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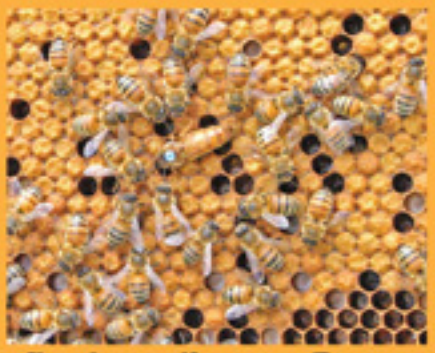

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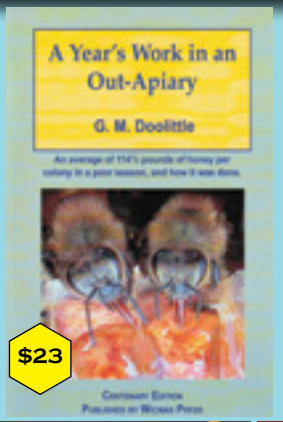

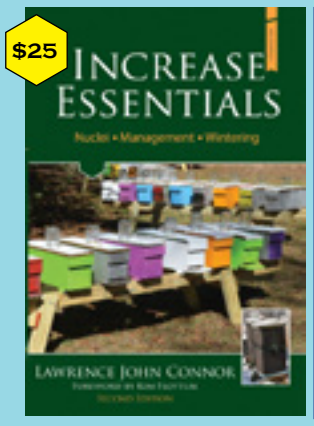

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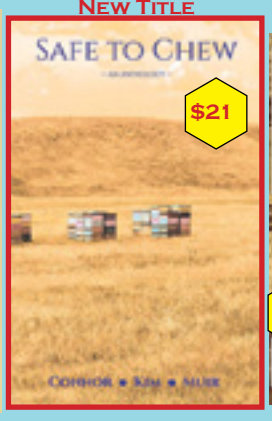

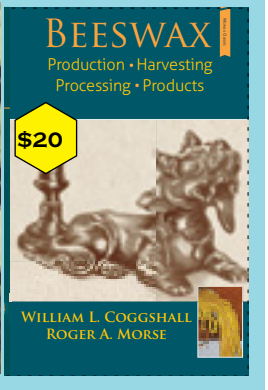

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example for grid 20138 Merced County, CA

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2012	$34.36
2011	$14.69
2010	– 0 –
2009	$18.94
2008	$55.70
2007	$44.26
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2005	$27.45

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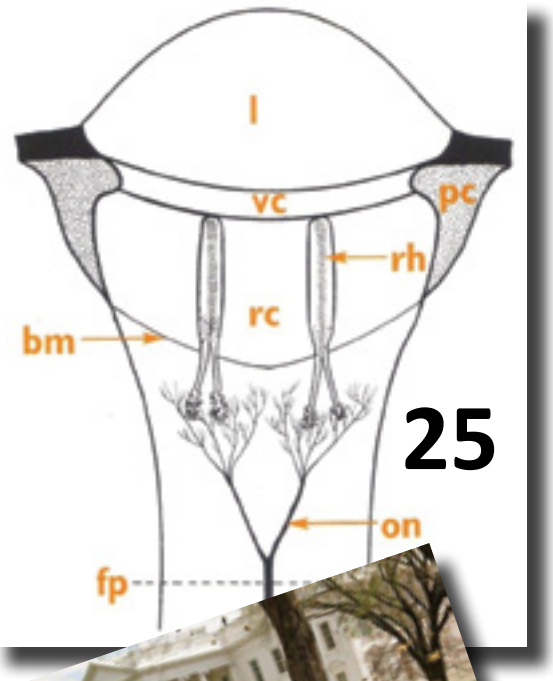
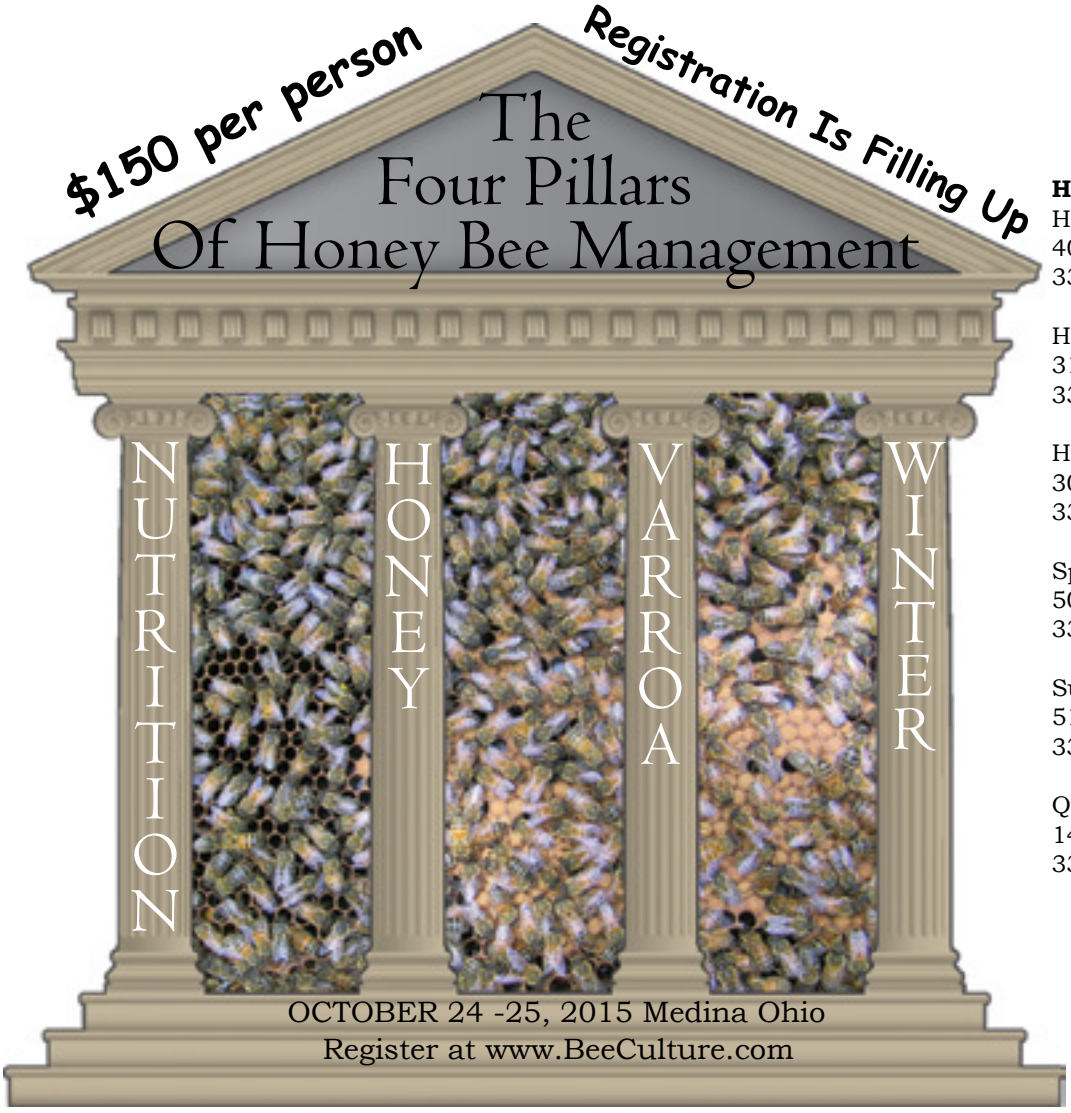


In Every Month –



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Follow **Randy Oliver's** discussion of every aspect of honey bee nutrition from best diets, how, when and how much to feed, and feeding in preparation for pollination events, wintering, dearth and everything inbetween. Nutrition has become the least understood aspect of producing healthy bees. Fix that here.

Varroa. Listen and learn *Varroa* biology, but most importantly, *Varroa* control from **Dennis vanEngelsdorp**. Get every detail on every *Varroa* treatment. How, when, why, where. *Varroa* control chemistry needs to be perfectly understood to avoid, or reduce wax issues, and IPM *Varroa* controls need to be understood and used as much as, and as effectively as possible. Space is limited. Register early. Watch for details.

Next, listen in as **John Miller, Andy Card** and **Steve Coy** who are in the business of serious honey production share their secrets, their skills and even their mistakes so that they consistently make as much honey as their bees can, every year. And now so will you.

Then follow **Jim Tew's** arctic, and not-so-arctic adventures in wintering. Everything from as far north as you can get to moving bees south for a kinder, gentler Winter. Refresh your Winter biology, then get better at wrapping, moving, feeding, treating and all you need to know to get bees from Fall to Spring.

SATURDAY

8-8:30 a.m. – Registration, Coffee & Pastries
8:30-12:00 p.m. – *Randy Oliver,* Honey Bee Nutrition
12-1 p.m. – Lunch, provided
1-4:30 p.m. – *Dennis vanEngelsdorp*, Everything Varroa
4:30-5 p.m. – Q & A, Wrap-up

SUNDAY

8-8:30 a.m. – Registration, Coffee & Pastries
8:30-10:00 p.m. – *John Miller,* Honey in CA & ND
10-11:30 p.m. – *Andy Card,* Honey NE and South
11:30-12:30 p.m. – Lunch, provided
12:30-2 p.m. – *Steve Coy*, Honey in SE
2:30-4:30 p.m. – *Jim Tew,* Winter Where You Are

Tanging

In the article,"Tanging Works Well With A Little Seed,"(*Bee Culture*, June 2015),the author perpetuates the tanging myth.

It is well known that after issuing from their hives, most swarms settle within a few hundred yards of the hives from which they emerged whether or not one tangs. However tangers believe that if one tangs while a swarm is airborne, it will end its flight and form a swarm cluster.

This article adds a new dimension to the effect that can be achieved by tanging namely, the ability to lead an airborne swarm back to its own hive! Upon arriving at its hive, the airborne swarm then clusters on the front of the hive. A plausible alternative explanation for the beekeeper's "success" may be that the queen of this particular colony failed to emerge with the issuing swarm and when this occurs and no other queens are present in the swarm, the swarm will return to the hive from which it emerged.

With all due respect, to assume that because several events followed one another in time they are therefore causally related is an ancient fallacy. This false premise is often expressed in Latin as *Post hoc ergo propter hoc*, translated as "After this, therefore because of this."

Al Avitabile
Bethlehem, CT

Canola vs. Corn

With a protein content of 24% (vs. 15% for sunflowers, 14% for blueberries) canola pollen is one of the most nutritious of all pollens for honey bees (nutritionists recommend a minimum of 20%).

With corn prices dropping from $7/bushel a few years ago to $4 today, corn growers are looking for alternative crops but don't have a lot of choices. Some are switching to soybeans, not the best plant for bees when pesticide programs are considered. There are about 1.6 million acres of canola in the U.S., mainly in the Dakotas, vs. 90 million acres of corn. Converting 10% of current corn acreage to canola would be a windfall for bees.

Even at current prices, corn is still a more profitable crop than canola for many growers. Perhaps a portion of the government $ targeted for pollinator habitat could be used for subsidies to canola growers (or to corn growers that convert some of their acreage to canola).

Joe Traynor
Bakersfield, CA

Beekeeping Manifesto

We often support the value of bees with economic arguments, neglecting the dimension of values, the principles we hold important and the personal and environmental standards that should be at the heart of beekeeping rather than at its fringes.

The current serious issues facing bees suggest it is time for a new manifesto to guide beekeeping, one that recognizes beekeepers as stewards of both managed and wild bees, promoters of healthy environments, managers of economically sustainable apiaries and paragons of collaboration and cooperation. It's time for some audacious thinking about the future of beekeeping.

Such a manifesto might look something like this:

- Beekeepers are **Stewards** of their honey bees, lightly managing colonies with minimal chemical and antibiotic input.
- Beekeepers are **Promoters** of healthy environments in which wild and managed bees can thrive, including reduced chemical inputs and mixed cropping systems in agricultural settings and diverse unmanaged natural habitats in urban and rural areas.
- Beekeeping is **Economically Viable**, so that hobbyists can enjoy their bees with some honey to give away, sideliners meet expenses with a bit of profit and commercial beekeepers have a consistent and sustainable income sufficient to support a family without the heavy personal stress associated with contemporary beekeeping.
- Beekeeping organizations are **Inclusive, Collaborative and Cooperative**, encompassing hobbyists with one hive to commercial beekeepers with thousands, wild bees enthusiasts to honey bee keepers, and honey producers to pollinators, under one umbrella organization that puts the health and prosperity of bees and the environment that supports them first.

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We need to recognize that the good old days are gone. Bees are no longer able to respond with the resilience that allowed us to manage honeybees intensively and depend on healthy ecosystems for wild and managed bees to thrive. Today, pesticides are ubiquitous, diseases and pests rampant, and the diversity and abundance of bee forage has plummeted.

It's a new day, and below are just a few suggestions for what a manifesto-driven bee community might look like. Note that every idea goes against conventional wisdom, but keep in mind that these are not conventional times for bees:

Perhaps we can no longer take copious honey harvests from our bees. If so, a good first step would be to take ¼ less honey and feed that much less sugar.

Perhaps we should let colonies swarm every second year, providing a break in the brood cycle that might diminish the impact of *Varroa.*

Perhaps we should move honey bees no more than once for pollination, recognizing that honey bees are no longer healthy enough to sustain multiple moves.

Perhaps honey bees should no longer be considered our primary agricultural pollinator, but used to supplement wild bee populations whose diversity and abundance we increase by large-scale habitat

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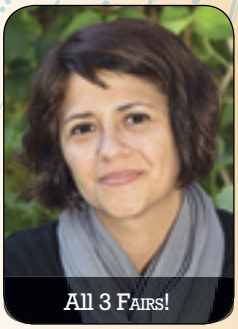

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enhancement in and around farms.

Perhaps we should allow only one *Varroa* treatment per year to prevent resistance.

Perhaps we should eliminate all antibiotic use, controlling bacterial diseases like American Foulbrood through a rigorous inspection and burning regime, as they do in New Zealand.

Perhaps we should cease the practice of feeding pollen supplements in the Spring, as we now understand such feeding yields higher worker populations but weaker individual bees.

Perhaps research should rigorously analyze these "perhaps" ideas. Our research community has done a fabulous job of elucidating why honeybees and wild bees are doing poorly, but what we need now are bolder research directions towards solutions.

Researchers tend towards the more glamorous high-tech solutions, but those are unlikely to succeed and at best are far down the road. Some old-fashioned, large-scale management research is needed now, coupling studies of hive survival and wild bee abundance and diversity with economic analyses of what works best for beekeepers and crop pollination.

Here's one example: I have been travelling quite a bit lately promoting my new book "*Bee Time: Lessons From the Hive,"* and I consistently encounter beekeepers who are not treating for *Varroa*, but rather breeding from surviving untreated colonies. They report colony survival rates as good or better as those commercial beekeepers who treat heavily, but it's all anecdotal. Let's test those claims more rigorously, by organizing national projects to compare untreated surviving colonies to lightly or heavily chemically treated colonies.

Here's another example: I know of no economic studies that demonstrate moving bees for pollination is economically superior to maintaining stationary apiaries, or that compare moving bees once, twice or more. My own opinion is that the extent of bee movement is a major contributing factor in the poor colony survival we see across North America, with 42% of colonies dying in 2013/2014 in the U.S. But, I know of no data that support or dismiss my hunch.

There is a changed mind-set enveloped in my brief manifesto, one in which we consider the well being of bees as the primary directive rather than economic prosperity or beekeeper convenience. Putting bees first is the only way managed and wild bees will return to health, and beekeepers and farmers with bee-pollinated crops to prosperity.

I don't know whether this manifesto is the right direction, or the ideas above sound, but I do know that the status quo is unsustainable.

There is a quote attributed to Einstein that is highly relevant for the future of beekeeping: "*Insanity is doing the same thing over and over again and expecting different results."*

Perhaps it's time to challenge everything we have believed about beekeeping with honeybees, and to boldly promote wild bees to become our primary commercial-level pollinators.

Perhaps it's time to be audacious.

Mark Winston
Vancouver, BC

(Mark Winston is a former *Bee Culture* colunist, author of *Honey Bee Biology* and several bee science books, and most recently *Bee Time, Lessons Of The Hive*. He is Professor and Senior Fellow at Simon Fraser University's Centre for Dialogue.

Sampling For Varroa

The concepts of monitoring pest population levels, and taking action as such pest levels approach seasonally-adjusted treatment thresholds is integral to integrated pest management, no matter whether we are speaking of *Varroa* or any other agricultural pest.

When brood is present in a hive, *Varroa* increase is nearly always exponential from Day 1– in non resistant bees, doubling about once a month. This is for the entire *Varroa* population in the hive. The illusion of linear increase in the mite population occurs for two reasons: (1) all exponential growth curves appear linear in the early stages, and (2) the bee population in a colony builds along with the mite population for the first part of the season, so the *infestation rate *(number of mites per bee) does not

change to any great degree so long as the colony is also growing at the same rate as the mites.

The monitoring of the infestation rate of adult bees does not directly reflect the total mite population in the hive, since a proportion of the mites are typically hidden in the brood (about 50% for much of the broodrearing season). Natural mite fall more accurately reflects the total mite load of the colony, but needs to be considered in the context of the size of the colony, and the amount of brood emerging on that day (natural mite fall is mostly correlated with daily adult bee emergence, and typically varies greatly day to day).

The sudden increase in *Varroa* level in late Summer, observed when monitored by the sampling of adult bees, gives the illusion that the *Varroa* infestation of the colony has suddenly begun to "go exponential." What has actually occurred is that the recruitment rate of bees tends to rapidly drop off after the main flow, due to reduced broodrearing. This results in a greater infestation rate of the remaining brood, and a shift of the mite population from out of the brood, and onto the adult bees, hence the appearance of an "exponential explosion" of the mites.

Note how the mite infestation rate "explodes" in Fall, despite the fact that the total mite population of the hive appears to have only increased relatively slightly. This illusion is due to the scale of the y axis. Allow me to plot out the exact same data for the mite population on a more illustrative scale below:

This is exactly the same mite data, but plotted on a different scale. The mite growth was exponential at first, but then limited by the reduction in broodrearing by the colony after midsummer.

The other factor that can cause a sudden increase in the mite population is immigration of mites from other collapsing hives, which ⇨

typically occurs in late Summer and Fall. Robbing and drifting bees can suddenly increase the mite population of surviving hives within flight range.

The proactive beekeeper will monitor mite levels throughout the season, and apply seasonally-adjusted treatment thresholds to keep the mites at acceptable levels. It is far better for the bees to keep mite populations from building, than it is to reduce them *after* they've built to damaging levels.

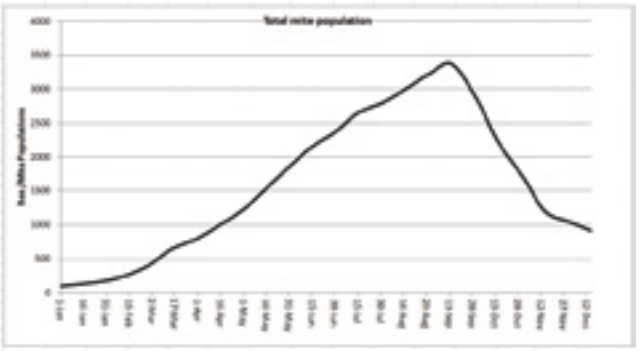
Such seasonal treatment thresholds must take into account a number of factors, such as the point in time of seasonal colony population buildup and decline, the amount of brood present, available windows for treatment (often determined by whether honey supers are present), the method of monitoring, and the expected curve for the mite population in the near future (it declines when there is little broodrearing).

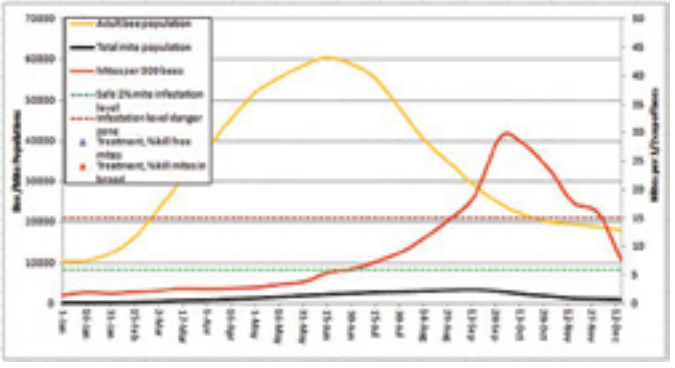
The most important concept to keep in mind is that it is not the mites that kill the colony – it is epidemics of viruses vectored and triggered by a high rate of mite infestation. So long as the infestation rate of the adult bees remains below about the 2% level (assuming complete recovery of mites by your sampling method), viruses are seldom a serious issue. As the level approaches 5%, depending upon the individual colony, in-hive epidemics of either DWV, one of the paralytic viruses, or Lake Sanai Virus begin to occur.

Such virus epidemics, as well as the rate of recruitment of new bees via broodrearing, are highly influenced by the protein intake of the colony, in the form of pollen or pollen sub.

The proactive beekeeper understands pollen, bee, and mite population dynamics, and manages his hives to prevent the *relative *population of the vector (the mite infestation rate) from exceeding the threshold at which viruses are likely to go epidemic.

Randy Oliver
Grass Valley, CA





Out Of State Beekeepers

Ohio State Beekeepers Association represents the over 4500 beekeepers in our state. Our purpose is to support beekeeping research, education and outreach. We are very concerned about the issues that Kim has raised regarding out of state beekeepers bringing in live bees on comb into Ohio.

The potential to expose Ohio apiaries to increased risks of diseases pests, and Africanized hybrid honey bees snowballs with bees on comb. The resulting incursion of pests and diseases, along with genetics of aggressive honey bees, will have a negative impact on the profitability of farmers, and on beekeepers in our state, now and in the future.

We support the ODA in implementing stronger enforcement of Ohio Revised Code 909.02, "for or upon moving bees into this state from outside the state, file with the director of agriculture an application for registration setting forth the exact location of his apiaries and the number of colonies of bees in each apiary, together with such other information as is required by the director, and accompanied by a registration fee of five dollars for each separate apiary owned or possessed by him at time of registration." Along with identifying the apiary by posting the identification number in a conspicuous location and having timely inspections to identify issues before they cause problems. This information will then be passed on to county inspectors. Beekeepers in the area have the opportunity to find out if any out-of-state beekeepers have out-yards in the nearby area so they can increase pest monitoring and mitigate breeding with undesirable genetics.

We also support the Ohio Department of Agriculture in implementing 909.09, Permit necessary to transfer. It clearly states that "No person shall sell, offer for sale, give, offer to give, barter, or offer to barter any bees, honeycombs, or used beekeeping equipment without a permit from the director of agriculture."

Tim Arheit
OSBA President

New Summer Reading –

Honey. Everyday Recipes For Cooking And Baking with Nature's Sweetest Secret Ingredient. By Angelo Prosperi-Porta. Published by Greystone Books Ltd, Surrey, BC. ISBN 978-1-77151-108-7, 8" x 9", 180 pgs, color throughout, soft cover, $22.95 U.S.

I know a little bit about cooking with honey. I put a bunch of mostly tried-at-home recipes in each of my books but I'm not creative enough to make them up. I scoured lots and lots of cooking with honey books, some very, very old, others more contemporary, to find those that I could alter to just my liking and went from there. And I used several of them when a Japanese film crew came to my house last spring to film me cooking BBQ wings, salad and a dessert all made with honey out on the deck.

And I've reviewed a lot of cooking with honey books on these pages over the years. Some have been well done, most were makeovers, much like what I did, that were useful, but bordered on boring. Only a very, very few stand out on my recipe shelf. Honey is such a fantastic ingredient in almost anything you want to make that it's a shame to under use it when cooking.

Let me tell you, this Italian Chef, living in British Columbia and teaching at a cooking school, does not ever under use honey. And I don't think I've ever seen a single recipe in any other book that he offers here.

He does the mostly traditional format – breakfasts, breads, side dishes, main dishes, desserts, sauces and beverages. But, oh, are they all so different than what you have tried in the past. For breakfast I choose warm chocolate almond crepes with raspberry honey butter, and for later, the rosemary, honey and cornmeal scones made me hungry just reading the ingredients. An excellent side dish was the honey and balsamic-glazed shallots, and for the main course I'll go with the honey and lavender-brined chicken breast.

Did I mention the brines? Simply, they are water, salt and honey… and then herbs and spices to taste and enjoy. I'd watch the cooking channel 24/7 if I could, and almost every chef uses some kind of brine, but none use just honey and salt and spices.

This chef's Italian background really comes into play with desserts, with almost all of them with an Italian flair. I haven't had time to explore these in the kitchen yet, but the rhubarb, honey and fresh thyme sorbettor, or the honey almond brioche both read well.

If you don't own a honey cookbook, I'd recommend this one for starters. If you do, graduate to this one. And don't blame me when you read the scale. *Kim Flottum*

Simple, Smart Beekeeping. By Kirsten S. Traynor and Michael J. Traynor. ISBN 978-0-9723492-2-2. Image Design Publishing. 8" x 10", 180 pgs, soft cover, color throughout. $34.95 at Amazon or **www.simplesmartbeekeeping.com**.

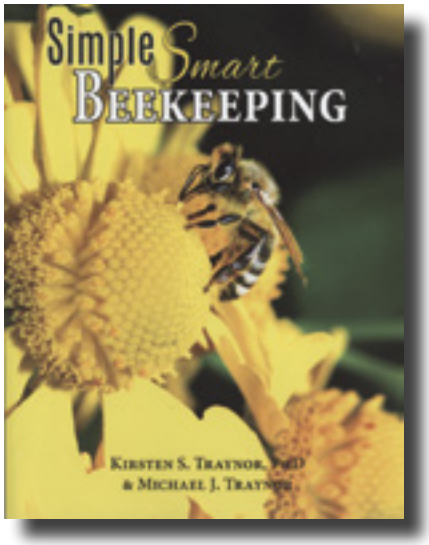
Kirsten and Michael have spent months traveling Europe learning beekeeping techniques, and Kirsten has a Ph.D in honey bees and is now working for the BIP program, so she has access to lots of good information that's current. And Michael has spent time photographing various parts of the world for National Geographic and lots of time with bees. This makes a pretty good combination to put together a fine beginner beekeeper's book.

Chapters include history, one on a beekeeper's alphabet (a list of words used by beekeepers, but repeated in the appendix), bee biology, getting, putting and installing bees, hive health, *Varroa* management, other pests, supering, records, Summer work, wintering up to getting ready for spring. There are a lot of topics covered in this book. The depth of the information on each is limited, but you don't want to overwhelm beginning beekeepers. The 'bee aware of this' method is good and doesn't usually frustrate a beginner.

The photography needs mention. In far, far too many beginner books the publishers want stunning, up close photos that show stunning up close bees. Little or nothing about how to, when to, it looks like this. That's not the case here. The photos are stunning, up close photos showing exactly what needs to be seen describing a given task or subject. I was impressed (however, we published one of those photos on a cover a while back, so I expected no less) with every page.

Another good beginner's book with excellent photos, easy reading, and lots of ground covered with solid, up to date information. Hard to beat any book that does that.

Kim Flottum



Beekeeping For Dummies. Third Edition. By Howland Blackiston. ISBN 978-1-118-94546-9. Regular Dummies dimensions, available almost everywhere, 416 pages. Black and white, soft cover. $22.99.

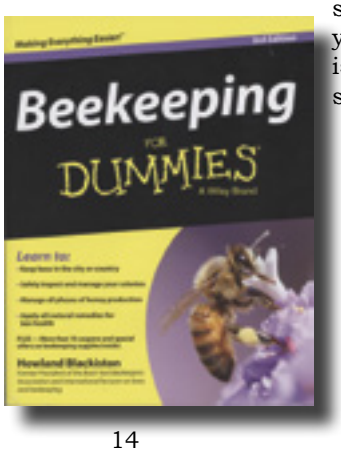
I have to admire Howland for his long time association with the Wiley folks. They do a dynamite job of promoting their products, they are absolutely everywhere, and they are using a few more photos than before, and there is that color section in the middle. But it does keep the cost down.

This edition, like the second has matured a bit which is good. For an author to get a second, and now a third chance to say what needs to be said is gratifying, and often self-correcting, a fact I am well aware of.

It comes in six parts with the18 chapters covering the introduce-you-to-beekeeping material, basic biology, overcoming apprehensions, which hive, what equipment, getting bees, examining a hive, seasonal activity, potential problems, CCD, pests and diseases and remedies, raising queens, a new section on honey, written by Marina Marchese (my coauthor for the Honey Connoisseur), harvesting honey, and finishing with his Parts Of Tens – 10 Fun Things To Do With Bees, including making splits, making hive stands, flowers for bees, mead, propolis, and beeswax. There's a very helpful appendix on Resources in the industry, and for a bonus, there are coupons in the back that will get you all manner of bee things from business all over the place.

Wiley doesn't re-do books that don't sell, and this one does. It's basic, mostly up to date, an easy read, enough photos to help and covers a lot of topics, some of which you will not see in most beginner books. It should be on your shelf if this is your first or second year.

Kim Flottum



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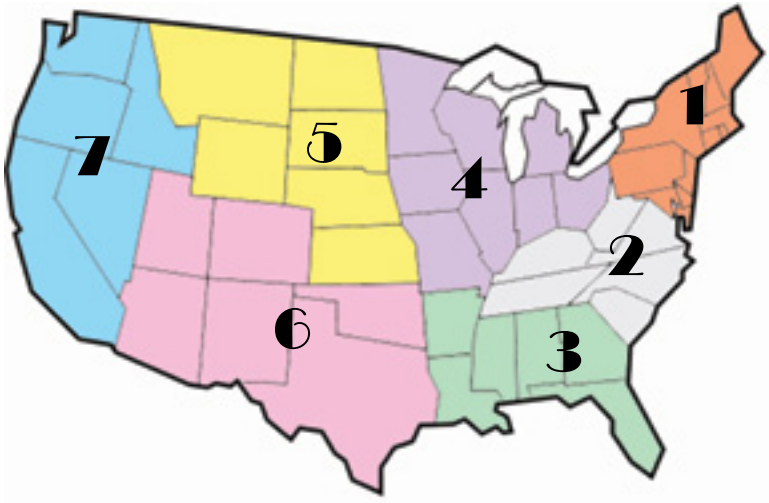
AUGUST – REGIONAL HONEY PRICE REPORT



	% Important				% Less Important			
	2012	2013	2014	2015	2012	2013	2014	2015
Price	80	59	53	55	20	41	47	45
Label Design	64	46	49	35	36	54	51	65
Name on Label	71	67	64	60	29	33	36	40
Local Honey on Label	96	61	77	66	4	39	23	34
Variety of Honey/label	27	32	19	24	62	78	81	76
Second Label	17	5	8	9	83	95	92	91
Location I sell	61	57	58	54	39	43	42	46
Time of Year	36	17	28	17	64	83	72	84
Glass Container	52	35	31	36	48	65	69	64
Plastic Container	25	19	17	19	75	81	83	81
12 oz. size	55	32	35	32	45	68	65	68
1 lb. size	74	56	60	55	26	44	40	45
2 lb. size	65	35	55	37	35	65	45	63
5 lb. size	43	38	42	36	57	62	58	64
Quart jar	57	46	45	44	43	54	55	56
Pint Jar	52	42	40	36	48	58	60	64
Specialty Jar	30	10	13	13	70	90	87	87
Gallon	-	-	-	24	-	-	-	76
Raw	-	-	-	67	-	-	-	40
Color	-	-	-	27	-	-	-	73

What's Important?

August is when we poll our reporters to find out what it is, what they use, how they try to sell their honey. Now we've had many of these reporters helping us out every month for years. Some for many years, so they must have this figured out, at least to their own satisfaction. The one thing we did a tiny bit different this year was add a couple of new products, and look at some trends in different regions. We see the importance of this now and in future we're going to focus more on how regions are the same, and different.

For now, price remains flat as a selling feature. How much isn't as important as it used to be, and it still isn't important as having your contact info on the label, even if it is the law in most places. But what that label looks like is much less important this year. We don't know if that's good or bad, but its' certainly a bump in the down direction. Having local honey on the label is off this year which was a surprise, but one reporter told me that having local is getting tougher with replacement bees every year, so honey is not as local as it used to be. Varietal honey is moving uptown for a change. We'd like to think that the GOOD FOOD AWARDS contest on honey flavors has something to do with that, along with a certain good book we know of, and the Davis Honey Tasting School that's taking off.

New this is was our questions on how important is the gallon container (some), that RAW be on the label (more important this year than ANY other attribute), the color of the honey (some). Take a look, then take the best of this a turn it into money in your marketing plans.

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7				Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS								Range	Avg.	$/lb		
55 Gal. Drum, Light	2.22	2.12	2.40	2.38	2.36	2.24	2.40	1.90-2.95	2.29	2.29	2.26	2.21
55 Gal. Drum, Ambr	1.90	2.07	2.03	2.38	2.28	2.13	2.33	1.90-2.85	2.18	2.18	2.13	2.11
60# Light (retail)	216.44	188.75	181.67	213.96	212.90	185.00	238.13	153.00-284.40	207.09	3.45	197.17	191.61
60# Amber (retail)	220.53	185.50	173.33	204.84	209.37	172.25	267.20	147.00-284.40	203.05	3.38	188.81	191.31
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	89.20	74.27	82.99	57.00	82.99	88.80	97.00	48.00-120.00	81.97	6.83	81.52	75.21
1# 24/case	126.21	109.73	117.48	102.50	148.00	107.19	105.47	45.00-192.00	116.23	4.84	112.35	111.72
2# 12/case	118.19	94.00	107.51	95.55	114.69	100.80	116.00	72.00-168.00	109.37	4.56	102.34	99.13
12.oz. Plas. 24/cs	107.55	85.20	79.43	90.54	102.81	108.00	105.60	63.10-153.60	97.27	5.40	92.09	88.83
5# 6/case	125.33	103.00	110.29	105.36	117.56	105.00	120.00	82.50-158.10	114.83	3.83	115.17	112.20
Quarts 12/case	175.97	125.68	116.49	119.00	166.00	138.20	131.00	96.00-252.00	139.09	3.86	140.14	135.57
Pints 12/case	109.28	86.25	66.80	102.00	111.00	73.20	97.33	60.00-138.00	91.97	5.11	87.18	82.69
RETAIL SHELF PRICES												
1/2#	4.91	4.30	4.00	3.39	3.81	4.16	6.00	2.90-7.75	4.42	8.84	4.14	4.09
12 oz. Plastic	6.15	4.99	5.00	4.37	4.90	6.23	7.05	3.50-8.99	5.48	7.31	5.24	5.07
1# Glass/Plastic	7.30	6.56	6.76	5.45	6.44	6.50	10.00	3.00-11.99	6.82	6.82	6.76	6.47
2# Glass/Plastic	12.35	10.79	10.28	10.70	10.09	11.00	16.00	5.50-18.25	11.53	5.77	12.12	10.80
Pint	11.19	8.58	7.33	11.20	8.17	8.58	11.63	4.00-17.00	9.39	6.26	9.52	9.12
Quart	17.43	15.22	12.63	15.29	15.00	14.99	17.60	8.00-27.00	15.43	5.14	16.65	15.47
5# Glass/Plastic	27.67	23.94	23.22	23.33	21.29	24.86	30.00	15.00-39.95	25.16	5.03	27.92	23.83
1# Cream	8.88	7.98	9.54	7.72	11.61	6.25	9.50	4.97-16.00	8.59	8.59	8.20	8.03
1# Cut Comb	10.79	8.88	6.50	8.71	7.00	8.75	19.50	5.00-25.00	10.06	10.06	9.96	9.41
Ross Round	10.00	6.83	8.77	9.00	8.77	8.83	8.77	6.00-12.00	8.55	11.39	8.31	7.91
Wholesale Wax (Lt)	7.20	5.00	4.25	6.64	7.76	6.94	5.00	3.50-15.00	6.27	-	6.13	5.73
Wholesale Wax (Dk)	6.16	4.50	4.00	6.00	5.62	3.38	5.00	3.25-8.50	5.37	-	5.53	4.90
Pollination Fee/Col.	102.22	60.00	68.33	67.14	80.00	93.00	100.00	35.00-185.00	80.93	-	82.38	89.00

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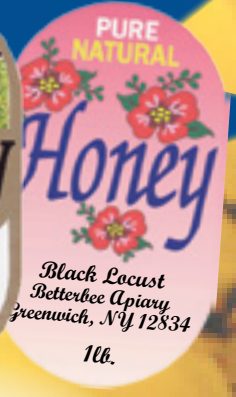

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INNER COVER

It's Father's Day, 2015.

It's about 10 AM or so and I'm at the computer catching up on some correspondence from the previous week. The phone rings. 10 AM, Sunday. This cannot be good.

It isn't. The call is from the County Sheriff's office. Honey bees have invaded a truck stop on the edge of town. The employee there panicked and called them.

The call was simple enough: There's a swarm of bees outside and what can you do because customers are getting stung lots of them and I'm afraid to even go outside and see what's going on and people are leaving and there's nobody here. HELP! HELP!

Well, Sheriff Deputies don't do bee calls. What they do is make beekeeper calls and tag, Kim, you're it this morning. They made a good handoff on that call, problem solved, what's next?

What's next is a problem, sort of. I don't have transportation. We're a one car household and the other half of the household has the car at church and won't be back until after lunch. Sunday mornings are like that here and it's good for both of us, I think.

So right off I called the truck stop and talked to the original caller. She's excited. Nervous. Scared. Her manager isn't answering the phone and what do I do next she asks. So I tell her it's going to be OK, help is on the way, but I need to ask a few questions first – where, how big, how high – and there didn't happen to be a truck recently with a big net over it getting gas by any chance? Well, it turns out that between the time she called the Sheriff and when I called, several customers had told her that was exactly what had happened and that's where the bees were hanging out. Gas up and outta here was the plan, before we leave too many bees. So – how many is too many?

Anyway. OK, got the picture. So, call the President of the Medina County Beekeepers who is on the swarm call list too. She's back from church now and takes the call. The President I called is Peggy Garnes who also works with us on the magazine. I tell her the story, she knows the truck stop real well because exactly the same thing happened last year on almost the exact same day. But right off she calls one of our members who lives nearby to see if he can help. He can. And does.

He takes a nuc with drawn comb, gets a queen from Peggy, who has a queen because she raises them to sell, and leaves it close to where the bees are. It's not long before they find it, and mostly, problem solved. It ended up being a good size chunk of real ornery bees and he goes back after dark, picks up the nuc and takes it over to Peggy's house. But let me tell you about the meanest bees on the planet when he went to move them from the truck to where they were to go. He'd stuffed a screen in the front door for the ride home, but bumpy road moved it a tiny, tiny bit. They started bombing both of them as soon as he stopped. By the time she gets them on the stand she's covered in piss mean bees. Next morning she and her husband can't leave the house. Mean, mean bees those bees. I'm sure they were carefully inspected in Florida. Inspected from inside the truck they were.

But you just know the story isn't over.

I said it happened last year, at almost the exact time. Here's why.

Out of state southern commercial beekeepers come to Medina and surrounding counties because there's a pretty good Summer flow, not hardly any pesticides, and absolutely no government interference. Some make splits down south and sell them up here (inspected I'm sure, by the good folks who inspected those truck stop bees), or shake packages down there to sell to Ohio beekeepers (beware, Ohio beekeepers). They get a piece of paper in Florida that says there are no mites, small hive beetles or African bees in those hives and Ohio has to assume they are right because that's the law. Any bets? I don't care how good the Florida folks are – I got good money that says all three of those beasties are on every load and in every hive – maybe not many – but whether one or a million, nobody anywhere is counting.

But that's not the worst of it, and here's where our Ohio Department of Agriculture shows its true colors when it comes to supporting beekeeping and our Apiary program. Not.

Those out of state beekeepers can put their bees anywhere they can find a place to put their bees. Anywhere. But, once they hit the ground, where they hit is an apiary and they are *supposed* to register those bees with ODA, just like every beekeeper in Ohio has to, and registered bees are liable for inspection. But they all know that nobody, ever is going to bother to check up on them because nobody, hardly ever knows where they are. Unless they cause a problem.

Now, in Ohio, we have maybe as many as a dozen small operations raising queens. They're trying to do a good job, and they want to produce queens that do well in Ohio. Some are supported by the Ohio State Beekeepers Association (see the letter in the Mailbox, by the way), others

Father's Day, 2015.
How Do You ...?

by local charitable groups, some are self-supporting, raising queens, selling nucs and making honey. So some rogue beekeeper from out of state sits his bees down just over the hill from one of these operations and doesn't have to tell anybody, anywhere that he's there. So our local queen producer suddenly has a pile of small hive beetles, *Varroa* out the ying yang, and starts sharing queens that have at least some AHB blood in them. But here's the kicker – to sell queens in Ohio you have to be inspected – you got pests you don't sell queens. And guess what – an Ohio business goes out of business because the state of Ohio doesn't care a whit about beekeeping, honey bees or our local beekeepers. They cut the staff a few years back and to heck with them anymore. The migratory guy comes in, takes our honey, leaves his trash and we're left to clean up his mess.

This has been going on for a bit, but it is escalating. Bees at truck stops, bees messing up our genetic lines, bees terrorizing our citizens. This has got to stop.

The Ohio State Beekeepers should be marching at the Department of Ag with signs and baseball bats declaring that at the very least, at the very least these criminals MUST declare their locations. That we have to move to stay clear of out of state trash is bad enough, but at least we'd know what's over the hill. It's no different than the beekeeper having to cover his hives on his land when the next door farmer sprays. Both of these insults are a hive tool in the eye, and the Ohio Department of Ag supports both and could care less. C O U L D C A R E L E S S.

I know this occurs in other states. I know other Agriculture departments feel the same, and local beekeepers get screwed. And by the way, how is your state dealing with this? Are you, too at the mercy of migratory genes? I read about it a lot on list serves and blogs. One beekeeper is stealing from another because he can. And local queen rearing operations everywhere are just as screwed as we are. This all may be legal, but the ethics stink. How much money is being spent on breeding programs in other states just to have them sabotaged by some greedy out of state thief I wonder? If you got into bees because you want to help the bees, I can't think of anything better that you could do than to stop this practice, in Ohio, and in your state.

Just so you know, this is going to as many people in the Ohio Department of Ag that I can find, and to the Editors of The Medina Gazette and Post, The Record-Courier in Portage County, the Columbus Dispatch, the Toledo Blade and the Cincinnati Inquirer – for starters. Editors, and beekeepers have to stick together you know.

And we beekeepers do have to stick together because If we let this continue, there won't be a local queen raised anywhere in the universe. And every hive will have small hive beetles, *Varroa* out the ying yang, and African bees can quit their migratory behavior. Beekeepers are doing it for them.

•

So, how do you . . . ?

Good friend and popular contributor for over 30 years Jim Tew recently had a book published by a publisher in the UK that had to do with 100 beekeeping questions. He'd pose a question and then offer a succinct answer, solving the problem he had originally asked. Not a lot unlike Phil's column, or the one Gerry Hayes does in . . . that other magazine. It's a good book, and if you haven't yet, get a copy and take a look. He asks questions you never thought of, and then gives answers you'll find useful.

Well, this got me to thinking recently. Some of bee work can be mind-numbingly dull, and a couple weeks ago I was removing the wax off of plastic foundation frames and got to thinking. It's a pain in the butt, and I know there just has to be a better way than I do it, and even my way isn't too bad. I throw all the frames in my rain barrel and let them soak for – as long as it takes for me to get back to the task and quit procrastinating. Usually a few days to a week or so.

When I pull them out, the drawn comb tends to be softer, and lets go of the foundation easier than if you just try and scrape it with a hive tool right out of the box. But it's not perfect, and you will end up with busted knuckles and on occasion the hive tool gets a bite out of you and some frames are dead stubborn.

Now, for the past few years I've been a fairly strong advocate of not using commercially available beeswax foundation. Our tests here have shown thousands of ppb of miticides, sometimes tons of ag chemicals – we have fouled our nest, for sure. So, I start with plastic, let the bees build it out and after two or three years remove it and start over. I tried wax melters, and hot water, but they distort the plastic, so it's soak and scrape for me.

So how do YOU remove old comb from plastic foundation? Send me a short description of what works for you and we are going to start this as a regular feature. And of course I'm quite certain you have problems that need solving differently than the way you are doing them, so send them in too. I'd like to have four or five good answers and four or five good question for every issue. What do you think? Send me your solution to removing wax, and send me a problem or five that you have that we can find answers for. Above, I said beekeepers have to stick together. This is one of the best ways I know how. Send questions and answers to me, **Kim@BeeCulture.com**, with Q&A in the subject line so they don't get mixed in with the 400 or so emails I get every day.

•

I've finished this on the evening of the 4th of July. There's an old axiom about goldenrod – if it's wet the first week of July, you'll have a bumper crop of goldenrod the first week of September. We've had inches and inches and inches – probably feet of rain here in June. The ground is wet. I am anticipating a goldenrod harvest to die for. And now that I have frames to store it in, I'm all set.

Remember, keep your smoker lit, your hive tool handy and your veil tight. You'll do better, and live longer.

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It's Summers Time –

West Coast, Ducks and Travel

We had a great trip to the West Coast. First to Albany, Oregon for the Mother Earth News Fair. As usual it was a great time. This was the first time at this location and from my perspective it worked well. The numbers they are showing for attendance are 10,000 – amazing for the first time.

The Fair was similar to the other MEN's fairs that we have attended, but there is always a local flair. There are three more Fairs this year – West Bend, WI; 7 Springs, PA and Kansas City. If you get a chance to visit one close to you, take the opportunity. You can't imagine all of the things that are on display and for sale. There are over 200 workshops and that many vendors. We saw some pretty odd and amazing things – wicker caskets for sale.

The weather was a little drastic for us – it was 91° the first day. Kim's daughter Jessica picked us up at the Eugene airport and it was about a 90 minute drive to Albany. It is so dry and brown out there, but we saw acres of wild blackberries growing along the side of every road. I'm not sure why we didn't see beehives along side those same roads. We did see beehives in fields of meadowfoam which was also in full bloom.

It was a great time. The best part was getting to spend a few days with Jessica. She lives in southern Oregon and we don't get to see her often enough. After the weekend she drove us to the Portland airport where we took a plane to San Francisco.

It was 100° when we arrived at my sister's house just across the bay from San Francisco. We spent a few days with my sister and my younger son, Matt who lives with her. It was hot, brown and dry there also. The water situation is bad all over the west coast. It has been about four years since there has been any significant rainfall.

After San Francisco we landed in San Diego to visit my older brother who lives in Oceanside – which is pretty close to heaven on earth. It's almost always 72° and sunny. I had to go the ocean. I love the ocean. Kim and I took several walks around my brother's neighborhood just to be outside. Water is a big issue there also, but in spite of that there were flowers and plants blooming in abundance. It was great.

Back home while we were gone it was a rough week for our poultry. We had a young couple house-sitting for us. Four ducks and one of the young chickens went missing one day. No sign of them. Brandyn looked and looked and felt terrible that it happened on his watch. Our neighbor has a pond and in that pond is a snapping turtle. I'm hoping that the ducks took flight and didn't head for the pond. So we're at two ducks, 10 young chickens and eight of the old girls – we lost another one of the old ones after we got home.

Ducks and chickens are very vulnerable. Everything likes to eat chicken. I still think we're doing pretty good. I've talked to some folks who've lost their whole flock to predators – hawks, fox, raccoons.

The ducks are pretty funny. I feel bad that we are down to two. They seem happy enough, and very entertaining. They are now quacking like real grown up ducks and make a lot of noise when exiting the coop in the morning. The ducks and the chickens now co-habitate quite nicely. We've had a little bit of bullying going on, but not too bad. The ducks are the last ones in at night. All of the chickens are in and ready for bed by about 8:30, the ducks stay out til around 9. They will come in when I whistle and call for them.

The ducks are still very skittish about being touched. If we can catch them inside the coop they settle down pretty quickly. Not sure yet if we have males or females – no eggs yet.

More travel is ahead for us. We're off to England and Northern Ireland in just about a week. The trip will be mostly vacation, but Kim is giving one bee talk while we're there. We will be visiting southern England, an area we haven't been to before. After landing in London, we will take a four hour train ride to our destination. I'm looking forward to the train ride. England has a very good railway system. I'm anxious to sit back and look at the countryside. After some time in England we will travel over to Belfast to visit good friends there. It should be a great trip.

On a bit of a sad note we're losing our good neighbor, Luca. Luca is 10 now. He moved in next door when he was five. We've gotten to know him pretty well. I had hoped we would get to watch him grow up, but not to be. The adults that rule his life have decided he's moving back to Michigan. He touched our lives for a short time and hopefully we touched his. Neighbors come and go, sometimes becoming friends, sometimes just neighbors. Kim had the same neighbors – great neighbors – for about 25 years before Luca moved in. Let's hope our next neighbors will be as sweet as he is.

I hope you are having a wonderful Summer, that your bees and gardens are doing well and that you are enjoying life. We've already had our first tomatoes and squash from our garden. Kim always says you should have your first tomatoes on the Fourth of July and we were there this year. Nothing better than that first tomato!

Filtering Honey What Is Best?

Vaughn **Bryant**

Pollen In Honey

What is the best way to filter honey and not lose any of the pollen? I wish I knew the right answer, but I don't. I have been conducting pollen tests on hundreds of honey samples every year for over a decade. I find that some samples appear to contain all of the pollen, some contain part of the pollen, and some contain none of the pollen. So why is the pollen important? First, the pollen is one of the best clues that tell us what nectar sources the bees were collecting to make the honey. Second, the pollen provides a good geographical indication of where the honey was produced. Third, the pollen does provide some nutritional value to those who eat the honey. Fourth, if a honey sample is blended with more than one type of honey or if the honey has been adulterated by adding other liquids such as rice syrup, high fructose corn syrup, or even water, the pollen ratios will often identify that the honey has been altered or blended.

Pollen is an important component in honey. It is estimated that each year over 91 million tons of illegal honey enters the U.S. and the pollen in that honey can often identify the illegal sources. Much of that illegal honey has been transshipped from one country to a second country, which then exports the honey to the U.S. as being a domestically-produced product of the second country. Other honey is sold on the world market to importers who are told the honey is from some specific location and that the honey was produced from some specific nectar source; frequently, both the location and nectar source information is misrepresented either by accident or on purpose. Pollen in honey also protects the consumer by being able to confirm what is represented on the label

Domestically in the U.S. certain honey types command premium prices because they are highly prized by consumers. Fireweed honey from Alaska, tupelo honey and orange blossom honey from Florida, sourwood honey from North Carolina and Virginia, sage honey from California, mesquite and huisache honey from Texas, buckwheat honey from New York, and many other premium types are sold from roadside stands, at farmer's markets, and in some local grocery stores. Unfortunately, many of those types, which I have tested, contain no pollen because they were over-filtered. Therefore, it is difficult to authenticate that those products are actually what is inside the jar, as claimed on the label. This also makes the consumer less willing to pay higher prices for premium honey types that cannot be verified as being accurate.

Many local beekeepers send samples of their honey to me for testing because they are either curious what nectar sources it contains, or they want to be sure to label their honey accurately so their customers can be assured of the quality as stated on the label. Unfortunately, many of those samples that I test do not contain pollen because the pollen was accidently removed by some filtering technique. Many times when I contact the beekeeper who sent me the honey they are shocked to discover they accidently removed some, most, or all of the pollen from their honey.

Filters

There are many types of commercial filters that are sold to beekeepers and those filters are then used to remove unwanted dirt, bee parts, wax, and other impurities from extracted honey. Many of the beekeepers want to remove those impurities from their honey but they do not want to remove the pollen. Unfortunately, the filtering techniques many of these people are using does remove the pollen. Many, many times beekeepers ask me "What is the best way to filter my honey and not remove the pollen?" Frankly, I don't know what to tell them because I don't know what is the best method to use. I mention that pollen grains are smaller than 200 micrometers and thus a filter with openings larger than that should not remove pollen. However, some people tell me that is what they are using, but still their honey samples have lost the pollen. Some people say they use cheesecloth, some say they are using various types of screens, using various types of open weave fabrics, or sometimes they say they use the screens often used for flour sifting. Apparently, some of these people must be doing something else to their honey samples or their filters are getting clogged and trap pollen because the end result is a loss of pollen.

HELP!

We need your help in searching for the best and least expensive honey filtering technique that will remove unwanted impurities but will not remove the pollen. Our problem is that we don't know what that best technique might be. This is where you, the beekeepers, can help us solve this problem.

What we propose to do is to ask a number of beekeepers, **but no more than about 20 or so individuals**, to tell us exactly how they filter their honey from the time it leaves the hive until they bottle it for sale. Along with that information we will need a small amount (about 25 grams) of honey that comes directly from the hive before anything else is done to it. We will also need another sample of that same honey after it is filtered and when it is ready for marketing. The comparison of the pollen types and the percentages of each pollen type in the samples before and after the filtering process will help determine which techniques are the best suited for removing the impurities in honey, but do not remove any of the pollen from the processed honey.

We realize that there may be hundreds of people who might be willing to help in this experiment, which is wonderful. However, it is expensive and time-consuming to do these pollen tests and thus we must limit the number to 20 or fewer specific types of filtering techniques. Therefore, what we propose is that for those individuals who are interested in helping, we would like them to send an outline of exactly how they filter their honey and what **specific filtering equipment** they use. The type of information we will need includes things such as: is it a gravity filter, a centrifugal filter, what is the opening size of the filtering screen or cloth being used,

is one layer or multi-layers of material being used, is the honey heated to speed filtering, is the filtering screen frequently cleared of debris, and any other factor that may affect the process.

From these initial responses we will select a number of different filtering types and different techniques in an effort to test a diverse group of techniques in hopes that one or more of them will prove to be the ideal method for filtering honey. For those selected individuals, I will respond with a positive request for them to please collect the before and after honey samples, please provide detailed information of their filtering, include photos of the entire process, identifying make and model of uncapper, extractor, filter, piping if any, pumps and storage tanks. If you are unsure, at least be able to provide a photo of each step. If using material providing a sample would be ideal and also ship me the samples for analysis. If you are using a commercially purchased filter – any size, make, model – please include where purchased, any information included when purchased and when you purchased it. As a reward for this effort, we will provide each selected participant with an analysis of what I find in their sample and I will also identify the nectar sources in their sample, provided the filtering technique that was used did not remove the pollen.

After the study is completed, the results will be reported in a future issue of *Bee Culture* Magazine.

Thank you, Vaughn. BC

FILTER TEST FORM

ATTENTION: For both samples please send honey samples that are at least two (2) ounces each.

Name _____

Address _____

Phone _____

Email _____

County/State where the hive and sample were collected _____
(Collected from uncapped comb)

Date collected _____
(Collected sample on this date from uncapped comb)
(Labeled PRE-FILTERED- your first & last name here)

Uncapping equipment (please include photo EMAIL ONLY NOT PRINTED COPY) _____
(make, model, source)

Extraction equipment (please include photo EMAIL ONLY NOT PRINTED COPY) _____
(make, model, source)

Pump, if used between extractor and filter (photo included EMAIL ONLY NOT PRINTED COPY) _____
(make, model, source, age)

Honey strainer/filter used (please include photo EMAIL ONLY NOT PRINTED COPY) _____
(make, model, source, age)

If filter is plastic or metal skip next question, but answer rest of the form

FILTERS OF CLOTH OR SIMILAR MATERIAL:
Please send small sample if possible
Mesh size of openings in millimeters (if known) _____
Layers used: single, double, or triple? _____

FILTERS-PLASTIC-METAL OR BOTH: Two or three filter-mix combinations (i.e. collider and nylon mesh, course and fine metal strainers, plastic mesh strainer, other. (Please include photo of combo unit, and names of make(s), model(s), and source(s))

POST-FILTERED SAMPLE: Sample collected immediately after passing through all filtering devices but, before entering into a storage container.
(Please be sure to label both the PRE and POST filtered sample – your first and last name here)

Return this form, as hard copy to
Att'n FILTER TEST
Kim Flottum
623 W Liberty St
Medina, OH 44256
Or email to
Kim@beeculture.com
Subject line FILTER TEST

Western Apicultural Conference

The CSBA is pleased to host the Western Apicultural Society annual conference. The conference will be held in Bee-utiful Boulder, Colorado on October 1-3, 2015 at the Millennium Hotel.

The conference theme is "Putting the Bee in Boulder" and we are indeed! The first two days will be "Healthy Bee" and will focus on topics supporting bee health. The final day is "Bee Healthy" and is focused on bees and human health/interaction and will be a community celebration featuring the ABF's "Kids and Bees" program as well as Matt Camper from CSU performing a "bee beard" (or two).

Flying to Denver is an inexpensive proposition. Tickets from Seattle ($220 RT), Portland ($175 RT), Phoenix ($180 RT), Salt Lake City ($200 RT), San Francisco ($300 RT), and Los Angeles ($200 RT). Not bad at all.

The conference pre-activities will start with National Honey Month. The National Honey Board, Colorado State Beekeepers Association (CSBA), along with the Boulder Convention and Visitors Bureau and the Downtown Merchants Association will be holding a honey craft cocktail contest with the winner being served at the Bee Buzz Social on Wednesday evening at the CU Museum of Natural History!

We have a full schedule of top-notch speakers, with something for everyone, beginners to intermediate/advanced beekeepers. There will be talks on other subjects relating to bees – forage and programs by folks helping bees and pollinators. We'll have speakers for lunch and dinner, along with additional tour options for WAS members. From Banjo Billy's Bus Tours of Boulder to Rocky Mountain National Park from the Butterfly Pavilion and the Denver Botanic Gardens to the Celestial Seasonings tea tour.

Conference Schedule Highlights

Wednesday, September 30

The conference will begin on Wednesday afternoon with a Board of Directors meeting followed by the "Bee Buzz Social" on the CU campus, Museum of Natural History, with its bee collection of over 900 species. Alex Rose will speak briefly on the "Bees Needs" citizen science program. Honey craft cocktails and hors d'oeuvres will be served.

Thursday, October 1

The conference goes into full swing with Elina Lastro Nino of UC-Davis. She will be joined by Jim Doan and Mark Winston as well as our partners at the Honey Bee Health Coalition and the Pollinator Stewardship Council. We will break into beginner and intermediate tracks for the balance of the afternoon. The Trade Show will get underway, too. Dinner will be on your own and the Next Generation Beekeepers conference will get fired up long about the time the rest of us will be "hitting the sack."

Friday, October 2

The Friday speaker line-up is every bit as strong as Thursday with Susan Kegley of the Pesticide Research Institute, Peter Loring Borst of Cornell University and Jonathan Lundgren of USDA set to entertain and educate us. We will again break into beginner and intermediate tracks for the afternoon. The Banquet and Award ceremony will be held at the hotel this evening and will present a terrific opportunity for you to hobnob with the speakers.

Saturday, October 3

On Saturday, the focus of our conference will change from "Healthy Bee" to "Bee Healthy" and a community-wide celebration will begin! The morning sessions will feature several mainstream physicians who are using honey for general human health as well as for wound care. Dr. Marla Spivak, MacArthur Fellow and head of the University of Minnesota Bee Lab, will join us for lunch. The ABF Kids and Bees program will be available for the youngsters. There are FIVE different tracks available for conference attendees in the afternoon ranging from Apitherapy to Book Signings, Gardening for Pollinators to a "Who's the Fairest of Them All" session featuring some of the country's finest bee breeders. Don't forget the Bee Beards!!!!!

The Farm-to-Table dinner will be seating in the early evening and will feature renowned southwest gardener, Lauren Springer Ogden, as the keynote speaker. Come hungry!!! And let Boulder's finest farms tantalize your palate. (And if you are the winner of the Homecoming game tickets between the Oregon Ducks and the CU Buffaloes, we'll miss you!)

Sunday, October 4

The CSBA is pleased and honored to host the 2015 WAS conference. We hope you will join us! Come for the conference, stay for the experience.

To stay in touch or to register for the WAS Conference visit **www.westernapiculturalsociety.org**. BC

A Closer LOOK

HONEY BEE VISION

Clarence **Collison**

The two large compound eyes are complex visual organs capable of a wide range of photoreceptive functions.

Honey bee visual perception is associated with two types of eyes, the simple eyes (ocellus, ocelli) and the compound eyes. Both are located on the facial region of the head. The three small ocelli are arranged in a triangular pattern and are located on the top of the head in the worker and queen and more anteriorly in the drone (Goodman 2003). The ocelli cannot focus or make images and appear to function solely to detect light intensity, possibly to regulate diurnal activity patterns or for orientation. The two large compound eyes are complex visual organs capable of a wide range of photoreceptive functions (Winston 1987). Each compound eye is made up of around 5,000-6,000 ommatidia or facets in the worker, 3,500 in the queen and 10,000 in the drone (Goodman 2003).

Ommatidia are covered externally by a cuticular lens (cornea). Each lens is seen to be an elongate prism only slightly convex on its outer and inner surfaces. The ommatidia lie close together in the eye, but they are separated and optically isolated by intervening pigment cells; they taper inwardly and converge to the narrowed outer end of the optic lobe of the brain (Figure 1). The surface of the cornea is differentiated into six-sided facets corresponding with the outer ends of the ommatidia. The narrow rims of the facets are opaque, but the central areas are transparent and constitute the lenses of the ommatidia (Snodgrass 1956).

Beneath the lens lies the transparent crystalline cone which extends downwards for about 100µ. Its diameter decreases from about 20µ near the lens to about 4µ where it meets the rhabdom. The crystalline cone is secreted by four cells (Varela and Wiitanen 1970).

Below the cone, and in contact with its apex, is a bundle of eight or sometimes nine long retinula cells, also surrounded by pigment cells. The pigment cells of the ommatidium appear to serve to exclude the light which enters neighboring ommatidia, thus insuring that stimulation is applied only by the light entering the individual unit. The edges of the retinula cells, which meet in the axis of the ommatidium, combine to form a long narrow rhabdom, like a transparent rod running down to the proximal end. The rhabdom is striated and it appears that its function is to divert the light which travels through it laterally into the cells. At the narrow, proximal end of the rhabdom, nerve fibers from each of the retinula cells pass through the basement membrane and into the optic lobes of the brain (Dade 1962).

The compound eye is equipped with ultraviolet, blue and green receptors, which form the physiological basis of a trichromatic color vision system (Avarguès-Weber et al. 2012). The visual pigments present in each photoreceptor cell are localized in microvilli which are oriented toward the central axis of the ommatidium and form a photoreceptive rhabdomere. The R1-9 rhabdomeres build together a fused rhabdom along the central axis of the ommatidium. The main photoreceptors R 1-8 contribute to the microvilli along the entire length of the rhabdom, but the basal cell R9 contributes to microvilli only at the base of the ommatidium. Three types of photoreceptors, S, M and L (for short-, mid- and long-range wavelength), peaking in the ultraviolet (344 nm), blue (436 nm) and green (544 nm) regions of the spectrum, respectively, have been identified in the honey bee retina (Peitsch et al. 1992). Bees use color vision to both detect flowers as they forage and to discriminate between rewarding and non-rewarding flowers (Hempel de Ibarra et al. 2001; Dyer and Neumeyer 2005).

"The compound eye of the drone has a specialized region of acute vision."

Wakakuwa et al. (2005) studied the distribution of the spectral receptors within the compound eye by localizing the three mRNAs encoding the opsins of the ultraviolet-, blue- and green- absorbing visual pigments. The expression patterns of the three opsin mRNAs demonstrated that three distinct types of ommatidia exist, refuting a common assumption that the ommatidia composing the honey bee compound eye contain identical sets of spectral receptors. They found that type I ommatidia contain one ultraviolet and one blue receptor, type II ommatidia contain two ultraviolet receptors and type

Kelley Beekeeping

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Bee Health Kit

As a beekeeper, if you are unsure of what you need to keep your bees healthy we have tried to combine all of the basic and necessary products that you will need on hand.

Contains: 2 pack of Mite Away Quickstrips, .5 gram fumigillin, 8 oz. Honey Bee Healthy, 50 gram pack of menthol, nitrile gloves, measuring spoon, and beekeeping log book.

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8 oz. Honey B Healthy

Honey-B-Healthy is a feeding stimulant composed of lemongrass and spearmint oil concentrate. It promotes healthy vigorous hives. Use it in early spring, late winter, and during nectar shortages. Our exclusive 8 oz size is perfect for 1 to 2 hives.

8 oz (.65 lbs) **..... 7708..... $15.50**

"The ocelli or simple eyes are structurally and functionally very different than the complex compound eyes."

III ommatidia have two blue receptors. All three ommatidial types contain six green receptors. The ommatidia types appear to be distributed rather randomly over the retina. The ratio of type I, II and III ommatidia was about 44:46:10. Type III ommatidia appeared to be slightly more frequent (18%) in the anterior part of the ventral region of the eye.

The surface of the compound eye, especially in young bees, is covered with long unbranched mechanosensory hairs arising from the rims of the facets (Snodgrass 1956). These hairs are set in sockets and innervated at the base of the shaft. The neuron is stimulated by movement so that the bee is aware of anything touching the surface of the eye (Goodman 2003).

Images are produced by the central nervous system integrating the signals from the individual facets into a mosaic image. Since each facet diverges angularly only about 1° from its neighbors, the mosaic pattern is particularly well adapted for detecting movement. In addition to visual motion perception, the compound eyes can perceive airflow using sensory hairs arranged at the junctions of the facets (Winston 1987).

The compound eye of the drone has a specialized region of acute vision. The drone uses the dorsal region of its eye to detect, fixate and approach the queen from behind and below during mating, having to locate her against the vast area of the sky. The drone's eye is divided into three distinct areas (Menzel et al. 1991). The dorsal two-thirds, through which it views the queen is less curved and the facet lenses are larger resulting in interommatidial angles of 1°-2° compared with 2°-4° in the ventral region. Smaller ommatidial fields of vision would result in the entry of less light to each ommatidium and thus less contrast in the image formed, but contrast sensitivity needs to be high to discriminate the small silhouette of the queen. Other modifications to the eye compensate for the smaller ommatidial fields of vision. The enlarged facet diameter allows more light to enter, and as the photoreceptor cells are longer and wider in this part of the eye, they contain a greater volume of the visual pigment. This increase in volume produces twice the contrast sensitivity of the ventral region of the eye and twice that of the worker eye (Goodman 2003).

The compound eye in addition to forming mosaic images can also use the pattern of polarized light in the sky for navigational purposes. Recent behavioral, electrophysiological and anatomical studies have revealed the mechanism of how bees sense and use polarized light (Goodman 2003).

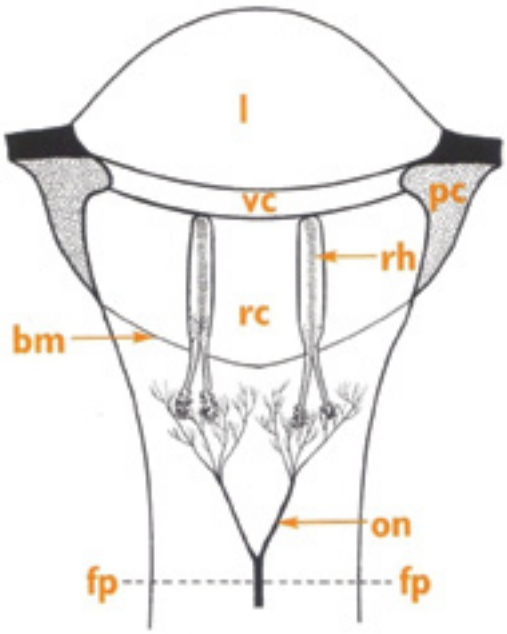

Figure 2.- Longitudinal section through the median ocellus of the worker showing the lens (l) overlying a transparent layer of vitreous cells (vc) and the layer of retinal cells (rc). Two pairs of retinal cells are shown in this layer. The inner border of each cell is lined with microvilli forming the cell's rhabdomere. The rhabdomere of the two cells are fused together to form the rhabdom (rh). Bm = basement membrane. On= ocellar neurons. Fp = focal plane. Pc = pigment cells. (Goodman 2003).

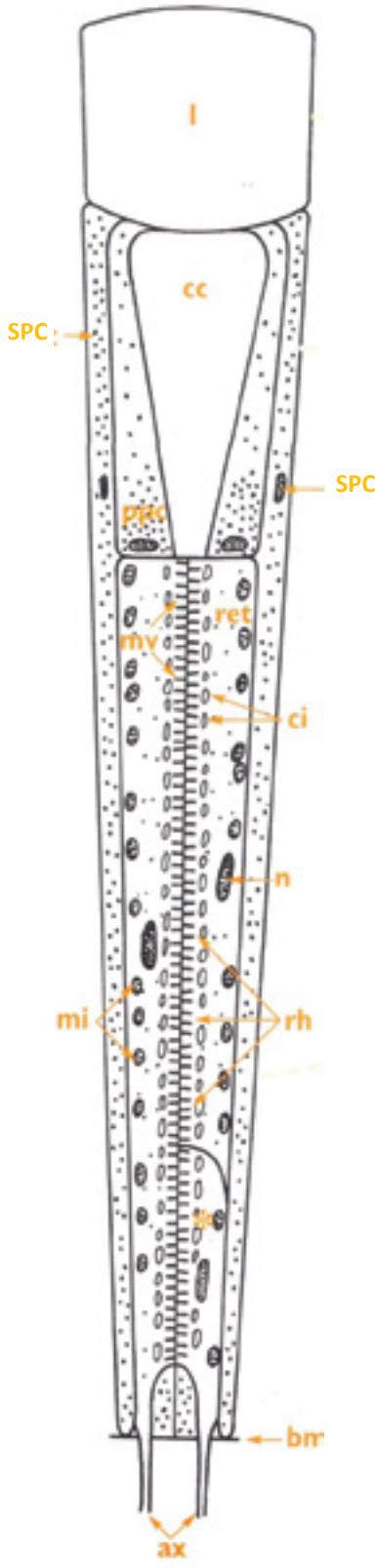

Figure 1.- *Longitudinal section of an individual ommatidium of a compound eye. l = lens; cc = crystalline cone; mi = mitochondria; rh = rhabdom; bm = basement membrane; ppc = primary pigment cells; mv = microvilli; ret = retinula cells; ax = axons; spc = secondary pigment cells; ci = cisternae; n = cell nuclei. (Goodman 2003).*

The polarization-sensitive retinal cells are located in a narrow band of ommatidia, two to three deep, lying around the dorsal rim of the compound eye (Schinz 1975; Labhart 1980). The ommatidia in this band are slightly larger in appearance and their optical axes are arranged so that the majority of them view the contralateral half of the sky, looking frontally or upwards in directions close to the zenith. The corneal lenses of these ommatidia are penetrated by fine canals. Scattering or reflection of light off these canals means that light hitting the corneal lens off axis is also able to reach the rhabdom. Because of this, the ommatidia each collect light from a larger area than the ommatidia in the rest of the eye. The ommatidia of this dorsal rim differ from those of the rest of the eye in other respects. The ninth retinal cell, shorter in other ommatidia, is the same length as the other cells in this region. Most importantly, the parallel array of microvilli on the inner border of each cell maintains its direction of orientation down the whole length of the rhabdom. The ultraviolet sensitive cells of this area form the primary polarization analysers, and each UV-sensitive cell is maximally sensitive to polarized light vibrating parallel to its microvilli.

The ocelli or simple eyes (Figure 2) are structurally and functionally very different than the complex compound eyes. The lenses of the ocelli are divided into a dorsal and ventral part by a cusp-shaped indentation. The retina is also divided, with a ventral retina looking skywards and a dorsal retina looking at the horizon. The focal plane of lenses lies behind the retina in lateral ocelli, but within the dorsal retina in the median ocellus of both workers and drones. Each ocellus of the worker has about 800 elongated retinular cells (Toh and Kuwabara 1974). Ventral retinula cells are ca. 25 µm long with dense screening pigments. Dorsal retinula cells are ca. 60 µm long with sparse pigmentation mainly restricted to their proximal parts. Pairs of retinula cells form flat, non-twisting rhabdom sheets with elongated, straight, rectangular cross-sections, on average 8.7 µm long and 1 µm wide. Across the retina, rhabdoms form a fan-shaped pattern of orientations. In each ocellus, ventral and dorsal retinula cell axons project into two separate neuropils, converging on few large neurons in the dorsal, and on many small neurons in the ventral neuropil. The divided nature of the ocelli, together with the particular construction and arrangement of rhabdoms, suggest that ocelli are not only involved in altitude control, but might also provide skylight polarization compass information (Ribi et al. 2011).

A number of studies have shown that the dorsal ocelli of worker bees are involved in the light-dependent aspects of foraging behavior (Pan and Goodman 1977). The onset and cessation of foraging activity is dependent upon light level. When the bee's dorsal ocelli have been covered they begin foraging later and cease earlier than normal bees. The light intensity required for the first and last collecting flights is increased by a factor of 4.5 if all the ocelli are covered. It has been suggested that the ocelli are providing the bees with information concerning either the absolute brightness level or the rate of change of brightness at twilight. Behavioral experiments have shown that locomotor activities, orientatory movements and flight speeds are affected by illumination of the ocelli (Suzuki et al. 1976). BC

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The Pollinator Stewardship Council

A POLLINATOR PROTECTION PLAN

Does your state have one.

Michele **Colopy**

The "Report of the Association of American Pesticide Control Officials (AAPCO) Committee on Managed pollinator protection plans" published in February of this year clearly states the:

> *Development and implementation of managed pollinator protection plans depend on effective engagement of the stakeholders. This involves direct meetings of beekeepers, crop producers, landowners, crop advisors, and others as needed. Identifying and engaging stakeholders can be a hurdle for plan development. Identification of beekeepers requires knowledge of the structure of the beekeeping industry, with outreach to commercial beekeepers, small scale honey producers or pollination operations, and hobbyists.*
>
> *The objective, to the extent possible, will be to build a broad stakeholder consensus on effective strategies for protecting pollinators that are the least disruptive to production agriculture and other affected stakeholders. The first objective is to identify approaches used to engage stakeholders and provide for public participation*

State beekeeping associations are integral to any pollinator protection plan impacting the honey bees in their state. Beekeepers must be part of the process in developing these pollinator plans. The National documents promoting the development of these Plans were released just as the beekeeping season began. Find out if your state is developing or revising their pollinator protection plan. The Pollinator Stewardship Council has a number of the support documents compiled on our website (**http://pollinatorstewardship.org/?page_id=2816)** from AAPCO, EPA, and from the few states who have completed their plans. We also created a chart listing state efforts concerning pollinator plans. You can compare and contrast each state, review what your state has or has not accomplished, and who to contact to start the process or be a part of the process in your state. We hope this will assist State beekeeping groups, and state pollinator stakeholders in developing their plans.

Not all mitigation efforts will be transferable from one state to the next, based on each state's geography, crop diversity, and funding for pollinator plan support, administration, and/or enforcement. As we work to protect our managed and native pollinators we must remember:

- the pesticide label is the law;
- if a pesticide label states "do not apply to blooming crops or weeds," that is federal law;
- voluntary registrations of bee colonies, sensitive crops, etc. are *voluntary* with no enforcement mechanism to ensure their purpose;
- moving bee colonies with a 24-48 hour notice is not a reasonable mitigation measure. Migratory beekeepers may not be able to return to that beeyard in order to move hives, as they may be out of state pollinating another crop. Most importantly, where is the safe place for the beekeeper to move their honey bees?
- native pollinators are *not* notified of pending pesticide applications, and instead are sacrificed; reducing crop yield, and reducing the diversity of the landscape.

We can protect crops, and protect pollinators. We can protect human health, and protect pollinators. While MP3 plans have been focused upon pollinators in agriculture, beekeepers working on these state plans must also be cognizant of the exposure of honey bees and native pollinators to urban and suburban applications of pesticides for mosquito control, and pesticides used on lawns and backyard gardens. Beekeepers need to be involved in their local mosquito control boards to ensure honey bees are protected to pollinate backyard gardens, community gardens, and our city parks.

Some of the initial pollinator protection plans did not differentiate between managed and native pollinators. The plans sought to protect *all* pollinators. Research tells us native pollinators deserve protection, as they too contribute to increased crop yields, and support the diversity of a healthy ecosystem. Our 4000+ native pollinators are a national treasure deserving protection with managed honey bees. Economic research concerning native pollinators found "California agriculture reaps $937 million to $2.4 billion per year in economic value from wild, free-living bee species . . . About one-third of the value of California agriculture comes from pollinator-dependent crops, representing a net value of $11.7 billion per year . . ." The study estimated "wild pollinators residing in California's natural habitats, chiefly rangelands, provide 35-39 percent, or more than one-third, of all pollination "services" to the state's crops."

Is *Your* State Developing A Pollinator Protection Plan? It's *Your* Bees That Will Be Protected!

According to Dr. Nick Calderone of Cornell University, "The total value of commodities that require pollination was about $81.5 billion in 2010. Honey bees were responsible for $19 billion (23%) and other insects (mostly leaf cutting bees) accounted for another $9.8 billion (12%)." Researcher Krishna Ramanujan reported in the *Cornell Chronicle* that "honey bees pollinated $12.4 billion worth of directly dependent crops and $6.8 billion worth of indirectly dependent crops in 2010. Other insects, including alfalfa leaf cutter bees, bumblebees, horn-faced bees and orchard bees, added $4 billion and $5.9 billion in directly and indirectly dependent crops, respectively."

We can protect native pollinators in the State Pollinator Protection Plans. The mitigation efforts to protect managed pollinators will protect native pollinators.

As stakeholders come together, the following should be part of the plan to protect managed and native pollinators:

- extended residual toxicity and/or systemic pesticides should not be applied to pollinator attractive crops or weeds in bloom
- when applying pesticides during bloom use short residual toxicity products and apply at night
- Commercial beekeepers should be permitted access to pesticide-free pollinator forage on public lands (or on lands receiving short residual toxicity pesticides applied at night)
- moving or covering hives so pesticides can be applied is *not* a reasonable mitigation strategy (except in *rare* circumstances)
- IPM practices need to be followed according to those best management practices
- mitigation efforts to control for mosquitoes can protect human health and pollinators through night applications and use of short residual toxicity products
- mosquito control products should be applied at night when most mosquitos are most active, and pollinators are not. Even though the federal pesticide label allows for exceptions to application guidelines for public health, pollinators and human health can be protected through night applications of short residual toxicity products.
- the Federal Pesticide Label shall be followed regardless of the mitigation measures included in a State MP3 Plan.

"For fruit or nut bearing crops, pollination can be a grower's last chance to increase yield. All post pollination inputs, whether growth regulators, herbicides, fungicides, or insecticides, are generally designed not to increase yield but to conserve losses." "Pollinator: a grower's last chance to increase yields,"

The Univ. of Georgia, College of Agricultural and Environmental Sciences

Beekeepers need to keep their bees healthy from crop to crop, from Winter to Spring. Beekeepers need to keep queen bees healthy, strong, fertile, and surviving from crop to crop, from Winter to Spring.

Cities need to protect their citizens and animals from mosquito-borne diseases. And beekeepers have

a need to protect their honey bees from bee toxic pesticides – including herbicides, fungicides, insecticides, adjuvants, surfactants, and the "inert ingredients" in pesticide products.

Farmers need their vegetables, fruits, nuts, and seed crops pollinated in order to have a profitable harvest. Farmers need to protect their crops from 5% of the insects that are harmful to crops and humans.

> *"For fruit or nut bearing crops, pollination can be a grower's last chance to increase yield. All post pollination inputs, whether growth regulators, herbicides, fungicides, or insecticides, are generally designed not to increase yield but to conserve losses."* "Pollinator: a grower's last chance to increase yields," The Univ. of Georgia, College of Agricultural and Environmental Sciences

Pollination affects all of us: the beekeeper, farmer, food wholesaler, food retailer, and food consumer. We must all work together to develop reasonable, agreeable, fair State Pollinator Protection Plans. Beekeepers alone should not bear all of the burden of moving their bees away from pesticides, and a crop in need of pollination, trying to find pesticide-free bee forage to provide high-quality nutrition for their bees, paying for lab testing of bees allegedly harmed by pesticides. Nor should beekeepers be responsible for educating others as to the toxicity of pesticide products to bees. The federal pesticide label contains that information. Applicants must read the entire label before using any pesticide product.

While it would be easier for the Environmental Protection Agency to compile one MP3 plan for the entire country, it is unrealistic. States need to bring together all of the stakeholders, and create a Plan that reflects their state, their crops, their apiary programs and apiary research. The MP3 planning process is an opportunity to evaluate the state apiary program for funding, staffing, and the creation of a state apiary program if the state does not have one. The MP3 planning process is an opportunity for each stakeholder to learn from each other; to realize without pollination there is no crop yield: be it wind, rain, self-pollination, or insect pollination. Facilitators of the MP3 planning meetings must be willing and capable to bring the stakeholders together, to listen to all the needs of the all of the stakeholders, and to guide the stakeholders into developing actions which will result in a strategy where the MP3s are truly Managed Pollinator Protection_Plans that everyone can support, so everyone can live. BC

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BEE HEALTH DEPENDS ON COMMENSAL MICROORGANISMS.

Introducing Strong Microbials DFM Honeybee, concentrated direct-fed microbial supplement.

Variables affecting honeybee colony health. Honeybee colony health worldwide is considered to be in decline. A 2012 causal analysis workshop by honeybee experts focused on this problem identified nutrient deficiency as a possible cause, with infections and pests as other possible causes[1].

Important functions of commensal microbes. Nutrient absorption in the gut, as well as food preservation, requires commensal microorganisms. Besides digesting and fermenting food, commensal microorganisms synthesize essential B vitamins, and aid in defense against pathogens.

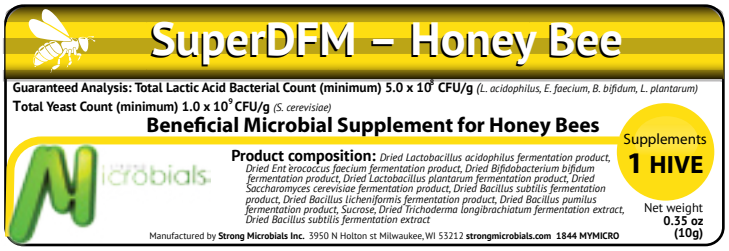
Commensal microbes help develop immune system[2], reduce inflammatory disease[3], promote longevity[3].

Chemical treatments suppress commensal bacteria. Preventative use of antibiotics and antimicrobials is widespread in commercial beekeeping practice to reduce infections. In addition to pathogens, **antibiotics and antimicrobials decimate the native hive microbial community, leading to dysbiosis.**

Feeding direct-fed microbial supplement restores commensal microorganisms. DFM (direct-fed microbial) is a mix of live concentrated bacteria and enzymes. DFM is **fed dry** by mixing with powdered sugar and sprinkled over top bars of brood chamber. DFM is applied two weeks **after** any treatments for nosema, foulbrood, varroa and two weeks after any essential oil treatment.

Our DFM ingredients include:

- Commensal *Lactobacillus* and yeast that aid in digestion of pollen and fermentation of beebread[4-7];
- Commensal *Bacillus*. *Bacillus* species found in hive environment exhibit potent fungistatic activity[8-10]. *Bacillus* species can specifically suppress pathogens that cause honeybee diseases chalkbrood, nosema, and foulbrood[11].



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BEATING THE HEAT

Keep Cool When Temperatures Rise

Kaitlin **Newcombe**

With Summer well underway, it is important to take proper precautions while working outside in the apiary. Full beesuits provide adequate protection from direct sunlight but they may also restrict cooling air flow around the body. The human body strives to maintain homeostasis – in other words, it desires to regulate internal systems as well as an inner core temperature. The regulation of the body's internal temperature is known as thermoregulation. Improper thermoregulation may occur in people of any age and could lead to cardiac distress.

Know the signs

Two identifiable forms of improper thermoregulation are **heat exhaustion** and **heatstroke**.

Heat exhaustion occurs when sweating, your body's natural way of cooling itself, is no longer enough to keep you cool. Some common symptoms of heat exhaustion are: weakness, confusion, dizziness, nausea, fatigue, and dark-colored urine.

Heatstroke occurs when the body's internal temperature reaches 104˚F (40˚C) or higher. Heatstroke is more severe than heat exhaustion and can occur suddenly. Importantly, you can experience heatstroke without experiencing heat exhaustion. Common characteristics of heatstroke include: fever, severe headache, nausea, vomiting, flushed skin, confusion, disorientation, hot and dry skin, fainting, and seizures. Symptoms for heat exhaustion and heatstroke are generally the same for children, adolescents, and adults.

Treatment of heatstroke and exhaustion

If an adult or child is experiencing symptoms of heat exhaustion, move them to a cool place such as an air-conditioned indoor area or a shaded area outside. Remove excess clothing, especially if the person is wearing a beesuit. Have the affected individual lie down and slightly elevate their feet. If the individual is alert and the resources are available, place them in cool bath water or if outside, spray them with mist from a garden hose. Ice packs can also be applied to the person's armpits, groin, neck, and back. Cooling these specific areas can help the person cool down overall since these areas contain many blood vessels that are close to the surface of the skin. If the person begins to vomit, turn them onto their side to prevent choking. When an adult or child begins to experience symptoms of heatstroke, **contact emergency medical services immediately** and provide the same treatment as above until personnel arrive.

Prevention is key

Both heat exhaustion and heatstroke are preventable. Wear lightweight, light-colored, loose-fitting clothing to allow airflow around your body. Drink plenty of water and avoid drinking beverages that contain caffeine or alcohol. Try to schedule outdoor activities for cooler times of the day – generally before 10:00 a.m. and after 4:00 p.m. While outside, do not overexert yourself. Take plenty of breaks in cool, shaded areas and drink clear fluids every 15-20 minutes, even if you're not thirsty. Some allergy medications, blood pressure and heart medications, amphetamines, laxatives, antidepressants, seizure medications, and water pills (diuretics) can make you more susceptible to heatstroke because of how they can affect the body's response to heat. Any concerns should be discussed with one's doctor. BC

Kaitlin Newcombe is a student currently studying civil and environmental engineering at Case Western Reserve University in Cleveland, Ohio. She is a Student Member of the American Society of Civil Engineers (S.M.ASCE).

FIVE STEPS THAT EVERY BEEKEEPER SHOULD FOLLOW

1. **Plan your work conditionally**. Pay attention to the temperature, heat index, and humidity for each day. You may not be able to spend as much time in the apiary one day as you did another day. As always, your personal health and safety come first.
2. **Alert others of your plans and location(s)**. Have at least one contact person who would be able to provide aid in case of an emergency. Call that person every 30 minutes to an hour (depending on how long you are outside) and check in with them. If they do not receive a call or some sort of notification around the set time and are unable to contact you then they should go out to your location and check on you.
3. **Stay hydrated**. Bring plenty of clear fluids with you to drink throughout the day and leave them in a cool or shaded place. Take a few sips every 15-20 minutes, even if you're not thirsty. If you plan to be outside for an extended period of time on a certain day then begin hydrating and drinking excess water one to two days in advance.
4. **Take frequent breaks**. Do not overexert yourself. Take a break in a cool, shaded area outside or in an air-conditioned area inside. Remove any bulky items that could restrict air flow around you. Check for signs of possible heat exhaustion or heatstroke.
5. **Contact emergency personnel immediately if you begin to feel ill.** If you experience symptoms of heat exhaustion or heatstroke then contact emergency medical services immediately and alert them of your location and symptoms. After contacting EMS, alert your personal contact of your location and have them provide medical care until EMS arrives.

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Perpetual Motion Change Of Behavior

Terry **Lieberman-Smith**

According to the scientific community, a perpetual motion machine cannot exist because it violates two laws of thermodynamics. However, education is in perpetual motion and its ripple effects can be felt for years on end. George Imrie's "Pink Pages" are still being read today, as are Dr. C.C. Miller's writings. Thanks to electronic media, our world is inundated with a proliferation of information, misinformation and "me" information. In order to cut through all the clutter, beekeeping organizations must develop a self-sustaining, perpetual motion educational system that provides timely and accurate information to beekeepers in their area.

While many corporations employ a Train the Trainer methodology by sending select employees to learn and then share the knowledge with co-workers, in our type of volunteer organizations, we rely on whoever raises their hand. Sometimes the volunteers put their own agendas, which can range from, "sounds interesting" to "I can now rule the world" before that of the club. Another issue with a volunteer organization is the frequent turnover of leadership. So how can we set up a perpetual motion educational system based on volunteers?

You need to develop a model that doesn't solely rely on spreading the information as an oral history. Oral history has a tendency to be modified, like the game of Telephone. The initial phrase winds up to be something completely different by the end of the game. The information in the program you design must keep its integrity over the course of the life of the program. One way to do this is to make the system available on a variety of teaching platforms.

The point of this type of educational model is to provide an ongoing opportunity to change the behavior of beekeepers. We are not trying to motivate, rather we want to *change* behavior. Motivation is an external force that has limited long-term impact. We all know that motivation to be a better beekeeper ends the minute you open the hive and you are rushed for time. Motivation ends when you are not prepared before your hive visit and your dirty hive tools spread disease and your record-keeping notebook is somewhere in the house.

By changing beekeeper behavior we can become better beekeepers with lower levels of hive mortality. The topic for your education model cannot be vague, it has to be precise. Something such as "Sustainability" is too broad, while "Insulating Methods for Winter Survival" has a more defined focus.

After the change of behavior topic is selected, you must select the format of the finished product. Are you creating a manual, a class, a training video, something short for YouTube, an app, or something brand-new? What mode will have the highest saturation and greatest longevity? A self-contained manual, like a book is great for general information, however I must admit I have lots of books on my bookshelf whose pages have never seen the light of day, or a lightbulb. I buy them hoping someday I'll have time to read them, but the life of this beekeeper is crazy busy. Therefore with all best intentions of the author and purchaser, that great information is still sitting on the shelf not changing any behavior.

One of the many teaching paradigms is "Tell them, Show them, Let them learn." The three forms of learning build a strong platform for behavior change, and offer many formats for the final product.

For the Tell Them segment, there needs to be some sort of classroom-type session. A manual would be created for attendees to take home and use as a resource guide. Classroom education is limited to teacher time, classroom availability, and the disposable income of local beekeepers. An all-day class with two instructors and 40 students still does not reach a high saturation level given the number of beekeepers in any county or state. A one and done class by definition, is not perpetual motion. As I mentioned earlier, since most beekeepers are not instructors, the information that they learn in class may or may not be disseminated accurately, or shared at all. A multi-hour video program would require a lot of bandwidth, and may not attract a wide audience. However, many people believe that the standard classroom setting with student-teacher interaction is one of the best learning options.

Short movies would cover the Show Them portion. Viewers can look on as experts explain and demonstrate different methods to insulate hives. We all are aware of our nation's video addiction. If it is on-line, it must be gospel. Our newer beekeepers demand on-line accessibility for their information, even if the information is wrong. Your product will need to be a high quality video with an equally well-written accompanying script. Videos can be posted on YouTube, or any other server that has enough bandwidth. As long as there is a marketing program in conjunction with the videos, this format can reach an

Learning is a perpetual motion activitiy . . .

. . . and so is teaching.

even wider group of beekeepers. There is also the potential to sell the videos to help recoup some money for the original costs to develop the program. For example, Ohio State Beekeepers Association has a free, on-line video series that has reached over 28,000 people in less than three years. While we have not saturated the market, these videos certainly have educated a broad group of beekeepers. We were even asked to have CDs available for purchase. For the past three years, these videos have been educating, and hopefully changing beekeeper behavior, with little maintenance to the system. Not completely perpetual, but close.

The third paradigm, the Let Them Learn, is to actually create something that beekeepers can use in their apiary each time that they visit. We can change their behavior by giving them easy to use tools, resulting in instant gratification. For example, rather than wait for the results from some lab test, the beekeeper could perform in-apiary testing that could provide similar results as a lab, then we could potentially have better hive survival by having a better educated beekeeper. How about an app that can analyze flight behavior and tell the beekeeper what is going on in the hive, or even some sort of sensor that can analyze pheromone level and tell the beekeeper the health of the queen. How about creating an app that can tell the beekeepers when things will bloom. Oh, never mind, we already haVE a program that does just that. Otherwise known as, tools that the beekeeper will use at each hive visit. Tools that empower the beekeeper and help reduce hive mortality. Tools that the beekeeper can purchase, or put together on their own. The smoker was once a new-fangled, almost miraculous invention, and yet, we now look upon it as just a part and parcel of beekeeping.

Another factor in creating your perpetual motion change of behavior program is choosing your team of movers and shakers. Putting together this type of program is like taking a huge leap of faith. You need to have confidence in that first step, knowing that somehow you will land feet first. If you don't have butterflies in your stomach and a bit of sweaty palms, then your program isn't strong enough. Your team needs to have visionaries, go-getters, and do-ers, not all in the same person. Each person brings their own qualities to the team. Everyone needs to understand that the program must have enough stability to stand the test of time. Like a painter with a masterpiece, there comes a time to stop adding layers of paint, and allow the work to be framed. Timelines and deadlines are critical because the project itself has a beginning, middle and end – then you let it loose into the universe with the goal to change behavior and improve beekeeping. In many cases, you will need to look for funding, since not everyone should be expected to volunteer long hours, travel costs, or other associated costs of the program. Grants, local fundraising projects, private donations, or even crowdsourcing are some ways to get the needed start-up funds.

Phillip Crosby's book "Quality is Free" is based on the tenet that if you create a quality product, then you do not have to spend money to make fixes, add inspection costs during production, or wind up re-calling your product. When you are building your perpetual motion education system, you need to spend the time up-front to design your focus, your product, and build your team. Is it a large undertaking? Absolutely. Is it a one person project? Absolutely not.

Our state organization is working on our perpetual motion change of behavior program. It will include a class taught in four locations, a series of videos, and a toolkit. Each phase is self-contained, but the integrated product will be amazing.

A learning program that covers Tell Them, Show Them, Let Them Learn. One of the best parts will be that we are working to build a cost-effective way to have education available to beekeepers for years to come, without requiring further resources of any of the creative visionaries who helped develop the program. We are working to modify the behavior of beekeepers so that we will have future generations of beekeepers who enjoy spending time in the apiary.

Projects like these are huge leaps of faith, but worth leaping given the potential outcome. I'll keep my bottle of Pepto handy. BC

Terry Lieberman-Smith is a 10 year beekeeper who is the Newsletter Editor and Vice-President of The OH State Beekeepers Association. She's an active Board Member of two local bee associations in the Dayton, OH area; plus being a beekeeping educator and frequent guest speaker for a variety of audiences.

It Takes A Hive –

How To Run A Successful Crowd Funding Campaign

Ian **Everett**

The crowdfunding story of Flow Hive, from Australian inventors Stuart and Cedar Anderson, became an internet phenomenon earlier this year, when in hit its original funding target of $70,000 in just eight minutes. The project has now raised over $12,000,000 in funding, making it one of the most successful ever crowdfunding campaigns and, of course, inspiring dozens of 'internet buzz' headline puns.

Flow Hive's level of success is a rare event, however. The majority of crowdfunding campaigns actually fail to hit their fundraising goals and even successful projects can run into issues with sales tax and order fulfillment. So if Flow Hive has inspired you to test the crowdfunding waters for your beekeeping business, it's essential to do your homework.

Getting Started

Crowdfunding, for the uninitiated, provides an alternative source of funding for your business by tapping into the buying power of your social network. There are several sites that enable you to safely fund a project, including Kickstarter, Indiegogo, RocketHub and Kiva, as well as several smaller sites.

Most platforms share the same general concept: Project owners launch a campaign featuring their story, often with a video and offer a range of incentives for backers. Friends, family and the general public then pledge small amounts, sometimes as little as $1, to help the campaign hit a larger funding goal. As each crowdfunding site has its own pros and cons, it's important to select your platform wisely.

Kickstarter

Kickstarter, the most well-known crowdfunding site, operates an 'all or nothing' funding model. Hit your target and you'll receive your funding, miss it by even one dollar and you'll get nothing and your backers won't be charged. Kickstarter charges a 5% fee from successful campaigns. There are no fees if a project does not reach its goal.

Indiegogo

Indieogogo, the site of Flow Hive's success, lets project owners keep any funding they receive, even if they don't hit the goal. However, a 9% fee is charged on projects that fall short. If you reach your goal, only a 4% fee is applied.

A possible downfall with this approach is that project owners can be stuck with a fraction of the funds they need to launch a project, but a crowd of backers who are still expecting their funding incentives to be fulfilled.

RocketHub

RocketHub operates a similar model to Indiegogo, with a 4% commission for successful projects and an 8% fee for campaigns that don't hit the goal. RocketHub has also partnered with the A&E television network on the *A&E Project Startup* initiative, which promises selected projects extra support through on-air and online events.

Kiva Zip

With Kiva Zip there are no incentives or range of funding choices. Instead, individuals each contribute $25 to help fund a zero-interest loan. Businesses can receive a maximum funding of $20,000 and are required to pay back their micro-financing with terms that range from six to 60 months.

Alternative Options

Other crowdfunding sites worth mentioning are foodstart.com, which focuses solely on food and drink projects, localstake.com in Indiana and craftfund.com in Wisconsin – both of these sites are taking advantage of state laws that allow businesses to offer equity to state residents through crowdfunding. Currently, federal rules do not allow equity to be offered as an incentive to the general public, but 13 states, including Wisconsin and Indiana, have already enacted their own crowdfunding laws with varying approaches to equity.

Tips for a Successful Campaign

Most successful campaigns share a few common traits – they're well planned, feature strong branding, an engaging video and offer imaginative and enticing rewards for backers.

Crowdfunding veterans typically recommend a planning period of three to six months for a campaign and to base fundraising goals on the size of the audience you already have. Include exclusive rewards that are only available to crowd fund backers, as well as one or two big-hitting, top-tier incentives that would go a long way to reaching your overall goal. Expect the most popular pledges to be in the $25 range.

A video can also be the difference between failure and success and they don't need to be Oscar-worthy to make a big impact. Nearly half of all projects with a video are funded, yet only 30% of campaigns without a video succeed. Earlier this year Erik and Rachel Messner, owners of Messner Family Farms, raised over $2,500 on Kickstarter to expand their apiary, with the help of a last-minute, home-made video.

"We talked about the campaign for a few months and spent about three weeks writing our content, gathering pictures, researching other campaigns and doing all the math needed." Said Rachel Messner. "We made posters and flyers and put them in local coffee shops. When I had craft shows I put up posters behind my booth and people would ask about it. We decided to shoot a video at the last minute and we are so glad we did! It made a huge difference.

"We were surprised how many people supported our Kickstarter that we did not know! We thought it would be mostly friends and family but we had people contributing because they found us on Kickstarter or saw one of our posters. Our friends sharing our video with their friends probably helped a lot too."

Although campaigns are usually open for around 30 days, most raise the majority of their funding in the first one or two days, so building awareness before a campaign launches is important.

"I think everyone has this conception that they'll just pop an idea online and it will get instantly funded, but there's so much more legwork and especially prep-work that goes into building a campaign. No matter how well you plan, there are always still hiccups. It's incredibly hard work." Says Kickstarter veteran Ash Richter.

As well as creating a campaign website and promoting the project on social media, reaching out to local news media and connecting to your audience off-line are also effective tactics. As all of the work involved with preparing a campaign can seem overwhelming, it can be wise to seek out help.

Honey by the People, a community apiary in Oregon, launched their successful Kickstarter campaign by teaming up with local event planner Stephanie Laur, owner of Union Event Co. Stephanie helped plan a launch event, create a website and marketing material and generate coverage in the local newspaper.

"When hiring a planner you hire an incredible behind-the-scenes team of vendors you may not have known even existed." Says Stephanie. "For example, is there a cafe willing to stay open late in return for hosting a cash bar during your event? Is there a caterer willing to work with donating food? Hiring an event planner from the beginning eliminates the guessing game.

"Don't be shy to lean on others for assistance. Seek out experts in the community, you will not only be forever grateful, you will have more time to work on your campaign!"

Pitfalls to Avoid

Even after hosting launch parties, creating a compelling video, running social media campaigns and hitting your fundraising goal, there are a few common mistakes that can trip-up projects.

In addition to the commission fees, crowdfunding sites also charge a credit card processing fee of 3-4%. Shipping costs to mail rewards across the country can add up quickly and sales tax may also apply for in-state pledges, so it is important to factor in these fees when setting your overall funding goal.

Funding from hundreds of backers will also result in hundreds of rewards to fulfill, which, of course, requires a lot of time. "Although our awards did not seem complicated it is still hard to complete them because there are so many!" Says Rachael Messner. "I think it would be best to have fewer tiers of rewards and create ones that are easy to complete. For example, we offered beeswax lip balm and our contributors could choose the flavor. We have five flavors and multiple lip balms per person. It would have been easier to just send the same variety pack to each person.

"The time commitment of honoring the rewards and keeping folks updated on our progress has been a struggle, but our bees are doing great and everyone has been supper supportive and patient. We are really glad we did it!"

Even Flow Hive may now face complications from their multi-million dollar success. Having to scale up rapidly to produce over 30,000 hives and ship them across the world may prove challenging.

For most businesses crowdfunding is not a fast, easy way to raise capital, but with proper planning and effort it is a viable funding option. Perhaps the most important thing to remember with any campaign is that, like a hive, success is only possible with a 'crowd', with everyone working together, each contributing a little, to reach a larger goal. So don't try to go it alone, instead ask for help, seek out experts and share your story with your community. BC

Ian Everett is the Studio Director at Pretty Lethal Designs *a branding studio for artisans. He is from Wales and became interested in beekeeping when working at Lyman Woods apiary in Downers Grove, IL. Connect with him on twitter at prettylethal.*

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The Sustainable Apiary

Larry **Connor**

New beekeepers have several options for obtaining bees, from catching swarms to buying established colonies. There are advantages and disadvantages of each method, so we will provide you with a review of your options. Keep in mind that what works in a southern state may not be suitable in a northern states, or in any other combination. Join a local bee club and become involved with an experienced beekeeper who will serve as you mentor to help you make the decisions involved in starting colonies.

Complete Hive

Complete beehives consist of eight or ten frames of bees and brood, pollen (stored as bee bread) and honey in mostly drawn comb (where the bees have made fully formed comb). There may be one or more boxes involved in the purchase, and all this is up to the seller and buyer coming to an agreement as the number of frames of bees and brood contained in a hive at the time of purchase.

The advantages of complete hives are many. They contain a full range of brood ages (brood is the word used to describe eggs, larvae and pupae) that reflects the presence of a queen. The queen should be young, having built the colony to full size. The population of bees should be growing rapidly and strong enough to accept a second or third box of drawn frame or beeswax foundation.

Complete hives may be quite expensive, but at certain times during the season may be on sale and thus a wise investment if they are ready to expand and produce a crop of honey. They may carry disease but many these methods have that potential, so this concern is not unique. Comb may be old and need replacing, in fact, large commercial beekeepers move their old combs in full hives and nucleus hives they sell as way to eliminate old contaminated combs from their beekeeping operation. The queen should be young, produced the same season, but could be quite old and ready to fail. Large colonies may require a great deal of feeding before being ready for the start of Winter.

Nucleus Hive

A full hive with all the component parts but in miniature is called a **nucleus colony**. Usually there are four or five frames of bees and brood along with some honey and pollen (bee bread). Nucleus hives are a form of increase colony, and are called by many names, such as splits, divides, nucs, nukes, nooks and others.

The advantages of buying nucleus hives include a reduced purchase price when compared to full-sized hives, with either a younger queen from the previous season produced from mite-tolerant bee stocks adapted for your area or a new queen introduced into the unit about a month prior to its sale and delivery to the new owner. Overwintered nuclei have the added advantage of having survived a Winter in a particular location, which is considered a good thing. Spring nuclei are made early in the season and often contain a queen that was produced, mated and started laying in South Florida or California.

The disadvantages are similar to the full sized colonies as far as disease, old comb and old queens are concerned, although most beekeepers try to sell nucleus hives with new queens. The price is higher than a package colony. Sunbelt queens may not contain queens with adaptions for their final destination. If mated in areas where African bees are established, the queen probably has mated with African drones. The buyer must expect a few colonies that are more defensive than desired, and the queens should be replaced.

The beekeeping industry's shift to locally produced nucleus hives containing queens from a particular area has resulted in a major survival increase of these colonies, and better honey production from healthier colonies carrying adaptive traits suitable for the area.

Package Bees (Artificial Swarms)

Bees are sold by the pound with a queen added in a screen and wood or plastic container so she is unable to move among the bees. All the bees

Complete hive.

Nucleus (Nuc) hive.

Installing a package.

are shipped into a package container that consists of bees, queen, feed but no brood. The bees are shaken in California or a southern state (Sunbelt states) without a queen. These bees are given a queen in a cage. The queen was produced separately from the bees and is not their mother. In many operations she may have been laying eggs (following mating) for a day or two before being caged to ship with the package bees.

The queen and the bees must become familiar with each other's scent, especially the workers getting used to the pheromones produced by the queen. If released too quickly, the worker bees often kill queens in package colonies, even though they have no other option for a queen. I recommend that the queen be in with the package bees for a minimum of three days, and ideally for five days before she is released. If worker bees crawl over her and curl their abdomens toward the queen, they are attempting to kill the queen in a process called "balling."

The main advantage for using packages is their lower cost and relative ease of introduction. Because there are no combs there are much reduced chance of developing brood diseases, but the lack of brood may make the package colonies seriously out of balance. There is no relationship between the queen and the bees. Without proper care and feeding packages can languish when the weather is cool and food supplies are limited. When package bee production is rushed to meet the deadlines of northern beekeepers the queens may be produced early and rushed through the mating process and subjected to poor feeding conditions during rearing. Also, the drones may have been stressed during development and poorly fed. This reduces both the production of sperm and the migration of sperm into the seminal vesicles where it must be present when the drone mates with the queen. A very high number of queens in package colonies never lay very well and are replaced within weeks after the package was introduced. Without established colonies in the operation to provide a queen or frame of brood for queen production, the colony may be doomed to a premature death. In general, package bee queens loose about one third of their queens during the first Spring and Summer of their existence. However, in some seasons the loss rate is much higher, forcing the buyer to calculate the risk into the final cost of the hive.

Comparing packages with nucleus hives, new beekeepers need to adjust upward the final cost of the packages by as much as fifty percent to cover losses they often experience when using these units. This does not happen every time, and I have had very good luck some years using packages, but there have been years when beekeepers lose 80% of their package colonies due to queen problems. This makes the final cost of the successful package colonies very expensive. I urge new beekeepers to avoid package colonies until they understand how to compensate for their weaknesses, being fully aware that this is in direct opposition with one of the beekeeping industry's most empowered methods of expanding colony numbers.

Package bees are added to wooden equipment – this is the only method (other than swarm capture) that works for Langstroth, Warré and Kenyan Top Bar Hives because it does not include comb. The box of bees is opened and the can of syrup removed. The queen will often be found in a plastic or wooden cage hanging in the mass of bees. A gentle bump on the ground will knock the bees to the bottom of the cage and the queen, in her cage, may be removed.

In a Langstroth hive, place the queen in the center of the second brood box, hanging by a string or positioned between frames of drawn comb. The package is then placed in the first box and the bees allowed to crawl up to be around the cage. Later in the day remove the lower box, perhaps using it to enclose feed containers, and set the package cage in front of the hive if there are any remaining bees. They will eventually crawl out to join the rest of the bees.

To use packages to install bees into Warré and Kenyan Top Bar Hives, position the queen between two of the bars, and shake the bees so that they can reach her. Release the queen in three to five days into the mass of bees and new comb whey should have started to build.

Package colonies require a great deal of feed. You may use sugar syrup or frame of honey – if you are an established beekeeper and have reserve frames of honey. Lacking food, package colonies are famous for leaving the hive and absconding for a new location, just as soon as the new queen is released. The solution: keep the queen in her cage until for five days, by which time the bees will have constructed several frames of new comb for the queen to lay eggs into. This comb serves as a foundation for the new hive's comb building.

Swarm Capture

A time-honored method of starting new colonies of honey bees is by the capture and installation of swarms of bees. These swarms come from area colonies, and perhaps from your own. Swarm season can develop very rapidly and often hits a peak numbers as weather improves for the final buildup of population numbers and the super abundance of food stored in the hive. Swarms leave a colony about the time the first queen cells are capped, which only takes about nine days from newly deposited egg to sealed cell (queens take a total

Sometimes swarms aren't easy to capture.

of 16 days to develop, so the rest of the time is spent as a sealed queen cell before emergence).

Swarm use requires your ability to be available to collect the swarm, as they are temporary transient groups of bees leaving the parent hive and moving to a permanent location, a process that may be as short as a few hours and often only take a day or two for new swarms to find a new home. Many beekeepers share the experience of arriving at a swarm location only to watch the bees fly away to their new home.

The average first, or primary, swarm from a hive will contain 40 to 60% of the workers in the colony, averaging about 12,000 bees. A few hundred drones and a queen travel with the swarm. The queen is usually the old queen, the mother of all the bees in the swarm. She has been put on a diet and exercise program by the worker bees to stop laying eggs, loose weight and be able to fly again (her last flight was during mating).

Colonies will continue to produce swarms as long as they have queens that they have produced under the swarming instinct that are able to join about half of the adult bee population and leave to become a new colony. These after-swarms are smaller and less likely to survive in nature.

A prime swarm is an amazing group of bees. There are usually more bees than in a package colony, but the queen and the bees are already a proven team, having built up the parent colony to the point that it can swarm. Within 100 days after it finds a new home, the colony will have produced most of the honey comb it will need. The colony focuses on collecting and hoarding food to survive the Winter.

Swarm colonies face difficult challenges, with only one in six surviving to become one year old. Fortunately, a skilled beekeeper can increase the probability of swarm survival by feeding the colony and adding a frame of brood and bees to help stabilize the colony's growth. The queen may or may not carry genes for local adaptive behaviors (the queen could be from a colony a beekeeper purchased from the Sunbelt and put into the operation). Observe the performance of the colony and replace the queen as necessary.

While swarms are free, the travel time, equipment, feed and other expenses add up. If you loose four hours of work to capture a swarm and travel 100 miles round trip to get there, these bees are clearly not free. You also run the risk that the swarm my leave the temporary site once it decides where to move to permanently.

In planning the growth of your apiary, allowing for a few swarms every year is a good thing. Put your name, phone number and email on a local swarm list run by your bee club. Contact your local police and fire departments so they know how to reach you should a swarm develop. Swarm catching is a great activity for the underemployed, the retired, and those with very flexible schedules including college students.

Swarms carry with them a slight chance of brood disease because the bees engorge with honey before they depart, and the colonies should be monitored for brood diseases. Some beekeepers medicate swarms with anti-American foulbrood antibiotics as a one time prophylactic treatment, which serves to protect the entire beekeeping operation from American foulbrood. Small swarms should be combined with weak or medium sized colonies rather than fussing with them to have them die in the Winter. As a general rule colonies that are weak and starving in the Summer will die during the Winter, regardless of how much food you provide.

Bee Removal (Cut-Outs)

Taking a hive of bees out of a building, natural structure or a bee tree is a common way some beekeeper use to increase the number of colonies they own. They can also obtain a large mass of honey. Collecting bees from buildings has a degree of risk of stings, and is a hot and sticky chore. Combs of brood will need to be tied to empty frames and the honey squeezed out for use. There is a risk of brood disease, as there is with any hive, and this manipulation can spread the disease through robbing by other colonies during the removal process. There is a unique risk for beekeepers who perform cut-outs, as the property owner often resorts to the use of an insecticide to kill the bees. When that fails, they call Pest Control Operator who either refuses to handle bees or charges a huge fee. By the time the bees are removed by the beekeeper, the honey and comb may have been contaminated with an insecticide. Do no eat honey if there is any chance of treatment. Property owners will often lie about using insecticides to beekeepers, yet it is often their first attempt at bee control.

Trap Nests

Setting out trap nests is a perfect way to capture natural swarms for growth. In areas of heavy African bee populations, trap nests may be used to remove African colonies and re-queen or destroy them as part of an AHB management plan. In areas of no African bees, trap nests are a suitable way to increase colony numbers – and the bees came to you! The risks of using trap nests are about the same as using swarms.

Trap nests are a nice way of monitoring the population of local bees, both beekeeper-managed and feral. The use of essential oils like lemon grass and other materials increase the attractiveness of the cavity. There are commercial mixtures available that may be obtained for this purpose. BC

Hope to see you at the EAS Conference in Guelph, Ontario in August.

Winter Bees & Formic Acid

Ulrike **Lampe**

Every year in early Spring, beekeepers inspect their hives to find out if and how their bees have made it through the Winter (Figure 1). And every year, many of these beekeepers are in for a rather unpleasant surprise when they discover that a number of their colonies have not survived the cold season. *Varroa destructor* remains one of the most significant causes of these colony losses, especially when the winter is exceptionally mild. Keeping your mite counts in check in late Summer, and treating your bees with MAQS® at the right time can prevent these losses. Here's why the late season *Varroa* treatment is the most important treatment in the year, and why formic acid is the weapon of choice against *Varroa*

Honey bees (*Apis mellifera*) are fascinating insects in many different ways, but to me, one of the most interesting aspects of Honey bee life is the difference between Summer bees and Winter bees. Worker bees that hatch in Spring or Summer have an average life expectancy of 30-40 days[1], whereas their sisters born in September or October are built to remain alive during the broodless period and throughout the Winter until the following Spring[1]. When the cooler weather arrives along with shorter days, the queen slows and eventually stops laying eggs completely. The colony shrinks from 20,000-60,000 bees in July to a modest 5000 bees that stay in the hive during the cool season[2]. These workers all attend to the queen, feeding her and keeping her warm until the following Spring.

This overwintering process of Honey bee colonies has become much more vulnerable since the *Varroa* mite (*Varroa destructor*) began parasitizing colonies over two decades ago. Research studies from Canada and Germany conclude that *Varroa* mites are the main cause of colony loss and severely reduced colony strength in Northern climates[3,4]. To understand why *Varroa* pose such a threat to Honey bee colonies in the overwintering phase, let's look at the correlation between Honey bee and *Varroa* mite populations over a full beekeeping year (Figure 2[5]). The first thing we will notice is that the honeybee population and the *Varroa* population are not in synch[5].

The graph shows how the bee population starts to build up slowly in late Winter, then the build-up gains more speed in Spring until it peaks in June and July (Figure 2). In July, the number of workers begins to decline, and, depending on the climate the queen slows and eventually stops laying eggs altogether in November/December. The *Varroa* population lags behind the number of worker bees in the hive, because mites need the bee brood to reproduce.

If the previous year's treatment for *Varroa* was successful *and* the brood break sufficient, *Varroa* counts should be low. As the bees are expanding their brood cluster, the *Varroa* populations grow too. Mites then have access to a dramatic increase in worker and drone brood cells for reproduction, and a steady supply of Honey bee haemolymph, or bee blood, a *Varroa* staple[6]. But, there is one significant difference between the seasonal development of bee population and that of the *Varroa* population: The mites reproduce exponentially – as long as there is brood in the hive[7]. More specifically, the *Varroa* population doubles ca. every three weeks between springtime and the onset of the broodless period[7].

With such a sharp increase in the *Varroa* population over the season, you might ask yourself how to realistically stay below the threshold of serious colony damage until August or September. The answer is drone brood removal throughout the season[6], and treatment during or in between honey flows. MAQS® Beehive Strips are an authorized *Varroa* treatment during honey flow[8]. If you choose not to treat during honey flow, apply MAQS® in between two flows. Just make sure that your colonies have enough access too fresh air during the seven-day treatment period by fully opening your entrances, and pay attention to the required maximum daytime temperature range (between 10°C and 29.5°C)[8].

But, what about the late Summer treatment between late July and early October? The exact timing of the treatment depends on various factors such as the *Varroa* levels in your hives, the length of the season and the weather conditions. To determine when you should treat in your zone, consult the *Varroa* calculator, a helpful tool provided by the National Bee Unit. **www.nationalbeeunit.com/public/BeeDiseases/varroaCalculator.cfm**

With a late Summer or early autumn treatment, you want to eliminate as many *Varroa* as possible to protect your Winter bees. Remember, they have a (relatively) long bee life ahead of them, and "hand over" the colony to the next generation of Summer bees the following Spring. Looking at our graph again (Figure 2), we can see that

Figure 1. *Spring time hive inspection in Canada after treatment with MAQS in the previous Autumn.*

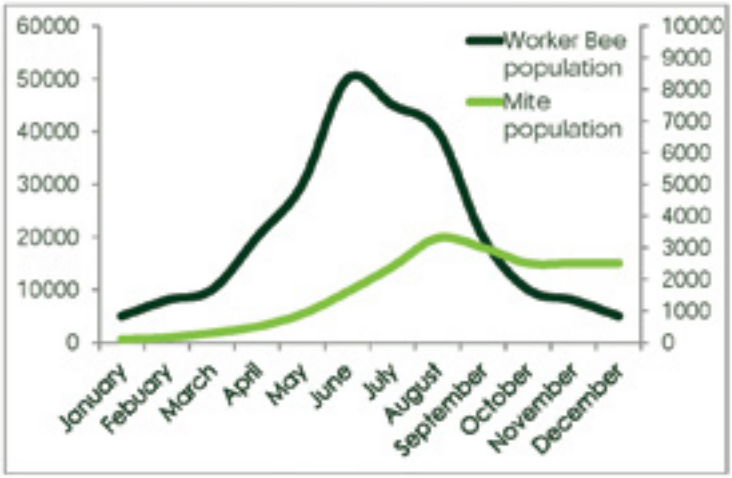

Figure 2. *Worker Bee Population (dark green) and* Varroa *Mite Population (light green) throughout the year.*

the mite population increases even when the Honey bee population decreases. This means more *Varroa* for fewer bees. A high *Varroa* load during the cold season will also increase the virus load in the Honey bee colony[9]. This can lead to a shorter lifespan for Winter bees, reflected in pitiful springtime finds by the beekeeper of small groups of leftover bees in the hive, or complete colony losses[9].

Formic Acid, the active ingredient of MAQS®, is the best candidate for *Varroa* treatment in late Summer. First and foremost, it is the only available substance that targets mites under the brood cap where they reproduce[6,10]. Secondly, mite resistance against Formic Acid are presently unknown and also quite unlikely[6]. And finally, the Formic Acid in MAQS Beehive Strips is an organic acid that is not soluble in wax or honey, and vaporizes over time. MAQS® combines all of these advantages in a smart and easy to use dosage form, which offers a safe and much shorter treatment period compared to treatments with liquid Formic Acid.

In early October 2009, the Ontario Beekeepers' Association tested the long-term efficacy of MAQS and compared it to the efficacy of Apistan[11]. In this trial, colonies treated in late Summer with the full dosage of MAQS® (two strips per hive) had a mean mite count of 1.3 per 100 bees the following April. In those hives treated with the half dosage (one strip per hive), 2.9 mites were found on a sample of 100 bees. The Apistan-treated hives showed an infection rate of five mites per 100 bees (Figure 3[11]. Pre-treatment infection levels for all three groups in this trial were above 20 *Varroa* per 100 bees. Moreover, the group of colonies treated with the full MAQS® dosage was also the group with the lowest Winter mortality (9%), whereas 42% of the Apistan-treated control group were reduced to drone laying workers, or had died off completely[11].

This test shows clearly how important the late Summer or early Autumn treatment is for the health and survival of your colonies over the Winter. To treat against *Varroa* successfully, it is crucial that you also monitor the treatment success *after* the treatment has been finalized. To see the full efficacy of MAQS® under the brood cap, we advise to check the treatment success after day 21 (three weeks after the application of the strips). At this time, all bees that were still under the cap during treatment will have emerged, and the dead *Varroa* from their brood cells will have fallen. If your colonies have suffered from a particularly high mite load before the treatment and you want to repeat it, you should wait at least a month between your MAQS® applications. BC

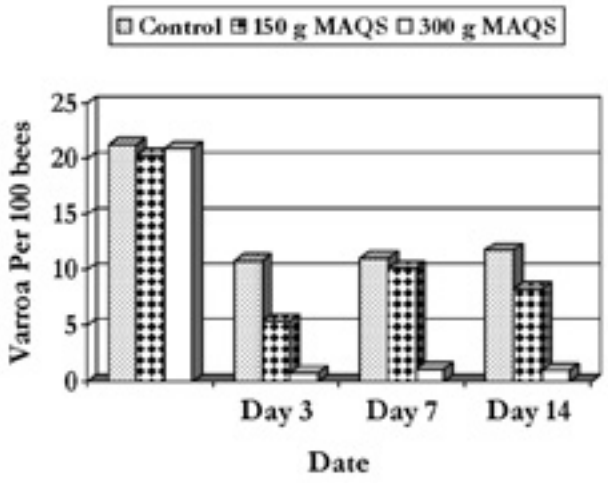

Figure 3. Varroa *per 100 bees during Mite Away™ (MAQS™) treatment trial, Fall 2009[11].*

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WINTER STARTS TODAY

Roy **Hendrickson**

I realize that a percentage of those reading this article are, for whatever reason, committed to a mite control agenda absent of any form of chemical treatment. That's your choice, and I completely understand. However, you have to realize that any attempt to overwinter mite/virus infested colony(s) is almost certain to fail. With that thought in mind, perhaps your best option would be to locate replacement packages or nucs at the earliest opportunity. I would also suggest you brush up on *Varroa* sampling and treatment procedures. That might go a long way toward staving off a future disaster. One final thought. Does anyone really believe that any replacement package or nuc they purchase will arrive absent any form of mite control?

Queens

Varroa notwithstanding, Winter preparation actually begins; take your choice, in July or August. How many times have you read or heard that being discussed at the local club meeting? Actually it's my belief that Winter preparation really begins with the queen, starting in late May or the early part of June. In the central and northern latitudes mid to late Spring, the primary swarming season, is the best time to rear and work with queens. Why, because prosperity reigns supreme. In most areas spring pollen quality is second to none. Nectar is plentiful, and honey bee colonies are rapidly expanding their populations. Consequently there is an over abundance of young nurse bees. As a result, queen cells, be they swarm or supercedure, are of the highest quality. The same generally holds true for beekeeper initiated cells.

The benefits of having colonies headed by young queens should not be underestimated.

Young queens offer several distinct benefits. Because of greater pheromone output and distribution, colonies headed by young queens are less likely to swarm than colonies that contain older queens. Young queens are more prolific than second or third year queens. That translates into a larger field force to take full advantage of the available resources. And from an overwintering perspective a young queen's added brood production provides her colony with a larger population of young bees going into Winter. This is of critical importance for those operating in truly cold climates. Last of all, a young queen is able to provide her colony with a critical population boost the following Spring. Probably the most significant benefit of all!

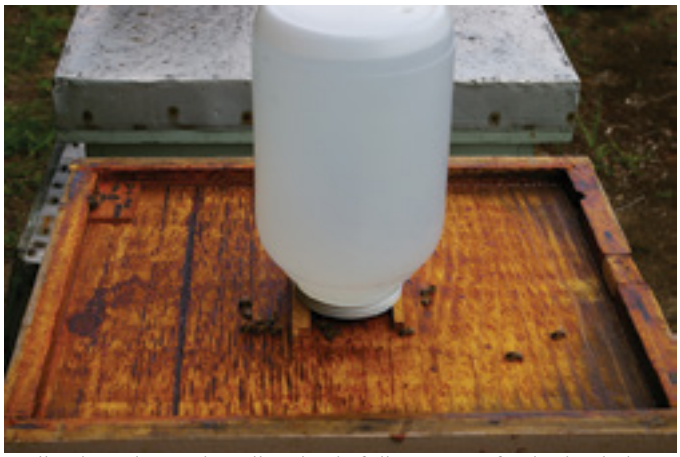
Food Reserves

The second requirement for successful wintering involves the food supply. Since top insulation has been integrated into the over-wintering equation, an abundance of stores is absolutely essential. Heat retention as a result of the top insulation will allow a colony to rear more brood earlier in the season than non-insulated colonies. In northern latitudes late Winter-early Spring feeding is not generally feasible. Therefore it's imperative that the necessary Winter stores be provided prior to the onset of cold weather.

If you're located in an area with a well defined fall flow Mother Nature will generally provide the necessary Winter stores. Moving colonies to pick up a Fall flow is another possible solution. The last option is to produce feed honey on standard production colonies, and use that honey to supplement the food requirements of colonies short on Winter stores, Summer splits for example. This plan would work well in areas that feature secondary honey flows of lesser quality honeys, honey that otherwise might be difficult to market. Absent these alternatives, traditional feeding is the only resort.

From an operational standpoint, top feeding is by far the easiest and most efficient way for small beekeepers to feed. By top feeding I refer to the practice of feeding through the center hole in the inner cover. Feeding in this manner is both economical and extremely effective. The feed container can consist of whatever is handy. Quart Mason jars or plastic gallon jugs make excellent feeders. The rate of syrup consumption is controlled by the number of holes punched in the lid. The more holes the greater the rate of consumption. Ideally the holes

Mixing syrup.



Gallon jug, elevated to allow bee's full access to feeder jug holes.

Hive body protects friction top feeder can from the elements.

should be about 1/16th of an inch in diameter, or about the size of a standard frame nail. Use either 4 or 6d nail and a tack hammer, and tap the nail just hard enough to drive the point partially through the metal lid. With plastic lids, use the aforementioned 1/16th in diameter drill. When inverted over the inner cover, the feeder should be elevated about a quarter of an inch to allow the colony complete access to the feed holes. Use an empty super or hive body to protect the feeder from the elements. With this system, once feeding has commenced, it's often possible to quickly replace or refill the feeder without the use of either a smoker or veil.

Cane or beet sugar, which works best? Both are sucrose, and they work equally well. Most of the big box wholesale stores tend to feature cane sugar, at least in my area. Cane sugar is always labeled as such; beet sugar is almost never specifically identified. If the bag or box just says sugar, it's invariably beet sugar

Syrup Formulas

Sugar syrup formulas are simply ratios of sugar mixed with water. In general there are two basic mixtures, thin syrup consisting of equal parts sugar and water, and thick syrup featuring a two to one ratio of sugar to water. Thin syrup is the basic spring and summer feed. It's primarily used to stimulate early season brood rearing, and to allow the colony to maintain its strength through periods of nectar dearth. Heavy syrup is used to augment the winter food supply, to prevent overwinter or early Spring starvation.

For small quantity mixing purposes, sugar and water are almost identical when compared on a weight to volume basis. For example, by volume a four-lb (64oz) bag of sugar measures out to approximately eight 8-oz measuring cups. Fill that same 8-oz measuring cup with water, the water also weighs about 8-oz. Therefore a four lb bag of sugar when mixed with eight cups of water would yield roughly eight lbs of 1:1 syrup. The same bag when mixed with four cups of water would yield about six lbs of 2:1 syrup. For larger quantities simply convert water volume to a weight based mixing formula using eight lbs per gallon as the conversion basis. For specific sugar weights and the compatible water volumes refer to the table.

1: 1 Mixtures:

8 lbs of sugar into 8 lbs or (1 gallon) of water
25 lbs of sugar into 25 lbs or (3 gallons + 1 pint) of water

2: 1 Mixtures:

8 lbs of sugar into 4 lbs or (2 quarts or ½ gallon) of water
25 lbs sugar of into 12 ½ lbs or (1 gallon + 2 quarts + 1 cup) of water

Depending on the amount of syrup required, the mixing vessel can be whatever is handy, a bowl or pot, a five gallon bucket, or my favorite, a 20 gallon garbage can. To mix any type of syrup, run the predetermined amount of hot tap water (130° to 145°) into the mixing vessel, and then add in all the sugar before you start the mixing process. Stir intermittently until the sugar is dissolved. No additional heat source should be necessary. Once dissolved the syrup can then be poured or pumped into the feeders or holding containers for transport to the bee yard.

Emergency Feeding

Since early Spring weather patterns and the corresponding honey flows are relatively unpredictable, the specter of early season emergency feeding is always present. The simplest way to solve this problem is to transfer frames of honey from overly heavy colonies to those in need. The same holds true for weak colonies with an excess of stores. Assuming there are no brood disease issues, don't be afraid to use the leftover honey from Winter deadouts. Colonies in weak to average condition should have at least one frame of feed honey placed adjacent to an outside frame of brood. Strong colonies should have frames of feed honey placed on both sides of the active broodnest.

Absent these options, granulated sugar poured around the center opening in the inner cover will keep the colony alive, but will probably not sustain continuous brood rearing. Candy boards and fondant patties both have merit. However the additional cost and the extra time and effort required to make up or prepare these products somewhat mitigate their value. An easier alternative might be a Winter feed patty. (Available through several bee supply outlets.) These are concentrated sugar patties specifically designed for cold weather feeding. Some are straight sugar; others are a mixture of sugar and pollen substitute. For emergency feeding purposes, I would place the emphasis on the sugar only patty.

Thick young woods, an ideal natural windbreak, looking northwest.

Early growth crabapple, another excellent windbreak, again looking northwest.

Windbreaks

When it comes to overwintering success, the importance of good windbreaks is second only to adequate food reserves. Colonies that are under constant wind stress simply do not overwinter very well. The further north you are located the greater the potential for damage. Perhaps the most interesting aspect of wind stress is that it's a very manageable condition. In many instances the solution lies within easy reach. If there isn't a good natural windbreak nearby, the materials needed for a man-made windbreak are probably already on hand, simply awaiting assembly or repositioning.

The very best windbreaks are of the natural variety. Thick woods, heavy underbrush, or a solid fence row all create ideal windbreaks. Colonies placed downwind at the base of a hill are usually well protected. In heavy snow territory these locations are often buried by drifting snow, thereby creating the best natural windbreak of all. I classify buildings as natural windbreaks. Apiaries located on the leeward side of a building generally fare very well. I have a friend in a neighboring state with an out apiary located in an abandoned dairy barnyard. The barns provide Winter wind protection from the west and northwest while leaving the apiary in full sunlight. This is perhaps the finest apiary location I've ever observed.

In wooded or hilly territory good natural wind breaks generally aren't too difficult to find. When necessary consider temporarily relocating an apiary to take advantage of a good natural windbreak. The following Spring the process is reversed. The Summer or home location becomes the split yard for Spring management purposes. In due course all the colonies are moved back to the home location prior to the honey flow. The two locations compliment each other, honey production is maintained and overwintering success is improved.

Absent a satisfactory natural windbreak, man made windbreaks become the order of the day. Any apparatus that knocks down or diverts the prevailing Winter winds will add significantly toward overwintering success. If available, a few well placed bales of hay or straw make excellent windbreaks. I use a couple of old aluminum storm doors. The doors are placed lengthwise behind the exposed colonies and held in place with short lengths of old water pipe, re-bar, or metal fence posts. They're not very pretty, but they work extremely well. My favorite man-made windbreaks are old shipping pallets. I cut the pallets in half and use deck screws to attach pieces of scrap plywood. In use, they are held in place the same way as the storm doors. Their big advantage is the ease of placement. I run two hives to a pallet and I place these accordingly at one or both ends of each pallet depending on the primary wind direction.

My friend Carl is the fourth beekeeper that I know of to keep bees in a very windy location a few miles to the west. Carl has installed permanent six foot high solid wooden barriers to protect his colonies. Carl also has an apiary in big-time bear territory in central Pennsylvania, also a very windy location. His bear fence consists not of wire, but heavy insulated metal grids attached to wooden posts. His wind protection, sheets of corrugated metal barn roofing fastened to the electrified metal grid work.

Colony Protection

The last factor in the overwintering equation is colony protection, primarily top insulation. In cold climates top insulation has at least five identifiable benefits. First, the insulation traps a portion of the heat given off by the overwintering cluster, thereby preventing any frost or ice buildup that might occur without insulation. Similarly, the combination upper entrance/ventilation port allows the warm moist air to vent, virtually eliminating any condensation buildup on the underside of the inner cover. Third, the retained heat allows the cluster to expand thereby increasing its ability to access the stored food reserves. Colonies protected by top insulation are much less likely to cold starve during the depths of a long

Bales of hay protecting from the west and northerly winds.

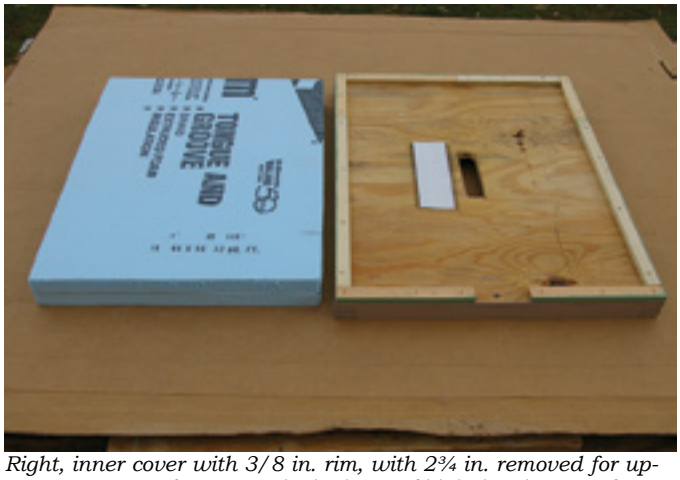




Shipping pallets with attached plywood protecting from the westerly winds.

cold Winter. Fourth, the upper entrance allows for easy outside access whenever the weather warms enough for a cleansing flight. And last of all, top insulation allows the colony to rear more brood in the cold of early Spring than would be possible were insulation not present. If possible allow the colony to benefit from the top insulation until average daytime temperatures reach the 55 to 60° range.

Top insulation can be applied a number of different ways depending on the specific outer cover configuration. Since the vast majority of smaller beekeepers use a combination inner cover-outer cover assembly, the most practical application is to place the insulation between the two covers. I would recommend two inches of high-density Styrofoam of the type commonly sold in big-box lumber stores. Buy the one inch thickness, and cut two pieces the exact size of the inner cover, inside of the raised border. The insulation should rest directly on the surface of the inner cover, not on the raised border. Use woodworker's glue (Titebond II) to glue the two pieces of Styrofoam together. To prevent the bees from chewing a hole up into the insulation, cover the center hole with a piece of window screen or eight mesh hardware cloth. For rigidity and durability purposes you can apply duct tape to one or both sides of the screen. Once the insulation is in place, the outer cover is returned to its normal position over top of the insulation.



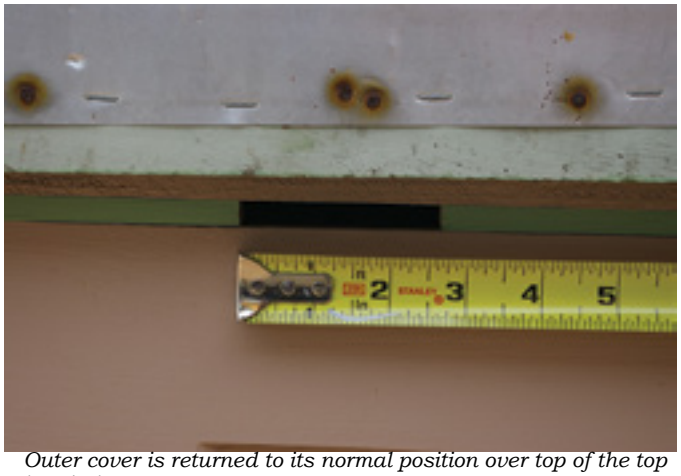
Right, inner cover with 3/8 in. rim, with 2¾ in. removed for upper entrance. Left, two one-inch pieces of high density Styrofoam glued together with Titebond II.

Inner cover in the Winter position, with top insulation in place.

Creating the combination upper entrance/ventilation port can be a bit tricky. Nowadays virtually all commercially manufactured inner covers have a raised border on both sides. Select the side with the thickest border, and add an additional strip of wood to increase the border height to 3/8 of an inch. Now locate the center line on one of the short sides of the cover, and remove a 2¾ inch section of the 3/8 inch border. This opening will serve as the combination upper entrance/ventilation port. In use, this side is turned down so that the bees have direct access to the outside. If you were to shine a flashlight into the opening, you would be looking directly at the top bars of the uppermost brood box. Do not allow the outer cover rim to obstruct the upper entrance. If it does, either cut a notch in the outer cover rim, or add another layer of Styrofoam.

For those operating in the more northern latitudes, it may be prudent to consider some form of colony wrap. For years I used 15 lb. roofer's felt to great advantage. In late Winter and early Spring the black tarpaper absorbs the sun's heat. When combined with top insulation it increases the cluster's ability to move and maintain contact with the stored food reserves. However, the roofer's felt of yesteryear is long gone. Today's product

Final assembly, snow will cover the bottom entrance throughout the Winter.



Outer cover is returned to its normal position over top of the top insulation.

The colony needs unobstructed outside access to facilitate cleansing flights.

Colony Quilt temporarily held in place by ½ inch staples and clear packaging tape.

The depths of Winter. No problem for a properly prepared colony!

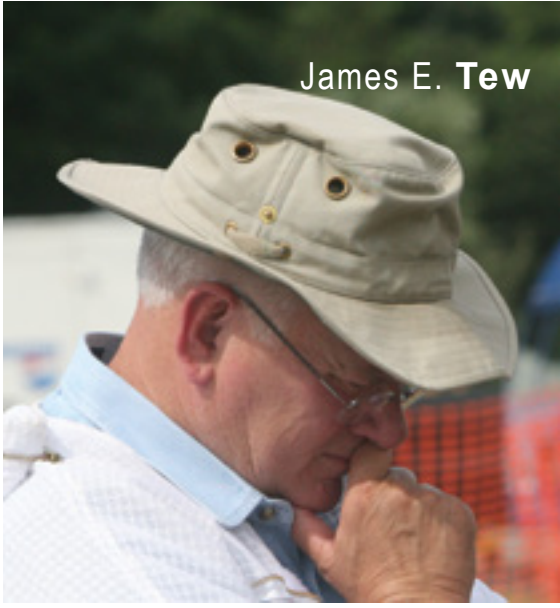
simply doesn't hold-up very well. And it's a real pain to cut new wraps every other year or so. As a result, I've switched to the Colony Quilt wrapping material supplied by B&B Honey Farm in Houston, Minnesota. This is a plastic based wrap combined with a thin layer of insulation. It's durable, easy to cut, and easy to apply. Although the cost is somewhat higher than roofer's felt, I believe its money well spent.

This product provides a colony with far better weather protection than roofer's felt, including a degree of wind protection. However, it's not a suitable alternative for a good windbreak. In use the pre-cut wrap can be temporarily secured with a couple of half inch staples or clear packaging tape. I use plastic bailing twine as a means of overwinter security.

In summary, there are an infinite number of variations on the Winter preparation theme. Don't be afraid to experiment. The development of a comprehensive overwintering strategy fitted to your specific situation is a very worthy endeavor, and one that will pay big dividends the following Spring. Good Luck! BC

Roy Hendrickson keeps his bees through very tough Winters in Chardon, Ohio.

Some Beeyard Thoughts, Observations and Updates



I love my beeyard barrier fence
Queens – Wow, they cost a lot – maybe I will produce my own
Queens do faint. I recently saw one do it
More on water and mineral foraging – I'm missing something
Winterkill equipment stinks, but I can't discard it. What to do with it?

I am a one-person beekeeper

I have never had a long-term beekeeper *"partner."* I always envy you people who have brothers, kids, family, or friends who are partners in your beekeeping business. Not having a consistent *"bee buddy"* has become my perpetual excuse for not getting more done in a timely manner. For instance, take my bee yard stockade fence that I recently had installed.

A couple of months ago, when I had the blockade fence set up around most of my beeyard, I knew that I would be the one-man crew who, after installation, would be responsible for painting and personalizing the barrier. I wrote about this improvement in my apiary a couple of *BC* issues back.

Well, it's not finished, but I love the barrier. It is as though I enter my private bee world every time I open the gate. There are still neighboring sounds of lawnmowers or an airplane droning somewhere, but it feels that I am in an isolated place. The raccoons, chipmunks and ground hogs love the improvement, too. I spend a lot of time here. It has been in this bee yard compound that that I have had the following thoughts and observations.

Wow – replacement queens are pricy

After all my complaints about bees dying during the past Winter, my surviving bees have built up well. As is the biological case, if I did not do something, swarms would escape. I chose the three largest colonies and made a strong split from each. I spent a short two hours on the road to get queens and paid $30 plus tax for each. Essentially, I paid $100 plus time and transportation for three bugs. *(Please don't rip into me commercial queen producers. I know that queen production is more difficult than it once was.)*

As an aside, I have a reasonably good understanding of queen production and its pitfalls. In my earliest years at Ohio State, I actually produced queens at a small commercial level. I know what is involved in producing queens and I know how much can go wrong – but $30 per queen? A good part of my *queen-price-shock* could very well be my present age. In my earliest beekeeping years, for a short time, I paid 75¢ for queens (the year was ***not*** 1850 but more like 1973). Later, the price range was stable for many years at $1.25- $2.50. Everything has gone up. I realize that fact of commercial reality, but at these prices (and I assume they will be higher next year.), the whole queen management recommendation system is forced to seriously evolve. Over time, I have noticed that I keep marginal queens longer than I would have in years past. How should experienced beekeepers offer queen management advice to new beekeepers?

I am not a bee hero. Many of

A simple queen grafting kit from 1982.

you have managed bees more and managed them longer than I have, but having said that – I have produced, purchased, stored, and introduced a lot of queens for a lot of years. Even with that experience and background, I need to admit that when storing and introducing these pricy queens, I was nervous. (*To my knowledge, they no longer come with a warranty as they did in the olden days.)*

When I got the queens, the weather was rainy and cool. I temporarily stored the caged queens in the top hive body of a populous colony for two days. *(The queens came from California. I have no idea how long these queens had already been in the cage.)*

Before releasing them, I left them in the splits for three days. If I had been introducing them into a large established colony, I would have let them stay caged longer – maybe five to seven days. I have increasingly begun to release my queens directly rather than using the candy plug technique which is still safest technique for new beekeepers. *(As it were, don't try this direct release procedure at home new beekeepers – occasionally, the new queen will quickly fly away or require re-caging if she is not welcomed by the new hive.)* Releasing the queen directly demands that I handle and otherwise manipulate her and her cage until she is on the comb. At that point, I can monitor the hive bees' reaction to the new queen. I am happy to report that all three new queens are alive and well with great brood patterns underway.

As I went through the introduction procedure, I wondered if I could produce my own queens again. Or at least produce cells that could be used for queen replacement *(more about using ripe cells next month)* Am I at a monetary point where I should try again? My wife says that she is.

So, considering producing queens yourself? Here's the deal.

It is not particularly complicated to produce queens, but it is surely tedious and time sensitive. Since the visual requirement for larval transfer is a deal breaker for many of you, the state of queen production equipment has evolved to eliminate the beekeeper being required to relocate a tiny, tiny worker larva to an awaiting queen cup. There are all kinds of plastic devices available that confine the queen to a special box and *"graft"* larvae without requiring the beekeeper to actually have to touch them – just look at any supply catalog. Generally, I like these devices and they certainly do produce queen cells, but there was a time when queen production was a much simpler procedure and did not require so many parts and pieces. Then there's the impressive price tag required to purchase these devices.

The assembled vintage frame. This product is still available from some suppliers.

Just for you, I opened some new old stock (NOS)

Late in his life, my Dad was a beekeeping supply dealer. As he became increasingly feeble, his beekeeping equipment inventory became trapped in time. To give you a glimpse of how simple queen producing equipment was just a few decades ago, I have opened the sole remaining A.I. Root Queen Grafting Kit that Dad had in his inventory. The equipment was manufactured in December 1982, in Medina, Ohio. *Varroa* mites had not yet arrived so the wax queen cups were not made from pesticide contaminated wax. This simple equipment is the design that I used when I was much more serious about queen production many years ago.

The kit is nothing more than a common deep frame with extra thick end bars having two cell bars that fit in slots cut across the end bars. A grafting tool and the necessary beeswax cups and wooden cell bases complete the device. Appropriate frame nails and a short written explanation on how to use the equipment to produce queens was also included. That's it. That's all that was in the queen kit from 1982.

Today, look at all the parts and pieces that are available for today's queen producer. There are pages and pages of queen rearing equipment in today's catalogs. For the beginner, it is obviously confusing. Fortunately, some of the suppliers still produce these simple parts for those who may be interested in producing some queens of their own with minimal equipment using techniques that are now mostly considered primitive and obsolete.

The frame was simple to assemble. It would not be difficult to modify a wood frame before assembly to come up with a general design.

That's enough

At this point, I have a vintage frame assembled, waxed, and loaded with queen cups that are now ready for grafting larvae. I will pick up here next month and see if I can keep this backyard queen project moving along *(Using eyes and dexterity that is now much older than it was the last time I tried this.)* Stand by. This may be embarrassing.

My queen fainted!

The nucs I referred to above have built up nicely. At this stage, these small colonies are easy to handle and little to no smoke is required. Being a beekeeper and unable to let a good thing manage itself, I felt that it would be a good time to mark the new queens. The current queen color for 2015 is blue, but I only had white. I decided an incorrect mark is better than no mark at all. The queens are Carniolan so they are dark against a dark comb. The white dot on the queen's thorax stands out nicely.

I was not impressed with my ability to quickly find all three queens – even in a small colony – but find them I finally did. The first two I marked without incident but the last one was not as cooperative. When finally sighted, she was between capped honey and the outside wall. I didn't expect this. I had been quiet

Foragers on leaf and clipping compost. (For 30 sec video, see: https://youtu.be/xvck0btsgM0)

and gentle and used no smoke. So why was she already hidden? Who knows?

I picked her up and repositioned her between my left hand thumb and forefinger. I put a small mark on her thorax and repositioned her to my thumb and finger on my right hand where I held her by all four wings for just a bit to allow the enamel[1] to at least become tacky. Not my best mark, but everything seemed to go along without incident.

As I had done with the other two, I gently placed her back on the vertical comb. She held on for only a few seconds and then dropped off like a stone and lay quivering on the hive top near the frame where I was working. Imagine my state of mind. I had not done anything that I had not done many times before. In just a few seconds, she quivered more and staggered sluggishly on her six legs. I put her on the comb and she waddled away. Hastily, I closed the hive and, with shallow breath, checked the colony the next day. She was there. What a relief. What a strange experience for both the queen and me.

The web has a few observations on this catalepsy of queens. It is rare. The old literature reports this malady only happens to young queens. It certainly unnerves the beekeeper. You might notice there are no photos. I had no time and was seriously concerned that I had just killed a $30 queen. The occurrence is rare and the queen usually recovers – but not always. I hope I was lucky. My first time, I do not want a second.

1I use paint pens that I get at a craft shop. They are Zig Painty pens and come in a variety of colors. Disadvantage is that the permanent enamel paint requires a short time to dry. In the past, when I rushed, the nurse bees smeared the mark on one of my queens.

Yes, it's true. Bees will work compost.

Last Fall, I dumped all my tree leaves on my small garden plot. I planned to till it all in for planting my garden this Spring. Since this task didn't get done, I have now decided to have a late season garden instead. So what does my pile of decaying leaves have to do with bees?

Since I have written about odd foraging behaviors in previous articles, I know many of you are sick of the subject, but there they were – in significant numbers – working, searching, imbibing, or something – maybe as many as a thousand foraging bees. Foraging for what? Sources of standing water were readily available in the traditional places. I left the compost forager photo uncropped to show that there was nothing else attractive in the vicinity.

It would appear that bees forage for more than nectar, pollen, and water

With only anecdotal observations and with no analytical science, it appears that over and over bees will consciously forage for necessary nutrients in addition to nectar, pollen, water, and resin *(to make propolis)*. They seem to conscientiously forage for these necessary food supplements in some unusual places. This fourth aspect of foraging would seem to be important to healthy bee populations. I am increasingly comfortable adding nutrient foraging to my list of things for which bees will forage.

What flower species is this?

In the botanical garden in Steamboat Springs, Colorado, I saw this vividly colored plant that had honey bees foraging on it. Some of your gardeners know what it is? I don't know.

Next month

What should I do with stinking, molded brood combs and wet and seeping frames of unused honey from last Winter? Can I actually still produce a few queens? I wonder if robbing behavior can be used to indicate the strength of a nectar flow. Thanks for reading. BC

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

What flower species is this? (Botanical Garden, Steamboat Springs, CO)

All The Buzzzz in...

Hello Friends,

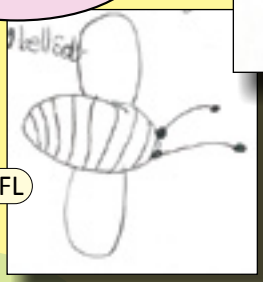
Enjoy the last days of summer. I hope you can take some time to smell the flowers.

Bee B.Queen

Bee B. Queen Challenge

Plant some bee friendly flowers.

Nicole, 11, CA



Caroline, 7, FL

Olivia, 10, CA

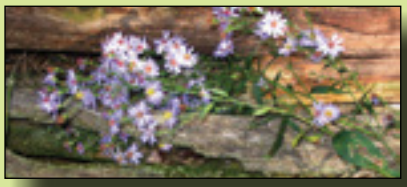
Weeds We Love

Many people look at plants like goldenrod and think of then as a weed – a plant that is a nuisance or has no value. As bee lovers, we are also weed lovers. We love many wild, flowering plants because they provide our flying friends with nectar and pollen for their food. Besides being useful to bees, many wildflowers make our roadsides, fields and yards beautiful.

Here are three wildflowers many consider weeds. All of them are in the Asteraceae family. This very large plant family also includes daisies, dandelions, tansy, thistles, and artichokes along with about 22,750 other species.

Asters

There are many, many different kinds of asters. Actually there are over 180 species. The name aster comes from the ancient Greek word meaning "star". These lovely "stars" not only provide nectar and pollen to bees in the fall but many moths and other insects love this plant.

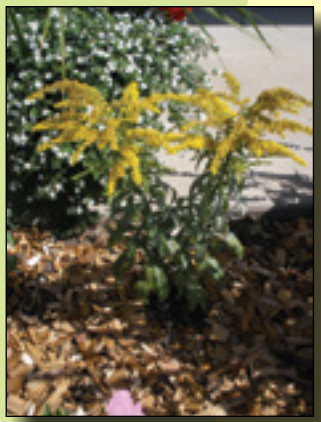


Sunflowers

This flower is an excellent source of pollen and nectar for honey bees. Sunflowers, a member of the aster family, are very tough and easy to grow. These plants are one of the few crops that originated in North America. The sunflower head is not a single flower but is made up of 1,000 to 4,000 individual flowers joined together. That means the plant can make that many seeds! The seeds are food for people, birds, animals and they can be made into oil.

Goldenrod

Goldenrod shows its yellow flowers at the end of summer when cold weather is around the corner and bees need to store honey for the winter. Honey bees share this great source of nectar and pollen with bumblebees, solitary native bees, soldier beetles, yellow jackets and many other tiny creatures. It's a Thanksgiving feast fit for a bug.



1-B, 2-E, 3-F, 4-C, 5-G, 6-D, 7-A

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
August 2015

The Bees
When the warm breeze is blowing,
And when the leaf is blowing,
It's going to get warm,
Then the bees do swarm.
And we'll extract honey,
But we won't feed it to the bunny,
For we will sell it, cool or warm,
And we will make a little money,
Off our small amount of honey,
And we will catch a swarm.

Timothy Miller
Age 11, TN

Poem
Said one bee to the other,
"I think pretty soon I'll smother.
Last winter was pretty lean.
Oh, no! Where's our queen?
We'd better find her
Or we'll be left behind her.

Harvey Miller
Age 13, TN

Flower Chain

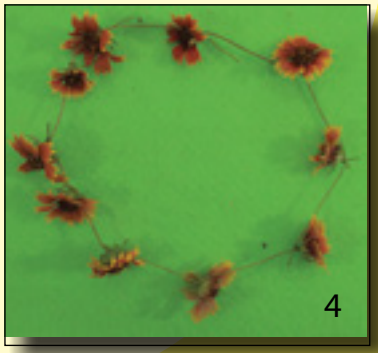
This is a fun way to create a belt, crown, necklace or bracelet out of flowers. Clover works great but try experimenting with other flowers with stems you can bend. This necklace is made out of Gaillardia.

1. Tie a loose knot in the stem of one flower.

2. Take the second flower and slip the stem inside the knot.

3. Gently tighten and slide to the base of the flower.

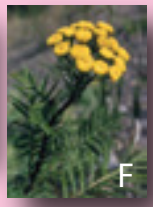
4. Keep tying one flower onto the next to make your chain.

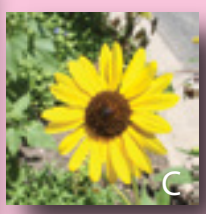


Plants Bees Love

Can you help these bee plants find their names? By the way all these plants are in the Asteraceae family.

1. Aster
2. Chicory
3. Tansy
4. Sunflower
5. Echinacea or Coneflower
6. Goldenrod
7. Dandelion





Bee Buddy

Destiny Pridgen from McAdenville, North Carolina loves nature. Even though she is only 5 years old and entering first grade, Destiny has developed an interest in bees thanks to family friend Tom Vitrano or Vito for short. Through letters, Vito teaches Destiny how important bees are to us. Vito sends information about bees while Destiny sends questions for Vito to answer. When Destiny is not listening to stories or watching TV, she is out digging up worms, catching frogs or smelling flowers.

Beecome 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.

Imported Bees Boost Northern Ontario Wild Blueberry Yields

Alan **Harman**

Canadian Trevor Laing is importing thousands of workers to try to reduce Northern Ontario's biggest export – its youth.

He is operating a recently created 375-acre wild blueberry farm outside Wawa, a small community on the northern edge of Lake Superior and 575 miles northwest of Toronto.

And now his Algoma Highlands Wild Blueberry Farm and Winery is beginning to expand after just four years, thanks to a lot of help from the thousands of honey bees from Thunder Bay, 300 miles to the west.

"We researched pollinators before we started," Laing says.

"We looked at native pollinators and at the beginning, I figured there are 20-plus native species out there."

With those pollinators in mind, Laing set a 655-foot maximum for the size of his fields and developed buffer zones on the edges to encourage the native pollinators that live along the fringes to migrate in to the blueberry fields for the pollen.

"With less coverage needed in the fields, we felt they were fine," he says. "But as the fields became more and more developed, as the plants spread in, we definitely needed to bring in bees."

He talked to people with the Ontario Beekeepers' Association and other experts about pollination. They all said he needed more pollinators.

"We were thinking about bringing in our own bees, but because of the amount of work and the time involved, we decided to use an outside source," Laing says.

That's where Barry Tabor of the Bears, Bees and Honey Apiary in Shuniah, outside Thunder Bay, comes in.

Laing set up a pollination deal with him ahead of other apiaries.

Trevor Laing uses bees to boost his Northern Ontario blueberry yields.

"I had no shortage of offers from beekeepers," Laing says. "The phone range constantly.

"The people from Ontario move their bees out to the East Coast for the blueberries and it's a long way. We are much closer and we get a discount for that. I know what they pay out there, so we pay a little less."

The farm has a permanent staff of five as well as 25 seasonal jobs, something Laing says is important.

"The biggest export in northern Ontario is our children – we lose them," he says.

He figures as his business grows, so will the job creation in a region where unemployment is so endemic most young people are forced to move south in search of work.

Laing sees the farm as a legacy to give his children McKenzie, 15, Talus 13, Aiden 11 and Quinn 9, the opportunity to stay in the remote region.

"If they want to come and work on the farm great – but it is whatever they want to do," he says.

A farm gate store was planned for this Summer to grab the tourist blueberry business, and there were sales booths at the region's Summer fairs and at the Sault Ste. Marie, ON, farmers' market.

Laing's first production was in 2011, and he didn't use commercial pollinators until 2013.

"We brought in 10 hives to start, and we noticed a huge production increase in the fields where the hives were," he says.

This year, 40 hives were on the blueberries for three weeks.

"We have each year increased the number of hives."

He is hoping to reach 200 hives within the next five years.

"We are going to try and do it with organic growth, through the beekeeper we have now.

Last year's blueberry production averaged 500 lbs. an acre and, looking at the flowers this year, Laing was predicting 2,500 lbs. an acre.

"I know we are going to do north of 100,000 lbs. for the season, and I would like to see how close we come to 200,000 lbs.," he says.

The soil has poor fertility and the basic treatment is with nitrogen and nitrates. For every ton of fruit grown, Laing has to put 30 lbs. of nitrogen back.

His aim is to harvest 4,000 lbs. an acre or 600,000 lbs. annually

"My soil guy, Todd Mason, doesn't think it is out of the question," Laing says. "We know we need the bees to do that."

Tabor, who runs 60 hives in a family operation, says the blueberry honey yields are not high.

This year with the cool Summer, he was expecting just 10 lbs. of honey a hive, compared with the best years when it might reach 35 lbs.

At first glance, wasteland. Bees turn it into a high-yielding wild blueberry field.

Warm weather means the bees are flying over Northern Ontario wild blueberry farm.

The honey coming off the blueberry fields is a medium type, a fairly dark, amber color.

"The smell is different," Laing says. "You can't smell the blueberry, but it is similar to a wild flower honey. It is very good."

Laing is beginning the legal process of becoming a licenced apiary area and aims to open a small winery in the processing plant next year.

"Under Ontario law, to produce mead or honey wine, you have to have a minimum of 100 hives and this would complement our blueberry wine," he says. "One hundred is a nice goal to get to – so we get the licence for the winery."

To reach those numbers, Tabor says Laing will need to bring in at least one more beekeeper.

Handling that number would be too much work for his small family operation.

Laing is approaching the stage of deciding on a honey source for the winery, but says he will probably just purchase it from beekeepers.

Under Ontario law, he can sell his honey wine production either on site or through the provincial government's liquor monopoly, but not both.

The on-site wine store was a no-brainer.

"If we sold it to the LCBO (Liquor Control Board of Ontario), they take 53% of the price and the producer has to pay the taxes on top of that," Laing says. "You are allowed one winery attached to a fruit operation and can sell it there."

He has hired a recent university graduate, Mandi Ramhandie, to manage the winery operation.

"She is a young woman who started last year as a harvester and she shone at the job," he says. "We took her on full-time and enrolled her in an Internet correspondence course with the Viticulture and Enology Science and Technology Alliance through Missouri State University's wine-making class. She will also do an internship with a Muskoka Lakes (central Ontario) winery."

Laing keeps an eye on the hives, but finds they are pretty self-sufficient.

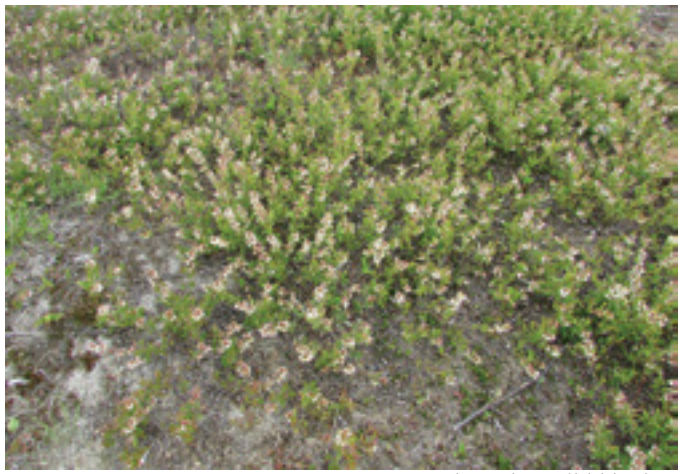
Permanent hive sites have been created with fence polls well set in the ground. The beekeeper drops his bees at the site and hooks the electric fence to the poles.

That electric fence is as important as pollination, Laing says, because "everyone knows" that bears like honey even more than blueberries.

And the Wawa area has plenty of bears.

The local permanent population is about 100, including 15 resident bears at the town's garbage dump.

The farm is also on a migration route between the dump and an area known as the blueberry barrens



Flowering wild blueberries are a magnet for bees.

The Laing family – McKenzie, 15, wife Tracy, Aiden 11, Talus 13, Quinn 9, and father, Trevor – checkout the blueberry flowers. (Algoma Highlands photo)

further north.

Any bear problems in the area usually involve what Laing calls "the teenagers".

"It is not the little ones and it's not the really big ones – it's the ones that are still learning life," he says.

Thus far no bears have made it into the blueberry farm hives.

The only losses happened a year ago when two of the hives swarmed and left.

"People were busy and everybody missed the warning signs," Laing says.

The bears do graze the blueberry fields, but Laing says they don't like being in the open and stay close to the edge of fields or prefer the blueberries growing in the bush surrounding the farm.

The length of the hives' stay on the fields depends on the flowers.

"This year we needed them a little longer," Laing says. "The flowers were out in early June, but it was cold and the bees weren't flying."

Blueberry fields are rested every second year. The bushes are cut to about an inch under the ground leaving only the root. This emulates the disturbance caused by forest fires and results in the bushes spreading farther and increasing in size. They spread naturally, filling in open spaces in the fields.

"You can double your production when the berries produce two years later," Laing says.

He aims to have 185 acres in production every year, but will have 155 acres harvested this year.

Some fields are approaching readiness, but this year there was not enough fruit to make them economical. They were left for another year, until they get better bush coverage.

He bought the land in 2006 after the owner clear-cut it for logging.

The farm is unusual in that Laing didn't have to bring in any stock. He had done his research and soil analysis showed acidity levels were within the optimal level for wild blueberries that were already growing throughout the property and on adjacent land.

Blueberries don't like being moved and they don't grow well from seed.

"They don't start in the open fields," Laing says. "They start in the forest when a bird might drop a seed into a moss. Then a fire comes though, or a lumber company, and they are left wide open and ready to spread."

The Wawa property is perfect for the berries.

Nearby Lake Superior used to be 160 feet higher and what now is the blueberry farm was the lake bottom. It is covered by 80 feet of mainly silt and sand with no stones or pebbles – perfect growing conditions.

The business has no trouble selling its production.

The blueberries are sold to distributors throughout Ontario, including the big Toronto market.

The farm is not certified organic, but Laing has a major organic company as a buyer.

"We disclose everything we do on our fields. They have more than 4,000 weekly household clients and we had an order from them of more than 15,000 pints this season over four weeks."

Scenic High Falls, a major tourist attraction in the Wawa area, can only be accessed through the farm road, giving the business a ready Summer supply of potential customers.

"Last year, we put up a little sign on the road to the falls and in one day my daughter Talus sold just over C$700 worth of blue berries to tourists," Laing says.

The farm is selling Algoma Highlands-branded jam, syrup and a barbecue sauce to retailers along the north shore of Lake Superior.

"One of our clients has us bottle our product and provide it under their own label," Laing says.

Internet sales have also begun.

All products are 100% natural, with no artificial color or preservatives added.

"Right now, we are just keeping up with the demand," Laing says. "We are trying to keep that home-style, home-made, family farm image and sometimes you can get swept away with greater production."

With the hives and their bees safely back in Thunder Bay, Laing turns his attention each year to harvesting.

He uses a cavernous old tree nursery, located in the middle of his property, as a factory to ship his fresh crop and produce the value-added products.

The 160 ft. by 80 ft. two-story building offers plenty of room for expansion and a large freezer unit has been installed that allows the company to provide customers with products year-round.

A large commercial kitchen with three fresh processing lines was added to produce the home-style value added products.

Eco-farm tours and an educational center are on the drawing board and Lain has an ultimate aim of creating a local wild blueberry music festival.

Meantime, pickers using push rakes collect the ground-hugging berries.

"We harvest for the fresh market, which means they have to be fairly dry when they come off the field. If they come in a little damp, we blow dry them and freeze them. They are good quality, but they are not perfect quality for the fresh market.

Everything that comes in from 8 a.m. to 10 a.m. goes into the freezer. From 10 a.m. the berries are dry and destined for the fresh market.

Laing says his isolated location is both a curse and a blessing.

For marketing it is a curse, but for land costs it is a blessing.

"I would love to be on top of Toronto, but the land there would cost a fortune," he says. "The land here is relatively inexpensive."

At a time when other production areas running are out of land, he has plenty of room for expansion.

"I think we have a great location. Most people who buy farms have to move to where the farm is. There are not too many people who can say I am going to build a farm two kilometers from where I live. I can look across and see my fields."

On the other hand, starting in a new area meant he has had to develop everything about the product – the farm, the farm management including pollination services, getting the product to market, the value-adding, marketing, promoting and handling tours.

But even as he expands, he sees climate change as a threat to the long-term future of his cool-climate farm.

"The climate is changing and it is changing fast," he says. "We are getting heavier and heavier rainfalls and more rain in the Winter where we used to get snow.

"We used to have several days of temps below -40° F, but we don't see that now."

Climate change, he says is affecting the blueberries, which prefer a cool climate. They are the first plant to flower after the winter and produce their fruit by August.

"Warm early Springs can be followed by freezes that kill the flowers," Laing says. "The window for harvesting is also getting shorter." BC

The end result – wild blueberry products in a presentation box.

Atlantic Canada contributes about half of the total North American wild/lowbush annual production of 150 million lbs.

Nova Scotia is the biggest producer in Canada, while New Brunswick and Prince Edward Island are major players. Québec is also a major producer, with an average harvest of 26 million kg, 95% of it frozen for export.

Photos by Alan Harman unless otherwise noted.

Alan Harman is a freelance writer and frequent contributor to Bee Culture Magazine.

MAKE A TRIANGLE BEE ESCAPE

Heck, make one for every hive

Rick **Andrews**

With the dog days of Summer in full swing, it might be time to start thinking about this year's honey harvest. Do you recall last year's harvest? Did everything go according to plan or were there one too many stings, endless attempts at brushing bees off frames or way too much commotion as those robber bees tried to grab themselves a free lunch?

Maybe this year, you'd like to make the process a whole lot easier and try using a bee escape to get the bees off of those frames. But, better still . . . why not make a bee escape for each of your hives. It's really not too difficult a job and, in fact, you may find that most of the material is sitting around in that scrap pile which you've been meaning to go through for a number of years.

How It Works

A triangle bee escape works on the following principle. First, you need to put the escape in between your supers and the brood boxes. As the evening approaches, the bees in your honey super will want to join the rest of the colony down in the brood boxes. In order for this to occur, the bees must pass through the center hole on this board and exit out of the openings in the triangles on the other side. The bees are not immediately able to figure out how to get back up to the supers on the following day and you are left with relatively "bee-free" honey supers. But, make sure to plan accordingly and do not leave the bee escape on for longer than a 24-48 hour period. In many cases the bees will figure out how to get back up to these supers if more time permits.

So, with that said, let's get ready to make a bee escape or two. But, before we begin, let's talk about safety**.** *Make sure that you read and understand how to SAFELY operate your power equipment. In some of the pictures below, the safety guard has been removed so that you can get a better understanding of the photo. NEVER operate your equipment without the original guard or an auxiliary guard in place!*

Material List:

Plywood: ¼″ x 15½″ x 19-1/8″
Front & Back Frame Strips: ¾″ x 1½″ x 14¾″
Side Frame Strips: ¾″ x 1½″ x 19-7/8″
Outer Triangle Strips: ½” x ¾” x 12½”
Inner Triangle Strips: ½” x ¾” x 8”
#8 Hardware Cloth

Getting Started

Begin by cutting the frame

strips to their proper width and length. Next, cut the ¼” groove in these strips that will accommodate the plywood. There's no need to set up a dado blade for this job. You can cut this groove in two passes on your table saw using a standard combination or rip blade. Just set the table saw blade to 3/8 for height and the rip fence to one from the *right* side of the blade. It's a good idea to use a feather board for additional support and a push stick to guide the stock. Adjust the rip fence (depending on the thickness of your blade) to make the second pass in order to complete the ¼” groove. Once this is completed, use a 3/8” countersink bit to drill one hole (3/8” deep) in each end of the side strips. These will become the screw locations that will secure the frame together. **Note: If you do not have a plug cutter, then omit this countersink step and just set your screws flush with the frame when it's time to assemble.*

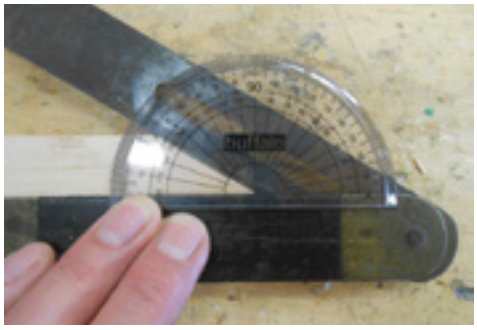
Next, cut the ¼” plywood to the

proper length and width. Using a drill press or hand drill, cut a 1¾" circle (or what drill bit you have that is close in size) in the center of the plywood. This will become the exit hole for your bees.

Making The Triangle

Using the table saw, rip two ¾" x ½" strips for the two triangles. The outer triangle should have a combined rough length of 42" and the inner triangle should be around 27" in length. It is much safer to rip the entire length of each triangle rather than the much smaller individual pieces. I recommend using a feather board and a push-stick that is *thinner* than the stock being ripped for this application. ***Never use a push stick that is thicker than the stock being ripped. This could cause serious injury***.

Cutting the 30° angles for the



triangle pieces can be a bit challenging and potentially dangerous if one chooses to use the miter saw and a backer block for this application. It really just comes down to the fact that your fingers are pretty darn close to the blade when you are cutting the triangle ends; especially when it comes to the smaller triangle. It also may be worth mentioning to the novice woodworkers that the number 30 on the miter turntable is *not 30°*. It is, in fact 60°. 30° would be way past 45° and this angle cannot be found on the turntable. So, why not play it safe and go "old-school" and cut the angles safely using a fine tooth cross-cut saw. This way you'll be able to keep those fingers for more important jobs like lifting your honey supers off of your hive.

In order to accurately layout the 30° angle on the ends of the triangles, you will need a few layout tools. A protractor and a bevel gauge work well for this application. The protractor will easily illustrate the 30° angle and the bevel gauge can be then used to draw the angle on your triangle strips. You'll just need to measure and layout one strip for each triangle and you can then use that piece (after the angle has been cut) to trace out your other pieces. Now, carefully and accurately cut each angle with your fine tooth cross-cut saw. Don't get too worried if you're not 100% accurate. I don't think the bees are going to care too much.

Positioning and Assembling The Triangles

Accurately positioning the triangles on the plywood can be a bit challenging without a few points of reference. I'm big on accuracy, but not so big on time. So I "bit the bullet" on my first bee escape and worked out the measurements using three pieces of wood that would accurately, but quickly, provide the location and spacing for the triangles. In order for you to do this, you'll need a few feet of ¾" stock that must be ripped to 3/8". *Remember to use that thin push stick for this step!* The first two pieces must have a finished length of 9" and a 60° cut (30 on your miter saw) on one end. The other piece (center) will be 90° on both ends and 9½" in length. Align these three pieces over the center of the exit hole and begin placing your triangle pieces in their appropriate spots. With a little adjusting, everything will come together well.

Now, lift one piece at a time, run a bead of exterior glue over the underside and fasten it back down to

its original position with a few ½" staples or nails. Cover the triangles with #8 hardware cloth, secure with staples and trim with metal cutting shears or snips.

Assembling The Frame

Generously cover the ends of the front and back frame strips with glue and slip the plywood cover in place; making sure that the triangles are on the wider side above the groove. Set the side frame strips in place and

screw the entire frame together. Now, fill your screw holes with wood plugs and trim the excess to flush. Last, fill the ¼" x 3/8" grooves at the ends of the sides with some leftover scrap from your triangles. A utility knife makes good work for cutting these small pieces. Drop in a bit of glue in the space, set the plug in place and trim to flush. Now, give the frame a quick sand and get ready to harvest some bee-free frames of honey! BC

Rick Andrews lives in Southern Ontario, Canada with his wife, kids, cat, chickens and honey bees. You can follow his chronicles at ***www.cityboyhens.com****.*

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

Send your questions to Phil at
phil@philcrafthivecraft.com
www.philcrafthivecraft.com

A beekeeper in Kentucky writes:

Hoping you can help me with a swarm question. On Friday, May 29 I captured a swarm from my hive only to find that Sat, May 30 they were gone. Sunday, May 31 the swarm appeared again, I put it back in the hive and it has stayed.

What length of time should pass before I see brood on the frames of comb?

Phil replies:

Swarming is one of many fascinating and mysterious activities carried out by honey bees. When a critical mass of bees is moved by a collective urge to seek out a new home, they begin by producing a number of queen larvae – usually more than a dozen – to ensure the continuation of the colony they leave behind. Typically, as soon as the queen cells are capped, they exit the hive along with the current queen. She, however, is not the leader. On the contrary, the process is initiated and controlled by a communal consensus of workers, and the queen is literally pushed and prodded into going along. She displays an understandable reluctance to abandon the only home she has ever known and one which she has not left since the mating flights of her first few weeks of life. Occasionally, she manages to evade her handlers and remain behind. When the departing swarm clusters on a nearby branch (or convenient branch substitute, such as your mailbox), they take stock, notice her absence, and have no choice but to return to the hive to try again another day.

Photo by Mary K. Parnell

Very probably, the bees you captured on the 29th were part of a queenless swarm which went back to their original colony shortly after you hived them. Under such circumstances, they tend to swarm again soon – often the next day, weather permitting. When you caught them on the 31st, they had presumably succeeded in coaxing or prodding the queen into leaving with them, and were content to settle in the hive you provided when placed in it for the second time. You're not the only beekeeper who has caught the same swarm more than once. I have, on numerous occasions, heard similar accounts from beekeepers, some of whom actually saw the swarm returning to the original hive. I have had the same experience myself.

As to when you can expect to see brood on frames in the new hive, that is partly dependent on whether you hived the captured swarm on frames containing drawn comb, or on frames with new foundation. If on previously drawn comb, you should see eggs almost immediately since you have a mature, mated queen and open cells in which she can lay. You should certainly see them within a day or two, and larvae a couple of days after that. If the swarm was placed on new foundation, you can still expect to see some eggs within a few days, though how many depends on the size of the swarm. The bees in a swarm are especially well equipped to draw out new comb quickly, because a large proportion of them are young workers at the peak of their wax building capability – about eight to seventeen days after emergence. I have observed large, newly captured swarms draw out a box of foundation into comb in as little as a week.

The other important variable in how quickly a captured swarm will began producing brood is whether it is a primary or secondary swarm. A group of bees leaving the hive with the old queen in order to start a new colony is called a primary swarm. It can be very large, containing as much as 60 percent of the original colony's population. However, sometimes once is not enough, and a colony can swarm a second, third, or even fourth time. These subsequent departures are called after swarms or secondary swarms. They will obviously not be as large as the first one, and if there are multiple secondary

swarms, each will be progressively smaller. In addition to containing fewer bees, they occur so soon after the first that each will be accompanied by a virgin queen. The young queen cannot begin to lay eggs until several days after completing her mating flights (which can be delayed by rainy weather), so a newly captured secondary swarm may not begin rearing brood for as long as two weeks after you hive it. If you capture a small swarm, be aware that it may be an after swarm and be patient, but do check on it after a couple of weeks to make sure that the queen returned, successfully mated. Secondary and tertiary swarms will build up slowly, but can still be worth capturing and nurturing unless they contain only a handful of bees or appear late in the season. You can help them out by putting them on drawn comb, adding a frame or two of brood from a strong hive if available, and by feeding them. They may reward you next Summer.

A beekeeper in Ohio writes:

I heard you speak last week. I'm a new beekeeper. I have two hives started in late April from 3# packages. My intent is to develop strong colonies this year and figure on honey collection next year. I expect to have two deep hive bodies on each hive going into Winter, they are close. I plan to check for mites, but if I need to treat, how and when would you recommend treating for Varroa mites?

Phil replies:

I like your goals for your new hives: developing strong colonies and planning to control mites. Your question comes as an excellent follow-up to a *Varroa* related inquiry which I included in last month's column. That one concerned monitoring for *Varroa* mites, which is the first step in answering your question about when to treat. (*Bee Culture* readers: I am assuming that you read that Q&A last month, but if you are a new subscriber or newsstand reader, contact me and I will email, or mail, you a copy.)

One common mistake which beekeepers make with *Varroa t*reatment is waiting too late – not treating until the infestation has reached devastating proportions and the colony is already weakened. That's where monitoring comes in. Another mistake is waiting until too late in the year. In Fall, a colony must rear the bees that will live through the Winter, but one consequence of *Varroa* infestation is a reduction in honey bee lifespan. Colonies with high Fall mite counts contain too many bees parasitized as they developed in their cells. The damaged bees are unlikely to survive the Winter, contributing to the collapse of colonies before Spring. The earlier *Varroa* mite levels are reduced, the better the health of the bees and the strength of the colony going into Winter. I prefer to treat as early as July or August, soon after I remove my honey supers. However, there are other considerations, and what works for me in Kentucky, may not work for you in Ohio or for beekeepers in other parts of the country. Is there a nectar flow on? Are there honey supers on the hive? Do you intend to collect a late Summer or Fall honey crop? Are the bees rearing brood (which should coincide with nectar flows)? What is the weather like (temperature, rain, etc.)? When does Winter set in? All of these are factors to be taken into account when choosing a method of control, and in turn, determining when to use it.

Photo by Mary K. Parnell

It is good that you are thinking about *Varroa* control now, prior to your need to treat. This gives you time to research miticides (the name for chemicals used to control mites), and make decisions on which might work best for you. Plan to use a product that is registered for the control of *Varroa.* The approval process for bringing a new miticide to market requires that it demonstrate, in scientific trials, effectiveness at killing mites. Registered products have an EPA registration number on the package. If it is not there, the product is unregistered. Avoid homemade remedies; they do not work. There is plenty of snake oil out there for sale. If you see advertisements for a miticide that sounds great, but you're not familiar with it, ask your university apiculture extension specialist, or bee inspector. These folks are also just good resources for recommendations and information about miticides – what works best in your area and what doesn't work. Ask local beekeepers what they use and when they treat, but be sure to ask those with low loss rates. When beekeepers repeatedly lose a large percentage of their hives, there is probably a reason. Read past articles in the beekeeping magazines, and consult university bee lab webpages for articles about different *Varroa c*ontrol products. Read about possible side effects on brood and queens. Educate yourself about your options.

CAREFULLY read the label instructions for products you are thinking about using. Most miticides cannot be used while honey supers are on hives, so treatments must be coordinated with nectar flows if you hope to harvest honey. Some products must be in place for a month or more to be effective, and require a two week delay between the end of treatment and the placement of honey supers. That may mean choosing between using a (possibly less effective) miticide which is legal for use while hives are supered-up, postponing treatment until honey supers are removed, or sacrificing a honey harvest to control high *Varroa* levels for the health of the colony. Follow the label instructions. If honey supers must be removed prior to use of a miticide, remove them. If dosage is dictated by colony strength, make sure that you use a sufficient quantity, though not more than recommended. Underuse, resulting in reduced effectiveness, is the more

common error made by beekeepers. If more than one application is needed, do the re-application when directed by the instructions. Do not skip the re-application. Most products, or containers, need to be removed from the hive at the end of the treatment period. Remember to do so; mark your calendar. Note other restrictions, such as temperature requirements for some products. The upper temperature limits of some miticides may restrict their use in the heat of Summer, and some may be ineffective later, due to minimum temperature thresholds.

I would suggest monitoring your hives in mid to late Summer, which means between July and September in most places, to determine your mite levels, and make a decision concerning the need to treat with that data in hand. Extremely high *Varroa* counts may dictate treating as soon as possible. In that case, temperature restrictions of certain products may limit your options, since you cannot wait for a change in weather. Another consideration is whether or not there are there large amounts of brood in the hive. *Varroa* mites spend a large part of their lifecycle in the brood, and any miticide is more effective during periods of low or no brood, which typically correspond to stretches of dry weather. Treating during these times will always make your application more effective. However, high *Varroa* counts may preclude waiting, or the timing of broodless periods – in some locales occurring too late in the year - may not allow them to be a consideration.

Follow-up monitoring, after treatment, will tell you if your *Varroa* control has been successful. If treatment is conducted several months prior to the onset of cold weather, or if mid/late Summer monitoring indicates that treatment is not required, another round of monitoring later in the Fall is prudent. I would also advise you to conduct a round of *Varroa* monitoring early next Spring, whether or not you treated this Summer or Fall. While many small scale beekeepers, myself included, find that a once a year treatment is usually sufficient, monitoring in both Spring and Fall is wise.

As with so many issues in modern beekeeping, a simple answer isn't an adequate reply to a simple question This is one of the reasons beekeepers lose bees: they look for simple answers. There is no check list for what to do in order to be a successful beekeeper. We must educate ourselves, and then make educated decisions. But, education does not occur overnight, which is tough on new beekeepers and on their bees. Make the wrong decisions, and our bees die. However, just deciding that you MUST control *Varroa* is the first correct decision. BC

A Good Thing About Science Is That It's True Whether You Believe In It Or Not.

Neil deGrasse Tyson

BIGGER PICTURE

Jessica **Louque**

The Berry Business Of Bees

Once when I was driving *somewhere* south (I don't remember if it was just to south Georgia or to Florida) I saw a billboard that caught my attention. It said "How many berries can you name?" followed by the reason for asking and the organization in letters way too small to actually read. It did make me start thinking about how many I could name off the top of my head, which turned into an undergrad lesson in botany for what actually constituted a berry vs. other type of fruit. Most people do know more types of berries than they would be able to name if you put them on the spot, but it might be like one of those things where three days later in the checkout line of the grocery store, you suddenly exclaim "elderberries!" and everyone looks at you like you're crazy.

Let's look at the basics first. What normally is considered a "berry" to most people? It would be a little fruit on a stem that's easy to pick. Botanically speaking, it's a simple fruit that comes out of one ovary. The first berry that probably comes to mind is the blueberry. A side note of information here for naming: in entomology, an insect that is not what its name indicates is combined as one word e.g. dragonflies are not dragons or flies. An insect that is what the name indicates would be two words, such as honey bee (which is coming up on my autocorrect as wrong with the space in the middle) or bumble bee. Botanically, there is no such rule and the names often change based on the regional dialect. I guess technically "botanically" we'd just use the scientific name, so the common name would be more horticultural.

Some of the more common berries would be blueberries, huckleberries and cranberries (blueberry cousins), currants, elderberries, gooseberries, goji berries, and lingonberries. We do not have currants and gooseberries here in NC because they are disease vectors and cannot be shipped over state lines. Another berry that is becoming popular is the honeyberry, which comes from a honeysuckle cousin. Bobby and I planted a couple last year but they were not having our ark plan (two of every plant we can get our hands on) and didn't do well with the transplant, then totally died with our ice storm. They're basically elongated blueberries, but supposedly sweeter. Grapes are also common, but not often thought of as berries. Coffee technically comes from a berry as well, but most people don't particularly care about the fruit aspect of coffee. Avocado is a pretty delicious berry as well, but definitely not something normally considered as a berry. I personally just consider avocados as an extension of fish because I usually only eat it with sushi. Bananas are also a berry, which would be a bit more avocado-ish because of the texture. There's also the never-ending tomato argument of fruit vs. vegetable. For the intents and purposes of this article, tomatoes and their kin are all berries. Yep, eggplants, peppers, tomatillos – all berries.

A bunch of blackberries waiting to be in my smoothie at Unger's Farm.

Blueberries, tomatoes, and their relatives are native to North America, meaning that they were already doing pretty well being pollinated by things other than honey bees. This group of plants requires buzz pollination for all their flowers to release pollen. You can even buy your own garden vibrator online to pollinate your garden plants that prefer bumble bees or solitary bees. Some of the other berries, like gooseberries and currants, are from Europe and like their honey bee pollination just fine. Grapes originated in the Near East, and do not normally require insect pollination. Honey bees do not prefer grape flowers and they usually have to be sprayed with sugar water to attract bees.

Watermelons and other cucurbits are considered berries, but they get to be pepos. Pepo means that it's a berry with a harder outer shell, like a cantaloupe or melon. Citrus fruit is also considered as a berry, but they are also a different kind of berry called a hesperidium because they have the thick outer skin that you peel off to eat the delicious interior.

While most people consider blackberries and raspberries to be berries (duh, it's in the name), they are actually aggregate fruits, where there was still only one flower but it had multiple ovaries making the one fruit. We have a lot of dewberries growing wild around our work hives, which is related to blackberries and raspberries. Anything that looks

like a blackberry is an aggregate fruit, unless it's not. Mulberries, for example, look similar to a raspberry or blackberry, but are actually multiple fruits. It's a small horde of flowers that were all close together so each of their tiny berries make it look like an aggregate fruit.

Strawberries, a popular berry, are actually just receptacles. The tiny little seeds all over the outside ARE the fruit. The delicious part that you want to eat is the receptacle from the original reproductive parts. Comparatively, a fig fruit is an inverted receptacle. Basically, it's a strawberry that was turned inside-out (or outside-in for a better visual).

Now that we know the difference and still don't care since they're delicious, let's talk about some things you can do with berries (and non-berries). If you've ever been lucky enough to visit Oregon, you know that it is the most amazing place to find delicious berry products. Oregon has an interesting climate because it can get warm to hot during the days but it cools off at night, and it sets the sugar in the fruit. At least, that's how it was explained to me. Bobby and I were doing some work out at Unger's Farm a few years ago, and I think that man has magic in his land. On first glance, He had some really bizarre grapevines on the way to our strawberry section. Upon closer inspection, they were BLUEBERRIES. They were the most gorgeous grape clusters of blueberries I have ever seen. He had blackberries the size of my thumb, and the strawberries would maybe fit three to one hand.

There was a really cool shop on the farm that would sell you a Panini and a berry smoothie for lunch with fruit samples while you wait. I think I went on a full-on smoothie binge after leaving there because they were so good. If you're looking for a basic smoothie recipe, I have a couple of suggestions…

The "healthy" berry smoothie

Puree two cups of berries, ½ cup of orange juice, ½ cup of skim or soy milk, and one to two teaspoons of honey to taste. If you use fresh berries instead of frozen berries, you should add in another ½ cup of ice cubes to make it cold.

The "Jessie gave herself diabetes" smoothie

Puree two cups of berries (strawberry is my favorite) with about three scoops of vanilla ice cream and add heavy cream until it covers everything in the blender. Add some more berries if you want. All of these could be mixed in any ratio that makes you happy, but you need to make enough for everyone in the house or they'll steal yours!

When we were at Unger's farm, we were working with strawberries where we had to keep pulling fruit off to have enough blossoms. Being the generous person that I am, it seemed like a nice idea to take a couple bags home to the kids. I would like to tell you that all the strawberries I picked to take home were made into a glorious jam, but in reality, I ate them all on the way to the airport. It was maybe five pounds of strawberries – such a terrible decision, but terribly delicious. No regrets here. While wandering around the airport trying to stay close to a bathroom in case I had to relieve myself of said strawberries, I found a cool recipe in the *Oregonian* that may be of interest. I would suggest using this recipe to augment some homemade strawberry ice cream, as using alcohol in ice cream keeps it creamy and delicious since it doesn't freeze like water.

A row of blueberries at Unger's Farm.

Homemade Berry Liqueur – makes about three quarts

- 2-2.5 lbs of fresh berries that are extremely ripe and rinsed
- can use blackberries, strawberries, marionberries, raspberries, black currants
- could also be frozen
- zest of 1 lemon, cut into strips
- 1 to 2 cups of sugar or to taste
- 6 cups of vodka

Put the berries and lemon peel in a clean glass gallon jar. Set aside.

Put a small saucepan over medium heat and dissolve the sugar in one cup water. Let cool and pour over the fruit in the jar. Add the vodka and enough water to fill the jar-about one to two cups. Place wax paper under the lid and close. Put the jar in a cool, dark location, shaking gently every day for at least one month, preferably three months.

Remove the lid and taste for sweetness. If it's not sweet enough, make and add a small amount of simple syrup. Replace the wax paper and lid, place in a cool, dark place for another three months; don't shake during this time.

Strain through a cheesecloth or decant the liqueur by siphoning liquid off the top. The liqueur may be a little cloudy. Pour into small containers and store either at room temperature or in the refrigerator. It will keep for up to three years.

Note: Adjust the amount of sugar depending on the sweetness of the berries. For instance, use 1.5 cups sugar for raspberries and strawberries, but two cups for blackberries and black currants. The sweeter the berry, the less sugar you will need. BC

Jessica Louque and her family are living off the land in North Carolina.

Splits & Varroa

More Colonies, Fewer Mites, New Queens – What Could Be Better?

William **Hesbach**

At a recent beekeeping meeting the question was asked if a split can be made to help control *Varroa*. The answer is yes, and the reason is *Varroa's* dependence on developing bee larvae. *Varroa* can only reproduce by entering a cell containing a mature larva ready to be capped. Once the cell is capped, *Varroa* begin to reproduce. They feed on the developing pupa's hemolymph vectoring viruses and ultimately weakening the emerging bee. This cycle then repeats for as long as there are larvae for *Varroa* to infest. Since more than one mature *Varroa* will emerge with a single adult bee, eventually the varroa population can overrun the bee population and the colony's viral load will cause extensive disease and ultimate collapse. Depending on the initial level of infestation, this can happen in as short an interval as a single season.

There are many ways to make splits and almost an equal amount of reasons why beekeepers make them. In this article I'll discuss splits made with the intent to control *Varroa*-using manipulations to temporarily stop the colony from producing bee larvae and therefore providing control of the *Varroa* population.

This means the split must go through a period when no eggs are being laid either because it's in transition to a new queen or the existing queen is being restricted from laying. This is referred to as a brood break, or broodless period, and must be of sufficient duration to deny mites the opportunity to reproduce for an extended period. During the broodless period all the reproducing mites, already under capped cells, will emerge and with no available larvae to continue reproduction some will die and others will be groomed off. Since the population is diminished, once the brood cycle resumes the emerging bee population can grow faster than the *Varroa* population. This has been described as a forever-young colony where periodic brood breaks allow bee populations to naturally out-run their pathogens and pests. The model in nature is the African honey bee that constantly swarms and absconds re-starting their brood cycle each time.

With a split, accompanied by a brood break, there are a few important considerations. The colony looses a great deal of population and the split must be timed to allow recovery before the end of the season. Also, facilitating a successful brood break requires understanding the brood cycle. The splits must be re-queened, but egg laying must be delayed. How you introduce a queen will depend on the resources you have, or can obtain, at the time of the split. Here are some examples of how to re-queen and at the same time facilitate a brood break.

- A walkaway split where a colony raises an emergency queen.
- Timing the introduction of a virgin queen using a ripe queen cell.
- Timing the introduction of a purchased fertile queen.

Let's look at each one.

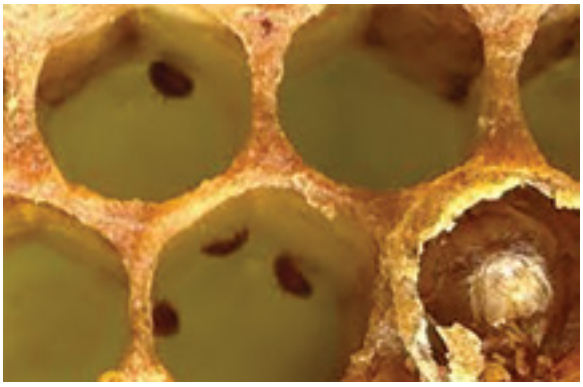
Walk away split building a new queen cell.

Walkaways

Using walkaway splits will depend on having brood frames with eggs so the splits can draw queen cells and raise emergency queens. If all goes smoothly, raising a new egg-laying queen will take about 27 days. It will take another 21 days, or about seven weeks total, before the colony has an emerging population of new bees.

For the first nine to 10 days after the split, *Varroa* can still find open cells with mature larvae to reproduce but after that all existing larvae will be capped. While the current brood cycle finishes, *Varroa* will continue to emerge with adult bees but are denied larvae to reproduce until about day 34. At that point the new queen's larvae will mature and *Varroa* can resume reproduction. The 25-day period, between day nine and day 34, is the start of the *Varroa* population decline that will become evident in future *Varroa* measurements.

The main advantage of a walkaway split is that it can be done without the timing restrictions of acquiring new queens or queen cells. This option works best around



Varroa *entering a cell.*

swarm season with good nectar flow and plenty of available drones. A walkaway also allows time for additional *Varroa* controls when all the mites are out of cells and on bees. That window is difficult to predict, but can occur starting around day 24 and can last about 10 days. That's the sweet spot for optional additional treatments. Inspections can help determine exactly when all the old brood has emerged and when new brood is first available to mites.

Queen Cells

A delayed introduction of a ripe queen cell provides a similar brood break. With this mehod the queen in the cell is only a day or two from emerging. Assuming the split is eggless, with no opportunity for emergency queen development, you can leave the split queenless for about 10 days then install the ripe cell. A few days later the virgin emerges and a few days after that she begins mating flights. By delaying the introduction of the queen cell, the events inside the colony follow the timing of a walkaway split with all the same benefits.

The advantage of using a queen cell is your choice of queens. If you're doing this during swarm season, you can use your own swarm cells from colonies that have characteristics you want, or you can purchase desired cells from local queen breeders.

Since the queen-cell splits must be ready before the cells arrive, timing is critical. You want your splits done and waiting for about 10 days previous to the arrival of your ripe queen cell. During the 10-day period prior to introduction of your queen cell it's critical there are no emergency queen cells in production by the colony. Emergency cells are normally started within a day or two. Check a few days after the split and if you encounter emergency queen cells you must remove the frame, shake or brush off the bees, destroy all the emergency cells and put the frame back. Then before installing the ripe queen cell check for emergency cells again and repeat the procedure above if needed. It's imperative that you're only allowing the queen you want to emerge.

New Queens You Purchase

Unlike the parent colony queen, new queens must be introduced to the colony slowly allowing their pheromone to permeate and facilitate acceptance. The technique is the same, meaning you must delay the introduction long enough to facilitate a brood break. Just like with ripe queen cells, there are the same critical timing issues and colony behaviors to consider. If the split had eggs, the colony will start emergency cells almost immediately. Those will need to be removed as explained previously. If no emergency cells are present, you can simply leave the split queenless for few days, then introduce the new queen in her cage with the cork in place denying access to the candy plug normally used to release the queen. After a few days you can remove the cork and expose the candy plug. It takes about three to five days until she's released and another five, or more, until she starts laying.

The Parent Colony Queen

In all cases, the parent colony queen will continue to lay without a brood break unless you intervene. One way to accomplish a brood break is to capture her and leave her in the colony but restrict her laying to a very small area under a "push in cage." These cages are generally about four inches square made from #8 hardware cloth and deep enough so the queen has room and can be attended by workers. Another way is to install a commercially available queen release frame and leave her in the frame. Either way her physical presence in the colony will maintain some order and you can leave her caged until all the existing brood has emerged.

Which Option is Right for You?

To help decide, start with an inspection and determine the number of splits you can make based on the quantity of nurse bees, brood and food frames that are available. Choosing an option, like queen cells, or new fertile queens will depend on connecting with a supplier and timing the splits with delivery. During swarm season you can use your own swarm cells and, as mentioned, a walkaway can be done almost spontaneously as long as drones are available to mate the virgin queen.

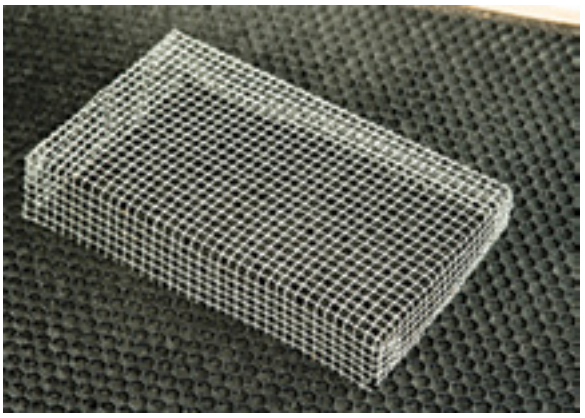
Other Considerations

All the options require inspections

Emergency cells are removed in splits where a new queen is introduced, but allowed to emerge during a walk away split.

to determine if the queen is accepted and laying. When re-queening doesn't happen according to plan, you must intervene to get the colony on a path to becoming queenright. Leaving a colony without a queen, for an extended period, will result in worker bees developing their ovaries and when that happens workers will start laying eggs. A colony of laying workers produces all drones and the colony is basically doomed. Also, if your virgin queens from queen cells or walkway splits are not mated correctly they can also lay all drones and must be replaced.

The weather plays a major role in the mating of virgin queens and can also delay your planned date for doing splits. Queens will emerge from cells on their schedule regardless of weather, so you may need to think about how you would care for virgin queens in case weather prevents you from getting cells into colonies before they emerge.



Push in cage – #8 hardware cloth 3x5 inches.

Notes:

Since these splits are for the purpose of *Varroa* control, monitoring mite populations before and after is critical to understanding efficacy. If your ultimate goal is limited treatment, your requeening choice should favor queens with hygienic behavior that resist *Varroa* or, conversely, bees that can tolerate higher levels of infestation. When using walkaway splits or ripe queen cells, area drones will determine part of the genes passed on to the splits. The hygienic quality of locally mated queens can only be determined as you monitor *Varroa* counts. Also, you will loose queens that you purchased for their hygienic traits if they swarm and her daughter queens may produce workers with different traits because they will mate with local area queens of unknown genetics.

A realistic goal is to achieve a balance between infestation and a healthy colony. Realizing it will not be possible to eliminate all *Varroa*, or to ignore them hoping the bees will deal with them on their own, is the first step toward successful *Varroa* control.

Critical Dates Post Split-Approximate

Day-9 All existing open brood are capped

Day-12 New queens emerge from various options

Day-24 All brood and all mites have emerged

Day-24 All mites are phoretic until 7-8 days after the new queen starts laying.

Critical Dates Based on the New Queen – Plus or Minus Five days

Day-27 New queen starts laying

Day-33 Last day that all mites are phoretic

Day-34 Mites resume reproduction in new brood

Day-48 New mites begin to emerge BC

William Hesbach is a sideline beekeeper in Cheshire CT.

My First Harvest

Ann **Harman**

This is the year of cooperation – the weather during nectar flow was perfect; the two hives were positively full of bees to take advantage of the flow. The Langstroth hive has two honey supers full of capped honey and the top bar hive has quite a few combs all capped. How many jars of gleaming golden honey will there be?

Harvesting your first crop of honey is the most exciting one you will ever do. So aim to make it happen smoothly and easily. Your friends have been asking when they can buy some of your honey. Invite them to come and help. Order some refreshments and pizza and have an extracting party. Promise them they will get sticky.

The speaker at the last club meeting said it was very important to take the frames of honey off and extract immediately so the small hive beetle does not destroy them. That means everything needs to be in place and ready to receive and process the supers and combs without delay. Before you remove even one comb or the honey supers, now is the time to prepare a place and assemble the equipment you need. Honey, warm from the bees' care, will flow easily and make harvest easier than struggling with 'cold' honey from supers and combs that have cooled.

Where had you planned to do your honey handling? In the garage or kitchen or basement or garden shed? Well, which place is the cleanest? Honey is a food product and should not be contaminated from *things* in its processing area. Wherever you decide, keep in mind that you will be handling wax that sticks to everything and honey that makes everything sticky. If you plan to extract during the day, the chosen place must be bee-proof. If you leave screened windows open for ventilation you may be surprised at the number of bees that will congregate on the screens.

If you decide on the garage, clean up cobwebs, dust and dirt; get rid of old containers of paint and motor oil and mystery gunk. Cover open storage shelves with plastic sheets. The garage has an advantage. You can extract honey after dark with the garage door open for cooler air. No, you do not want to use a fan – it blows dust around. If you think the basement would be a better place, clean it up also and cover any open storage shelves. Remember that you will be carrying some heavy things up and down the stairs unless the basement has a ground-level entrance. The kitchen has its advantage – hot and cold running water. You will have to remove anything you don't want to become sticky. If the kitchen is small, or is awkward to work in, it may not be the best choice. The garden shed may be the worst choice. Does it have a dirt floor and is it used to store muddy spades and rakes? If so, it is not a good place to prepare clean honey.

If you did not save newspaper for your honey project, ask the neighbors for some. However big a stack of paper you have, it's not enough. Newspaper is to protect the floor from bits of wax and your shoe soles from sticking to the floor. The easiest way is to start with a layer of newspaper. Then as it becomes sticky and full of wax bits, put another layer on top. At the end, at cleanup time, it can be gathered up and recycled. You may think that a sheet of plastic would work but when it becomes sticky you cannot put another sheet of plastic on top. The top sheet slides on the bottom sheet; the area turns into a skating rink, quite dangerous.

If your choice of a processing place does not have running water, you will need some buckets of water and clean towels because your hands will have honey, wax and perhaps a bit of propolis all over them. The honey actually makes your skin feel soft and smooth. Remember, honey and beeswax are used in hand creams and lotions.

The equipment supply catalogs offer quite an array of equipment for harvesting honey. Yes, the various pieces make harvesting efficient but this equipment is used only once or maybe twice a year. The rest of the time the equipment needs to be in a clean storage area. Some items can be easily made at low cost. Beekeeping books and, of course, the Internet, give suggestions and plans for the handy DIY. Some items could be borrowed from fellow beekeepers, perhaps in exchange for your help in their harvesting.

For the Langstroth honey supers you may wish to borrow or rent an extractor and hot knife. Your club does not own equipment for members to rent but the neighboring club does – to dues-paying members. Oh go ahead and pay dues (and attend some of their meetings) and select the day for your extracting. With two full supers you will be glad you chose to rent equipment. You need to find out if the extractor has either legs or a stand. If not then you will have to have some sort of sturdy stand for the extractor, high enough so you can drain the honey into a bucket.

One handy item is probably already in your bee bucket – a cappings scratcher. You will need that to scratch the cappings on low places and corners that the hot knife does not reach. Keep your hive tool handy also to scrape any burr comb from tops of frames and to loosen the frames of honey in the super. For crushing top bar combs you can use an ordinary hand potato masher.

Once the honey has been spun out in the extractor it needs to be strained into a container. If you are planning on extracting honey each year you may wish to invest in a very nice set of strainers (called 'filters' in the catalogs) sold by many of the equipment suppliers. You will first use a coarse screen because there will be small chunks of wax coming out of the extractor. Then you progress to a medium and a fine screen to remove all of the small particles. You can also purchase one or two five-gallon buckets (five gallons of honey is 60 pounds) with a gate

This is a hand powered two-frame extractor on a stand.

A very handy setup. The hot knife removes the cappings which fall in the uncapping tank. The tank has grid which catches the wax and honey drains below. The uncapped frame goes to the blue holding tub, and then into the extractor. The box to hold uncapped frames is behind the beekeeper.

for settling and bottling. The set of strainers is made to fit the top of this bucket. If you do not wish to purchase the strainers you can use sheer nylon window curtain material from a fabric shop. This fabric can also be used for harvesting the top bar combs.

Now you will need a way to uncap the Langstroth frames comfortably. If you did not have access to the rented hot knife you could have used one or two kitchen carving knives kept heated in a container of hot water. They do need to be dried before uncapping since you do not want to introduce any water into the honey. This method will take a bit longer than using a hot uncapping knife and will be more tiring on your wrist. You need to catch the wax cappings and allow them to drain. Equipment suppliers sell small uncapping tanks that are useful. But you can construct your own with a five-gallon plastic bucket and a piece of wood to support the frame.

Find an empty honey super and telescoping cover. Set the super inside the overturned top. This will be where you put the extracted frames. Then this super, when full of extracted frames, can be put over the inner cover on a hive for the bees to clean up. Setting the frames out in the open will attract small hive beetle and at least a zillion bees and may lead to robbing from the hives themselves. You do want disease-free colonies to do this. American foulbrood can be transferred in honey.

You need a place to put your buckets of honey for settling, for the cappings to drain and also for the crushed top bar combs to drain. A warm place would be best since the honey is not as viscous when warm. You want the air bubbles, tiny wax particles and other small debris to rise to the top of the extracted honey. And, of course, the place must be clean and bee-proof. Ant-proof also!

Is all your equipment assembled? Good. Think about the traffic pattern. Supers and top bar comb will enter the area. The Langstroth frames will go first to the uncapping area then to the extractor. Extracted frames to the empty super and from there back out to the hives. The top bar combs will go to the area where you have a bucket with a strainer cloth. You can take care of these combs first since they will take time to drain. Cut or break the comb from the top bar. Break the combs into pieces. Use the hand potato masher to crush the combs. For best drainage you may need to rearrange the mashed pieces from time to time. A lid for this bucket will help control humidity and any wandering critter, large or small.

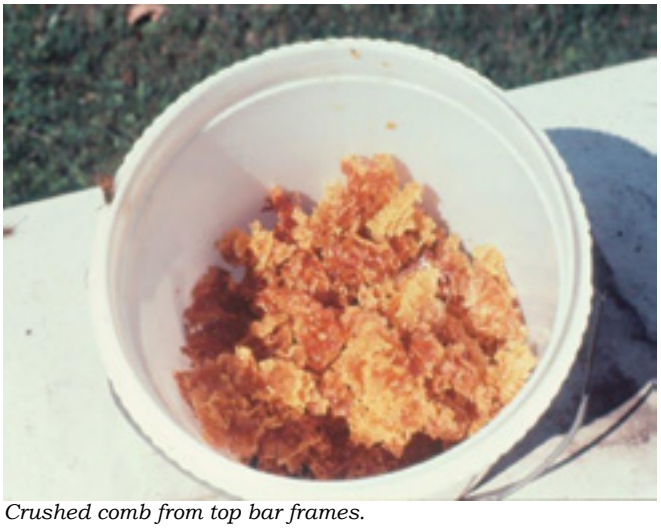
Breaking and mashing the comb was easy and did not take much time. Now you can start uncapping and extracting. How many frames does your rented extractor have? Uncap only that number at a time. Honey will leak from uncapped comb. Don't waste it while extracting uncapped frames.

If this is your first time uncapping, you can try cutting upward and then try cutting downward to find which way works best for you. Tilt the frame slightly so that the sheet of cappings falls clear of the frame. Uncapping with a hot knife is hard on the wrist. That is why some beekeepers prefer the heated uncapping plane. Here are two very important things to remember. (1)Learn to uncap quickly. The hot knife will scorch honey and give a 'burnt toast' flavor to your beautiful honey. (2)Never bang or pound the hot knife against the uncapping bucket or tank to dislodge pieces of comb. The hot element inside the knife will break very easily; then the hot knife is ruined.

The uncapped frame goes immediately into the extractor and when full of frames, start up slowly. If the extractor is tangential, extract only about half the honey from the first side, then stop and reverse the frames. Extract this side fully then reverse the frame and finish the first side. If the extractor is radial there is no reversing of frames; spin until free of honey. When the frames are removed from the extractor they will be placed in the empty super you prepared.

Watch the level of honey in the bottom of the extractor. If you have had the extractor gate closed and the honey reaches the bottom of the frames the rotation will be slowed. Open the gate and drain the honey out.

When the bees have cleaned the frames they can be removed for storage. If they have never been used for brood they are safe from invading wax moths. However if any eggs from wax moth or small hive beetle have been laid in the crevices, damage can occur. If frames are kept



Crushed comb from top bar frames.

This is probably the least expensive and simplist straining and bottling system there is.

in a freezer for a week the eggs will be killed. Wrap and seal the frames in plastic bags to freeze. Upon removal, do not open the bags. They can be kept sealed in the bags in a mouse-proof area until next season. Any enterprising mouse can chew through a plastic bag.

Yes, it is wise to clean up the extracting area, no matter what time of night it is. Ants and flies and honey bees only take moments to find your delicious honey spatters. Your friends who came to help each went home with a jar of honey. They understand the tiny bits of wax and air bubbles that may surface but will enjoy their reward for participating in your first honey production.

You may think that making extracted honey and crushing top bar comb is more complicated than making cut-comb. However, good cut-comb production may be more difficult than you realize. But that is a story for another day.

Browse through various equipment catalogs, ask members of your bee club and pay a visit to the Internet to have a good idea of equipment available, or can be made, for small-scale harvesting. Decide what worked this year, what needs to be changed for next year. And dream about your perfect honey house to be built in the years to come. BC

Ann Harman keeps her bees and harvests her honey at her home in Flint Hill, Virginia.

The Constitutional Freedom Of Misinformaton

Ross **Conrad**

This Spring Angela Logomasini of the Competitive Enterprise Institute (CEI) released a paper titled "Beepocalypse" Not: Alarmist Honeybee Claims Collapse Under Scrutiny. In it Ms. Logomasini tries to make the case that the facts do not support the hypothesis that pesticides in the neonicotinoid family are playing a role in the honey bee losses experienced during the past decade. Unfortunately, the claims she makes in her effort to "… sort fact from fiction and promote a more balanced understanding that will facilitate rational solutions for helping honeybees," too often fall short.

Claim #1 – **Colony Collapse Disorder is not the biggest threat facing honey bees**. Ms. Logomasini correctly points out that lots of people blame hive losses in recent years on Colony Collapse Disorder (CCD), but the more significant problem is not really CCD, but instead compromised hive health, which is affected by a combination of factors, including: diseases and parasites, poor queen bee health and/or genetics, transporting hives for pollination services, and nutritional issues. There is no question that bees are dying from many factors in addition to CCD and while CCD may make for good headlines, it is not the primary cause of hive decline for many beekeepers. Unfortunately, she also claims that 'pesticides are the least among these factors (that kill bees) and neonicotinoids the least among those, if they have any impact at all." It has been well documented that not only can neonics have direct lethal and sub-lethal impacts on honey bees, but research has indicated that neonics have the capacity to weaken the honey bee's immune system so that they are more likely to get sick from diseases such as nosema. (Pettis, et. al.)

Claim #2 – **CCD is not a new problem that can be easily attributed to modern pesticides.** Sure wide-spread honey bee losses have been documented around the world numerous times in the past, however this is the first time that such a die-of has been accompanied by the "…presence of food stores, both honey and bee bread which is both not immediately robbed by other bees, and when attacked by hive pests such as wax moth and small hive beetle, the attack is noticeably delayed." (vanEnglesdorp, et. al.) We don't know if this is a unique symptom that was present in past bee losses but simply went unnoticed, or it is a symptom totally unique to the current situation. We do know however, that chemicals and their residues can and do repel bees and insects from beeswax combs filled with honey, pollen and bee brood, as any beekeeper who has used a fume board to harvest honey can attest to.

Claim #3 – **Honey bees are not even a "natural" part of any ecosystem in the United States**. Today's North American honey bees are all descended from importations from Europe, Asia and Africa and are not native to North America. However, as the discovery of fossilized honey bee remains in Nevada indicate, (Engel, et. al.) honey bees were a part of the natural ecosystem in North America but for some reason died out about 40 million years ago. I am not sure how the author's point proves that pesticides are not a problem, unless perhaps she is suggesting that we should not care about bees and non-native, and that species such as the European honey bee deserve to be killed off with toxic chemicals.

Claim #4 – **Honey bees are nowhere near going extinct. In fact, the number of hives has increased globally**. On the face of it, this statement appears accurate, as Ms. Logomasini points out, "according to United Nations Food Agricultural Organization (FAO) statistics, the number of beehives kept globally has grown from nearly 50 million in 1961 to more than 80 million in 2013." (UNEP) However, in the United States honey bee populations have dropped from around five million colonies in the 1940's to approximately 2.7 million colonies in 2014. (USDA-ARS) While this is an increase from the 2.4 million colonies the U.S. boasted just a few years ago, it is because beekeepers have gotten very efficient at splitting their hives to increase numbers and replace losses, while honey prices, pollination prices, and demand for bees have all increased dramatically providing strong motivation for beekeepers to increase hive numbers. What is astonishing is that hive numbers have not gone up faster than they have, given the powerful incentives for the industry to increase production.

Claim #5 – **Surveys in 2014 show that honey beehives have improving survival rates**. "Hives kept for pollination services in the United States and Europe have shown better survival rates in recent years, much closer to what beekeepers consider normal. This occurred despite continued use of neonicotinoids." The Bee Informed Partnership looked at thousands of records from beekeepers in the U.S., how they managed their hives, and what the end results were. From that data, they use statistics to find trends and they found that while in the U.S. Winter survival rates have improved somewhat recently, yearly losses are still above what beekeepers consider acceptable. The BIP also has also found that Summer losses can sometimes be even higher than Winter losses resulting in overall yearly losses that can be well over 40 percent. (see graphic)

Claim #6 – **Farming and food production is not about to collapse because of poor pollination**. This is the one claim that is close to accurate since even though it is widely believed that about one third of food production in the United

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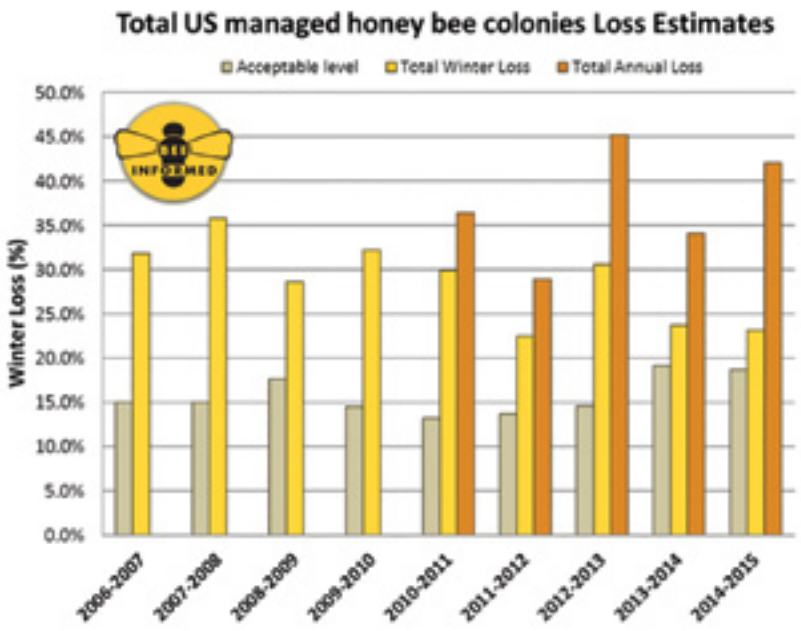
States benefits from honey bee pollination, poor hive health is unlikely to completely undermine production of these foods. (Aizen, et. al.) As the CEI paper points out, it could make them more expensive and yes, improved hive survival can mitigate such issues. The question we should be asking is: is consistently improved hive survival possible without dramatically changing the current levels of stress that honey bees are facing from all sources?

Claim #7 – **If neonicotinoids were a cause of CCD, we would expect to see at least some correlation between their use and CCD, but no such pattern has been observed.** A correlation that has been observed and reported found there was a major surge in the use of corn and soy bean seeds treated with neonicotinoids in the mid-2000s, which correlates almost exactly with the occurrence of CCD in the U.S. (Douglas) The Competitive Enterprise Institute paper also argues that in places where neonics are used widely, such as in Australia, CCD is not a problem. This simplistic evaluation put forth as evidence that neonicotinoid pesticides are not an issue fails to note that about 70% of all Australian honey is produced from foraging on native flora (e.g. eucalyptus trees) and mostly on public lands such as forests and national parks. As a result, Australian honey bees get very little exposure to pesticides used in agriculture. The claim that "…in Europe during 2013-2014, hives survived well in many areas where neonicotinoids were used," also holds little weight since the consensus is that multiple stresses are behind the current hive losses, and so when bees are exposed to a single pesticide, but not additional stress factors at the same time (such as multiple pesticides at once, mites, pathogens, or poor nutrition), they can handle the pesticide stress much better than would otherwise be the case.

Claim #8 – **Field studies find no health effects from "sublethal exposures" to neonicotinoids under field relevant conditions**. While there is solid research that shows sublethal exposure in a lab can be harmful to bees, more difficult studies to conduct that expose bees to sublethal levels of neonicotinoids in field conditions are lacking. (Cresswell) If we ignore the numerous lethal exposures that have been reported under field conditions, (Krupke; Girolami; Johnson; Gill; Samson-Robert; Eiri; Daren) and the fact that lab results are often enough to trigger action when human health is on the line, then the lack of data on sublethal impacts under real-world field conditions are a convenient excuse to not taking action against neonics. Never mind that a study on wild bees exposed to neonicotinoid treated canola under field conditions determined "…that a commonly used insecticide seed coating in a flowering crop can have serious consequences for wild bees," noting that it "…reduced wild bee density, solitary bee nesting, and bumblebee colony growth and reproduction under field conditions." (Rundlöf)

The CEI paper goes on to state, "No one can completely dismiss the fact that agrochemicals can have an impact at some level to honeybees and non-target insects. The key is finding a level where risk is low-to-negligible in real-life settings, to allow beneficial uses of products necessary to grow food. That way we can have both effective pollination and agricultural productivity." Currently the Extended Residual Pesticides Testing protocol used by the U.S. EPA determines the latest time an application can be made prior to bloom without causing more than 25 percent loss. Despite the fact that 25 percent loss of any livestock is not generally considered to be acceptable, this is the current risk assessment endpoint used by U.S. EPA for honey bees. (U.S. EPA)



Field trials will also need to study the synergistic impacts of neonicotinoids and other pesticides that become more toxic when combined. (Gill) One example is the neonic acetamiprid which is hundreds of times less toxic to honey bees than the most common neonicotinoid, imidacloprid. However, when acetamiprid is combined with a fungicide such as triflumizole or propiconazole, it becomes over a hundred times more toxic than when it occurs by itself. (Iwasa)

Claim #9 – **Neonicotinoids do not present the most significant pesticide exposure to honey bees.** This claim actually has some basis in reality since studies have tended to find that only small amounts of neonicotinoids are actually found in hives. Instead, the majority of the chemicals found in the hive are put there by beekeepers trying to fight mites. However, this fact alone does not mean that neonics are not a significant problem since research showing that even undetectable levels of exposure can have a harmful impact on honey bees. (Pettis)

Claim #10 – **Alternative chemicals may prove more dangerous than neonicotinoids.** Ms. Logoma-

sini's use of the word "may" here is important since the neonicotinoid family of systemic pesticides are much less toxic to humans that many of the alternatives, but not necessarily less dangerous for insects and pollinators. (Marrs)

Claim #11– **Regulations will not solve the problem.** Now we get to the primary point of the paper… the Competitive Enterprise Institute is a libertarian think-tank that seeks to advance economic liberty by fighting government regulation and supporting a free marketplace in the hopes that it will allow entrepreneurship and innovation to thrive. As the paper states "The best solution will strike a balance that recognizes the value of targeted pestsand managed use of agrochemicals while minimizing risks." I would agree, but unfortunately while the seed application of a pesticide has the potential to reduce environmental exposures to non-target species, blanket use of neonicotinoids through the planting of chemically treated seed, year after year, is a totally untargeted approach. Since the chemicals are systemic and relatively stable they build up in the soil, and can impact non-target species reducing biodiversity.(van der Sluijs)

The constant refrain that pesticides are necessary if we are going to be able to feed the world is simply false. (DeSchutter; Foley; FAO; Natural Research Council) Not only are hundreds of millions of people underfed, malnourished, or starving today with pesticides, but natural organic methods have been proven to match, or exceed, the crop yields currently enjoyed by chemical industrial-scale monoculture agriculture. (Pimentel) What is significant and avoided by the CEI paper is that pollinators across the board, from butterflies, moths and bees, to birds and bats (both insect eaters) are all in decline and the majority of these declines have occurred since the dramatic increase in neonicotinoid treated seed use that began around the middle of the first decade of this century. BC

Ross Conrad is author of Natural Beekeeping: Organic Approaches to Modern Apiculture, Revised and Expanded Edition (2013)

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GLEANINGS

AUGUST 2015 • ALL THE NEWS THAT FITS

AUCTIONING BEEYARD SITES

A new auction system for beekeeping sites in Australia is being described as unfair and irresponsible policy.

Apiarists in the state of New South Wales say the sudden change in direction by the state-owned Forestry Corp. in the method of allocation of forestry sites to the state's beekeepers threatens to further destabilize an already vulnerable industry, as well as the numerous agricultural enterprises that depend on it.

The corporation allocated beekeeping access permits to 24 vacant sites near Batemans Bay through an online auction. The permits sold for an average A$1,311.33 a year for five years. The top price was A$3,500 a year for five years.

The auction was announced May 20 and held May 27.

Under the previous, long-established allocation process, beekeepers could apply for a permit to access vacant sites for a fee of about A$90 a year, renewable annually.

NSW Apiarists' Association executive councilor Neil Bingley is horrified at the auction and its outcome.

"It's not that we don't think we should pay to access these public resources," he says. "Of course we should pay. We want to pay a reasonable price, and negotiate a fair and equitable fee structure."

Bingley says the issue is that this new auction method tends to inflate the price of access to completely unsustainable levels."

He says the auction was unfair even for the individual beekeepers who were successful in the auction.

"Let's look at the beekeeper who's just paid $17,500 ($3,500 per year for five years) for access to one particular site," he says. "I know that country well because my family has kept bees in the area for generations. It's spotted gum country which means it is only going to flower once every four to 10 years.

"In a really good Winter flowering year – which is never guaranteed, especially with droughts and prescribed burns and so on – the potential value of honey for that site would be approximately $15,000 gross, at best," Bingley says.

"At worst, there won't be any decent flowering events at that site during the five-year permit period, and the beekeeper gets nothing for his $17,500 investment. And that's just one of many sites a beekeeping operation needs to remain viable."

Bingley says the auction system just doesn't make any economic sense from the beekeepers' viewpoint.

"The two or three local beekeepers who were forced by the auction process to compete against each other and thereby drive prices up, have probably compromised the future of their business," he says.

That's bad news for an industry whose dwindling numbers means they're already struggling to provide the pollination services that the state's agricultural enterprises need to succeed.

Association president Casey Cooper outlined the scale of the pollination problems facing the state's growers.

"In July and August this year, for example, the almond industry alone is going to need three quarters of all the hives we've got in NSW," he says. "They are 100% dependent on bee pollination to get any crop.

"But providing these intensive pollination services knocks the bees around, and they don't make good honey while they're pollinating almonds or most other commercial crops."

Cooper says that's why beekeepers must have more reliable access to good native floral resources, such as the ones on lands managed by the Forestry Corp., if they're to continue to provide the essential pollination services to the agricultural sector.

"Every year the need and demand for pollination services across NSW's agricultural sector increases – not just almonds, but other crops such as apples, cherries and beans – but our ability to provide them seems to be constantly under attack, thanks to thoughtless changes in policy such as like this latest one from the Forestry Corp.," he says.

Cooper says the corporation breached the Integrated Forestry Operation Approvals agreement that explicitly requires it to consult key stakeholders – including beekeepers – before any major policy changes.

"In this case there was no consultation at all," he says/

"They said that they thought an auction would be a fair and equitable system, but this is clearly not the case," Cooper says. "The Forestry Corp. should acknowledge that this auction process has not resulted in a fair or equitable outcome."

Cooper wants the corporation make good on its commitment to consult with his members.

"We look forward to negotiating a better process that will deliver for the corporation, for beekeepers, for growers and for NSW as a whole," he says. – *Alan Harman*

OBITUARIES

Stanford Brown, one of the founding fathers of modern beekeeping in Maine and the oldest registered apiarist in the state, has died aged 95.

The Portland Press Herald reports he ran Brown's Bee Farm, a popular beekeeping equipment and supply shop on his property in North Yarmouth and kept about 50 hives of his own until his health began to decline in his 90s.

Maine State Beekeepers Association president Jacky Hildreth says Brown was an iconic beekeeper.

"He taught quite a few people about beekeeping," Hildreth says. "He was always willing to talk bees. "You learned so much. He came across as if he had known you for years, even if you just met."

He says that in the last 10 years the Cumberland County Beekeepers group swelled to more than 300.

"It's people like Stan Brown who really instituted bringing the rest of the state in," Hildreth said. "He will be missed."

Billy Engle of The Rock, GA passed away May 12. He owned and operated Rose Creek Honey Farm. He was active in attending many national beekeeper meetings and made many friends. During his many years as a commercial beekeeper, "Billy" went out of his way to make friends and stay up to date on all the information he could gather to make his beekeeping operation successful. He was active in his local area bee clubs teaching classes on beekeeping, and over the years moved his bees for pollination and honey production in GA. Lost will be his dry humor and unique love for his passion to honey bees and willingness to help new beekeepers.

OZ DROUGHT

After a year of drought conditions that saw most of the major honey-producing flora fail, Australian beekeepers now are facing the impact of a moderate-to-severe El Niño drought-inducing weather event.

The Bureau of Meteorology has confirmed El Niño thresholds have been reached in the tropical Pacific for the first time since March 2010.

That's not good news for a honey industry that generates about A$90 million (US$70.5 million) a year.

Bureau assistant director for climate information services Neil Plummer says El Niño is often associated with below average rainfall across eastern Australia in the second half of the year, and warmer than average daytime temperatures over the southern half of the country.

Alan Harman

CLEMSON SAVES POLLINATORS

In a presidential memo released last year, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, the White House stated that this rising loss requires immediate attention in order to "ensure the sustainability of our food production systems, avoid additional economic impact on the agricultural sector, and protect the health of the environment." Kelly Registration Systems, which is already working with the departments of agriculture in several states, has developed an application to map beehives and allow pesticide applicators to notify beekeepers of applications in the area to help prevent the accidental poisoning of honey bees. The official program is available as soon as next month and is being rolled out to other states as well.

With Kelly Registration Systems, once beekeepers, farmers and pesticide applicators share their information, the program matches hive locations with areas that will receive pesticide applications. And using alerts, it lets applicators know which areas to avoid and helps beekeepers prevent or mitigate potential exposure.

The program is currently being used by The Clemson University Department of Plant Industry and The Clemson University Extension Service to map as many of the estimated 25,000-30,000 hives in South Carolina as possible. It has been designed and developed with the ability to map bee hives, hive registrations, organic farms and vineyards, as well as other sensitive and protected areas. Beekeepers are able to update GPS locations and submit online applications, while pesticide applicators are able to map multiple layers of data and save field coordinates for re-mapping. "This program creates an interface between the beekeepers and pesticide applicators and the communication between these groups is key for protecting our honey bees," says Dr. Jennifer Tsuruda, Apiculture Specialist at Clemson University.

The program features email and text notifications to beekeepers and applicators, and it can even keep track of beekeepers' license fees and payments to the state. The system is secure and keeps hive ownership and location information confidential because of their sensitive nature. This information is only made available to the state and to authorized pesticide applicators.

Says Edmondson, "From what we've heard in industry meetings and feedback we've received on the program, we feel this offers a solution for states with voluntary and required programs."

CALENDAR

♦INTERNATIONAL♦

Apimondia International Apicultural Congress will be held September 15-20 in Daejeon, Korea.

The theme is "Bees! Connecting the world!" There will be many participants from the beekeeping world – beekeepers, scientists, honey traders, development workers and those who work in the equipment industries.

We invite you to visit the website www.apimondia2015.com to register to get a valid ID and password. The only register participants can submit abstract(s), booth ApiEXPO booth(s) and get detailed information on the congress.

To participate in the Apimondia Congress 2015 all participants are required to pay registration fee.

Technical tours will be offered September 20 after the conference.

Please see the web page **www.apimondia2015.com** for more information.

♦ARKANSAS♦

The Arkansas Beekeepers Association will hold its Annual Conference at the Ozark Folk Center in Mountain View, October 9-10.

Featured speakers are Tom Seeley and Tammy Horn.

For more details visit **www.arbeekeepers.org**.

♦COLORADO♦

The Colorado State Beekeepers Association will host the Western Apicultural Society conference in Boulder October 1-3.

For details visit **www.ucanr.edu/sites/was2**.

♦CONNECTICUT♦

Back Yard Beekeepers Association 2015 Speaker Schedule – September 29, Juliana Rangel Posada on the Reproductive Biology of Honey Bees; October 27, Sam Comfort subject Let's Stick Together; November 17, Michael Fairbrother of Moon Light Meadery on Mead.

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**.

♦LOUISIANA♦

The 19th Annual Field Day at the USDA Honey Bee Lab in Baton Rouge will be held October 10, located at 1157 Ben Hur Road.

Gates open at 9:30 a.m. and activities begin at 10:00 a.m. The fee is $30/person 12 and over. The registration fee includes coffee, pastries and a catered lunch.

For information contact Lanie Bourgeois 225.767.9299, Sandra Hineman 225.767.9280 or Joe Sanroma 318.346.2805. Regarding registration contact David Ferguson 225.726.1664.

♦MISSOURI♦

The Missouri State Beekeepers Association will hold its annual Fall Conference October 16-17 at the Hilton Garden Inn in Columbia.

Speakers include Michael Bush.

Register online at **www.MoStateBeekeepers.org**.

♦MONTANA♦

Master Beekeeping Certificate endorsed by MT State Beekeepers Association; The American Honey Producers Association and Project Apis m.

For more information visit **www.UMT.EDU/BEE**.

♦NEW YORK♦

NY Bee Wellness Workshop at Dyce Lab, Cornell University August 22. This is an intensive one-day skills oriented hands on workshop in recognizing and diagnosing honey bee disease; microscope use and hive inspections will be done. Experience with bees required.

Contact Pat Bono, **pat@nybeewellness.org** or 585.820.6619 for more details.

The Long Island Beekeepers Club will host the all-day 2015 Greater NY Honey Bee conference October 18 at St. Johns University, D'angelo Center, Queens.

There are six seminars by Jay Evans, Diana Sammataro, Timothy Leslie and Rachael Bonoan. Beekeeping supply companies will be on hand to offer supplies.

For information visit **www.longislandbeekeepers.org**.

Western NY Honey Producers Association will host Reed Johnson discussing Pesticides and Poisons in the Beehive, September 26 at the Roycroft Auditorium in East Aurora, 9:00 1.m..

Cost is $10 and more information is available at **www.wnyhpa.org**.

♦NORTH CAROLINA♦

The Center for Honey Bee Research Haywood Community College, Clyde invites the general public to an all-day educational event, September 26.

The cost is $55/person pre-registered. Speakers include Don Huber, Jay Evans, Melanie Kirby and Steve Sheppard.

Details and online registration available at **www.chbr.org**.

♦OHIO♦

Medina County Beekeepers Association meets the third Monday of the month at the Root Candle Company in Medina, OH. The meeting starts at 7:00 p.m.

September - Phil Craft

October - Dave Duncan and Ellen Harnish

For more information visit **www.medinabeekeepers.com**.

The Warren County Beekeepers Association will host a Beekeepers' Swapmeet and Pot Luck, September 13 at Armco park, 1223 N. State 741, Lebanon.

Lunch will be at noon and the swapmeet starting at 1:00 p.m. Please bring a covered dish to share. The club will provide the meal.

Please rsvp before September 1 by email to **dmalonej@gmail.com**.

East Central OH Beekeepers Conference will be held at F.O. E. 302 1275 E Market Street, Zanesville, September 19. Registration starts at 8:00 a.m.

Pre-register at **www.e-coba.org**. Cost is $40/person, $50 at the door. Lunch for $8.00.

Speakers will be Tammy Horn, Jennifer Berry and Ed Karle.

♦OREGON♦

The Oregon State Beekeepers Association will hold its annual Fall conference November 6-8 at the Oregon Garden in Silverton.

Speakers include Peter Berthelsen, George Hansen, Pat Heitkam, Jay Miller, Randy Oliver, Ramesh Sagili, Nick VanCalcar and Clint Walker.

For more information go to **www.orsba.org**.

Oregon Honey Festival will be held October 17 at the Ashland Springs Hotel. This event showcases primarily small and medium sized beeyards.

Presenters include Marie Simmons, Susan Kegley, Lynn Royce and John Jacob.

For information contact Sharon Schmidt, **oregonhoneyfestival@outlook.com** or 541.951.5595.

♦WEST VIRGINIA♦

The West Virginia Beekeepers Association will hold their Fall Conference Septembe 25-26 at Jackson's Mill State 4-H Camp & Conference Center, 160 WVU Jackson Mill, Weston.

The main speaker will be Tom Seeley.

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

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If you are having an annual meeting, teaching a beekeeping class, or some other beekeeping event, we are happy to send you magazines to give to your attendees and students. BUT – we need to receive your request four weeks before your event so that we have time to process your request. Please email Amanda at Amanda@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

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Down the road at Maud's restaurant, the pumped-up staff eagerly anticipates this weekend's Colorado Beekeepers' June banquet. Last week at lunch my waitress Mary Ann asked me, "Do I have to dress up like a bee, or can I be a lady bug?"

"No problem," I said. "Any friendly insect's OK." Just so the little darling doesn't come as a spider, natural enemy of honey bees.

After I dropped off a load of bees at the Dodo yard on the Flat Tops last week, I took a break in the cab of the big truck. A bee buzzed against the glass on the inside of the closed passenger side window. Suddenly a hairy, mostly gray spider appeared on the same window, about a foot away from the bee. It was one of those jumpy spiders, like you see in the garden -- three quarters of an inch across, including legs, with a black spot on its back, and in the middle of that black spot, a white dot. I wondered if it might be looking for trouble. I thought of rolling down the window for my struggling *Apis mellifera*, but as this bee tried to get out, another little darling was trying to get *in* to the cab to pester me. So I could have intervened, but for self-centered reasons decided instead to let God sort this out.

You never saw such a truck as mine. A battered and bruised, chopped off 1983 one-ton Ford Econoline van with an 8- by 12-foot flatbed behind it, it hauls 30 colonies with ease. That 460 engine likes a load. I suppose I could double-stack hives, and haul even more, but I've never tried. Fuel economy: not so great. Hence I don't drive it much anymore. The floor's riddled with holes, and small animals occasionally move in. One year I ran 300 hives up by Steamboat Springs and camped in my bee yards. A little mouse kept me company in my never-tidy truck most of the Summer, presumably dining on lunch scraps. So it didn't surprise me when I learned I had a pet spider.

The bee seemed to be losing her grip, slipping down the frame, toward the spider. Meanwhile, the spider hopped around and turned tight little circles on the window, like my gal Marilyn's blue heeler dog Pepper when he's all worked up. I wondered if this would take all day. But no. Suddenly the spider lunged in the direction of the bee, closing the distance between the two to perhaps four inches. Then it stopped. The bee wagged her stinger in front of the spider as she continued to slip down the window frame.

I couldn't take my eyes off the two. Now, as the bee slipped, the spider slowly, ever so slowly, climbed upwards towards her, until the two sat less than an inch apart. It felt like watching Janet Leigh in the shower in the movie Psycho. I knew the story ending, and I did nothing. In a lightning move, the spider attacked. The bee struggled for a couple of minutes. I could clearly see the spider's neon green fangs sunk deep into the honey bee's back. Neon green fangs? There are things in this life, gentle reader, that I could never make up. Why would a gray spider with a white dot have neon green fangs? (The better to bite you with, my dear!)

Do you think less of me now, cold voyeur that I am? Listen, insect life is cheap. I kill more bees than this every time I replace a hive cover. If you fuss with bees and try to save them, you'll never get anything done in the bee yard. Are you squeamish about the crunch of honeybee exoskeletons when you put a super on your colony? Toughen up. Do the best you can and move ahead. Think of the hive, not the individual bee, as the living organism. Otherwise you've got too much death on your hands.

Some gentle souls object to the noble craft of keeping bees because we beekeepers kill honey bee queens and replace them. This is crazy talk. Queens die naturally or fail, bringing down entire colonies with them. Our job is to promote the health and vigor of the bee hive organism, not to fret about this bee or that queen. Bees hatch from eggs and live their lives, be they short or long. Then they die, just like us. So stop worrying about it, OK?

photo by Marilyn Gleason

I went back to work erecting a solar electric bear fence around my apiary, like I've done a thousand times before. Pound the steel posts, put PVC pipe around them for insulation, hang the woven-wire fence on the PVC with tie-wire, hook up the charger and solar panel to the battery. Wire the charger to the fence and to ground. Turn the charger on. When I hold a blade of grass against the fence and receive a tiny shock, I know I'm finished.

Back at the big truck, the spider and her prey are gone. The spider must have her web somewhere in the cab. I wonder where.

Ed **Colby**

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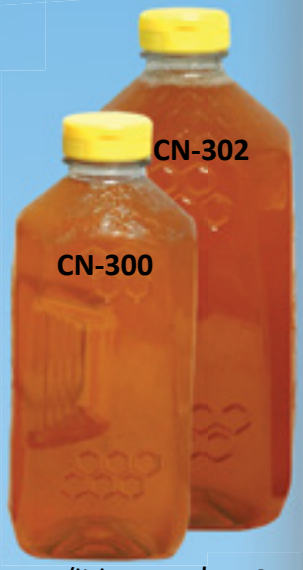

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