many small scale and backyard beekeepers are seduced by the idea of natural beekeeping without chemical treatments. But.

*Varroa destructor* is a devastating parasite which has been preying on bees in the United States for almost 30 years and is still the major cause of colony loss in this country. These mites suck the blood of both adult bees and pupae and are vectors for a host of devastating viruses. There is nothing natural about our having, however inadvertently, brought together this Asian predator with European honey bees on a continent where neither is native. In this unnatural situation, which we have created, the only natural consequence is for the honey bees to die. They have been doing so in great numbers. And still, 60% of small scale beekeepers do not monitor or treat for *Varroa*. I'm sorry if my bluntness offends, but responsible people would not be so neglectful of any other animal entrusted to their care – neither pets nor livestock.

The first chemical treatments for *Varroa* were indeed

harsh. They were commercial pesticides hurriedly adapted for use in hives to staunch the devastating losses following the introduction of mites. They had adverse effects on bees (though not so adverse as the parasite itself), and within a few years mites developed resistance to them. Since those early years, much research has been conducted to discover methods – chemical and nonchemical – of controlling mites without harming bees or leaving residues in wax and honey. It's a problem, as one researcher put it, of trying to kill a bug on a bug without damaging the host. They are still working on it. However, we now have a lot more options when it comes to treating, each with its own advantages and limitations.

Which brings me to oxalic acid. It is definitely a weapon in our arsenal against mites; I recently bought an oxalic acid vaporizer for my own use. But it can't fight the whole war by itself. It is designed to be used, as the label states, at times when brood is not present in the hive. One of the reasons that *Varroa* is such a difficult parasite to control is that it is present both on adult bees and on brood inside the cells. Most honey bee pests and diseases affect one or the other, but not both. Oxalic acid is what is sometimes referred to as a flash treatment. It kills mites quickly, but ONLY those on the adult bees. Mites in the cells are left alive. During Summer in your part of the country, and year around in areas where winters are mild, as much as 80% of the *Varroa* mites in a colony are inside the brood. That means that using





oxalic acid at this time of year will only treat 20% of the problem. As mites in the brood emerge and reproduce, their numbers will rebound quickly.

With one exception, all *Varroa* control products registered for use in the U.S. have the same limitation: they do not kill *Varroa* in the brood cells where most of them are most of the time. The exception is the formic acid formulation sold by NOD Apiary Products as Mite Away Quick Strips. Several other products address this problem with multiple applications during a treatment period in order to kill successive generations of mites as they exit the cells. Others, such as Apivar, rely on a slow release of the active ingredient over a period of several weeks to achieve the same end. I do hear beekeepers talk about performing successive (typically three) back to back treatments with oxalic acid to catch newly emerging generations of mites. However, it is not without detrimental effects on adult bees. One application seems to cause negligible harm, but experts agree that using three close together invites serious bee loss in hives. That is the reason the label directions call for a single treatment while hives are broodless.

Many years ago a scientist performing research on oxalic acid told me that he would recommend it as an effective “clean up” treatment for use in late Fall, early spring, or even Winter. That is how I intend to use it in my own apiary. My usual practice, when indicated by monitoring (and it’s almost always indicated), is to treat in the Summer after taking honey supers off. This year, I intend to follow that up with *Varroa* checks in the late Fall: late October or November. If the numbers concern me, I will plan to use oxalic acid sometime in November or December – whenever I find little or no brood on the frames. Kentucky is far enough south that, depending on temperatures, we sometimes have brood present throughout the Winter. If that should turn out to be the case this year, I would need to make an alternative plan.

Can oxalic acid be useful in treating Varroa? Yes. Will

it solve your varroa problem? No. I advise you to choose another treatment for immediate use in your hive. There are a number of effective products on the market. You can consult with your local apiary inspector or university extension specialist, but the decision is yours and it will require some research on your part. Keep in mind that some products are designed to be used in specific temperature ranges and may not be the best choice in hot weather. (I’ve visited Missouri in the Summer, and it can get HOT.) Some, as I mentioned before, require multiple applications. Is this workable for you? With most varroa treatments, honey supers must not be in place. With only one hive and at this time of year, that restriction shouldn’t be a problem for you, but you should be aware of it. Lastly, learn about possible side effects. Some may be aggravated by temperature, so educate yourself. Whatever method you choose, I congratulate you on deciding to treat. The worst side effect of all is when you allow *Varroa* to proliferate uncontrolled and all your bees die.

*A beekeeper in West Virginia writes:*

*I witnessed something today that I thought was crazy!!! I found out this morning that my queen has a daughter. I just by chance saw her come out of her queen cell when I went into my hive today. There were several additional queen cells, they all appeared to be underdeveloped, so I took those out. However, I clearly saw a new queen emerge and be welcomed into the hive.*

*Then about two hours later, I saw 200 drones go into the box, at least, no exaggeration.*

*Did my Princess lose her virginity? What happened? Did I do well by killing the rest of the queen cells?*

*Phil replies:*

The role of the birds and the bees in plant propagation has long been used as a cute analogy for the mechanism of human reproduction. Perhaps because of that, most people are familiar with the way honey bees pollinate flowers as they move from bloom to bloom in search of nectar. Few, on the other hand, know much about the process which produces young bees. The opportunity to watch these fascinating creatures up close and learn about their behaviors is one of the main reasons we are beekeepers - that and the honey – and the queen’s reproductive biology is as amazing as it gets. It starts with fertilized eggs or young female larvae. Their destiny is to become worker bees, but sometimes the needs of the colony require that one or more be selected by her sisters to be reared as a queen. The story of how the newly emerged virgin queen, or princess as you call her, completes the next step of her passage is intriguing.

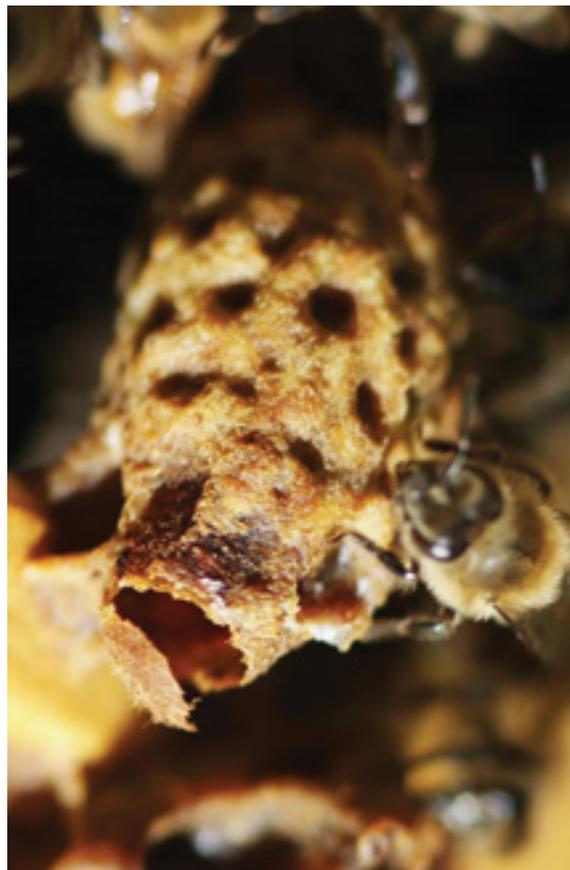
The mating process takes place at some distance from the hive in specific locations referred to as drone congregation areas (DCA’s). The name comes from the fact that sexually mature drones of a certain age (about 12 days and up) collect in these special spots. Though queens seek out the same sites, drones get naming rights, probably because the young queens are greatly outnumbered by their suitors. One of the most interesting aspects of DCA’s is that the same sites are used year after year. Since queens only mate during a short period early in their lives, and drones do not usually survive through the Winter, individual memory is not what guides them back from one season to the next. Pheromones dissipate



too quickly to act as likely beacons. There must be some special physical characteristics of DCA's which attract both drones and queens to a site where they have never been before, though generations of bees before them have used it for the same purpose. What those characteristics are is still one of the unsolved mysteries of honey bee biology.

More readily explained is the question of why the instinct to mate in relatively distant drone congregation areas evolved in the first place. In examining the origin of such hard-wired behaviors, the key is to determine what advantages they confer upon the colony. After all, mating flights are fraught with danger to the queen, as many beekeepers know who discover a colony queenless after a swarm. Why not mate within the safety of the hive, or at least closer to home? There must be some overriding advantage to DCA's to compensate for the risks. There is, and it's all about genetic diversity.

Virgin queens mating with drones from their own colony would mean sisters mating with brothers. Such inbreeding results in colossal genetic abnormalities which result in nurse bees removing affected larvae before emergence, increasing both brood mortality and the energy cost of producing young bees. Another negative effect of a small gene pool in a colony is reduced adaptability in the face of disease, parasites, or other stressors. In a genetically diverse community, some individuals may possess traits (such as natural resistance, hygienic behavior, or ability to better draw out wax and build up more quickly) which enable them to survive a threat and



keep the colony going. In a more homogenous group, such traits are less likely to be present and the entire colony would face a more difficult path to survival.

That is the problem. Drone congregation areas are the answer that evolution has devised. Drones and queens fly some distance to find DCA's. It is thought that queens travel two to three kilometers, and there is some evidence that drones usually stay a bit closer to home. The difference in flying distances alone would reduce the chances of inbreeding. However, the fact that drones are programmed to travel in search of a mate means that the cloud of eager bachelors at a given DCA includes drones from multiple colonies. Drones develop from unfertilized eggs – not an unusual way to produce males in the insect world – so they have only a single set of chromosomes. That means that all drones produced by one queen are

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genetically identical. Hence the importance of a source of unrelated drones. When the queen mates at a DCA, which scientists tell us she will do with between seven and 17 drones, there is an excellent chance that she will collect the semen of drones from several different colonies with different genetic characteristics. Later, when she fertilizes and lays her eggs and her daughters develop, they will be only half sisters, and the colony will be stronger for her early promiscuity.

That said, the drones you saw entering your hive may well have been returning from a visit to the local DCA. Once a drone starts hanging out there, he will make several trips each day. But did they make your princess a true queen? Not that day, and not those drones. Newly emerged queens, like drones, need a few days to mature before commencing their mating flights. Your young queen would not have fulfilled her destiny until about five or six days after you saw her emerge from her queen cell. Even then, she probably would not have mated with drones from her own colony and the drones she mated with would not be returning home. (Drones die after mating.) It is also possible that the bees you saw were a group of young drones coming back from an orientation flight. All honey bees make short initial test flights – workers before beginning to forage and queens and drones before mating flights – both to practice flying and to imprint upon their surroundings so that they will be able to find their way home again. Hence the name orientation flights. They

typically occur en masse on warm, sunny afternoons with little wind. Since those are exactly the conditions most likely to entice me out into the apiary, I have watched many such flights take place. Suddenly there will be a great flurry of activity at the hive entrance, with bees flying out and returning. A short time later, all is calm. Unlike the commotion associated with swarm activity, there is no cloud of bees swirling and buzzing above my apiary, and no cluster settling onto a branch.

You did not mention whether or not you saw an old queen in the hive in which the new one emerged. If she was not there, your colony probably swarmed several days ago. If both were present together, you saw a supersedure taking place. In either case, the bees would have destroyed the additional queen cells if you had not done so, or the new queen herself would have. Personally, I rarely destroy queen cells, preferring to stay out of the business of queen production in my hives. My theory is that if the colony reaches a consensus to swarm and gets to the point of building queen cells, it's too late for me to stop them, and if they decide to supersede, they probably know something that I don't know. The greatest risk in destroying queen cells is that the colony has swarmed and you have just killed the successor. Since you actually saw the new queen emerging, (How cool is that?) it isn't a concern in your case. You didn't do any harm by eliminating those cells, though it was probably unnecessary. **BC**



## PROTECT YOUR WINTER BEES

### 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 bees are at fueling thermogenesis.



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# Beeyard Thoughts

## *The Life and Death of a Survivor Colony. Removing Honey From Big, Hot Colonies. Odds and Ends – When Water Foragers Abandon An Established Water Source Top Bar Plans*

### **The life and death of a survivor colony (1980-2016)**

I'll bet that not a single one of you will remember a short interactive series that I wrote in 2005. Indeed, many of you were not even beekeepers at that time. The article that started the discussion was entitled, "An Unclear Case of Colony Survival – Lonely, Unloved, but Apparently Prosperous (December, 2005)." This entire article is available at the URL presented in the footnote below<sup>1</sup>. Now before I go any farther, this review describes a colony that was started during the early 1980s and lived – without much beekeeper intervention – far beyond all other colonies in that yard. This is not the story of a typical beehive.

This is a summary of what happened with this unique colony, and how it ended. During 1979 and 1980, during my very first years at The Ohio State University, I literally stumbled into an international grant project that ultimately went on for several years. Agricultural officials in Myanmar (then Burma) had been introducing honey bees (*Apis mellifera*) into selected parts of that county and wanted to send military combat veteran officers to Ohio State to be taught advanced beekeeping and honey harvesting techniques. Subsequently, officers returned to Myanmar (Burma) to be teachers themselves.

Today, there would need to be serious discussions about the various environmental impacts on the Burmese ecosystem, but

at that time, the administrative decision had already been made and honey bees were already in the country. Until then, there had been no (known) honey bees in Burma. Honey production was the primary objective of the project.

During the same timeframe, students from the world over began to participate in additional training programs being offered at the time. These international students frequently introduced other beekeepers to concepts and hive designs being used in their respective countries.

As a generalized teaching tool, my small staff and I set up an "international" hive yard in a remote, difficult to reach by vehicle area. As best we could, we duplicated some of these international hive designs. The yard had top bar hives from Kenya and Uganda, Botswana tree hives, African long hives, compressed straw hives, and for good measure, we put an eight-frame colony and a skep or two.

As quickly as the grant funding began, it just as quickly began to wane – primarily due to the arrival of Africanized bees and parasitic mites in the U.S. After about eight years, the training endeavor flickered out. Shortly thereafter, we closed out the international hive yard and went on with our lives – except for the single colony in eight-frame equipment. It was left in that yard – waiting to be needed – from 1987 or so, until 2005. The details to this point are in the archived article.



<sup>1</sup>[www.mediafire.com/download/492130ltc3bd930/BC.2005.12.pdf](http://www.mediafire.com/download/492130ltc3bd930/BC.2005.12.pdf)  
Shorten URL for hand copy: <http://tinyurl.com/Survivor-Colony>

*The survivor colony – about 35 years on its own.*



James E. Tew

In 2005, I remembered the lone hive and using four-wheel equipment, I made the trip to the isolated location. The hive that had been unloved for 18 years was there, and it was – packed with bees. The condition of the equipment was interesting. Both the flat transportation top and the traditional bottom had (mostly) rotted away. Approximately one-third of the outer cover was actually propolis. All else was solid.

### **This is where you come in**

At that time, I asked *BC* readers what to do with this colony. Should I jump in and upgrade the equipment, check for diseases, or just leave it





*The remains of the plywood transportation outer cover repaired with propolis.*

where it is. As I recall, something like 85% of you said don't touch it. The colony did not need me. I took your advice.

In 2010, Ohio State, Wooster Campus suffered a disastrous tornado. The losses to the bee program were huge. Approximately a month after that storm, I remembered that I had not visited the Survivor Colony in five years. I hoped that the tornado spared the persistent colony. It had not. The hive had been laying facedown for about a month. Without much thought, I stood it back up. Years ago, the outer cover had blown off, so I put on this original outer cover that had been laying near the hive all these years. That was *all* I did. The bees were still alive, but the hive was a muddy mess. I then told you readers what I had done to restore the colony and its hive. Most of your responses were that I should have let it die. I just could not do that.

After retiring from Ohio State,

I relinquished my responsibility to the OSU bees. Six years have passed since the tornado, and last month, I decided to visit the long-lived colony. It was not good. Sometime during the past year or two, something had happened to destroy the colony. Equipment was scattered, and all was in disarray. It appeared to have been kicked over.

Ironically, the combs in that colony had never been exposed to any miticides. The colony was never treated – for anything. It was never requeened. There was never any swarm control. It was never prepared for Winter. It always had done its own thing. Now you and I both know that the bee cluster had probably come and gone several times during the years, but even so, it (apparently) had bees in it most of those years.

### Epitaph

Except for me setting it up and replacing a cover that had blown



*The end of the survivor hive. Approximately 34 years without a beekeeper.*

off years ago, the colony was never touched. For about 34 years, bees did their own thing without beekeeper intervention. Through the years, I enjoyed my interaction with this unique colony. But all things must end<sup>2</sup>.

### More photos

More photos of a long hive, TBH, and other hive designs are stored at the following URL. Also, a few more photos of the fallen survivor hive are presented.

<https://onetewbee.smugmug.com/September-2016-Survivor-Colony/n-96fpZG/>

Shorter URL for hand copying: <http://tinyurl.com/Survivor-Hive>



### Removing honey from populous, hot, tall colonies

Right out of the gate, I need to ask, "Why would anyone open, big, hot, tall colonies?" Because you need to get that honey off in order to perform the late season mite treatments. Possibly, another reason is that you may not want the bees to blend Spring honey with Fall honey. Who knows – maybe you have other reasons. Whatever the reason, this is a task for an experienced beekeeper with a good back, or for a beekeeper with good beekeeper friends who can help with the project.

### An aside before I begin

In past articles, I have had pity-party after pity-party in this monthly column about various maladies and disasters that have befallen my bees. I think that learning from errors and bad luck is sensible – even logical. What else can you do with problems that are difficult to correct? Colonies died in the Winter, colonies produced high swarms, mites were running the show in my yard, and some of my queens were ugly. But . . .

Right now, my colonies are simply spectacular. Everything is full and bees are bearded out front. I must say that I have been doing this bee thing most of my adult life,

<sup>2</sup>And yet, things will go on. The yard is a remote, unused area. Once again, I did not touch anything. Now just for the curiosity of it, I would like to see how long it takes abandoned bee equipment to rot away. Hmmmm, I wonder if I have enough time to make this observation.



*This unit will be an enjoyable colony to open up – yeah right!*

and yet, I find myself more than a bit cautious about being in my apiary without proper protective clothing – especially when the weather is hot and dry. These oversized colonies can be a short fused bomb if mishandled.

These colonies are at full population. It is now mid August. Nothing much is in bloom, and nearly all of these bees are unemployed. If you open these units, they have little to do but come after you. These colonies are not the pliable kittens of the early Spring type colonies.

I want to get these full deeps off in order to extract and to use oxalic acid to knock the mites back. These colonies appear to be able to withstand anything, but please know that the mite population is building up and can take these big hives down in just a few weeks.



*Some of my colonies that are hot and heavy.*

### Choose the day

In a perfect world, I would choose mid to late afternoon for the removal task. These bees will be upset, and I want to try to maintain control on how far and wide they make their ire known. Though it would only make the honey removal process worse, it could be done during a moderate rain shower. I could do the removal job at night, but that is really an adventure. In all things, I must be concerned for my neighbors.

For you lucky bee people whose colonies are far from the madding crowd, you can do the removal task anytime you like.

### Smokers blazing and bee suits subsidized with duck tape

Do any of you remember my admonishments to only lightly use smoke? Forget that advice now and dependably fire those big canister smokers. Any of you remember me telling you to be comfortable and don't worry about the gloves. Bad advice for this situation. Suit up and glove up. On hot days, don't bother with a sweatband. It won't help and only makes your head hotter.

If you can get along without your glasses, leave them off. If not, use a glasses strap and put a washcloth within you veil. You will have sweat running off you and onto your glasses. The cloth is not perfect, but it will help some. In some way, keep the bees from getting up your pant legs. Put a piece of tape over the zipper that is at your neck level.

### Everything else ready?

Hive tools? You should probably have more than one. Do you have a leaf blower? Top it off with fuel and have it warmed up so it will start as easily as possible. Don't have one? See if you can borrow one. They can

be rented. Bee supply companies will happily sell you one. These bees will be seriously unhappy if you start trying to brush frames and keep the colony opened a long time. Using some kind of bee escape will only make you and the bees miserable twice.

Using a blower is not perfect. It's noisy and smelly, but use it – and use it quickly and be gone. If you seriously overheat yourself, put the blower nozzle in your bee suit pocket and run the throttle up to about one-quarter. You will look like the Pillsbury® Doughboy, but you will blow some heat out of your bee suit. If you are truly overheated, I do not need to tell you to take a break.

If you take off more than a few supers, you will need a wagon or a cart. While running the blower, some kind of table or a set of sawhorses would be very useful. Setting honey supers on end will while using the blower will make both your life and your bees lives just a bit better.

### Okay, go get them

Upon entering the yard, vigorously smoke **all** the colonies but don't choke them. Choose your starting point and work quickly and steadily. Don't kill yourself. It will be hot in that suit. Upon getting most of the bees out, use outer covers to cover the top and another to serve as a bottom – almost like a tray beneath the stack as you continue to add to it.

It's more than a bit difficult, but try to watch for brood patches in honey supers. The colonies' queen could be there. Don't spend a lot of time trying to gouge out frames that are jammed in with honey to search for the queen. After blowing the bees out and before moving to the next colony, check around for any cluster of bees on the ground or wherever. They could be surrounding the queen.

Keep the smoke going on the ones not opened yet. This is to hold down robbing behavior as much as possible and to disorient organized defenders. After removing honey, if you have extra supers or deeps, you might consider putting them on in order to give the displaced bees a clustering space. Otherwise, they will really beard on the outside.

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## The crop is off and you are one tired beekeeper

If you had the equipment, the stacks will be covered – top and bottom. If at all possible, until it can be extracted, store this unextracted honey is a bee-tight location. I expect that you will leave more than a few bees in the removed supers. You simply cannot reasonably get them all. Consequently, in your bee-tight room/screened porch, you will have some bees. If possible, turn off lights and open doors long enough for bees to leave.

Though better than nothing, supers stored on screened back porches will attract bee foragers. The smell of honey will drive them nutty.

If you are in Small Hive Beetle areas, those isolated honey supers cannot sit very long before the risk of beetle invasion occurs. Obviously, you must move expeditiously to get the crop extracted and the wet supers back on the bees.

Back in the yard, everything should be closed up. There will be bees everywhere. It should be late in the day by now. Not surprisingly, quite a number of these bees will not be yours. All those good aromas of honey being blown around your apiary will bring in neighboring bees, too. During nighttime, I would hope the bees would quiet a bit and things would begin to calm.

At the end, you will be hot and sweaty and will reek of bee smoke, but the job is done. Now “Little Red Hen” beekeeper, who is going to extract that crop? Maybe we will consider that topic later.

Senior Citizen designed hive equipment. More later. (photo by Page B.)



### Odds and Ends High End Top Bar Construction Plans

For those beekeepers who are both accomplished woodworkers and top bar hive beekeepers, the *Woodworker's Journal* (August, 2016) had a front page layout of a stylishly designed TBH. Within the magazine, complete plans and photos are presented. The design is clean and crisp and is a bit complex to construct. (Contact *Bee Culture* for a photocopy of the plans.)

### Bees are finicky about their water source

For several years, I have been using a blue kid's wading pool to provide water for my bees. Having read that water foragers could more easily find water that was less than pristine, I made no particular effort to keep pure water in it.

The pool finally developed a small crack that allowed the water to leak

out. I purchased another pool, filled it with beautiful water, and put the same floats in place. After only one day of being empty, the foragers nearly completely abandoned the source. Same location, same type of container, same floats – but different water – resulted in 99% of the foragers abandoning the source. Now, all those foragers are somewhere else in my neighborhood, and I don't even want to think where that might be. Could I speculate that bees are not particularly crazy about pristine water or that changing the aroma and flavor of the water confused the foragers?

### Senior Citizens update

I continue to get responses from Senior Citizen beekeepers with photos and procedures. Also, I frequently get water source ideas and hive stand designs. I dutifully store them all. At some point, I will do something with these responses, but just now, they are steadily coming in.

I will have more designs and concepts for seniors (or anyone else) in future articles. Until, I consider more of their ideas, consider this concept – seven-frame equipment with greatly enlarged handles.

Well, I'm out of space. I look forward to your continued responses and suggestions. We're all in this together. **BC**

Dr. James E. Tew, State Specialist, Beekeeping, The AL Cooperative Extension System, Auburn Univ; Emeritus Faculty, The OH State Univ. [Tewbee2@gmail.com](mailto:Tewbee2@gmail.com); <http://www.onetew.com>; **One Tew Bee** RSS Feed ([www.onetew.com/feed/](http://www.onetew.com/feed/)); <http://www.facebook.com/tewbee2>; @onetewbee Youtube: [www.youtube.com/user/onetewbee/videos](http://www.youtube.com/user/onetewbee/videos)



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# Bee Passionate

Jennifer Berry

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Even though it's October as you peruse through this issue, it's early August, right here, right now. Both the Republican and Democratic conventions have wrapped up, and the candidates have been chosen. Thankfully, it will be over soon. I think most will agree, campaign 2016 has been droning on for way too long. Actually, it began in 2015 when Ted Cruz announced his candidacy, only a mere 586 days before we would head to the voting booths this November. And, to make things even more tiresome, is the fact that the mud-slinging, that's been going on for over a year, is accelerating with even more mud being slung. I mean, how can we possibly be told any more about how **horrible** the remaining two candidates are?

So, wouldn't it be wonderful if Trump and Clinton decided to run a "nice" campaign? Think about it. Instead of all the negative ads bombarding us on a daily basis, filling the airwaves and cluttering our papers and mailboxes, they could elect to eliminate the insults and damaging comments. They would sit down together, say over lunch or a cup of tea, and calmly discuss their differences on key issues. They could engage in a quiet, low-keyed exchange on why they think their plans would work better for the country. No yelling, no finger pointing, no derogatory comments, no nasty tweets, and no "he said, she said" would be allowed. Words like liar, crooked, loser, dishonest, lunatic, obnoxious, devious, weak and thief would be deleted from speeches, websites, and headlines. Only soft-spoken, kind, thoughtful comments would remain. Wow, wouldn't that be wonderful, to actually have a debate without all the drama and name-calling? "Toto, I have a feeling we're not in Kansas anymore." Okay, back to reality and smack dab in the remaining months leading up to the craziest, political season ever. The war continues and passions are running high. Hopefully, this will be over come Tuesday, November 8<sup>th</sup>. (Oh, Lord, let's just hope there aren't any "hanging chads"!)

Not only can we be passionate about our beliefs, political or otherwise, we can also be passionate about our bees. I've never seen a knock-down, drag-out fight at a bee meeting or protests like we've seen at some recent campaign rallies, but I have seen some pretty heated debates. I've also read some intense exchanges over the net. I believe this is good as long as we are civil and can back up our statements with facts, not just emotional flim flam. We should be passionate about our bees because if we weren't, they'd be in a lot more trouble than they are.

One topic, however, that seems to divide beeks is the subject of treating our bees, especially for mites. "To treat or not to treat"? I guess you could say, I agree with both sides of this issue. There are times I believe, absolutely, 100%, that we need to treat our bees, and then there are other times, I believe that we don't. One thing that beekeeping has taught me is this: you need to be fluid in your beekeeping practices. Rigidity and closed-mindedness will not work when it comes to keeping bees. Beekeeping methods will be different from day to day, week to week, month to month, and year to year. It will also be different from apiary to apiary, county to county, and state to state. So we need to listen and learn, not only from those with more experience than ourselves, but more importantly, from the bees!

One of my bee mentors once told me, "I let the bees tell me what I should be doing, not some book, not some person preaching on the internet, not some speaker touting their dogma at a bee meeting or on YouTube. I let the bees tell me, so, that way, it becomes about them and not about me." I try to keep bees in this manner. Not on my terms but theirs. It's not always easy, but beekeeping isn't easy. Plus, something else I've realized over the years: the word "lazy" shouldn't ever appear anywhere near the word "beekeeping", especially if you want to keep your bees alive!

In my last article, I talked about how mites from collapsing colonies drift into neighboring colonies, causing those colonies issue. This is nothing new. Actually, *Varroa* migration and infestation rates have been researched for years both here and abroad. Let's check out a few of those studies.

In order for a *Varroa* (parasite) to survive, it must be able to reproduce and then transmit to new colonies (host populations). Otherwise, if it's unable to transmit, (say from hive to hive), then varroa would "burn out" once the host colony dies. Poof, extinction of the species! But that's not the case where *Varroa* is concerned, unfortunately. Because honey bees drift from colony to colony and rob each other, they inadvertently transfer mites (and diseases) into other colonies. This is one reason why mites were able to spread so rapidly across the globe once they host shifted from *Apis cerana* to *Apis mellifera*.

Yet, there's another reason as to why mites are able to spread so rapidly: it's due to its ability to alter their host's behavior, which favors their transmission. These host-parasite adaptations have been examined in many other arenas, but, just recently, *Varroa* and their influence on inter-colonial transmission was investigated. Forfert et al. (2015)



revealed that colonies with high mite infestation loads not only had a significantly higher incidence of drifting, but they also had an increase in the acceptance of drifters. Good for the mite, bad for the bee!

There are several other studies that have investigated varroa transmission from colony to colony. One in particular, Frey and Rosenkranz (2014), explored how robbing and drifting significantly increased varroa invasion, especially in apiaries that contained a high density of colonies. Over a three and a half month period, colonies in the apiaries with a high density of bees had an invasion rate of  $462 \pm 74$  mites per colony compared to those in low density apiaries, which only had  $126 \pm 16$  mites per colony.

Another recently published work by Dynes et al. 2016 focused on genetic structure between populations of *Varroa destructor* and surprisingly found a degree of “within-colony” variation. *Varroa* mites are genetically very similar. The reason being that daughters of the foundress mite (mom) mate with their brother (son). Talk about inbreeding. So when colleagues at Emory University wanted to decipher the structure of varroa population genetics, they knew it would be tough. But this recent study did find differences in the mites, which suggests that horizontal transmission (movement between colonies) must be occurring in order to stir up the genetic mixtures. And this horizontal transmission is due to bees either drifting or robbing.

Okay. Makes sense. So what’s the big deal? Like I mentioned last month, when colonies are crashing from mites, usually in late Summer and early Fall, bees are evacuating, jumping ship with those mites and drifting into other colonies. Meanwhile, the surrounding colonies are taking advantage of these weakened colonies and, hence, start robbing them out, bringing their honey, pollen and mites back home. This just compounds the problem because the neighboring colonies are bombarded, very rapidly, with a huge influx of mites. This is called a *Varroa* bomb. Mites from crashing colonies or ones with high mite loads are infesting or re-infesting neighboring colonies. But wait, it gets worse. These invading varroa bombs may not even be coming from colonies within the



same apiary but from apiaries up to a mile away or more. “Great! So now I have to worry about all the honey bee colonies within a 1-mile circumference?” YUP! Plus, if these colonies being invaded had been developing resistance/tolerance to their local family of mites, then KABOOM! They get inundated with a whole new group of mites, very rapidly, all at once; thus they may not have any defense and die.

Data collected from research confirms that mites from heavily infested colonies over 1.5 km (.98 miles) away are invading colonies, even ones previously treated (Frey et al. 2011). And to make matters even worse, the increased rate of mite invasion rises during nectar dearth periods due to increased robbing and drifting. Food sources become scarce, and bored forager bees increase their thievery attempts on other colonies. Nectar dearth periods usually occur during late summer or early fall (depending on where you live), which coincides with mite populations surpassing bee populations. Also, it’s during the time when bees need to be rearing Winter bees for the survival of the colony. Lots happening, none of which are good for the bees, is it?

Let me switch gears here for a minute, but I promise it’ll make sense (well, at least in my mind it will). The Bee Informed Partnership has been collecting huge amounts of data for several years now. The data is primarily generated from survey information gathered from beekeepers (commercial, sideline and backyard). If you are interested in taking the survey or seeing some of the results, visit their website at <https://beeinformed.org>. They’re doing some really cool stuff!

One bit of information reported on the BIP site is a comparison between average winter loss and operation size (backyard, sideline, or

commercial). According to the data, backyard beekeepers lose more colonies than commercial beekeepers or sideliners. This makes sense, right? And it’s fair to say that most beginner beekeepers start out as backyard beekeepers. They didn’t just jump from one colony to owning 1,000 colonies overnight. And as beginners, they are more likely to lose colonies than someone more experienced. Yes? Not jumping on backyard beekeepers here. I was one – still am, actually! But for years I’ve heard how bad commercial beekeepers are for pouring all those chemicals and poisons onto the poor bees. Yet, their bees are surviving better than the backyarders’ or sideliners’ bees. Maybe chemical treatment as a concept isn’t so bad after all?

So, following that train of thought, treatment-free beekeepers are more likely to be backyard beekeepers than commercial. Commercial beekeepers can’t afford the risk of losing bees because they opted not to treat for mites. Plus, their *Varroa* management protocol usually includes treating twice a year and treating all the colonies at the same time. There’s something to glean from this.

Because of the BIP data, the evidence from numerous research projects and hands-on experience, we (the UGA Bee Lab and myself) are shifting our approach in controlling *Varroa*. In years past, we said to only treat those colonies that have reached the economic threshold (ET). Now, we say it’s imperative to treat **all** colonies, simultaneously, during late summer before the winter bees are being reared, even if only one colony has reached the ET. Again, research has shown that even moderate varroa infestation rates in the fall can significantly increase the risk of a colony to crash and burn during the winter. This is because varroa and the viruses present negatively affects the health and longevity of Winter bees.

One more thing to consider: our bees may not be as isolated as we think. Since it is **not** mandatory that beekeepers register their hives, we may not know how many colonies are behind that fence next door, or over that ridge, or down that road. And in recent years, beekeeping has become more and more popular, adding to the overall pool of colonies. Plus, the number of migratory bees traversing the states each year is mind blowing.

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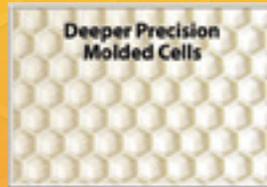
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According to statistics derived from USDA (2014), there are approximately 36,000 migratory beekeeping operations in the U.S., which accounts for three million individual colonies. These large-scale operations move hundreds/thousands of colonies at a time over thousands of miles each year. This movement of bees is driven by crop pollination contracts, such as the almond industry, which requires 1.4 million migratory colonies to pollinate the one-half million acres of nuts. Then, after the almond flowers are pollinated and begin to fall to the ground, these bees (and mites) are either moved to new locations for more pollinating work, shook into packages, or split into nucs. Afterward, they are sold and shipped across the US and set up in your neck of the woods. That isolated apiary doesn't feel so isolated anymore. And those mite-free colonies may no longer be mite free.

When I first started keeping bees, I fought against using any kind of chemical treatment in my colonies. My thought was, it must be harmful to put an insecticide into a box of insects. But, over time, I began to realize that the environment that **we** have created for our bees – by the introduction of exotic parasites and pests, a myriad of toxins, and the reduction of forage acres – is causing them to suffer. So, like I mentioned at the beginning, I do believe in using treatments when mite populations are high. Sorry to be Debbie Downer here, but we must adopt a solid, realistic, tried and true varroa management plan to keep our bees alive. Letting bees die from *Varroa* because we assume those bees are genetically inferior is not fair to the bees. Once, I heard, “If the bees die, then good riddance to bad genes.” This is not the answer. Their dying may not have

anything to do with “bad genes” and everything to do with the environment that we've inflicted upon them.

We treat our animals for parasites, we treat ourselves (or our children) when we are sick. And if you really think about it, by using soaps, detergents and other cleansers (even organic ones), we treat our bodies, clothes, dishes, floors, sinks, and counters with chemicals each and every day. The words “chemical” or “treatment” have gotten a bad rap over the decades (and for good reason in some cases). But even organic farmers use chemicals. Oils and soaps are chemical treatments as well, just not synthetically derived! So what do we do?

If you are a treatment-free beekeeper or planning to become one, I hope you are using some sort of method to keep mite populations down. And if the mite loads do reach damaging levels, especially late in the year, I also hope you take the necessary actions to save the bees, which may mean using a treatment (and not just letting nature take its course). But the discussion still remains: if we use treatments, it can be hard on the bees and hard on their environment. Yes, it can be, especially if we don't follow directions. And yes, we may be killing off all sorts of microorganisms in the hive or in the gut of the bee. But what's worse: a few thousand microbes dying, or a few thousand bees or colonies dying due to mites biting and chewing on them and amplifying viruses? And just like when we take an antibiotic, we end up killing off a whole host of “good” bacteria, but we are also killing off the bad bacteria that may be killing us off. So, how about we just say, treatment-reduced? That way we aren't stuck in a box that offers no solution to save our bees when they are in need. And that's the point, isn't it?

Look, not one bit of mud slung here, but I have to add a final thought, one resembling the political jargon splattering the airwaves right here, right now. We will be STRONGER TOGETHER, and it'll be HUGE, if we just PUT OUR BEES FIRST! BELIEVE ME when I say, if you just VOTE FOR ME, then all our PROBLEMS WILL BEE SOLVED, and we'll live happily ever after. Right, Toto? Happy voting! Thankfully, it's only a month away. But first, take care of you and your bees! **BC**

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# The Cappings Scratcher Or The Uncapping Fork

Jim Thompson

It all depends on how you plan to use the Cappings Scratcher or the Uncapping Fork as to what you want to call it. Originally this device was designed to scratch the low spots of the cappings that were missed by the uncapping knife or plane. A second use of the cappings scratcher was found as an inspection tool. One could insert the tines of the fork into drone brood and pull out the brood and look for the female *Varroa* mites on the white drone larva. The motion of scratching and pulling of only a few tines puts a lot of force on the tines and it is only a matter of time until the end tines are bent or pulled out of the plastic.

A third use for the fork is to uncap the honey cells. The entire width of the fork tines are inserted just below the cappings and pulled upward removing the beeswax. Just think, no heat required and only the cappings and a small amount of honey are removed. If you used a knife you take more honey and wax because you are straightening out the comb using the frame as a guide. The honey can now be strained through a fine wire screen to get out the wax and other large debris and allowed to sit for a while for the air bubbles to rise and you might be able to call it raw honey.

It seems that everyone has a definition of raw honey and the difference seems to be a matter of the degree of heat that has been applied. I happen to be a purist and to me raw honey is honey that is still in the comb. However according to some large honey corporations, raw honey is honey that is not heated above 150 degrees.

Golly, have you ever looked at



Bent and missing tines

an uncapping fork? There are many different kinds and prices. The original ones had straight tines set in plastic. Some companies call the tines, needles as some of the tines are very sharp and if you don't watch yourself, you can draw blood. These are very good to be used as the inspection tool. If you get to see the fork before you buy it, you can see just how much plastic was used in its manufacture. I have one plastic uncapping fork that is moderately heavy because it has a lot of plastic. You may notice that some of these forks have bigger tines in diameter for more lifting and some will have a bend in the tines to allow for a better lifting angle. Oh yes, there are different colors available, so you could make a fashion statement in the honey house.

An improvement is the fork that has the tines set in metal and a wooden handle. It feels good to hold as there are no indentations in the handle for your fingers to get crowded into. Because the tines are set in metal, I have the feeling that they are going to last longer.

Still there are even better uncapping forks. From Bulgaria, I got a fork that has tines that were cast into an aluminum handle and even has a one year guarantee. It is really well made and I can see why they



Cappings Scratcher with more than average plastic

would stand behind their product. A uncapping fork that was designed in Sweden and is now available in many of the U.S. suppliers, features the tines being cut out of the stainless steel head. There should be no reason for losing these larger tines. The side of the fork on the model that I have has a scraper.

Of course you could use a regular fork from your table service. Just be careful to not break up the sterling silver set and to use only the tips as they could make a real mess quickly. Because the regular forks are so narrow, you will have to make more swipes to get the job done.

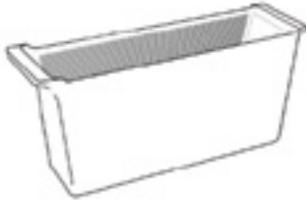
The honey punch was invented by Dr. Clyde M. Hackler in 1991 as he was frustrated with all of the techniques used to open honey cells in order to extract honey. For 25 years Plastools manufactured the honey punch, but went out of business. The main reason was Clyde, who was the owner of the company and an avid beekeeper died October 12, 2008.

The Hackler Honey Punch was made of plastic and stainless steel and would punch a hole in the capping of each honey cell by rolling the unit back and forth along the length of the comb. In appearance it looked by a paint roller with the "brush" made of hard food grade plastic. It was manufactured in five sizes: 2", 4 1/4", 5-1/8", 6", and 8". The 1995 prices for the punches varied from \$25 to \$50 depending on the size plus \$2.50 for shipping.

It was recommended to put the head of the honey punch in an old Crockpot filled with water and set on high to avoid the wax/honey buildup on the punch. The excess water could be shaken off before rolling it on the comb.



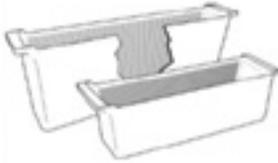
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**Hackler Honey Punches**

Those that use the honey punch claim that it is definitely faster than using an uncapping knife and it is much safer as it will not burn or scorch the honey. Much of the cappings are still attached to the comb so there is less wax and the combs are about the original height. I have seen a person demonstrating the honey roller on the internet and he rolled the cells both vertically and horizontally and used a cold roller. One might say that they have raw honey as no heat was used in its extraction, but that also has to do with the beliefs of the individual. There is the claim that you get more honey from the comb as you are not cutting the cells down to straighten out the frame.

Beekeepers that use Permacomb, say that it works great because the cells do not collapse while rolling.

I have obtained four different styles of honey rollers. 1.) A honey roller that is available from most bee supply houses and looks like the Hackler Honey Punch only it has white plastic and is about 4" wide.

2.) A honey roller that has Stainless Steel pins and is about 2" wide.

3.) A honey roller from the Czech Republic that has Aluminum disks and short spikes. It is about 2 3/4"

wide. I would have to say that it definitely would have to have some treatment to keep the spikes free from the wax and honey build up.

4.) A honey roller that was made in the USA with plastic wheels with short spikes. It is about 2 1/2" wide and has set screws to help in disassembly for cleaning. However I would be tempted to use the hot water method.

The honey rollers with the plastic tines are most like the Hackler Honey Punch and appear to be better made than the others. **BC**

**References:**

Hackler Honey Punch from the internet  
Other Honey Rollers from personal collection



**Long Plastic Pin Punch**



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**Tines cut into Stainless Steel head**



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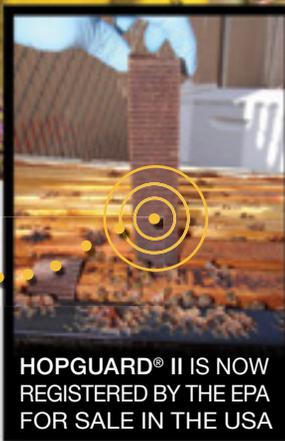
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# BIGGER PICTURE

*Shades of Blue and More*



Jessica Louque

At the beginning of the year, I was super excited to plant a blue pollen garden. I was fairly sure that some of the flowers would just *be* blue instead of producing blue-tinted pollen, but it was still going to be GREAT. In the off chance that Bobby doesn't know *exactly* how much I spent on seeds, I will neglect to mention the cost, but let's just say that I ordered anything and everything that looked blue or promised blue pollen on any obscure beekeeping site. With the purchase of the tractor and complementary implements, our garden expanded substantially this year, but not necessarily for the better.

My best estimate would be that we planted about a quarter acre of pollinator-attractive plants to be blooming for most of the Summer. The first was a strip along the field in the front (about 0.2 miles) to be pretty coming down the driveway. There were plots of successive buckwheat, clover, sunflowers, and patches of random mixed forage. In the midst of this, we also had corn, beans, tomatoes, squash, zucchini, melons, cucumbers, and pumpkins.

Our clover pretty much was worthless. The crimson clover did okay, but it really should have been planted in the Fall. Our vetch from four years ago still comes back fairly well in front of the fruit trees, but this clover – it won't be back. We did a round of sweet yellow and alsike clover, and we may as well have planted grass for all the blooms it produced. It was not really differentiated from the chicory because they all looked like weedy grass, except our weedy grass had flowers.

There was some success with borage, but it was fairly pitiful. The flowers that were produced were

ravaged by the honey bees and bumble bees, but they were delicate and didn't hold up well to our harsh Spring storms. We didn't have a particularly high germination rate in this patch. I believe we bought a half pound of borage seeds, and on a really good day of optimistic guessing, we might have had 50 plants blooming. Next down was the cornflower section, and it totally overshadowed the borage. While it wasn't as successful as I had hoped, it filled in well and had lots of flowers. This was another half pound planting, and was pretty high up on the popularity ladder with the bees. It bloomed more or less continuously for about six weeks before tapering off. However, a second patch in a different section didn't do well at all with a mix of other flowers. Neither the borage or the cornflowers produced blue pollen, but they were definitely bee attractive.

The last of that line was a sunflower mix that ranged from tiny sunflower balls (about a foot tall at best) to a middling 4-5' tall series of lemon, burgundy, and chocolate sunflowers. Everything in the yard loved the sunflowers, and they bloomed in a perfect synchrony where one variety started just as soon as the previous one ended. The weird thing was that some of them were mammoths, and nobody cleared five feet. There was a pollinator mix planted separately with mammoths, and they also didn't even come close to being tall.

The highlight for my blue pollen was viper's bugloss – because it was the only blue pollen I could verify. The bugloss surprised me because it did really well and topped out at around three feet with prolific blooming. It also did really well mixing with other flowers. I saw several

types of bees visiting these, but honey bees only cared if it was in the morning. Later in the day, they would totally ignore it and go straight for the cornflowers and sunflowers. The bumble bees and carpenter bees were not as picky and would visit them all day. The plants started blooming the fastest of all of the seeds at around six inches tall, and continued to bloom and grow until late Summer. We had a few oddballs with white and pink flowers instead of blue, and they had light yellow pollen. It looked nice with the other flowers and added a good undertone of blue. In the end, the mixed plot for this section only produced something along the lines of bugloss, gomphrena, sunflowers, and a couple varieties of zinnia. I would consider it a success though because that spot is covered in butterflies and bees. There's also a much larger contingent of small songbirds now, with black and yellow finches standing out brightly and nesting in the trees near the sunflowers. There have been at least eight species of butterflies and 10 species of bees in this flower patch that I've seen, even without particularly paying attention. Nothing seems to be overly attracted to the gomphrena, but they are outstanding with vivid colors so bright they don't look real. I would plant them *en masse* again just for the color.

The mix section was meant to start up at the back end of a buckwheat plot, which did well as always. Buckwheat has been lauded before in my articles for its durability and stubbornness, but it really is a fantastic plant. We had two sections reseed themselves twice with enough viable seed to have 100% coverage in the same plot. It absolutely did not do well in a mixed flower planting. I thought with the way it grows that it would be fine, but apparently it does not like being social with other species of plants. Speaking of the mixed plot, the buckwheat was planted in mix plot #2, which was basically a total failure.

We've had a small garden of some sort in the same spot for the last few years, which is almost entirely flowers (sometimes some vegetables) because it's in front of the fruit trees that block off the hives in the back. We put in a specific pollinator mix in this section, and we ended up with what appears to be a single sunflower, three

echinacea plants, and maybe a dozen cosmos. All of those are covered in the most horrendous weed patch that was apparently better suited to the spot.

With all that being said, I'm sure it seems like we had a pretty bad attempt at flower growing this year. I think it turned out a little better than it sounds, but certainly not good enough to keep me from being disappointed with the lack of variety. Here's some of our practices and what might have been a hindrance or went wrong for us:

### **The Bermuda Triangle of Weather Patterns**

Where we live currently has the strangest weather patterns that I've ever seen. We can go to the top of the driveway and watch the rain stop at the red barn a quarter mile away and be dry as a bone at our house. We had tons of rain until the end of June, then didn't get a single drop of rain again (unless it was literally a single drop) until the end of July. We had about 10 days in the high 90's with 70+% humidity and no rain in sight. When we did get rain though, it was monsoon season. We would get so much rain that the water would shoot out of the drainage and explode in an angry current down to our neighbor's pond. Even a couple days after the rain, various patches would be squishy still. I don't think the plants ever got used to this complete lack of pattern.

### **Bad Soil**

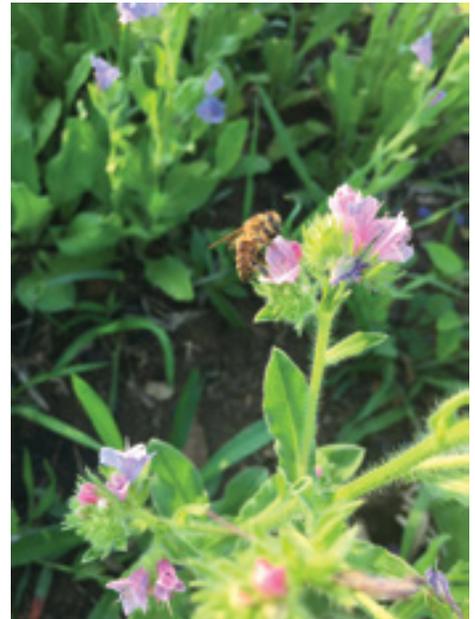
Our soil here is terrible with less than half a percent of organic matter. If you dig down a foot, I'd say you've made quite an accomplishment because the ground is so hard, but you won't get much farther digging through the bedrock and clay without some heavy machinery. Bobby tilled in over \$1,000 of compost amendments, and it was fairly obvious where those sections were. The plants either were burned from the compost, or they grew to what appeared to be almost a real plant size. The ground still looks horrible, but hopefully the green manure from this year being



Cornflower



Borage



Bugloss

tilled in will add some nitrogen and make it less awful next year.

### Pest Pressure

We had a lot of issues with stem borers building up over the years affecting our cucurbit crops, but most of our problems were not of the insect variety (except Japanese beetles. They are always a problem). We had raccoons murder our corn, possums and mice and rats eat our melons, and worst of all, the deer would nest in our flowers and beans like we had planted for the sole purpose of providing cushion for the entire local deer community. What wasn't being trampled was being consumed. They crushed our tender pumpkin and melon vines while munching the sweet potatoes down to tiny nubs. We had a

fence that didn't fool them in the least and they pranced around and over it like it wasn't there at all. The short term fix was to shoot fireworks at them at night to scare them away.

I do think this combination of unfortunate events led to a significant amount of germination failure in our seeds. Some of these things will be remedied shortly. We discovered the joys of electric fencing after the bear debacle with the bees, and have been chicken-murder free since the installation around the coop. The chickens didn't have a problem navigating the wires, but no raccoons or opossums have managed to get in the coop. On that same line, we used the tractor, dug out holes, and put up an 8 foot fence around the entire front field. Bobby ran the same low wires to "discourage" (i.e. throw via electricity) raccoons and smaller vermin, while running the rest of the wires all the way up to keep the deer out of the area.

Our plan is also to dig a new well in the front for irrigation, and maybe also the house. Since the house is so old, it has an 80 foot hand-dug well and causes a lot of anxiety during a drought. If we put a good well in the front, we can run it to the house and use it to water the front and side gardens, while still using the old well in the backyard. We would have better water pressure and not be quite so dependent on the crazy weather patterns here.

Compost and topsoil additions definitely help, but I'm not sure we have enough money to pay our way out of that problem. For our flowers next year, we may have to resort to plain old fertilizer to boost them along, while slowly amending the soil. With some time, we may be able to get it up to par.

All of this was a little annoying and depressing, but it was really not a bad start for megasizing from where we were in years past. We have learned a lot from this in both successes and failures, and of course will try again next year. Here's to better luck for 2017! **BC**

---

*Jessica Louque and her family are keeping bees, farming, gardening and living off the land in North Carolina.*



Mini sunflower



Chocolate sunflower



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# All The BUZZZZ in...



Hello Friends,

One of my favorite smells in the fall is dried leaves. What's yours?

Bee B. Queen

Go outside and write down the all smells around you.

Bee B. Queen Challenge

Sophia, 4, WI



"The honeybee is going to sting the monster really hard so he will go into a deep sleep."

Jesse North, 7, AL



Allie, 6, TX



## Pheromones, You Smell!



The smells that drift from your sweaty feet or underarms come from pheromones produced from glands in your body. Bees also have glands that make pheromones or scented chemicals used to send out special messages as a way of communication. All a honey bee needs to do is follow their nose – oops – their antennae. Different smells from bees help the hive to work together, warn the colony of trouble, and mark the hive entrance.

### The Smell of Royalty

The queen bee has a smell that is all her own. The queen's pheromone travels through the hive by food sharing. The worker bees feed the queen and then they feed each other. This scent is very important for the order of the hive. It helps control swarming, keeps the worker bees from laying eggs, and encourages comb building. When the queen's "special perfume" is very strong, the worker bees know the queen is nearby. The worker bees will turn towards the queen to feed and groom her.



Photo: Pollinator from Creative Commons

### Danger! Danger!

Worker bees need to protect brood (babies) and their food supply (honey and pollen) for the hive to survive. When immediate danger is detected, worker bees will give off an alarm pheromone calling the other worker bees to defend the hive. You will never guess what this alarm pheromone smells like? Bananas! Yes, bananas!



Communicating with other worker bees in a hive using the Nasonov gland.

Honey bees will only sting when they feel their lives or the hive is threatened. When opening a hive, beekeepers use smoke to help mask the alarm pheromones of the worker bees. In this way, the communications of the bees are disrupted. Beekeepers also move very slowly to avoid distressing the bees.

### X Marks the Spot

What if a bee gets lost? They cannot shout, "We are over here!" But they can guide bees home using a smell. The worker bee raises her abdomen in the air, and then fans her wings to send out a scented message from a gland located on the top of her abdomen. In this way bees can indicate the hive entrance, a new home after swarming or mark a location to find food or water. The smell has a floral aroma, even a bit lemony.



# ... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com

www.beeeculture.com

October 2016

## Name the Gland

Unscramble each of the words. Copy the letters in the numbered blocks to other blocks with the same number to discover the name of the worker bee's scent gland.

REHNEOPOM          
4 6 5

SELLM       
3

DANGL        
2 1

V  
1 2 3 4 5 6



## Bee Buddies

When asked what Sydney and Avery, age seven, like about honey bees the girls replied, "How all those honey bees in one hive can get along nice and work together. Daddy went to beekeeping classes and read lots of books on bees for almost a whole year before we got them. We are glad our bees are not grumpy anymore like when we first got them. They are very sweet now and we have a whole lot of them! We like making sugar water and helping to hammer and paint the wood parts [of the hive]."



Sydney trying on her new suit.



Avery painting hive boxes.

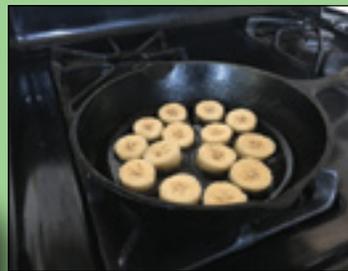
## Fried Honey Bananas

The alarm pheromone of worker bees smells like bananas while the pheromone produced by the Nasonov gland smells lemony. Combine these two foods along with honey to make a tasty treat.



### Ingredients

- 1 banana, sliced
- olive oil
- 1 tablespoon honey
- 2 teaspoons lemon juice
- cinnamon



### Directions

1. Slice the banana using a butter knife.
2. Drizzle oil into a skillet over medium heat.
3. Place the banana slices in a skillet. Cook for 1 – 2 minutes on each side. Remove from heat.
4. Whisk the honey and lemon juice together.
5. Pour over the bananas.
6. Sprinkle with cinnamon.



Answers: pheromone, smell, gland, Nasonov

## Become a Bee Buddy

Send two self addressed stamped envelopes and the following information to:  
 Bee Buddies, PO Box 2743,  
 Austin, TX 78768.

Name  
 Address  
 Age  
 Birthday Month  
 E-mail  
 (optional)



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

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



He's a Northwestern State University in Louisiana grad in Business Administration and works alongside John at the Honey Booth at the state fair. He has working with him John's grandson Justin, who's returning to the operation after working out in industry. But combined, their skills complement each other and cover a beekeeping business pretty well.

The city of McKinney, Texas, is north and a tad east of Dallas and sits smack in the middle of Collin County. That's the county that John Talbert lives in and where the Collin County Hobby Beekeepers Association regularly meets. And I traveled there last June to visit John, and meet all those fine Texas hobby beekeepers.

John, however, isn't quite a hobby beekeeper, since he and his son Skip (actually his name is John, too), run the family owned Sabine Creek Honey Farm in Josephine, on the far

east side of Collin county. John and his late wife, Lavada started Sabine Creek Honey farm 30 some years ago. John's a UT grad in Facilities Engineering and Management, very useful skills when running something as dynamic as a beekeeping business. He's also active in local and state beekeeping associations, and very active in the Texas Beekeepers State Fair operation.

Skip is retired military and specialized in project management and administration and is now Operations Manager for the business.

Like most commercial sized operations the number of colonies they have at any one time depends on what's going on. They average about a 30% loss every year to Varroa and it's evil ways, using Apivar to treat. They shoot for having about 800 colonies on hand, in one place or several all of the time. They send 400+ to California almonds every spring, working with Denise Qualls at Pollination Connection as a broker. John and Blake Shook team up when sending bees out west, and Denise doesn't have any problems with entry into California – which can be



*Flowering fields in all four directions, a perfect place to make and build nucs in the Spring.*

an issue when coming from Texas because of some of the ride-alongs that often accompany Texas beehives. Both John and Blake bring strong colonies she says, bringing colonies that grade out at eight frames average or better. The bees go to a variety of orchards in Stanislaus country, or as part of those that go to a 1500 acre orchard in Waterford. Once located they take a day to get settled, then Denise's crew and country ag inspectors go and inspect the colonies, looking for issues that might occur during transit. They spend essentially no time in holding yards sitting on the ground in California. They leave strong, and arrive strong.

When the bees come home they're full of almond pollen and almond honey, and lots and lots of bees so to relieve all that stress and compact living it's Nuc time, and Sabine Creek makes up about 600 every Spring. There's acres and acres of wild flowers stretching to the horizon around John's home and business and it's a holding yard to die for. It's a hectic, almost frantic time, but when it's all done it's time to make honey. And Sabine Creek makes honey as sweet as Spring Sunshine, and they'll tell you that on their web page and lots of their promotional material. It paints a bright, tasty picture.

When the bees return there's some pollination work in local cucumbers, water melons and squash, but most are located in distant yards for honey production. A honey production bee yard consists of 64 colonies on pallets, and they are producing from March-ish after the

loads return from California and are split to July-ish when the honey flow is essentially over. Honey removal is done with fume boards and one ton flatbed trucks. It takes the crew a half day to harvest a single yard. You can do the math on how long it takes to get the crop in. Once the honey is harvested colonies are reduced to double deeps and each is fed with both wet and dry protein and a three gallon bucket of syrup.

A Cowen uncapper removes cappings and some honey and drains into a tank with an auger that moves this slurry to a Cook and Beals wax separator in the next room where the honey and wax go their different directions. The honey is heated, strained, and run into barrels, and the wax is thrown onto the sides of the separator essentially dry and is collected as wax flakes.

Uncapped frames are moved to the three Dadant extractors (two 84 framers, one 60 framer), spun and the honey from all three is collected in a holding tank, pumped through a heat exchanger, strained, and run into barrels.

Sabine Creek has nearly 80 wholesale customers in a variety of outlets that handle their retail sized containers. They make up 8 oz., 12 oz., 1 lb., and 2lb., in glass and plastic and 40 oz., 5 lb., and gallons in plastic. They also sell bulk, wholesale to resellers in pails. They sell good quality beeswax from their cappings (*delete* and old combs, only capping wax is used. Too much possible bad stuff in old combs. We burn them.) in a variety of sizes to walk-in customers.

John is the face of Sabine Creek



*A unique outdoor storage area – two shipping containers and a roof between them.*

at both the nuc sales in the Spring and meeting, delivering to and helping customers. Skip handles the day to day operations and is the Chief Operations Officer (he does most of the work he told me, but I think John helps out a bit).

But that's not all they do.

Every Spring in the honey house John teaches beginning beekeeping classes. His classes include lectures and hands-on experiences. There are five, four hour classes, and he has both bees and equipment for sale during the class. The classes are scheduled for Saturday mornings once a month, and for the fifth month there's an outside session. He allows only 25 people in a group so the classes are small enough that everybody gets all the attention needed. A fee of \$185 covers a single person, or an additional \$145 for family members, plus a beginner's text book and a one year family membership in the Collin County Hobby Beekeepers Association. He runs at least two sessions a year, with



*Cowen uncapper.*



*Dadant extractors.*



*Catching cappings and honey.*



*Bottling tank.*

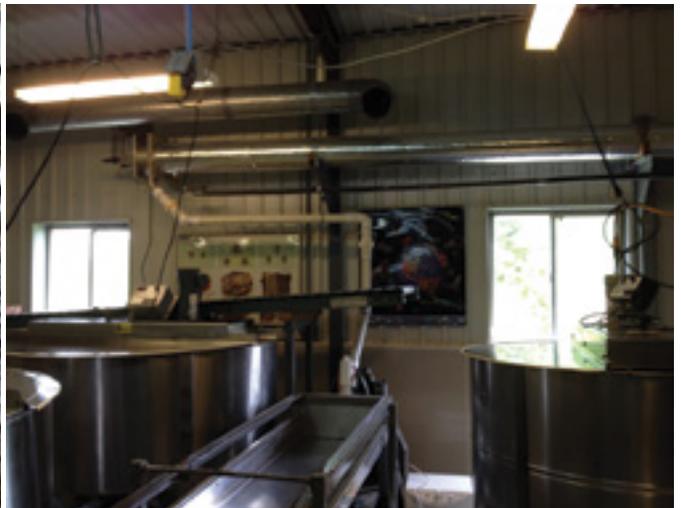
some years as many as four sessions, mornings and afternoons.

But that's not all they do, either.

John is a past president of the Texas Beekeepers Association, and is Executive Secretary of the group now. He's also the Treasurer of the American Honey Queen program,

with the American Beekeeping Federation. And both John and Skip are very involved in the State Fair of Texas, associated with the Texas Beekeepers Association. That's a story in itself.

The fair runs for 24 days, beginning the last week of September



*Pumping to wax separator.*



*The wax separator is in another room.*



*Wax flakes out of the separator.*

every year. It hosts about 2.5 million people during that time and is one of the biggest State fairs in the country. The Texas Beekeepers have several spots occupied on the grounds starting in the Food and Fiber Pavilion. Over the course of the fair they use up 125 – 150 volunteers doing presentations, working with the Texas and American Honey Queens, distributing National Honey Board materials, videos ongoing continuously. They sell honey in the Go Texan store and have a honey show, cooking with honey, black jar tasting contest, plus beeswax sculptures, youth entries, paintings, photography all in the Creative Arts Section. Volunteers at the Food and Fiber Pavilion Honey Booth and at the observation hives in the Texas Discovery Gardens Butterfly house are all well trained and current on the beekeeping industry, and there are a host of special events with the Honey Queen and Princess during the fair.

Both John and Skip are involved during the whole of the fair so beekeeping work at home needs to be pretty much done by the middle of September. But with harvest in July this schedule works out fairly well for the operation.

Clean, neat, well organized and well run. Sabine Creek Honey Farm produces Texas wildflower honey that is as sweet as Spring sunshine. **BC**



Labels.



John Talbert showing his honey house.



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Chris Cripps

# Do I Need A Vet For My Bees?

**Q.** I heard I have to have a veterinarian for my bees – Is that true?

**A.** Maybe. As of January 1, 2017, anyone that feeds antibiotics to an animal needs to have a prescription from a veterinarian to obtain the antibiotics. Honey bees are considered food producing animals by the FDA Center for Veterinary Medicine. If you do not need antibiotics, you do not need to have a veterinarian. If you choose to give antibiotics to your bees, you will need to have a veterinarian. The antibiotics that beekeepers currently use without a prescription are oxytetracycline (Terramycin®) for control of American and European Foulbrood, and tylosin (Tylan®) for the control of American foulbrood. Lincomycin (Lincomix®) is another antibiotic that is rarely used for bees, but has approval for use in bees to control American Foulbrood.

**Q.** Whose idea was this?

**A.** The U.S. Food and Drug Administration has been charged with revamping antibiotic use to help slow antibiotic resistance from developing in bacteria. One of the ways they are doing this is by removing all growth promotion uses from antibiotics fed to food-producing animals. Now, antibiotics will only be used for Prevention, Control or Treatment of a disease. To ensure that drugs are only used for these three reasons, the FDA used the system of control that was already in place. The current system to control drug use in animals involves veterinarians writing a prescription or veterinary feed directive (VFD). Veterinarians have broad training in disease diagnosis and treatment, microbiology and pharmacology in many species. They are also licensed, which provides accountability in the system. The FDA sees veterinarians as a key component of the system to ensure judicious use of medically important antibiotics labeled for use in animal feed. Prior to this rule, there was little oversight of animal feeding of antibiotics.

**Q.** Why target beekeepers?

**A.** Bees and beekeepers were not targeted per se; they were already grouped with other animals prior to this ruling. Whether the FDA knew the effect this rule would have on beekeepers is moot; the laws and rules are in place and the basic tenets of the system will not change.

**Q.** What are the basic tenets of the system?

**A.** A beekeeper should contact a veterinarian and develop a legally defined relationship called the Veterinary

Client Patient Relationship (VCPR). The veterinarian needs to conduct an exam to ensure they are familiar with the keeping of the bees and that there is a need for antibiotics. The veterinarian can then write a prescription or VFD order. If the veterinarian writes a prescription, depending on the state, the beekeeper accesses the antibiotics directly from the veterinarian, a clinic, or a pharmacy. If the veterinarian writes a VFD order, the beekeeper accesses the antibiotics from a feed mill that mixes the medication for direct application. Regardless of how the beekeeper accesses the medication, the beekeeper agrees to follow the directions of the veterinarian when they apply the treatment. The veterinarian agrees to be responsible for the medical management of the bees and to be available for follow up if needed, for instance if the treatment does not work.

**Q.** I heard the veterinarian will have to apply the antibiotics, is that true?

**A.** No. The veterinarian determines if antibiotics are needed and then writes the order. The beekeeper applies the antibiotics.

**Q.** What, exactly, is a Veterinary Feed Directive order (VFD)?

**A.** A VFD order is very similar to a prescription in that the veterinarian has their name and address on it, the beekeeper's name and address are on it, the bees to be treated are identified, the drug, its concentration, its feeding directions, and the withdrawal time to avoid food contamination is written out also. The directions are provided on the drug label from the manufacturer and must be followed exactly by the veterinarian, feed mill, and beekeeper. A VFD order also has an expiration date which cannot be more than six months from the date of issue. If a VFD order is issued October 15th, it cannot be used after April 15<sup>th</sup> of the following year. The records of a VFD order must be kept for at least two years by the beekeeper, veterinarian and feed mill.

**Q.** How do I know if I need a VFD order or a prescription?

**A.** You don't need to know. You and your veterinarian will determine if antibiotics are even needed, and if so, what antibiotics are available. The label on the bag as it comes from the pharmaceutical company will determine what type of veterinary antibiotic order is needed. The means of delivery is not what differentiates these.

**Q.** What do you mean by means of delivery? Don't you mix the antibiotics with sugar or water or feed patties?

**A.** This is a fortunate thing for beekeepers. The VFD drugs and the prescription drugs have nearly the same instructions for final delivery form. In the major species like hogs or chickens, VFD drugs are generally given in feed and prescription drugs are given in water. In bees, both forms of antibiotics can be mixed in sugar and fed to the bees. Just because you are feeding the antibiotic to bees does not mean you need a VFD order. You could use a prescription form instead.

**Q.** Is a prescription different from a VFD?

**A.** Yes! There are major differences that will affect beekeepers.

Prescriptions are regulated at the federal and the state level. However, at the federal level, a veterinarian can prescribe the prescription antibiotic in ways *other* than exactly what is on the label.

Alternatively, using a VFD order means the veterinarian and beekeeper agree to follow the directions exactly as approved by the FDA. Extra Label Drug Use is prohibited. A feed mill must mix up the final feed form. The feed mill must keep records for their FDA inspections for at least two years. ***A beekeeper could be their own feed mill.*** The VFD drug for bees does not need to be mixed in a licensed medicated feed mill.

**Q.** Why is Extra Label Drug Use important?

**A.** The labels for the antibiotics for honey bees all say the drug is to be used "For the control of..." American Foulbrood (and possibly for European Foulbrood). Control has a specific meaning and comes from a spectrum that includes Prevention, Control and Treatment. In Prevention, there is no need to diagnose the disease, only to have a strong suspicion that it would be likely to occur, so should be prevented. In Control, the disease is diagnosed in the population at some low level and the spread of the disease needs to be controlled. In Treatment, the disease is present in the animals being fed the medication. Using Oxytetracycline to prevent American Foulbrood or European Foulbrood is Extra Label Drug Use. Since Extra Label Drug Use is not allowed for VFD drugs, veterinarians are more likely to use prescription drugs for bees.

**Q.** I can get antibiotics over the counter now, why don't I just stock up and not call a veterinarian until I absolutely have to?

**A.** After January 1, 2017, any time antibiotics are to be fed to animals, a VFD order or prescription issued by a veterinarian with a valid veterinarian client patient relationship will be required by law. Antibiotics also deteriorate with time and exposure to air, water or light. If you are using antibiotics after the expiration date, you could be using a smaller dose than expected, and you may select for antibiotic resistant bacteria.

**Q.** What veterinarian even knows about bees?

**A.** There are a number of veterinarians that are interested in and keep honey bees. There are no veterinary school classes about honey bee diseases in the USA yet, but there will be continuing education events for veterinarians. There are textbooks on honey bee

veterinary medicine published by European veterinarians. I also established a website, [www.BeeVets.com](http://www.BeeVets.com) where veterinarians can list their interest in honey bees and beekeepers can look up a veterinarian interested in bees in their state. There is a group of veterinarians working to form the American Association of Bee Veterinarians which will exist to educate veterinarians about bees and their diseases.

**Q.** How much does it cost to get a veterinarian to issue me a prescription?

**A.** Prices for veterinary services are set by individual veterinarians. There is no standard fee. It seems that the charges would depend on the amount of work involved, the liability assumed and the veterinarian's business model.

**Q.** If the inspector was just here, found European Foulbrood and told me I should treat it, do I need to have a veterinarian come?

**A.** The laws are very specific that in order to have an antibiotic order issued by a veterinarian, there must be a valid Veterinarian Client Patient Relationship (VCPR). The VCPR may be defined by your state or by the FDA. In a VCPR, the veterinarian must have first-hand knowledge of you, your bees, and their conditions. ***In most all interpretations, this means a veterinarian must have physically been in your apiary and examined the patient.*** So yes, you would need to have the veterinarian come. Follow up may be done differently. Depending on your state laws, after establishing a VCPR, you and your veterinarian may be able to have follow up by other means like telephone conversations, email, or texting. If you had established a Veterinarian Client Patient Relationship previously, you might have a protocol from the veterinarian directing you how to treat, or you might be able to discuss with the veterinarian your diagnosis and then the veterinarian could write the antibiotic order without a visit to your apiary.

The states set laws individually and I am not aware of any state that allows a non-veterinarian to write a prescription for animals. So, a state inspector will not be able to write the antibiotic order. For a VFD order, the FDA dictates only a licensed veterinarian can write this order.

**Q.** Can I have a veterinarian come to my apiaries to establish a VCPR and have them write the health chart for my bees to move interstate?

**A.** Unfortunately, the USDA has not given veterinarians the ability to write interstate health charts. A level II USDA accredited veterinarian can write a health chart to move several tractor trailer loads of chickens to Canada, but not to move a hive of bees to another state. The state inspector needs to write that health chart.

**Q.** Can my veterinarian talk to the bee inspector and vice versa?

**A.** Of course! Veterinarians often work with allied professionals on farms. In my dairy practice, we often consulted with on-farm herd managers, nutritionists, foot trimmers, artificial inseminators, supply dealers, milk company inspectors, traveling consultants, state inspectors, and state veterinarians. With a relationship between the inspectors and veterinarians, the state

inspector may take the word of the veterinarian and issue the health chart. The development of those relationships may take some time and may differ from state to state and from person to person. The veterinarian and bee inspector relationship could be a good relationship for you to foster.

**Q.** I only need a veterinarian if I want to use antibiotics, what if I don't use antibiotics? Are antibiotics even necessary?

**A.** Talk about a loaded question that is hotly debated. This question would probably take several articles to answer, but here are some thoughts.

Antibiotics will help clear most European Foulbrood infections. Those infections might also clear up without antibiotics by one or more of these techniques: re-queening, feeding, providing better forage, removing stressors, changes in weather, or removing affected combs among others. Since European Foulbrood bacteria do not make spores, once there are no more clinical signs, the disease is considered cured. If the diagnosis is European Foulbrood, there are ways to deal with it with or without antibiotics. Wouldn't it be nice to have a professional that could help guide you through that determination? That is what the FDA thinks veterinarians are or will become.

American Foulbrood (AFB), on the other hand, makes a spore that is resistant to being killed. Antibiotics do not kill it. Some states, like New York, have laws that require burning any hive with AFB. When you feed antibiotics to hives that have active AFB, you can kill the vegetative form, or growing bacteria. If you feed antibiotics to a hive that has AFB spores, you may stop the spores from becoming active for some length of time that is extremely variable. Besides burning, alternative treatments for a hive with AFB include irradiation or doing the shook swarm technique. In the shook swarm technique, all of the bees are shook from the hive, they are placed on new frames with new foundation, the combs are burned, and the other woodenware scorched. The bees are fed antibiotics to kill any active AFB. The bees use any honey they have while building comb and hopefully do not store honey contaminated with AFB.

**Q.** With this new directive making it harder to access antibiotics, won't disease increase?

**A.** There is a nationwide epidemic now affecting bees caused by *Varroa* mites. These account for the vast

majority of diseased hives. American Foulbrood has been the target of the bee inspectors for many decades. The incidence in the U.S. is thought to be well under 5%. The incidence historically has been much higher, so the inspectors have done a good job of finding and removing this disease. Hopefully the alliance of veterinarians, beekeepers, and inspectors means there will be more progress in eliminating all diseases.

**Q:** Fumagilin is an antibiotic. How is that affected?

**A:** Only "medically important" antibiotics are affected. These are antibiotics used in both animals and humans. Fumagillin is not one of those. It is an antibiotic, but it is only used for honey bees. Technically, there is no approval for this antibiotic in the U.S. The approval was withdrawn when the company that used to make it in the U.S. did not file paperwork. It is approved in Canada. The company that makes it in Canada is working on an approval in the U.S. In the meantime, because the loss of the label was not due to safety issues, the FDA is allowing US companies to import it from Canada via "enforcement discretion." That discretion is subject to change at any time, so hopefully the Canadian company does receive their U.S. approval.

The FDA is pushing veterinarians and beekeepers together. Hopefully this is a good thing for both. Neither has invited this change, but both are working to understand how it will work and to make it work. The FDA is still a little unclear on some of the details. Keep informed because there may be changes as time goes on. The FDA is not looking to put beekeepers out of business or to create massive disease outbreaks. The FDA is trying to make sure antibiotics work when people get sick. Hopefully we can overlook some of the small problems created while trying to fix a really big problem. **BC**

*Chris Cripps started beekeeping when he earned the Boy Scout Merit Badge in Beekeeping. He took beekeeping classes at Cornell and then worked as a bee inspector in central Ohio while in veterinary school at The Ohio State University. He practiced as a dairy veterinarian for 17 years in eastern NY and thought he left veterinary practice when he bought Betterbee in 2012. His two partners at Betterbee are also veterinarians who have kept bees for many years. They are Beekeepers Serving Beekeepers.*

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## GRANT MANAGEMENT FOR BEE CLUBS

*Grants Are Not “Free Money” A Nonprofit Can “Do Anything With”.*

Michele Colopy

Your beekeeping organization has enhanced its financial literacy, presented in the last issue of *Bee Culture* magazine. Now your Treasurer, and Board are ready to expand the opportunities to their members and the public, and seek grant funding for collaborative projects. More and more funders, with limited grants to award, favor those grant applications which are collaborative projects, comprised of two to five groups working together for a common cause or project.

Before you apply for grants, can you manage the funds once you receive them? There are far too many myths about grant funds, most of them will result in the funds being returned, or someone facing fines. Grant funds must be used for the purpose described in the grant application. Nothing else!

Grants are not “free money” a nonprofit can “do anything with.” A grant application defines a project, the costs, the responsibilities, the goals, the outcomes, and the timeline for the proposed project.

The funder in awarding the grant funds to your nonprofit, signs a contract with your nonprofit that you will spend the grant funds as defined in the grant application and contract. The grant award/contract will also define the repercussions concerning unspent, and misspent grant funds. A grant writer/manager’s reputation, to secure other grant funds, is based on how they manage each grant they receive. If other leaders in a nonprofit misuse funds, it will damage the grant writer/manager’s reputation first, then the nonprofit’s. Competent, reputable, professional grant managers are protective of their reputation, requiring collaborative partners and staff and Board members within the nonprofit, to work together to fulfill the grant contract per the guidelines.

Barbara Floersch of The Grantsmanship Center lists basic and

critical rules for grant management:

- Only expend funds as laid out in the approved grant budget
- Never use funds from a grant for items not included in the grant budget or for purposes other than described in the grant narrative
- If the original budget requires amendment in order to support the purpose of the grant, contact the funder to get permission before making changes
- Support every expenditure with adequate documentation
- Use a system of checks and balances so that no one person is solely in charge of the money (i.e., dual sign-offs on expenditure requests and checks).
- Keep receipts, documentation, and monthly financial statements well organized and accessible
- M o n i t o r  
g r a n t

expenditures monthly to ensure that over-spending or under-spending can be addressed before the end of the grant period<sup>1</sup>

A grant is typically written three to nine months prior to it being awarded. It is important to review the original application comparing it to the grant award. If any changes occurred in timelines, or expenses, contact the funder and discuss the changes. Open, clear, honest communication is key in managing grants. Since time has passed between the application and the award, is the leadership of the nonprofit still committed to the

project? Make sure the staff and volunteers understand the grant project, expectations, schedule, and budget. Maintain communication with staff, volunteers, collaborators, and the funder so the project can be successful, and the funds managed effectively and legally. Make sure to meet deadlines for drawing down the grant funds, collecting data from the project for reports (to the nonprofit and to the grant funder). Most importantly, thank the funder for the grant. Acknowledge their grant to the community. Recognize their support of your work and the collaborative project.

Robin Toal, writing for *Funds for NGOs: Grants and Resources for Sustainability* offers the following tips for managing grants:

1. Build trust with your funders and grant partners. “Put everything in writing.”
2. Implement the grant within the “project start and end dates” per the contract.
3. Meet the goals of the project within the project budget. The grant contract will define the timeline for the project goals.
4. Spend the grant funds per the grant. Underspending a grant is as inappropriate as overspending. If you underspend a grant you have to return funds to the funder. Follow the contract. If costs have changed since the application, ask the funder if you can adjust the budget based on current market conditions.
5. If multiple donors are funding a project, strict monitoring of each donor’s contribution and expenditures applied to the contributions is important.



6. If the budget includes purchasing equipment, purchase it first, not at the end of the project period.
7. Ongoing communication with staff, volunteers, and collaborative partners is key to preparing donor reports. Collecting data at regular intervals helps to ensure timely reporting to the funder.
8. "Reports must be complete and accurate,"<sup>2</sup> on time, and applicable to the project and the budget.
9. "Keep clear contract files and budget notes."<sup>3</sup>
10. Communicate to eliminate surprises. If a situation arises where the nonprofit cannot meet a reporting deadline, the project is experiencing set-backs, contact the funder to discuss the issues. Situations can arise that are completely out of the control of the grant manager: key staff could take another job in the middle of the project, or the organization's building could burn down with all of the grant records, the equipment purchased, and the space where the program was presented. The funder cannot work with you, if you do not talk with them.

A good Grant Manager will "provide professional, high quality service"<sup>4</sup> to ensure the funds and the project match the grant contract. Capacity Builders defines the value and work of a good Grant Manager who will:

1. Keep your organization out of trouble with the IRS and its funders.
2. Make you audit ready.
3. Create or continually update policies and procedures for how grant funding must be used and accounted.
4. Support (not shove) your organization into meeting such policies.
5. Assist you in creating organization-wide forms, spreadsheets, and reports to track and control systematized grant activity and evaluation.
6. Educate your staff and stakeholders on the spending and cost principle policies of your funders to avoid spending pitfalls.
7. Take care of your grant drawdowns and expenditure reports.
8. Oversee the leadership of your grant programs.<sup>5</sup>

There is no easy way to

manage grants. It takes planning, communication, and documentation. Even if you get lured into purchasing "grant management software," you have to enter the data you need to track, and you still have to communicate to others to secure the documentation in order for the software to print a report, and you still need to have separate professional accounting software. Grant management software is for large nonprofits with millions of dollars in grant funds, and dozens of grant funded programs annually. A volunteer beekeeping organization receiving one to three grants a year every few years would be wasting precious funds on such software. Member funds are best spent on a professional accounting software program, and word processing and spreadsheet software. When in doubt: ask! "If you don't understand something, figure out who can provide you with accurate information and call them. If you are overwhelmed, retain a consultant to determine exactly what you need to do, and to help you get the necessary systems set up."<sup>6</sup>

Grant funded projects allow a nonprofit beekeeping association to tackle larger projects, collaborative projects, and meet the needs of members and the community. The

organization must understand prior to applying for grant funds how they will manage those funds. It takes planning, communication, and documentation, but most importantly a willingness to ask questions, and ask for help if needed. The reputation of the beekeeping association, collaborative partners, grant manager, and funder all depend upon ethical, legal management and implementation of grant funds. **BC**

<sup>1</sup>**Managing the Grant**, Barbara Floersch, The Grantsmanship Center, [www.tgci.com/articles/managing-grant](http://www.tgci.com/articles/managing-grant)

<sup>2</sup>**10 Top Tips for Grant Management**, September 26, 2013 By Robin Toal, Funds for NGOs: Grants and Resources for Sustainability, [www.fundsforngos.org/all-listings/10-top-tips-grant-management/](http://www.fundsforngos.org/all-listings/10-top-tips-grant-management/)

<sup>3</sup>Ibid.

<sup>4</sup>**What Good Grant Managers Do**, Capacity Builders, <http://capacitybuilders.info/services/the-art-of-grant-management/what-good-grant-managers-do/>

<sup>5</sup>Ibid.

<sup>6</sup>**Managing the Grant**, Barbara Floersch, The Grantsmanship Center, [www.tgci.com/articles/managing-grant](http://www.tgci.com/articles/managing-grant) **Administering Grants Effectively**, Government Finance Officers Association, [www.gfoa.org/print/1737](http://www.gfoa.org/print/1737)

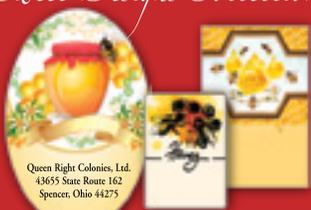


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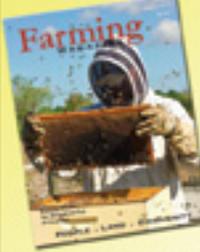


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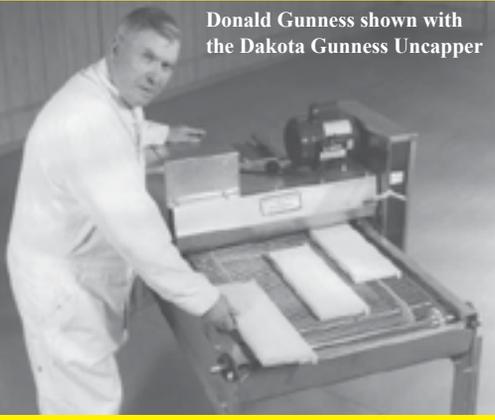
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# Online Beekeeping Certificate Program



Apprentice



Journeyman



Master

Jerry Bromenshenk

The face of beekeeping education looks vastly different than it did 10 years ago and is continuing to change. There is not a “one size fits all” approach to beekeeping, and as such, there is a need to individualize both delivery and teaching methods of beekeeping education, while maintaining a focus on consistent, high-quality outcomes in beekeeping curricula

The University of Montana has built an Online Master Beekeeping Program through School of Extended and Lifelong Learning (SELL). In June, we graduated the first group of Master-level students. Coincidentally, I was invited to participate in a conference call, arranged by the Keystone Policy Center on behalf of the Honey Bee Health Coalition (HBHC), to discuss Master Beekeeping Curricula. HBHC is looking at what is currently available in North America and asking what else is needed? HBHC recognizes that there are “many programs doing great work and producing highly trained beekeepers. There are also concerns that there are programs that are representing themselves as master beekeeper programs that are not rigorous and may be teaching inappropriate practices.”

Certainly, there are long-established programs such as the Master Beekeeping Program of the Eastern Apicultural Society. And there are exciting new advancements, such as a modular online program being designed by Dr. Jamie Ellis in Florida. We use online distance education to address problems of delivery to beekeepers distributed over wide and often remote geographical areas

Online courses present both unique opportunities as well as some logistical problems. It took us four years, meeting weekly with the support team from SELL and media arts students, to design and produce our program. Fortunately, we have experienced both a high demand and great feedback for the courses. The first Apprentice class was offered in 2012, the first Master Course was offered in April, 2016. Only students who satisfied the requirements of the Apprentice Level and who had passed our Journeyman course were allowed to register. Registration opened at 4:00 p.m. on a Friday. The class of 40 was filled by 5:38 a.m. Saturday morning! The next Master’s course will be offered in October, and it’s already full. Part of our success is based on the infrastructure through the University to design engaging, high-tech and accessible online courses.

To prepare for the HBHC conference call, I spent several hours reviewing beekeeping course offerings on the Internet. I found that most online beekeeping courses available in the U.S. and Canada consist of text-based documents, often with PowerPoint presentations, and occasionally webinars or podcasts. Some are academically based, with experienced instructors. Others run the gamut from experienced to novice, offered by individuals, bee equipment companies, extension services and bee associations, for purposes ranging from public service, to vanity videos, personal profit, and advocacy. By the time I was finished with my review, I understood the concerns of the HBHC, for I had found the Good, the Bad and the Ugly!

During the HBHC conference call, Dr. Dewey Caron commented that the Eastern Apicultural Society (EAS) modeled their program after Certificate Programs in Europe. With that in mind, I went to British Beekeeping Association’s web page ([www.bbka.org.uk/learn/examinations\\_assessments](http://www.bbka.org.uk/learn/examinations_assessments)) to see what they are doing.

I was surprised at how they address distance learning; they offer correspondence courses. The student is provided with books, papers, and other instructional materials. Exams consist of essays submitted by each student to examiners, the invigilators. “The papers go out to the invigilators with guidelines for the candidates. The papers are returned to the Exam Sec who photocopies the papers – hence the requirement of black ink or black ball point and pencil. The photocopies go to the two examiners for marking – the originals remain with the Exam Sec in case a set gets lost or the handwriting needs further interpretation by looking at the original script.”

I was glad to see that BBKA recognizes needs of applicants with disabilities. The association allows extra time, up to 25 minutes for each module. Where writing is difficult, an amanuensis, who is not a relative/partner or friend of the candidate and who is not a beekeeper, may be employed. I had to go to the dictionary twice (invigilator and amanuensis) just to understand the BBKA instructions. As an instructor, I shudder at the thought of reading hand-written essays. I’ve been told that the BBKA exams are strenuous, of that I’ve little doubt.

Certainly, the oldest and well organized Master Beekeeper Program in the USA is that of the EAS, started by Dr. Roger Morse at Cornell ([www.easternapiculture.org/master-beekeepers.html](http://www.easternapiculture.org/master-beekeepers.html)). Applicants are provided

with a subject outline and a list of references. The Certification Assessment, which includes written, oral, laboratory, and field exams, is held concurrently with the annual Conference of EAS. A pre-exam review is available to applicants before the examinations are administered. There is a lot of memorization involved.

When Dr. Morse produced the EAS program, his approach was a conventional educational model; one that is still employed in many schools. However, just as EAS says that a “Master Beekeeper should be up-to-date and knowledgeable about current trends and newer scientific findings/management practices of beekeepers”, so also have educational models changed. This is particularly evident with the advent of distance education and online courses.

For example, the approach currently being taken by Dr. Jamie Ellis in Florida is very different than that of the Correspondence courses of the BBKA. In an email to me, Dr. Ellis described the Online Beekeeping Courses that he is generating: “What I’m trying to do is turn my program from a ‘teaching for the sake of teaching’ course to teaching toward objectives. Most importantly, we are developing ways to assess the impact of our program. I want beekeepers taking our course to have purpose, to learn, and to apply what they learn in a real and meaningful way.”

I’m in full agreement. He is describing an approach that mirrors our own journey in terms of building the Master Beekeeping Certificate Program. Whereas he is producing online modules that can be excised and used for other purposes, we focused on a more holistic experience. Our online program provides immersion in each week’s topic via extensive interactive discussions combined with a rich complement of multi-media resources. Numerous animations and videos are used to illustrate concepts and methods. Face-to-face education is not always feasible, especially with the dramatic increase in new beekeepers that is occurring worldwide.

New beekeepers need guidance. Long-established beekeeping organizations like EAS and WAS, composed of an informed membership, can and should review both face-to-face and online courses and endorse those conducted by experienced instructors who understand and teach best management practices.

Many good courses are available, whether the beekeeper association-based EAS style, or a program like the one put together and run by Dr. Keith Delaplane at the University of Georgia, the Edmonton Field Courses of Dr. Medhat Nasr, the Oregon courses coordinated by Dr. Dewey Caron, as well as many others. Experts can be beekeepers who may or may not have attended college. A Ph.D. doesn’t necessarily mean that an instructor is knowledgeable about bees. However, universities have academic standards committees and mandatory faculty and course assessments, so a form of oversight is built in.

Our program takes three to five years to complete. Courses can be taken for Certificate, with students earning Continuing Education Units. Students have the alternative option of taking the courses for academic credit through the University of Montana. These are rigorous courses that require participation in discussion forums and successful completion of assignments and quizzes. A microscope is required for the Journeyman and Master-level courses. Completion of a research project

is required at the Master-Level. Students are expected to have an open mind, develop critical thinking skills, and be interested in joining a community of informed beekeepers – a network that will serve as a resource for years to come.

The lead instructors, Dr. Jerry Bromenshenk, Entomology; Scott Debnam, M.S. Biology, Ph.D. Candidate Pollination Ecology, UM, and Phil Welch, B.S., Biology, have a total of 79 years of beekeeping and research experience. Guest experts include Dr. Colin Henderson, an expert in experimental design and statistics with 21 years of bee-related experience, Dr. Cam Lay, the Montana State Entomologist and Apiarist, with 30 years as a Pesticide Regulator in South Carolina, and Dr. Dale Hill, an animal nutrition specialist who authored the Chapter on Honey Bee Nutrition in the 2015 edition of *The Hive and the Honey Bee*.

Before offering each of our courses, we had to apply for and receive approval from the UM School of Extended and Lifelong Learning (SELL), the Associate Dean of the Division of Biological Sciences, the Dean of the College of Humanities and Sciences, and the Registrar. We also have to comply with UM academic policies. As such, SELL insists upon accessibility compliance as required by the American Disabilities Act (ADA). For example, all of our videos and animations have the option of turning on closed captioning. Also, SELL requires student assessment surveys for each section of each course, which means that our courses are continually being reviewed, updated and constantly improving. See an overview of our program below:

<b>Apprentice</b>	<b>Journeyman</b>	<b>Master</b>
History of Bees and Society	Honey Bee Anatomy II	Spreadsheets & Record Keeping
Honey Bee Anatomy & Biology	Microscopy and <i>Nosema</i>	Principles of Research
Tools and Equipment	Mites	The Craft of Research
Introduction to Langstroth Hive	Queen Production	Honey Bee Anatomy III
Rules, Laws, & Regulations	Making Splits	Reproductive Biology
Colony Dynamics	Anatomy of Flowers	Genetics and Races
Diseases and Pests	Pollination & Honey Production	Pheromones
Honey Extraction	Honey Marketing and Labeling	Hive Products
Working with Your Bees	Reviewing Scientific Literature	Nutrition
Supplementary Resources	Pollinator Protection: Pesticides	Web Collaborating
Discussion Forums	Discussion Forums	Discussion Forums
<b>Assignments</b>	<b>Assignments</b>	<b>Assignments</b>
History or Regulations Essay	Monitoring Pests & Diseases	Research Report or Project
Quizzes, Comprehensive Exam, Video Practicum	Ranking of Scientific Articles, Mite/ <i>Nosema</i> Survey, Pollination/ Honey Production Plan, Topic Exams	Topic Exams, Research Project, Technical Report in Publishable Format

Launched in 2012, to date 278 students have completed UM's Apprentice level, 140 have completed the Journeyman and 31 completed the Master, which was first offered spring of 2016. Another 40 are currently enrolled in the summer 2016 Journeyman class. UM's classes have reached nearly every U.S. state and Canadian province, as well as Europe, Asia, S. Africa, S. America, New Zealand, and Australia. These courses are endorsed and recommended by the Montana Beekeepers Association, the American Honey Producers, and Project *Apis m.*

Student feedback has been intensely positive. One of our Master-Level Graduates has a beekeeping blog (<http://honeybeesuite.com/becoming-master-beekeeper/>). When asked by her readers about value of our program, she wrote: "Truth seeking is exactly what the UM Master Beekeeper program is all about. Beekeeping should be based on facts, science, and research, not on emotion. We should never let belief systems get in the way of evaluating what is actually in front of us. The UM course helps you know the difference and enhances your ability to find the information you need and evaluate its source. Simply put, I now have less tolerance for voodoo beekeeping than I did before."

I could not have asked for a better outcome. After researching several beekeeping programs and thinking about the future of ours, it's my hope that we can continue to open both students' and educators' minds to different modes of learning, combining both rigorous academic standards with practical beekeeping experience. **BC**

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# Manuka Honey Thefts In New Zealand

Alan Harman

Organized crime is targeting New Zealand's lucrative honey industry, threatening its NZ\$242-million- (US\$176.5-million-) a-year export market.

At a recent meeting, New Zealand Police and Apiculture New Zealand agreed to work together to find solutions to the growing problem of organized beehive thefts that are costing apiarists millions of dollars.

The big attraction is manuka honey, which last season saw bulk prices reach NZ\$60 a kg (US\$19.88/lb.).

*Consumer New Zealand* magazine notes a 500-gram (17.6 oz.) jar of manuka honey sells locally for NZ\$73 (US\$55.22), more than for a bottle of champagne.

New Zealand is the third-largest global exporter of honey on a value basis behind China and Argentina. However, most of their products are significantly lower value than New Zealand honey, with an average export price of 91 cents to US\$2.73 a lb., compared with New Zealand at US\$8.18/lb.

The government and a consortium of private sector companies aim to boost the value of the manuka honey industry to NZ\$1.2 billion (US\$874.7 million) a year by 2028.

With the sector now awash with money, Apiculture NZ chief executive Daniel Paul says the crime problem has escalated to the point that a coordinated, nationwide solution must be found.

"Previously it's been sort of a regional thing, you know, a hive's been stolen somewhere around the country and the local police will be involved." Paul tells *Newstalk ZB* radio. "We would like to address this issue nationwide so that we have a coordinated response."

Police are meeting with the Ministry of Primary Industries, Apiculture NZ, government food safety and biosecurity services companyASUREQuality, and associated government and non-government organizations involved in the honey industry.

A working group to formulate a national, coordinated standard is planned to prevent further increases in the theft of beehives and honey.

"We do not believe this is just a few individuals, but it is potentially criminal activity occurring on a much wider scale," NZ Police community policing coordinator Senior Sgt. Alasdair Macmillan tells *Bee Culture*.

"Hopefully a coordinated response will prevent more beekeepers from becoming victims, and will improve the intel we have on these offenders."

The working group will look at the ways to gather improved intelligence about thefts and how stolen hives are processed, and to monitor hive movements more proactively.

In the meantime, police are encouraging beekeepers to take their own actions.

"Keep beehives out of sight from potential thieves," Macmillan says. "This could mean within a locked fenced-off area or hidden behind property."

"Use motion sensor lights and security cameras where possible. Keep serial numbers or another identification number engraved on hives so they can be easily identified if stolen."

The criminal focus on the industry comes as a Westpac Bank report said New Zealand's honey exports had risen 3,000% in 16 years.

NZ Police community policing coordinator Senior Sgt. Alasdair Macmillan says crime now is costing apiarists millions of dollars a year.

Macmillan is looking to the public to help prevent these thefts, which are particularly common in the Northland and central regions of the North Island.

In the most recent incident, NZ\$500,000 (US\$364,510) worth of hives were stolen from a pine forest in Northland. Police made an arrest in this case and charged a man over a number of beehive and honey thefts in the region.

Elsewhere, two men have been charged with stealing 65 beehives from a property near Whanganui, 125 miles northwest of Wellington.

Macmillan says the pair were arrested after police received information from the owners of the hives, which were later recovered from a property 24 miles from the crime scene.

"It's common for thieves to shift the hives in small utes (pickups) or trailers in rural areas," Macmillan says. "Even if people are not directly involved in the beehive industry, they can still help."

They can do so, he says, by reporting suspicious vehicles carrying beehives to police and taking note of the registration number and description of the vehicle.

Apiculture NZ is the peak body representing the beekeeping and honey products industry. Its members include some of the country's biggest beekeeping companies, many of which are major producers and exporters of high value manuka honey.

"We are discussing ways in which we can, with the assistance of police mount a planned, managed and sustained program to combat this problem," CEO Paul says

Paul says one proposal is to establish a central database to ensure that information about thefts and the people and organizations behind the thefts is shared more efficiently.

Crime information now is held regionally.

"All our major commercial members and even many non-commercial, hobbyist beekeepers are concerned about the growing trend of beehive thefts and we will be putting considerable effort into initiatives that will help beekeepers keep their hives safe," Paul says.

Last year, ANZ Bank rural economist Con Williams said in a research report that medical grade manuka honey was fetching NZ\$1,000 a kg (US\$331.36/lb.).

Williams says information about the product is tightly guarded by producers.

"They're trying to protect their own interests in markets so it's hard to substantiate but there have been

quite reliable reports from people I've spoken to that there's a market at that kind of price point," he said.

Williams says the price of Manuka honey varies hugely depending on its level of methylglyoxal, the medicinal compound that makes it so desirable.

"For the lowest quality/MGO purity, current prices range from NZ\$18-\$22/kg (US\$5.96-US\$7.20/lb.), for mid-range NZ\$30-\$50/kg (US\$9.95-US\$16.57/lb.), and top range NZ\$50-\$100/kg (US\$16.57-US\$33.15/lb.)," he says. "These figures were derived from actual results from several honey companies."

The price of the Manuka honey continues to skyrocket, while the cost of table honey soared almost 50% earlier this year.

Queen bee breeder David Yanke told *Radio New Zealand* the high prices are bringing in a huge influx of new hives and keepers.

"Most of these beekeepers have very little experience and a lot of them are getting into the industry for all the wrong reasons," he says.

Yanke says it's reached the point where the only way things will improve is if there's a price plummet – but, he adds, that's a double edged sword.

The industry has bounced back from the arrival of *Varroa* mites in 2000 and the country's honey bee population is growing rapidly.

"We are nearing 700,000 hives, up from 300,000 15 years ago," Paul says. "Hive numbers grew by nearly 70,000 in the 2014-2015 year alone. There are close to 7,000 beekeepers in New Zealand and that number continues to grow each year as well."

A recent nationwide bee loss survey found annual "natural" hive losses in New Zealand are only about 10%, much lower than the most countries.

Recently, the Unique Manuka Factor Honey Association (UMFHA) applied for a trademark on manuka honey, a variant associated with Maori culture. Now, member companies are calling for their peers to protect the name globally. **BC**

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# DOWNTOWN

## *Harvesting As Outreach*

Do you remember the first time you stuck your finger into the golden stream of honey produced by your own bees, trickling out of a (probably) hand-cranked extractor, most likely in the company of a more experienced beekeeper who showed you how to select frames, uncap them, and spin out your harvest? For me, it connected the dots, from flowers blooming and jockeying for pollination services all over town (some with bodacious olfactory advertising, some with prolific nectar production, some with the perfect color and bloom configuration) through the health of the colonies I had been hovering over for almost a year and a half, to the people who were about to be gobsmacked by the extraordinary beauty of how Washington, DC tastes when curated by local bees.

We hold community harvests for our beekeepers (especially first harvest experiences) once or twice a year to give them access to tools and to training on how to extract. Over the past few years, however, we have discovered the power of showing non-beeks how to bring home the gold, and to connect the dots between city living and the green world.

### **How to Make Honey Flow for Non-Beeks**

Non-beekeeper honey harvests have taken a couple of forms, roughly: 1) educational settings; and 2) community-building fundraisers, but there is no reason this kind of tool could not be used for other goals. Here's a short discussion of how and why we do it in educational settings, to be followed next month by advice

for engaging entire adult community groups. Hopefully both will offer some lessons learned that might help you to share the power of the harvest with your neighbors who don't keep bees.

Though it is not strictly part of the harvest, when possible it is most powerful to give participants a chance to visit the beeyard first, though these session descriptions assume that the beekeeper leaders have already pulled frames appropriate for extraction in advance. In small groups with high school age or older participants, where you have legal releases and enough protective gear, you could consider having them help pull a honey super (and put it back after). But don't try to pull all the honey necessary to engage all participants for an entire event: no one will ever get home!

Whether your group is kids or seniors, be prepared to start with a short – meaning really brief, not more than five to 10 minutes – spiel that explains what honey is, how and when it is produced in your area (name the plants and tell folks where they might see them!), and why it's all a sideline to the main gig: pollination, and the way the bees connect the plant world to the animal world, and to you and me.

### **Honey for education**

We hold harvests in educational settings for two student populations: elementary school kids (usually between the second and fifth grades) who participate in pollinator and STEM education programs, and high school age members of the "Green Ambassador" Program of the Washington Youth Garden. In each of these settings, we make sure that participants take some part of the harvest home in order to bring the lesson there (if you hook the kids,

you probably get the family as a bonus). At two sites, a significant part of the harvest is sold via the PTA or school garden program to finance the programs which invite in the bees. By the way, this reaches additional hundreds of community members who become accustomed to hearing about bees, children, and their neighborhood in the same sentence without freaking out.

If you reckon that we are letting go of a whole lot of honey, that's pretty much correct, except in the cases where our early harvests promoted the establishment of in on-site hives that now contribute the majority of the honey that reaches the community. At Janney and Horace Mann Elementary Schools in DC, they harvest mostly from their own bees. At the Washington Youth Garden, we started with their own hives. Every single student walks to school through gardens (vegetable and flower) where they see bees, native and other, pollinating, and they see the results of this observed science in their own classrooms and homes later. And they become vocal advocates for honey bee health!

### **Harvesting with school kids**

To work in a school-based setting, there is no way to go but through the educators who work there every day. Many beekeepers fear working with young kids because they are unsure how to manage classroom groups. Guess what: you don't have to. You are there to provide information and an unforgettable opportunity, their teachers are the pros at group dynamics and discipline. They should be there any time you are. Our wonderful and undervalued professional educators can also guide you on the most age-appropriate and relevant content to include, and the

## **Connecting Kids and Bees**

side activities you might offer when not everyone can be uncapping or spinning.

Because of our local nectar flow, educational outreach harvests happen late in the school year for classroom programs, and midsummer for garden programs. They need no less than three months advance notice for a first-ever session of this kind: to set up alterations in the school day schedule that allow multiple classes to be present at once or on days when they might not usually meet, and for the instructors to prepare introductory sessions to set up the activities for young students before the actual harvest. This requires time, consultations, and a varying amount of logistics depending on school size, curriculum, and regulations. Sign up your volunteers (I like to have two plus the teachers and any aides available for a whole school day in addition to me) in advance, and provide names to the school so that they are expected. Later years can happen on a far more routine basis.

Managing workflow is the biggest challenge for small ones with short attention spans. It is important to divide classes into manageable chunks, and give sub-groups something to do, with an adult supervisor, in addition to times when they are handling frames or the extractor.

When we work with second- and third-graders (as young as I will go), we provide activity stations: one with veils and (safe) tools, a coloring area with bee-related pages to work on, and sometimes either a mini demo hive with frames they can manipulate or an observation hive manned 100% of the time by a volunteer. Smaller groups require fewer sideshows. If we are going to bother bringing all this stuff and getting this sticky, we usually seek to do a half- or full-day of sessions, with multiple classes rotating through, sometimes two classrooms worth at a time. I like to have two class periods per group (which is why we often end up with a double class size for each session).

With elementary school kids, we use six to eight uncapping forks and three to four uncapping tanks (I make small versions of these out of commercially available plastic bins – about the size of kitty litter boxes – with one or two spare top bars from frames fastened across). There is at

*We used cardboard boxes for uncapping tanks bec I forgot a couple of the small ones I usually bring!*



least one adult for every two tanks, more if you can recruit them. You can put four kids at each tank: two pairs of students where one holds a frame while the other uncaps one side (or a portion of one side) then they switch and the second member of the pair gets to uncap. For each group of four, demonstrate how to insert and lift the fork a couple of times, and tell them that the less they dig in, the easier it will be for the bees to re-use the wax and make more honey for next year. If you have each kid uncap one half of one side, you only have to bring one frame of honey for every four kids in order to give each a go at it. Some students may not want to, as well.

Everyone is told up front that the forks are sharp, stabbing their partner is not cool, and failure to take this in results in immediate ejection. I've never had a kid disrespect this information.

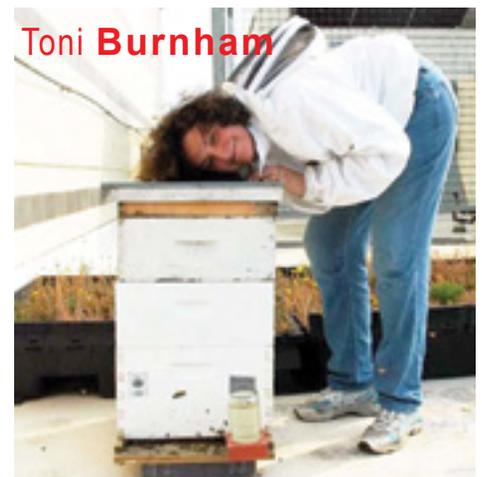
When enough frames are uncapped for your extractor (I like a two- or a four-frame job for this: larger extractors require too many kids to wait too long to see them spin), we load it, have the kids form a line, and give each kid a shot at a set number of cranks (I like to say "1-2-3 next!"). If the kids are tall enough, you can show them how to load. When we get to the end of the cranking queue, if the frames need a couple of adult sized spins, they get it from us. For most of our extractors, the frames need to be turned around and we give the kids a chance to do that, too.

We open the extractors, let the honey flow through that familiar two-piece steel filter set, and proceed to bottling in three-ounce bears before they leave. A little needs to go a long way! I often let kids stick in a finger if they 1) wash their hands first; and 2) don't double dip (they

police each other pretty rigorously on this!) I ask the schools to procure the bears, because they have a better idea of how many kids will be present, and just . . . well . . . because. Over time, I have come to believe that no investment often equals no lasting impression. And hey, we brought the honey!

Sometimes I bring two filter sets and bottling buckets so we can get started before all the frames are extracted (we switch out the first one when there are a few inches in it). It is not critical to get all the honey bottled, but it is helpful to try to send each kid home with some honey the same day (or the next) while the memory and enthusiasm is fresh. The kids really do talk about this with all kinds of enthusiasm for days!

Not all schools are set up to help you do this (sinks in classrooms, etc.) but it is fair to ask for help in gathering up cappings, washing tools and tanks, and loading vehicles with all the stuff you brought. Teachers may have no clue that these activities need to take place, and they should be mentioned from the earliest planning stages to make sure that





*Teens helping to pull frames at Washington youth garden.*

you have things like helping hands in the hour after school finishes and a place to pull up a car.

Once the kids are all set, it is time to follow through on whatever plan you made with the school for the rest of the honey. Do you get to take it home? Do they keep it, and if so what kind of containers do they need to have and how many? One of our schools sells the honey at a farm stand they run once a week in the school veggie garden, one of our schools makes attractive jars (one of the kids drew the bee on the label, and they all voted on what to call the product) and sold them in an online auction. Other options include sales at annual STEM or Science Fairs, sending flyers home in backpacks, or adding honey sales to an existing PTA program. I ask, and feel entitled to know, whether the proceeds will in any way benefit the type of education me and my volunteer buddies came to provide, and make future choices accordingly.

#### **Kids from junior high onwards**

For older kids, like the Green Ambassadors mentioned earlier,

sessions are less likely to occur in a classroom and side shows are not likely to be as necessary (though one should never underestimate the power of an obs hive). Go ahead and use the suggestions from above, but realize that you are less likely to be coordinating with a professional educator, content requirements are probably less defined, and you are likely to be providing more of the structure for the session. On the upside, the kids are able to help you with that.

We see these groups in Summer programs/camps, 4H, and community garden contexts. You can give teens some of the responsibilities you might ask of the elementary teachers above, like helping you set up and clean up. However, the context of beekeeping in pollination and environmental stewardship deserves a higher profile from the start, and the program may not have discussed this previously. Having a couple of experienced beekeepers on hand to answer questions and share experiences is important and is more than conversation: it is connection. When I walk into a group of teens

from a different part of town, who are less than half my age, I often wonder why they listen to me at all: but I am a lovestruck geek for bees, and when I bring it, they meet me.

These groups are almost always much smaller than the school classes, and I like to show them how the process works, then ask them to organize the work themselves with our supervision and initial demonstration of each task. We ask them to come up with questions about both the harvest and about bees throughout and during the work, and they really do go for important topics that we just don't cover with little kids, like how bee mating really happens, how the queen can store semen for years, how pesticides may impact drone viability, and how honey and wintering behavior have made honey bees our only true insect partner, even though the honey is the least important gift they give to us.

Like the elementary school kids, this is a "many hands make light work" situation, so we go for uncapping forks rather than hot knives, hand cranked two to four frame extractors rather than large or powered models. Everyone still needs to see that it is not necessary to dig into a frame, but this group is also ready to learn more about how wax requires eight times the nectar resources by weight than honey does, and how their extra care can help a hive sock away more honey and survive more hardily in the Winter ahead.

Whether or not you end up taking home the honey these groups harvest varies a lot, and you need to ask about expectations. For a camp or a 4H seminar, these kids may be part of a weeks-long program,

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rather than experiencing the harvest as part of a multi-year educational process. There may be no permanent organization with which you will work to market or promote the honey, and the teens may not be around to talk up the experience to the next group to come through (in schools, the second grade is often very aware of what the third grade got to do, and wants in, BAD).

So talk about the unique needs of each young adult program, and how the honey can be used to build bees into future offerings. It is perfectly OK to leave some on the table, but take much home. Even with these limitations, these kids often change the definition of "cool" among their peers to include bees, and

the education you give is perfectly timed to influence coursework they may consider during and after high school. This is a way to make science one heartfelt subject.

Honey harvest programs are one of the few ways that we can "do bees" with kids and have them take home both the experience and a product of their hands. If we connect the dots, they don't look at flowers or the neighborhood around them in the same way. With any luck, this added perspective may create a hopeful future for our bees. **BC**

*Toni Burnham keeps her bees and helps educate and mentor local beekeepers in the DC area.*



*Younger kids learning about uncapping.*

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bit of information of just one of these groups. We need more of them. And we need our commercial producers to be doing the same thing.

•

As you read this we're putting the finishing touches on our *A Case For Honey* conference at the end of the month. If I do say so we have a great line-up of speakers going. The National Honey Board will be here – they got their schedule rearranged and Margaret Lombard, the CEO can make it, and we have an Ohio Dept of Ag person – Joann Dunlevy – who will address all the new Food Safety regs heading our way. Then we have beekeepers by the score. Gene McCune, from right here in Ohio, will talk about gearing up and getting his honey house up to speed now that he's retired and expanding, Dan Conlon, who also raises Russian Queens and sells honey in Massachusetts will talk about that balance, Dave Shenefield, the biggest beekeeper in Indiana, has a mix of honey packing, pollination and honey making information. Then Bob Binnie, from Northern Georgia talks about marketing, his experience with retail and wholesale and making varietal honey, and not last, and not least is Roger Starks, from Howlett McDowell Insurance, who knows more about risk management, the new FDA regulations and insurance issues in the beekeeping industry than anybody I know. Finally Colin Stone and Geoff Martinak, from Canada, will be talking about going from hobby to commercial in only three years, and the Extractor Trailer they have that is a complete unit going from beeyard to beeyard – supers in one end, barrels of honey out the other – it's an amazing operation, and if we're lucky one of their units will be in the parking lot to examine. If growing your business is in the future for you, this is a program you will want to experience. There's still time, and there's still room and it's worth every minute and every penny. Come on down . . .

•

We've done a few of these events now – *Miles To Go*, on migratory bee-

keeping, *The Russians Are Coming*, on Russian bees, *4 Pillars* on nutrition, *Varroa*, Winter and honey production, and now *A Case For Honey*, for those who want to expand their honey business. And, we already have next year's planned – well, sort of scoped out as to what we'd like to do.

So – you've taken the beginner's class and been at this awhile, lost some but not many, don't have a ton of time, make some of the meetings, but just want to get better at what you're doing. Not grow the business, just keep them alive. Your smoker stays lit, you know which end of the hive tool to use and you almost always remember to zip the hood on your beesuit all the way closed. So what's next . . . Well, simply, *The Next Class*. You're no longer a beginner, but keeping bees alive isn't all that easy, and maybe raising a few queens once in a while would be good, and what about making some of your own equipment, or raising some of your own bee pasture, or moving a few bees for pollination, or wintering indoors for a change, or making sure you can ID every problem your bees have, maybe selling some nucs so you get rid of those extra bees, actually make some money and stop swarming at the same time, or not selling more honey but selling what you have for more money, or making something with wax, or propolis, or even bee venom, or, well, I think you get the point. It's not about getting bigger, but getting better. That's what you want to do. And now you can.

Next year, in *Bee Culture's* Conference Center, there will be not one, but two sessions of *The Next Class*. The first, for Spring and Summer, and the second, for Fall and Winter, and we'll cover, we hope to cover anyway, all those topics just listed and more, at the speed, and the scale you want them covered. Getting Better, Not Bigger. That's the goal next year. Stay tuned for more as this unfolds. I think you'll like what you see.

•

In the New Products section we have a review of a book about water. Nothing to do with bees, other than they need it as much as we do, but it's simply about the state of water

in the world. I worry about water, or actually not having enough water. And why in a beekeeping magazine does this matter? Let me give you some numbers that may explain this.

There are 683 million people that still obtain all of their water from an open, unimproved drinking water source. Half of those are in Africa.

Water for food . . . A western diet requires about 925 gallons of water a day to produce. To produce a single pound of these foods, requires. . .

Beef – 490 gallons (that means it takes 123 gallons to make a quarter pounder – more if you have cheese with that), chicken – 150 gallons, rice – 80 gallons, bread – 50 gallons, apples – 26 gallons, and tomatoes – seven gallons of water. That's right about seven gallons of water for just one of my Mortgage Lifter Tomatoes being eaten by those stink bugs this summer. And almost all of that I had to apply. Seven Gallons.

One quote made all this crystal clear. Our industrial lifestyle is propped up by water even more than it is propped up by oil.

It's available from University Of California Press.

•

Somebody asked me the other day how much room he would need to store about 100 deeps, crossed ways so the wax moth wouldn't get into them too bad, in a room with only an eight foot ceiling. Well, it's a math thing and you can figure it out, but it got me to thinking – it's October, and I have to rearrange the garage again to accommodate the supers I had last year, plus what I got this year. But I don't have any more garage to put them in. It's kind of a good problem to have, but it's still a problem. I can't put them in the chicken coop, I don't have a storage shed, and the basement just doesn't do it. Maybe outside this year. What could go wrong?



# Time To Graduate – To Be A Vendor

Ann Harman

Beekeepers are inventors and frequently make various items to make keeping bees easier. Some beekeepers love to collect books about bees and beekeeping. Honey bees inspire crafters who create bee-themed quilts, pottery and jewelry. All these items enrich a vendor area at a meeting.

You have set up your bee-related sales display at local meetings and have had enthusiastic buyers. Perhaps now is the time to graduate to larger meetings. State meetings frequently have vendors and the three regional associations, Eastern Apicultural Society (EAS), Heartland Apicultural Society (HAS), and Western Apicultural Society (WAS), encourage vendors whether large equipment supply companies or individuals with bee-related items. The two national conferences American Beekeeping Federation (ABF) and American Honey Producers Association (AHPA) also have vendors. Where to start to be a vendor at one of those?

You can do much groundwork with the internet. So be prepared to spend some time to find the information you need. Does your state association have vendors at the meetings? There would be an excellent place to start. If vendors have not been a part of your state association meetings, then perhaps now is the time to suggest vendor participation to the association officers. Vendors, whether large equipment suppliers or small crafts people, do enhance a meeting.

Some associations may have vendor coordinators. These are the people who are discovering what facilities the meeting venue has. They will be planning how many of what size spaces the vendors need and are working with the conference organizers on the financial part

of having vendors. Each venue is different – size, arrangement of meeting rooms, available space, security of areas, ease of access, availability of tables and chairs, costs and many other details.

It is always a big help if an association has a vendor coordinator, especially one who has done the planning each year for a number of years. Different people reinventing the wheel for each meeting frequently leads to confusion, something falling through the cracks, and general unhappiness on the vendor's part. Therefore your first step is to inquire



from one of the association officers whether vendors are welcome and if there is a vendor coordinator. If so, then you may be in good hands. If not, then perhaps you can contact a vendor from a previous meeting to find out how to proceed.

Right now, October 2016, the only regional association that has a vendor coordinator is HAS, whose vendor coordinator is Dawn Feagan, contact information at [d.feagan@hotmail.com](mailto:d.feagan@hotmail.com). The other two, EAS and WAS, may have a coordinator in the future so keep asking if you plan to attend. The two national ones have vendor coordinators. For ABF you can contact Regina Robuck,

contact information [rrobuck@meetingexpectations.com](mailto:rrobuck@meetingexpectations.com) and for AHPA contact Cassie Cox at [cassie@ahpanet.com](mailto:cassie@ahpanet.com).

If you are used to a free space with a table and chair at a local meeting and as many tables and chairs as you want, you may be surprised when applying to be a vendor by a fee for a set space and exactly what will be provided. Not all venues are free for association meetings. The association may very well be charged by the space required, for the number of rooms, and even for tables and chairs. Sometimes an association charges a fee as a means of increasing the club's income. As a vendor there is no need to get involved with setting fees. Just be certain you understand exactly what space and items you are allotted. If there are separate fees for tables or chairs or other items you can certainly ask if you can bring your own. Don't grumble if the answer is 'no.'

Tables seem to come in all sizes.

Many places are now using the lightweight and sturdy plastic ones. Although the six-foot tables seem to be the most common, you could encounter five-foot ones and even eight-foot ones. You could also find various sizes of 'ancient' tables, perhaps plywood tops with blobs of equally ancient glue, paint and gouges. You, as well as the vendor coordinator, have no choice but to take what the venue has. Some venues, but not all, will have nice table covers that not only cover the top

but also go down to the floor on all sides. Always carry your own table cover, just in case you need one. One item to bring with your supplies is some large binder clips – handy for coping with table covers and different size tables.

It's very simple to make your own table cover. An old bed sheet will *not* do – it will always look like an old bed sheet (not a good image for your display). Pay a visit to a fabric shop where you might find a bee-related fabric. A tablecloth is very useful but probably will not go down to the floor at least in front and sides. Why does it need to go down to the floor on front and sides? Because nobody

wants to see you've taken off your shoes and are trying to hide your feet in the jumble of empty boxes, rubbish and a raincoat stuffed under the table.

Some venues offer 'pipe and drape.' This is a framework made of pipes on which cloth is hung to make a separation for a given space. Some backdrops are high, others low. Some form sides to the space; others have no sides. Vendors can hang banners on the pipe and drape or fasten something lightweight to the cloth. Usually the pipe and drape is found at convention centers and large hotels. Sometimes colleges have them available.

If you require electricity for your display it may not be available at all venues. Vendor coordinators will have this information as well as any charge for it on their registration form. Sometimes small venues will be in a room with wall outlets. You may need to ask in advance if you need to be near one. Never plan on putting extension cords where someone will trip over the wire. Even if taped down, tape can loosen with many people just walking around.

Always check what the after-hours security will be. Sometimes vendors are put in hallways. If the whole building is secured for the night, that's good. You want your items safe from theft or just being handled. Bring something to cover your display. Here is where an old bed sheet works just fine. Find out the times the area will be locked for the night and also when it will be open in the morning. You want enough time to have your display ready for sales and your cash box in place.



Yes, you will want some sort of cash box. And have plenty of change. Twenty-dollar bills are common, even for a purchase of \$3. But a hundred dollar bill or two are certain to appear. Most people will want to use a credit card, even for that \$3 purchase. You will have to decide how or if you will handle credit cards. Some states require vendors to collect sales tax and remit your total collected. Forms for that would be available. You need advance information about any sales tax when you apply to be a vendor in case you need to adjust your prices and also have the right change available.

Do you have a business card or a brochure showing your items? If not, this is the time to have some made. They can help with future sales. However, if you put a pile of your cards or brochures out on the table you can be certain that the 'collectors' will take one that will get tossed away sometimes within hours. (These 'collectors' walk by all the booths picking up any available card or handout but never actually stop and look at what is being sold.) If a customer stops and looks and

even asks questions offer the card and brochure and also tell them you are happy to ship your items if that is possible. It would be nice to get a phone call or email after the conference from someone interested in making a purchase. At big meetings some vendors will have something free on the table – pens or candy are frequent ones. It is a cost for you so you can decide if it's worth it.

If you are planning to be a vendor at many meetings it might be a clever idea to make a list of the things you would normally bring. Several pens and pencils – never just one. Some paper for making notes. A clipboard can be handy. So is some tape. Although the association may well give their special 'goody bag' with souvenirs to attendees, you need to have some bags for your sold items. Some supermarkets will sell you 50 or 100 of their plastic bags, or you can save your own clean ones. If you have fragile items some suitable empty boxes can be useful, as well as bubble wrap and tape.

Your busy times will be in the morning during registration before the program starts, then the break times and the lunch period. A few may come by at the end of the presentations for that day. You may very well have a customer arrive just as you have packed up almost everything at the end of the meeting. You will have to decide whether to dig for the item or not. Just remember to smile. Some associations take good care of their vendors. They are invited to eat lunch early if a box lunch is available at the meeting or if a lunch is served. Otherwise make your own

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plans to eat early and visit the break area before the time shown on the program.

Should everything have a price tag? If not, you will be answering many 'how much is this?' questions. If you buy sticky labels make sure they are labeled 'removable.' You can make posters for many situations: items reduced in price, a meeting special, closing time, a new item. However do not make too many posters – many people just do not read them.

Plan your display at home if this is your first meeting as a vendor. You probably know what size table you will have there so find a space that size on a table at home. Decide if you will be standing behind your table then arrange your items. You may not be able to display everything. If the table is too crowded things can be knocked to the floor. Keep in mind that children may find your items interesting. Although the parents are there they are busy deciding to buy something. Various things will get abandoned on your table. Be alert for the half-full coffee cup or bottle of water. The forgotten souvenir bag will

probably be retrieved by its owner.

Some customers do not wish to carry their purchase around with them during the day. So they may ask if you would hold it for them. You may not have the space to do that. But if you do, have the customer pay for the purchase and hope they remember to return. Put their name on it in case they forget then you can leave it perhaps at the registration table.

The meeting is over; the vendors have packed up and are leaving. Did anyone tell you where to leave trash and empty cardboard boxes? It is courteous to leave your space clean so seek out the rubbish bins. If they are overflowing you can always take any trash and recycling material home.

Later you will see how successful – or not – you were. Maybe you just broke even or lost a little bit of money. Was it worth it? Yes. Now the beekeepers are familiar with your items and may well buy from you next time. New people come to meetings all the time so there are other possible sales. You have time now to decide if you want to change your display, have more of one item and less of

another. Think about what worked and what didn't. Write it down! Put your comments and ideas in your computer. (It has a better memory than you do.) Now you are ready for the next meeting. See you there! **BC**

*Ann Harman lives in Flint Hill, Virginia but has travelled all over the country and the world being a vendor at bee meetings. She knows the ropes.*

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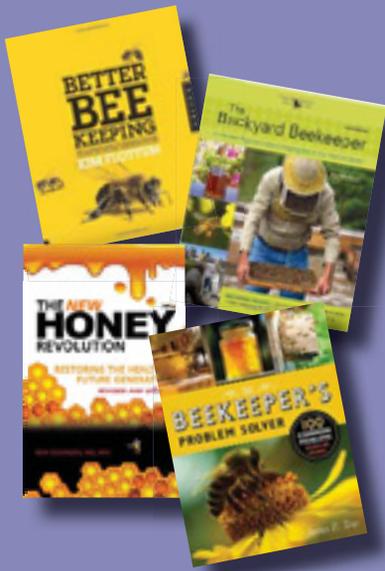
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# GLEANNINGS

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## BEGGING FOR WATER GETS WATER COLLECTOR BEES BUSY

Thirst is a sensation that we can all relate to; however, dealing with this basic physiological impulse takes on a whole new dimension when an entire bee colony craves water.

"We are interested in the social physiology of honey bee colonies, that is, how they work as physiological units," says Thomas Seeley, from Cornell University, who was curious how the elderly bees that are tasked with gathering water know when the colony's collective thirst is running high. "Water collectors do not spend much, if any, time in the broodnest, and yet somehow they know when to start collecting water to control its temperature," explains Seeley. Intrigued, the scientist and his colleagues Madeleine Ostwald and Michael Smith turned up the heat to make a bee colony thirsty. They discovered that water collector bees begin searching for water when the colony is thirsty in response to insistent begging by nest mates; and when water is available and the colony is hot, water bottle bees store water for later use. The team publishes their findings in *Journal of Experimental Biology*.

Bees use three mechanisms to cool an overheated hive – nest evacuation, fanning with their wings and water evaporation – so Seeley and

his colleagues raised the temperature in a glass-walled hive by positioning a lamp close to the broodnest to find out how the hive responded. However, the water collectors did not spring into action immediately. It was only when the workers began desperately begging for water – by walking up to the face of another bee, contacting the bee's antennae with her own and then extending her tongue between the mouthparts of the other bee – that the water collectors increased their water-bearing activity. By begging more, the thirsty nurse bees in the broodnest had prompted water collectors to embark on water-collection flights and the hive managed to stabilise its temperature at around 40°C.

The team then removed the nearby water supply for 2.5h to find out how the hive coped, and this time the temperature soared dangerously to almost 44°C. "The water collectors continued visiting the empty water source, which they probed feverishly but unsuccessfully," recalls Seeley. Ostwald and Smith also gauged the colony's thirst by pipetting a 0.2 ml puddle of water onto the floor of the hive, which the bees gulped down in just 46s – in contrast

*Continued on Next Page*

## NUTRITION MATTERS

In the first large-scale and comprehensive study on the impacts of transporting honey bees to pollinate various crops, research from NC State University shows that travel can adversely affect bee health and lifespan. Some of these negative impacts may be reduced by moving bee colonies into patches with readily available food or by providing supplemental nutrition when there are few flowers for honey bees to visit, the researchers say.

Honey bees (*Apis mellifera*) are among the country's most important agricultural pollinators. They are frequently trucked around the U.S. – short and long distances – to pollinate apples, almonds and berries. The impact of that travel remains unclear and ripe for study, says Hongmei Li-Byarlay, a National Research Council senior research associate in NC State's Department of Entomology and Plant Pathology and co-first author of a paper describing the research, which aimed to be the first to directly measure stress in these types of colonies.

Combining the results of three different experiments, research shows that traveling bees generally have shorter lives than stationary bees. Traveling bees also have greater oxidative stress levels – which ages them more quickly and may lessen their capacity to fight off disease and parasites.

"We found that migratory beekeeping influences the lifespan of bees, but how this impacts health and honey bee aging is more complicated and often more influenced by the environment these colonies are in," said Michael Simone-Finstrom, an NC State postdoctoral researcher during this research and co-first author of the study who currently works at the USDA honey bee research lab in Baton Rouge, LA.

In one experiment, bees from commercial colonies that traveled to pollinate almonds in CA and then ME were compared to colonies that remained in the NC State apiary.

Traveling colonies lived about a day less than stationary bees.

"One day may seem trivial, but when a normal forager bee lifespan is only around 20 days, one day is significant," Simone-Finstrom said.

In the second experiment, researchers compared lifespan and colony health of migratory bees that traveled relatively short distances in NC – 35 to 60 miles in a handful of trips – to stationary bees; both types controlled by researchers.

"We saw the same lifespan differences as in the first experiment, plus we saw more oxidative stress in traveling bees when compared to stationary bees," Li-Byarlay said.

However, this increase in stress levels was only apparent early in the season – May and June – when the stationary bees had plenty of access to food. As the flowers dried up in the NC Summer heat, stationary bees had to work harder to find food while the traveling bees were moved into fields of blooming plants and therefore did better.

In the third experiment, researchers compared oxidative stress levels of stationary bees with bees that were transported across NC for three hours each day for six consecutive days – a more intensive bee travel regimen than the second experiment. The results shed light on how the bee-rearing environment – where bees were raised as larvae – can impact the oxidative stress levels when bees become adults. In this experiment, foraging bees raised in migratory bee colonies had higher oxidative stress levels than foraging bees raised in stationary hives.

Li-Byarlay would like to look at longer-term effects of bee migration and the interaction with nutrition, as this study examined bees over the course of roughly four months in late Spring and Summer. As colonies nationwide currently experience higher annual mortality, understanding effects through overwintering and mitigation of these effects would be particularly insightful.



*Photo by Dave Schiefelbein.*

## 2015/16 WINTER LOSSES IN CANADA

The Canadian Association of Professional Apiculturists (CAPA) coordinated the annual honey bee wintering loss report for 2015/16 in Canada. Harmonized questions based on national beekeeping industry profiles were used in the survey as in previous years. In this year survey the province of Newfoundland and Labrador was included for the first time in the national survey.

The Provincial Apiculturists collected survey data from beekeepers across Canada. The responded beekeepers operated 441 640 honey colonies. This represents 61.15 % of all colonies operated and wintered in Canada in 2015.

The national percentage of colony winter loss was 16.8% with individual provincial percentage ranging from 7.7% to 24.4%. The overall national colony loss reported in 2016 is one of the lowest losses since 2006/07. Despite reported wintering losses in recent years across Canada, beekeepers have been able to replace their dead colonies and increase the number of colonies from 2007 to 2015 by 22.4%.

Respondents reported considerable variation in identifying and ranking the top 4 possible causes of colony losses across the country. The most cited cause was poor queens, followed by *Varroa*, weak colonies, and weather conditions.

Beekeepers responded to questions on management of three serious pests: *Varroa* mites, Nosema and American foulbrood. The ma-

majority of beekeepers in most provinces reported that they monitored for *Varroa* mites. Most beekeepers reported that they mainly used Apivar(tm) in Spring, formic acid in the Summer or Fall and oxalic acid in late fall as *Varroa* treatments. Due to the long season of 2015, many beekeepers used Spring and Fall applications of Apivar(tm) or Apivar(tm) plus formic acid to keep mites under control. For preventing and treating nosemosis and American foulbrood, many beekeepers across Canada regularly used registered antibiotics but their methods and timing of application varied widely from province to province.

Overall, the survey responses indicate that Provincial Apiculturists, Tech transfer agents and researchers have been successful working with beekeepers across Canada to encourage them to monitor honey bee pests, especially *Varroa* mites, and adopt integrated pest management practices to keep these pests under control. CAPA members continue to address management options for beekeepers and issues of honey bee health through various working groups within the association and with various stakeholders. CAPA members are also actively involved in the Federal Bee Health Roundtable to develop strategies and work toward addressing the risks and opportunities for developing sustainable industry.

Medhat Nasr  
Edmonton, Alberta Canada

*Continued from Page 89*

to the well-hydrated cool bees from earlier in the day, which took almost five minutes to drain the puddle. Despite increasing the air flow through the hive by recruiting more fanning bees and evacuating workers, the thirsty bees were unable to use evaporation to keep the hive cool. However, when the team returned the hive's water supply 2.5h later, the water collectors' delivery rate skyrocketed, from 3.2g/30min (when the hive was cool) to 22.8g/30min as the colony satisfied its thirst; which is impressive when each bee can only carry 50mg of water per excursion. Some even performed waggle dances to recruit additional water collectors.

Finally, the team set the bees another challenge when they warmed the hive briefly while providing

unrestricted access to water before gathering bees later the same day to analyse their crop contents and the contents of brood cells. "We had to open the hive in the evening and then pluck bees, one-by-one, off the combs, and squeeze their abdomens so that they would regurgitate their crop contents to get data," recalls Seeley, who narrowly avoided being stung in the eye by the disturbed insects. However, the team's courage was rewarded when they discovered that the hive was stock-piling water in the brood comb. In addition, many of the bees had bulging abdomens full of water. "We called them the "water bottle bees"', chuckles Seeley, who is now keen to find out whether water collector bees are also motivated by their own personal thirst.

## ONTARIO BEAR GIVE BEEKEEPER A LESSON

When Canadian David Dubois bought himself six hives of bees and installed them in a northern Ontario city he forgot for a moment about one thing – bears.

Dubois of Sudbury, 250 miles north of Toronto, researched his beekeeping project for four years, but obviously didn't include bigger critters in his planning.

He received his C\$4,000 (£2,335) worth of bees and equipment one day and by the next all six hives had been torn apart by a bear that dropped into town for a meal.

"He destroyed every one," Dubois told the Canadian Broadcasting Corp. "He opened every one. I'm pretty despondent, but it's not so much the money, as I was looking forward to the experience."

Dubois had ordered an electric fence – standard equipment for beekeepers in Canada's Great White North – but it wasn't due for a week. He figured no bear would be desperate enough to root out the little bit of nutrition in his new hives.

He was wrong.

A little bit of research shows how wrong.

Agriculture, Food and Rural Affairs data shows that in the 2014/15 year running from April 1 to March 31, bears in the province caused losses of 352 bee colonies and 349 hives and equipment valued at C\$67,771 (US\$52,250).

A year later, in the 2015.16 year, colony losses to bears rose to 518 along with 604 hives and equipment worth C\$111,166 (US\$85,668).

The 1,742-square-mile Grey County region, with a population of 93,000 on Georgian Bay in southwestern Ontario, accounted for the

losses of 220 colonies and 226 hives and equipment worth C\$47,085 (US\$36,300) in 2015-16.

Further south, the much more densely populated 715-square-mile Niagara region's population of 431,346 didn't deter the bears in their quest for the sweet stuff. The major winemaking region bounded by the Niagara River – also the border with the United States – Lake Ontario and Lake Erie, lost 61 colonies and 64 hives and equipment worth C\$15,100 (US\$11,641).

Dubois had an explanation for his losses way to the north and it has nothing to do with the countless squadrons of black flies doing escort duty for waves of mosquitoes.

"I'm angry more at the aerial spraying that has made bears not be able to have any food in the bush," he says. "And they have to forego all their natural instincts and resort to coming in to an urban environment to feed themselves."

The comment had Internet trolls firing stinging remarks in his direction.

"He left a known bear treat in an area where there are bears," wrote one. "He knew the chance of bear engagement was high enough to warrant purchasing an electric fence. And then when his unprotected hives get hit by a bear, he blames people who are doing spraying?"

Other wrote that he should do his research before opening his mouth.

"There are no blueberries yet. Bears eat bugs and grubs at this time of year, and fresh grasses, as well as any easy caught animals (like newborn moose calves or deer fawns).

*Continued on Page 92*



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Continued from Page 90

There are no berries right after hibernation. They will eat whatever they can find, and they are drawn to bees and the hives at this time of year."

Another asserted there is no aerial spraying "in the bush" other than when fires are being extinguished.

"The bears are in an urban environment because there is plenty of food here and it is too early for a lot of food in the bush. If there wasn't anything to eat, they wouldn't be here.

"That's how bears work."

Another wrote: "The easiest source of food at this time of year is into the city, where all of the garbage-throwing, beehive-keeping people live. Bears aren't stupid."

In fact, research has found them to be one of the more intelligent mammals.

Adults grow to 50 to 80 inches nose to tail. Males weigh 125 to 500 pounds, depending upon age, season, and food. The record is 816 pounds, Females weight 90 to 300 pounds with the record at 454 pounds.

There are an estimated 100,000 black bears in Ontario.

The provincial Ministry of Natural Resources and Forestry says the bears' entire life revolves around food. When they are not hibernating, they spend their time looking for food.

From the time they come out of hibernation until berry crops are available, bears live off their stored fat and the limited energy provided by fresh spring greens. They get most of their food energy by feeding on summer berry crops such as blueberries, raspberries, and cherries. In the fall, they turn their attention to hazel nuts, mountain ash, acorns and beech nuts.

So many fun-loving bears have visited Sudbury, a city of 165,000 people – 66 at last count – the Greater Sudbury Police created a triage system handle bear reports.

Inspector John Somerset says the new approach takes 911 callers through a series of steps to determine whether the situation is dangerous or not. He says a trapped or injured bear, or a bear acting aggressively are considered a higher risk than a bear rummaging through a garbage can.

Critical situations include when a bear enters a school yard, tries to enter a house, attacks a pet, or stalks people.

Once the 911 call has been tri-

aged, a dispatcher then determines the resources directed to the call.

Somerset says Sudbury bear sightings are an ongoing issue and blames residents.

"People need to see what's attracting bears to their areas and manage the attractants," he says.

Bears usually avoid humans, but are lured into urban and rural areas by the promise of food. They will topple bird feeders, ransack barbecues, raid garbage cans and even try to enter buildings. If they learn that they can find food where people live, they will continually return.

In Timmins, a further 185 miles north, police last year warned against discharging firearms within city limits by city residents seeking to bag bears in their backyards.

Offenders face fines of up to C\$5,000 (£2,919).

The politically oriented online Northern Bear Report has been created to build a database of documented bear encounters – and to embarrass the provincial government into action.

"Bears have been regularly observed walking down streets in the middle of the day, posing an immediate hazard to public safety," it says.

"It is not reasonable that people living in built-up areas should be experiencing this degree of risk on a regular basis. The constant exposure of residents to roaming bears should not be happening in our province; unfortunately, this has become the norm in many Northern communities."

The North American Bear Centre, however, says the 750,000 black bears in North America kill less than one person a year on average.

Timmins resident Angie Corson, a professional biologist, says the situation where so many black bears are entering built-up areas of the city is a real problem. Many people have changed their behaviour and there is a genuine sense of fear, she tells the local newspaper.

Corson says her support of the provincial Bear Beware program includes distributing free whistles to hikers, children, berry pickers or anyone else who fears an encounter with a bear.

She says the whistles are an effective deterrent.

"A bear whistle makes the bear aware that you are there," she says. "People can be a lot quieter than you think. It also alerts the bear that he needs to move on."

"If you see a bear, you blow that whistle, and he will run. Nine times

out of ten, he will run. Very rarely do they stick around. They really don't want to be around people."

Timmins, a grim little city of 43,000, has posted signs on all highway approaches telling people not to feed the bears.

But 205 miles to the southwest, Algoma Highlands Wild Blueberry Farm and Winery owner Trevor Laing shares his farm outside the tiny town of Wawa with as many as 50 bears and doesn't have a problem with them.

He says when his farmed wild blueberries are ripe for the eating there are also plenty available growing in the nearby forest.

"The bears also don't go to far into the blueberry fields because they don't want to get too far from the safety of the forest," he says.

Laing leases beehives to pollinate his crops, but there is a big difference between him and would-be beekeeper David Dubois.

Laing has his hives guarded by a sturdy electric fence.

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**From Honey and Beekeeping experts C. Marina Marchese and Kim Flottum comes this comprehensive course in the origin, flavor, and culinary uses of more than 30 varietals of honey, from clover to star thistle to buckwheat and many more. Over 200 pages, color throughout the book.**

## NEW SLOGAN FOR TISDALE

The little Canadian town of Tisdale, Saskatchewan, is no longer the "The land of rape and honey."

The slogan, on the town's highway welcome sign had been used for 60 years.

Rape, in the agricultural context, refers to rapeseed, a once-popular crop now largely replaced by canola.

With the sexual assault context on many people's minds, the city surveyed its 3,200 residents and found 57% wanted a new slogan, while 36% opposed any change.

Majority rules and the council

has voted for a new, as yet undecided slogan.

The town also decided "honey" was out, noting honey production around Tisdale has also been in decline for a number of years.

The new slogan is not so sweet – "Opportunity grows here".

A Canadian Broadcasting Corp. on-line survey asking if a community's slogan affects how people felt about it attracted more than 7,400 responses. The yes vote took 53.53% and the no vote 46.47%.

Alan Harman



# COLONY LOSSES IN CHINA

Since concern about widespread honey bee colony losses began ten years ago, there have been surveys carried out to assess winter losses in North America and many European countries. So far, the picture in China, the largest beekeeping country in the world, has been unclear. Now for the first time, information about winter losses from a large-scale survey carried out from 2010-13 has been published.

In this new paper published in the *Journal of Apicultural Research*, Zhiguang Liu and Wei Shi from the Institute of Apicultural Research, Chinese Academy of Agricultural Sciences, Beijing and colleagues, report on a three year survey using standard questionnaires developed by the international COLOSS Association. In total, they received 3,090 responses, including 485 from part-time beekeepers, 2,216 from sideline beekeepers, and 389 from commercial beekeepers. Between them these beekeepers managed some 140,000 colonies, that is about 2.4 % of China's six million colonies.

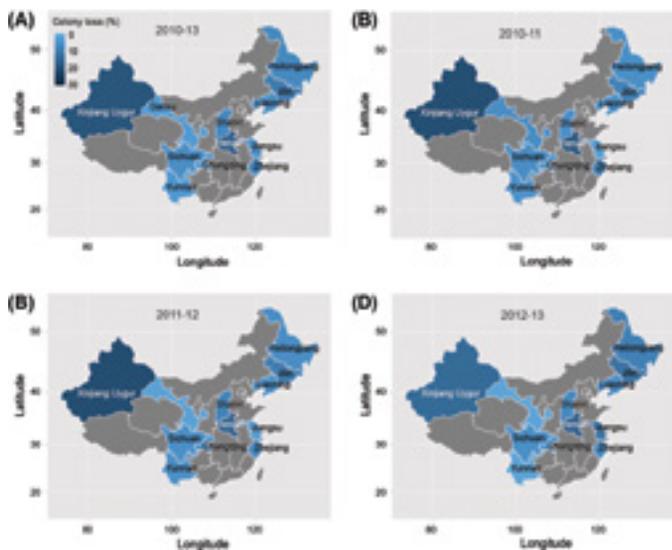
The results showed that colony losses were generally low (on average 10.1%), compared to published results from Europe and the USA. There were however variations between years (ranging from 8.5 to

12.0 %), between provinces (ranging from 2.5 to 19.0%), and between different sizes of beekeeping operation (ranging from 7.6 to 12.1%).

The authors speculate that reasons for the lower losses compared to those of other countries may be due to a high genetic diversity in their honey bees, regular replacement of queen bees by the beekeepers, and because the average size of beekeeping operation is small, meaning that beekeepers can pay close attention to their hives, in particular to the way they control the parasitic varroa mite. The authors also discuss why losses may be consistently higher in certain regions.

IBRA Science Director Norman Carreck says: "For the first time we now have a good picture of honey bee colony losses in China, the world's biggest beekeeping country. Further studies of why losses there appear to be relatively low may assist our understanding of widespread colony losses elsewhere".

The paper: "Survey results of honey bee (*Apis mellifera*) colony losses in China (2010-2013)" by Zhiguang Liu, Wei Shi and colleagues is available here: [www.tandfonline.com/doi/full/10.1080/00218839.2016.1193375](http://www.tandfonline.com/doi/full/10.1080/00218839.2016.1193375)



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Women Are People*

# NO MORE ORANGE BLOSSOM HONEY?

The sweet orange is not only the most widely planted tree fruit worldwide; it is by far the most economically significant crop to Florida. Since the discovery of the original sweet orange, advantageous mutations have been identified, clonally propagated, and introduced. Though the list of sweet orange varieties presents a range of traits and characteristics, genetic variation of the sweet orange genome remains quite narrow. Tremendous expansion of orange plantings and the development of multiple market channels resulted in efficiencies, but also has contributed to the creation of a monoculture. Sweet orange varieties have proven particularly susceptible to HLB.

Breeding sweet oranges is a complex task. Dr. Ed Stover, USDA, shared that "the process is impeded by the high degree of apomixis in sweet orange, and low survival of embryos from sexual recombination (Hearn, 1994). When true hybrids are produced from sweet orange crossed with sweet orange, they reportedly do not closely resemble sweet-orange, displaying traits more like those of mandarins (*C. reticulata*) or pummelos (*C. maxima*) (Hearn, 1977) and some breeders reported no sweet-orange-like hybrids despite several attempts (Furr, 1969). There have been some instances in which crosses not including sweet orange have produced hybrids similar to the sweet orange (Hearn, 1994)."

## PAWS AND CLAWS FROM MANN LAKE

Smiles, applause, even happy tears were evident at the Aug. 11 groundbreaking for Paws and Claws Rescue and Resort south of Hackensack.

As cameras clicked and onlookers clapped, the Paws and Claws Board of Directors, representatives of Nor-Son Construction and others each flipped a shovelful of dirt in the air to mark the start of construction on the new pet shelter/pet boarding facility serving the Hackensack area, Cass County and beyond.

"It's a good day, but we have a long way to go yet," declared an emotional Betty Thomas, chair of Paws and Claws' Board, speaking to 40-50 people who gathered later at The Hub in Hackensack.

Betty's husband Jack Thomas explained how the idea for Paws and Claws came about. More than 30 years ago, the Thomases started Mann Lake Ltd., a business serving beekeepers with products ranging from frames and hives to bee medications. Since then, Mann Lake has grown to be one of the largest suppliers of beekeeping products in the world.

Five or six years ago, Jack and Betty were discussing what to do with their estate. The couple has no children, and Mann Lake Ltd. is now employee-owned. Betty, who grew up on a farm, suggested doing

something for animals, especially domestic pets.

"I want to thank her for that vision," Jack declared. "She brought this project to where it is today. It will be a great asset to Cass County and will help the economy. Area resorts are already asking when it will open so guests can board their pets."

Paws and Claws Executive Director Jim Clark noted that 420 people have donated to Paws and Claws from as far away as Florida and Hawaii.

Construction will be led by Nor-Son of Baxter, design-build architects, utilizing local subcontractors and suppliers when possible.

If all goes as planned, Paws and Claws will open in the Spring of 2017. Groundwork will begin in mid-September on the 22-acre parcel about one mile south of Hackensack at the corner of Highway 371 and Cemetery Road, with the main entrance off Hwy. 371. Only about five acres of the 22 acres will be disturbed, Bontrager added.

The 13,000 square foot building will utilize the latest energy-saving technologies including a wood-fired gasification furnace and solar array.

For information visit the website [www.pawsandclawsrr.org](http://www.pawsandclawsrr.org), [info@pawsandclawsrr.org](mailto:info@pawsandclawsrr.org) or 218.675.7297 (PAWS).

# CALENDAR

## ◆INTERNATIONAL◆

**Nepal - Honey Bees and Honey For Food Security,** October 23-24. Tours of the Himalayas October 25-26. For information contact [rtlaboriosa@gmail.com](mailto:rtlaboriosa@gmail.com).

## ◆ALABAMA◆

**The Alabama Beekeepers Association** will hold their Annual meeting September 30 and October 1 at the Clanton Conference and Performing Arts Center in Clanton. Speakers include Jerry Hayes, Jim Tew and Shane Gebauer. Details can be found at [www.alabamabeekeepers.com](http://www.alabamabeekeepers.com).

## ◆CALIFORNIA◆

**American Apitherapy Society** October 21-23, The Redondo Beach Hotel, Redondo Beach. For details visit [www.apitherapy.org](http://www.apitherapy.org).

## ◆CONNECTICUT◆

**Back Yard Beekeepers Association** 2016 Speaker Schedule – October 25: Brenna Traver on Honey Bee Pathogens; November 17: Jennifer Tsuruda, Clemson Behavioral Resistance to *Varroa*. Each month we have timely weekend hands on inspection workshops, bee school, mentor program and more. For dates and locations and more information please visit [www.backyardbeekeepers.com](http://www.backyardbeekeepers.com).

## ◆FLORIDA◆

**FL State Beekeepers** will hold their conference October 20-22 at the Hilton UF Conference Center in Gainesville. Speakers include Danny Weaver, Les Crowder, Frank Rinkevich and more. For more information visit [www.floridabeekeepers.org/fsba-conference-2016.html](http://www.floridabeekeepers.org/fsba-conference-2016.html).

## ◆ILLINOIS◆

**The IL Queen Initiative** will hold its annual meeting October 29 at the Asmark Institute Agricenter in Bloomington, IL. Featured speaker is Meghan Milbrath from MI State University. The cost is \$30 for paid IQI members and \$45 for non-members. For more information contact Tim Lindley, 618.780.3772 or Stu Jacobson, 217.498.7223.

## ◆INDIANA◆

**The Beekeepers of IN 2016 Fall Conference** will be held October 29 at Swan Lake Resort in Plymouth. Speakers include Ernesto Guzman. For more information and to register visit [www.indianabeekeeper.com](http://www.indianabeekeeper.com).

## ◆IOWA◆

**IA Honey Producers Association Conference** will be held November 11-12 at Clarion Hotel and Convention Center in Cedar Rapids. Speakers include Jim Tew, Jennifer Berry, Charlotte Hubbard, Andy Joseph and more. For more information visit [www.iowahoneyproducers.org](http://www.iowahoneyproducers.org).

## ◆KANSAS◆

**Kansas Honey Producers** will hold their conference October 28-29 at the Whisky Creek Wood Fired Grill Conference Center in Hays. For more information visit [www.kansashoneyproducers.org](http://www.kansashoneyproducers.org).

## ◆MARYLAND◆

**NAPPC International Conference** October 18-20 at the USDA Animal and Plant Health Inspection Service in Riverdale. Speakers include Kevin Shea, Bruce Rodan, David Inouye and more. For information visit [www.NAPPC.org](http://www.NAPPC.org).

## ◆NEW JERSEY◆

**Mid-State Beekeepers** October 15 at the Ramada Inn, Bordentown, 9:00 a.m. to 3:00 p.m. The guest speaker is Jim Tew. Details can be found at [www.njbeekeepers.org](http://www.njbeekeepers.org).

## ◆NEW YORK◆

**4th Annual Greater New York Bee Conference** hosted by the Long Island Bee Club, October 9 at Farmingdale State College.

Speakers include Richard Fell, Peter Borst and Kristen and Michael Traynor. For more information contact Joan Mahoney, [saw\\_whet@hotmail.com](mailto:saw_whet@hotmail.com).

**Empire State Honey Producers Association** will be held November 4-5 at the Embassy Suites Hotel, Syracuse. For information visit [eshpa.org](http://eshpa.org).

## ◆NORTH DAKOTA◆

**The ND Beekeepers Association** will hold their conference October 7-8 at the Ramada in Bismarck. Speakers include Jerry Hayes, Rebecca Masterman and Clint Otto. For more information contact Bonnie Woodworth, 707.290.4647, [bon@ndsupernet.com](mailto:bon@ndsupernet.com).

## ◆OHIO◆

**Cleveland Pollinator Symposium** October 22 at Squire Vallevue Farm, Hunting Valley, 8:30 a.m. - 4:30 p.m. **OH State Beekeepers Association Fall Meeting**, November 5 in Plain City. Speakers include Jamie Ellis and Steve Repasky. For information visit [www.OhioStateBeekeepers.org](http://www.OhioStateBeekeepers.org).

## ◆OKLAHOMA◆

**The OK State Beekeepers Association Fall Meeting** will be held October 28-29 Will Rogers Gardens Exhibition Center in Oklahoma City. The featured speaker is Michael Bush. For more information contact Pat Tickel, [pat@okbees.org](mailto:pat@okbees.org).

## ◆OREGON◆

**OR State Beekeepers Association** will hold their Annual meeting October 28-30 at the OR Garden in Silverton. Speakers include Tom Seeley, George Hansen, Ramesh Sagili, John Skinner, Elina Nino, and more. Details can be found at [www.oregongarden.org](http://www.oregongarden.org).

## ◆WISCONSIN◆

**Wisconsin Honey Producers** will hold their Fall Convention November 3-5 at Holiday Inn - Fond du Lac. Keynote speakers include David Westervelt, Emily Brown and Rebecca Masterson. Details can be found at [www.wihoney.org](http://www.wihoney.org).



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**J**ust when I started getting the *Nosema* under control in a handful of my weaker bee colonies, my gal Marilyn drank the medicine!

How could this happen? I mixed the Fumagilin into a sugar syrup solution in a gallon plastic jug, with “FUM” written on it in big letters with a felt pen. That seemed adequate to me.

But I should tell you that our well water isn’t so good, so we drink water that Marilyn brings from her house in town, in jugs just like the Fumagilin jug.

Marilyn keeps a little water Thermos in the refrigerator, and she topped it off with one of the plastic jugs the wrong one, of course.

She broached the subject thusly: “The water in my Thermos tastes a little sweet. You wouldn’t have any of those bee chemical jugs in the kitchen, would you?”

Me: “For cryin’ out loud, girl, you drank the Fumagilin!”

Marilyn: “Well, I feel just fine.”

Me: “I’ll take you to the emergency room!”

Marilyn wasn’t having any of my panic. “Don’t be silly. I just drank a little bit,” she said.

So I did nothing but monitor the patient, and the patient survived, with no apparent ill effects.

I got the idea for using Fumagilin-B at the summer meeting of the Colorado Professional Beekeepers Association, not to be confused with the Colorado State Beekeepers Association. I belong to both.

A respected beekeeper reported that when you see spotty brood, or your colonies just won’t build up, or you see a rash of queen die-offs and supersedures, the unicellular fungal parasite *Nosema Ceranae* might be the culprit. He said you can knock out this disease with the antibiotic Fumagilin-B, and he gave us his recipe. I’ve got some hives that fit this description, and in a majority, the mid-Summer application of this strong dose of Fumagilin turned them right around.

Obviously you don’t want any honey supers on your hives when you use this stuff. It’s August as I write, but believe me, the dink hives I treated are in no danger of making surplus honey! I just want to keep the little darlings alive.

The recipe calls for a 9.5 gram jar of Fumagilin-B powder mixed into seven gallons of light sugar or high fructose corn syrup, two treatments, eight days apart, and don’t blow it and go longer than ten days! You dribble six ounces onto the top bars. I didn’t need seven gallons. I mixed a two-gram jar into 1.5 gallons of one-to-one sugar-water syrup.

So spotty brood doesn’t necessarily mean you have a bad queen! If your culprit is nosema, you could spend a lot of money replacing perfectly good queens with yet more perfectly good queens, and still not see your colonies bounce back.

It was good to rub elbows with real commercial beekeepers at the meeting. You can learn so much from these guys! There were only 30 people in attendance, but they represented 20,000 Colorado bee colonies!

There’s a bit of angst among at least some of the commercial beekeepers, newly organized into their own association, and beekeepers of the backyard variety, who now vastly outnumber commercial beekeepers in the venerable Colorado State Beekeepers Association.

Part of the unease stems from attitudes and beliefs about neonicotinoid pesticides. Many environmentalists and small-scale beekeepers have called for a ban on these now-common agricultural chemicals, on the grounds that they harm pollinators. The

commercial beekeepers at the meeting I attended voiced the opinion that, rather than killing honey bees, the neonics have saved them. To some extent, they argue, the neonics have grounded the crop dusters, bane of beekeepers since the first pilot got the idea to spray poison out of airplanes.

We had major problems here in Colorado with the crop dusters. Furadan on alfalfa was devastating. Entire bee yards got wiped out. I used to move my bees out of Peach Valley every May when they sprayed Furadan for alfalfa weevil.

We need to follow the science, wherever that takes us. There’s more in this mix than our honey bees. There exist pollinators other than honey bees, many less resistant to the neonics, and presumably to other pesticides as well. We know this. And let’s not forget that God made us stewards of this good Earth. We need to work to reduce the harmful impacts of all pesticides on the environment. But the commercial guys have a point. If we ban neonicotinoids, and the crop dusters come back to rain deadly organophosphates from the sky, what chance might monarch butterflies and native bees, or our honey bees, have against them?

Politically and morally, we beekeepers have more that unites than divides us. But there’s going to have to be some give and take. We’re not going to be able to ban every chemical harmful to our pollinators and still feed the world. Food production’s a priority, too, you know. What we can do is work to mitigate harmful impacts. This can be as simple as spraying fungicides at night. Or keeping orchard floors mowed or cultivated, so as not to attract pollinators. Or tweaking a pesticide chemically so that it kills its target organism, but not pollinators. And yes, we may have to call for a ban on insecticides that clearly do more harm than good. But if we do, let’s do it with our eyes wide open.

**Ed Colby**

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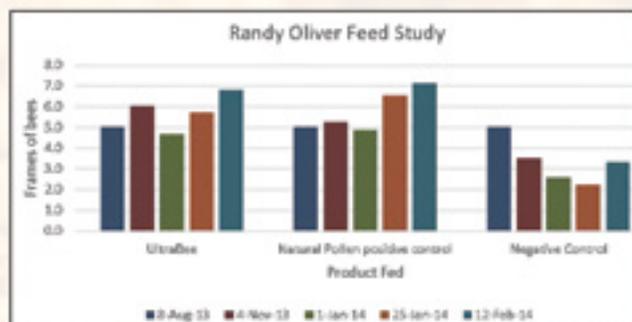
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