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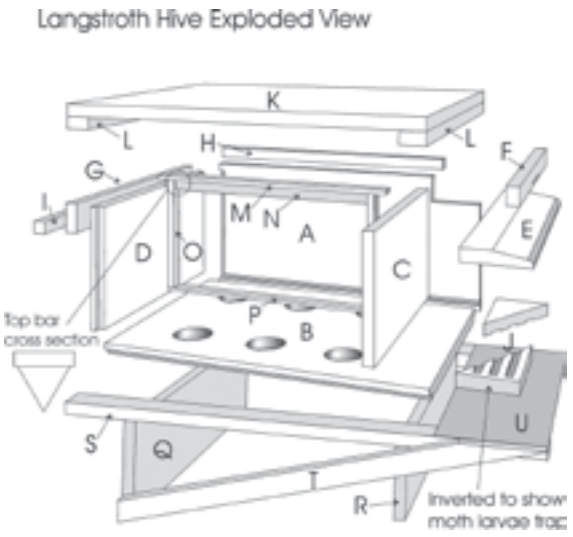

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Photo by Travis Owen. See the story on page 48.

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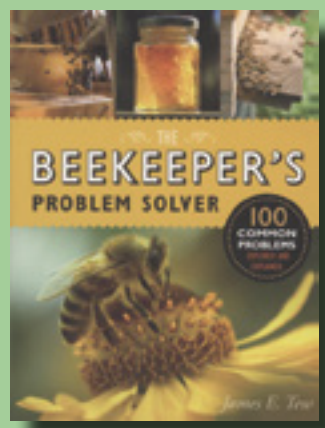

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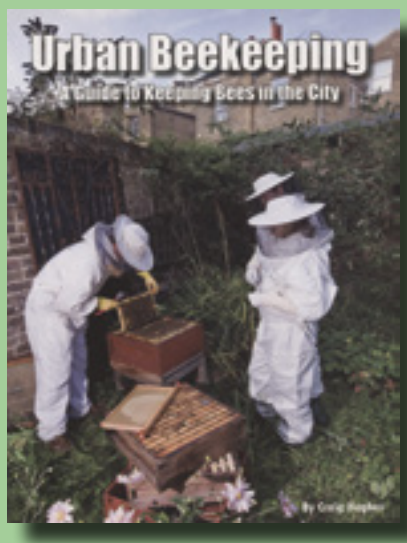

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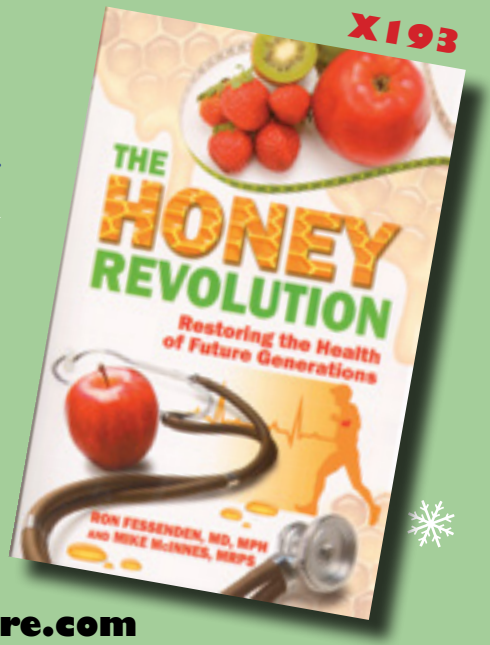

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In Every Month –

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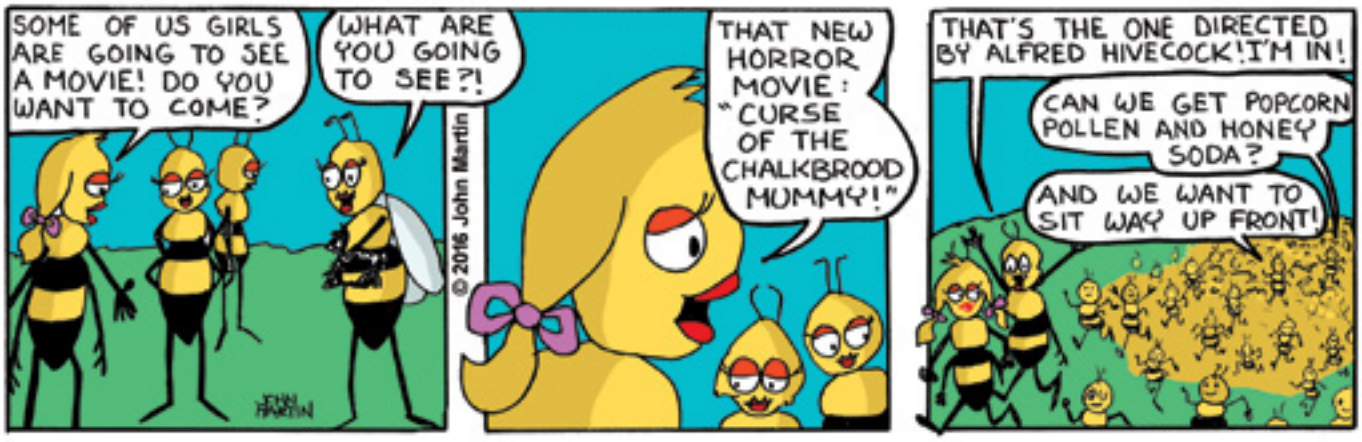
by JOHN MARTIN



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Killing SHB

Losing two colonies to small hive beetles this Summer put me on high alert for the creatures, and in subsequent hive checks I sought them out mercilessly and popped them under my thumb. For an animal lover like myself, the fury with which I sought out these unassuming beetles surprised me. Had I not signed an online petition the day before decrying the extermination of another agricultural pest? In that case it had been the eradication of foxes by ranchers, and while (by my anthropocentric standards) I believe there is a gulf of difference between killing SHBs and harming an intelligent mammal such as a fox, here I was making a similar value judgment on "good" versus "bad" forms of life: bees versus beetles, livestock versus foxes.

This theme resurfaced this past week as I sat with my five year old son, who is currently working his way through every shark-themed B-movie he can find on Netflix. He asked me whether the shark terrorizing the beach-goers was "good or bad", to which I replied that it was, like all wild animals, "just hungry". This answer simply would not do, however, and he educated me that this was in fact a "bad" shark because of its love for human snacks. I pretended to agree, but it underscored the fact that we must use caution in labeling an animal "pest" or, in the shark's case, "monster". Many such creatures owe their ascendancy to the actions of humans, such as coyotes filling the ecological gap that wolves have left, or in the case of SHBs following us to the New World. Creative and humane pest management is one way forward, but in the end it will take a full appreciation on our part of the intrinsic value of life in all its forms, rather than a crude value judgment of "useful versus harmful" creatures.

Peter Keilty
Austin, TX

BEEKeeping – Love It

As a first year beekeeper, I have found *BEEKeeping* to be immensely valuable and would love to see it

offered on a subscription basis. I use it like a manual.

Steve Revella
Friday Harbor, WA

Editor's Response: *Thanks for the good words about our Newest Magazine, BEEKeeping, Your First Three Years. It's been on newsstands now for 4 issues, and the response has been overwhelming, and understandably, so has demand for access to it via our web page, newsstand, and now, we'll be offering it as a Subscription. See the ad in this issue and on our web page, but beginning with the January issue, BEEKeeping will be available as a quarterly subscription. Thanks again for the kind words. Kim Flottum*

Nicaragua Bee Project

I am not sure if this would fit into *Bee Culture* in some way but we are looking for beekeepers to help us train new beekeepers in Nicaragua. In the 1960s, President Kennedy partnered states with Central and South American Countries. Wisconsin was partnered with Nicaragua and the collaboration has remained strong with the Wisconsin/Nicaragua Partners of the Americas. Several years ago Martin Havlovic, a professor with the University of Wisconsin and past president of the Wisconsin/Nicaragua Partners contacted Dr Michael Bauer, a beekeeper, to help train new beekeepers in Nicaragua. Since then the project has grown. You can see more about the project on our website, **http://nicabejaproyecto.org/** and our Facebook page **www.facebook.com/NicaraguaBeeProject2016/?fref=ts** Right now, we are trying to enlist more beekeepers to help us train new beekeepers in Nicaragua. Most of the honey produced is exported to Europe as organic honey. The balance is sold locally. The result is that families are raising their standard of living substantially.

If there is some way we can get this invitation published in *Bee Culture,* it may help us connect with more beekeepers. I have traveled to

Bee Culture
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mailbox@beeculture.com

Nicaragua twice and it has helped me become a better beekeeper as well as helping others.

Kent Pegorsch
Waupaca, WI

Old Sol – Great Supplier

I am an avid reader of your great magazine and read it from cover to cover (sometimes more than once) as soon as it comes. Many of the articles deserve multiple readings and further study. Keep it up.

Now for the reason for this short letter. I am very quick to complain if something goes wrong with a purchase or a vendor is lacking in customer service, but I also try to praise any vendor that provides a good product and customer service.

One of these companies is Old Sol Bees, which often advertises in your magazine, *Bee Culture.*

I just want everyone who reads your magazine to know that this company has a great product (in my opinion), but more importantly they provide unquestioned great customer service.

There was a problem with a recent order, and when I called them they not only helped me diagnose the problem but also bent over backwards (so to speak) to make the problem right!

I want everyone to know what a great company this is.

Thank you for a great magazine, too.

Frank Gunseor
Coerurd'alene, ID

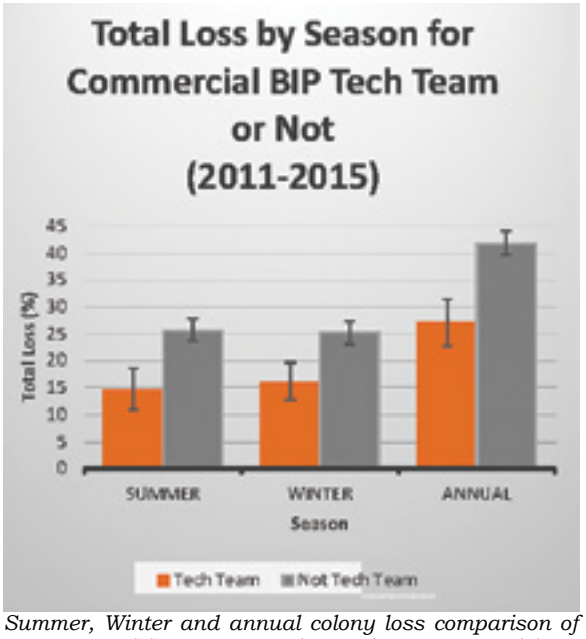
Tech Team Solutions And Support

The best beekeepers keep the best bees. Declining honey bee health does not always have a single cause or a single solution, but putting the best tools, techniques, and technologies in the hands of the people on the front lines – the beekeepers – makes a huge impact.

The Bee Informed Partnership has been working alongside beekeepers on the front lines for over five years. You may know us for our annual Winter Loss report or National Management survey, but the greatest asset of the Bee Informed Partnership is undeniably our Technical Transfer Teams.

Our teams of highly trained honey bee experts work closely with commercial beekeepers in the field to share best practices, monitor and sample colonies over time, and provide near real-time diagnostic data. This data helps beekeepers make informed decisions about treating hives for diseases and prevents unnecessary losses. ***All told, commercial beekeepers working with us lose 35.6% fewer colonies annually than their counterparts who are not serviced by our teams. For the typical 2,000 colony operation this means that our beekeepers, on average, save almost 300 colonies per year - a savings conservatively estimated at $74,000.***

Katie Lee, Midwest (MN) Tech Team lead sampling colonies. (photo courtesy of the Bee Informed Partnership)



Summer, Winter and annual colony loss comparison of BIP TTT participants versus those who are not participating. Data from years 2011 (start of BIP) through 2015.

Healthier colonies in orchards and on farms mean that less disease is spread to neighboring colonies. We think this is a win-win for everyone. From backyard beekeepers to large-scale commercial operations, the Bee Informed Partnership offers several ways for beekeepers to participate and gain value from our research. But we can't do it alone.

We began over five years ago with a USDA/NIFA grant to monitor colony loss, management practices, and to start a single Technical Transfer Team in northern California. The grant has ended but the work continues. Now an established 501(c)(3) non-profit research organization, the Bee Informed Partnership has expanded to include five Technical Transfer Teams based in California, Oregon, Texas, Florida, and Minnesota and our outreach efforts and management results can be found on our highly utilized **website**. We want to keep growing and we see a great need for our services. Our teams are making a difference across the country every day, and we need your help to support their efforts and expand our reach.

The success of the program has created demands beyond the scope of our existing funds. To scale our impact, we're launching a crowd funding campaign to raise 50K, a small portion of the funds we need. You are uniquely positioned to support our cause. As a beekeeper or general honey bee enthusiast, you can help expand the Technical Transfer Team program and ultimately improve honey bee health to safeguard the food supply. Here are three things you can do to take action and help us reach our goal:

1) Support our campaign once we launch. Visit **beeinformed.org/** donate in November to make a contribution."
2) Share this article with your friends, family, and social media network to help us spread the word about our fundraiser.

Visit **beeinformed.org** to learn more about our work and get involved.

Karen Rennich
And the BIP Tech Team

Bee Culture

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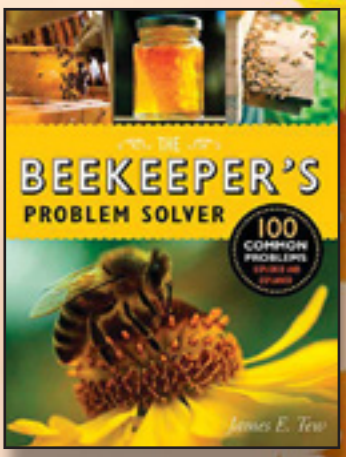

X198 The Beekeeper's Problem Solver.
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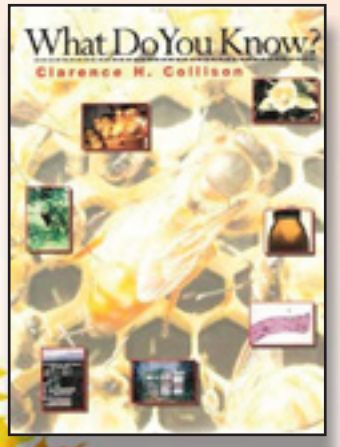

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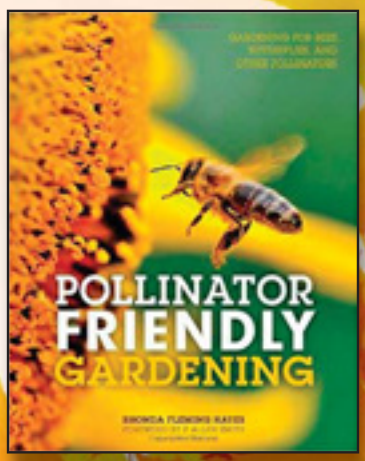

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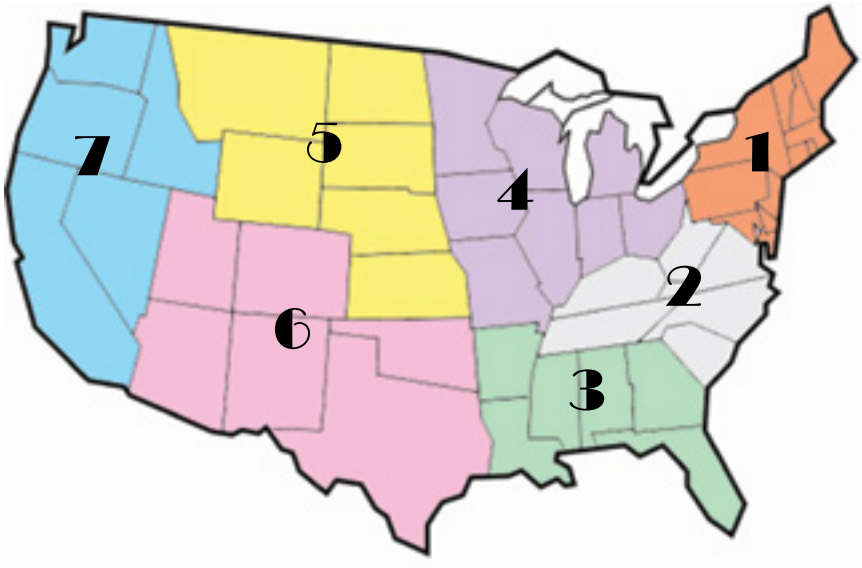
NOVEMBER – REGIONAL HONEY PRICE REPORT



2016 Honey Production

OK, here's where we really go way out on a limb, but we're pretty confident what we're doing will provide a comprehensive picture of what's going on with this year's honey crop.

Here's what we did . . .

We had our reporters give use three data points from their honey harvest this season. The average honey production/colony from only those colonies that honey was harvested from. Those colonies not harvested, nucs, queen mating colonies and the like were not included. Then, we asked of all the colonies they had, what percent of their colonies did they harvest honey from. This would give us a picture of honey production per region. To get that, we looked at the NASS records from 2015, showing the total number of colonies in a region. Once we calculated the average production per colony in the region, and then, the average percent of those colonies honey was actually collected from, we could make a prediction of how much honey would be produced in each region by multiplying the number of colonies honey was actually harvested from by the average production per colony in that region.

Region	2015 NASS COLONIES	2016 % Harvested	2016 Harvested Colonies	2016 Avg. Lbs/colony	Pounds Production /Region
1	90,000	70	63,000	33	2,079
2	49,000	58	28,400	31	88,040
3	379,000	78	295,600	81	23,944
4	341,000	68	231,900	51	11,827
5	1,029,000	59	607,100	36	21,856
6	208,000	49	101,900	42	4,280
7	508,000	72	365,800	45	16,460
Totals	2,660,000	-	1,694,000	-	168,486,000

2016 U.S. Honey Crop

NASS did not use data from several states last year, so we left those states off of our data sets also.

But even given this, last year total U.S. production was given as 156,544,000 pounds. We predict a modest 7% increase this year over last, but based on a more accurate number of harvested colonies.

Overall regions the data is also interesting. Overall, colonies produced on average 45.6 pounds of honey/colony. Last year it was 58.9 pounds/colony, with a total production of 156,544,000 pounds produced in the U.S. It's obvious that those regions with the highest percentage of colonies harvested also has the highest per/colony production, more than making up for the modest overall average production.

We'll have to wait until May next year to see how the NASS count comes out. Stay tuned. But for now, this is our story, our prediction, and we're sticking to it.

	REPORTING REGIONS 1	2	3	4	5	6	7	SUMMARY Range	Avg.	$/lb	History Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	1.55	2.05	2.19	2.35	2.10	1.88	2.80	1.25-3.00	2.16	2.16	2.27	2.23
55 Gal. Drum, Ambr	1.45	2.00	2.00	2.48	2.11	1.90	2.80	1.25-3.00	2.10	2.10	2.12	2.14
60# Light (retail)	217.50	181.50	208.75	225.40	142.50	156.79	252.00	140.38-300.00	209.50	3.49	205.81	204.42
60# Amber (retail)	226.67	181.40	198.75	223.00	115.92	163.46	250.00	51.84-300.00	205.87	3.43	202.48	203.73
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	86.42	76.17	77.57	67.00	97.44	86.40	125.00	48.00-125.00	84.29	7.02	83.08	85.86
1# 24/case	127.27	107.57	115.88	98.10	117.81	135.60	191.33	56.84-236.00	124.70	5.20	124.28	117.90
2# 12/case	114.14	96.33	106.26	92.73	93.54	108.00	130.00	74.40-163.20	107.07	4.46	110.67	105.80
12.oz. Plas. 24/cs	101.43	84.20	97.40	78.27	102.30	108.00	104.67	66.00-153.20	95.91	5.33	99.08	96.06
5# 6/case	142.30	106.00	131.73	107.13	125.60	120.00	160.00	71.50-210.00	130.13	4.34	129.45	115.86
Quarts 12/case	165.93	128.90	120.75	123.60	185.00	144.00	164.33	81.44-216.00	141.63	3.93	149.32	142.50
Pints 12/case	101.13	86.70	70.40	72.00	111.00	73.50	99.67	54.00-120.00	87.25	4.85	91.94	89.10
RETAIL SHELF PRICES												
1/2#	5.13	4.08	3.84	3.48	4.40	5.75	5.88	2.00-7.75	4.61	9.21	4.55	4.53
12 oz. Plastic	6.03	4.62	4.87	4.95	5.08	5.07	7.74	3.00-9.50	5.53	7.37	5.83	5.49
1# Glass/Plastic	7.31	6.27	7.29	6.02	6.08	5.59	10.74	3.00-16.00	7.30	7.30	7.20	7.09
2# Glass/Plastic	13.19	9.89	11.25	10.53	10.67	8.50	16.25	6.00-22.00	11.97	5.99	12.35	12.11
Pint	11.61	8.49	8.07	13.50	8.50	8.43	12.47	4.50-18.00	9.67	6.45	9.84	10.23
Quart	17.72	15.90	16.05	16.55	15.52	15.20	20.35	8.00-31.29	16.89	5.63	16.72	15.73
5# Glass/Plastic	27.97	23.59	31.98	25.80	22.20	20.43	32.50	15.00-42.00	26.52	5.30	26.80	25.35
1# Cream	9.57	7.95	7.99	6.25	10.14	6.39	12.00	4.90-16.00	8.79	8.79	8.86	8.37
1# Cut Comb	11.81	9.37	7.67	8.31	11.00	12.98	15.75	5.00-25.00	10.96	10.96	10.75	10.41
Ross Round	10.03	6.75	8.92	9.25	8.92	8.50	9.47	6.00-12.00	8.84	11.78	8.94	8.69
Wholesale Wax (Lt)	7.84	5.15	4.83	6.06	6.00	4.38	6.65	2.50-12.00	6.27	-	6.16	6.21
Wholesale Wax (Dk)	7.39	4.79	3.71	7.00	5.80	3.00	6.25	2.00-10.00	5.60	-	5.58	5.73
Pollination Fee/Col.	98.13	71.00	61.25	83.33	80.00	98.66	95.83	35.00-190.00	84.81	-	79.12	78.39

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INNER COVER

I rediscovered something this year that I already knew but hadn't applied it to keeping bees. Or rather, to feeding bees. John Miller, of *Beekeeper's Lament* fame by Hannah Nordhaus (a book you must read by the way), is a commercial bee producer, pollinator and honey producer in North Dakota and California who keeps telling me that the next great thing in beekeeping isn't going to come from beekeeping, but from outside our world. I know he's right because we keep seeing it happen. Here's another.

I've been watching the people who are struggling to find more and better forage for bees. Enough good food is always noted as one of the factors in what's wrong with bees right now. I'm not referring to the beekeepers looking to find a place to call home for a few months, but rather the folks who are trying to improve the places the beekeepers find. In almond country they are planting mustards and clovers and all kinds of bee plants on land that isn't being used for almonds or other crops and that blossom when they need to and don't need a lot, or any water. Unused land, field edges, between crop rows, corporate land, roadsides, meadows and fields, where ever seeds can be sown and the plants don't need attention afterwards, and bees can find them. And they are finding lots of those places, and, where they do, life gets a little better for bees and their keepers. We need more and more and more of that kind of work.

But here's the thing. That land, and those seeds are coming from…not the beekeeping world, but from almond and other crop growers, donors like Bayer, Monsanto, Costco, even Root Candles, my parent company. But not beekeepers. Not really. Beekeepers are taking what they are given. They're not making it happen. Yes, they are organizing the corporate giving, sitting on the boards of the organizations that do the asking and then give the grants, and they're finding the places and educating anyone who will listen that this is a good way to spend your money. But mostly, beekeeping isn't doing any of the giving, or doing any of the work. An extended hand should be reaching for a shovel, not asking for a handout.

I have another idea. It's kind of half-baked yet, and I don't have all the details worked out, but kick back for a minute and see if this doesn't make some sense.

Four, maybe five, even 10 beekeepers join forces. They pool their funds and resources, and rent, say, 50, maybe 100 or more acres from a local farmer. Maybe they rent even more, depending on the cost and the number of beekeepers involved. And they move their bees there, and keep them there for the season, far from harm's way.

They invest in producing a cash crop that does two things. One, that the farmer owner, or some other farmer can harvest and use or sell at season's end, and two, while in bloom will make honey crops for those bees. The beekeepers pay the farmer to plant the crop, tend the fields and do what needs to be done to make it grow pretty well. Doesn't have to be perfect, and not even close for the bees, but what these beekeepers are going to do is pay that farmer to tend and harvest that crop, and then sell it to him, or them, to pay for the rent and the work. The farmer gets the crop, and the beekeepers get the honey crop made from those plants.

Depending on where you live there are a multitude of crops that would work here. Forage crops, hay crops, even some food crops, cover crops, the list goes on.

Yes, there's a lot of maybe's here. And there's some risk. The rental price of local land, the weather, the farmers, the other beekeepers, the market for what you chose to grow, honey prices, gas prices – that list goes on, too.

But look at what you take off the table if you head in this direction. Planned right, succession plantings of multiple crops could mean you have something blooming all season long – a left over from last Fall gone to seed now, then an early clover bloom then cut, midseason clover bloom then cut along with a midseason alfalfa crop and cut and a late season something, and the second and even third cutting of all of the above. There's always something blooming, so the bees always have a reason to stay home. And staying home is a very big deal. That land is your land. This land has no pesticides, no fungicides, no insecticides, no poisons at all. And with multiple crops blooming at the same time, your bees have the luxury of making choices rather than only clover, or only mustard or only buckwheat. And that keeps (most of) them on your land. And, with multiple crops you'll probably get more than one farmer involved because some want this for seed, that for hay, and others just the straw at the end of the season.

I know, it's not perfect. I've already heard a lot of what-ifs, but I really think a bunch of organized, right-headed beekeepers could make something like this work. And it would be beekeepers making it work, beekeepers in charge, not Costco, or Bayer, or Root Candles.

But wait, there's more.

My friend Buzz (you'll read about him and his wife Nancy in the December Interview issue) called me up in early October with a question about goldenrod. Just down the road from where he lives there's been a

Safe
Food.

couple of vacant fields, each maybe five or six acres more or less, on two sides of the road that aren't used for anything. Just vacant. And every year they sprout goldenrod like mushrooms. Ten, 12 acres of the stuff that, in this part of Ohio, might just as well be gold when the bees turn it into honey. And his bees do, every fall.

But this year the folks who live next to one of those fields mowed it in late May. Mowed his goldenrod for heaven's sake. Mowed it! What were they thinking???

Well, as Summer went, it was the ultimate drought here in northeast Ohio, and the goldenrod that was left, across the road, the unmowed plot, didn't produce enough honey to even make his colonies smell at night. It was a bust. NaDa. Nothing. Zilch. Nothing but beautiful but barren blossoms ruled the day in the unmowed field. No goldenrod this year was what he had to tell his customers. But then, in early October, that wonderful aroma of goldenrod nectar tuning into pure gold honey washed over his beeyard at home, strong and heavy and, like the smell of money, filled the Winter coffers of his beehives with wonderful, luscious, golden goldenrod honey.

From where, from what, how? So Buzz called. We went and looked, and here's what we saw, and here's what you can use sometime down the pike to make life a bit better.

The botany part of it is really straight forward. Those goldenrod plants had a pretty good start by late May. Growing strong and unimpeded, with lots of rain early on they got a good start and had a good root system going when along comes the mower. Takes the top half of the plant off. Snip. Gone. And then comes the drought. Well now, these cut-in-half plants, with good roots, don't have much of an above-the-ground plant to support, so they're not very stressed by the drought. And by late August when the rains come again they get their act together. They're already shooting up, up and away, but with two, three or more stems to a plant instead of the usual single stem. And all those stems are late bloomers, starting in late, late September instead of mid-August.

So we head down to that field in early October and the field is coming into – not finishing, not done – but coming into full bloom. In fact, half the plants were still in bud stage, not yet blooming. They were shorter, maybe half as big as what they would have been, but many of them had two, three some with five stems, all with buds or blooms. There were bees everywhere, on every plant. Happy bees. Because look, across the road – nothing but long dead goldenrod plants. Goldenrod plants the drought robbed of their nectar, robbed Buzz of a honey crop. But on the golden side of the road – happy bees, happy Buzz.

And that's when it hit me. You probably already saw it. It's just like a second cutting of alfalfa. Comes up once, just about ready to bloom and gets cut for hay, comes back, stronger, more stems, more blossoms if the farmer'd let it, and better hay. What we were seeing was a second cutting goldenrod. Stronger, more blossoms, and later than normal. Essentially a second crop. Imagine doing this on purpose to a field that's otherwise always only a single crop? Now, it's two crops.

So, couple this observation of cutting early any mid-to-late blooming perennial honey crop – wild or cultivated, and you just made either two crops, or a single crop that's later, and probably better timed from a fall feeding perspective than if you just let it be.

OK, here's two ways to keep your bees home and away from the dangers of the real world. Think about it this winter. Find some friends who think this might work. Keep your bees safe, keep your bees home and keep your bees alive next year.

And while you're at it, are you out now collecting those seeds to sow later this Fall in those fields that aren't providing anything for your bees? Seed bombs come in all manner of sizes and shapes, and right now you should be collecting everything you can find.

A few years ago I cut the top off a white clover plant after it had gone to seed and took it home. One plant. I crumpled it up to get some of the seeds while standing in my gravel driveway. I got some seeds, and dropped some seeds so the next Spring a few white clover plants came up. This is a biennial, so all you get the first year is a short, pretty nondescript clover looking plant with no bloom. By Fall it was gone and I didn't think of it any more. Come spring, it's back, or rather, they're back. Eight or 10 plants up, with blossom stalks reaching for the moon. By July blossoms, by September seeds. From those very few plants I harvested almost a cup of seeds by the time they were done. A cup! Thousands of seeds, for free, and for spreading in ditches, unused land, out back, on the neighbors fence line – where ever there's a spot that isn't in the way and nobody cares about. Except the bees. Your bees.

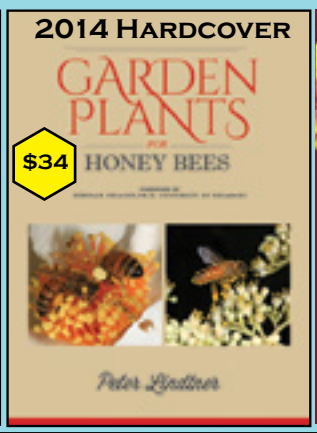
We can, and do talk about the problems we have. And we have lots of issues to deal with. But here's something you can actually do to make things better that works.

Even if you and a couple of friends only get five acres of meadow and just let it go, mow half and have two, maybe three crops of wild flowers next year it's better than complaining about big ag killing all your bees.

There's an old saying about politics that goes something like – decisions are made by the people who show up. It's the same with keeping bees.

So this year, Get up. Go out. Do it.

From all of us here at *Bee Culture* and *BEEKeeping*, we wish you and yours a happy, healthy and wonderful Thanksgiving Holiday.



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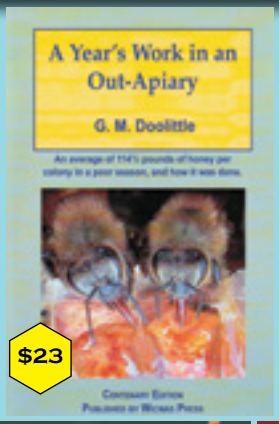

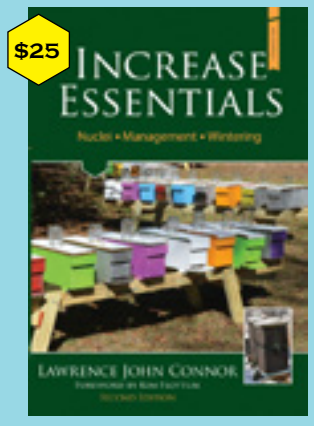

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It's Summers Time –

Chickens, Phobia and Fall

We lost one of our old girls a couple of weeks ago. She was one of the original Buff Orpington's from the first group of chicks in 2012. So she was four and a half years old, which I'm told by many is a long time to keep a chicken around. She's the same one that had gone downhill a couple of other times this year, but bounced back once we isolated her and gave her some time alone. But not this time. We kept her safe for about three or four days, but she didn't make it. I'm still amazed at how unforgiving and vicious my dear hens are when one of their coop mates turn up injured or sick. They have zero tolerance for the weak.

We're at 16 now and six of those are the old girls. The other 10 are a year and a half. The coop addition is just about done. I'm excited about next Spring when we'll get ducks again. I'm not sure at this point if we'll get more chickens. Kim is a little disappointed right now because he isn't getting very many eggs. So we'll start leaving the light on a little longer in the evening. The main thing is we're still having a good time. They are so fun and entertaining and very social. And no, we're still not going to eat any of them.

If you've been reading my column for long you might remember that I have a terrible phobia when it comes to snakes – just typing the word here gives me a bit of the willies. Little tiny snakes, big snakes, it doesn't matter what size they are, what kind they are – I don't like snakes. That's not a strong enough way to say it. They scare me to death. I've tried to get over this, but it hasn't worked. Many of you are sympathetic, some of you tend to be like Kim, who's usually a fairly nice guy, and just laugh about the whole thing.

So one Fall day a week or so ago I was outside and actually wondered to myself where do these snakes go when it starts to turn cold. Well, the next day I found out where some of them go. Kim harvested our small crop of cabbages – three to be exact – brought them in the house, put them int he sink for me to deal with and make wonderful cole slaw, which as it turns out I make pretty good cole slaw.

So the next day, after the heads of cabbage sat in the sink all night, I got ready to clean them up and deal with them. (This is creeping me out just telling this story!) As I started to peel off the rough outer leaves I was fortunately holding one head right over the chicken's scrap bowl and yes, the snake was curled up inside those leaves and fell – lucky for me – right into the scrap bowl. I didn't scream. I just dropped everything and calmly moved to the other side of the kitchen and very politely asked Kim to "GET THAT OUT OF HERE, RIGHT NOW." He had to clean the rest of the heads of cabbage and then I finished making my wonderful cole slaw. He didn't laugh in front of me, but I'm sure he was laughing all the way outside to dispose of the critter.

I'm pretty sure most of all of us have some sort of phobia that others don't understand at all. Mine will continue to be snakes. I'm not too crazy about mice, but I can deal with that.

We've had a lovely start to our Fall here in northeast Ohio. It is a beautiful time of year here. Even though we know what's coming later on, it's still my favorite time of year. It's cool, it's colorful. It's nice to sit out on the deck with a light jacket and just enjoy the scenery.

We live close to a high school, about a mile away and on Friday nights if the wind is blowing the right way I can hear the marching band at the football games.

I'll mow one more time this week and then be done for the year. We'll get the hives wrapped for Winter here in the next few weeks. Then we'll get plants inside off the deck and get the chicken coop windows closed and covered for Winter.

It was smelling like we would have a wonderful goldenrod flow this year, but I guess because of the drought in the Summer we just aren't getting much honey. A friend of ours has 17 hives sitting right in the middle of acres of goldenrod and only got three supers of honey. The smell was incredible. The aroma coming from that hive that sits on the front porch was absolutely overwhelming at times. But not much of a crop. In fact we'll leave everything on.

We've lost three hives in the last month. We harvested a good crop from all three. We lost one a month ago. Kim went out to check a week or so ago and two more – bees gone, nobody home. No dead bees, no queen, just gone. So we're at seven right now.

Our Amanda came back last week. If you've been paying attention you know she was off on maternity leave. We are so happy to have her back and she just seemed to not even miss a beat after being off that long. She's right back in the swing of things. She brought little Anthony, and actually dad Matt, for a visit this week. Welcome back, Amanda. If you're coming to our October even in a couple of weeks you might get to meet Matt and Anthony. You can still sign up for "A Case For Honey" – just visit our web page – www.beeculture.com.

I wish you and your families a wonderful Thanksgiving and a safe Winter.

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A Closer Look

VARROA MITE PHORETIC PHASE

Clarence **Collison**

The role of the phoretic stage is unclear but must have some physiological role for the mites, since the mites cannot increase their population and they experience higher mortality during this stage by falling from the hosts or being groomed off by other workers.

The *Varroa* mite life cycle consists of two distinct phases: a phoretic phase during which the females stay on adult bees and feed on hemolymph (blood), and a reproductive phase taking place inside of capped bee brood cells. During the phoretic stage, the mites frequently switch among adult bees. The role of the phoretic stage is unclear but must have some physiological role for the mites, since the mites cannot increase their population and they experience higher mortality during this stage by falling from the hosts or being groomed off by other workers. Mites, however without a phoretic stage could reproduce up to eight cycles and the average number of offspring for the first five cycles would be four (De Ruijter 1987), both parameters are much higher than occurs naturally. However, no study has compared fitness of mites with phoretic stage to those without, to determine the contribution of nutrition, if any, obtained during the phoretic stage.

During the phoretic phase the mites clearly prefer nurse bees over foragers (Kraus 1993; Kuenen and Calderone 1997; Del Piccolo et al. 2010). However, all of these studies were conducted inside laboratories using either live or freshly frozen bees. For field studies, one study showed mite preference for six and 12 day old bees (Kraus et al. 1986) but it appeared that they used only one colony. After six hours of the test runs, about 60% of the tested mites were situated on nurses, 35% on pollen collectors and only 5% on young bees which had just been uncapped. Tests using dead bees killed by freezing resulted in 55% of the mites being found on nurses, 35% on pollen collectors and 10% on young bees. The relative infestation of bees of different ages within the hive resulted in a two to three fold higher infestation of young bees compared to older bees and about a 20 fold higher infestation compared to pollen collectors. Differences were also found in the positions of the mites on the bees. During the tests of simultaneous choice, about 35% of the mites on pollen collectors were positioned between the thorax and abdomen and 12% under the abdominal sternites, whereas in nurses only 11% were between the thorax and abdomen and 26% were under the abdominal sternites.

"Phoretic behavior or phoresy is also involved in mite dispersal. Female mites 'hitch a ride' to other hives through the aid of the bees during swarming, drifting and robbing."

Another study showed no difference for mite preference for six to 13 (nursing age), over 17-29 day old bees (foraging age), again using a single colony but with two cohorts of bees (Steiner 1993). Thus mite host preference inside colonies is inconclusive. In addition, in both studies the mite preference was studied by following the same cohort of bees as they aged, so environmental conditions were also changing, both internal and external to the single colony used.

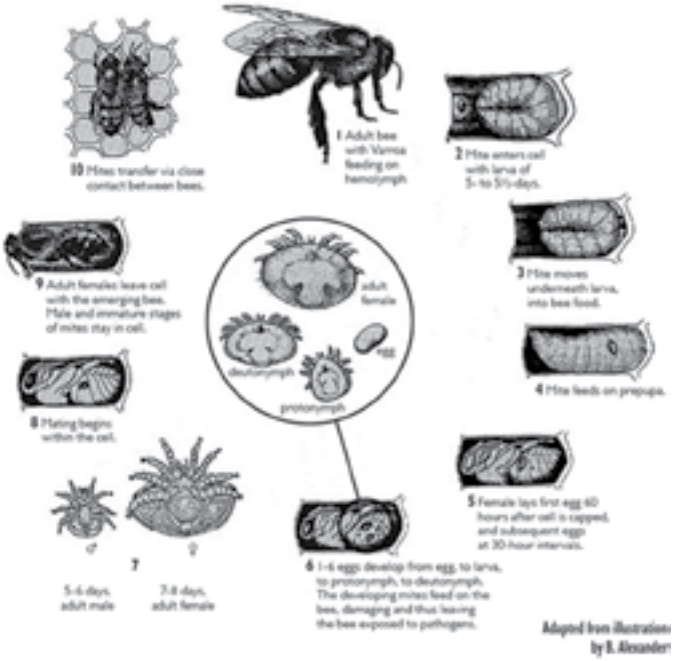
When an infested adult bee emerges from its brood cell, the accompanying female mites (the original female mite(s) and the new adult females) leave the cell by phoresy (dispersal by clinging to another organism). Each mite may search out another adult worker or drone and attach herself to it or stay on the original host on which they hide and feed. With the chelicerae (mouthparts), she pierces the intersegmental membranes (or other soft parts) of the bee and feeds on its hemolymph for several days. This is the beginning of the phoretic phase. The time interval until the next brood cell invasion varies and is one of the determining factors for the rate of increase of the *Varroa* population. When this interval is short the rate of reproduction is effectively increased because more reproductive cycles are accomplished per unit time (De

Jong 1997). Some mites may invade brood cells immediately. Boot et al. (1993) found in three different measurements, that 50% of the mites reentered brood cells within 2.0, 4.3 or 8.3 days. A longer time spent on adult bees before beginning a new reproductive cycle is correlated with a lower infestation rate in the colonies (Otten 1991).

Early studies that focused on the phoretic phase showed that it seemed to have no purpose for the parasite other than providing transport between reproduction sites (Boot et al. 1995). Therefore, it could be suppressed without having any visible impact on mite reproduction under natural conditions (De Ruijter 1987).

The significance of the mites phoretic stage, when mites feed on adult bees for a few days is not totally understood. In addition, it is not clear whether the preference of mites for nurse bees observed in the laboratory also happens inside natural colonies. Xie et al. (2016) tested whether mites prefer nurses over other bees when they are given simultaneously a choice of three types of bees (newly emerged bees, nurse bees, foragers) in field colonies, and whether feeding on nurses increases their fecundity or fitness when they later reproduce on worker pupae. They found that *Varroa* mites prefer nurses over both newly emerged bees and foragers in a colony setting. They were also able to determine the mechanism behind this preference and show that this preference maximizes *Varroa* fitness. However, due to the fact that each mite must find a second host (a pupa during the reproductive phase) to reproduce, the fitness benefit to the mites is not immediate but delayed.

Mite fecundity was significantly affected by the type of phoretic hosts



that they had previously fed upon: mites that fed on nurses showed the highest number of female offspring, followed by those fed on foragers, then those on newly emerged bees. Mite fitness followed a similar pattern with mites that were hosted by nurses having significantly higher fitness than the mites on the other two types of bees, but mites feeding on foragers showed the same fitness as those on newly emerged bees. Infertility rates also differed significantly among the mites hosted by the three types of hosts, with mites fed upon nurses having the lowest infertility rate, followed by foragers, then newly emerged bees. Finally, when mites were hosted by phoretic hosts with known ages, there was a significant negative relationship between mite fecundity and age of phoretic hosts (Xie et al. 2016).

The duration of the phoretic period is dependent on the mite's chances of being taken to a suitable cell by its host, which depends on the number of brood cells in relation to the number of adult bees (Boot et al. 1994). Therefore, more brood cells and fewer bees increase the chance that a mite is carried close enough to a suitable cell to invade, thus shortening the phoretic period (Martin 2001). When brood is present, phoretic periods of between 4.5 to 11 days have been recorded. Mites artificially transferred from one cell to another, without passing any time on the adult bee, are still able to reproduce (De Ruijter 1987), although at a reduced rate when compared with mites that have spent some time on an adult bee (Beetsma and Zonneveld 1992). However, under natural conditions mites need only a short time on the adult bee, less than one day for their subsequent reproductive ability to be unimpaired (Boot et al. 1995). The minimum necessary phoretic period is probably linked to maturation of the sperm within the female.

Piou et al. (2016) investigated if the type of bees on which *Varroa* stays during the phoretic phase and if the duration of this stay influenced the reproductive success of the mite and the damage caused to bees. They used an in vitro rearing method in the laboratory to assess egg laying rate and the presence and number of fully molted daughters. The expression level of two *Varroa* vitellogenin genes (VdVg1 and VdVg2), known to vary throughout reproduction, was also quantified. Results showed that the status of the bees or time spent during the phoretic phase impacts neither reproduction parameters nor the *Varroa* vitellogenin genes levels of expression. They correlated these parameters to the gene expression and demonstrated that daughters expressed the vitellogenin genes at lower levels than their mother. Regarding the damage to bees, the data indicated that a longer stay on adult bees during the phoretic phase resulted in more frequent physical deformity in newborn bees. They also showed that those mites carry more viral loads of the Deformed Wing Virus and hence trigger more frequently overt infections.

Varroa mite egg cell development was studied by sampling mites from adult worker bees (phoretic phase) and from larvae before and after cell capping (reproductive phase) in order to determine the course and duration of the previtellogenic oocyte growth and subsequent embryogenesis (Steiner 1991). Mites removed from adult bees, in particular from nurse bees, had only previtellogenic oocytes in the ovary. Apparently vitellogenesis is not possible during the phoretic phase. Females sampled from still unsealed or newly capped worker brood cells likewise carried only previtellogenic oocytes, one of which often was found to be somewhat enlarged. After consumption of the larval food by the bee and subsequent freeing of the female mite, active parasitization by sucking hemolymph from late feeding, spinning, or prepupal stages began. This evidently stimulated vitellogenesis and subsequently rapid growth of the first oocyte to develop. Vitellogenesis was usually initiated ≈ 10-15 hours after cell capping and lasted ≈ 15-20 hours. The fully grown egg was ovulated into the oviduct and embryogenesis then began.

Mating of *Varroa* mites takes place inside the sealed honey bee brood cell. During copulation, male mites transfer the spermatozoa into the genital openings of the females. Before the fertilization of female germ cells, the transferred spermatozoa have to pass through a final maturation process inside the genital tract of the female, the so-called capacitation. Häußermann et al. (2016) described for the first time the morphological changes and chronological sequence of spermatozoa during the process of capacitation within a female mite. They defined seven distinct stages of spermatozoa during the process of capacitation and have shown that it takes about five days from mating to the occurrence of spermatozoa ready for fertilization. This might explain the results of an additional experiment where they showed that freshly mated daughter mites need a phoretic phase on bees before their first reproduction cycle. The transfer of non-capacitated spermatozoa from male mites and the resulting long capacitation period within the female mites seems to be a consequence of an adaptive pressure for the male mites to inseminate several daughter mites within the short time span inside the sealed honey bee brood cell.

Phoretic behavior or phoresy is also involved in mite dispersal. Female mites "hitch a ride" to other hives through the aid of the bees during swarming, drifting and robbing. Only the adult female mites disperse between colonies aided by the behavior of adult bees (Martin 2001). Infested colonies weakened by the activities of the mite are prone to robbing by other stronger colonies. Mites can be transferred into the robbing colony via the robber bees picking up the mites or infested robbed bees which desert their hive and return with the robber bees. Bees have long been known to drift from hive to hive, especially the drones which may visit many hives during their lifetime and appear to be excellent dispersal agents for the mite. When any infested colony swarms, both halves of the colony will contain a proportion of the mite population. Dispersal rates appear to be linked to a combination of mite buildup and changes in bee behavior, with peak dispersal occurring in the Fall in northern temperate regions. This corresponds with the peak in mite numbers and peak in robbing activity due to the lack of nectar flow. Since at this time there is little brood production, the majority of mites will be on adult bees. BC

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BOARD MEMBER RECRUITMENT

It's That Time Of Year Again.

Michele **Colopy**

It is that time of year again when new Board members are recruited for the beekeeping association. The bee club has beginning beekeeping classes to present, beeyard maintenance, field days in the beeyard to prepare for members, monthly meetings, speakers, and outreach to other bee clubs, fellow stakeholders, school children, and advocacy to local legislators and policy makers. The bee club needs leaders who can tackle all of the goals of the Club. Leaders do not simply appear. Sadly, some who fancy themselves leaders, in reality often are not. They may be best suited to specific committee tasks, but leading the club, motivating other members, and attending to the broad work of being a Board member they cannot do. The current Board needs to work to recruit Board members who will help the club meet its goals and serve its members. In "Building and Managing a Better Board," The Enterprise Foundation advises Boards to "identify the types of people and sets of skills it needs." Board members must be "filled with commitment and passion," and "meet an organizational need."

Board members, current and prospective, must "understand and be committed to the organization's mission." Board members want to be motivated, and appreciated, for spending their time and resources to make the beekeeping association the best it can be. However, Board members need to be needed. Boards must examine the needs of their association, and seek Board members who can fulfill those needs. "Some of the skills, knowledge or experience that prove useful include:

- Knowing the needs of those the organization serves
- Having technical skills such as finance, accounting, insurance, contracting, or event planning
- Having wealth or connections to wealth (political connections)." (This includes a wealth of time to devote to the club as well.)

"The job of building a board that meets the organization's needs is one that truly never ends. New seats open every year, especially if there is a term-limit clause in the bylaws. So, finding and recruiting new board members is vital, continuing work."

Develop a Recruitment Plan

The Enterprise Foundation offers a three step plan to recruit board members.

Step 1 – Decide on Needs. The Board must determine the needs of the beekeeping association, what skills, knowledge, and experience are needed to replace departing Board members, and meet the needs of the club.

Step 2 – Find people! Look to your membership. As bee clubs are membership associations, this is the breeding ground for the next Board members. A strong bee club welcomes all of its members, and all of its members will have a belief that they too could be a Board member or committee person one day. In recruiting new Board members to run for the Board look for those members who will satisfy the needs of the bee club. It may behoove the bee club to require Board members serve on a committee first before running for a Board position. Working on a committee is a practice run of sorts for the member as well as the Board. Working on a committee is a great way to determine how someone works in a group, how they assist others, are they open to new ideas, are they welcoming of new ideas, do they show good judgment? In this process the Board or nominating committee can begin to formulate a list of prospective candidates. However, never underestimate the self-nominating club member as they could be just what the club needs.

Step 3 – Make the Plan! As candidates for open Board positions are determined, the personal contact by the nominating committee is key to ensuring the needs of the beekeeping association will be met by the skills and experience of the prospective candidate. The nominating committee should interview each candidate and compile a list of skills, ideas, passion, and commitment the candidate will provide. The membership also will want to know how a prospective Board member will work with the current Board, and serve the membership and mission of the beekeeping association. In bee clubs larger than 100 people, not everyone knows each other. Prospective candidates should

have the opportunity to introduce themselves to the membership, and share with the membership why they want to serve on the Board, the skills they bring to the Board, their beekeeping experience, and the vision they have for the bee club. So, the nominating committee needs to plan the recruitment and nominating process two-three months ahead of Board elections.

The Enterprise Foundation offers a Board Recruitment Planning Form, for those who like the simplicity of forms. The planning form has three parts: determine your prospective Board members, why they would be good for the Board, and their contact with the Board. The second part of the plan defines who on the current Board or nominating committee will contact the prospective Board member, and the approach taken to encourage them to run for the Board. The third part of the recruitment plan is to schedule time for the prospect to introduce themselves to the Board and membership as a nominee for the Board.

The Nominating Committee for any organization should be defined in the By Laws. The Nominating Committee must have an understanding of the skill sets of current Board members; and be aware of the "mix and characteristics of the board and identify the need" of new Board members. The Nominating committee should "identify, recruit and prepare the slate of prospective board members and officers; monitor board performance; train and orient board members; and maintain the board manual in consultation with the secretary."

The Nominating Committee advises and makes recommendations to the Board and membership, but the membership votes for its Directors and Officers. Voting for the Board should be by written, and anonymous ballots. It is fair and balanced to hold a written ballot vote, in order to dispel the formation, and appearance of cliques, and dictatorships in organizations. Each beekeeping association will have to examine the concept of absentee ballots or email ballots. If you have too many people voting via an absentee ballot, what else is occurring in the club that keeps so many people absent? Members have a responsibility to their club as much as the Board. Members need to know who is running for the Board, why they are running, how they will contribute to the health and stability of the beekeeping association, and vote!

The members of the beekeeping association are the owners of the club. They elect the Board to run the club, administer the programs, welcome new members, and fulfill the mission of the beekeeping association. Get to know your members, get to know your Board, and consider sharing your talents with the club as a Board member or committee member. BC

Resources:
The Enterprise Foundation, "Building and Managing a Better Board," 1999.

Michele Colopy is the Program Director for the Pollinator Stewardship Council. She holds a Master's degree in Arts Administration/Nonprofit Management from The University of Akron, and has created, revitalized and held leadership roles in nonprofit organizations for more than twenty years.

I. Name & Bio	Rationale	Source of Recruitment
II. Board Contact	**Venue**	**Strategy**
III. Contact Date	**Nomination Date**	**Date of Board Vote**

The White House Pollinator Health Task Force Initiative

Malcolm **Sanford**

More Than Just Honey Bees

Ms. Rebecca Terrell of New American Magazine writes about the Pollinator Health Task Force in a **recent post**, stating: "One year and $82 million after the Obama administration launched its **Pollinator Health Task Force**, honey bee colonies are doing great — just as they were one year before the advent of Obama's costly initiative. In fact, 2014 witnessed a 20-year high in numbers of managed honey-producing colonies, according to the most recent data available from the U.S. Department of Agriculture (**USDA**)."

Ms. Terrell discusses the gray areas surrounding Colony Collapse Disorder (CCD) ("With no dead bees to examine, pathologists remain at a loss."). Nevertheless she states, "U.S. honey farmers have maintained fairly steady hive totals over the past two decades. Honey-producing colonies numbered 2.77 million in 1994, 2.56 million in 2004, and 2.74 million in 2014. How have they managed it? Quite simply, seasonal die-offs are nothing new, and beekeepers know how to deal with them. They buy new bees." Other evidence of honey bees doing well, she says, include increased sales in queens and package bees, near doubling of honey prices in the grocery store and pollination fees roughly doubling in the last decade.

Ms. Terrell contends it's taxpayers who are really getting stung by the initiative. The federal government spent $48 million in 2015 to address pollinator health, as explained on page 14 of the White House's 58-page treatise, the National Strategy to Promote the Health of Honey Bees and Other Pollinators. "What good came of the $48 million worth of programs she asks? 'These efforts have proven insufficient to reverse declines,' she quotes from the document, adding 'the authors of which are clearly oblivious to USDA data. Yet in keeping with its characteristic never-let-a-contrived-crisis-go-to-waste approach, the Obama administration upped this year's funding by more than 70 percent to $82 million. This includes $56 million for the USDA to perform 'research and associated statistical survey programs. In other words, an additional $56 million swarm of bureaucratic paper pushers on Capitol Hill. Would it be unrealistic to expect that in 2017, the White House is going to report words to the effect that these efforts have proven insufficient to reverse declines?' "

This is quite an indictment and deserves scrutiny. A June 29, 2014 Presidential Memorandum mandated the creation of a federal strategy to **promote the health of honey bees and other pollinators**, containing the following tasks:

Establishing the Pollinator Health Task Force. There is hereby established the Pollinator Health Task Force (Task Force), to be co-chaired by the Secretary of Agriculture and the Administrator of the Environmental Protection Agency. In addition to the Co-Chairs, the Task Force shall also include the heads, or their designated representatives, from over 14 different official departments and such executive departments, agencies, and offices as the Co-Chairs may designate.

Many of these departments have now produced specific plans based on this mandate (80 pages). Of major significance are those developed by the two agencies that make up the task force, United States Department of Agriculture (USDA) and the Department of Environmental Protection (EPA).

"This memorandum shall be implemented consistent with applicable law and **subject to the availability of appropriations**." Here's the rub; will Congress appropriate the funds as noted on page 14 of the main document listed below, or will this have to come from funds re-directed by departments and agencies?

On May 19, 2015 The White House **announced** new steps in the pollinator health initiative. The Task Force selected are two agencies, USDA and EPA. The Task Force Strategy (58 pages) including provisions detailed above was unveiled with three overarching goals:

1. Reduce honey bee colony losses to economically sustainable levels;

2. Increase monarch butterfly numbers to protect the annual migration; and

3. Restore or enhance millions of acres of land for pollinate through combined public and private action.

It was accompanied by the science-based Pollinator Research Action (92 pages), which outlines the needs and priority actions to better understand pollinator losses and improve pollinator health. These actions will be supported

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by coordination of existing Federal research efforts and accompanied by a request to Congress for additional resources to respond to the pollinator losses that are being experienced.

The budgets referenced by Ms. Terrell (page 14 of the Task Force Strategy) are $48.53 million for Fy 2015, climbing to $82.49 million in Fy 2016. The largest recipients in FY 2016 are Agricultural Research Service (ARS) $21.9 million; National Institute of Food and Agriculture (NIFA) $31.5 million; Farm Service Agency (FSA) Conservation Reserve Program (CRP), $18.06 million; Natural Resource Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP),$4 million; and Environmental Protection Agency (EPA) $2 million.

Again, it is not clear whether this funding is newly appropriated or not. **NIFA** the major recipient of funding requires some explanation. The National Institute of Food and Agriculture essentially replaced The cooperative State Research and Education and Extension Service. It is responsible for coordinating federally funded agricultural research under the Department of Agriculture and will be soliciting and funding grants for the initiative from a wide array of sources.

On August 10, 2016 a "**refresher**" was issued on the initiative. It includes nineteen projects that are in full swing, including

1. National, statistical, metrics on honey bee colony numbers have been revamped to include all beekeeping operations , This will provide a robust baseline against which we can apply our expanding research knowledge on causal factors and best practices to mitigate losses;

2. The monarch butterfly migration research showing improvement in 2015-16 due to ideal weather conditions and early on-the-ground habitat efforts. However, an early spring snowstorm in the overwintering forests in Mexico is reminder of the tenuous nature of this situation.

3. Good progress has been made to restore or enhance millions of acres of pollinator habitat. Mostly done via best management practices as noted in a major publication on best management practices (BMPs) Pollinator Friendly BMPs on Federal Lands (44 pages).

On June 22, 2016 the White House released the Pollination Partner Action Plan (PPAP) building on Federal actions to improve pollinator health by facilitating additional state and private-sector engagement. The PPAP furthers President Obama's original June, 2014, memorandum on the plight of the pollinators. As he made clear, ultimate success can only be achieved through an "all-hands-on-deck approach" to create the necessary long-term change and fully internalize the value of these creatures to our well-being.

The PPAP document shares examples of existing partnership actions (24 pages) as models for future efforts, and encourages ideas for new and creative ways to engage all sectors of society in the long-term protection of pollinators. Again, three major areas are included: Honey Bee Health; Monarch Butterfly Conservation; Pollinator Habitat via Land Conservation, Restoration, and Enhancement.

Clearly this initiative begun by the President is a huge effort in a lot of ways, incorporating several extremely large-scale documents (almost 300 pages in total) and is expected to generate efforts of similar magnitude. The objectives include all pollinating organisms, and is especially strong in terms of habitat management. Ms. Terrell's indictment focusing on it as a boondoggle for beekeepers and honey bees is too narrow given the scope of the proposed effort.

Beyond Ms. Terrell, others are not happy with the initiative. The Center for Food Safety among others is concerned that there is little mention of the effects of neonicotinoid pesticides on honey bees, which the believe is the main issue affecting all pollinators. Their conclusion: "... the best management practices (44 pages) for creating habitat on federal lands weakly encourage officials to "try to keep portions of pollinator habitat free of pesticide use." But unless you get rid of pesticides altogether, this simply is not possible.

A major effort to look at reactions to the Strategy from the viewpoint of various other organizations and potential contributors was published on November 20, 2016. It offered a range of samples from the Strategy's Action Plan and opinions that were generated from **Bayer Crop Science**, the **Xerxes Society**, **Honey Bee Health Coalition**, EPA, Washington Post among others. Notably, it includes some strong critics of the status quo who are sounding hopeful – and watchful. One wag asked the question, "Is it **smoke and mirrors or bountiful possibility**?

Meanwhile, the White House Pollinator Health

Monarch Butterfly Conservation

USDA United States Department of Agriculture National Institute of Food and Agriculture

Task Force is going forward full speed ahead with its activities. The initiative is simply too big an effort (four major publications with over 300 pages) and two years in the making to tell how much effect it will actually have on honey bees, beekeepers, regulators and the general public.

It will be up to the public and others interested in the results of this initiative to be invested in the measuring of its success as noted on page 13 of the Strategy:

"Periodic follow-up and reporting of agency performance is also vital in demonstrating to the public the Federal government's commitment to reversing pollinator declines and improving pollinator health. To this end, Task Force agencies are to **report annually on all metrics to the Task Force Co-Chairs, who will publicly disseminate the results on an annual basis** so that the general public can monitor the progress each agency is making in fulfilling the commitments detailed in this Strategy, including collaboration with public and private stakeholders." A beginning is the "refresher" mentioned above from the **USDA**.

An overriding concern will be whether funding is secured in the Fy 2017 budget to continue this important work. Given that a new President will take office in the near future, those interested in the health of the initiative itself should be making plans to do their utmost to support it in the future.

It is important to understand that the budgeted funds on page 14 of the main document noted above have already been appropriated by Congress. The agencies involved and are simply being redirected by the President toward the goals of the pollinator initiative's strategic plan. Looking at the numbers in the task force document as new money being appropriated strictly for the pollinator initiative is incorrect. Only Congress can appropriate funding not the President himself. This leaves us with the fact that almost any project from the agencies listed in the task force document on pesticides, butterflies, honey bees, other pollinators, planting seeds and other agricultural activities etc. might be attributed to the President's initiative.

Ms. Terrell conclusion continues to be way off base when she says, "despite all the buzz over a supposed 'beepocalypse,' the real tragedy is rampant, unconstitutional government waste on an issue that should be left for beekeepers and the free market to handle on their own. Somebody needs to tell the feds that it's none of their darned beeswax." As one way put it, "From my y reading, the author of that article is neither a beekeeper nor a farmer reliant on pollinators.

A much fuller report on this is found on the world wide web via a *Bee Culture Catch the Buzz*, which allows access to all underlined links, including the publications making up major parts of the Strategy: Main document: National Strategy to Promote the Health of Honey Bees and Other Pollinators (58 pages); Research Action Plan backing up the main Document (95 pages);Habitat Restoration Best Management Practices on Federal Lands (44 pages);Pollination Partner Action Plan (PAPP) to bring the general public into the initiative (24 pages); Appendages of the Strategy showing departmental-specific Plans (80 pages). BC

*Malcolm Sanford is the retired Extension Apiculturist from Florida and publisher of Apis Information Resource Newsletter – **http://apisenterprises.com/vita.htm**.*

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SCHEDULE AT A GLANCE
(subject to change)

Tuesday, January 10	
All Day:	Board and Committee Meetings
Wednesday, January 11	
All Day:	General Session
Noon:	Tradeshow Opens
Evening:	Welcome Reception & Honey Queen Candidate Entertainment
Thursday, January 12	
All Day:	Track Sessions for Beginning, Serious Sideliner and Commercial Beekeepers
All Day:	Tradeshow
Lunch:	Auxiliary Lunch/Meeting*
Evening:	Social Activity – Moody Gardens Rainforest*
Friday, January 13	
Morning:	Kids and Bees Program
All Day:	General Session
All Day:	Tradeshow
Lunch:	Foundation for the Preservation of Honey Bees Lunch/Meeting*
Afternoon:	ABF Business Meeting
Afternoon:	2017 Honey Show Live Auction
Evening:	AHPA Banquet*
Saturday, January 14	
Morning:	Commercial Beekeepers Breakfast/Meeting
Morning:	AHPA Business Meeting
All Day:	Concurrent Hands-On Workshops
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DOWNTOWN

Harvesting As Outreach, Part 2

Most clubs have done a version of a public honey harvest at one time or another – at a county or local fair, for example – and have seen first hand the power of watching frames turn into bottled gold for people who might be too afraid to interact directly with bees. This is essentially an educational or "friend raising" activity of great value for the ongoing understanding of bees and acceptance of beekeepers in polite society. In an article just past, we talked about why and how to set up honey harvest events directed specifically at young people. This time, I wanted to show you how we sometimes re-engineer these events specifically to meet additional goals, such as outright fundraising, building community partnerships, creating shared apiary sites on valuable sites (that we don't own), and creating benefits for members of our community who are also doing important service.

Unlike kids' events, there is usually significant money on the table for this one, so everyone needs clear goals and expectations.

We've done this a bunch of times, but the examples we have space for here are: an event we have held for six years at a five-star hotel, a nine-year gig at a local monastery, our four years at a historic cemetery, and a brand-new session that benefits an urban agriculture non-profit serving our veterans (as well as the expanded greening program of a major hospital). We are in other places, too, like food banks and rec centers, so don't limit your imagination, either.

Please note, in all of these cases, someone is donating some honey, or just paying it as rent for use of a site. You may be able to set up another deal (for instance, offering hive tours for a silent auction–which can raise an insane amount of money).

Getting Sweet With Adults

Prepping for A Grown Up Honey Harvest

In each case where we hold a honey harvest, we have negotiated an out apiary agreement with the site where the event takes place: this is because most of our partnerships have evolved with the opening of new sites for new beekeepers. It doesn't have to be this way. If your club has an ongoing relationship with a meeting site (like a nature center, for example) this could be another way to seal the deal, or score free meeting space. The main point is that maximum value comes from doing this in the course of an ongoing relationship. In my opinion, this is too much of an investment for a one-off event.

Your partner is going to want to sell much of what is harvested: think about bottles and labels, who provides them, and who pays. The money is on their end. Let them also manage who is invited, how it is publicized, and how much is paid to attend (if anything) and the price of honey to take home. Inform them up front of how many beekeepers will be in the room, and whether you will be bringing additional frames for harvest that will go home with the beekeepers, not the institution. They should be pleased with the latter: the more frames there are to harvest, the more folks they can invite to participate.

Make sure you know how many are coming: this allows you to bring enough uncapping tanks, tools, and activities. I like to have at least two bottling buckets and stainless steel filter sets so we can begin bottling by mid-session. Yes, I know there will be foam, and this will not be state-fair-quality product. It's OK.

Things in the room can be slow when getting started (before there is an extractor to crank, or honey to bottle). Ask them to provide refreshments, and consider providing a beekeeper with a demo hive to take questions. We sometimes assign folks to sticking labels on empty bottles. A honey tasting from different years and different parts of the area is often appreciated. If it is daytime, bring a beekeeper volunteer to escort groups out to see the hives on site (this is *really* powerful: connecting the honey all the way back to the green space).

In each agreement, we establish on what basis and how much honey we donate, usually how much per-hive onsite with early notice of particularly bad harvest years (like 2016 in DC). If we can't harvest at a long term partner, we try to deliver additional value, like participation in public programs onsite or donating other products such as beeswax soaps/lip balms, etc.

We prefer to harvest in inspected, food safe locations in order to maximize cleanliness and later

salability of the product. Most large institutions have a kitchen that meets the standard. If not, bring your drop cloths, make sure there is a sink (non-negotiable), and have a plan to evacuate sticky stuff to a place where you can really clean up. A first aid kit is not out of line where hot knives and uncapping forks are available. Almost all sites have them.

Sweet Examples

At the ***Fairmont Hotel,*** we taught chefs Ian Bens and Aaron Weber how to manage on site hives starting in 2009. This was a patently obvious attempt to land a major commercial partner with a major commitment to the environment (and a large legal department) during our long-term effort to more widely legalize beekeeping in DC. They only had three hives, and they could not harvest until 2010, so the next year, they invited the DC Beekeepers to do a community harvest with them in a completely certified commercial kitchen. It offered something exceptionally groovy: a commercial dishwasher capable of handling a partially disassembled extractor. We used this event to show first year beekeepers how to harvest, and to give our more experienced beeks an efficient method to quickly get extracted honey, and to have that honey eligible for sale anywhere in the city. Those beeks brought their own bucket and bottled on their own time. The Fairmont got their honey harvested with no additional staff cost or delay, and tons of press pictures that hit their Facebook and Twitter streams, as well as other media in support of their corporate greening program (which is for real). The Fairmont wanted their honey in a bucket (which they provided) and which was used in the kitchen for as long as it lasted. Last year, they partnered with DC Donuts for a special promotion afterward.

At the ***Franciscan Monastery***, they had bees decades ago, but still had a going vegetable and Bible garden with so-so yields. The volunteer Garden Guild asked us if we would set up hives in 2006, and most years since 2007 we have had a significant public harvest there. Over the years, the 20+ acre grounds have become home to six beekeepers (+/-) and we have been given room to grow this year. This is also where we bring bee trees to disassemble and hive. The Garden Guild sells tickets, usually about $15 each, to the public, brings them into their certified site to harvest, and sends them home with jars from three ounce to eight ounce, depending on the yield. There is an option to buy right at the session, but most of the honey is sold in the Monastery Gift shop in small bears: this has profound meaning to many of the site visitors, and is completely in line with their mission of linking religious values to all natural life. It's an important source of funds for the Garden Guild to maintain the site, too.

In nine years, we have hit some bumps, but the long term relationship helps. It is really important to maintain regular communication with the rotating roster of volunteers who staff and lead the Garden Guild. Incoming officers may not understand the deal, or may not know that honey harvests are not predictable year-to-year. It is

important that site beekeepers value the opportunity much more than many other sites: the monks actually live here, and religious pilgrims walk the grounds in meditation. Messy or ill-tended hives must not be allowed to persist. Inconsiderate beekeepers must get the boot. Right away.

Historic Congressional Cemetery Apiary

It took us over 10 years to get on the grounds here, and we probably have goats to thank. This site was struggling financially for years, until they managed to market themselves as a dog-walking and green burial location. They brought in Eco-Goats to help with pesticide-free landscaping: munching away invasives and

Fairmont Hotel Harvest.

inviting the public to watch. This made the local and national news. I had been a dog walker there for years, and had participated in a number of fundraising events: so I said, "Hey!"

In our second year, we pulled three supers of honey and made $5,000 for this site. Several local club members had to bring their frames to have enough to do, but Cemetery users paid $35 each to do our work and bring home a four-ounce hex jar, with an opportunity to buy additional jars for $20 each. The "class" sold out in 36 hours, the honey in a couple of weeks.

We are very welcome at Congressional Cemetery.

The historical tours mention us, the dog walkers say "Hi," we bring extra veils so the adventurous can join us in impromptu inspections (in reality, actually selfie-production opportunities). Each one of them goes home and tells at least ten friends, and who knows how many followers, how cool urban bees are.

They can have the three supers. The six other beekeepers here will be kicking in next year.

Bees for Vets

The year before last, our short course included a returned Iraq War vet, who also joined our Swarm Squad. He is a devoted urban gardener, and started a non-profit called Fields 4 Valor (**http://fieldsforvalor.org/**). The group helps former military, including those managing PTSD, by growing food as a positive activity, and in turn sharing the harvest with 50 former service member families in need. They asked us to help find them an apiary to add to the garden

this year. Funny thing was, Sibley Hospital had asked us to set up bees on their new green roof, and it was way too much of a pain for me to drive 45 minutes each way to do so. Also, this is no spot for rookies or dilettantes.

Fields 4 Valor is new and cash-poor (though vegetable-rich) and decided to try a honey harvest to both raise money and put sweet stuff in the basket for their families. They had an existing relationship with the Dog Tag Bakery, which has a fellowship to train returning vets in the culinary biz. I had plans to send a couple of supers to the Maryland Honey Harvest Festival of the Maryland State Beekeepers Association for extraction demos the weekend before, so we donated that honey for bottling and sale. Fields for Valor had three supers of their own to uncap and spin (because they started with massive splits early in the season). Folks bought tickets for $40, the honey is not yet on sale, but they already have $4K in their pockets. The garden will be bigger next year.

So let's count up the happy people here: veteran volunteers, families in need, a major hospital, the MSBA, a local pro-community business, and all the people who came and feel good about themselves and the stuff they will put in their tea for the next few weeks. How else can you do this??

There's so much about beekeeping that builds virtuous circles – if you're a beekeeper who reads this magazine, you already know how it broadens and deepens your life in the world and in the spirit. If honey bees are the great ambassadors of the wide pollinator family, this is their calling card. And people are happy to offer their support – in space, kind, cash and friendship – for this worthwhile effort. BC

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

A Medley Of Fruit Plants For Bees – Medlar and Quince

Connie **Krochmal**

Medlar and quince share some common traits. Members of the rose family, both are uncommon, old fashioned fruits that have largely fallen from favor. Fairly small trees or shrubs with great ornamental value, these were widely popular during the Middle Ages.

Thriving in zones five through nine, the plants originated in Persia and the Caucasus. These bloom later than apples and pears. At the same time, they're good bee plants like most of the related fruit trees.

MEDLAR

The picturesque medlar (*Mespilus germanica)* has earned a place in the bee garden alongside other fruit trees. They can survive for several centuries. Cultivated by around the 2nd century B.C., it was grown by the ancient Greeks and Romans, who enjoyed the edible fruits.

The plant was first described by Theophrastus (about 371-287 B.C.), a Greek naturalist and philosopher. Ancient Greeks ate the fruits fresh and dried and used them for medicinal purposes just as the Europeans did later. This was introduced to England as well as to other areas of Europe where it naturalized and now grows wild in woods and hedgerows.

French folklore attributed magical powers to the tree. According to myth, it offered protection from witches and sorcerers and could protect their homes from enchantment.

William Shakespeare mentioned medlar fruits in several of his plays, while Geoffrey Chaucer alluded to them in his tales. The fruits remained popular during the Tudor and Victorian eras.

Medlar plants were introduced to North America by European colonists. John Bartram received plants and cuttings along with medlar seeds from England. During the 1800s, interest in medlars waned in Europe, England, and America. Nowadays, they're most popular in the Piedmont of Europe.

Medlar Description

Sometimes spiny, this deciduous, crooked, gnarled tree or shrub is only 15 to 25 feet tall and wide. It features a widespread, rounded crown with dense branches that form sharp angles. The plant matures very slowly and can take two decades to reach its ultimate height. The young growth is hairy. The twigs are also downy.

Three to six inches in length, the thick, deep green, alternate leaves arise from very short stalks. They're finely toothed near the tip. Hairy when young, the foliage can be lance-like, oblong, or oval-oblong.

This can display various bright colors during the Fall. A variety with variegated foliage is grown in some areas of the world. However, this is rarely available in America.

Medlar flowers appear from May to June, depending on location, for about ten days. The large, showy, ruffled, solitary, stalkless blooms, which resemble apple blossoms, are 1½ inch across. Initially white and fading to pink, these open at the ends of the shoots on the new growth as the foliage unfurls.

The blossoms contain five long, narrow, lance-shaped to rounded petals and red anthers. The woolly, pointed, leaf-like sepals remain on the fruit as it grows to maturity.

Bees are very fond of medlar flowers. The nectar arises from a yellowish circle at the base of the blossoms. In America, there are rarely enough medlar plants to yield surplus honey. However, it provides very good honey crops in some European countries.

Medlar plants bear annually beginning at about three years of age. The brownish fruits can vary somewhat in shape. They resemble a flat topped apple with the shape varying from flattened globes to spherical, conical, or elongated.

The blossom ends with their persistent sepals are unique among fruits. These remain open, exposing the inner space containing the seeds that are clearly visible.

Medlar fruits are generally about two inches in diameter and about half as long. Depending on the variety,

Medlar (Mespilus germanica).

Medlar (Mespilus germanica)

Quince (Cydonia oblonga)

Quince (Cydonia oblonga)

these can weigh up to three ounces or so. The fruits lack the core that is seen in the related apples and pears. The seeds are enclosed in stony, hard capsules that are easily removed by straining the pulp.

Growing Medlars

These fruit trees require a Winter chill. Certain varieties have survived temperatures of -30°F. Easy to grow, the self fertile plants require minimal care.

They're suited to most any soil provided it is moist, well drained, and relatively rich. Medlars are well suited to the Gulf and the South Atlantic regions.

If planting a grafted medlar, the graft union should be placed below the soil surface, which is contrary to most grafted plants. As with any fruit planting, keep the plant watered as needed until it becomes well established.

Although medlars can be grown from seed, the grafted trees tend to bear larger fruits. Somewhat slow growing, these require very little pruning other than the removal of crossing or diseased branches.

Medlars are generally free of disease and insect problems. Sometimes, rust does occur.

About a dozen medlar varieties are available worldwide. At least three of those can be found in America. These include Breda Giant, Marron, and Royal.

Harvesting and Using Medlars

Initially, the fruits are very hard and inedible. These are eaten once they're overripe. Harvest after the first frost, which begins the ripening process, which is known as bletting.

Store medlars in a cool dark place until they ripen enough to eat. A traditional way to store them is in sawdust or straw. They can also be placed on a wooden shelf. For best results, avoid storing them on plastic surfaces.

Over time, the fruits become soft and overripe. With the texture of baked apples, the raw pulp has been compared to unsweetened spiced applesauce. It has a characteristic, wine-like, slightly acid, sweet flavor.

Victorians ate the raw pulp with cream and sugar. They also stewed the fruits lightly and made them into jam. Medlar paste, which is similar to lemon curd, is popular in some parts of Europe. The paste contains medlar fruit pulp, eggs, and butter.

The fresh fruits go well with wine. They're made into jelly, comfit, and cider. For dessert, roasted medlars are flavored with butter and cloves. Add sugar and whipped cream to the raw pulp for a quick, easy dish.

QUINCE

Quince (*Cydonia oblonga)* has been cultivated for over 4000 years. The Greeks and Romans dedicated the fruit to the goddess of love, Aphrodite. Quince fruits are mentioned in the Bible as well as in ancient Babylonian and Assyrian texts.

The plant was widely grown in most of Europe – particularly the Mediterranean region – and Asia long before the apple. It has naturalized in Europe and England.

Quince plants were brought to North America by European colonists. At one time, this was more popular

in America than apple and pear trees. Interest in the plant began to diminish in Europe and America during the 20th century. These tend to be most popular in warm regions of the world, including Italy, Spain, Greece, and the Middle East.

Quince Description

This fast growing, small, bushy, round-topped tree or shrub can become contorted with age. It features black bark and crooked branches. Generally only ten to 12 feet in height, the plant has occasionally been known to reach 20 feet. The shoots are hairy.

The short stalked, greenish-gray, alternate foliage, two to four inches long, can vary in shape. It ranges from oval, rounded, oblong, or broadly ovate to elliptic. Sometimes toothed, the leaves are hairy underneath. They turn a lovely yellow in the Fall.

The large, showy, solitary, stalkless flowers can be white or pale pink. With a goblet-like shape, they resemble apple blossoms, but are larger – up to 2½ inches wide. These emerge at the tips of the shoots after the foliage has begun to unfurl.

The flowers feature five petals and five sepals. The size, color, and shape of the petals are variable.

Along with other fruit plants in the rose family, quince flowers are eagerly sought by bees for nectar and pollen during the Spring. The plants usually aren't numerous enough to bring surplus honey, although they're helpful to brood rearing.

Quince plants provide good fruit yields and begin bearing at about four to five years of age. They can continue bearing for perhaps 40 years.

From flower to fruit is about 150 days. The stemless, hard, heavy fruits can be green to yellow or orange. They usually ripen to yellow, but will still be firm. These remain fuzzy until they ripen.

Quinces resemble a cross between an apple and a pear. The flesh is whitish-yellow. A single fruit is so aromatic that it can perfume a room. Historically, these have been used as room deodorizers.

Usually slightly larger than a baseball, these are variable in size. The largest ones are about three to four inches long. They can weigh up to a pound.

The shape of quince fruits can vary. They're often blocky and irregular to pear-shaped or plum-like. Some are round or globular.

Growing Quince

There are several sub-species of quince. About as easy to grow as the European pear, the quince is relatively low maintenance and trouble-free. This has a low chill requirement of only 300 hours or so.

In northern areas, the fruits don't always have sufficient time to ripen before the onset of cold weather. The best variety for cool climates is reportedly Vranja. Quince fruits ripen best in areas with long growing seasons.

Withstanding high humidity, quince requires full sun. The plant thrives in a deep, rich, moist, well drained, heavy soil with a pH ranging from nearly neutral to acid. It will tolerate a slightly wetter or drier soil than most fruit trees.

Space quince plants ten feet or so apart. They can be trained just like any other fruit tree to develop a strong central leader and a very full, round shape. These can also be left untrained to assume their naturally bushy shape, a method that requires very little pruning other than removing crowded, damaged, or diseased branches.

If young plants produce straggly growth, head this back. Older plants tend to produce suckers, which should be removed. Pruning is best done in late Winter and early Spring.

Some quince plants bear such large crops that the limbs can break. If necessary, provide strong supports for the heavily laden branches. On occasion, the fruits might benefit from a thinning if a plant consistently overbears.

Avoid overfertilizing quince plants – particularly nitrogen – for this can promote fire blight. Phosphorus and potassium are beneficial to quince. Usually, an organic mulch and an application of compost can provide enough nutrients if the soil is rich.

Quince is generally propagated by grafting, dividing, and layering. Seeds can be used, but the plants will be quite variable and could produce either apple-shaped or pear-shaped fruits.

Before buying a quince plant, check to see whether it requires cross pollination. Some varieties are self fruitful.

Avoid digging around quince plants for these are shallow rooted. They can experience some of the same potential problems as other fruit trees, such as fire blight, rust, caterpillars, and occasionally borers.

A number of quince varieties are available in the U.S. These include classics, such as Cooke's Jumbo, and Smyrna as well as newer ones from Russia and Turkey.

Harvesting and Using Quinces

Normally, the fruits are allowed to ripen before harvesting. However, they can be picked earlier if you plan on storing them for long periods. These keep well on the tree.

Cut the fruits from the plant rather than pulling them loose, which can damage the stems. Handle quinces carefully for they tend to bruise very easily.

In areas with lengthy, hot Summers, quince will ripen on the tree from September to December and will be sweet tasting and soft enough to eat raw. When grown elsewhere, the fruits can sometimes be astringent, tart, bitter, and hard. These contain lots of seeds, which are easy to remove.

Quince fruits are used mainly for jams, jellies, and baked goods. During the cooking process, the quince flesh turns red and contributes a lovely color to pies and other cooked fruit dishes. The related flowering quinces (*Chaenomeles spp.)* bear similar looking edible fruits that can be used the same way as true quinces. BC

Connie Krochmal is a writer and a beekeeper in Black Mountain, North Carolina.

Beeyard Thoughts

Using Bee Blowers.
Using Bee Vacuums.
Help With Commercial Exhibit Observation Hives

Blowing bees from supers

When I first came to the Ohio State bee program in 1978, one of the few luxuries the young bee program had was a bee blower. Ironically, at that time, the program only had about ten badly overworked hives. The program later grew to just under 400 hives. In the very early days of the program, there was precious little use for a bee blower, but there it was. In truth, it was an early backpack leaf blower with an ever- so-slightly modified air tube to make it just a bit more suited for blowing bees from supers.

In retrospect, I suppose it is humorous that the crown jewel of the bee program was stolen within two weeks of my employment with the program. At the time, it was a mighty mystery at the school. Reports were completed and police interviewed potential suspects, but – for crying aloud – it was a small, portable leaf blower. Just pick it up and go. It was never seen it again.

Even earlier, at the University of Maryland, I extensively used a Dadant Tripod bee blower. Without minimal modifications, this device is still manufactured today. It is heavy and solidly dependable. For you small engine authorities, the oldest units had a Tecumseh 5hp engine with a vintage float/needle valve carburetor.

During my years, I had a major part in wearing out the engine and hose on four of these units. That took a long time. This blower has always been simple and easy to use. Beekeepers typically arrange for the heavy device to be strapped to a hand truck to move it from hive to hive.

A common modification was to buy vacuum line unions and join two or three vacuum lines together to make one very long line that reduced the number of times the device had to be moved.

The pinnacle of bee blower systems

For a short time, an interesting bee blower system was manufactured named the Bee Off Blower System. There was nothing like it before, and there is nothing like it now.

It was a gasoline-driven 34" propeller within a typical fan blade guard. The propeller was wooden and was perfectly balanced. All those years ago, I heard a rumor that the company manufacturing the propeller also produced wooden airplane propellers. Supporting this large blower device was a separate smaller simple leaf blower.

The plan was for the beekeeper to stand in the slipstream of air from the big fan while running the smaller blower to remove bees from supers. The beekeeper was kept cool, smoke was not required, and bees were blown from the immediate area by one or both of the blowing devices. A work stand was included on which full supers could be positioned for removing bees from equipment.

The brand new bee blower before being stolen.

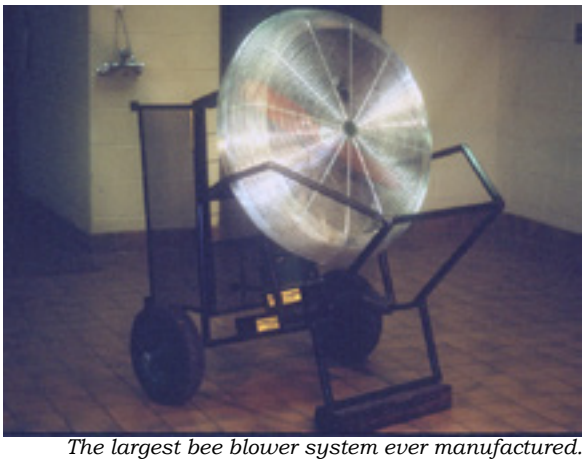
Though I do not know the true reasons for it not being available today, I do know that the device was heavy and had a large footprint. Once in place, it worked nicely, but getting to the yard, and subsequently, moving it from one hive to another was a chore. Additionally, a mat of trapped bees would accumulate on the backside of the blower. Screening prevented the bees from passing through the fan, but over time, the output of the fan was greatly reduced as the "bee mat" thickened on the backside of the propeller guard. These shortages could have been addressed in later models. I suspect it was too expensive for most of us.

As is the case with nearly all of the beekeeping equipment at the Ohio State bee lab, this device was destroyed in a tornado that stuck the bee facility in 2010. Only this poor quality photo remains.

Now, we are back to leaf blowers

Now, other than the Dadant unit, we are all back to using leaf blowers. As has everything else, leaf blowers have improved. They have become smaller, lighter, and more powerful. These multipurpose devices – annoyingly noisy that they are – have become a staple in many beekeeping operations. It should be noted that some leaf blowers are electric.

Dadant Tripod blower with double vacuum tube.



The largest bee blower system ever manufactured.

Some of my bee blower observations

1. All types of blowers are noisy. I would recommend hearing protection under your bee veil.
2. When blowing bees from frames that are not completely full, bees can become lodged (half in) half-filled cells and will not be blown out. This happens because bees are engorging honey. Heads and thoraces are in the cells while abdomens are out of the cell. Such bees are trapped by the air blast in the cells.
3. Burr and brace combs will obstruct the air blast.
4. Frames facing the exterior walls will be difficult to get air through.
5. Removing a frame or two to give workspace will help with issues #3 and 4 and will help with all other remaining frames.
6. If possible, blow the bees into the air. Blowing them on the ground makes them crawl and requires the operator not to step on the crawling bees.
7. Blow bees out from both top and bottom, but primarily from the bottom side of the super.
8. Immediately cover the supers once the bees are removed. Cover both the top and bottom with no openings of any kind. Thousands of bees in the air will immediately find the open supers.
9. Using air to remove bees from supers can easily incite significant robbing events. The aroma of honey will pervade the area and can cause this behavior both from colonies both within and outside the apiary. Closing down colony entrances after removing supers is helpful.
10. Look for the queen, but in the heat and noise of battle, she will not readily be found. If large numbers of supers are to be removed, keep the task moving. Spending too much time searching for the queen gives robbing and aggression time to get started.
11. Know this – unless you are removing bees from ten supers or so, you will never get every last bee from the supers.

Finally –

For removing bees from larger numbers of hives, many beekeepers use a combination of chemical repellants, brushes, and blowers. Also, shop vacuum airflow can be reversed allowing them to become blowers. As stated above, work fast to get the job done. The bees will not readily let their honey be taken, and they will express their views. For a while, chaos will reign. Give them a few days to settle down.

For all of you who are wondering why I made no mention of escape boards, Porter escapes, simple brushing, or removing honey during cold months, my discussion here only concerns either electric or gasoline-powered blowers.

Bee Vacuums

Essentially any kind of common blower or vacuum device can be modified – one way or the other – into a bee-vacuuming device. The premise is that a trap should be in the vacuum line that prevents the bees from passing through the blower impeller. You are only limited by your imagination[1]. Dadant bee blowers, shop vacuums, and leaf blowers can all be modified to become vacuums. As time has come and gone, various companies have manufactured vacuuming devices. If you have an interest is purchasing a vacuum trap, check bee equipment catalogs to see what is currently available.

Many years ago, when I was a graduate student at the University of Maryland, I needed to monitor

[1]An older article with more construction details is at: **Early Bee Vacuum Article** http://tinyurl.com/Archived-Vacuum-Article

Bee (leaf) blower with work stand.

The 1976 model vacuum device. The smaller vacuum line entering on the top empties into a screened package bee cage.

the weight of wintering colonies. It was cold outside. So I vacuumed inside. I developed the vacuum that is pictured here – except I used a shop vacuum. At first, I modified a deep super to serve as the trap, but in later generations, I built trap boxes that would specifically fit the screen-shipping cage. I initially used 4" plastic drain line as the air supply line from the vacuum to the trap device. Later, it became much easier just to use the same sized vacuum lines as the airline. I tell you this because my photos may show variation.

The thin rectangular board on top covers a hole. Opening or closing the top gate controlled the rate of vacuum airflow. That simple procedure was more precise than trying to control airflow with the engine throttle. The simple advantage to this prototype was that it could be made from readily available deep supers – but just a bit not deep enough. Note the unpainted spacer that was required to raise the lid enough to clear, but still fit tightly against the internal cage.

Modifications of later variations

Later trap variations were a bit smaller but taller. Additionally, a telescoping lid could be hooked to the trap box. The earlier model required that the lid be ratchet-strapped to the trap.

Early Bee Vacuum Article

http://tinyurl.com/Archived-Vacuum-Article

A simple control for air pressure flow.

Within the trap box, a bee package-shipping cage prevents the bees from moving into the shop vacuum canister. The bees collect within the package cage. One shortage of all vacuums of which I am aware is no way of estimating how full the collection cage is. Over time, the operator gets a feel for how many bees have passed down the tube. As stated earlier, but importantly, the small board on top controls the amount of vacuum pressure. Obviously, too much pressure will damage or kill bees.

Vacuum Cage

I only mention vacuum cage devices in order to briefly explain how I vacuumed bees inside the bee lab. I built a simple collapsible cage with wooden framing and plastic film sides and tops. It would fold reasonably flat for storage and had an opening for allowing the vacuum hose to be fed into the cage. It worked nicely.

Vacuuming cages are enclosed while robbing cages generally are open at the top. At the URL posted at the end of this article, I have included photos showing a 1940s robbing cage that was used by university scientists for research work. When used in a hobby apiary or queen producing operation, such a simple cage would be a useful robbing control method.

Some of my bee vacuum observations

1. Once bees are vacuumed, the vacuum device must continue to run. Confined bees will quickly overheat.
2. With the vacuum running at a brisk speed (gasoline), the vacuum line can be removed. Though bees, attempting to escape, will ring the bottom side of the opening, they will not be able to crawl against the air blast.
3. The shunt used to control air pressure flow is critical. Too much vacuum and the bees will be battered to death. Too little pressure and the bees will not be pulled from the combs. Bees passing beneath your hand in the vacuum line should feel as

Shop vac modified to provide vacuum to the trap box.

The bees are captured within the cage while the vacuum air exits through the black tube in the opposite wall.

though they are made of velvet. If the passing bees feel like dry pinto beans, too much vacuum is being used. An indication of proper pressure on the comb is bees that will hold on for only a second and then be vacuumed.

4. Once bees are vacuumed, let the air flow run to prevent overheating the captured bees. An observation, if captured bees are allowed to overheat a bit, drones will die first.
5. When vacuumed bees are released, they can be extraordinarily aggressive. Be ready for that possible behavior.
6. I have never killed a queen by vacuuming her, but I always try to find her before vacuuming. I would not recommend intentionally sending her down the tube.
7. While the vacuum is running and some bees have been trapped, drones from surrounding colonies are attracted to the bee-scented airstream produced by the vacuuming process. I always wondered if a tethered virgin queen could be presented to the drones in that airflow. If you try this, let me know the results.

Can you help me?

A non-beekeeping company has asked me to help design a professionally styled observation hive for a nature center that is currently under construction. In addition to many other high-end nature exhibits, this will be a high quality bee display.

Have any of you visited such facilities with an impressive observation hive exhibition. This will have to be viewable year round. It will be in a warm climate. Have some of you seen something *really* impressive? Any help would be greatly appreciated.

Additional photos and comments:
Original URL: **https://onetewbee.smugmug.com/October-2016-Bee-Culture/n-xzrsMH/**
Shortened URL: **http://tinyurl.com/BC-October-2016**

Cage that allows indoor vacuuming.

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Processing Propolis Part II

Ross Conrad

In last month's *Bee Culture* article we looked at the origins of propolis; how it is produced and used by honey bees; and how beekeepers can harvest and process propolis into various medicinal forms for market. This month we'll explore the potent medicinal properties of this product from the hive that is among the most powerful antimicrobial compounds found in nature. Also included is just a small sampling of references to scientific research that backs up many of the medicinal and therapeutic claims made with regard to propolis.

Use of propolis for healing and health by humans has a long history, predated only by the discovery of honey. Propolis is one of the few natural products that has maintained popularity for a long time, although it is not considered a therapeutic agent by the conventional allopathic medical establishment.

Throughout their 6,000 year civilization, the Egyptians used propolis medicinally as well as for the mummification of cadavers. The ancient Greeks used propolis to speed up the healing of wounds and Aristotle recommended it for all afflictions of the skin. The Roman legionnaires reportedly carried small amounts of propolis with them into battle, not only to help speed up wound healing but for its analgesic (numbing) properties. The Incas used propolis for infections. During the Boer War, the British used it to keep wounds from becoming infected. Throughout history, propolis has played an important role in veterinary medicine since many of the human uses for propolis are applicable to animals.

Unlike some anti-microbial compounds, propolis exhibits strong antimicrobial activity against both gram positive and gram negative bacteria and fungi. (Melliou 2004, Grange 1990) This may be why propolis is reported to have been identified as one of the ingredients in the wood finish of Stradivarius violins built in the 17th and 18th century. Today the evidence suggests that the activity of propolis against microorganisms appears to be more related to the synergistic effect of flavonoids (and other compounds) than to any individual compound that may be extracted from propolis. This is probably why modern medicine does not take advantage of the benefits of propolis: it is a natural product available inexpensively to anyone with access to bees, and does not contain a single active ingredient that can be extracted, patented and sold for a lot of money.

Antibacterial

Since propolis is composed primarily of tree resins collected by honey bees, the properties and thus medicinal qualities of propolis will vary with the geographic location where honey bee colonies are located. While all propolis has been found to exhibit antibacterial properties, propolis from wet-tropical rain forest-type climates have shown the highest antibacterial activity. (Seidel, 2008) It makes sense that trees growing in hot, wet climates will have the greatest amount and variety of bacteria to fight off and, through evolution, have developed the world's most powerful antibacterial tree resins to get the job done.

Antifungal

In 2011 propolis was tested with 40 yeast strains of *C. albicans*, *C. glabrata*, *C. krusei*, and *Trichosporon* spp. (Koç 2011) Propolis inhibited the growth *C. albicans*, *C. glabrata*, *Trichosporon spp.*, and *Rhodotorula sp.* and the most sensitive strain was *Rhodotorula spp.* The most resistant strain was *C. Albicans*. When it comes to wound healing, propolis from USA, Australia, and Turkey have all been found to have strong antifungal activity and aid wound healing. (Sonmez 2005)

Anti-viral

Both aqueous and ethanol extracts of propolis have been tested against the herpes virus and results indicate that it may help when used as a topical application against cold sores. (Schnitzler, 2009) Meanwhile studies have indicated that Brazilian propolis possess anti-influenza virus activity and ameliorated influenza symptoms in mice making it a possible candidate for an anti-influenza dietary supplement for humans (Shimizu, 2008). This suggests that propolis may speed the recovery from colds or flu by stimulating the immune system.

Antioxidant Activity

Cell damage can result when oxidation, the chemical reaction known to produce free radicals occurs. Antioxidants inhibit the oxidation of molecules and it turns out that propolis contains some powerful antioxidants. Of three bee products examined in 2009 (propolis, pollen, and royal jelly), propolis exhibited stronger antioxidant activity than even pollen, (Nakajima, 2009) and one component, Caffeic acid phenethyl ester (CAPE), may be responsible for the majority of the antioxidant activity of propolis. (Chen, 2009)

AntiCancer Activity

Research on mice indicates that propolis may be able to help with over 70% of human cancer cases. (Messerli, 2009) Mexican propolis

While the use of propolis for healing and health is considered alternative, it does not require you to turn your back on modern medicine. Propolis can be used in conjunction with modern medical treatments for a synergistic effect that is better than either the modern treatment or propolis alone.

possess a strong antiproliferative activity on cancer cell lines. Alcohol based propolis tincture contains components that may prevent colon cancer. (Ishihara, 2009) Propolis shows promise as a chemotherapeutic agent as well as preventive agent against prostate cancer. (Hernandez 2007, Li 2007))

The use of propolis does not necessarily have to mean the abandonment of conventional chemotherapy or radiation therapy typical of conventional cancer treatment. In fact, it appears that propolis may be beneficial when taken in conjuction with standard cancer treatments, acting synergistically to increase the anti-cancer activity of chemotherapy agents, while at the same time it can help patients with the unpleasant side effects of chemo and radiation therapies. (Orsolić, 2005)

Synergy with Antibacterial Drugs

Alcohol based propolis has shown significant antimicrobial activity towards strains of *Staphylococcus spp. and S. aureus, including strains of "superbugs" that are resistant to conventional antibiotic treatment. Propolis can also enhance the effects of many antibiotics by acting synergistically with antibiotic treatments to kill more bacteria in unison, than when either antibiotics or propolis are used alone. Among the antibiotics that researchers have shown to have increased antimicrobial effect by acting synergistically with propolis are ampicillin, gentamycin, streptomycin, netilmicin, tetracycline, chloramphenicol, ceftriaxon and vancomycin. [Fernandez (2005), Scazzocchio (2006)]*

It is important to note that whenever propolis it taken internally, it will tend to be fully metabolized by the body after eight hours. For best results, it is important to spread out therapeutic dosages and take them three times a day at a minimum. Taking propolis four times a day is preferred (every six hours) if possible.

Dental Benefits

The powerful antimicrobial benefits of propolis make it a potential tool in countering bacteria that effect cavities, gingivitis, and may help prevent infection during root canals or other dental procedures. [(Koru (2007), Hayacibara (2005), Al-Shaher (2004), Duailibe (2007)] Based upon experiments with rabbits, a dose of 0.012 g/kg, propolis is estimated to exhibit anesthetic properties that is three times that of cocaine and 5.2 times higher than procaine (novocaine). (Prokopovitch, 1957) Propolis is applied topically to the treatment area when used as an anesthetic, but may be used both topically and internally when utilized for its antibiotic/antibacterial properties.

Possible Negative Effects

As noted above, propolis is safe to use in combination with allopathic medicine (antibiotics, chemo-therapy, vaccines) and may in some instances, increase the effectiveness of the drugs taken. However, all treatments have potential side effects and while propolis appears to be generally safe and without serious side effects for most people, a small number of folks have expressed sensitivity to this hive product. While propolis sensitivity is rare and generally expresses itself as dermatitis, it quickly resolves itself without long-term impacts once propolis intake is discontinued. In large therapeutic doses, propolis can cause diarrhea for some people.

For more information about the medicinal benefits and uses of propolis or any of the products from the hive, contact the American Apitherapy Society (AAS) **www.apitherapy.org/contact/** BC

Ross Conrad is author of *Natural Beekeeping: Organic Approaches to Modern Apiculture, 2nd Edition.*

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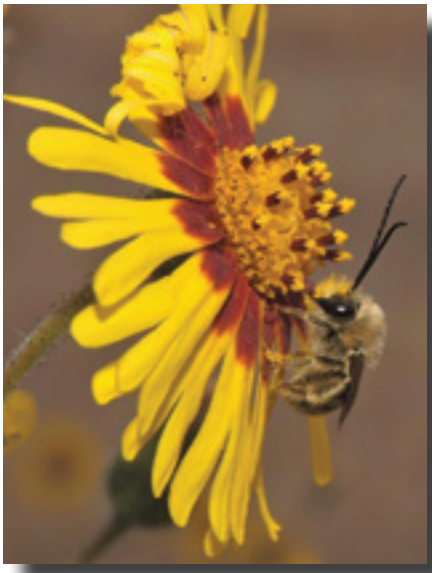
West Coast Late Season Pollinator Plants

Travis **Owen**

Autumn is here, the days are warm, the nights are cool, and bees and other pollinators are still active. For me this is one of the best times of the year since we can finally get some relief from the intense heat of Summer, and the leaves begin to change color on the trees. For bees, particularly honey bees, it is a crucial time to collect as many resources as possible so they can survive the Winter. For solitary bees and other pollinators, most of which do not live in colonies or over Winter as adults, nutrition is kept up in mating individuals and stores for brood are collected so the species may live on another year. For many of us gardeners, we love to see and support these creatures. This means reducing or eliminating the use of pesticides and providing them with good nutrition: flowers.



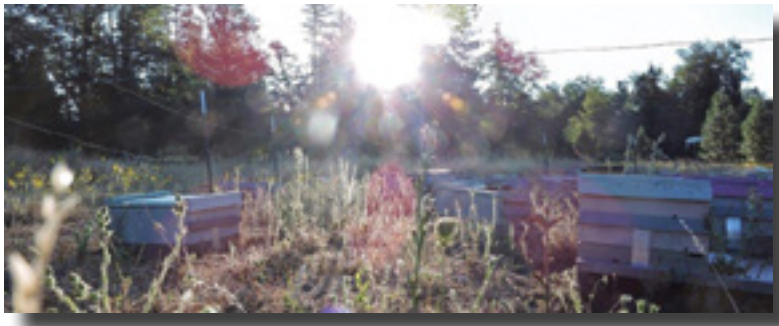
A male long horned bee (Melissodes sp.) *perched on* Madia elegans *with a face full of pollen.*

As a general rule, native flowering plants (although occasionally less showy) are far more useful to pollinators than exotic plants since the native pollinators have coevolved with them since time immemorial. Foreign plants, even those from a different region of the same state, generally do not attract the same diversity of pollinators, however, they may be highly attractive to a select few pollinators. I personally am not "strictly native" when it comes to gardening, so I grow many nonnative plants. I do appreciate the value and importance of natives, having seen firsthand the pollinators they attract that aren't attracted by exotic plants. This, in a sense, strikes a balance between gardening for conservation and gardening for aesthetics. Of course, for me, I am always gardening for pollinators.

Madia elegans

Madia elegans is one native wildflower that is just beginning to enter gardens. The flowers are open from dusk til dawn, and will remain open longer if grown with a Northern exposure or on cloudy days. They are highly attractive to honey bees and a variety of other bees and other pollinators, though for conservative gardeners they may appear a bit weedy and untidy.

Read more about *Madia elegans* and its various pollinators (Owen 2016)



Apis mellifera *queen mating yard flanked with* Madia elegans.

Euthamia occidentalis with Halictus ligatus

Euthamia occidentalis is a native goldenrod, occasionally sold in nurseries, and is used for erosion control. It can be grown in damp places, something I have seen firsthand on the bank of the Rogue River. Like the true goldenrods (*Solidago* spp.) they are highly attractive to bees, as well as various wasps. I observed honey bees and halictid bees visiting the flowers. Sphecid wasps, *Prionyx sp*. I think, were also seen. Species of *Prionyx paralyze* grasshoppers as live food for their offspring in underground brood nests.

Cichorium intybus

Chicory is one of those nonnative plants that is found nearly everywhere humans are, a truly successful species. They are closely related to lettuce, and like lettuce have flowers that are open for a single day (often only in the morning) before withering. New flowers open daily, and attract honey bees and other bees, as well as other pollinators (like grass skippers, *Hesperiinae*).

Cichorium intybus (2015)

Being a composite, each stalk seen in this photo is an entire flower complete with staminate and pistillate parts, while the "petals" are actually sterile ray florets whose purpose is to attract and provide a landing pad to pollinators.

Read more about *Cichorium intybus* (Street et al. 2013)

Centaurea solstitialis and Apis mellifera

Related to chicory, in the sunflower family (Asteraceae), yellow starthistle is another nonnative plant which is adored by honey bees and beekeepers alike. Unlike chicory, which is unofficially considered to be a benign exotic by most, *Centaurea solstitialis* is on the noxious weed list in Oregon and at least 10 other states and two Canadian provinces. Despite this, it is loved by beekeepers since it gives honey bees a lot of resources to make it through Winter, since this region is generally considered to be in a dearth of nectar from mid-Summer onward. I challenge this view, considering there are at least a few other plants, native and exotic, which are worked by bees and flower en masse in the latter half of the year (i.e. *Madia elegans* & *Hypochaeris radicata*, the latter another noxious nonnative adored by bees).

An apiary inundated with yellow starthistle .

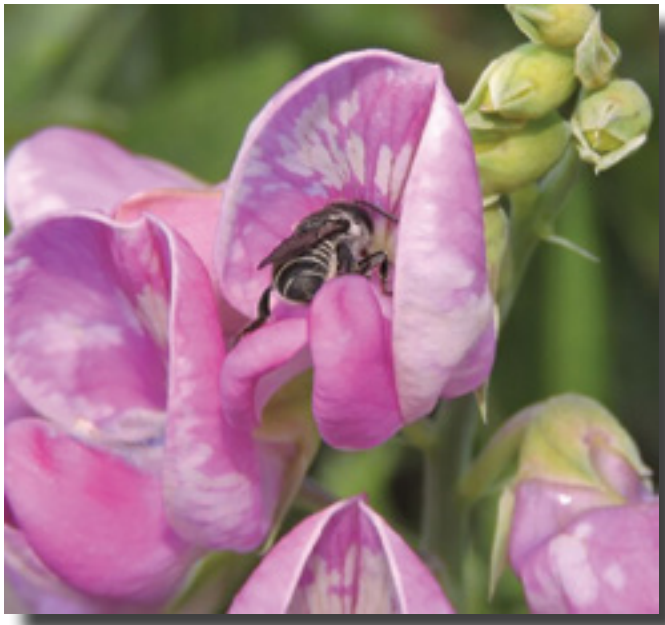
Yellow starthistle is native to southern Europe and western Eurasia, and in some parts of its native and introduced range is considered to be a supreme honey plant as the honey produced from it is one of the most sought and most popular varietal honeys according to some sources. The plants are self-incompatible, thus requiring insect pollinators. Honey bees account for most of the seed set, bumblebees following in importance. The apiary above was surrounded by a portion of uncut starthistle in Ashland, Oregon. The hills of Ashland are completely filled with this invader, showing the true destructive nature of noxious weeds, whose extreme competition outcompete native wildflowers and disrupt the natural balance. And in case you were wondering, I had to work all 50+ hives in this apiary, and thanks to the

thorny inflorescences, it was quite literally a pain in the ass (among other places).

Read more about *Centaurea solstitialis* (Zouhar 2002)

Cirsium vulgare

True thistles, such as bull thistle (*Cirsium vulgare*) are considered noxious weeds in Oregon and several other states. It is found in all fifty states of the U.S., yet native to Europe, Eurasia, and Africa. The plants are worked by honey bees and bumblebees, possibly others, though they often grow in very low density in this area so are not worked judiciously. They are known to grow in dense stands and I would presume that they would be quite covered in bees. The thorns are incredibly sharp and easily penetrate clothing and skin, which I can say is quite painful!



Lathyrus latifolius with a small leaf-cutter bee (*Megachile sp.*)

Another nonnative weed, quite widespread, the perennial sweet pea was once introduced to prevent erosion in ditches and banks. Fortunately, it is worked by a variety of bees including honey bees, bumblebees (*Bombus spp.*), large carpenter bees (*Xylocopa spp.*), and leaf-cutter bees (*Megachile sp.*). Peculiar, this nonnative pea is the only flower I have seen the leaf-cutters on. Except for the carpenter bees, all the bees I have seen appear to rob nectar by accessing it from above the nectaries rather than passing through the anthers, though these plants may very well be self-compatible like the garden pea since they seem to produce full pods most of the time (if not all the time).

Verbascum olympicum

Mullein (*Verbascum spp.*), occasionally "cowboy toilet paper" (I haven't, so don't ask), is an ubiquitous roadside weed, probably all over the country. Typically when one speaks of mullein one is speaking of *Verbascum thapsus*, or common mullein, which has a single flower spike and can reach seven or eight feet in height. A less common species, at least in my area, *V. olympicum* differs from *V. thapsus* most obviously by the multi branched inflorescence atop the plant, which attains a similar height. The individual flowers of *V. olympicum* appear to be slightly larger than those of *V. thapsus*, and the flowers of the latter seem to close or wither quicker than the former.

Verbascum olympicum and a hidden bumblebee.

Both *V. thapsus* and *V. olympicum*, in my experience, are decent bee plants, though *V. thapsus* seems to only be worked in the morning when new flowers open, while *V. olympicum* seems to be worked all day. Another weedy mullein commonly encountered, *V. blattaria*, or moth mullein, is only occasionally worked by bumblebees but rarely honey bees, or at least I haven't seen it. All are grown in gardens, sometimes for their medicinal properties (the flowers of *V. olympicum* and *V. thapsus* are used for tea, and the plants are a source of water soluble saponins and mucilage).

Oenothera elata ssp. hookeri

The tall evening primrose, similar to some of the species native to Oregon, is one of many species grown in gardens. As the name implies, the plants can get really tall, up to four feet in the case of the plant photographed. The flowers open at dusk and remain open until morning when they wither. Though each flower is only open one night, new flowers open daily. They are primarily pollinated by large crepuscular sphinx moths (*Sphingidae*), some have visited this plant on more than a few occasions though I was unable to attain a photo. Honey bees adore it, as you can probably tell, and can be seen visiting the flowers as they open on warm nights, or in the morning before the flowers wither. There are hybrids of some of the smaller *oenotheras* available (i.e. *Oenothera kunthiana*), though they do not appear to be as attractive to pollinators in my garden.

Asclepias fascicularis and Apis mellifera

Many milkweeds are useful bee plants, though the flowers of some species can pose a threat to bees and other pollinators (more on that later). Milkweeds are important honey plants in much of the U.S. where they are common. They are also paramount to the survival of many species of butterflies, including the monarch (*Danaus plexippus*) and other milkweed butterflies (*Danainae*) since the caterpillars of these butterflies are completely dependent on them for sustenance. Certain species of moths and a few true bugs are also dependent on milkweeds for survival.

Read more about milkweeds as honey plants (Krochmal 2016)

Apis mellifera with pollinia on her hind foot.

Milkweeds are peculiar plants for a variety of reasons. For an amateur botanist, I find their breeding system intriguing. The most notable feature of this, I think, is that the pollen is in the form of pollinia, as is found in orchids, where the pollen from each anther is composed into a single sticky mass. This mass adheres itself to the foot, or anywhere on the pollinator before being hooked onto the "claws" surrounding the pistil. Some unfortunate pollinators whose feet have pollinia attached become stuck themselves on these hooked appendages (called horns) and not having the strength to escape, die of dehydration or something similar. Butterflies, often being larger and more powerful fliers, can probably escape the horns quite easily, but bees, beetles, and wasps have been found hanging, dead, on the flowers of some species.

Read more about the Fatal Attraction of Milkweeds (Chen 2006)

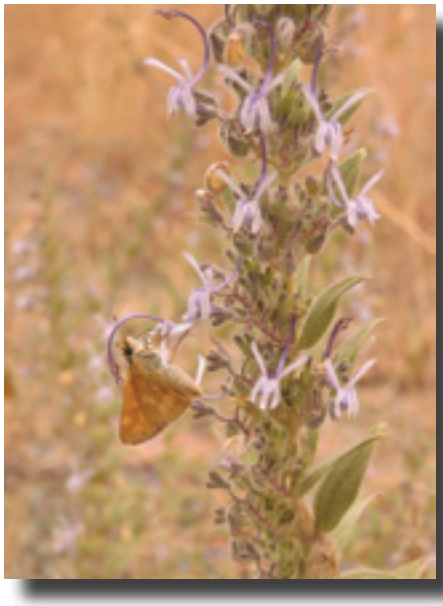
Croton setigerus

In dry sunny fields, an inconspicuous plant in the *Euphorbiaceae* forms tight grey-green cushions of hairy foliage and tiny inconspicuous flowers. This is *Croton setigerus*, or turkey mullein, found in much of the Western U.S. in dry hot sites. It is occasionally worked by honey bees, and claimed to produce a "thick amber honey."

Read more about *Croton setigerus* (Owen 2016)

Trichostemma lanceolatum

Trichostema is a genus in the Lamiaceae, or mint family. A few of which are notoriously bee pollinated, such as the perennial California native *T. lanatum*, woolly blue curls, which is widely proclaimed to be a good honey plant. In my region, the annual *T. lanceolatum* is a somewhat locally common plant that grows in poor soil with low grasses and other small forbs. In my experience, it is more frequently visited by skippers (*Ochlodes sylvanoides*) who appear to be a good fit for the plants highly elongated reproductive structures.



Ochlodes sylvanoides on Trichostema lanceolatum

Pollinator visitation, it seems, is a highly regionally specific variable. This has been seen in many other plants, and can readily be studied by any gardener who grows nonnative plants. In the case of *Trichostema*, where I have witnessed butterflies, many other people have reported seeing various bees visit the flowers of *T. lanceolatum* and there is similar literature on bee pollination of *T. lanatum*. Aside from bees, hummingbirds have been observed on some species, probably another regionally variable observation. To me, this speaks of the adaptability of some species to overcome the boundaries of others, in this case perhaps an inadequate supply of bees (not specifically due to bee losses, but maybe the normal ebb and flow of native bee activity in this area, correlating with the diversity, or lack thereof, of flowering plants at any given time).

Read more about *Trichostema lanceolatum* (Owen 2016)

Nepeta cataria and Bombus vosnesenskii

In the garden, mints and their relatives are a sure thing when it comes to bee plants. I do grow a variety of mints, all in one corner of the yard since they can be so invasive, and the flowers do attract a variety of bees. I prefer the more well behaved mint relatives, such as *Agastache* and *Nepeta*. Common catnip is a short lived perennial that has survived with little care at the border of my garden for four years now. It was started by seed scattered onto disturbed soil and watered for the first year. Now it is four feet tall and covered in small flowers. Many species of native bee are attracted to the flowers, such as *Lasioglossum* and *Bombus vosnesenski*. Honey bees also adore the flowers, there may be upwards of 50 bees on this single plant at any one time.

Thymus serpyllum 'Elfin' with Apis mellifera

Another "mint," thyme is always attractive to honey bees. The particular selection *T. serpyllum* 'Elfin' appears to be later blooming than the others in my garden, and is an excellent plant in my small rock garden. Thyme is the source of the thymol, an antimicrobial compound used for the control of *Varroa* mites (*Varroa destructor*) among other things. There is a folk tale that where thyme is grown for seed at the field scale the honey bees nearby are free of mites. I cannot speak to the legitimacy of this claim, but the notion that very small quantities of thymol or other mite-repellent compounds are found in the nectar is not without merit.

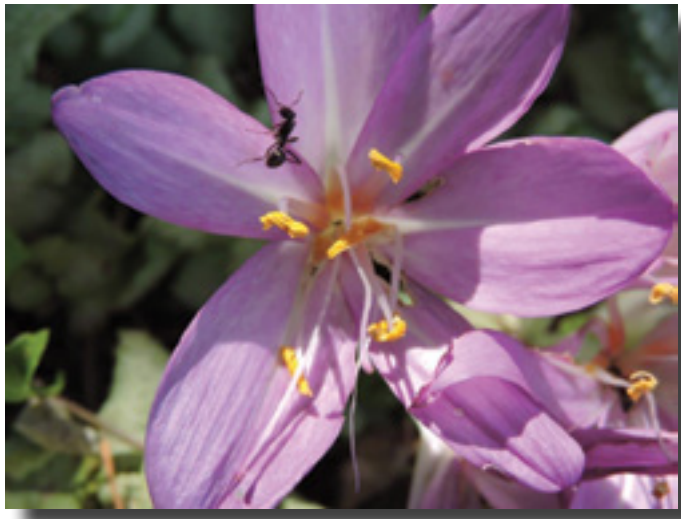
Aerial yellowjacket *(Dolichovespula arenaria),* bald-faced hornet *(D. maculata)*

While talking about Autumn bee plants, it is worth noting some of the bees cousins that are also highly active at this time. Aerial yellowjackets and bald faced hornets (both in the genus *Dolichovespula*) are predatory social wasps which build enclosed paper nests in trees or sometimes under overhangs of human made structures. At best, they are predators of garden pests such as tomato hornworms (*Manduca quinquemaculata*) and others, but at worst they are bee predators who can destroy weak honey bee hives. For strong hives they are merely a nuisance.

Practices to help your hives protect themselves include using the smallest opening of an entrance reducer, maybe a one inch entrance hole, and feeding your bees (inside the hive is best, i.e. hive top feeders or some variant) so they build in number and strength to ward off any potential intruders. Yellowjacket traps can be useful where they are very populous, but I would suggest using a hot dog or lunch meat as bait rather than the commercially available bait. I don't usually condone the killing of hymenopterans, even wasps, but to be sure with simple traps (a chemical free approach) their populations will not be devastated and they will probably bounce back the following year.

When your cousin shows up at the party uninvited . . .

. . . and disembowels your family. It happens.



Colchicum 'Lilac Wonder' with a carpenter ant (*Camponotus* sp.)

To avoid ending on a gruesome note, here is one more good group of bee plants: Colchicum. Sometimes referred to as the autumn crocus, this name is a poor representation of the genus since there are autumn, winter, and spring blooming species in both Colchicum and Crocus. Colchicum, unlike Crocus, grows from a toxic structure that is like something between a bulb and a corm, quite unique, although typically considered to be a corm. Crocus on the other hand grows strictly from a corm and is not toxic, in fact it is practically edible and it is eaten by rodents, deer, turkeys, and slugs. Colchicum is virtually pest free, due to the toxins within the plant. Most of the commercially available colchicums are the autumn blooming types. These tend to flower in the fall, and send up leaves and seed pods in spring. I've grown colchicums for three years, and honey bees seem to adore them.

Colchicum cilicicum

I grow four varieties including three Fall blooming and one Spring blooming although the Spring blooming type hasn't grown to flowering size yet. The first variety I attained was the hybrid C. 'Lilac Wonder,' a commonly available and very popular large flowered hybrid supposedly between *C. giganteum* and *C. bornmuelleri* (both sometimes considered synonyms of *C. speciosum*), bred sometime in the early 1900s. I also grow *C. speciosum*, which has slightly smaller flowers and is shorter, but equally if not more beautiful.

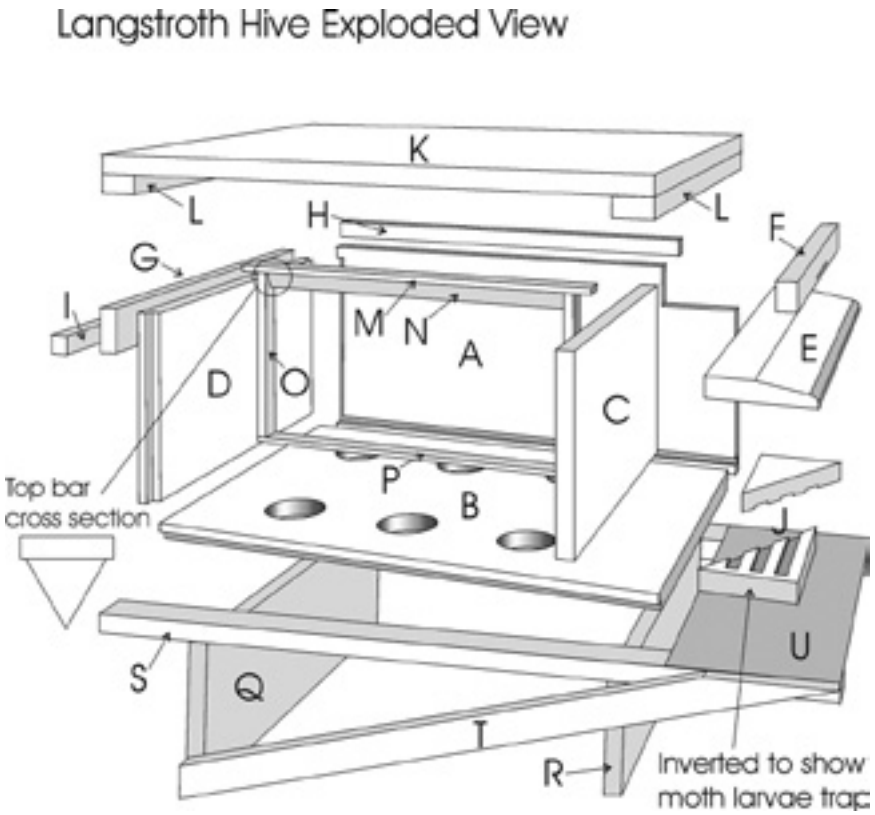
Colchicum cilicicum

Of the few colchicums that I grow, *C. cilicicum* is by far the most floriferous and longest blooming, thus the best for bees. The individual flowers don't last very long, but *C. cilicicum* sends up new flowers in succession for a few weeks. Despite there being so few of these flowers, there is a continuous stream of honey bees visiting them for both pollen and nectar. I imagine a field full of Colchicum would be quite active with bees of various types. I would do just that, but the cost of these large bulb/corms is somewhat prohibitive for me. I am attempting a few species from seed, and have a hopeful view of the future.

Oenothera elata ssp. hookeri with six honey bees

There are many other Fall blooming plants that may be excellent bee plants. Some recommended by others include *Aster spp.*, *Caryopteris spp.*, *Clematis ternifolia*, *Epilobium spp.*, *Eutrochium spp.*, *Hylotelephium spectabile*, *Lythrum salicaria, Perovskia atriplicifolia, Pycnanthemum flexuosum, Rosmarinus spp., Tetradium daniellii, Vernonia altissima, Vitex agnus-caste*, and no doubt many others. I'd love to hear about more bee plants, put them in the comments (with your location for context)! BC

Travis Owen lives with his wife and two daughters (3yo & 6mo) in the outskirts of Rogue River, Oregon. Initially a hobbyist beekeeper, Travis now works for commercial queen breeder Old Sol Apiaries. He is also an amateur entomologist, botanist, and photographer, and writes about plants and native pollinators in his blog, www.amateuranthecologist.com.



BUILD THE ORIGINAL LANGSTROTH HIVE

Peter **Sieling**

Langstroth's 1852 patent moveable comb hive was the first practical hive that allowed the beekeeper to examine any comb in a hive quickly and with minimal disruption to the bees. His original design, patented in 1852, looks complicated, but it's actually simple to build, requiring only a few hand tools and a table saw. Langstroth assures us the saw can be powered either by steam, water, or horse power. If none of these power sources are available, electricity will work fine. Besides a table saw, you'll need a drill press with 1¼" and 1-3/8" bits, and a router with a straight cutter.

Langstroth's plans are not so easy to follow. He tended to leave out details or put them somewhere else in his book. The illustrations and descriptions don't quite match. He offers five hive models, from a basic box to a complicated double walled hive with a glass window. He recommends his "hive #2 without observing-glass" for "those largely engaged in bee culture". This is the model described here.

Langstroth's hives were meant to be stacked. The lower box contains the brood; the upper box was for surplus. Unlike the modern hive, you stack an entire hive, including the bottom board, on top of the lower hive. The bottom board has holes drilled in it allowing access to the upper hive. You can make multiple hives and stack them, or just put a modern super on top.

Lumber in the nineteenth century was planed to 7/8". Almost all components are based on this thickness. You won't find this at building supply centers, but any lumber company selling rough lumber can custom surface lumber to 7/8". Langstroth recommends cedar, basswood, poplar, or pine. Other species will work as well.

Rabbet on sides.

Sides and bottom front view.

Sides and bottom rear view.

Constructing the Box

1. Cut two sides 10-7/8" x 23-7/8". Cut the front to 8-7/8" x 14-1/8", and the back to 8-7/8" x 15".

2. The sides are mirror images of each other. On the sides cut a 2-1/8" x 4" notch on the upper front (see diagram). Mill a 7/16" groove across the bottom of the sides, 7/16" above the bottom edge. The floor fits into this groove.

3. The back will be "halved into" the sides. Cut a 7/16" x 7/16" rabbet on the ends of the back. Cut a mating rabbet in the back of the sides. This rabbet starts 5/8" from the top of the sides and stops at the lower rabbet. Nineteenth century carpenters would have bored a row of holes 7/16" deep, and then chiseled out the waste wood by hand. Using a router with a straight bit is easier. Clamp a straightedge to the side to guide the router. Square the upper end with a chisel. A simpler but weaker construction would be to skip the rabbets, cut the back to 14-1/8" and nail in place.

Floor

4. Both floor and roof are tongue and grooved, so mill them both at the same time. The grain on the floor runs from side to side, the roof runs end to end. After tongue and grooving, crosscut to 15" enough material to make a floor 23-7/8" wide. Mill a 7/16" rabbet on the end grain. Make sure it slides easily into the groove on the sides without play. The bottom of the sides should be flush with the bottom of the floor.

Fastening ends to sides.

5. When hives are stacked, the bees pass between stories through six holes in the bottom board. Start with the 1-3/8" bit, drill 1/16" deep, then drill through with a 1¼" bit. For the lower box, close the holes with 1-3/8" disks cut from tin. When using a second hive for surplus honey, remove the disks.

Portico Roof and Top Rails

6. Langstroth's hive's distinctive look comes from the portico, the porch that extends 4" past the hive front. Cut a board to 4½" x 17-5/8". Bevel the front from 1/2" to full thickness 2½" back, then round the front drip edge.

7. The frames rest on top of the two ends. The front and back rail form the back of the frame rests. Both rails are 15-7/8" long. The back is 2-1/8" wide. The front, which sits on the portico roof, is 1¼" wide. The front rail

Completed hive front view.

Completed hive side view.

has an upper entrance, 3" long by 1/4" wide and slanting downward from inside to outside.

8. Make two ledges to run from the portico roof to the back rail, 7/8" square by 20-3/4". One back ledge, 7/8" square by 17-5/8" completes the hive body.

Triangular Entrance Regulators

9. Make a block 4" x 5¾". Cut in half diagonally. On the bottom, cut grooves 1/8" deep x ½" wide. The grooves are supposed to attract wax moth larvae for you to remove periodically. The entrance regulators remain loose and can be added or removed as needed, depending on the strength of the colony.

Cover

10. Make a panel from tongue and groove stock 25-3/4" x 19" with the grain running lengthwise. Langstroth recommends rain-grooves at the tongue and groove seams – bevels forming a gutter to draw water away from the seams. A better solution would be to cover the top with sheet metal. Two cleats, 2" x 19", fasten to the underside, flush with the ends.

Frames

11. Make 10 top bars 5/16" x 1" x 19-1/8". If you plan to fasten comb to the top bar, you are done.

12. If starting a colony without combs, you'll need triangular comb guides. Crosscut the wood to 16-3/8". Set the table saw arbor to 30 degrees and the fence 7/8" from the bottom of the saw blade. Use a push stick to prevent kickback. The first cut will be a waste piece. Rotate the stock end over end and saw out the first triangular piece. Continue until you have ten per box.

13. Make 20 side bars 1/2" x 7/8" x 8 5/8".

14. Make 10 bottom bars, 1/4" x 7/8" x 17 3/8".

Moveable Hive Stool

15. Make a front and rear leg, both 20" long, the front 5" wide and the rear 7".

16. Make two pieces 1-3/4" x 32". Nail them across the top of the two legs as illustrated, projecting 4" beyond the rear leg and 9" beyond the front leg.

17. Two more pieces, 1½" wide are trimmed to fit and attached to the sides to brace the legs.

18. Hem a piece of cotton duck canvas, 8" x 20". Tack to the front as an alighting board for the bees. The hive

fits loosely on the stand. Langstroth's illustration shows small wooden wedges holding the hive in place.

Assembly

Use exterior nails, zinc coated or stainless steel for nailing the hive together. For maximum strength, use spiral threaded nails, 2"-2½" long when nailing into end grain. Use 1½" nails when nailing 7/8" to 7/8" pieces. Drilling pilot holes just smaller than the nail's diameter prevents splitting and increases a nail's holding power.

19. Nail the floor to the sides. The back end should fit into its grooves and flush at the back. The top of both ends should be 5/8" below the top of the sides and 3/8" above the floor. The front end is flush and square with the notch for the portico roof. Nail the ends in place.

20. Center and nail the portico roof. Nail the front and back rails. Add the two sides and one back ledge.

21. There is a back entrance at the bottom. Make a shim to fit (not pictured) and slide it into place. Most of the time that remains closed.

22. When assembling the frames, use 1½" pneumatic staples or standard frame nails to fasten the top and bottom bars to the side bars. If making several hives, make a jig to align the parts for nailing.

23. Assemble the stool. Tack the canvas to the frame after painting.

Once the hive and frames are assembled, prime and paint the hive with exterior paint. The hive is ready to stock with bees. For directions on stocking and using the original patent hive, read Langstroth's Practical Treatise on the Hive and the Honey-bee. It is still in print or available online. BC

Peter Sieling is a beekeeper and expert craftsman. He builds hives and he builds other things out of hive parts from his home in Bath, NY.

Materials

Hive Body Part	Description	Finished size (inches) 7/8" thick except where otherwise noted	No. Required
A	Sides	10 7/8 x 23 7/8	2
B	Bottom board	15 x 23 7/8	1
C	Hive front	8 7/8 x 14 1/8	1
D	Hive back	8 7/8 x 15	1
E	Portico roof	4 1/2 x 17 5/8	1
F	Top front rail	1 1/4 x 15 7/8	1
G	Top back rail	2 1/8 x 15 7/8	1
H	Side ledges	7/8 x 20 3/4	2
I	End ledge	7/8 x 17 5/8	1
J	Entrance regulator	4 x 5 3/4	2
K	Cover	19 x 25 3/4	1
L	Cover cleats	1 3/4 x 19	2

Frames

Part	Description	Finished size (inches)	No. Required
M	Top bars	5/16 x 1 x 19 1/8	10
N	Comb guide (triangular cross section)	7/8 x 7/8 x 7/8 x 16 3/8	10
O	Side bars	1/2 x 7/8 x 8 5/8	20
P	Bottom bars	1/4 x 7/8 x 17 3/8	10

Moveable Stool for Hives

Part	Description	Finished size (inches) 7/8" thick except where otherwise noted	No. Required
Q	Rear leg	7 x 20	1
R	Front leg	5 x 20	1
S	Upper rails	1 3/4 x 32	2
T	Leg brace	1 1/2 x 30	2
U	Duck canvas	8 x 20	1

Winter Management

William **Hesbach**

Evolution has provided honey bees with an extraordinary ability to thermoregulate and survive in a cold climate.[1] During Winter, bees cluster in a configuration that has a dense outer layer of older bees, sometimes referred to as a mantle, covering an inner core of more loosely packed younger bees. The cluster responds to changes in temperature by expanding to dissipate heat and contracting to conserve heat. Bees can precisely position their bodies in layers so their thoracic hairs interlace. Since a bee's hair has similar properties to down, bees resist heat loss, and their layered bodies close off ventilation through the cluster and between combs.[2] As an interlaced cluster they form a naturally efficient insulation cooperative.

As the body temperatures of the mantel bees fall, they generate heat by using their indirect flight muscles to shiver. While shivering, bees are using fuel, oxygen, and exhaling carbon dioxide. Their respiration, in combination with reduced ventilation, creates an environment with increased carbon dioxide and reduced levels of oxygen. Both these conditions would be toxic to humans, but to bees these alterations are intentional. The changed environment around the cluster induces the bees into an "ultra low metabolic rate" which conserves energy and traps some needed humidity. There is also some research indicating that a higher level of carbon dioxide increases the mortality of wintering *Varroa*.[3]

The temperature of bees in a cluster are regulated in three different ways, first by conduction because they are touching, then by radiant heat from bees nearby, and finally, with convection via air movement. When bees cluster tight and shiver, the heat they generate reaches down to the core. At the core, the temperature would continue to increase until the cluster overheats, but instead, the younger bees at the center expand and loosen the core allowing excess heat to flow back to the outer layers of the mantel. In this way, the heat being generated in the mantle layers is equalized and distributed by the action of younger bees at the core.

Ultimately, the heat dissipates from the mantle's surface into the convective airflow around the cluster. Heat dissipation plays an important role in understanding how the size of a cluster matters to heat loss and winter survival. The larger the cluster, the less the surface area represents the total mass of the cluster. The opposite is also true, and in a small cluster, the surface bees represent more of the cluster's mass.

An infrared photo reveals a tightly packed Winter cluster. The bright yellow indicates the warmest part or the center of the cluster. Away from the center the color darkens, as the temperature is lower.

To understand this better, visualize a cluster of just one bee. In a one-bee cluster, 100% of the surface area and 100% of the cluster's mass is represented in the single bee. Convective flow around that one bee will also cool the entire mass of the cluster because they are one in the same. If we add another a bee, the cluster's mass is doubled, but the surface area is not increased by the same amount. As we continue to add bees, the surface area becomes less and less representative of the total mass of the cluster. The surface area is critical because that's where heat dissipates and if that surface represents less of the cluster's mass, the cluster can retain more heat and stay warmer. It's why a dog or a cat curls in a ball to sleep; they're protecting their core temperature by reducing the surface area exposed to cooling. Maintaining core temperature is the key to Winter survival and is also where insulation can make a critical difference.

How Insulation Works

As beekeepers, we can't control thermoregulation, but we can influence heat loss in two significant ways. We can manage the convective flow by keeping the air as still as possible around the cluster, and we can add insulation to the hive body to help conserve some of the heat.

To aid in understanding how insulation and air temperature play a role in over-wintering colonies, it may help to visualize the cluster as if it were a stand-alone hot-water tank. Water inside is maintained at a steady temperature, and the amount of fuel used to heat that water depends on both heat lost to the surrounding environment and the insulation quality of the tank. If you want to save money on heating fuel, the first thing you are advised to do is insulate the tank. The reason insulation conserves fuel is because it resists the natural movement of heat to cold and therefore, the heat that's generated takes longer to migrate away. The same thermal transfer takes place in a bee cluster, and the same conservation of heat applies when you add insulation around a hive.

In a natural bee cavity, insulation is provided by the surrounding mass of the tree. Above and below the colony is an almost infinite amount of insulation and the outside walls can be virtually any thickness, but more typically range from three to five inches. According to universally accepted standards, soft pine offers an R-value of about 1.12 per inch.[4] Therefore, the ¾ inch pine boxes we typically use provide an R-value of about 0.84. Conversely, a colony surrounded by five inches of wood in a natural softwood tree benefits from an R-value of about 5.6 or

With the physical comparison between a single deep box and a bee tree, it's easy to see that there's little insulation value in a thin box compared to the mass of a tree.

about six times the insulation quality of a typical bee box and that's just the outside walls.

The real contrast in R-values is evident when you compare the insulation quality of what a tree provides above and below the cluster. A typical commercial box sits on an open bottom board, which offers little to no insulation value below the cluster. Above, the combination of an inner cover and telescoping cover provides some insulation, but not much. Also, if the inner cover has a bee escape hole, with a notch on the outside rim, the insulation value is near zero. That's a problem and especially on top where warm moist air will accumulate. If that warm moist air meets a thin cold surface or an open bee escape hole, it will condense and dump cold liquid water back onto the cluster. Bees can tolerate extremely low temperatures while dry, but if you wet them in cold temperatures, they will die.

In a recent study, researcher Derek Mitchell went beyond simple R-value calculations and used his physics background to apply known thermal mass calculations to compare the heat transfer (loss) of a tree to that of man-made hives. His research indicates that a thin man-made box will lose four to seven times more heat than a typical tree colony and that some behaviors may be driven by that fact.

"Many honey bee behaviors previously thought to be intrinsic may only be a coping mechanism for human intervention; for example clustering in a tree enclosure may be an optional, rare, heat conservation behavior for established colonies, rather than the compulsory, frequent, life-saving behavior that is in the hives in common use. The implied improved survival in hives with thermal properties of tree nests may help to solve some of the problems honey bees are currently facing in apiculture."[5]

Mitchell makes a strong case for adding insulation to an overwintering colony, but he also makes a case for more year-round insulation. Mitchell is hardly the first to consider the difference between trees and thin pine boxes. Langstroth's first hive was double-walled and he advocated filling the dead-air space between with a non-conductive material like charcoal or sawdust, "to enable the bees to preserve with, the least waste, their animal heat."[6]

Some manufactures recognize the need for more insulation and today we're seeing hive bodies offered in lightweight insulating materials like high-density polystyrene. Polystyrene boxes have been used in Europe for many decades, and the characteristics are well documented. But in the U.S., wooden boxes dominate, and there still seems to be a lingering discussion about the need for adding insulation.

Arguments Against Insulation

There are a few standard arguments often advanced against insulating. The first being that insulation will make bees more active at times and use more stores while they're moving around- and that's true. An important thermology study of wintering bees[7] concluded that colonies with insulation have more relaxed clusters, and, therefore, bees have the ability to move around more when compared to uninsulated colonies. But that only allows bees to have greater access to stores and avoid starvation. To the contrary, it's not uncommon to observe that a starved colony left behind plenty of honey because it was just too cold for the cluster to move and consume them.

Another common objection is that insulation will cause the colony to remain cold as the outside temperature warms, and the bees will miss opportunities for cleansing flights on warm winter days. But as the thermology study documented, bees in insulated colonies reacted to changes in outside temperature at basically the same rate as uninsulated colonies. Bees break cluster based on the temperature of outside air drawn directly into the cluster, not the temperature of the hive body or the surrounding honeycombs.

Contrary to the belief of some, insulation does not add heat – it can only help contain heat already generated. As such, insulation will not provoke bees to fly when it's too cold causing them to die as they exit the colony – they do that with or without added insulation. When considering arguments that advance the notion that added insulation will harm your bees, it's important to remember that bees have lived in well-insulated natural cavities for thousands of years.

Finally, during a Winter when a colony will need almost all the honey it has for survival, insulation

In this figure, the bees are attempting to close an inner cover bee escape hole, which is an indication that they want control over ventilation.

can make a critical difference. Even in Winters when insulation may not play a significant role in survival, the bees can benefit from less cold stress and emerge in spring healthier. Improving the insulative quality of the habitat we provide our bees is just moving them closer to life in a more natural enclosure.

Ventilation In a Langstroth Box

Ventilation is both complicated and interesting when wintering bees, and although I've separated the topic from insulation, how you use ventilation will determine the effectiveness of your attempts to insulate. The complicated part is understanding whether it's bees in the cluster that need ventilation, the Langstroth box that's made ventilation necessary, or a combination of both. It's always interesting to observe that bees in fall make every attempt to close all seams and holes in their hive – are they trying to tell us something?[8]

How Convective Flow and Condensation Work

In a bee enclosure, where bees are the source of heat, there is a natural convective flow. Heated air has the characteristics of being both more buoyant and capable of holding more water vapor than cooler air. As bees breathe and metabolize food, the heat they generate provides a constant upward convective flow of warm moist air. What happens next depends on the type of enclosure.

In a natural tree cavity, which is a tall cylinder, the moist convective flow reaches the top of the cavity and meets a warm surface with a physical vapor barrier. The warm surface is there because the tree offers, as mentioned earlier, an almost unlimited amount of insulation above the cluster which is resisting heat loss. The vapor barrier is there because the bees have placed water-resistant propolis over the entire inner surface of the cavity. Since the top is warm, and heat seeks cold, the warm flow spreads along the top seeking the cooler surfaces of the cylinder walls. Warm moist air and a cold surface will cause condensation. The condensation happens because as the air's temperature is lowered, it loses its ability hold water vapor. As the water vapor condenses out and turns liquid, the hive's humidity level is lowered, and the process gives back latent heat to the enclosure. It's a perfect balance made better by the fact that the bees select cavities where the entrance is positioned away or lower than the center of the Winter cluster[9] so any cold air coming in, falls to the bottom of the cavity mostly avoiding the actual cluster. At the bottom, excess humidity remaining in the falling air condenses out into the compositing detritus on the bottom.[2] Also, since the cylinder is long, the cluster has more surface comb to allow for a Winter position farther up into a warmer space as needed.

In a thin wooden man-made enclosure, things are much different. We've already discussed the difference in insulation quality, so what happens in this box follows the same principles of thermodynamics, but with a different outcome. For the purpose of comparison, I'll assume an uninsulated box with a typical inner cover and telescoping outer cover. The warm moist air rises and the first thing encountered is a thin cold inner cover where condensation will occur and in this case, it will occur directly over the cluster. Bees can tolerate cold well below -20°F, but drip cold water on them at 32°F, and they die. It's no mystery that having observed this, beekeepers want to ventilate the moist air before that happens. For many decades, beekeepers have devised ways to use the inner cover's conveniently placed Porter bee escape hole to ventilate all that warm moist air, without regard for the consequences of lost heat.

What Happens When You Add Ventilation

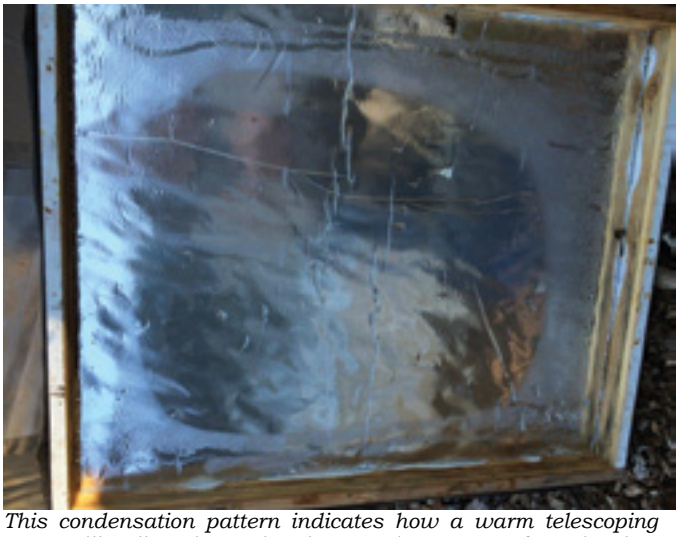
Ventilation provides some level of humidity control by directing the cluster's warm convective flow to the outside, but the consequence is the removal of needed heat. A few important questions come to mind. First, as beekeepers, we know how to keep condensation levels down by adding lots of ventilation, but do we know enough to understand how to balance ventilation with the needs of wintering bees.[10]

The complication arises from the fact that natural humidity levels change in response to many ordinary variables in the daily life of the colony. Therefore, a fixed amount of applied ventilation will not accommodate those natural fluctuations. How much ventilation is required, and when to adjust the amount, is not known. It's not even definitively known if bees attempt can control humidity, or if they just adapt to naturally occurring levels.[11] What is clear is that bees need some of the condensation they generate to hold heat in the enclosure.

Also, we've known for some time that humidity plays a significant role in *Varroa* reproduction, with optimum humidity for reproduction ranging from 55% to 70% and only limited reproduction taking place at higher humidity.[12] So a real contemporary question is does added ventilation aide *Varroa* reproduction.[13]

The next question is how much of our current practice of provisioning 60-100 lbs of honey per wintering colony, then providing supplemental fondant, and in some cases ending with the need for emergency food, is being driven by removing lots of heat the bees must replace?

E.B. Wedmore calculated the amount of honey required to overwinter a measured population of bees in his influential 1947 book, The Ventilation of Bee-Hives. Wedmore converted the caloric content of honey to watts and then using wattage he calculated that the basic needs are about three lbs. per month between mid-October and mid-April. Therefore, if Wedmore is correct, and



This condensation pattern indicates how a warm telescoping cover will redirect hot moist air to condense away from the cluster's center – notice the dry center.

the primary Winter honey requirements of an average population of bees are in the range of ~21 lbs., it seems like our need to provision Winter stores at four times that amount, may indicate something about the burden on bees to generate additional heat beyond their basic needs. One obvious reason is the loss of heat by an abundance of added ventilation.

There's no question that ventilation is needed, but I think if we could refine our understanding of how much is needed and when, modify our boxes to direct the convective flows away from the cluster's center, and increase insulation around the Winter cluster, we could help our bees live healthier, lessen the burden of Winter provisioning, and reduce Winter losses.

Insulation options

When the subject of adding insulation comes up, it invariably starts with wrapping a colony with tarpaper. Although tarpaper is not insulation, because it has no R-value, it has historically been used in combination with insulation material as a way to keep them dry. Early use of tarpaper included covering leaves or straw after they were packed around colonies. If you're not interested in insulation and only require a water shield or windbreak, tarpaper will work, but advances in energy efficient house wrap made of woven polyester, designed specifically as moisture and air infiltration barriers, are another option.

Many commercially available Winter wrap systems simplify the process of insulation. These kits offer an inner core of bubble wrap or fiberglass and an outer covering of black plastic. Some with a fiberglass core offer R-8 insulation. They are simple to install, provide adequate insulation, but are only operating on the vertical box surfaces. The vertical sides represent about 25% of the total heat loss with the remaining heat exiting from the top. That means that almost 75% of a colony's Winter heat loss is unaddressed unless you use commercial side wraps and add insulation to the telescoping cover.

One product discussed as insulation is Homasote. Homasote is a mixture of recycled sawdust and newsprint in combination with insecticides and microcrystalline wax. When thoroughly dry, ½ inch Homasote has an R-value of 1.20. Beekeepers sometimes put Homasote over their inner covers to act as insulation and as a moisture collector, but those two functions can oppose each other. Homasote's intended use is in dry building cavities where liquid water or excessive water vapor can become a problem. To combat this, Homasote added microcrystalline wax to delay vapor saturation. But since Homasote is paper, it will collect moisture, which is an advantage if you're using it for that purpose, but once Homasote starts to collect moisture, its R-value declines. So, if you decide to use Homasote as insulation or a moisture collector, consider its properties and use it accordingly. The "moisture boards" sold commercially are made of Homasote or a very similar product.

If you want insulation approaching the quantity of a natural tree cavity, the best insulator is sheet foam. Sheet foam comes either as pink extruded polystyrene (XPS) or foil-faced polyisocyanurate. These insulators resist moisture and provide excellent R-value in the range of 5-7.5 per inch. Sheet foam's insulation quality will not degrade in the presence of moisture and, therefore, will provide constant R-value in all conditions. Sheet foams can be fashioned into sleeves that slide over the colony for complete sidewall insulation, and sheet foam's biggest advantage is when it's used for both sidewall and top cover insulation.

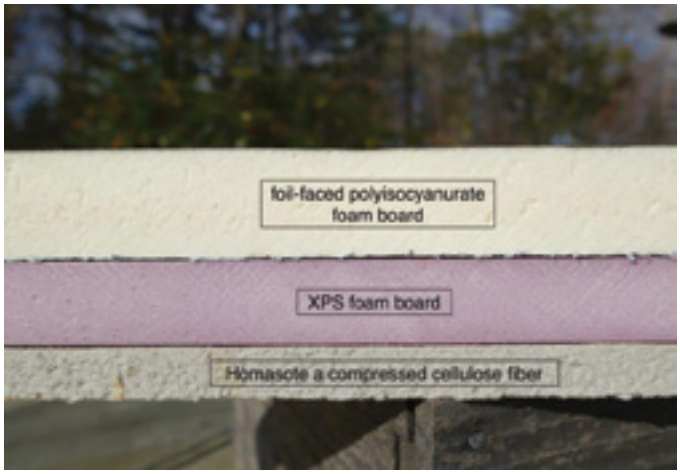
Not All Foams Are The Same

XPS is rigid[14] , easily cut, and offers about R-6 per inch. XPS can withstand a short exposure to sunlight, but the manufacturer recommends painting it, or covering it with a house wrap or tar paper. When used in the telescoping cover where bees can access it, they sometimes try to chew it out, but you can stop them by covering it with a thin plywood sheet or a screen.

Foil-faced polyisocyanurate foam, sold under different brand names, is a premium product designed to both insulate and reflect infrared heat. Reflecting infrared heat is a valuable way to conserve heat. To use foil-faced insulation as an infrared reflector, you must provide an air space between the infrared heat source, which is the bees, and the foil surface.

Details For A Winter Cover With A Built-In Winter Feeder

You can use the following construction details with either XPS or foil-faced foam. If you use XPS, the sleeve



Foil-faced, polyisocyanurate offers both dense insulation and reflective qualities. Pink XPS board provides insulation, and Homasote a compressed cellulose fiber product, offers lower insulation but good water vapor retention.

When the telescoping cover is in place, this ½ inch space will help reflect infrared heat back to the cluster. Radiant reflection is used for thermal efficiently in the building industry and works equally well when applied in beekeeping.

should fit snug around the box and if your boxes are anything like mine, they're sometimes misaligned or slightly different dimensions so don't make the sleeve fit tightly, or you may find that you can't get it on. With XPS you are also advised to protect the surface from the weather and sunlight. If you use foil-faced poly, you can fit the sleeve snuggly or build in an air space to reflect infrared heat, which will increase the insulation quality of the whole project.

I'll explain the details for using foil-faced poly combined with an air space to reflect infrared heat. If you want a simpler snug fitting sleeve, just eliminate the details concerning the air space.

With the writing on the foam sheet facing out, construct a sleeve that's the total height of the boxes you're overwintering in, plus the height of an Imirie shim used for feeding, plus an additional ½ inch. The ½ inch air-gap is incorporated into both the sides of the sleeve and the top. When you build the ½ space around the sleeve, it will work even better if you ensure that the space around the sleeve's bottom is sealed to prevent airflow; you want the ½ inch space around the box to be as close to dead air as possible. [15]

For the sleeve's rectangular dimensions, just measure your boxes and add one inch to both measurements – remember to measure twice and cut once. When installing the sleeve, it's best if the sleeve rests on a support that's level with the seam between the bottom board and the bottom box. Otherwise, the sleeve can tilt, or slip down, and cover the front entrance. I install a small shelf of wood that supports the foam and keeps everything at the correct height (Figure 7). Next, install screen on the shim (Figure 6). The screen on top of the shim prevents bees from occupying the ½ space above the screen, and the space under the screen is convenient for winter-feeding. If you don't screen the shim, the bees will gather against the under surface of the foam. They like it there because it's warm, but their bodies will conduct heat and partly eliminate the reflection of infrared heat.

The final piece is a rectangle cut the same size as the outside dimensions of the sleeve. You can now place that rectangle on top of the sleeve. I like to then build a telescoping Winter cover that fits over the sleeve, and insert that piece into the underside of the cover. I have also used a flat piece of plywood with a stone weight or ratchet strap and there's lots of other ways to add some cover on top.

Lastly, the sleeve and top cover are not intended to be airtight. If you use a screen bottom, you should block it against a sudden cold updraft, but it's not necessary to seal it tight. You may see liquid moisture at the corners around the top and you may also see some in other places indicating air infiltration, and that's OK. Those indications are proof that your system is working, and that condensation is occurring away from the center of the cluster and also that the bees are not sealed in too tight. So, have some fun, keep your bees a little warmer this Winter and there may be a few more around to greet you come Spring. BC

The foam sleeve slides over the boxes and rests on an added ledge at the junction between the bottom board and the lower box keeping everything at the right height.

William Hesbach is an EAS Certified Master Beekeeper and sideline beekeeper in Cheshire, CT.

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[14]*Foam sheets are not a structural material, meaning they cannot be used to carry weight. But, they will resist a certain amount of compression, so if you install foam inside an inner cover and then place a weight on top, you will not damage it.*

[15]*It makes assembly a lot easier if you tack any pieces together with a hot glue gun first and then use aluminum tape to reinforce and cover the exposed foam edges.*

BIGGER PICTURE

Fall Bucket List

Jessica **Louque**

Maybe it's just me but it seems like there's not a break between holidays anymore. Halloween candy was up for sale before the "Back to School" signs were down in August. Christmas will be for sale as soon as Halloween is over (not really enough consumer merchandising for Thanksgiving, but some will be out), and Valentine's Day cards and candy will be out by the second week of January. If we celebrate the holidays for two or three months each, what makes them special?

Don't get me wrong; I love to celebrate holidays. It's just irritating to me that everything has turned into a "you don't have spirit if you don't buy all this stuff" mentality floating around now. I love pumpkin flavors but I am not eating pumpkins in August! To make me feel a little better about celebrating not just a particular holiday, but the season in general, I am enacting seasonal bucket lists. This way, I can pinpoint the things I enjoy about a season without focusing on the retail aspect of a holiday.

Bucket lists are pretty popular now for all sorts of things. Originally, they were just meant to be for things you wanted to accomplish before you checked out, but now with the limited attention spans of everyone, combined with the limitless ideas of the internet, people make a short-term list that expires at a certain point. Altering this to a seasonal version just gives a list of accomplishments within a three-month time span. It's also good for a goal-setting expedition, and helps remind you of the things you enjoy most.

As bee people, you should also try to incorporate some essential overwintering into your planning, whether it be bucket-listed or not. As an example, I move these items from my "to-do" list to my bucket list:

- Winterizing all the colonies, including *Varroa* treatment, combining hives, a good pollen supplement, and some sucrose feeding
- Cleaning out the apiary for any dead hives, bad equipment, or trash
- Proper overwinter storage of drawn frames
- Organizing the honey house
- Planting a Fall-to-Spring flowering crop for your bees if you have space
  - Clover
  - Vetch
  - Mustard

All of these things are easier to do in the Fall because it's usually a little cooler for the outside work (or in the honey house) and make the Spring so much easier to deal with. It's hard to feel prepared for Winter when you have a messy apiary or unhappy bees waiting to be attended to. Organizing your honey house or storage area also gives you an idea of what you might need for the next year, or what could be repaired or repainted during the Winter months. You have to be

George with his pumpkin pick.

realistic when you're perusing the bee catalogs in preparation for Spring – you totally have enough space for that 18-frame extractor now that you have cleaned up, and since you cleaned, you deserve it!

While each season has fun things associated with it, there's also work to be done in each season. Getting the work done makes the play part more fun. Besides the business of bees, here's some other ideas for a fall bucket list:

- Visit a haunted house
  - This may be something you want to do with a group of friends to make it more fun, but make sure you're prepared for the fright level associated with your haunted house/trail choice.
- Eat something pumpkin
  - Don't make this just about the Starbucks pumpkin drinks (unless you want to), but use it as motivation to make your own pumpkin bread, pumpkin cookies, pumpkin pie, pumpkin fritters – or talk a friend into making them for you. Have a competition!
- Winterize outdoor equipment
  - If you use a lawnmower, weed whacker, chipper, tiller, or tractor, all of these things need to be properly stored for Winter. Gas goes bad when it sits, so adding something like Stabil to the gas and leaving as little as possible in the tank is best. You should also sharpen the blades, change the oil, check the pressure in the tires, check the belts, and unhook the battery. If you get a chance, it's also good practice to crank them up for a few minutes at least once a month to keep them running well. We're lucky to have a good mechanic and garage nearby that will do all of our maintenance work so we don't have to think about it and he remembers to do everything.
- Roast something at a bonfire
  - Preferably not yourself, but get a metal coat hanger and roast some marshmallows or some weenies and take the opportunity to eat a lot of s'mores!
- Appreciate the changing leaves
  - Plants are fascinating with their reactions to external stimuli. In the future, I plan to have an article dedicated to the process of why leaves change colors. In the meantime, get outside and marvel at the beauty of the leaves. Try to find a good place that isn't surrounded by other people, although the parkways are great at this time of year.
- Learn a Fall dish for Thanksgiving
  - Maybe try some of that pumpkin food we were talking about earlier? Or, try to make something with Fall foods besides pumpkin. A house favorite in the Louque family is roasted Fall veggies. It's just carrots, parsnips, beets, squash if there's any around, brussels sprouts, and red potatoes mixed in salt, pepper, and olive oil. We bake until it's glorious. Mushrooms can also be good in this if you happen to have any available.
- Have a picnic in the woods
  - You could double this with the Fall leaves one. Take the opportunity to squeeze out that last bit of decent weather to stay outside. It's supposed to be a rough Winter, and thinking about those Fall picnics might be what gets you through!
- Decorate your doorstop
  - Not everybody has a lot of space, but you can always hang up a colorful fall wreath that you either bought or made (if you're crafty). If you have a little more space, you could pile up enough pumpkins to cause a fire hazard, some dried corn stalks and indian corn for pizazz, and maybe a scarecrow to add some ambiance.
- Line your driveway with paper lanterns and electric candles
  - We did this last year, and the effect is pretty cool. I am not a fan of flammable things (fire not in a fireplace or designated fire-ok area) so putting real candles in a paper bag doesn't work for me. I bought a bag of tea candles from Amazon.com that have little plastic flames and little batteries. They flicker like a real candle and the battery life will last you at least a week, if not a whole season. The driveway here is about a quarter mile and was not motivating enough to light them frequently. It was really nice when they were lit because they had fall cut-outs with leaves of different trees, or an acorn cut-out, and I think a few might have been pumpkins.
- Scare somebody
  - Preferably your children when they are misbehaving, but be prepared for retaliation if you choose to go this route.
- Go to a football game
  - If you have a home team, grab a sweatshirt and head out to support your team! Tailgating might be your thing too, and you might be able to add wings with your own specialty sauce to your Thanksgiving repertoire after trying it out on your tailgating buddies.

Jessie in SD, Wee-B-Little pumpkin field.

- Watch a seasonal movie
  - Lifetime network has a ton of "made for TV" movies that are seasonal, but there's not a lot of guy movies for this time of year. Most Autumn movies are more sentimental, with something like a throwback to Stepmom, or something reminiscent of Summer with a Nicholas Sparks movie and a box of tissues.
- Clean out your Summer closet
  - With six people in our house, space is at a premium so we do two clothing swaps a year with the upstairs closets. There's a big gap in temperatures for Fall, so this is the cluster of clothes hoarding at its finest during this time. Summer clothes are still out, but Winter clothes have to come down to match the cooler days and cold nights. This is the best time to go through clothes from the Summer and decide to get rid of what you don't want, don't wear, or don't need and donate it to your charity of choice. It's an even better time to go through your Fall/Winter clothes to make more space to buy new ones.
- Bring out the flannel sheets
  - Switch out your bedding to warm quilts and flannel sheets. Best. Thing. Ever. You can even sleep with the windows open.
- Go to a festival or a fair
  - This is the season for festivals and fairs. It's finally time that you can be outside and not sweat to death or have a heat stroke, so people come out of the woodwork like roaches to celebrate the non-sweltering outdoors. I know the unofficial start of fall here is the Labor Day weekend junk pile party in Hillsville, Virginia. It's basically a mile square outdoor flea market/yard sale/confusion that everybody goes to. It's something to see even if you don't plan to buy anything (oh, but you will. You can't NOT buy *something*. You NEED that metal rooster in your yard) and to get some steps on your FitBit.
- Go on a hayride
  - Okay, so maybe your allergies don't like hayrides, but it's always fun if you can. You could always try to combine some of these into a "Bonfire of roasting new foods while looking at leaves followed by a hayride" and count it as double points… you know, if you give yourself a score.
- Celebrate the Longest Night (Winter solstice)
  - Another excuse for a party, go old school and have a longest night party to celebrate the beginning of Winter, the nearness of Christmas, and a lot of holiday time with friends.

I hope these ideas have given you something to think about to have a great fall season. Use some of these and come up with your own to make a family tradition, or at least keep up with your Winter preparation! BC

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

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

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

A beekeeper in Georgia writes:

I have been keeping bees for several years, but still consider myself a new beekeeper. So much to learn. I have noticed the bees doing something in the hives, and wonder WHAT ARE THEY UP TO? I have noticed that at times they will hang between the frames with their legs hooked together, as if they have made a chain. Can you tell me what they are up to?

Phil replies:

Though it may not look like it, what they are up to is helping to build bees wax comb. It's such a common practice that we have a name for it. We call the chain of bees a festoon, and refer to the behavior as festooning. To understand the reason for it requires a little knowledge of honey bee anatomy. Although the fine hairs on their bodies make them look soft and fuzzy, honey bees, like all insects, have an exoskeleton. In their case, the exoskeleton takes the form, not of a solid carapace, but of a series of plates. If you look closely at the underside of a worker bee's abdomen (be careful – this is also where her stinger is located), you will see a series of individual plates. Between and under the fourth through the seventh plates is where her wax glands are located. From these, she produces wax at will, but usually only during a certain phase of her adulthood. Honey bees have a short lifespan, about five to six weeks for those emerging in the Spring through early Fall. In that brief period, workers perform a progressive series of tasks, culminating in the roll of forager. Wax production and comb building are age specific duties which take place when the bee is between about 12 and 25 days of age. The wax is secreted in the form of small flakes. She uses her legs to move them up to her mouth where she shapes them into perfect hexagonal cells with just a slight inclination downward from the opening.

Festooning

How honey bees form comb with such precision is one of nature's mysteries, but if you ever played with Play-doh as a child and had to roll it around in your hands and squeeze it until it became malleable enough to shape, you'll understand why temperature is an important factor in the process. That's where festooning comes in. By hooking together and forming festoons around the construction site, the bees can maintain it at about 95°F – the ideal temperature for comb building. Even though it is a common behavior and you have been keeping bees for several years, it is not really surprising that you have never seen it before. In the first place, festooning is a factor in only about half of all comb constructed. In a closed hive in the Summer, daytime temperatures can easily reach the nineties and above, so festooning is unnecessary. You would have had a better chance of seeing it before now if you were in the habit of inspecting your hives at night. Temperature goes down with the sun, but work in the hive does not stop. After a long day of collecting nectar and pollen, foragers are available to work the night shift in festoons while younger sisters work in production.

It has been a long, hot Summer in Kentucky, but I recently saw some festooning while visiting a beeyard during a trip to France. It was early September, but temperatures were already starting to drop there. There was a nectar flow on, and the hive where I saw the festooning was missing an end frame. The bees had obviously decided that they needed another comb to store incoming nectar. I speak no French and the apiarist knew only a little English, but we pointed, nodded, and smiled. For those of us who have been captivated by the little insects, beekeeping is a universal language.

A beekeeper in Nigeria asks:

We are told in Africa that the stings from honey bees will help cure disease, including malaria and typhoid fever. Is this true?

(*Bee Culture* readers: This was a question posed to me during a question and answer session after a beekeeping

talk I gave on a recent trip to Nigeria. The reply that I am sharing here is an expanded version of the answer that I gave that day.)

Phil replies:

In the United States there is a branch of alternative medicine known as apitherapy. It includes not only the intentional administration of bee stings, but also the beneficial health effects of honey and other products harvested from honey bee hives, including pollen and propolis. Though stings are often applied directly, bee venom can also be harvested from bees by an ingenious method. A grid is attached to the hive entrance and an electric current passed through it to induce the bees to sting without impaling their stingers. That way they are not killed. The venom collects on a glass plate placed under the grid and is allowed to dry before being collected in the form of a powder. To see a video of the procedure, go to **www.youtube.com/watch?v=SGQso0dWwy8**.

Harvested bee venom can be used in an injectable form, or as a cream or ointment, in the treatment of rheumatoid arthritis, nerve pain (neuralgia), multiple sclerosis (MS), tendonitis, and muscle problems. It is also used to reduce the reaction to **bee stings** in people who are extremely allergic. Some victims of Lyme disease have benefited from bee venom therapy. Lyme disease is similar to some of the conditions cited above in that it affects the nervous and muscular systems. I have even read of research with some of the components of bee venom which indicate that it may someday aid in the prevention of HIV infections. However, when it comes to diseases such as malaria or typhoid fever, I know of no research showing that bee venom is beneficial.

With regard to honey, many people find that daily consumption of small amounts just makes them feel healthier. It is used to relieve coughs, either alone, or as an ingredient in cough syrup. Honey is also said to provide relief for those suffering from asthma and hay fever, stomach ulcers, and diarrhea. Some of the components of honey have antibiotic properties which aid in the healing of wounds. For that reason, it has a long history of being applied directly to injuries of the skin to promote healing. The Greek physician Dioscorides used honey in the treatment of sunburn and skin wounds. Reference to the medicinal use of honey can be found in the Bible, Koran, and Torah. Today special bandages are available which contain medical grade honey. One particular varietal, Manuka honey from New Zealand, is especially prized for its healing properties, and is said to have four times the antibacterial effects of other honeys. Some claims of the medicinal benefits of bee venom and bee products are well researched and documented; others are merely anecdotal. Probably not all are true, but if you *think* beestings can help, it doesn't hurt to try, right? Or, ouch, maybe it does.

A future beekeeper in Minnesota writes and Phil replies:

I'm looking into starting up a couple of hives in a year or two, and as all newbies, I have a ton of questions. Here are the first ones.

Question 1: The queen gives off pheromones which lets the bees know she is still around (over simplified), but if you put hives side by side, how do the bees know which hive is theirs?

Each hive has a distinctive 'smell', that is due not just to the queen's pheromones, but also to other brood and bee pheromones and to the unique collection of stored 'stuff' in the hive, such as honey, pollen, propolis, etc. Even so, bees do sometimes end up in the wrong box. We call that drifting. Drones have an especially bad reputation about this. Women beekeepers tell me that guys get lost more often because they will not ask for directions. I am not aware of any conclusive research on the subject.

Question 2: Would the hive be confused if an active hive is next to it? Do the bees go from one hive to another and then back?

Though drift does happen, bees do not return randomly to first one hive and then another. A honey bee that flies into the wrong hive is normally accepted into the new colony, especially if she is returning from foraging trip with a load of nectar or pollen. She becomes a part of the new colony and accepts it as her new home.

In nature, colonies of honey bees would never be as close together as beekeepers place their hives in apiaries. Wild colonies would be hundreds of yards apart, at least. I have 20 hives in one location. Though it would most likely be healthier to have them spaced well apart, it would not be as convenient for me when I inspect the hives or collect honey.

Question 3: If a queen dies, how long until a new queen is developed?

(Mary Parnell photo)

(Mary Parnell photo)

It takes about two weeks for a colony to produce a new queen, providing that it has a young larva, only a day or two days old, which it can raise as a queen. Once the new queen emerges, it can take another two weeks or more for her to get mated and start laying eggs.

Question 4: The bottom is the brood box and the queen is "trapped" there. Is it best for the first few years to leave a second box on top of it, strictly for supporting hive growth?

We call the boxes which contain the queen, and where the colony rears new bees and stores Winter supplies of honey, brood boxes. The number of brood boxes which comprise a hive is a factor of how much food has to be stored for Winter. Beekeepers who enjoy the mild Winters of the deep south get by with one brood box, but in most of the country two is the norm. I live in Kentucky, which is considered the upper south, and I use two brood boxes. In Minnesota you will need at least two, and maybe three. More boxes not only provide room for winter food stores, but also housing throughout the year for the bees that forage and gather the food. Check with local beekeepers, or the folks at the University of Minnesota Honey Bee Lab about requirements for your specific region.

Question 5: Once you have honey, would creating a "hot box" out of plexiglass to set the racks in and letting the sun heat the honey off the racks a simpler way to remove it? This way the rack would not be subjected to unnecessary abuse and retain a little honey residue to rebuild it.

No. Unless you could control the temperature in the box precisely, you would melt the wax, make a mess, and kill the bees that would be trapped in it. And it would result in robbing. Unfortunately, there is no easy way to take honey off.

Question 6: I seen videos of a hive where they put the honey directly in the jars to sell. I have heard that the honey is naturally free of contaminants, is this a true statement or mostly true?

There is a hive design that makes this claim. It is new on the market, and I will reserve judgement about its effectiveness in the field until it has been in use for a couple of years and I have heard from beekeepers who have used it. See the answer to question number 5.

Question 7: How large of an area for flowers would I need for flowers to maintain a hive? ½ acre, one acre, two acre or too much to worry about?

Don't worry about it. Bees can find forage in most places in the U.S. Minnesota is actually a VERY good place. Bees will fly about three miles to collect nectar.

Question 8: I am in Minnesota. In wrapping the hive for winter, can you wrap it too much, retaining too much warmth?

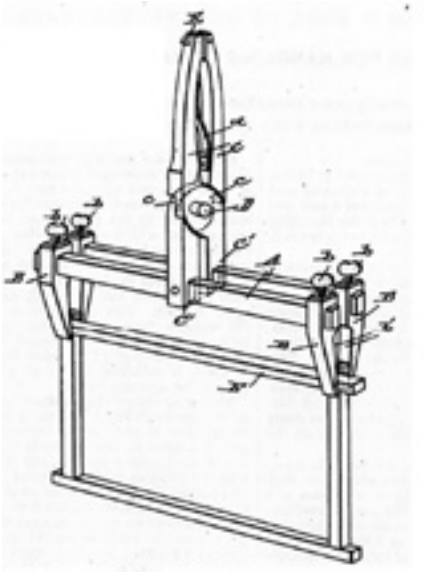
Hives are only wrapped in the more northern parts of the country, and that includes Minnesota, but it MUST be done correctly. The concern and danger is the accumulation of moisture under the wrapping. We are always concerned about moisture in hives – especially during Winter – whether they are wrapped or not. For a new beekeeper the simplest solution is to purchase a commercially designed hive wrap, designed for one hive, and install it according to the directions. Thanks for some interesting questions, and good luck. BC

Frame Grippers

Ways To Stay Away From The Bees

Jim **Thompson**

Do you know there are people that keep bees and don't want to get close to them? I thought that this was a new trend, but no, Crawford Holt developed a frame grip that he called "Tongs for Handling Comb Frames." His patent was issued June 9th, 1891 and had a handle that would keep you a foot above the frame. There were several thumb screws on the "grip" so it could be adjusted for the type of frame that you were working. He claimed that it would give you a better grip, but I wonder about the handling ability once you got the frame out of the hive.

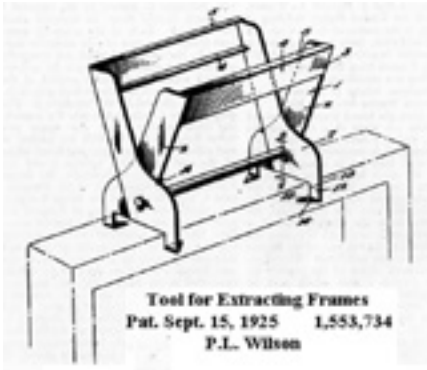


Tongs for handling Comb Frames
Pat. June 9, 1891 No. 453,905
C. D. Holt

In 1916, Ferdinand Ross patented his "Appliance for Removing Comb Frames" and it was a handle that had wires that would turn under the top bar and hold the frame in place as long as you kept your thumb against the button. Now we have the start of a device that might rip the top bar off of the frames if the frames were not assembled right. I wonder just how long the wires would hold their shape and work correctly, as they seem to be fairly thin.

Appliance for Removing Comb Frames
Pat. May 23, 1915 No. 1,184,491
F. C. Ross

In 1925, Payton Wilson's "Tool for Extracting Frames" is starting to look like the frame grips of today only it grips the top bar from the sides rather than hooking below it. When you squeeze the handle, there are spurs that will dig into the wood. This may work fine until the frame gets scared up from multiple manipulations.



Tool for Extracting Frames
Pat. Sept. 15, 1925 1,553,734
P.L. Wilson

The design "flaw" of having hooks digging into the side of the top bar was continued into Hugo Zeitler's "Device for Lifting Frames" as he had a plate on each side of the grip that had three hooks. It appears as the grip had enough depth to go under the top bar, but he must have wanted the plate to crush bees.

Device for Lifting Comb Frames
May 15, 1928 1,669,641
H.A. Zeitler

I know that this isn't a frame grip, but it fits right in here time wise. On April 22, 1930, Laurence Wilson received a patent for his "Beehive Frame Hook". You might have to shorten the ears of the frames in order to get the hook to go on the frames while they are still in the hive. Any burr comb and propolis will take up space, preventing it from going on the ears. It looks like a set of modified ice tongs that will keep the frame about a foot away from you and has the possibility of slipping off the ears of the frame. At some point, you are going to have to remove the frame from the holder and the best way would be to have a helper.

Beehive Frame Hook
April 22, 1930
1,755,941
L.F. Wilson

In the 1920s, Dadant sold a combination hive tool and frame grip. It was well made but caused you to choose what task you were going to do.

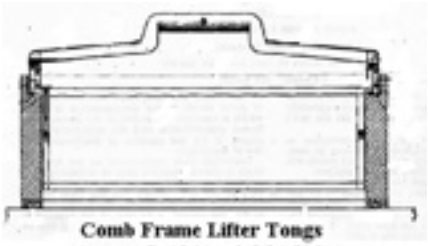
Combination hive tool and frame grip that was offered for sale by Dadant in the 1920's.

Perhaps Anton Kouba got his inspiration from the Dadant tool as it had only a small area to grip the frame. It had the hive tool on one side of the "pliers" and makes me wonder if you could even use the hive tool as a scraper. I'll bet he was a mechanic and patterned his "Honeycomb Frame Handling Pliers" after the brake shoe pliers that were used on drum brakes. It also looks like

Honeycomb Frame Handling Pliers
Jan. 13, 1931
1,788,577
A.V. Kouba

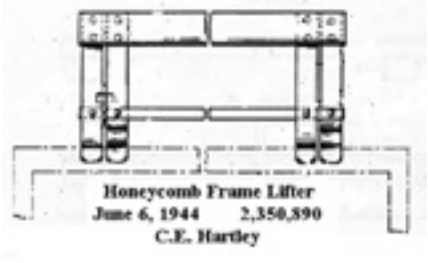
one would have a balance issue with this tool.

On August 5, 1941, Edward Sterling introduced his frame lifting tool. Not only was it a long tool of 19", but it would clamp on the ears of the frame. Just think about lugging this tool around the bee yard so you can remove frames. Then you would have to work the grippers under the propolis and burr comb on the ears of the frame and yank out the frame. I seem to remember that the weakest part of the frame is its ears, so maybe one should invest in a bunch of those metal ear repair units.



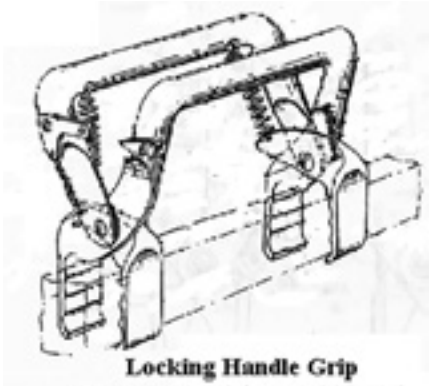
Comb Frame Lifter Tongs
August 5, 1941 2,251,529
E.C. Sterling

Cecil Hartley was granted his patent for a "Honeycomb Frame Lifter" on June 6, 1944. It featured a big wooden gripping handle, sheet metal gripping arms, and a complicated pivot system. The jaws of the lifter are back to the spur gripping method and the pivot system limits the amount of space that the jaws will open. There were no springs so one would have to open and close the lifter manually.



Honeycomb Frame Lifter
June 6, 1944 2,350,890
C.E. Hartley

Now we are talking, a "Locking Handle Grip"! August 22, 1961, Horace Daum introduced a cast aluminum frame grip that had external springs and attachments to lock the grip in the closed position. The springs could pinch skin or gloves and the casting spurs may encourage one to release their hold, so the locking feature was necessary. The locking feature was located at the end of the grip and you would have to turn the locking lever under the cross arm. This made it easy to lock and somewhat more difficult to unlock.



Locking Handle Grip
August 22, 1961 2,997,326
H.A. Daum

However a California firm developed a cast aluminum frame grip that had an internal spring and was pleasant to hold. If you ordered enough of them, you could have the name of your company molded into the handle. I remember seeing one that had A.I. Root printed in one handle and Walter Kelley in the other, so someone goofed in assembling the grip. The drawbacks to this frame grip were that the spring would pop out and get lost and the pins holding the two handles together would slide out. Would you believe that I have a couple of these and can't find them currently for a picture?

I purchased four different frame grips recently. The quality of the frame grips is much worse than the California cast aluminum one, but how often will they be used? The first frame grip has an angular handle of metal and feels cheap to hold. The one with metal tubes gives you an eerie feeling when you are squeezing; the handle. The tubes move with your hand but then pop as there is about a 1/8" clearance. The wood handled one feels good to hold, but how long will it last with the screws going into end grain? That leaves the one that is made out of bent steel rods. The

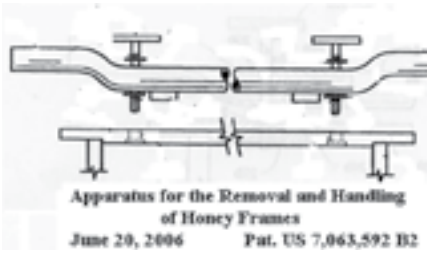
Frame Grip with angular metal

operation is much smoother than the rest.

June 20, 2006. William Pointer developed an "Apparatus for the Removal and Handling of Honey Frames". It is a handle that is longer than the frames and has two turn screws or thumb screws that attach the handle to the frame. It would require you to drill the top bar of each frame that you ever thought that you would ever remove. The two holes would have to be located precisely so that the proper sized threaded inserts or rivet nut threaded inserts could be used. Then you would have to have

Frame grip with tube covering handle

Frame Grip with Wooden Handles

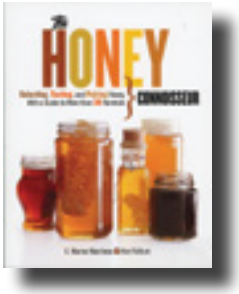


a stand made to hold the frame and handle.

Also on the market is a combination hive tool and frame gripper. I had to file the hive tool for about a half hour in order to get it sharp enough to use. Then it seems that when using the frame grip, the hive tool is somewhat in the way.

Can't you tell by now that I don't think much of frame grips? They can be destructive to the frames by pulling off top bars. If I took every type of beehive accessory out to the beeyard, I would have to have a wheelbarrow to haul the stuff and a check list to see that I don't lose something. BC

Jim Thompson has been a beekeeper and a beekeeping historian for many years. He lives in Smithville, Ohio.



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The Trailer

Geoffrey **Martinak**

Located in the Canadian prairies, Manitoba has long been a major producer for beekeeping in the country. This is where Collin Stone calls home. Here he operates International Honey Products, a manufacturer of honey extraction equipment. With a background as an inventor and entrepreneur, Collin has worked in aiding in the design and testing of mechanical and electrical equipment to create efficiencies in many industries, including some fortune 500 companies.

Collin's introduction into beekeeping began as a project with his teenage son, allowing him to earn money for his first car. Together they purchased 10 hives from a local beekeeper and set out on their first season. At the end of the year, the honey they sold netted $6,000. The following year they increased to 33 hives, which earned them $16,000. It was at this point that he realized there may be unforeseen opportunities in beekeeping. It was in those first few years in a hot room, knee deep in bees and honey with a hot knife and a 30 frame extractor, that Collin began to realize that the methods and technology in beekeeping have remained stagnant for the past few decades. His ingrained thought process of creating efficiencies coupled with his passion for beekeeping led to the creation of International Honey Products, and the design of the mobile extracting unit.

Collin Stone and International Honey Products manufactured

The Process -

The mobile extracting unit is towed right into a beeyard or staging area. The trailer is then disconnected from the truck and auto-stabilized by a remote. The levelling legs are lowered to ensure the entire unit is balanced, which ensures the honey flows unhindered through the heated sump pit and filtration system.

Honey supers are brought to the side of the unit, then loaded onto the conveyor which feeds them into the trailer.

International Honey's Mobile Extraction Trailer

a custom 32' harvesting trailer equipped with a 120-frame extracting line. The mobile honey extracting unit allows for incredibly efficient 24/7 honey extracting with minimum labour requirements. The mobile unit is a self-contained, diesel powered trailer capable of fully extracting, filtering and barreling 740 frames of honey an hour.

With mobile extracting, you simply pull into a beeyard or staging area, remove full supers and place them onto a conveyor. The trailer's technology removes full frames from the supers, uncaps the wax from the frames, and then loads them into an extractor for the removal of honey. The honey is barrelled and filtered right on site, and the frames are reloaded into the supers, which are placed back onto the original hive all within minutes of the initial removal.

From multiple tests conducted in Canada and the United States, International Honey Products noticed the following results;

- Lower operating costs with money saved on fuel, labour and electricity
- Reduction of equipment by putting supers right back onto hives with no extra transportation
- Time saved processing by extracting on site rather than timely process of transporting to fixed location
- Higher honey yields by putting wet honey supers directly back onto hives
- Reduced labor by eliminating pest issues like small hive beetle in warming room storage

In addition, from the original concept and testing phase, several new advantages were found in the mobile technology. With the introduction of NFC tracking technology, International Honey Products can now track not only each individual barrel of honey with GPS location technology right back to the beeyard in which it was produced, they now have true to source tracking that can monitor the individual hives. Not only does it allow for data to be collected on the honey production

Once entering the unit, the honey supers are fed onto the deboxer. The frames are removed from the supers and fed into the uncapper. The cappings fall into the hopper and are then fed through the wax press, which eliminates the need for a centrifuge.

of each individual hive, it also has paved the way for a new and innovative breeding program for high-yielding queens. With multiple units operational in North America and orders filling up for next season, the innovative concept of mobile extraction appears to be much more than just a passing thought within the industry. For more information on the mobile honey extractor, you can visit International Honey Products website at **www.internationalhoney.com** BC

After exiting the uncapper, the frames accumulate on the loading rack, where they are then loaded into the 120-frame extractor. The extractor will run on a 6-8-minute cycle time

When the extractor is loaded it automatically unloads the empty frames which are then placed backed into the supers to be put back on its original hive.

Ohhh, My Aching Back!

Jerry **Bromenshenk**

A Make It Yourself Hive Loader

Large scale beekeepers often place hives on pallets and move them using forklifts and flatbed trucks. Small scale beekeepers are more likely to have a pickup truck or trailer. The problem is loading and unloading hives, especially if one is working alone.

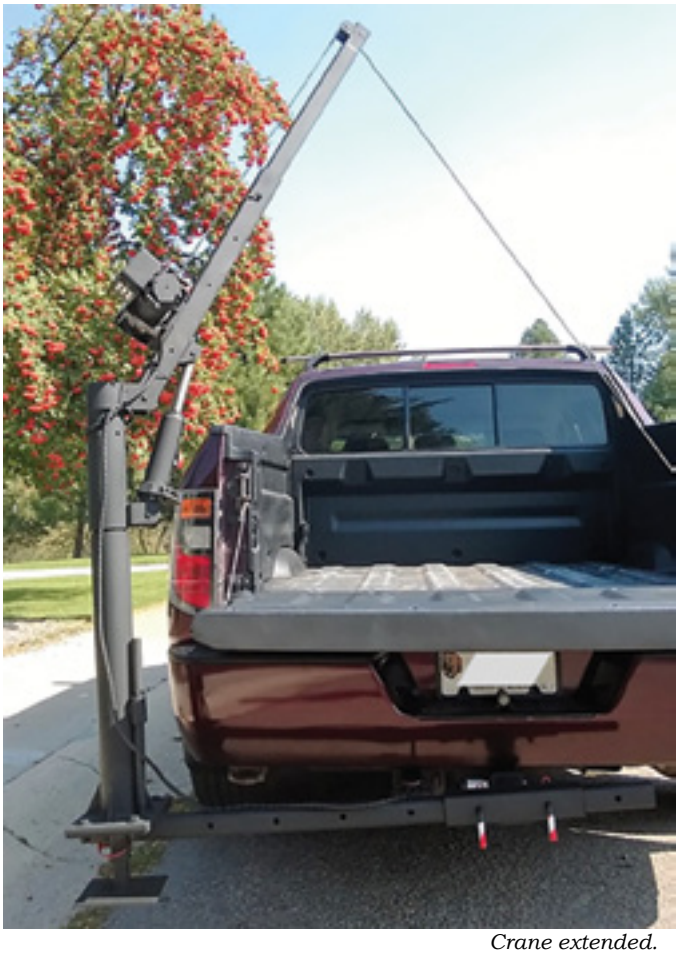
A bed-mounted hoist is really handy but most are expensive. It's time to make a trip to a discount tool store like Harbor Freight (HF) or Northern Tool. I've got a nearby Harbor Freight store. A hydraulic-jack ½ ton hoist with a hand-crank winch costs $89 for a short crane and $149 for a taller crane. For another $89, you can toss the hand-winch and replace it with an electric ATV winch with a wireless remote control. Now you can operate the winch while steadying the hive.

If you don't mind bolting everything into the bed of the truck or trailer, you're ready to go. Just be sure to add a reinforcing plate to the truck bed, the thin bed sheet metal won't take the strain. If your truck has a trailer hitch, spend another $18 for a 12" receiver hitch extender. Weld the base plate of the hoist to the extension, and you've got a crane that can be easily mounted and dismounted. If you or a friend can weld, that's a total of $256 for the taller lift. Cost will be a bit more if you need to pay someone to attach the base onto the extension.

This works very well, but the downside is that since the crane is in the middle of the truck. You will have to either remove the tailgate or lift the hives up and over the sides of the truck. A better solution is to move the hoist to the side of the truck so that the tailgate can be opened. You can find this type of crane on the web in aluminum or steel for around $1500 plus shipping – ouch!

Not to worry, a chunk of square tubing welded into a T solves the problem. The hoist base needs support for heavy lifting, so you should add an adjustable foot. My design allows me to mount the crane on either side of any pickup with a trailer hitch. Basically, I had a T-shaped extension built, then added a longer, horizontal, square pipe that can be slid left or right to fit the truck, and a foot that slides up and down inside the vertical mast for the crane.

Crane down.



Crane extended.

This part takes the most fabrication work. You need to drill a hole through the center of the crane base and weld on a piece of square tubing to receive the leg of the foot plate. None of the dimensions are critical, just fit to the base of the crane that you purchase and use the right-sized extension for the hitch on your truck. If you want to be able to adjust the left or right length or the height of the foot for uneven terrain, you'll need to drill some holes – how many is up to you. Given that you are drilling two layers of rather thick-walled square tubing; I highly recommend a drill press.

The version of this crane that I use on my own truck has one more feature. I added a direct-wired controller to the electric winch. The wireless fob is easily to drop and lose in the grass, the battery may die, and there's a bit of lag between pressing an up or down button and winch response. The crane-mounted controller is more precise, can't be lost, and runs off the battery.

A few tips – the HF hand-crank winch has soft teeth and the cable may jam when spooling. If you use the HF winch, take up cable slack without any load, then use the jack to lift the load. If you lift the weight of a heavy hive by cranking the winch, it will self-destruct in a season or two. Leave the hydraulic jack in the down-position when not using. The jack shaft is prone to rusting if exposed to weather. Hook a loop of string through the keyhole in the remote control for the winch and hook to your belt or wear around your neck (just be sure that the string will break before it chokes you, if you hook it on something). HF's crane has a loop for the jack handle pipe at the base of the crane.

I worry about bouncing the jack handle out on rough roads, or someone using it to smash a window to steal things from the cab or maybe even the truck. I carry the steel jack handle under a seat and have a light-weight handle that I leave in the base of the crane. I made it from a piece of PVC pipe with a wooden towel glued inside to take the flex out of the PVC. Light, cheap to replace, and it's likely to take a lot of work to break a window with a PVC pipe.

The crane swivels, just remember to lock it down when driving or you may lose the rear window as the boom swings inward. Also, collapse the boom to its shortest length so it can't reach the window.

There's a locking pin for the crane swivel near the top of the mast. I replaced the HF clip with a bolt and a large thumb nut, painted red so I can easily find it. There's also a grease-fitting near the top of the mast. Keep the mast well lubed; do so frequently or the mast will be hard to turn with a load on the crane. Don't forget to raise the support foot before driving off! Otherwise you'll dig a trench in the dirt or hear a scraping sound. Worst case, you hook a stump or curb and tear the whole thing off.

The one change I'd make if I did this over would be to bend up the front of the support foot so it would act more like a sled, and I'd round the corners of the crane base – it'd be easier on the shins. Finally, the whole thing bounces and rattles if left loose. Before driving, I attach the crane hook to a bed tie-down, then tighten the crane until the cable pulls tight and starts to lift the whole assembly. That lifts the support foot even higher off the ground, and it keeps the crane assembly secure and stable with little or no rattles.

As per lifting hives, I have ratchet-straps on all of my research hives. We slide the web strap through a D-ring, ratchet the strap tight, and attach the cable hook to

The t-shaped extension plus the horizontal pipe.

Adjustable foot.

the D-ring. That's the cheapest and simplest solution. There are lots of slings for lifting hives that you can build or buy. Most either have a cradle the slips under the base of a hive or have clamping arms that use the handholds of a hive body. However, that's added expense and one more thing to carry. BC

Jerry Bromenshenk is a Class Development Leader at the University of Montana's, Master Beekeeper Programs and retired Researcher in the Entomology Department there. He is a frequent contributor to Bee Culture.

Locking it down.

Christmas Presents For Beekeepers

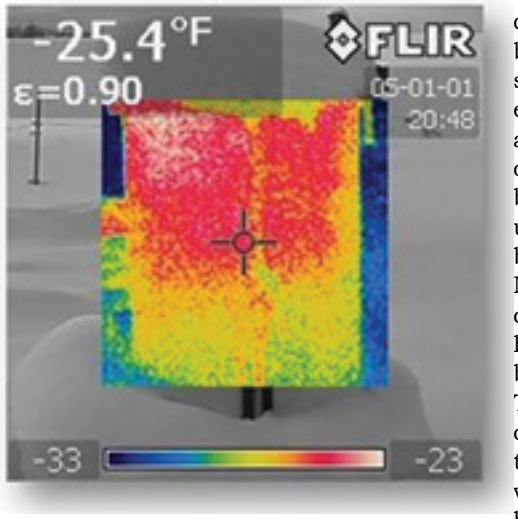
Ann **Harman**

Although December has not arrived the approaching days of Winter have slowed beekeeping tasks, giving us time to think about next year when we will all be busy with our colonies again. Equipment has been cleaned up and stored. We carefully made notes for items that will be needed. Perhaps it is time to start that letter to Santa Claus.

This year, as in years past, you will request a new hive tool to replace the favorite one you lost (again). A new veil is definitely needed – too many holes repaired with duct tape. Another nice gift would be an IOU for a special queen you are anxious to try. Your local club has been encouraging members to have a scale hive in the apiary. That would certainly be nice for tracking the nectar flow to know when to put on honey supers. So perhaps 2017 will be the year to have a scale hive. Put the scale on Santa's list. Someone in the club was asking questions about using an infrared camera to see what the winter cluster is doing. Now that could be both a useful and fun Christmas present! The Winter months would be an excellent time to use one. It could even be useful the year around. Now for a visit to the internet to find out about these cameras.

The Utah state apiary inspectors are using infrared cameras to inspect hives during the Winter months. If a colony is found dead it can then be opened to inspect for disease, especially American foulbrood. Pest control companies in African bee areas are using them to pinpoint a colony that has invaded a home or other building. Finding the exact location of the AHB colony means much less damage to a structure and easier removal of the bees and their nest. So an infrared camera could also be a tool for those beekeepers called to remove bees from buildings.

Here is a suggestion. Before plunging into an assortment of information on infrared cameras and who is doing what with them, take a few minutes to read two excellent articles by Dr. Jerry Bromenshenk about the cameras and their uses with beehives. Part one can be found at **www.beeculture.com/infrared-the-next-generation-in-colony-management**. For the second article go to **www.beeculture.com/professional-ir-cameras-2.** Now you have a better idea about camera selection and how to use it effectively. You do need to be able to interpret the colors and images the camera provides. After reading the articles you can then decide about adding an infrared camera to Santa's list.



In days not too far gone by, the farmer stood at the edge of his field, then decided to walk through looking for problems and determining when to harvest. The cowboy rode his horse over terrain not suitable for pickups looking for cattle hiding in a ravine or riding out to take a look at the number of calves in a big field.

Now drones fly over those fields reporting back on the state of the crop or the livestock. Wait – that's a non-bee drone! I'll have to say real-bee drone or non-bee drone so you won't be confused. (By the way, don't put a real-bee drone on a kite string and expect that to work.) Non-bee drones can be fun to fly although they do suffer from crash landings. (Real-bee drones do have crashes, too, but only after mating.)

Non-bee drones come in all sizes and can carry cameras for photos or videos. These drones are used by farmers, stockmen, real estate agents, and many others in their businesses. The uses seem to be increasing. Non-bee drones could certainly have a part in beekeeping. Those drones could be used to check on what plants are blooming. Then the beekeeper could stop guessing about putting on and taking off honey supers. Those beekeepers who have tasted their honey and wondered what the bees found could see what blooming plants the bees found.

It is difficult to know what is going on in the 18,000 acres surrounding a beeyard. (That is about the number of acres in a circle with a three-mile radius of an apiary.) Some beekeepers may wonder why their honey yield is

decreasing. Suppose a honey-yielding meadow has now been converted to a shopping mall with acres of concrete and asphalt instead of blossoms. A camera on a non-bee drone could find out. Are there crops that could possibly be sprayed and be a danger for bees? Send out the drone!

A cruise on the internet about non-bee drones is eye-opening. First you have to learn to fly a drone. Some people learn readily, others can find it difficult. And it is best to learn how to repair a drone after a crash. The prices of drones range from about $50 to $1000. Add on the price of a camera and you realize that buying one could be expensive. It is definitely best to learn to be a good pilot first.

Once drones became so available problems arose. All kinds of drones – from toy ones to heavy professional ones – were flying everywhere, including around airports. It was inevitable – the Federal Aviation Administration (FAA) needed to regulate drones, termed UAS or Unmanned Aircraft System. So now you can buy a drone but you are required to register it. This registration began at the beginning of 2016. Any hobbyist (someone not using a drone in a business) weighing between 0.55 pounds and 55 pounds must register it with the FAA and pay a $5.00 registration fee. Those using drones as part of a business have a different registration.

Registration can be done online. Just put drone registration into a search box to find information and forms. When registering, drone owners must provide a name, physical address and email address. Drone owners then must mark their drones with a registration number or register its serial number with the FAA. So a beekeeper must consider many things to decide whether a drone would be a useful part of beekeeping or not.

Drones are for knowing the outside – the environment around the hive. Perhaps it is more important to know what is going on inside the hive. Hive monitors, from simple to complex, are appearing on the market. Perhaps a hive monitor would be the ultimate Christmas gift. Although many sizes and styles of non-bee drones are for sale everywhere, only a few in-hive monitors are available. The hive monitors send the data to the beekeeper's computer. Monitors record temperatures through sensors placed throughout the hive. Some monitors also detect sounds. It seems very tempting to be able to know what activities the bees are doing. Since the monitoring systems are expensive it would be best to visit a beekeeper using one to see it in action. Perhaps requesting a monitor from Santa should wait until next year.

As we start to use modern technology in our beekeeping are we losing something? Today the beekeeper fires up the smoker and grabs the trusty hive tool and walks to the beeyard. Bees are flying in and out of hives. A bit of smoke is applied and the hive is opened. The story of that colony is ready to be read. Tomorrow, the future, the infrared image is noted; the wavy lines from the monitor are crossing the computer screen telling their story. Are we relying on modern technology to tell us all about our bees?

What would Storch say? In 1985 H. Storch wrote a small, but very valuable, book called *At the Hive Entrance*. It is still available today and should be read by all beekeepers. Watching the activity at the hive entrance can tell you much about the colony. Stop and look for a while – the 'rush hour traffic' during a heavy nectar flow, the colors of pollen brought in, the late-afternoon orientation flights, a dead bee being carried out and dumped, a guard bee accosting a possible intruder. Not even a monitor will bring you those scenes.

Is that infrared camera going to tell you anything about the temperament of that colony? Every once in a while a pleasant colony 'gets up on the wrong side of the hive.' But a colony can also just turn out to be a disagreeable one that needs requeening to settle down. The hive monitor cannot tell you the queen's brood pattern or how well a colony is drawing out comb.

It's time to requeen a colony that you know has an unmarked queen. Is technology going to help you find the queen? Not today, but perhaps in the future. Bees have carried bar codes and even tiny transmitters. Just think – no longer searching, searching . . . If the year's color mark were replaced with a tiny transmitter, a scaled-down one like the lions and tigers wear for conservation studies, finding that queen would only take a minute or two.

Monitor and infrared camera advertisements seem to be emphasizing that the bees do not need interference in their daily lives. It is true that opening a hive can be disruptive to a colony and its activities. A meddlesome beekeeper, opening hives frequently and just rummaging through is disruptive. However many beekeepers have watched a waggle dance with followers on a comb being held and have watched the queen laying eggs. With the proper handling those bees were just carrying out their usual projects. Unfortunately today we must somehow cope with *Varroa* mites and small hive beetles. So a certain amount of colony disruption is necessary. Good beekeepers think ahead and plan their hive invasions to cause less stress on the bees.

We can wonder what the future will bring. Partial or full automation of tractors are used in the U.S. corn fields. Dairy cows are wearing sensors on their tails to alert the dairy farmers in Ireland that the cow is about to calve. Robots! Strawberries are being harvested by robots in Japan. Robots do thinning of lettuce plants in Europe. Cattle are being given their daily rations of feed by robots here in the U.S. We can dream about the beekeeping tasks robots could do. They don't mind being stung. What would Langstroth think? I think he would approve of modern technology as long as the beekeeper does not lose that close personal contact with the bees. Both the beekeeper and the bees will always need that. BC

Ann Harman is hovering over her farm in Flint Hill, Virginia.

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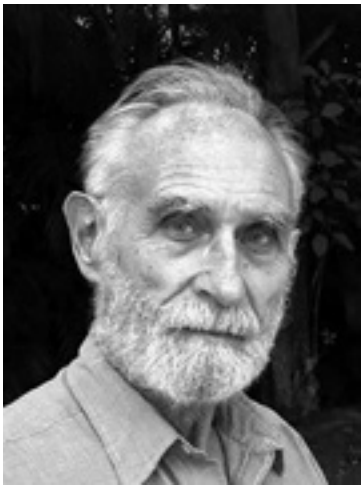
OBITUARY



Dr. Théodore Cherbuliez, 88, died on July 2, 2016, at his home in South Freeport, Maine. Dr. Cherbuliez was born in Geneva, Switzerland, and came to the U.S. in 1959 to pursue training in psychoanalysis and psychiatry. In the New York region, he worked at Albert Einstein/Montefiore Hospital and Cornell Medical Center. He also maintained a private practice in Scarsdale, N.Y., then in South Freeport for 53 years. In Portland, he consulted on family therapy at Maine Medical Center. For decades he returned annually to his native Geneva to work with clinicians on innovative approaches to child welfare, making his last trip this past April.

Dr. Cherbuliez had a passion for bees, which began during his childhood years in the Valais mountains. After becoming a master beekeeper in 1988, he became interested in the health value of the products of the hive and was president of both the American Apitherapy Society and the Apitherapy Commission of Apimondia (the International Federation of Beekeepers Associations). He travelled worldwide, lecturing on and teaching apitherapy. Theo was a consummate Swiss, deriving a great deal of his philosophy on resilience, responsibility, and cooperation from a childhood of skiing and mountain climbing with his brother, sisters, and mother; scaling the Matterhorn in his teens. As an adult his passions included not only bees and apitherapy, but also piloting planes, playing the recorder, baking bread, and caring for generations of cats.

Donations may be given to Doctors without Borders or, in keeping with Dr. Cherbuliez's commitment to justice and tolerance, to the Southern Poverty Law Center.

NUTS AND BOLTS OF BAYER MONSANTO MERGER

American farmers fear higher prices and lower research spending as a result of the US$66-billion Bayer takeover of rival Monsanto.

The merged Bayer-Monsanto operation will sell 29% of the world's seeds and 24% of its pesticides.

American Farm Bureau Federation chief economist Bob Young says major company mergers have a profound impact on the tools available to farmers and ranchers, sometimes to their detriment.

"Farmers and ranchers, in particular, are interested in how these deals will impact research and development budgets for companies such as Bayer and Monsanto," Young says.

"We depend on access to enhanced technology, and would hate to see agricultural innovation suffer at the cost of business decision.

The global crop seeds and pesticide market is worth US$100 billion a year.

Young notes the Monsanto-Bayer deal comes close on the heels of the proposed Syngenta/Chemchina - Dow-DuPont merger.

Canadian nutrient companies Agrium and Potash have also announced merger plans.

Continued on Next Page

NEW ZEALAND PLANS TO ERADICATE PREDATORS BY 2050

New Zealand has set itself an ambitious goal of being predator-free by 2050.

It is providing NZ$28 million (US$19.8 million) to kick start the project that aims to eliminate every rat, stoat and possum – all of them introduced and now estimated to cause losses of NZ$3.3 billion (US$2.33 billion) a year.

Prime Minister John Key says while once the greatest threat to native wildlife was poaching and deforestation it now is introduced predators.

"Rats, possums and stoats kill 25 million of our native birds every year, and prey on other native species such as lizards and, along with the rest of our environment, we must do more to protect them," Key says

The possum was introduced to New Zealand in 1837 to establish a fur trade, but now is a reservoir for bovine TB.

Stoats, ferrets and weasels were introduced in the 1880s to control the pest rabbits brought in by early European settlers. Within six years, drastic declines in bird populations were recorded.

Rats didn't wait to be introduced, they arrived on the boats of the earliest settlers around 1280 AD.

Keys says the pests threaten the economy and the primary sector.

"That's why we have adopted this goal," Key says/

"This is the most ambitious conservation project attempted anywhere in the world, but we believe if we all work together as a country we can achieve it."

The government is giving the grant to a new joint venture company called Predator Free New Zealand Ltd. to drive the program alongside the private sector.

The new funding is on top of the NZ$60 million to NZ$80 million (US$42.5 million to US US$56.6 million) spent on pest control by the government every year and the millions more contributed by local government and the private sector.

Predator Free New Zealand Ltd. will be responsible for identifying large, high value predator control projects and attracting co-investors to boost their scale and success. It will oversee the use of control measures such as traps, poisons and fences to control and then wipe out wipe out the predators.

The government says for every NZ$2 that local councils and the private sector put in, the it will contribute another dollar.

"We know the goal we have announced is ambitious, but we are ambitious for New Zealand, Key says.

A New Zealand stoat with its catch. (Dept. of Conservation photo)

"And we know we can do it because we have shown time and again what can be achieved when New Zealanders come together with the ambition, willpower and wherewithal to make things happen."

Last year, University of Auckland School of Biological Sciences and Department of Statistics conservation ecologist James Russell and colleagues estimated the cost of ridding New Zealand of pests over 50 years at NZ$9.04 billion (US$6.4 billion).

But they said doing nothing would see pest management and agricultural costs top NZ$15.96 billion (US$11.3 billion), so the benefits outweigh the costs.

"Fifty years ago we didn't dream of being able to clear whole islands of pests, but today we are talking about every last island in New Zealand," Russell says.

The researchers estimated the economic and tourism benefits of a predator-free New Zealand at NZ$9.32 billion (US$6.6 billion). That figure comes from off-setting the cost of damage to crops and timber caused by pests, while adding in an estimated boost to tourism from an enhanced natural environment.

Russell said the key to achieving such an ambitious goal is the development of new control techniques for invasive predators such as species-specific toxins, automated self-resetting traps and new fertility control agents.

But even then, researchers admitted that issues such as domestic pets remain a challenge and Key made no mention of how to handle domestic cats that go feral.

The researchers also say the biggest challenge will be the rats and mice in urban areas.

New Zealand has had success in eradicating up to 90% of pests on some small islands, but reaching 100% for the whole country – and staying there – is what Russell calls the equivalent to landing someone on Mars.

There is expected to be opposition from animal rights activists over a mass kill of the pest predators.

Dairy industry giant Fonterra says the government plan is a hugely significant goal, and one that the dairy industry shares.

Fonterra director of social responsibility Carolyn Mortland says a predator-free New Zealand would have significant benefits for New Zealand's environment as well as help with animal TB eradication."

TB and other diseases carried by possums and rats carry a high on-going cost to farmers, as well as to dairy companies investing in pest control for the protection of production facilities.

Mortland says New Zealand dairy companies have made a NZ$3-million (US$2.33 million) commitment over two years for investment in the Zero Invasive Predators (ZIP) research project.

ZIP's vision is to completely removing rats, stoats and possums from large areas of the mainland, and keep them out.

The funding includes a predator enclosure at Lincoln University that allows trials of new technology to more rapidly take pest-control concepts through to real world solutions.

Research is also underway on lowering the height of predator fences to that of a standard 1.1m farm fence, which has huge potential to exclude rats, possums and stoats from farms and dairy production sites.

"The ambitious goal set by government gives us real encouragement that these types of programs will get the ongoing support and partnership that is needed to deliver results," Mortland says.

Alan Harman

Don't Worry About Avoiding Temptation. As You Grow Older, It Will Avoid You.

By The Time A Man Is Wise Enough To Watch His Step, He's Too Old To Go Anywhere.

Monsanto … Cont. From Pg 92

Once completes, these will see these three giants control 59% of the world's patented seeds and 64% of all pesticides.

"Farm Bureau believes the Department of Justice should undertake a close review of the overall business climate that has encouraged these combinations, rather than evaluating them in isolation," Young says.

"Consumers must continue to have fair access to the best technologies and innovation."

The farmers say history is not in their favour.

A decade of mergers has still seen the share of farmer income consumed by seed costs continue to rise.

America's National Farmers Union condemned the merger,

"Consolidation of this magnitude cannot be the standard for agriculture, nor should we allow it to determine the landscape for our future," NFU president Roger Johnson says.

He says NFU members have been in Washington asking members of Congress to conduct hearings to review the staggering amount of pending merger deals in agriculture.

"We are pleased that – the Senate Judiciary Committee will be reviewing the alarming trend of consolidation in agriculture that has led to less competition, stifled innovation, higher prices and job loss in rural America," Johnson says.

"Concentration for us is not good in any form."

Bayer AG CEO Werner Baumann says Bayer will acquire Monsanto for US$128 a share in an all-cash transaction and take on Monsanto's nearly US$10 billion in debt.

Baumann says the combination of businesses will create a global leader in agriculture and give farmers increased access to innovation,

The acquisition is subject to closing conditions, including Monsanto shareholder approval of the merger and required regulatory approvals. Closing is expected by the end of 2017.

Monsanto chairman and chief executive Hugh Grant says the combination with Bayer brings together two different, but highly complementary businesses.

"The combined business will benefit from Monsanto's leadership in seeds and traits and climate corporation platform along with Bayer's broad crop protection product line across a comprehensive range of indications and crops in all key geographies.

"As a result, growers will benefit from a broad set of solutions to meet their current and future needs, including enhanced solutions in seeds and traits, digital agriculture, and crop protection," a joint announcement says.

Bayer Crop Science Division head Liam Condon says the agriculture industry is at the heart of one of the greatest challenges of our time – how to feed an additional three billion people in the world by 2050 in an environmentally sustainable way.

"We are entering a new era in agriculture – one with significant challenges that demand new, sustainable solutions and technologies to enable growers to produce more with less," Condon says. "This combination with Bayer will deliver just that – an innovation engine that pairs Bayer's crop protection portfolio with our world-class seeds and traits and digital agriculture tools to help growers overcome the obstacles of tomorrow."

The combined company will be well positioned to participate in the agricultural industry with significant long-term growth potential, he says.

Bayer expects the transaction to provide its shareholders with growth in core earnings per share in the first full year after closing and a double-digit percentage growth in the third full year.

The combined business will have its global seeds and traits and North American commercial headquarters in St. Louis, Missouri and its global crop protection and overall crop science headquarters in Monheim, Germany.

Bayer employs about 117,000 people and Monsanto more than 20,000 people.

Bayer CEO Werner Baumann (left) and Monsanto chairman and CEO Hugh Grant. (Bayer photo)

Alan Harman

CALENDAR

♦CONNECTICUT♦

Back Yard Beekeepers Association 2016 Speaker Schedule – November 17: Jennifer Tsuruda, Clemson Behavioral Resistance to *Varroa*.

Each month we have timely weekend hands on inspection workshops, bee school, mentor program and more. For dates and locations and more information please visit **www.backyardbeekeepers.com**.

♦IOWA♦

IA Honey Producers Association Conference will be held November 11-12 at Clarion Hotel and Convention Center in Cedar Rapids.

Speakers include Jim, Jennifer Berry, Charlotte Hubbarb, Andy Joseph and more.

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

♦LOUISIANA♦

Louisiana Beekeepers Association will hold their 55th Annual Convention December 2-3 at the Holiday Inn South, 9940 Airline Hwy, Baton Rouge. Rooms are $99/night. Call 225.924.7021 to make reservations. Please mention the LA Beekeepers Association.

Speakers include Sam Comfort, Marla Spivak and Sue Cobey. You can pre-register online starting November 1 at www.labeekeepers.org

For more information contact Joe Sanroma, 318.308.5000 or Jennifer Brown, 601.493.3447.

♦MARYLAND♦

Maryland State Beekeepers will hold their meeting November 12 at the MD State Department of Agriculture, Annapolis from 9:00 a.m. to 3:30 p.m..

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

♦NEW YORK♦

Empire State Honey Producers Association will be held November 4-5 at the Embassy Suites Hotel, Syracuse.

For information visit **eshpa.org**.

♦OHIO♦

OH State Beekeepers Association Fall Meeting, November 5 in Plain City.

Speakers include Jamie Ellis and Steve Repasky.

For information visit **www.OhioStateBeekeepers.org**.

The Mid Ohio Valley Beekeepers' Association in conjunction with the **WV Extension Services** will sponsor the 15th Honey Bee Expo on the campus of the WB University, Parkersburg, January 28, 2017. The cost is $20/person before January 13 or $25 at the door.

The keynote speaker will be Phil Craft.

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

♦TEXAS♦

Texas Beekeepers Association Annual Conference will be held November 3-5 at Bell County Expo Center, Belton.

Keynote speaker is Mike Palmer from Vermont speaking on Sustainable Apiary.

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

♦WISCONSIN♦

Wisconsin Honey Producers will hold their Fall Convention November 3-5 at Holiday Inn - Fond du Lac.

Keynote speakers include David Westervelt, Emily Brown and Rebecca Masterson.

Details can be found at **www.wihoney.org**.

December, 2016
Don't Miss The Interveiw Issue

Charlie Brandts, The White House Beekeeper, Washington DC
Sam Comfort, Migratory Beekeeper, NY and FL
Buzz & Nancy Riopelle, Beekeeper and Candle Maker, Ohio
Walter T. Kelley Company, An Expanded Beekeeping Supply Company, KY
Dr. Dave Tarpy, Honey Bee Researcher, NC State Univ., NC
Denzil and Sheila St. Claire, QueenRight Colonies, Beekeeping Supplies, OH
Randy Oliver, Commercial Beekeeper, Researcher and Author, CA
Jake Reisdorf, 14 Year Old Beekeeper and Entrepreneur, CA
Mark Bennett, Dadant Branch Manager, VA
Bear Kelley, Past President, GA State Beekeepers, GA
Tammy Horn, KY State Apiary Inspector, Author, KY

Phil Craft, Phil Knows Columnist and *Varroa* Consultant, KY
Kathleen Ireland, NOD Apiaries, Canada
Earl Hoffman, Strong Microbials, MI

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The bee business can keep you hopping, especially if you prefer to do things the hard way. My gal Marilyn says I need some time off. She insists. She declared, "For my birthday, I want you to take me to Cortez for an archaeological tour on the Ute Mountain Reservation, and I want you to take me to the hot springs in Pagosa." Right now, early September, she wants this, with moving bees out of the high country, honey removal and mite treatments all in full swing. We leave Thursday.

I do like the Indian stuff. Recently I got to go with a reporter friend and a Bureau of Land Management archaeologist to visit the Eagle Rock Shelter on the Gunnison River, here in Colorado. Pothunters looted it in the 1980s. They gave up right when they should have kept digging. The BLM looked around and got interested. Aided by college students, they painstakingly excavated the site with paint brushes and sand sifters. As they descended into the earth and back through time, they found 50 hearths and countess artifacts, including a 7,000-year-old woven yucca fiber basket. Finally they discovered evidence of Paleo hunter-gatherers. This is the only known stratified Paleo site in the world. It dates back nearly 13,000 years, and was occupied by Native Americans more or less continuously until the arrival of the pioneers.

Modern-day tribal elders call the shots when you're digging up their ancestors' stuff. Some finds at the Eagle Rock Shelter were so sacred as to be pronounced unmentionable. You turn these over to the Utes and don't talk about them. Those are the rules.

All this gives me that good creepy feeling, and reminds me there can be more to life than eking it out with too many honey bees and too many mites.

The current mantra is that beekeepers should "treat the yard" when managing *Varroa* mites. I understand this point of view, and it's an efficient way to manage mite populations. Naturally declining bee numbers in the late Summer and Fall, along with a geometrically expanding mite population, means an increased percentage of parasitized honey bees. Now the hive becomes susceptible to crippling viruses.

Mite numbers naturally double monthly. So a female mite in March could become by October a great great great great great grandmother with 128 descendants. But a colony with no mites in September could rob a hive crashing from mite overpopulation and the no-mite colony could itself become overwhelmed. Or bees drifting from a mite-riddled hive might bring along mites when these bees settle into a clean hive.

So the conventional wisdom says take no chances, and treat the entire apiary. Colonies with high mite numbers get the same treatment as hives with no mites. And we understand the reason. The mite pandemic is killing our little darlings and putting beekeepers out of business. Treating the yard works, until the mites adapt to whatever we throw at them. But it keeps us in the game, for now.

I don't like this way of dealing with mites, simply because some hives don't have mites. Look, I spend as much time sugar-shake sampling for mites as I do keeping bees. And mite numbers run all over the place. I recently tested two side-by side colonies of similar strength, on four way pallets. One had 25 mites in a 300-bee sample. The other, zero. Their hive entrances were two inches apart.

You hear about drift. Where was the drift here? And why was one hive capable of somehow resisting mites, and the other not?

I want these resistant hives in my operation. And I don't particularly want to bombard them with chemicals. I've found resistant hives, not treated them, and sent them to California to pollinate the almonds. Sometimes they return with mites, sometimes not. You never know. But this is a miracle, isn't it?

Do you want the truth? I'll give it to you. Mite Away Quick Strips don't work for me. If they work for you, congratulations. You must be doing something right. Ditto for Hopguard II. I do before and after tests with both of these products. That's how I know. Apiguard thymol gel works, although not as well as it used to. The most effective are the Apivar time-release amitraz strips. I can't find a mite after I use that stuff. I can't find any money in my bank account, either.

I recently completed a three-treatment oxalic acid dribble on 80 colonies with brood. Mite numbers were skyrocketing, and I felt overwhelmed. I treated all the hives in three yards. You really want to use oxalic acid when the colonies are brood-less, but you do what you have to. I needed a knockdown. I followed Randy Oliver's directions and recipe (Scientificbeekeeping.com), and the results came in mixed. In general, mite numbers declined dramatically, but at least one colony retained alarmingly high mite numbers. Maybe I didn't give them enough dribble.

So I'm of two minds about treating all my hives, or not. I know I have mites. Some yards just have them worse than others. I wish I could sample every hive, but I don't have unlimited time. Maybe I should quit sampling and give 'em all the hot foot. The experts say I should. Then I could kick back and enjoy my vacation.

Ed **Colby**

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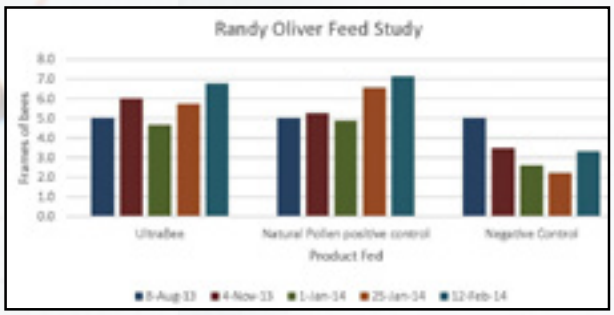

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