Jul 2013

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Features . . . Bee Culture . . . The Rest

Bees At Smith State

Finally, exciting and good things are happening at Smith State prison. I am an inmate at Smith. A little over a year ago I met a fellow inmate who previously raised bees, and we read an article in *Bee Culture* Magazine where the Florida Department of Corrections, with cooperation from the Florida Department of Agriculture, University of Florida and several other entities introduced a beekeeping program in the prison system. We discussed the article and thought it was a good idea, so we approached the warden here at Smith to start a similar program. It would be an OJT or reentry program to benefit the bee industry with experienced help, creating a new marketable job skill for released inmates looking for employment, as well as promoting beekeeping. But unlike the State of Florida's program we currently do not have the cooperation from Georgia Department of Agriculture. We also approached several universities as well as local apiaries for assistance to no avail, although we are hoping they will eventually come onboard to make this program a bigger success. With months of planning and putting a course curriculum together we received an ok to start a class.

In August we started with a package of bees. Things were going well and the hive grew fairly quickly, by December we had a story and a half hive and were looking forward to an early Spring split. January came and our facility was under lock down for the entire month with very limited movement and we were unable to attend to our bees. Mid-January came and we had a warm spell and the hive swarmed. A week later we experienced a hard freeze, and that was the end of our bees. A call was made to a local package seller and they told us that they had experienced similar swarming in their hives, and would be early March before any packages would be available. Mid-March came and the prison purchased another package. Using the old comb from the hive, by the first week in May we have already made our first split and installed a new super.

We have graduated one class so far, and our current class will be done soon. We have room for about 12-15 students and enough people have signed up for the next four classes. With one hive and a nuc we can't offer very much hands on as we would like, but as we grown things should get better. I am the co-instructor and have really enjoyed all the excitement and positive attitudes this program has made from both of staff and inmates alike.

There was a follow up article in my march issue of *American Bee Journal* about how well the program in Florida is going after a year. I am glad to see their program is doing so well. We have made a lot of progress in our program here at Smith State though there has been some growing pain and setbacks. If we had a little outside influence we would expect similar results as the State of Florida's program has achieved, and would be able to spread this program to other facilities. Knowing what this entire program has to offer and the positive impact it has on the inmates and staff alike, in fact of the staff have talked about attending the class.

As I have become more knowledgeable about beekeeping, I have been able to help my sister in Southwest Virginia, to raise bees. She has four hives, and is still a little nervous about going through them. She still lacks some confidence, but is doing a great job. If you know of any local bee clubs around Bristol-Abington, VA area that she might get in touch with, please let me know.

The articles in your magazine provide a lot of class room discussion, as well as keeping us updated to what going on in the industry. I will write again to give you an update as our program develops. Keep up the good work, the articles are great.

Stanley Austin
Glennville, GA

Disappearing Bees Demystified

I know one cause for death of millions of honey bees during

the almond tree pollination period (March) in California. I have witnessed hundreds of bees splattered on my windshield the past several years on heavily traveled Hwy 5 while passing through the miles of almond orchards thick with beehives on both sides of the freeway.

Hypothesis: 100 bees x 100 autos, trucks, motorhomes passing through the area each hour in one direction. 100 x100 x 2 = 20,000 bees per hour. Bees are busy at least six to eight hours/day.

The pollination period lasts at least 10 days. The traffic constant every day.

100 x 100 x 2 directions x 8 hrs/day x 10 days = 1,600,000 dead bees.

Jeryjak

Water Versus Smokers

Have you any historic articles on the merits of use of the above in terms of effectiveness?

I'm a great believer of using water sprayers as a novice beekeeper only entering my second year of keeping bees but what do USA beekeepers prefer to use to keep their bees in check?

Cath Proctor
England

Whose Bike??

This bike belongs to the swarm now.

Chris Koppelberger

Research Funds Request

Project Apis m. (PAm) has accomplished great strides in the six and one-half years of its existence. We have become *the* go-to organization at the interface of honey bees and pollinated crops. We are well-respected by scientists, government officials, beekeepers, agriculturists and related organizations. Some of the highlights of PAm's work have included:

- Sponsored 40 different projects infusing $ 2.4 M into bee research
- Bid successfully for and received over $ 1 M in grant funding
- Introduced technology from other fields into the bee world
- Accomplished considerable "firsts" for the bee industry, including:
  - o Awarded the first Specialty Crop Block Grant to a bee organization
  - o Developed the first comprehensive Best Management Practices program for commercial beekeepers
  - o Conducted the first-ever, in-depth look at pathogens in migratory beekeeping operations, discovering four new viruses
  - o Partnered in the first-ever, coordinated effort to improve CA border crossing by bee trucks
  - o Provided funding for the first-ever, cost-share program for full pesticide analyses of hive matrices

- o Developed the first comprehensive effort to improve honey bee forage resources

And we are not resting on our accomplishments. We are currently managing four different grants, producing two newsletters on a regular basis, are in production on several YouTube videos and presenting at stakeholder meetings. We are fully utilizing corporate funding to host a honey bee research conference, build a germplasm repository, initiate another Tech Transfer Team and sponsor a PhD fellowship for a honey bee scientist.

However, at this time we need an infusion of unrestricted funds to continue our comprehensive research program. We especially want to fund recent proposals received, including **Dr. Reed Johnson**'s Dimilin research ($134,640), **Maryann Frazier**'s pesticide cost share program ($15,000), **Dr. Brian Johnson**'s IVDS validation work ($34,755), **Dr. Jonathan Engelsma**'s Hive Scale Network ($22,140), and **Dr. David Tarpy**'s Nexcelom Vision System to process BIP samples ($29,480). These projects total $237,000.

We are requesting your help in circulating this letter so that we can obtain the needed funding for these projects. We have charted a strong course for Project Apis m's future. Please talk to your contacts about PAm and what PAm is doing for the honey bee industry.

Donations can be made to: **Project Apis m., P.O. Box 3157, Chico, CA 95927** or Online: www.ProjectApism.org; See "Donate Now" button.

Project Apis m is a 501 c(5) non-profit organization.

Thank you for your vision and your assistance in supporting PAm's efforts.

Sincerely yours,

Gordon Wardell
Christi Heintz
Chairman, Project Apis m. Executive Director, Project Apis m.

JULY – REGIONAL HONEY PRICE REPORT

How often, and how much do you take advantage of the information that's at your finger tips each season when it comes to planning the rest of the Summer, Fall harvest and wintering? If you're like most of us, not nearly enough. We're lucky if we can keep up with the day to day stuff, we don't keep good, or any records, and what we did last week is as much of a mystery as what we're going to do next week. Life is hectic and we tend to deal with emergencies rather than prepare for what's next.

Well, let's look at the some of the future right here this month. We didn't survey our reporters to see what they are doing or what they are going to do, but looked at a bigger picture. Last year the rain Gods didn't smile in most places and farmers and beekeepers paid the price. Although some blame the drought on the heavier than last year's winter losses rather than on our bee's exposure to the poisons and pests of the world, dry conditions did play some role in honey bee health last season.

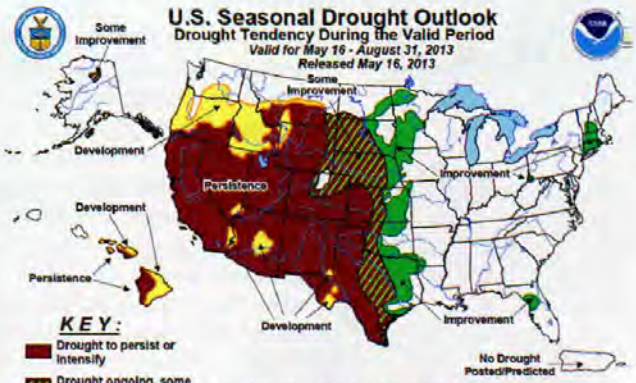
Primarily, there wasn't as much nectar available because there weren't as many plants available very early, and very late in the season. But the difference wasn't as huge as some would lead you to believe. On a national scale last season, colonies averaged 56+ pounds each, which is about 10% less than the average over the last 5 years which is 62 pounds/colony.

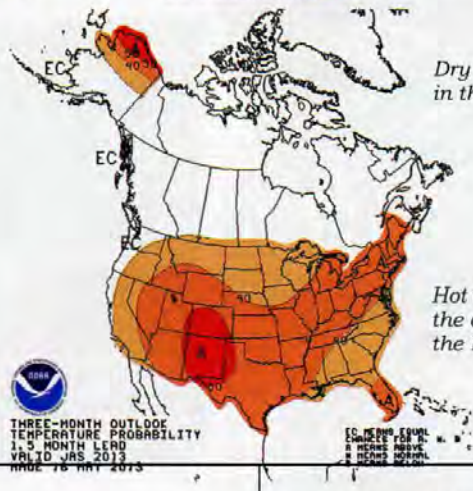
So given that dry means a problem, what can you do? Look at the drought monitor map for the next several months. The west is going to be dry, very dry. Just like last year, and a second year in a row means additional stress on those plants. But the northern border looks pretty good, as does all of the east, even west of the Mississippi. So what about temperatures? That map, too gives a good picture of what to expect. Hot in the southwest and northwest, and actually, mostly warmer than average all over. With enough moisture lots of heat is good – nectar wise.

Any extreme can be a problem. Being ready for it helps. So what happens to honey production this year? Is 56 pounds about right? More? Less?

What all this comes to is…what will the honey market be come October? Let's see. Average to short crops in South America, Europe is taking most of China's honey, not much honey is being transshipped right not because of the scrutiny on imports, Canada and Mexico average probably looking at the maps, and everybody else, even if they have a good crop – Vietnam, India and the rest . . .

Our prediction is that there is going to be a moderate global shortage of light to amber honey this year, and the prices, no longer set by cheap imports, will hit nearly $3/lb bulk. More for some of the varietals, and extra light. Let's see what happens.





Dry in the west, OK in the east.

Hot in the SW, warn in the center, average in the NW, SW and SE.

REPORTING REGIONS

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.97	2.25	1.97	1.78	2.00	2.00	2.11	2.10	1.80	2.00	2.00	2.10	1.60-2.25	2.02	1.97	1.76
55 Gal. Drum, Ambr	1.88	2.00	1.88	1.74	2.00	1.81	2.04	2.00	1.60	1.90	1.88	2.00	1.58-2.15	1.90	1.86	1.64
60# Light (retail)	192.50	190.00	155.00	157.75	160.00	164.00	174.00	165.00	185.91	208.50	172.50	208.33	135.00-255.00	176.81	182.19	157.26
60# Amber (retail)	181.67	185.00	155.00	165.00	160.00	157.00	163.60	165.00	145.00	255.00	159.00	185.00	120.00-255.00	169.00	169.47	150.78
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	78.77	70.23	50.40	69.20	69.93	53.75	52.28	69.93	69.93	57.60	75.34	85.65	43.20-100.80	67.86	69.42	61.86
1# 24/case	118.98	112.34	106.40	86.20	120.00	107.57	87.33	96.80	84.00	99.60	103.92	120.00	76.80-158.40	106.21	105.55	101.58
2# 12/case	111.49	92.01	82.50	78.00	87.00	90.57	86.65	99.00	69.50	93.96	112.50	104.18	63.60-144.00	95.01	93.76	83.89
12.oz. Plas. 24/cs	102.45	86.78	69.95	76.80	72.00	80.00	69.08	81.60	72.00	77.04	88.08	88.12	60.00-124.80	81.54	80.77	75.59
5# 6/case	126.16	108.99	100.50	85.57	102.00	92.48	91.75	97.05	81.00	95.70	111.25	131.61	64.95-168.00	105.22	103.81	90.49
Quarts 12/case	149.00	171.94	131.59	113.20	108.00	106.93	126.48	107.20	108.00	116.12	114.20	123.50	72.00-215.00	119.68	122.38	121.60
Pints 12/case	97.33	89.48	96.00	77.50	72.00	65.88	77.36	61.20	52.00	78.66	73.20	82.00	48.00-115.00	75.83	74.91	74.54
RETAIL SHELF PRICES																
1/2#	4.72	4.67	3.47	3.71	4.22	4.32	3.07	2.59	4.22	3.63	3.83	5.12	2.19-6.75	3.96	3.79	3.71
12 oz. Plastic	5.91	5.09	4.06	4.27	4.50	4.75	3.89	4.60	4.59	4.83	5.28	6.82	2.99-9.99	4.88	4.78	4.47
1# Glass/Plastic	6.68	6.14	6.18	5.42	6.75	6.45	4.80	5.71	5.99	6.09	6.10	8.08	3.00-11.99	6.13	5.98	5.92
2# Glass/Plastic	12.09	10.03	11.16	9.25	10.95	9.80	8.85	9.66	8.50	10.27	9.09	11.10	5.49-15.50	10.16	9.68	9.38
Pint	8.83	8.98	10.00	6.99	7.25	7.17	8.71	7.65	5.00	7.92	7.43	12.17	4.00-20.99	8.07	8.34	4.78
Quart	15.44	15.65	13.50	12.14	11.50	12.10	13.19	13.37	9.00	14.31	11.77	16.00	6.75-22.00	13.15	13.42	12.58
5# Glass/Plastic	26.90	18.89	23.56	21.65	24.00	25.49	19.29	22.00	21.00	21.20	20.71	23.00	13.99-35.00	21.84	21.41	21.73
1# Cream	8.70	7.30	8.10	6.33	7.55	5.50	5.55	5.99	7.55	7.56	8.13	9.25	3.77-12.00	7.22	7.27	6.52
1# Cut Comb	9.75	8.32	8.60	5.75	9.01	6.55	6.81	11.25	9.01	9.50	9.50	11.63	3.00-16.00	8.52	8.57	7.84
Ross Round	9.60	7.95	8.19	6.00	7.73	7.00	6.00	10.00	7.73	6.00	9.00	7.20	3.00-12.00	7.97	8.55	7.32
Wholesale Wax (Lt)	6.92	5.48	4.92	4.40	3.00	4.03	5.05	6.67	6.00	6.00	3.68	5.19	2.50-10.00	5.12	5.00	3.43
Wholesale Wax (Dk)	5.50	5.23	4.38	3.99	3.00	4.01	4.56	6.50	4.71	4.71	2.60	4.13	2.00-8.00	4.43	4.50	2.76
Pollination Fee/Col.	86.00	125.00	83.33	61.17	80.00	60.25	56.33	85.00	90.89	90.89	90.00	107.22	35.00-170.00	79.29	76.47	75.11

INNER COVER

The future has been on my mind lately. At least more than normal. I tend to try and look ahead – watch for and avoid things that will make life less interesting, secure, or predictable and head toward those that will make me rich, handsome or famous (I'd settle for even one, but all three would be OK, too). Too often we get bogged down in the right-now and don't see what's going to happen in a few minutes, hours or days – whether good or bad. Our brains can only hold so much data and some just doesn't get processed.

But I was thinking about the future recently as I was preparing a talk for The Ohio State Beekeeper's Meeting in early June. I was asked if I could give two talks about something that's relevant to the times, and to the group out front. Often the person doing the asking is less interested in the topic – anything you think is important is often the answer when I ask – than making sure that indeed I will attend, I really will give two presentations and I'd like the turkey for lunch. I've been in that position and I know the pressure to make and fill a program with speakers, moderators, food, vendors, registration, hives to move, tables to set up, lunch to order, parking, signs, the auction, breaks, AV equipment, nametags...with all that, the exact topic for each of a host of speakers is almost never critical. And, says the Board, do it all within a budget, on time. Every time. If you've been involved in planning meetings you know exactly what I'm talking about. If you haven't, you came, had a good time with friends, enjoyed the program, the lunch and the vendors and called it a day. Somebody else busted butt to get it right before it started, really busted it during the meeting to make sure the little things got taken care of before they became big things, and stayed late cleaning and sorting and packing and putting it back the way it was.

So when asked what I thought might be a timely topic, my very first thought was something to do with Honey Bee Nutrition. This little item is always on the list of causes for why our bees are disappearing at alarming rates. Some put it near the top, some in the middle and some down at the bottom of why our bees are dying. That nearly everybody puts it on the list is interesting, and that few if any symptoms from 'nutrition' are ever listed is also interesting.

The catch phrase always seems to be "well, poor nutrition didn't help." Duh.

Enough good food all the time is one of my 25 Rules for Modern Beekeeping I've put together for another book I'm working on so it's a natural for me to be interested.

So I organized that talk – it's a Meat and Potatoes talk really – a honey bee's meat and potatoes that is, and what they need, how much they need, where they get it, what they do with it and how you can make sure they get enough of it at the right time in the right place in the right amount. Pollen, nectar and water. It's pretty simple when you get down to it. Not much different than what you and I go through on a daily basis.

But honey bee nutrition is an issue. There's less for bees to eat, well, less good food for bees to eat any more, and what is good, isn't around long enough to provide season long dining. 97.3 million acres of corn and 77.1 million acres of soybeans will be out there this year – that's 174.4 million acres of just two crops bees can't much use. (think of every square inch of California and Nevada, combined, or New York, Missouri, Illinois, Iowa and Indiana, combined – no water, roads, cities, farms, golf courses or lawns). And though wet springs in some places and dry summers in others have changed the ratios of these two just a bit...about 175 million acres of land isn't going to be food for bees this summer.

Add in parking lots, roads, parks, golf courses, developments, cities and towns and more farm crops bees don't use (think wheat and oats and barley and potatoes and rice, to name a few), shopping malls, and the rest of people things (all that's a piece of land about the size of Texas) and there is less and less every summer for our bees to eat.

Take a look at the page our monthly honey report is on this time. It's not our usual survey, but a crystal ball look into the future. What's it going to do this year? In the west, a second year of drought. Bad news for those who bring bees to almonds. There ain't nothin' there at all is what they are telling me now . . . so there won't be anything there at all in October when the Midwest folks begin arriving. Nothing to eat. Nothing at all. The people who saw that last year predicted very correctly that it was going to be a tough year last year, too. Déjà vu all over again.

And land is being chewed up faster than we can find beeyards absolutely anywhere anymore, turning everything there is into corn...corn for cows, corn for ethanol, corn for chickens and pigs and corn oil and money. Corn for Money.

There's a proverb, and I'm not quite sure who to credit it to – some say it's from a Native American saying, others give GreenPeace credit – it goes like this . . .

When the last tree's been cut, the last fish caught, the last river poisoned, only then will we realize that one cannot eat money.

I've modified it a bit and hung it on the wall in my office, and you can still credit that wise Native American . . .

When the last tree's been cut and the last pasture paved, you're gonna find you can't eat your money.

And that got me to thinking of a poem – I do this when it's late and I'm tired and want a shot of energy – for me, Mozart and good Poetry are better than even the strongest coffee after

It's Keepin' On Livin' That's Hard

midnight – I recalled a poem by Robert Service. You may remember one of his better known works, though he was both popular and prolific in his day, entitled *The Cremation Of Sam McGee*. You probably read that way back in school.

But he did a story about someone who was on the brink...about to quit, about to lose, about to give up. It's called the Quitter if you want to look it up, but it's the last stanza that keeps me going every once in awhile . . .

It's easy to cry that you're beaten – and die;
It's easy to crawfish and crawl;
But to fight and to fight when hope's out of sight –
Why that's the best game of them all!
And though you come out of each gruelling bout,
All broken and battered and scarred,
Just have one more try – it's dead easy to die,
It's the keeping-on-living that's hard.

Robert Service, 1912

So what does this mean, really? I don't know for sure. It's going to be another tough year. Not enough good food, too many places where poison dwells, prices to feed through the roof, too hot, too dry, not enough good help, no safe place to go, and nothing to eat when you get there. Regulators around every corner, congress taking way, way more than it gives back, and the bees just keep on dying no matter what, no matter where. Sometimes it seems that hope's out of sight.

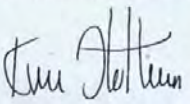
But the price of honey should go up, will go up this year - if there's any to sell, and pollination is going to get very, very expensive for those who grow things that need bees. And even if we get more land for more food (and good folks are working hard on that right now), it won't be quite enough yet, and most likely it'll be five states away, anyway.

So the bigger question, the far more important question is...is there anybody out there, still going after that last tree is cut, when we're all broken and beaten and scarred, is there anybody out there to carry it on – the next generation, the follow-in-our-footsteps folks?

Who will you hand off your hive tool to? Who's there to take the beekeeping baton in this long, long race? Who's gonna drive the lift, tote the bale, mix the syrup and clean the covers?

And this is where we too often don't look too far ahead. We...the beekeeping industry we...should be looking for those who will follow. We should be training them, teaching them, helping them, getting them ready for the long haul, the tough fight, the hard work, the sweet rewards of being the Keeping-On-Living beekeepers.

If we don't, who will? Who can?



It's Summers Time —

It's Finally Summer!

I mentioned last month that Summer was finally here. Well, it's been a real roller-coaster this Spring. This week we had nights that dipped down into the low 40s and highs barely making it into the mid-60s. We've also had some days of almost 90. Some of us get a little whiny when we have these extreme weather conditions.

Our neighbor, Quentin did get the garden plowed up for us and we've even expanded it by three or four feet in width. So far we've planted 31 tomato plants and should be able to get the rest done this weekend – squash (several kinds), cucumbers, peppers, some chard this year (haven't tried that before) and lettuce. Hopefully, tonight one more pass through the garden with the small tiller and it will be ready for the weekend planting.

We bought a riding lawn mower about a month ago, with a wagon to pull behind. Well, it's been an adventure. I used it for two days just hauling wood and yard waste to the back of the property to the burn pile. Wow, this is great. So much easier than dragging the wheelbarrow to the back by hand. I loved it. Then the third day, I'm ready to start the mowing – about two acres, shouldn't be too bad. The mower won't start – dead battery. So Saturday off to the tractor store where we bought it and wouldn't you know the customer service guy is a beekeeper and recognized Kim. So after talking bees for about 20 minutes we left the battery with him and left for the first Saturday of the new season for our Farmer's Market.

Medina has a town square with a gazebo which is pretty common in this part of the country. Not something I was used to growing up in Texas and California. But it gives a real home town community feel to our city. That's where the Farmer's Market is held each Saturday June through the end of September. It has grown quite nicely over the last few years and is now a very respectable market.

After our somewhat typical Spring Saturday of shopping, visiting a couple of nurseries, stopping for lunch – we headed home. The guy from the tractor place had brought a replacement battery and we were back in business. So I mowed a bit more that day and then back to it on Sunday afternoon. I didn't get it all done, but that was OK. I'm not a competitive mower. You know these people, you may be one yourself, but not me. I get to it when I get to it. I enjoy the activity. It's one of those somewhat mindless tasks that lets you think about all kinds of things and come up with some good solutions. It's not that I avoid mowing, it's just that other things get in the way. So with work, weather and a bee meeting this past Saturday, parts of the yard were getting pretty tall. OK, time to get back to it. So Sunday afternoon, out to the garage, ready to crank her up and there's a flat tire. Can you believe it?

When Kim went to pick up the newly repaired tire he asked what had happened. The service rep asked him if we have Osage Orange trees or Black Locust in our yard. Yep, you guessed it. We have several of each. It's going to be a long thorny Summer. The service rep at the tire repair center was smiling as Kim walked out and said I'll see you soon. So now I'm picking up sticks with much more diligence than before.

If you've been reading *Bee Culture* for very long, or if you've had many conversations with Kim, you know about Quentin, our wonderful neighbor who has been mowing our lawn for probably 20 years, long before I moved in. Well Quentin is turning 91 in August and yes he still mows his lawn – actually several acres. And he's already mowed our yard – two acres – a couple of times this year. But we decided it was time for us to grow up and give Quentin a bit of rest and start mowing our own yard.

The chickens are happy that Summer has arrived. We did have to add height to the fence around the pen because several of them were becoming airborn more frequently and landing outside the pen. It's rather funny to watch. When you open the coop door in the morning they are so excited to get outside that there is all manner of flapping and hopping and jumping and this is when they would end up outside the pen. The hen outside the pen frantically runs back and forth trying to figure out how she ended up out there all alone and the rest of them run back and forth along side her in the pen with a look that says "sorry we can't help." They are very comical. And so tame that when I go out to rescue the one outside she just sits down and waits for me to pick her up and put her back in.

We did let them out in the yard one day when we were going to be outside and they didn't wonder too far away. I was easily able to 'herd' them back toward the pen when they headed for the neighbor's yard. I know some chickens are totally free range and run free, but we have so many predators around that it concerns me. We now have a family of foxes living back in the woods – and raccoons and several neighbor dogs that sometimes get loose.

Until next time, I hope you are having a wonderful Summer. Maybe we'll see you at one of the big meetings coming up. If you haven't made plans yet to attend either HAS in July in Tennessee or EAS in Philly in August, google them and take a look at their programs. And don't forget WAS in October in Santa Fe, NM. I can't wait for that one.

Kathy Summers

New For The Summer –

More Than Honey. A documentary film produced by Markus Imhoof, distributed by Kino Lorber. 90 minutes. Showing in many places. Look for times and places at **www.morethanhoneyfilm.com**.

Basically, this is a side by side comparison of beekeeping on an industrial scale, personified by John Miller, North Dakota and California and honey pollination business, and a small scale beekeeper in Switzerland. The differences are far reaching and dramatic. And the reason for the film is that bees are in trouble. But, to the creators credit, there seems to be no villain here, not pesticides, cell phones, Varroa or monoculture agriculture. There's some unique footage of von Frisch, bee houses, the hand pollination done in China, some interesting bee research going on in Europe, and the almond industry. But basically, it's just the story of what is in these two worlds of bees. The photography is spectacular, and the back and forth between these two very different, but very similar worlds is spellbinding. Look for a showing near you, or distribution purchases can be made from the web page.

A Bee's Guide To Managing Beekeepers. Peter Sieling. ISBN 9781481871877. 6" x 9", 127 pages. Available from the authors webpage **www.makingbeehives.com** for $13.99.

Peter has been making contributions to this magazine for decades, and every one of them is perfect. They are short, humorous and insightful. I always enjoy his work, and only wish I could get more of it. He is also a skilled woodsmith, and has made many contributions on how to make beekeeping equipment – his is one of the many books on the subject out this year – he has also made contributions to some of the books I've published. He is very good. So is this book. there's 26 different short stories here, most from our magazine but some from other places. It's an easy book to read and enjoy for beekeepers, and those who know beekeepers. And should be for those that don't know beekeepers.

Build Your Own Beekeeping Equipment. Tony Pisano. Published by Storey Publishing.ISBN 978-1-61212-059-1. 8.5" x 11". B & W, with color insert. 160 pages. $19.95 in book stores.

This seems to be the year for build it yourself beekeeping books. This is the fourth I think we've seen

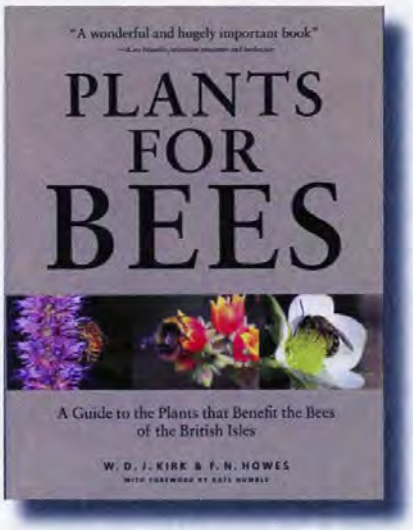
They are all good, inclusive of all the equipment you'll need, and reasonably priced. This is no exception. The mechanical artwork is easy to follow...I might even be able to do some of this...and the drawings are clear and concise. Equipment includes 10 and eight frame standards, top bar hives, feeders, swarm catchers, jigs, obs hives and hive stands. Everything but frames. But why people are still putting together frames is beyond me anyway. If you make equipment, this is another resource you will want.

Queen Bee: Biology, Rearing and Breeding. David Woodward. ISBN 978-1-904846-35-2. 136 pgs. Color throughout. 6.5" x 9.5". $29.95 from *Bee Culture's* Book Store.

Dr. Woodward has been raising queens in New Zealand and Australia for decades, and has a good handle on the biology and techniques of this craft...both the science and the art of making good queens.

Chapters include good information on Queen biology, Rearing, which goes into depth on equipment, grafting, without grafting, moving and banking, using nuc colonies, nutrition, and especially the chapter on Breeding. This includes the genetics, stock selection programs, instrumental insemination and a great glossary and bibliography.

There's everything here a beekeeper needs to set up and maintain a queen production program, whether 1 or 1000 queens. Everything from record keeping, drone production, feeding, anatomy and more. If you are now raising queens, or are going to start, this is definitely one of the books that should be on you shelf.



Plants For Bees. Edited by W. D. J. Kirk & F. N. Howes. ISBN 978-0-86098 271-5. Published by IBRA. 8" x 10". 311 pages. Color throughout. $49.95 from *Bee Culture's* Book Store.

Written by several authors, all from the UK, this book is one of the best we've found when it comes to describing those plants that benefit all kinds of bees. Chapters include Why Bees Need Help, Plants for Honey Bees, Plants For Bumblebees, Plants For Solitary Bees, and The Best Plants For bees. Each plant listed includes botanical identification, when it flowers, how to grow it or what it needs to grow, is it good for what kind of bees, photos of the plant and even a photo of the pollen. Hundreds of photos make this an excellent book and the information is enormous. Although written by authors from the UK, the information is almost universal, especially the information on the plants. But equally important are the photos and ID of the solitary and bumblebees. This is a useful, beautiful and necessary addition to the references we have on improving the nutrition of our bees.

We reviewed this book some months ago, but wanted to review it again because it is so very useful, and, of course, because now it's available in *Bee Culture's* Book Store.

Heat Holders. The Ultimate Thermal Sock. You may think the timing is weird, but cold feet in October are no fun, and by the time you act on this that's what it will be. Perfect with a pair of Wellies for Fall and early Winter outdoor work. As far as is known and has ever been tested Heat Holders® are the warmest socks ever! They are over 7x warmer than regular cotton socks and 3x warmer than ordinary thermal socks. They are better than heated, electric or battery operated socks because you can just put them on without fussing with batteries, wires etc. Heat Holders® means No more cold feet! Heat Holders are currently retailing from $15.99 for adults and from $11.99 for children's. Heat Holders also have a range of Ski Socks and Wellington Boot Socks! Check out the website **www.heatholders.com**.

A Closer LOOk

BROOD NEST TEMPERATURE REGULATION

Clarence **Collison**
Audrey **Sheridan**

Heating and cooling in a honey bee colony.

In honey bee colonies, brood temperature is controlled precisely within a temperature range of 33-36°C (91.4-96.8°F) (Seeley 1985) even when ambient temperatures reach extremes (Southwick 1987). High ambient temperatures are counteracted by wing fanning and water intake for evaporative cooling (Hazelhoff 1954). At low ambient temperatures, the bees crowd in the brood area (Kronenberg and Heller 1982; Harrison 1987) and produce heat by vibrating their thoracic muscles without moving their wings (Esch et al. 1991; Heinrich and Esch 1994).

While eggs and larvae (in open brood cells) can tolerate lower temperatures for some time, the pupae (in sealed brood cells) are very sensitive to cooling. If they remain too long below 32°C there is a high incidence of shriveled wings and legs, and malformations of the abdomen and adults may suffer from neural and behavioral insufficiencies (Tautz et al. 2003; Groh et al. 2004; Jones et al. 2005; Becher et al. 2009). Accordingly, the accuracy of thermoregulation is high in the presence of brood (Bujok et al. 2002; Kleinhenz et al. 2003) and much more variable and generally lower in broodless colonies (Fahrenholz et al. 1992; Ritter 1982).

Honey bee larvae and pupae are extremely, stenothermic, i.e. they strongly depend on accurate regulation of brood nest temperature for proper development (33-36°C). Stabentheiner et al. (2010) studied the mechanisms of social thermoregulation of colonies under changing environmental temperatures concerning the contribution of individuals to colony temperature homeostasis (maintain a condition of equilibrium or stability). Beside moving within the brood nest, the main active process is "endothermy on demand" of adults. An increase of cold stress (cooling of the colony) increases the intensity of heat production with thoracic flight muscles and the number of endothermic individuals, especially in the brood nest. As endothermy means hard work for bees, this eases much burden of nestmates which can stay ectothermic. Concerning the active reaction to cold stress by endothermy, age polyethism (division of labor) is reduced to only two physiologically predetermined task divisions, 0 to ~ 2 days and older. Endothermic heat production is the job of bees older than about two days. They are all similarly engaged in active heat production both in intensity and frequency. Their active heat production has an important reinforcement effect on passive heat production of the many ectothermic bees and of the brood. Ectothermy is most frequent in young bees (<~ 2 days) both outside and inside of brood nest cells. Stabentheiner et al. (2010) suggested that young bees visit warm brood nest cells not only to clean them but also to speed up flight muscle development for proper endothermy and foraging later in their life. Young bees inside brood nest cells mostly receive heat from the surrounding cell wall during cold stress, whereas older bees predominantly transfer heat from the thorax to the cell wall. Endothermic bees regulate brood comb temperature more accurately than local air temperature. They apply the heat as close to the brood as possible: workers heating cells from within have a higher probability of en-

Endothermic heat production is the job of bees older than about two days.

Worker bees contribute to the regulation of brood nest temperature by producing heat while sitting motionless on the caps of brood cells.

dothermy than those on the comb surface. Thermal homeostasis is achieved by a combination of active and passive processes. The different individual endothermic and behavioral reactions together add up to an integrated action of the honey bee colony as a superorganism.

Harrison (1987) found that most bees in a colony contribute to colonial heating in that they maintain a thorax temperature above local ambient temperature. However, not all bees contribute equally, and variation of up to 12°C (53.6°F) among individuals can be found. Workers have been identified that specialize in the activity of brood nest warming. Such bees sit motionless on the surface of brood cells while maintaining a thoracic temperature above 35°C (95°) with intermittent warming and cooling and without performing any other work during this time.

Kleinhenz et al. (2003) investigated brood nest thermoregulation at the level of individual worker behavior and the transfer of heat from workers to the brood. Worker bees contribute to the regulation of brood nest temperature by producing heat while sitting motionless on the caps of brood cells. A new heating strategy was also observed where heating bees enter empty cells between sealed brood cells and remain there motionless for periods of up to 45 minutes.

Individually marked worker bees on the surface of sealed brood cells maintained thorax temperatures between 32.2 and 38.1°C (90.0-100.6°F) with alternating warming and cooling periods. Most of the observed bees made one or several long-duration visits (>2 minutes) to empty cells within the sealed brood area. Thoracic temperature at the time bees entered a cell was 34.1-42.5°C (93.4-108.5°F). In 83% of these cell visits, thoracic temperature was higher (up to 5.95°C; mean 2.5°C) than the mean thoracic temperature of the same bee. High thoracic temperature values resulted from preceding heating activity on the comb surface and from warm-ups just prior to cell visits during which thoracic temperature increased by up to 9.6°C (Kleinhenz et al. 2003).

Bees inside empty cells had mean thoracic temperature values of 32.7°C (resting bees) to 40.6°C (heat-producing bees) during long-duration cell visits without performing any visible work. Heating behavior inside cells resembles heating behavior on the brood cap surface in that the bees appear to be inactive, but repeated warmings and coolings occur and thoracic temperature does not fall below the optimum brood temperature. Bees staying still inside empty cells for several minutes have previously been considered to be 'resting bees'. Kleinhenz et al. (2003), however, found that the heating bees can be distinguished from the resting bees not only by their higher body temperatures but also by the continuous, rapid respiratory movements of their abdomens. By contrast, abdominal pumping movements in resting bees are discontinuous and interrupted by long pauses.

Heat transfer to the brood from individual bees on the comb surface and from bees inside empty cells was simulated under controlled conditions. Heating on the comb surface causes a strong superficial warming of the brood cap by up to 3°C within 30 minutes. Heat transfer is 1.9-2.6 times more efficient when the thorax is in touch with the brood cap than when it is not. Heating inside empty cells raises the brood temperature of adjacent cells by up to 2.5°C within 30 minutes. Heat flow through the comb was detectable up to three brood cells away from the heated thorax (Kleinhenz et al. 2003).

To investigate the possible consequences of brood-temperature regulation in honey bee colonies on the quality of behavioral performance of adults, Tautz et al. (2003) placed honey bee pupae in incubators and allowed them to develop at temperatures held constant at 32°C, 34.5°C and 36°C. This temperature range occurs naturally within hives. On emergence, the young adult bees were marked and introduced into foster colonies housed in normal and observation hives and allowed to live out their lives. No obvious difference in within-hive behavior was noted between the temperature-treated bees and the foster-colony bees. However, when the temperature-treated bees became foragers and were trained to visit a feeder 200 meters from the hive, they exhibited clear differences in dance performance that could be correlated with the temperatures at which they had been raised: bees raised at 32°C completed approximately only 20% of the dance circuits when compared with bees of the higher-temperature group. Also, the variance in the duration of the waggle phase is larger in 32°C raised bees compared with 36°C raised bees. All other parameters compared across all groups were not significantly different. One-trial learning and memory consolidation in the bees raised at different temperatures was investigated one and 10 minutes after conditioning the proboscis-extension reflex. Bees raised at 36°C performed as expected for bees typically classified as "good learners." Whereas bees reared at 32°C and 34.5°C performed significantly less well. They proposed that the temperature at which pupae are raised will influence their behavioral performance as adults and determine the tasks they carry out best inside and outside the hive.

Brood nest temperatures in genetically diverse colonies (i.e. those sired by several drones) tend to be more stable than in genetically uniform colonies (i.e. those sired by one drone). One reason this increased stability arises is because genetically determined diversity in workers' temperature response thresholds modulates the hive-ventilating behavior of individual workers, preventing excessive colony-level responses to temperature fluctuations (Jones et al. 2004).

The temperature at the center, the periphery and the entrance of a colony was continuously determined during the Summer season and the broodless time in Winter (Fahrenholz et al. 1989). During the summer season the temperature in the brood nest averages 35.5°C with brief increases up to 37.0°C and down to 33.8°C. Increasing environmental temperatures resulted in linear increases in the temperature of the hive entrance, its periphery and its center. The temperature in the center of an overwintering cluster is maintained at an average value of 21.3°C (min

12.0°C, max 33.5°C). With rising ambient temperatures the central temperature of a Winter cluster drops whereas the peripheral temperature increases slightly. With decreasing external temperatures the peripheral temperature is lowered by a small amount while the cluster's center temperature is raised.

Microcalorimetric determinations of the heat production were performed on the three castes of the honey bee: workers, drones and queens of different ages (Fahrenholz et al. 1992). Among these groups single adult workers showed the highest heat production rates (209 $mW \cdot g^{-1}$) with only negligible fluctuations in the heat production rate. Juvenile workers exhibited a mean heat production rate of 142 $mW \cdot g^{-1}$. The rate of heat production of adult workers is strongly dependent upon the number of bees together in a group. With more than 10 individuals weight-specific heat dissipation remains constant with increasing group sizes at a level approximately 1/17 that of an isolated bee. Differences are seen between the rates of virgin (117 $mW \cdot g^{-1}$) and laying (102 $mW \cdot g^{-1}$) queens. Laying queens showed less thermal fluctuations than virgin queens. High fluctuations in heat production rates are observed for drones. In both groups (fertile, juvenile) phases of high and extremely low activity succeed one another. The heat production of juvenile drones was 68 $mW \cdot g^{-1}$, that of fertile drones 184 $mW \cdot g^{-1}$ due to stronger locomotor activities.

Medrzycki et al. (2010) investigated whether a decrease of brood rearing temperature may have effects on larval mortality, adult emergence, longevity, morphology and susceptibility to poisoning by pesticides (dimethoate). Honey bee larvae were reared in vitro at 35°C (optimal) and 33°C (suboptimal) from 12 h after hatching for 15 days. Dimethoate was tested by ingestion either on four-day old larvae or on 7-day old adults. The lower rearing temperature had no significant effects on larval mortality and adult emergence, but adult bee mortality was strongly affected. Moreover, adult workers emerging at 33°C were significantly more susceptible to dimethoate. Larval LD_{50} (48 h) was, however, 28 times higher at 33°C than at 35°C. The striking differences between larvae and adults may be explained by differential larval metabolism at 33°C and resulting slower pesticide active ingredient absorption. They concluded that adult honey bees reared at even slightly suboptimal brood temperature may be more susceptible to pesticide poisoning and be characterized by reduced longevity. Thus, low temperature brood rearing could be another stress factor for colonies. BC

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Managed Pollinator CAP
Coordinated Agricultural Project

eXtension Bee Health

John **Skinner**

Research Based Information About Bees And Beekeeping . . . At Your Fingertips

Background and History – What is the Extension Service?

The Morrill Acts of 1862 and 1890 established land-grant universities to educate citizens in agriculture, home economics, mechanical arts, and other practical professions. Cooperative Extension was formalized in 1914, with the Smith-Lever Act (link to that topic in About Us). It established the partnership between the agricultural colleges and the U.S. Department of Agriculture to provide for cooperative agricultural extension work. At the heart of agricultural extension work were the following:

- Developing applied applications of research knowledge.
- Giving training and practical demonstrations of existing or improved practices.
- 4-H Youth Development – cultivates important life skills in youth that build character and assist them in making appropriate life and career choices.
- Agriculture – research and educational programs help individuals learn new ways to produce income through alternative enterprises, improved marketing strategies, and management skills.
- Leadership Development – trains extension professionals and volunteers to deliver programs in gardening, health and safety, family and consumer issues, and 4-H.
- Natural Resources – teaches landowners and homeowners how to use natural resources wisely and protect the environment.
- Family and Consumer Sciences – helps families become resilient and healthy by teaching nutrition, food preparation skills, positive child care, family communication, financial management, and health care strategies.
- Community and Economic Development – helps local governments investigate and create viable options for economic and community development.

Regardless of the program, extension expertise meets public needs at the local level. Although the number of local extension offices has declined, and some county offices have consolidated into regional extension centers, there remain approximately 2,900 extension offices nationwide. Increasingly, extension serves a growing, increasingly diverse constituency with fewer and fewer resources.

eXtension – What is this and What is it good for?

In the late 1990s the Extension Service knew it had to improve delivery methods to utilize new electronic technology, therefore, the decision was made to formulate eXtension (pronounced E –extension). After making concept and business plans, a team of network experts produced a prototype in 2005 and after testing launched the full system in 2007.

eXtension is an Internet-based educational network providing 24/7/365 access to objective, science-based information from land-grant universities and partners nationwide. It is an integral part of and complements the community-based Cooperative Extension System and may be accessed via any Internet-ready device.

eXtension partners with faculty, educators and researchers across all of Cooperative Extension to do the work of bringing the information, knowledge and problem solving of this vast network to the public via the Internet.

eXtension – *America's Research-based Learning Network*™ – is using the Internet to teach, inform and inspire a large and diverse audience. According to the Pew Research Internet and American Life Project:

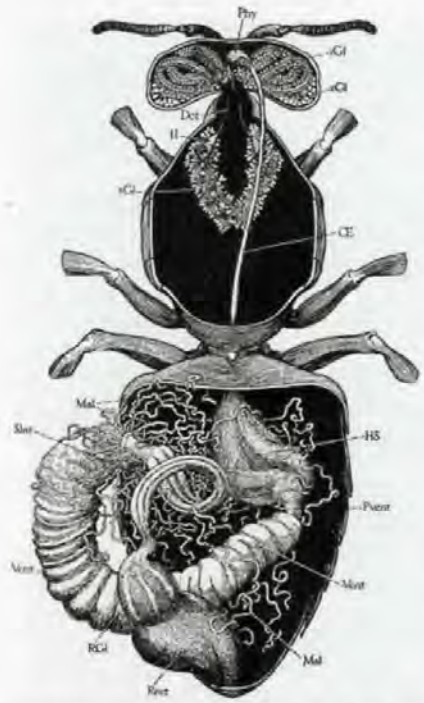
- 79% of all American adults now use the Internet.
- 68% are actively searching for information.
- 65% use social networking sites including YouTube, Facebook or LinkedIn.
- 65% of the general public believe new Internet technologies make people more efficient.

Information (content) on the eXtension Web site is organized into subject area Communities of Practice (CoP). Each CoP includes articles, news, events, and frequently asked questions (FAQs). The content is based on unbiased research and undergoes peer review prior to publication.

Starting a CoP for Bees - eXtension Bee Health

Several situations, factors and events came together to initiate formation of "Bee Health." The most critical situation involved high colony losses. Honey bee colonies were dying from a "mystery illness," starting in the Winter of 2006/2007. This malady was named Colony Collapse Disorder (CCD) and threatened the economic stability of the beekeeping industry and food production by reduction of crop pollination. In 2006, the National Research Council produced a report, "Status of Pollinators

Figure 1. *Bee Health Home Page view.*



Alimentary canal of worker (Phy-Rect), together with pharyngeal glands (1Gl), and salivary glands of head (2Gl) and of thorax (3Gl), as seen by cutting body open from above and pulling the ventriculus (Vent) out to left.

Figure 2. *an example from the Bee Anatomy Section showing a Snodgrass drawing.*

in North America," which recognized many bees other than the honey bee (non-apis bees) as important pollinators of crop and non-crop plants.

These losses underline the need to get the most up to date and accurate information to beekeepers as quickly as possible to improve bee health and continue to improve survival. Jeff Pettis, research leader at the USDA-ARS Bee Research Laboratory in Beltsville, MD. summed up the situation and plan for solutions by saying, "Declining honey bee health is complex and the answers that are needed to improve colony survival will only come from a concerted effort by a diverse group of scientists, beekeepers, extension specialists and other interested parties working closely together to improve honey bee health." We obviously needed to work together as a team to solve this complicated problem.

A series of meetings of experts including research scientists, extension educators, federal and state agencies, beekeepers, granting agencies and industry representatives occurred to brainstorm the colony loss situation and formulate a plan to find solutions. Granting agency representatives heard the message loud and clear that there was a critical need for research to study this challenge.

At one of these meetings, a regional group (NC508) of bee researchers and extension specialists met in Chicago in August, 2007. Dr. Craig Wood, Associate Director of eXtension explained what the eXtension network was and suggested that some of us get together to formulate a community of practice for bees. Our administrative advisor, Dr. Sonny Ramaswami, then a dean at Purdue University, now director of USDA/National Institute of Food and Agriculture (NIFA) asked which one of us would lead this endeavor. No one moved or jumped up to volunteer, therefore, he, being the cagey leader he was, asked each one of us, what % of our job responsibility was in extension. At that point, I knew "my goose was cooked", since I am 100% extension and I volunteered to lead the project with the stipulation that everyone in that room would help by adding content material. I am pleased to say – they did!

This regional project group met several times in 2007/2008, expanded to include other experts to produce a coordinated agricultural project (CAP) grant proposal to submit to the USDA/NRI (now USDA/NIFA) to research all aspects of potential causes of CCD. This grant was submitted in 2009 and we were successful. A major extension objective of the proposal was to develop a CoP for Bee Health. This effort was funded by the CAP grant and from the USDA Areawide Project.

What is Available in "Bee Health"?

The Resource Areas – Information Articles – 201 articles

Best Management Practices

Honey Bee Biology

- Bee Anatomy
- First Lessons in Beekeeping

Honey Bee Health

- Colony Collapse Disorder
- Pesticides and Bees
- Nosema Disease
- *Varroa* Mites
- *Varroa* Sampling
- Small Hive Beetles
- European Foulbrood
- Videos: Bee Diseases and Pests
- UGA and MAAREC

Basic Beekeeping Techniques

- Video: A Year in the Life of an Apiary

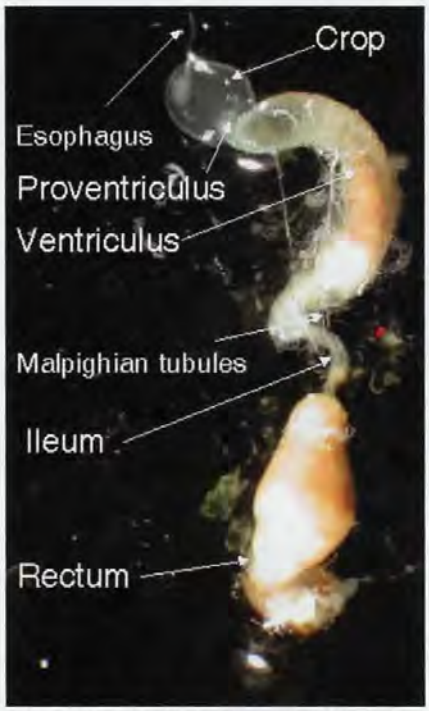


Figure 3. *The digestive tract of the honey bee.* (Huang photo)

Figure 4. *YouTube screen view.*

- ARS Areawide Managed Pollinator CAP Bee Informed Partnership
- USDA-NIFA SCRI Pollination Security for Northeastern Fruit and Vegetable Crops
- USDA -ARS labs
- American Association of Professional Apiculturists AAPA
- Apiary Inspectors of America AIA

Figure 5. *Some valuable links.*

Queen Rearing and Bee Breeding
- Grooming Behavior
- *Varroa* Sensitive Hygiene
- Hygienic Behavior Testing

Native Bees
- BeeMail Shelter
- Native Bee Benefits: .pdf download
- Some Native Bees
- Collecting Bees
- Identifying Bees

Bee a Citizen Scientist
- Hive Scale Project
- Broodmapper
- Winter Loss Survey

Bee Health Adopts Social Media To get the Message Across

Social media seems to be the "hot ticket" to stimulate and introduce many people of all ages to the internet and we responded with a YouTube Channel with 35 videos, 1808 subscribers and 475,394 video views and a Facebook Page with 950 "likes".

News Articles

We have 204 published news articles: **http://www.extension.org/bee_health/news**

Frequently Asked Questions (FAQ's)

We have 124 published FAQ's: **http://www.extension.org/bee_health/faqs**

Ask The Experts Section

You can ask a questions for a member of the CoP to answer. To date we have answered 785 questions: https://ask.extension.org/expert/groups/1700/answered

Links to Other Key Sites

This is an important feature of any good website.

The Future of eXtension? How Can You Help?

The need for research based information on bees and beekeeping has never been more critical with all the challenges we face to keep our bees alive. On one hand, this is probably the most exciting time to study honey bees because resources were made available to discover new information about bee biology, pests and pathogens, pesticides and survivor bees. On the other hand, there is so much more to learn. eXtension will continue to add new information as it becomes available and incorporate more use of social media that people want. It seems ironic that we are so fascinated with using social media to better understand a highly social insect. I feel we should use all forms of media to share the knowledge. Please share this Bee Health resource with your local and state bee associations. If bees could "talk" in human language, I bet they would tell us to work together to solve bee decline? BC

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http://www.extension.org/pages/21964/bee-health-is-focus-of-new-national-web-resource

The Voice Of The South

Can Be A Myth Buster

During the last few years I have heard some interesting and incorrect ideas from well-meaning beekeepers wanting to highlight the importance of honey bees to agriculture. Usually, the concepts are presented during discussions of honey bee health. Prominent in these discussions are the unusually high mortality rates of bee colonies that became known as Colony Collapse Disorder (or CCD). Propagation of wrong ideas actually erodes our credibility as representatives of the beekeeping industry. Some may view the topics covered here as banal oe even a "no brainer." However, I hear these ideas voiced frequently by beekeepers, and it seems reasonable to counter them in some way. I attempt to clarify some misconceptions:

(1) Myth – Humans will starve if honey bees are lost from the planet.

The honey bee (*Apis mellifera* L.) is the most important agricultural pollinator worldwide. The reason is simple – it can be managed for pollination. In North America, some native bees (e.g. Blue Orchard Bee and leaf-cutter bees) can be encouraged to nest in drilled nesting blocks placed near fields or orchards. However, most insect pollinators are not easily controlled for crop pollination.

Like most native bees, honey bees have anatomical modifications that allow them to pack pollen for carrying back to the hive. It is the movement of pollen between flowers of the same crop that results in successful pollination. In honey bees, it's the corbicula or modified basitarsus of the hind legs that holds the pollen during transport. Most people refer to this modification of the leg as the "pollen basket."

Honey bees are ideal pollinators for several reasons. First, a single colony of honey bees can provide tens of thousands of bees that visit flowers and collect nectar and pollen as food. Nectar is concentrated to form honey, which is the primary energy source for bees. Pollen provides essential amino acids, minerals and dietary sterols. Foragers routinely search for these foods in an area of 8,000-10,000 acres around their hive. A single forager will tend to visit the same species of flowers during foraging trips, and this is important for ensuring pollination of a particular plant. However, a colony of bees can actually pollinate different plants simultaneously by sending out teams of foragers for each type of blooming plant in the vicinity of their hive.

Second, honey bees are broad spectrum feeders and will collect food from hundreds of different plants. In fact, there are more than 120 agricultural crops (fruits, nuts, vegetables, fiber, and forage crops) that benefit from honey bee pollination within the U.S. Some crops absolutely require honey bees to produce the commodity. A good example is almonds. Almonds can only be produced when two compatible varieties are cross-pollinated. Honey bees are also used to produce seeds for vegetables that are sold to home gardeners.

Third, beekeepers can easily manage colonies to produce new hives for pollination, and honey bees flourish anywhere that agricultural crops can be grown. Finally, honey bees can be transported to crops needing pollination. The benefits to the fruit or other commodity grower are well known. If honey bees are placed near the orchards or fields to be pollinated just before the plants bloom, the bees will eagerly visit the flowers at the optimal physiology for the blooming plant. The result is that more flowers can be pollinated per plant, and the flowers on the same branch are pollinated evenly through time. Quite often the result is a greater quantity of fruit, nut or vegetable, and the quality of the commodity is often better when pollinated by honey bees. There is also more even ripening of the fruit on a single branch.

The monetary value of pollination from honey bees in the U.S. during 2010 was recently evaluated by Dr. Nick Calderone of Cornell University

Crop	Million Tons (metric)	Tons /hectare	Pollination
Corn	822.7	5.1	Self; wind
Wheat	689.9	3.1	Self; wind
Rice	685.0	4.3	Self; wind
Potatoes	314.1	17.2	cuttings
Cassava	232.9	12.5	Stem cutting
Soybeans	230.9	2.4	Insect (5% *Apis*)
Sweet potatoes	110.1	13.5	Slip sprouts
Sorghum	65.5	1.5	Self; wind
Yams	51.7	10.5	Stem cutting
Plantain	34.3	6.3	Stem cuts; wind

Table *– The top 10 food crops of the world (by weight of yield) for 2008 to show that many of the foods that feed people do not require pollination by honey bees (or any other pollinator).*

(December 2012, *Bee Culture*). The total value of commodities that required pollination was about $81.5 billion. Honey bees were responsible for $19 billion (23%) and other insects (mostly leaf cutting bees) accounted for another $9.8 billion (12%). Just for comparison, the total U.S. honey production for the same year was about 176 million lbs. valued at $282 million (data from the National Honey Board). Clearly, the value from pollination dwarfs the value of commercial honey production.

Although honey bees significantly contribute to the value of agricultural commodities, ***it is not true that humans would die of starvation if honey bees disappeared from the planet.*** The reason is that the top 10 food plants that feed the world do not require pollination by bees (or the pollination by bees contributes only a small percentage of the total value of the crop). These crops include corn, wheat, rice, barley, potatoes, cassava, soybeans, sweet potatoes, sorghum, yams and plantain. Most of these crops are self-pollinated or wind pollinated.

So, there is no need to exaggerate the value of honey bee pollination. Honey bees are responsible for one quarter of the value of those commodities that require a pollinator, and that alone is reason to exalt the benefits of honey bee pollination. Although we will not starve if honey bees are lost, if the species were lost we will certainly pay more for those crops that do benefit from pollination by them. The reason is that there would likely be a diminished supply of many of our favorite foods in our Western diet. Who wants to pay $2.50 per apple?

Finally, it is more than a little melodramatic to suggest that the honey bee would ever be lost on a global scale. Certainly there are problems in our commercial beekeeping industries of North America and Europe, but it is very unlikely that the entire species will ever be lost. This brings me to the next myth.

(2) Myth – Beekeeping is declining worldwide.

Insect pollinator densities have been in rapid decline in the U.S. over several decades. This trend applies to the native bees (and butterflies, etc.) and honey bees. There are many reasons, but the primary ones seem to be habitat loss and exposure to agro□chemicals (insecticides, herbicides, fungicides) from the foraging environment. However, diseases, parasites and loss of primary food plants by displacement from invasive plant species also impact pollinators. For the honey bee, the devastating effects of the *Varroa* mite cannot be understated. The mite and the viruses it vectors to honey bees remain the number one killers of bees worldwide. Additionally, the use of insecticides to control the pest adds risk to bees by contaminating the combs in which they live and their food supply. We are only beginning to understand the potential sub-lethal effects of hive contaminants on honey bee health.

In addition, the smaller family farms of the last century often had a diverse planting of crops and a substantial retention of native plants and trees and shrubs on field boundaries. These habitats provided food, shelter and overwintering sites for native bees. They also provided a more diverse diet for honey bees, which is healthier for the bees. No single pollen source can supply all of the essential amino acids needed in the honey bee diet. So a diverse diet of pollens is more likely to provide all of the essential nutrients needed for good health. Unfortunately, the small farms have been replaced by huge acreages of monoculture crops that often have greatly reduced refuge area for native pollinators. Every square inch of arable land gets converted to row crop production. Hence, the diets of honey bees in many areas are more limited than they once were.

The number of managed bee colonies in the U.S. has declined from nearly five million colonies in the early 1960s to about 2.5 million colonies today. It is easy to blame this decline on all of the problems mentioned above. Certainly these factors are major contributors, but other forces have affected the decline. The advent of cheap granulated table sugar has replaced honey as the main sweetener for cooking or eating in the typical home. Changes in society have also contributed. For example, children in more recent generations of traditional farm families are opting for careers unrelated to farming.

Many people can simply earn a good living by doing other types of work that does not tie them to the family farm. Frequently, these new careers are eight hour work days with the weekends off – and we all know that farmers are never off of work. This applies to beekeepers too.

Economic factors have also contributed to the decline in beekeeping within the U.S. Foreign competition in the honey market has forced some folks to hang up the hive tool and try something else. In many years cheap imported honey made it more difficult for the domestic producer to compete and make a profit. I mention all of these things to show how complicated a simple issue like the decline in number of managed colonies of honey bees can be once you begin to look critically at the causes.

Despite the declines of managed colonies in the U.S. (and Western Europe) over the last 50 years, the number of managed colonies and beekeepers has been gradually increasing on a global scale. There were roughly 40 million colonies of managed honey bees in the world during the early 1960s, and now there are in excess of 60 million managed colonies. The reason is that beekeeping is growing in developing countries of Asia, Africa and South America. It offers reasonable levels of sustainability in these areas, providing families with a consistent income and goods for barter (honey, wax and bees) to obtain other necessities of life.

It very easy to infer the demise of the global beekeeping population if one focuses on our condition, but beekeeping is thriving and will likely continue to grow on a global scale. Recent episodes of high colony mortality flames the impression that beekeeping is a dying craft, but do these losses reflect the entire beekeeping industry?

(3) Myth – CCD affects all beekeepers.

High mortality of honey bee colonies has again occurred during this last Winter. Many commercial beekeepers in the U.S. reported losses of 50%, and a few reported losses > 70%. The Winter losses seem to have patterns similar to losses that occurred during 2006-2009 across North America. Many authors have written about the multiple factors that are most frequently associated with high colony losses. Dramatic deaths of colonies are related primarily to *Varroa* mites and the viruses it vectors, nutritional stress related to colonies living in drought stricken areas, the plethora of agro-chemicals inside and outside the hive to which bees are exposed, and a variety of other diseases like *Nosema ceranae*. It is the interaction of a couple or more of these stressors that creates the perfect storm of bee death.

One result of these incidents has been a focus by national media on the problems of these commercial beekeepers. Some of these summaries leave the general public with the feeling that all honey bee colonies are in grave peril. Although it is true that the minority of beekeepers actually manage the bulk of the colonies in this country, there are still millions of colonies managed by small scale beekeepers, sideliners and commercial beekeepers that do not move their bees to pollinate crops. Most of these people do not experience the kind of losses reported by those most affected by CCD. I will probably anger some, ***but CCD appears to be strictly a phenomenon of commercial beekeepers participating in various activates that include transporting bees to pollination of crops***. I do not belittle the importance of this task; I am only trying to point out that many people keep honey bees without major losses.

However, an interesting psychology has developed in some small scale beekeepers (and even some larger beekeepers) when colonies are lost. I frequently get phone calls from a newbie beekeeper who is exasperated that CCD has killed two of the five colonies that he or she had in the backyard. Usually, with further inquiry and discussion I surmise that the colonies likely died from a known proximate cause. Perhaps the beekeeper did not have enough food stores for the winter, and the colonies starved in early January. Sometimes it is easy to decide that the likely cause of death was an uncontrolled infestation of *Varroa* mites – especially when the remaining three colonies are riddled at damaging levels. It has become easy for some to blame colony losses on the big "CCD" because it moves some of the blame from the beekeeper. In these cases, I gently point out the likely cause of death and make suggestions on how management could be improved to correct the problem.

However, there are many instances in which a *post mortem* exam of a colony without bees yields no information. In some cases I get the feeling that a cagy beekeeper is withholding information that would help the diagnosis, but in most instances, there is just not enough information to determine a likely cause of death. I tell beekeepers that honey bees die for many reasons, and sometimes there is not enough information to decide the most likely cause. However, that does not mean that the CCD syndrome has stricken an apiary – especially if the beekeeper has not been sampling for *Varroa* mites or other pathogens or has no clue about how to control the most serious of beekeeping health issues. Lumping all colony losses into the CCD column will not make someone a better beekeeper. However, critical evaluation of management protocols and fixing known inadequacies will improve overall colony health for most beekeepers. BC

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Is Natural Really Natural?

Jennifer **Berry**

When the most recent and well-publicized phenomenon of honey bee disappearance, termed Colony Collapse Disorder (CCD), began, it gave rise to serious concerns not only among those in the commercial beekeeping industry, but also among environmentalists, academics, and even the mainstream media and general public, as well.

Bees were dying at alarming rates. Large commercial beekeeping operations, having sustained crippling losses, were on the brink of bankruptcy. And, thousands of acres of pollinator-dependant crops were in jeopardy. Theories and rumors quickly arose as to why colonies were dying. In response, researchers raced across affected areas to collect samples and begin their investigations. The initial, knee jerk blame claims, ranging from cellular emissions and high-voltage power lines to UFOs and the wrath of God, began to fill the airwaves. However, cooler heads prevailed and the Coordinated Agricultural Project (CAP) was started to actually examine the facts; just the facts ma'am. The project attracted 17 institutions from across the U.S. to study why bees were dying, and, hopefully, to find a cure. For four years, nutrition, disease, mites, environmental toxins, miticides, habitat loss, along with other potential culprits have been investigated. The conclusion; there is no single "smoking gun," but that the causation of the syndrome seems to be a combination of stresses on the bees, chiefly from varroa mites and chemicals (in the hive and environment). Many of us sensed this all along. But, because of the project, we now have a much better understanding of honey bees and the effects of these stresses than we did back in 2007. This is a good thing!

However, this article is not about the outcome of the CAP research, but, instead, it is about a silver lining, or positive twist, so to say, that has spun off from the CCD disaster.

As bees were dying, the media jumped and jumped hard. News vans rolled into apiaries. Reporters and camera folk scrambled in search of beekeepers to interview. Jackets and ties were donned, shirts tucked in, lipstick and makeup applied, sound checked, cameras rolled, lenses focused, and mics turned on: "In, 3, 2, 1..."

> "Hello this is Melinda Jo Johnson standing in a field that used to have 100s of healthy, honey bee colonies. But, that's not the case today. Instead, the boxes you see behind me [camera pans] – are empty. Why are they empty, you ask? Well, for some unknown reason, all the bees have left or died. What does this mean for us? Could the bees be the proverbial 'canaries in the coal mine'? Is this a sign – some manifestation of global warming? And, without bees to pollinate the fruits and vegetables that we eat, will mankind starve? These, along with many other questions, may never be fully answered, but beekeepers and researchers alike are struggling to find out what is happening to the bees. Let's just hope it's not too late. Back to you, John, in the studio." And . . ., fade to black.

News reporters from the big guys (Fox, CNN, ABC, NBC, CBS) to the neighborhood stations were all racing to do a story. The newspaper and magazine giants were involved as well. Movies and shorts were filmed, and books were written. Even the local journalism majors in high schools and colleges were writing about CCD. And, with this blitz of media attention, the plight of honey bees reached a huge audience of non-beekeepers. This is the positive twist mentioned earlier; the CCD frenzy facilitated mass public awareness of the importance of bees and pollination. YES!!!

Then a second wave crashed in as individuals from all backgrounds wanted to become beekeepers. Interested folks started reading books on honey bees, joining beekeeping clubs and associations, buying equipment, and taking bee classes across the country. A few wanted to help to save the bees. Others sought a hobby for their kids. Some wanted to ensure the pollination of their farm, orchard or garden while others just wanted bees for the fun of seeing them flying to and from their porch, deck, rooftop or backyard. And, the trend still continues today.

Now, let's turn back to CCD. When symptoms first appeared, it resembled classic, in-field pesticide poisoning. Remember, there were no adult "forager" bees present. There were only brood, a queen and young bees. Plus, secondary scavengers or robbers were not present. As mentioned, pesticides were certainly a part of the problem, but it is much more complicated than that. Yet, at least early on, pesticides received the brunt of the blame. In response, a purist, "all natural" movement arose. Beekeepers, especially new ones, began to stay completely away from any chemical use. This new level of public awareness led to an upsurge of new beekeepers, who in turn, fueled the natural beekeeping movement. Maybe a stretch but seems like a logical stream of events to me.

However, the concept of "natural" beekeeping is not new. Many beekeepers have been claiming their naturalness for decades now. Yet, it has, irrefutably, gained much more attention recently. This is a good thing. Beekeeping should be more natural because beekeeping is so natural to begin with . . . Or, is it?

Whether it's triangular, rectan-

Whether triangular, rectangular, circular or hexagonal, we keep bees in a box. Is that natural?

If anyone tells you NOT to feed your bees, walk away.

gular, circular, or hexagonal, we keep bees in a box. Is that natural? Then, we put that bee box or boxes where we want them, next to our garden, gazebo or lining an open field. On average, feral hives tend to be a good distance apart, yet we (beekeepers) line them up, sometimes even side-by-side, for convenience. Natural? Next, during the Spring months, we take swarm prevention measures (cutting queen cells, rotating hive boxes, and adding more space) because we don't want to loose our foraging force. How natural is that? What about the idea of harvesting honey, pollen or propolis? Taking something away from the bees for which they have worked so very hard doesn't seem very natural. Then we re-queen to address issues of defensiveness, poor colony strength, hygiene against pests, low honey production, or simply because she's a year old or the wrong color. Does this sound natural? What about even lifting the lid and inspecting the colony? How natural would it be for the wall of a tree cavity to pop off and magic forest hands to reach in and rearrange "the furniture" in a feral hive?

In the end, keeping bees isn't very natural, is it? So, where do we draw the line between using bees as factors of production and treating them as fellow creatures of this planet? What really defines natural beekeeping? How about we do the best we can to keep our bees healthy and alive for their own sake as well as for the benefits to humans from their amazing abilities. Ok, the definition probably needs a little more work, but, it's a start.

Drawing haphazardly from numerous sources, let's consider these general parameters for a natural beekeeping objective: minimal intervention, no toxic chemicals applied to the bees, their hives or apiary, and, finally, taking only what the bees can afford to give without directly putting their quality of life and survival at risk. I'm sure there are hundreds of other additional ideas we could also consider, but let's begin with these.

Not only has there been an explosion of new, natural beekeepers, but there is also more natural beekeeping information available. A good bit, though not all, has been accumulating on the Internet. While doing some background research for this article (and other searches), I came across some seriously **BAD** information on the net. Some of it was just down right **WRONG** from beginning to end! That provoked me to do a quick survey among beekeepers (hobbyist and commercial), honey bee academics and beekeeping supply purveyors. I asked them to answer a simple question: what books or beekeeping information would you recommend to 1) a beginner and 2) a more experienced beekeeper.

Here is the list of titles (in order of most nominations to least):

Beginner information

The Beekeepers Handbook
First Lessons in Beekeeping
The ABC & XYZ of Bee Culture
Honey Bee Biology and Beekeeping
The Hive and the Honey Bee
Backyard Beekeeping
Bee-sentials
A Book of Bees: And How to Keep Them
Beekeeping: A Practical Guide
Hive Management

More Advanced

The Wisdom of the Hive
Honeybee Democracy
The Biology of the Honey Bee
Honeybee Ecology
The Buzz About Bees
Bee Culture Magazine
American Bee Journal

Of course you know this, but not everything you read or see on the Internet is correct!

Anyone can post a blog or YouTube video on his/her practices, thoughts, opinions, conclusions, personal views, belief, ideas, etc. And, because we've been somewhat trained to trust what's in print and other media, subconsciously we expect that it MUST be right! Please be careful while searching information in cyberspace. Especially, if you're a new (newer) beekeeper, start with credible information. Build your foundation of beekeeping knowledge from reliable, sound, and peer reviewed material. Don't buy into some fly-by-night, who's only credible experience is website building, and has had only one bee hive (now a dead-out) in his/her life. Yet, people of this ilk have convinced novice beekeepers to follow their nonsensical beekeeping theories, which invariably leads these new beekeepers to lose their colony, become discouraged, and likely give up beekeeping entirely. Thus, our cause loses a potentially great beekeeper.

Now, I didn't mention feeding above when exploring what is natural beekeeping. Is feeding your colonies natural? There are two obvious camps on this. If you were to call the UGA bee lab with the question of to feed or not to feed, this is what we would recommend: if your colonies are light in stores, feed them! If anyone tells you it is unnatural to feed your bees, walk away. If they write about how they don't feed because they want to stop perpetuating weak genetics and allow only the strong to survive, turn the page. If they blog about the fact they let their bees starve because the bees aren't smart or strong enough to find their own food source, hit the back button.

A rectangular box on a roof top. Natural? (photo by Cindy Hodges

It's early April as I'm writing this. It has been a challenging spring for the bees. Georgia and the southeast experienced a very warm December and January. So, the queens never shut down; in other words, they continued laying eggs through the Winter. These eggs hatched into brood, which were fed copious amounts of honey and pollen before pupating. Then, they emerged into hordes of active, hungry bees with little-to-no food sources in the environment. Then, to compound the crisis, a cold, wet winter returned for several months, which resulted in starving bees across the state. These circumstances also perpetuated the growth of mites, which will be discussed in Part II of this article next time.

For the past three months, we've fed about 800-1000 pounds of sugar per week to keep over 400 colonies alive. If we hadn't, at least 75% of our colonies would have starved, if not more. Their own stores were depleted by February. So, I have to strongly disagree with the naturalist camp who would write off this situation to bad genes, weak genes, or say that the world is better off without these bees. Nope. Sorry. As everyone who relies on agriculture for a living knows, you can't control the weather. And trust me, the lab staff would prefer not to feed; it's time consuming and messy. There are much better things we could be doing with our time and money than mixing up syrup, cleaning and filling jars, and enduring the wrath of hungry bees while swapping out jars in the field. However, I refuse to let bees die when it's within my control to take care of them – even if it calls for "unnatural" practices.

A diverse selection of food sources. Natural?

There are a whole host of reasons why a colony may not have enough food to survive the dearth: bad weather, inappropriate hive location, ill-timed swarming, queen injury, poisoning, infections, infestations and other disorders such as a bear attack. Of such circumstances too numerous to list, few have anything to do with the bees having inferior genetics.

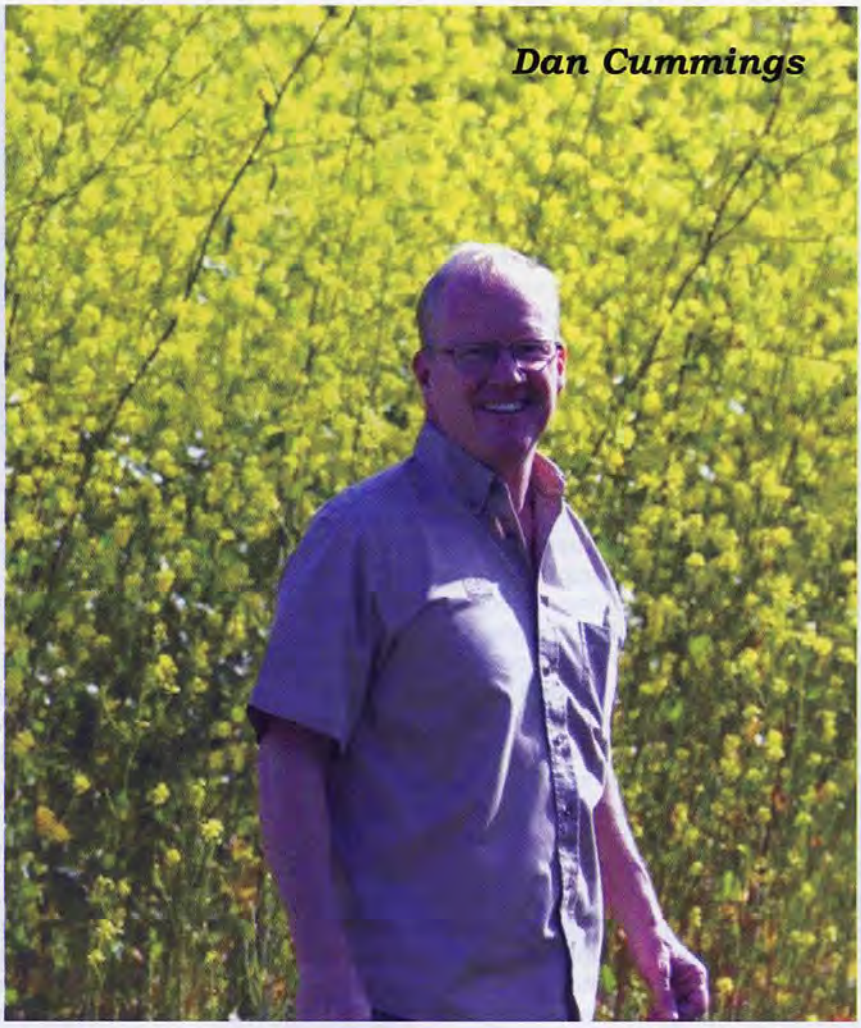
As extension personnel for the University of Georgia, we apply our knowledge and expertise to sift through information and disseminate the most important and applicable to the public. Beekeepers pose questions to our office by phone and email all the time. One common question in the late Winter and early Spring, unfortunately, is, "Why did my bees die?" After a few minutes of discussion we can usually figure out what happened. And, nine times out of 10, it's either starvation or mites. This is probably why I tend to go a bit overboard when talking about feeding and mite control. But, I will say this: If your bees are healthy and surviving without your intervention then, by all means, keep doing what you are or aren't doing. I only know what works here, in the Piedmont region of Georgia, under conditions similar to the lab or my own apiaries. So, our course of action may not be the same as that for beekeepers in other areas of the country or with different situations.

In any case, remember that the bees we have today aren't indigenous to the Americas. Settlers brought them here. Then, we imposed our human management techniques on them, laced our environment with a myriad of toxic chemicals, proceeded to convert vast amounts of natural landscape to golf courses, shopping malls and parking lots, and imported exotic honey bee pathogens and parasites. How can we expect honey bees to thrive on their own under these conditions? How can we stack the odds against them, and then demand that they survive without our help? If our environment was more "natural," then perhaps we could expect honey bees to proliferate more naturally and independently.

Take care of you & your bees! BC

Jennifer Berry is the research director at the University of Georgia Honey Bee Research Lab.

COMMON GROUND



Kathy **Kellison**

What a day! Even the weather cooperated in the great success of Project Apis m.'s, (PAm) Field Day, hosted by Dan Cummings, last month at Capay Ranch, near Chico, California, an almond-producing mecca. "Winds have been strong for many days, but Friday was the most beautiful Spring day yet, and perfect for our Honey Bee Forage Field Day," beamed Christi Heintz, Executive Director of PAm. Heintz is crafter and manager of the Specialty Crop Block Grant, which provided funding to the California Beekeepers Association, for the orchard-setting, bee forage planting trials.

While many causes of the abrupt and disturbingly large collapses of honey bee colonies across the U.S. have been proposed and researched extensively, no single cause has yet to be identified. Both scientists and beekeepers point to stress factors on colonies, including crop protection applications, in-hive mite treatments, viruses, and poor nutrition. These stresses are said to be interacting, leading to accelerated adult bee population losses, from which colonies are not able to rebound. PAm is working on honey bee health issues by funding studies, from controlling *Varroa* to new viruses that these mites vector. A high priority project for PAm is honey bee nutrition. "We believe that well-nourished honey bees live longer, result in larger and more robust colonies to service pollination contracts, and are able to withstand many of these stressors identified to be causal factors in CCD," according to Heintz.

Some 50 participants broke away from their hectic schedules to see first-hand the planting plots at Capay Ranch. Dan Cummings, Capay's almond orchard manager and PAm board member, kicked off the program by explaining the lessons learned from implementing the honey bee forage plantings. The cool wet Winters and hot dry summers are challenging attributes of California's Mediterranean climate when attempting any restoration project. In addition, the non-native, naturalized Italian Ryegrass (*Lolium multiflorum*), an artifact of earlier agricultural land use, can too easily out-compete establishment of the bee-beneficial annuals. To counter these obstacles, Cummings teamed with restoration experts Fred Thomas and Robert Sanders. Post-emersion herbicide applications were utilized to eliminate the Italian ryegrass. Afterward, trial seed mixes, which included varietals of mustard, vetch and clovers, were broadcast during dry periods in the Fall, before rains, at a shallow planting depth of ¼ inch, using a grain drill.

Speakers who addressed the group traveling by caravan to the demonstration sites, all communicated the same message: natural forage is essential to bee health. Besides the audible humming by bees, native pollinators, and other beneficial insects, the participants themselves were buzzing with excitement to see the dense and colorful assembly of flowering plants thriving adjacent to

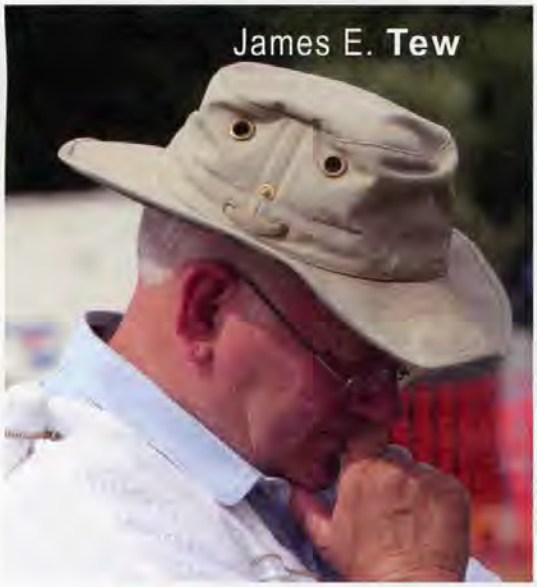
the hundreds of acres of almond trees. But as much of a celebration as it was to see this blooming bee buffet, perhaps more notable was the diversity of stakeholder representatives that attended PAm's Forage Field Day. Leaders were present not only from the honey bee and almond industry, but also from USDA's Farm Services Agency, California Farm Bureau Federation, California Department of Food and Agriculture, The Nature Conservancy, California Association of Pest Control Advisor, Bayer Crop Science, Monsanto, and Campbell's Soup Company. Zac Browning, past president of the American Beekeeping Federation, PAm Board member, and currently coordinating a national effort to restore and increase bee pastures in the U.S., was one of several who spoke to the broad-based group of stakeholders. Browning highlighted the importance of common goals and issues surrounding the challenge for beekeepers to provide a healthy diet for their bees. "If the hive is healthy it can thwart stress, and strength is derived from a diversity of floral resources. The solution is to put diversity back on the ground to sustain healthy hives. This will help sustain the beekeeping industry that will then be able to do its part to sustain pollination services for our agricultural partners."

Congratulations are in order to Christi Heintz, Meg Ribotto, (Educational Outreach Coordinator) Dan Cummings, and the entire board of PAm for their labors, but also for their forward thinking in demonstrating the potential for growers of almonds and other specialty-crop farmers to contribute to the health of bees. A viable beekeeping industry will be aided greatly by establishing some bee forage where land is not in production. Dr. Eric Mussen, Extension Apiculturist from UC Davis, remarked to the group as we ended the tour: "Huge monocultures are not good for bees. Keeping the bees nutritionally fit and robust, which enables them to handle diseases, pesticides, and mites, depends on making available some natural sources of pollen from different types of plants." There is a great deal more work ahead to help and encourage enough growers to provide nutritious floral resources for bees. PAm's Forage Field Day unveiled that it is possible for caring growers to be part of the solution to improving honey bee health by establishing bee forage plantings alongside intensive agriculture. Just as exciting, however; is the newly recognized common ground that exists between beekeepers, growers, land management agencies as well as mega-corporations and crop protection entities, centering on the need to work together to increase access to pesticide-free sources of natural pollens for beekeepers to nou BC their bees.

For more information on the pollinator forage project, please visit: **projectapism.org/content/view/142/61**. Follow this link to view a video produced from the Honey Bee Forage Field Day: **http://www.youtube.com/watch?v=l4_U1GJLNoM**

Kathy Kellison works with Project Apis m. on assorted grants and promotions.

Almond trees in the back, bee forage in front.



HOW I DO IT – Honey Bee Swarms Part 2

Last month

In the space made available to me in *Bee Culture* last month, I began to describe the sophisticated behavior and biology involved in a colony undergoing fission and splitting itself. Clearly, it is not a decision made lightly by the bees. While significant advances have been made in understanding swarm biology, there is never a shortage of questions. As I reread my piece last month in review for this month, I was struck by comments that I made just one month ago. I said that "*the tired queen plops down somewhere within a few yards of the colony and the swarming bees cluster around her.*" Yet at times, swarms seem to preferentially light on a branch that has been the bivouac site for previous swarms. In those cases, was the queen attracted to that spot or did the workers, in their own mysterious way, guide the queen to the special branch? Sometimes the queen drops or sometimes she is directed to a landing site. Indeed, she is directed to the new nest site so why could she not be directed to a temporary bivouac site. I don't know. Maybe it happens both ways.

Bivouacking bees awaiting instructions.

Last month, I left my hypothetical swarm in transit to the new nest site. As they departed, they left excited beekeepers running around banging metal pieces in an attempt to lure the swarm down. *(This really does not work but there is no harm in trying.)* Another beekeeper was attempting to get a water hose spraying water in an effort to the flush the swarm down. The chances of that happening were very slim, but again, no harm trying. What a sight the bees must have had as they gained altitude. The beekeepers' din would have become fainter and fainter, and one beekeeper would have continued to stand beneath his personal waterfall. To the beekeepers, it would have appeared that the swarm took to high speed and simply vanished, but in reality the swarm seems to have gained higher and higher altitude and, at about 10 miles per hour, moved from sight. This swarm was off on a grand pioneering adventure and they left behind disappointed beekeepers one of whom was quite wet.

At the new nest site

Initially, the new nest location was abuzz with scout bees that were thoroughly checking the place out. The bee activity would have been noticeable, but no thought would have been given the episode by the observer. After all, it was only a few dozen bees. After the decision was made and the swarm was out of the hive and individual bees were awaiting instructions from the scouts, the activity at the new site would have suddenly dropped to very near no activity at all.

All the scouts would be needed to guide the swarm and the queen to a location that the great majority of the swarm bees had never seen before. As was described last month, these location-informed bees incited the hanging swarm to warm up and take flight. As they neared the new home location, the scouts raced ahead to the new entrance and scented to guide the unenlightened to the new entrance. Just a few minutes ago, there was nothing, now the air around the new site was filled with seemingly randomly flying bees and hundreds of scenting bees. It normally takes less than 10 minutes for the swarm bees to move into the new location. The bees would then cluster up in the new cavity and move to the next phase of colonization – comb construction.

My swarm didn't stay in my box.

If, at that moment of swarm arrival, a beekeeper had shown up with a brand new hive box filled with new frames and wax foundation, it would have been very difficult to change the bees' little minds. If the swarm was near the point of making a decision and an eager beekeeper showed up with a box, all might look well when the swarm was hived. At this point, I don't know what I am talking about, but it appears that, sometimes, the scouts continue to promote their own quarters and the group decision was to go to the earlier selected location – even if they were already in a new deep hive body. One way of short-circuiting this swarm-absconding behavior is to capture the swarm queen, cage her and put her in the swarm box. If you really want to nail the rowdy swarm down, capture the queen and put a frame or two of open brood from other colonies around the caged queen. If the swarm still leaves, then good riddance. Those bees are

not the smartest bees out there. I know. I know. Capturing the queen may not be easy to do, but be looking for her on the outer surface of the swarm. She will be skittish. Have a cage ready, and on those times when she does show and you capture her – rejoice. That was good luck.

Meanwhile, back at the ranch

At the parent hive, it must be as though all the kids just moved out and freed up bedrooms. Just a bit ago, the hive was packed with bees and now there is an abundance of freed-up space. For about a week, the parent hive will be oddly out-of-balance. No queen, fewer drones, and about 50% of the workers they had just a few hours ago. The brood makeup is totally weird. There will be nearly no eggs or young larvae but a great amount of older brood and capped brood. Apparently, the bee rational is that there will be fewer nurse bees to care for the open brood, so cut it back. Since so many adult workers have left the colony, the parent colony will need a large influx of new workers to replace them so the parent colony is left with large amounts of capped pupae.

Queens in the parent colony and queens in the swarm colony

Interestingly, the colony can replace this large loss of population in just a couple of weeks . . . If all goes well acquiring a new queen. The swarming colony will leave behind a brood nest with one to 21 maturing queen cells. Swarm cell production and, ultimately, the initiation of a new queen is an article in its own right. But in this unique bee population composition, ripe queen cells are present rather than a mature reigning queen. If the queen is successfully replaced, the colony should survive the fission process without showing signs that it ever happened.

In the swarm bee and brood composition hanging on the limb, there is no brood. None. Cells must be constructed and eggs laid in every cell as soon as it is approximately one-third completed. The swarm bees must really push brood production rates. The Spring season is rapidly passing. The swarm queen, probably at least a year old, is quickly worn out by the egg production schedule. At a time known only to the swarm bees, at some point – sooner or later in the brood cycle – the swarm queen is superseded, and is replaced by a daughter queen that she produces. To humans, this process must seem heartless, but this swarm queen will not be allowed to fully enter the promise land of the new home site. Her job is to produce enough new brood to stabilize the new colony and to lay eggs in supersedure cells that will result in her replacement.

Swarm queens in the apiary

If a beekeeper successfully collects numerous swarms throughout the season and does not replace the original swarm queens, over time, that beekeeper will select for swarming propensities within his operation. There is no great wrongness in this and numerous swarms mean numerous hives. But keep in mind that as soon as those hives are established and functional, if the bees don't take care of it themselves, consider requeening them. In most instances, the beekeeper should be better off, from a bee standpoint, to purchase a mated queen rather than letting the colony supersede. A significant amount of time and brood is lost due to the time it takes to produce a naturally mated queen.

The drones that swarm queens produce are most likely the source of future stock that are inclined to swarm. You decide. This may or may not be an issue for you, but procedurally, the pathway is there for unintentionally selecting for swarming tendencies.

Some swarm oddities

Returning swarms

Not all swarms that leave the parent colony stay gone. In fact, with great fanfare, a particular swarm may issue causing beekeepers to go into high overdrive. Yet at some point during the event, the swarm may turn back to the parent colony and, again with great fanfare, reenter the parent hive. This swarm mind-change can occur at any time during the departing event – even after having been hived in new equipment. It would appear that the most logical reason is that the queen did not leave with the swarm. I can't say for sure. Know this – if a swarm departs and returns, probably the next day, it will leave again and will most likely not come back. A returning swarm is your clue to quickly do something or be prepared to lose a swarm.

Small, after-swarms

The first big swarm of the season is called either just a *swarm* or a *primary swarm*. But there is a gaggle of small swarms with different names like: *mating swarms, secondary swarms,* or *after-swarms*. All these names generally describe a small swarm that departs a few days after the primary swarm leaves the parent colony. This small-swarm event is a peculiarity to me. Such small swarms are nearly always headed by unmated queens. The common conjecture is that the replacement queen went on a mating flight and a few hundred of the workers went with her. Appar-

What a returning swarm looks like.

ently, everyone was confused. The workers seemed to think the new queen was heading a swarm, and the young queen got distracted from the business of mating. All of this results in a small group of flighty, difficult to manage bees. These small swarms are notoriously difficult to hive and rarely are able to build up, on their own, enough to survive their first Winter.

Alternatively, maybe the primary swarm did not remove enough bees from the parent colony, and more could be offered in the way of these small swarms. But the probability of these small swarms failing is so great as to seem biologically wasteful. I think there is more to this secondary swarm thing that we understand. Bees and queens do not commonly make errors of this magnitude.

Swarm bees are maniacal laborers

Swarm bees have no immediate brood to feed, and generally a nectar flow is underway. Swarm bees do an excellent job of producing brilliant white new combs. Either foundation or older combs can be given to a swarm of bees; and in just a few days, the comb make-over can only be described as amazing. In fact, if you are new to beekeeping and are considering this management procedure, I would suggest that you place a thumbtack in the top bar that is to be rejuvenated to keep up with the changes that occur to it. In general, a swarm will develop more comb, brood and honey that a non-swarming colony of the same size. Certainly, a three-pound swarm will produce more resources than a three-pound package.

Comb honey production from swarm bees

Truthfully, I have never implemented this procedure. It's on my list of things I want to yet do in beekeeping. Maybe it's because I don't always get the big oversized swarms of days gone by. However, someone reading this will hive a large swarm – say maybe five pounds. Everyone seems to know the traditional techniques for hiving swarms but a lesser known procedure is to put the large swarm in a single deep that that is essentially already filled with capped honey. About two frames in the center are left open for the queen to use. On top of this large, crowded swarm, empty comb honey supers are positioned. If you happen to be in a particularly good honey flow area, put on four to five of these comb honey boxes. ***Apparently,*** the colony is not inclined to swarm because it has already done that for the year. This procedure seems to have a solid biological basis – so long as the bees are not incited to abscond.

Swarming

Swarming in beekeeping happens – no matter how hard you try to stop it. It is a biological wonderment. As best you can, deal with it. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University; ***tewbee2@gmail.com; http://www.onetew.com; http://www.facebook.com/tewbee2; twitter@onetewbee; http://www.youtube.com/user/onetewbee***

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

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

A beekeeper in Kentucky writes:

I have a hive of Italian Bees that I started last April. They are very aggressive and downright mean. Every time I get close to the hive I get stung. If I remove the Italian queen and replace her with a Russian queen would this calm down the hive? If you think this is an option how long do you think it would take for them to calm down?

Phil replies:

Re-queening the hive should modify the behavior if it's genetic in nature. I'm presuming that this out-of-hand defensive reaction is something that has gone on for a while. Bees will often respond aggressively to circumstances in their environment such as weather (cold or overcast), predators (being harassed by skunks), having the hive bumped by livestock, or other unknown reasons. I've had hives of bees which would sting me repeatedly for a while and, a couple of weeks later, be as gentle as any I've ever had. I sometimes wonder if it was something I said that touched them off. Whatever the reason, if they are responding to some environmental irritant, they will calm down within a few days of its ceasing to be a factor.

If the aggression continues over a longer period of time, it is most likely genetic. Some colonies will start out gentle and then become more defensive. This is probably the result of the colony's having replaced the queen, either by supersedure or as a result of swarming. The new queen is a daughter of the old one, but when she mates with drones from other colonies, new and unpredictable genetics are introduced into the hive. Since most of a bee's behavior is instinctive, new genes mean new behaviors.

As soon as you introduce a new queen and her brood begin to emerge (about three weeks), the characteristics of the hive will begin to change. The effect won't be complete, however, until the last of the old queen's offspring have died off. Six weeks is usually long enough to see an appreciable difference. Until then, keep your veil on and your smoker lit.

New queen installed.

A beekeeper in Mississippi writes:

Phil, I have a BIG problem with robber bees. I have closed the entrance down to the smallest opening. I had an old frame of honey in my freezer and put it out away from the hive, and I also put out a feeder away from the hive. What else can I do to maybe get them away or out--short of killing the whole hive. Thanks for any help.

Phil replies:

Yes, our honey bees can become little criminals and steal from their neighbors! The threat of larceny is usually not great in the Spring and early Summer when a good nectar flow is on, but as the flow slows or stops (as occurs from time to time, especially in periods of dry weather), bees are on the lookout for any food they can find. The closest source is often a neighboring hive. Colonies with strong populations can usually defend themselves. New nucs and divides, recently captured swarms, and any hives which have not built up well or which are dwindling due to disease, pests, or other causes, are all likely targets of robbing bees. The culprits may come from your own hives, from your neighbor's, or from nearby bee trees. Heavily robbed hives can face starvation very quickly, so beekeepers need to be vigilant in order to prevent or reduce this activity.

We cannot manage nectar flows, but other circumstances which encourage robbing are more easily controlled. The first rule is to avoid open feeding. Feeding entire beeyards by setting out wet frames or by putting

sugar syrup out in an open barrel or bucket (often with straw or wood floats inside), very often instigates robbing. Once robbing has begun, open feeding is more likely to fuel the feeding frenzy than to sate the bees. If you practice open feeding (WHICH I DO NOT RECOMMEND), first install entrance reducers in ALL of your hives and place the feeding bucket or barrel a couple of hundred feet from your apiary, preferably with an obstacle such as a building or a tree line between the syrup and the hives. (Remove the entrance reducers from stronger hives after feeding is finished.) Open feeding and exposing honey can cause even strong colonies to be robbed. Another argument against it, especially during a dearth, is that you are very likely feeding, not just your own bees, but all the hives within a couple of miles, including feral colonies.

A robbing response can also be triggered by beekeepers while working hives or removing honey supers when there is not much of a nectar flow occurring. Supers of honey, or even open brood boxes, exposed in the beeyard can be all the temptation that's needed to initiate the behavior and, once begun, it escalates rapidly. We need to go through hives quickly and cover boxes which are set off the hives when working hives during a nectar dearth. When removing supers, take them out of your apiary as quickly as possible and keep them well covered if they are temporarily left outside.. If you set wet supers out after extraction to allow the bees to clean out the remaining honey, do so at least several hundred feet away from your hives. Also, set them out late in the day to lessen the time for potential robbing. Better yet, set wet supers back on top of the hives (only on strong ones) and allow the bees to clean up the remaining honey within the hive. This should be done late in the day as well. Always keep an eye on your hives whenever you have exposed honey so that, if robbing begins, you can attempt to do something about it.

That brings me back to your question about how to stop robbing once it occurs. First, remove the frame of honey and the outside feeder. If some of your hives need to be fed, use a frame feeder, top feeder, or just a jar of syrup with holes poked in the lid over the opening in the inner cover, inside an empty brood box. The next step is to install entrance reducers, as you have already done. They are even more effective when placed in nucs and weak hives at the end of the nectar flow, prior to signs of robbing. Reducers restrict access to the hive and will often prevent robbing or slow it down once it has begun. For even better results, consider using an anti-robbing screen. This is a specially constructed screen that is placed in front of the hive entrance, leaving a small opening directly over it, but closing off the front entrance. The screen shown is a commercially manufactured device I purchased years ago. They are also easy to make with some #8 hardware cloth, and many beekeepers do so. The key to the screen's success is the top entrance. The bees inside the hive quickly figure out where the new entrance is and use it to go in and out of the hive. Robbing bees will continue to come to the screened front of the hive and seek entrance there, to no avail. A Virginia beekeeper friend, who has used such screens for years, told me that robbers only want to enter straight ahead, not up and down. I don't know if that is a factor - I just know that they work. Besides being more effective than regular entrance reducers, these screens do not reduce air flow through the hive. This is a very important factor in hot weather.

To stop robbing that is already underway, you can also temporarily seal the entrance completely. Burlap placed in the entrance works well for this. Grass can be used as a substitute, but bees will remove grass fairly quickly. Remember to reopen the entrance at the end of the day, after the bees stop flying. When robbing is interrupted, it usually does not resume the next day, but keep the entrance reducer or anti-robbing screen in, just in case, when you open the entrance back up. Good luck to you.

Anti-robbing screen on hive.

A beekeeper in Tennessee writes:

I've been using 10 frames in my honey supers, but some of the beekeepers in my local beekeeping club tell me I can make more honey if I use nine. What do you think?

Phil replies:

To review a few basics, standard beekeeping equipment is designed for 10 frames.. (There are boxes designed for eight frames, but most hive boxes are built to hold 10.) The ideal distance between frames, and hence combs, is based on the concept of bee space, the maximum gap (about ¼") which can be left between frames without the bees' filling it with burr comb. Violating the bee space rule can result in the bees' bridging the space between frames with extra comb, which is why burr comb is also sometimes called bridge comb. It sticks the frames together and merges the combs into large irregular clumps which I call a mess. Separating and removing the frames becomes difficult or impossible, and endangers the queen if she happens to be inside the mass when we attempt to clean it up.

The good news is that the bee space rule is not absolute. It allows some wiggle room (so to speak) if we increase the spacing just a bit. Though some beekeepers like to use nine frames in a standard brood box, I do not. Doing so reduces the amount of available comb on which bees can rear brood, and so reduces both the number of bees in the hive and my honey production. It turns out that there is a lot more leeway in the distance between frames and combs in honey supers than in brood boxes, allowing us to use as few as eight frames in supers de-

Thick honey supers.

signed for 10. When we decrease the spacing between honey super frames, the bees build thicker combs instead of building extra layers of comb as they do in brood areas. Presumably, this is because bees are hard wired to create brood cells of specific dimensions, including a specific depth. On the other hand, comb used primarily for honey storage can be variable in depth.

The thicker combs which bees draw out in honey supers with eight or nine frames can benefit the beekeeper. Not only do the supers require less hardware, but the thicker combs are also more easily de-capped during extraction. I have used nine frames in my supers for many years, and am currently using eight on most of them. Some beekeepers insist that a honey super with eight frames produces more honey, though a recent study at Kentucky State University found yields to be about the same whether eight, nine, or 10 were used. My own experience is that using eight frames seems to result in more honey per super. My evidence is the ache in my back after lifting supers from the hives. Either way, the honey is obtained with slightly less cost (fewer frames per super), and definitely with less labor (fewer frames to assemble, de-cap, and extract.)

As with brood boxes, honey supers should not be started with fewer than 10 frames if they contain foundation instead of drawn comb. Some beekeepers do tell me that they successfully start supers with nine frames of foundation, but it's necessary to keep a close eye on them. The safer course is to begin with ten and remove one or two as the bees draw them out. Maintaining consistent spacing of the frames is important, and there are three ways to accomplish it. The first is to eyeball it, which works fine for me and is the cheapest – zero cost. The second is to purchase or construct a tool to press between the frames to space them perfectly each time. This is the second cheapest, involving a one time purchase. The last option is to buy and install eight frame or nine frame spacers, sold by beekeeping supply companies, in each honey super. The disadvantage of these "in the super" spacers, other than the cost, is that they restrict the beekeeper to a fixed number of frames unless he is prepared to remove and replace them each time he adds or removes frames.

An alternative way of starting honey supers with fewer than 10 frames of foundation is to mix them with frames which have already been drawn out. This method was suggested to me by a beekeeping friend, and I've had good success with it. I place five frames of foundation in the middle of a honey super, with slight spaces between them, and add two frames of drawn comb at each end of the box, evenly spaced between the frames with foundation and the ends of the honey super. The spacing can be readjusted as the comb in the center frames is drawn out.

To recap, you can use 10, nine, or eight frames in your honey supers. Just keep in mind the bee space rule and honey bees' natural inclination to fill up gaps as you are setting up the supers. The choice is yours – the bees don't mind one way or the other. BC

Phil Craft served as the Kentucky Department of Agriculture's State Apiarist from 1999 to 2011. He is a graduate of Oberlin College in Ohio and the University of Kentucky. A native of the mountains of Eastern Kentucky, he now lives out in the sticks in the Bluegrass Region of Kentucky near Lexington with his family, a very old dog and some beehives.

A HISTORY OF KIEV

Home of Apimondia 2013

John **Phipps**

Chernobyl.

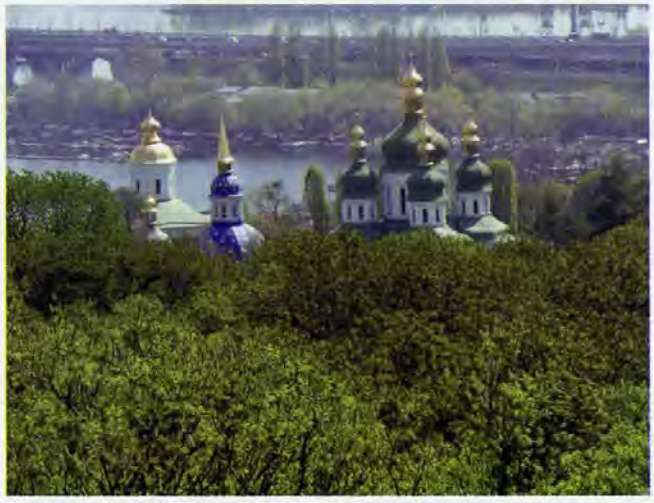
Visitors attending Apimondia in September 2013 will not only find themselves in Europe's largest country, but also the city which was the Russian seat of power for two centuries. The story is often told that the Slavs, inhabitants of the huge area of land between the Baltic Sea and the Black Sea, were always fighting each other and, seeing how wasteful it was, decided to find someone to rule over them - but not from within their own clans. Apparently an invitation was sent to three Varangian (Viking) brothers and Rurik, the eldest, became the leader of the Rus with his stronghold being the city of Novgorod in the north of present day Russia. Sometime later, the descendants of Rurik made voyages down the River Dnieper firstly to make war against the Byzantines but later for trade, and we are told that enormous amounts of honey, wax, furs and slaves were exchanged for silks, wine and jewelry. On one of the voyages, two Vrangians, Askold and Dir, noticed a small town which occupied a very defensive position high above the river. When inquiries were made as to who its ruler was, they learned that the three brothers who had founded the burgh, named after one of the brothers, Kii, had since died and that the inhabitants had to pay tribute to another tribe. In 882 the Vrangians, led by Oleg, a descendant of Rurik, gathered their forces together and seized the town, choosing Kii (Kiev) as their centre of administration rather than Novgorod.

The Adoption of Eastern Orthodox Religion

It was in Kiev too, in 998, that the Rus people turned to Christianity. Like the story about the founding of their capital, the sources of the material are found in the 'Primary Chronicle' and are as suspect as the account of King Alfred of England burning the cakes. Vladimir, the Grand Prince, allegedly sent envoys to find out about the various religions, i.e., Islam, Jewish and the Western and Eastern Christian faiths. Their report makes interesting reading: "*We saw men worship in a temple that is called a mosque, where they sit and bow and look like men possessed; but there is no happiness among them, only sorrow and a dreadful stench. And we went among the Germans and saw their ceremonies, but we beheld no glory there. But when we entered the edifices of the Greeks we knew not whether we were on Earth or in Heaven. For on Earth there is no such splendor or such beauty and we knew not how to describe it. God doth truly dwell among men and there we saw beauty that we can never forget.*" It is cynical perhaps to suppose that Vladimir not only managed to secure trading agreements with the Greeks, but also chose Orthodox Christianity, as its followers were allowed to eat all types of meat as well as drink alcohol. Whatever the reason, Vladimir ordered that every pagan idol was to be destroyed and that a Christian place of worship should be erected. Kiev remained the centre of the Orthodox Russian Church until its seat was removed to Moscow in 1325.

Kiev Today

The beautifully-colored and magnificent structures of Kiev's Orthodox churches and monasteries with their onion-shaped crowns and domes are a distinctive feature of Kiev and well worth a visit. Kiev is also a city of many parks, botanic gardens, a zoological garden, well laid out university campuses, tree-lined streets and museums of culture, archaeology, and science and technology. It is divided by the wide River Dnieper with its deep sandy banks which is as busy in the Summer months as any seaside resort. It also has an extensive network of trams, buses and underground stations – the latter being the



Monastaries, churches and R. Driper.

Modern hives and a mobile bee house.

Outdoor feeding.

deepest in the world - all of which makes getting round the city both cheap and easy.

Bees and Beekeepers

But, of course, the main reason for going to Kiev is for the bees. For nearly two decades I have been in contact with Dr Alexander Komissar, who was a Professor of Apiculture in Kiev until his retirement. As a correspondent for the Beekeepers Quarterly he has written extensively about beekeeping in his country and described many of the innovations of Ukrainian beekeepers, several of them his own, which he allows others to manufacture freely. He is particularly known for his nucleus hives which have many compartments, electric heating systems for overwintering colonies in the cold areas of Ukraine, ekes with many small bars which allow bees to build lovely combs of honey, enough for one meal at a time, a method for harvesting nutritious bee bread from colonies, and for developing a thriving business of producing solitary bees for garden and glasshouse use. I was able to see all these inventions for myself during a two week visit to Ukraine last Spring. Alexander also took me to the apiaries of beekeepers he had written about; a beekeeper who uses a paraffin wax dip for preserving beehives; a beekeeper who markets a filtered suspension of wax moth larvae in alcohol (a few drops of which in water is a good health tonic when taken daily); another beekeeper who together with his wife uses the Nagataki method of diagnosing body ailments both before and after the treatment – those consulting them have the splendid experience of sleeping in special sheds, lying on top of beehives; and an ex-aircraft engineer who has made a fortune from his beekeeping by designing and producing his own mini-nucs and raising and selling local queens.

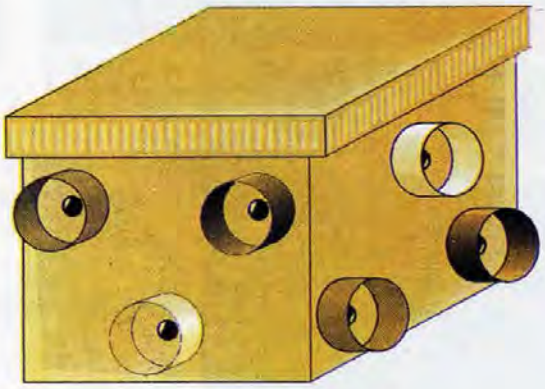
During my visit I attended an interesting conference held in a former Pioneer Camp (the Soviet posters were still on the wall), and, being an Orthodox country, those in attendance were splashed with Holy Water after a short religious service which marked the beginning of the event. The meeting was like no other one I have ever attended. Several beekeepers were on the platform together and this first session went on for three hours without a break except when a group of beekeeping suppliers started a shouting match which lasted for 20 minutes when the speakers claimed that a lot of the wax for sale was adulterated.

Best of all was the visit to the apiaries. Most of the commercial beekeepers stay in the forest apiaries with their bees during the season. Everything was well organized. A gas burner always on the go for black tea, a camp fire for cooking, fresh fish from the river, forest mushrooms, a pressurised hot shower made from a aluminium beer barrel painted black, fresh water from a spring and comfortable beds in the large mobile bee house which also housed colonies in two tiers and room for extracting honey. The main means of transportation were ex-Soviet military jeeps and lorries, relics of the Chechnya war. The Carpatica type bees are very gentle and build up quickly and are ready in time for the first major flow from acacia, after which the colonies are moved on to the numerous fields of sunflowers.

Chernobyl

As we were not far from Chernobyl, I joined Alexander on an organized visit. Just after the disaster it was Alexander's job to visit the region and collect samples of ducks from the marshes around the plant which had stopped over for a while on their northward migration. He found the ducks to be heavily contaminated with radiation – so word was sent out to hunters along the birds' route that they were unsafe for eating. Alexander also tested honey from a couple of hives after the disaster. Whilst he found very little if any radiation in the honey, the pollen was heavily contaminated.

The visit to Chernobyl? Well, I purposely bought rolls of B&W film in my belief that using this type of media



12 compartment mating nuc.

Mating nucs.

would best and most dramatically depict what had been, up until then, the world's most serious nuclear energy disaster. How wrong I was, for my small group arrived on an unusually warm Spring day with no clouds in the clear blue sky. The previous day had marked the 26th anniversary of the disaster and all the memorials were bedecked with garlands and small posies of flowers, tributes to those who had died at the scene. Whilst the buildings which we had been allowed to enter tragically revealed that in haste everything had been left behind, the shafts of light filtering through the dusty windows illuminated them in pastel shades. In the town of Pripyat, trees bursting into leaf were laying claim to what had once been pavements and balconies, and a few butterflies and a bee were feeding on the freshly opened cherry blossoms. In the unused children's playground, the ferris wheel towered over us and, like all the other structures made ready for the May Day opening, still retained many of its bright colors. As I walked round the quiet and deserted streets I almost felt that when turning a corner I would see some of the former inhabitants leaving their apartments as if it was just another **ordinary** day. Around the nuclear plant itself lorries carried their loads of cement to Reactor No 4 where a new sarcophagus was being built but, not far away, the cranes surrounding Reactor No 5 suggested that work was still in progress, although it had been discontinued decades ago. With many personnel on the site the whole scene was, to me, one of normality, a feeling consolidated by the beautiful day and the clear reflections of parts of the plant in the lakes that had provided the cooling water.

However, when we strayed from the paths to test the emerald green moss which thrived everywhere, the readings from the dosimeter shot up revealing a high level of radiation. In the midst of so much beauty, the plant and township surrounded by forests of pine, birch and lakes, there still lurked the potent remains of the unforgettable catastrophe. Apart from the original dangers concerning the explosion itself, the perils of a nuclear disaster are **insidious**, invisible, but still deadly if not respected. So, I needed to use color photography together with these words to highlight the fact that, despite the apparent visual normality, all is not as it appears; that whilst nature is reclothing the area in glorious beauty there remains the danger of the unseen, insidious nuclear pollution which has already wrecked the lives of so many people. I was left with a sense of great sadness and emptiness.

Surprisingly, maybe, I didn't leave Chernobyl thinking that there should be an end to nuclear powers stations. Chernobyl was an accident that wasn't supposed to happen. The nuclear industry has to learn lessons from this incident and the others in the USA and Japan. Harnessed correctly nuclear energy is an important and clean method of producing power though safety has to be of paramount importance. In the past too many people have died from the exploiting of coal and gas reserves and the effects of smog. Because of past reliance on the coal and oil industries the environment has been despoiled, in some places for ever and the continued use of fossil fuels will increase even more the carbon dioxide levels which are responsible for global warming. BC

(*Fortunately, throughout our escorted visit, care for our safety was of prime importance, and at various times during our visit, as well as when we finally left the zone, we were thoroughly monitored for any signs of radioactivity.*)

OUR VISIT TO CHERNOBYL WAS ORGANIZED BY YURI - Of ***UkrainianWeb.com****. He organizes tours for small groups which are collected from Kiev and transported, accompanied by a guide, to the Chernobyl exclusion zone. The tour lasts for a day and includes an excellent (safe) lunch at the staff canteen at the power station.*

XXXXIII APIMONDIA CONGRESS 2013

I am sure that anyone attending the conference will find their visit both interesting and worthwhile. The Ukrainian people are friendly and good hosts and their culture is very different from what we experience in the west. I have seen more innovations in this country than elsewhere – sadly, as yet, they are not ready to market many of their products because of the difficulties involved with exportation and bureaucracy. Should they achieve membership of the EU, then important markets would open up for the country.

For details of the Apimondia Congress see: **apimondia2013.org.ua/en/**

Comb storage.

MAKING

Small Scale Wax

Ed **Simon**

All the capping wax is sitting in five gallon pails and it is too much of a bother to send it off to be processed. So why not take try to process it yourself. After all wax costs more to buy than honey and there seems to be a steady market for it.

Processing your own wax in a small volume does not require a very large investment and can reap reasonable dividends.

Equipment

Much of the equipment needed can be obtained for a good price from your local Salvation Army store. It may not be available the first time you visit the store but all the needed equipment will eventually show up.

1) 5 gallon pails
2) Large sieve
3) Cupcake pans (molds)
4) Crock pot
5) Ladle
6) Wax releasing agent
7) 1 lb. plastic butter containers or other plastic tubs (Molds)
8) An outdoor propane stove or turkey roaster.
9) Filters

Warning:

For safety perform the first part this process outdoors.

Wax will catch on fire.

Wax burns when it splashes on your skin.

Beeswax Properties From Wikipedia

- Beeswax has a relatively low melting point range of 62 to 64°C (144 to 147°F).
- If beeswax is heated above 85°C (185°F) discoloration occurs.
- The flash point of beeswax is 204.4°C (399.9°F)
- Density at 15°C is 958 to 970 kg/m³.
  - o Just a little lighter than water.
  - o We will make use of this attribute.

Assumption:

Before we start, I'll make an assumption that the wax is dirty and full of honey. If your wax has minimal honey mixed in then you can eliminate the first step.

Step 1: Remove the honey from the wax

This can be accomplished in either of two easy ways:

1) Spread the wax out on cookie sheets and allow the bees to remove the honey. This is the easiest, most efficient and conservative way to remove the honey. Unfortunately, it does not work at temperatures below 60°F.
2) Put the wax in a five gallon pail and add warm water. Mix the wax and water, then strain the solution through a kitchen strainer. The honey water mixture will flow into the pail with the wax remaining in the strainer. The procedure may have to be repeated a couple of times to remove most of the honey from the wax. After the water settles, any wax that makes it through the strainer can be skimmed off the surface of the water and reunited with the wax in the strainer.

Step 2: Remove the bee's knees and other solids from the wax

This step requires melting the wax so it will flow through the strainer. For this we'll use the properties of water and wax to safely melt and separate the wax. Since water boils at 212°F. and wax melts at 145°F. and the flashpoint of wax is 400°F, you can melt the wax without worrying about it catching on fire as long as there is water in the container. The water boiling off at 212° will limit the temperature of the wax to 212°.

Warning: Do not let all the water boil off or the mixture or the wax temperature will rise above 212°F.

Warning: Wax and water may boil over while you are processing it. Be careful; boil the wax/water outside in an easily cleanable area.

Continued on Page54

THINGS

A Window Mounted Observation Hive

Peter **Sieling**

An observation hive makes an interesting and educational addition to your home, but not everyone cares to share their living space with a colony of honey bees. This observation hive stays outside, mounted to a window frame. You can watch the colony activities from the comfort of your home, but the bees stay outside.

This design uses six medium (6¼") frames, two deep. The larger number of frames helps the bees control their temperature more easily. You can watch the bees store nectar and pollen, and see the brood develop and emerge. The hive interior can be accessed quickly and easily from outside for stocking with bees and cleaning.

Lumber

Yellow poplar, basswood, and aspen are inexpensive woods and easy to work with. Most softwoods will also work, including white and sugar pine, cedar, and cypress. For the door, use 1/2" exterior grade plywood.

Tools Required

Use a table saw to cut pieces to length and width. Mill the frame rests with either a dado blade on the table saw or a router mounted on a router table with a straight bit. The ventilation holes can be bored with a hand drill and spade bit, but a drill press and Forstner bits do it faster and more accurately. I used pocket screws to fasten the top, bottom and sides. They require a pocket screw jig, available at most building supply centers. Alternatively, you can use 2" dry wall screws through the sides into the top and bottom. To mill the glass inset rabbet, use a router and straight bit. The feeder hole can be made with a jigsaw or router.

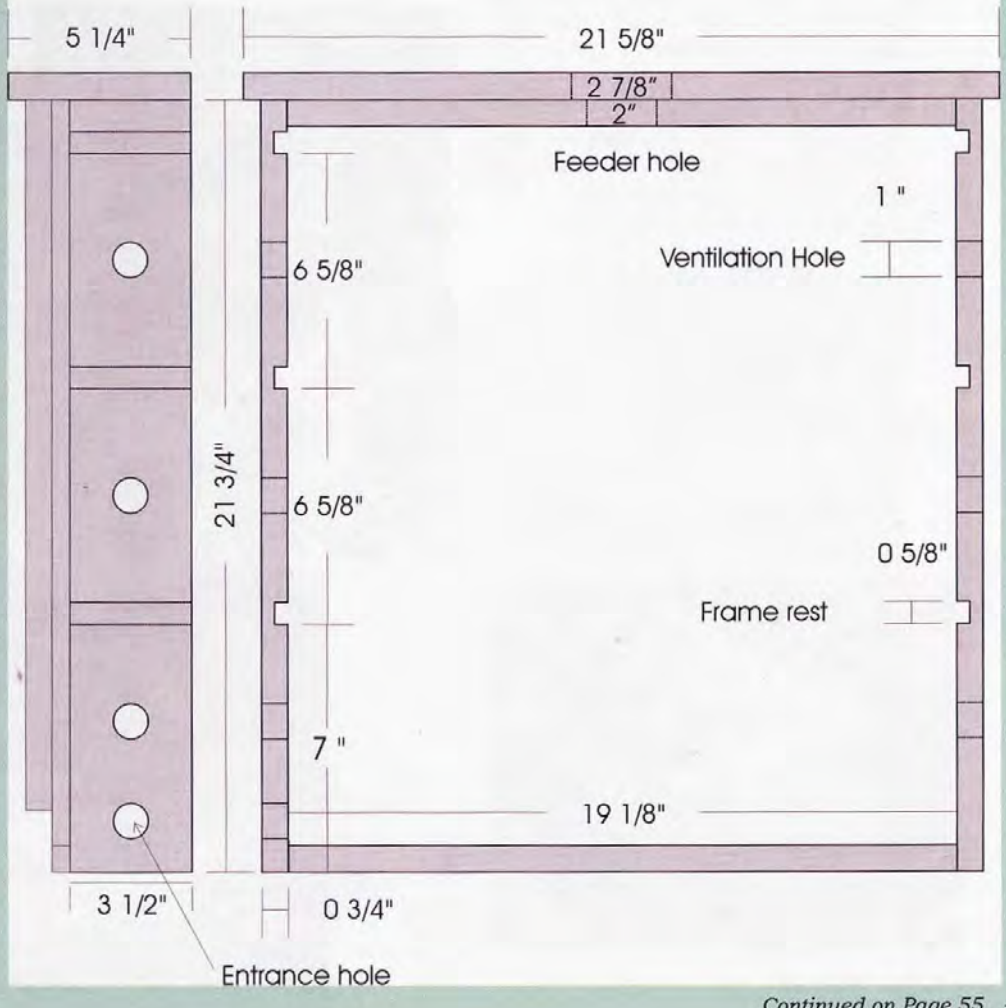
Step 1. Start by cutting the sides, top, and bottom to length and width. Mill the dados and drill the ventilation holes and entrance hole on the sides.

Step 2. Fasten the top and bottom to the sides, either with a pocket screw jig or by drilling, countersinking, and screwing from the sides into the top and bottom.

Step 3. Mill the rabbet that holds the glass. Make a jig (see photo) to support the router base, keeping it level. Add a fence to guide the router in a straight line. Set the router bit height to the thickness of the glass. Clamp the jig and the observation hive frame to your work surface, and then carefully mill the rabbet. The corners will have the same radius as the router bit. They can be chiseled square so the glass fits. If using a clear acrylic sheet such as Plexiglas, it may be easier to round the corners of the plastic with sandpaper.

Step 4. The keeper strips are thin wood strips that hold the glass in place. Rip them from 3/4" stock and cut to length. Install the glass after applying the finish.

Six Medium Frame Window Mount Observation Hive



Continued on Page 55

While the wax is melting, add a gallon of hot water to a five gallon pail. Once the wax is melted pour it through the strainer into the pail. The hot water in the pail will slow the solidification of the wax and allow the remaining impurities to slowly separate. The larger impurities will remain in the strainer.

After the mixture cools the result will be a layer of wax on top and a layer of impurities on the bottom. Depending on the degree of separation, this step may have to be repeated several times.

Step 3: Remove the bottom layer

Using a putty knife or your hive tool, scrape the layer of impurities from the cake of wax. Since you will probably get some wax in the scrapings, save them for further refinement.

Step 4: Re-melt the wax in a crock pot.

The crude refinement of the wax is complete. Now it's time to remove the last of the impurities and to mold the wax into sellable sized units. A crock pot works great for this step. It is best if you can get a crock pot that has variable temperature control, not just the standard Low, Med, Hi settings.

While the wax is melting, spray a wax releasing agent into your molds. And set them on a level surface.

Note: Wax releasing sprays are available at hobby stores.

Then attach your filter to a container that has a pouring spout. I use a Pyrex four cup measuring cup for the container and milk filters for the filtering device.

Note: I use standard and small cupcake pans as molds along with plastic one pound butter tubs for most of the molds. When I need a larger mold I use mini-bread pans.

Note: Milk filters are available in any farm supply store. They are extremely cheap (100 for $6.00) and are thrown away after one use. A coffee filter may also work but I have not tried using one.

Step 5: Filter and pour

Once the wax is melted, use a ladle and filter the wax through your filtering device. When the wax hits the cool surface of the Pyrex measuring cup it will start solidifying. To delay the cooling, you can preheat the measuring cup in a microwave oven. Then pour the wax into your molds.

As the wax cools you will notice some fantastic designs forming on the top of the wax. When the wax is cool remove the wax from the molds. If the wax is stuck in the mold place the mold outside in cold weather or in a freezer. The cold will shrink the wax for easier removal.

Conclusion:

If you make your wax cakes in multiple sizes, your customers can purchase a volume that closely matches their needs. BC

Step 5. Make the back rail. This is fastened to the bottom and provides a place to attach the door hinges.

Step 6. Cut the door to size. Plywood is almost never flat. Make cleats to counter the warp. Use water resistant wood glue and small nails to reinforce the plywood.

Step 7. The cover overhangs the observation hive on the sides and back and holds the feeder. After cutting it to size, trace a jar lid that fits your feeder jar on the cover and use a jigsaw to cut a hole. Cut a smaller hole in the hive top to provide a lip on which the feeder jar sits. If you don't want bees crawling out of the feeder hole when changing the feeder jar, cut a disk out of 8 mesh hardware cloth and insert it in the hole.

Step 8. Apply a finish before assembly to avoid splashing the finish on the glass, latches, and hinges. Use exterior grade polyurethane, spar varnish, or primer and paint. Leave interior parts unfinished. The bees will apply their own propolis.

Step 9. Use screws, brads, or small nails to fasten the back rail to the hive body. Mount the hinges to the rail and door. Add the latches. Staple window screen or eight mesh hardware cloth over the ventilation holes on the inside of the hive. Insert the glass and tack the keeper strips in place with small nails or brads.

Mounting the observation hive

Make a shelf to hold the observation hive from a two-by-four cut the same dimension as the window frame's outside dimension. How you attach it to the frame depends on the construction of your window. I cut notches on the ends just deep enough so the shelf doesn't quite touch the window glass. That reduced the width enough that I could use dry wall screws drilled into the window frame. Screw the observation hive to the shelf. To hold the hive steady, attach a second rail across the top of the observation hive or screw eyelets into the window frame and tie it with wire. Make sure the wire doesn't interfere with the opening and closing of the access door.

A window mounted observation hive gives you quite literally, a window into a different world. For more information on setting up and stocking an observation hive, see the A.I. Root publication Observation Hives, available at www.beeculture.com/store.

Step 1A

Step 1B

Step 2

Step 3

Step 4

Step 9

Finished Project

Materials		
Description	Dimensions	Number required
Sides	3/4" x 3½" x 21¾"	2
Top and Bottom	3/4" x 3½" x 19-1/8"	2
Cover	3/4" x 5¼" x 21-5/8"	1
Back Rail	1/2" x 3/4" x 19-7/8"	1
Plywood door	1/2" x 19-7/8" x 21"	1
Door cleats	3/4" x 1 3/4" x 20"	2
Keeper strips (vertical)	1/8" x 3/4" x 20 1/4"	2
Keeper strips (horizontal)	1/8" x 3/4" x 19 7/8"	2
Cover	3/4" x 5 1/2" x 21 1/2"	1
Glass or Plexiglas	19" x21"	1
Hinges		2
Hook latches		2
Window screen or 8 mesh hardware cloth	1 1/2" x1 1/2"	6

About the writer
Peter Sieling keeps bees, sells lumber, and writes books in Bath, NY. Find out more at ***www.makingbeehives.com.***

BIGGER PICTURE

Jessica **Lawrence**

Rub-A-Dub-Dub, Honey Bees In A Tub

I keep hearing all of these stories about the "doomsday preppers" or just those Preppers (with a capital "P" for emphasis) who are hoarding toilet paper and food for when the economy collapses, or the asteroid hits, or whatever it is that is supposed to happen. I used to mock these people as well, until I realized . . . they're just country people with a different title. I grew up in the foothills of North Carolina, and most of the things that Preppers do are the things that my family did. It's not uncommon to lose electricity for long periods of time, not be able to go to the grocery store, and overall independence is something you are born with in the rural parts of the country. When my grandpa and grandma went to the grocery store, it was to stock up on things like sugar and salt and flour, not potato chips and frozen food. They raised most of their own food, and the basement *was* the grocery store.

It's not just about the independence, it's also about money. It takes a lot of money to support a family, and these days, people just don't have it. For some people, it's about using more of the natural substances and controlling household exposure to the unknown. For me, it's a challenge to see how much I can do on my own and get it right. I think it is awesome to save money (more to go towards seeds and bees and chickens) and also to simplify life a little, but I really am in it to learn how to do it myself. My newest "hobby" in this line of progression is homemade cleaning products. I rarely use pesticides outside and around my bees because I'm too lazy to read a label, so I've resorted a lot to the garden tricks and manual labor as much as possible. I started thinking one day that it might be neat to make up my own inside stuff like I do outside, and then I started the research.

One of my favorite people to talk to is Tom the Chemist. He gets a titled name because that's how I refer to him to my other friends. I am not a fan of chemistry, to put it mildly. Tom has a fun time pointing out to me when I contract that sentiment, like my love of cooking and how everything in food preparation has a basic chemistry component. Or like how I have a Periodic Table of Elements for a shower curtain. Once I started my process of homemade cleaners, I have thought of him a lot because of the general chemistry of mixing things together and hoping they don't explode. For example, when you make homemade cleaners, you don't use bleach and vinegar or bleach and ammonia because it releases toxic fumes. What I learned chemistry-wise is that bleach has hypochlorous acid, and when mixed with something like hydrochloric acid (like toilet bowl cleaner, or essentially vinegar), you get the release of water and Chlorine gas. This type of gas attacks all of your mucous membranes, like your eyes, lungs, nose . . . you know, those unimportant places. It can kill you. This is the most important chemistry lesson I learned with homemade cleaners.

I'm going to share with you some of the best cleaners that I've used. Nearly everything in my ingredient list was already in the house, and the ones that weren't are not expensive and last a long time. I hope at least one or two of these will work for you, and that you enjoy these little chemistry experiments.

Basic Ingredient List:
Rubbing (isopropyl) alcohol
Hydrogen Peroxide
White vinegar
Vegetable oil
Olive oil
Lemon juice
Mild dish detergent
Baking soda
Washing soda
Castile soap
Borax
Fels Naptha soap
Cream of tartar

Of this list, white vinegar is the powerhouse cleaner. For nearly any normal cleaning job, it can handle the task with ease. Don't use it on things like marble. A new chemistry component: marble is primarily limestone, which is basic, and the acid in vinegar will etch and erode the stone. It's similar to what acid rain does to marble statues, wearing off their finish and staining the surface. Vinegar will also erode grout, so be careful! Other surfaces should be fine with vinegar. I usually have at least a gallon in the cabinet at all times, and it's a cheap ingredient. It's also a disinfectant, but it's not magical – if you're dealing with bacteria, like raw meat, use something stronger like hydrogen peroxide to clean up the mess.

Laundry

I am fair skinned and allergic to all sorts of weird things, primarily most detergents (but not bees!). Robert, my beekeeper friend in California, washed my bee suit

once with granular detergent and I broke out in hives. I also can't use certain brands of liquid detergents. I decided to give the homemade version a try, and it is some of the best detergent I've ever used, and it is ridiculously cheap. You can easily find these things online, or sometimes in the laundry section of the grocery store, and it will cost you about two gallons worth of detergent to purchase. For this list, you need one bar of Fels Naptha soap (Ivory soap, deodorant soap or beauty bars can be substituted here, but I've only been comfortable with Fels Naptha), washing soda and Borax (I use 20 mule team). You should never substitute washing soda for baking soda, as they are not the same (washing soda is basically ash, baking soda is made from nahcolite, a mineral). Washing soda has a high pH (11) and can burn your hands, so wear gloves when you use it.

Take a bar of Fels Naptha soap and grate it into a sauce pan with a quart of water. Heat it until it melts, then add a cup and a half of washing soda and a cup and a half of borax and mix until it dissolves. Then, pour it into a five-gallon bucket and fill to the top with HOT water. If you do not use HOT water, the original mixture will gel into chunks. I learned this the hard way. It's still usable but not friendly. You have now made five gallons of detergent. I even cut mine by filling an old detergent bottle halfway with the new mix and filling the other half with hot water. Mine has lasted over a year. With my initial purchase, which included two bars of Fels Naptha, I still have enough to make another batch and it was around $25 for all the ingredients.

If you are into the powder form, you can grate a cup of Fels Naptha, add a half cup of washing soda and a half cup of borax and mix them together in a jar. You only need a teaspoon at a time for washing, or two teaspoons for extra dirty loads. This really works better if you wash on the hot water cycle though.

All-Purpose Cleaner

A good general cleaner that is one of the few without vinegar is using two teaspoons of borax, two tablespoons of dish soap and a quart of water in a spray bottle. This will take care of most messes. You can also add one to one ratio of vinegar and water in a spray bottle. If you really need to disinfect something, use a mix of 50/50 hydrogen peroxide to water, but keep this one in a dark bottle because light will break it down and make it useless.

Cleaning Wood Surfaces

I have nearly all wood floors in my house with the exception of the kitchen and bathroom. Most of the furniture is also wood, so cleaning these is a little different than other surfaces. For the wood floors, I use a half cup of vinegar to a gallon of hot water, and if it's really nasty I add a teaspoon of castile soap. On places that are scratched or lighter than the rest, I will clean with a mix of steeping 15 tea bags in two quarts of hot water. It will clean the floor and darken lighter spots.

For cleaning wood furniture, I use a mix of six teaspoons of olive oil to three cups of vinegar. You only need to dampen a cloth with this and wipe. If I want to also polish, I use a cup of vegetable oil with a half cup of lemon juice and it polishes well and has a nice scent. Similarly, if you need to clean leather, you use olive oil mixed with a few drops of lemon oil. Be sure to not overdo any of these or it will be a mess.

Glass

I have two different glass cleaners. I tend to use the first one for "normal" glass and the second one for when the dogs press their noses into the windows and leave nose smears everywhere. For the first, use a cup of isopropyl alcohol, a cup of water and a tablespoon of white vinegar. For the second, use a half teaspoon of a mild dish detergent, three tablespoons of vinegar and two cups of water. The soap in the second one helps a little bit more with nose drool.

Bathrooms

For getting rid of stains in the bathroom, sprinkle some cream of tartar on the spot and use a lemon half and rub it over the spot. You can also make a paste with the cream of tartar and vinegar and use a cloth to wipe it. Rub it in and you can let it sit for a few minutes if it is a particularly stubborn stain.

A paste made of baking soda, dish soap and lemon juice will take care of most any surface cleaning in the bathroom. You can also use this in combination with the all-purpose cleaner for wipe downs.

To clean a toilet, dump in a cup of vinegar and then use a toilet scrubber. You can add in a quarter cup of borax for tough jobs, or use a half cup of borax with a quarter cup of lemon juice.

Cleaning a vinyl floor in a bathroom can be similar to the wood floor mentioned earlier, or you can add a bit of soap to the mix. Use a cup of vinegar, a quarter cup of washing soda and a tablespoon of dish detergent to two gallons of hot water. BC

Jessica Lawrence is a Research Entomologist for Eurofins Scientific, an avid gardener, beekeeper and tattoo collector.

Random Thoughts

Larry **Connor**

Fine-tuning The Drone Season and The Production of Increase Nuclei

Since I released *Increase Essentials* in 2006, many beekeepers have adapted the production of increase nucleus as an integral part of their beekeeping operation. This is not a surprise to me, but is quite reassuring, in large part because many larger beekeeping operations have used nucleus increase for years as a key part of their seasonal growth before the nectar flow. These beekeepers may incorporate a trip to California for almond pollination, and thus benefit from a strong flow from that crop to build up their colonies so they are ready to be split or used to produce increase colonies once their hives have returned to their home apiaries.

These operations generally limit the production of new colonies to the Spring period, making nucs in March or April as they benefit from the increasing warmth of their southern locations. Drone populations are generally large, especially after their visit to the almonds, and the queen cells they use successfully turn into queens that are mated well, with large numbers of well-fed drones.

This does not necessarily happen for the non-migratory northern beekeeper. Often with fewer colonies, they are typically the progressive and experimental apiarists who seek to make nucs in the Spring with the intention of growing the colonies into full production colonies in time for the nectar flow, or continuously reduce brood and bee populations (often by making additional nuclei), as the season progresses, so they may overwinter the nuclei.

Many of the beekeepers of this size operation that I have visited this Spring purchased queens from California or Hawaii to install during the first cycle of nucs, often made up just as soon as they can build the colonies to a suitable size to split. Others wait for weather conditions to improve to the point when they can produce their own queens and get successful mating in their northern apiaries. Many start with purchased queens and then shift to home-reared, survivor or genetically improved stock for their queen supplies. They may continue making nucs throughout the season.

After attempting to make nucs myself throughout the season, I am fine-tuning the process. Northern beekeepers often feel that they have abundant drones throughout the season, but my observation is that that there often huge gaps in the availability of drones in their colonies, and more important, in the colonies of their neighbors, that will result in successful mating with their queens.

Because we rely upon increasing temperatures, both daytime and nighttime, to generate the rapid growth of the brood nest in the Spring, cold and blustery weather as experienced in 2013 throughout much of the United States held colonies back and forced the beekeeper to provide sugar fondant feeding and protein patties well into the Spring. Both were necessary to produce colonies of a size and strength that would have developed naturally with warmer weather and earlier pollen and nectar sources. Fortunately colonies headed with top-quality queens were able to respond to feeding and produce an abundance of brood and drones.

In April beekeepers started to phone me for Michigan-raised queen cells or virgins. It was pretty interesting, because few of them could state that they had any drones in production in the cold spring weather that would mate with these queens. True, some exceptionally strong colonies were making a few drones, but not solid brood frames needed to time the graft.

Once again I reminded them that they must have drones in the purple-eyed stage (about the fifth day of pupation) to generate the drones that will be sexually mature when the queens they graft that same day will be out flying, seeking 13 to 20 sexual partners. It would have been difficult to produce queens in the weather that included long cold periods with snow and lack of forage during early Spring, but these cold-weather queens would not have found many drones from overwintered colonies. Ironically, the best source of drones in Michigan in April of 2013 was from package bees shipped in from southern states and California. It is not a formula for good mating.

This door for drone production opened in late April, but last year it closed in early August. Our attempts at mating queens were foiled by a rapid reduction of drone production during July and the rejection

There is a frightenly short time for a beekeeper to generate these colonies, it requires careful care and management to make sure queens are well mated

of drones during August. Ironically, many colonies produced a second season of drones during the late August early September flow from goldenrod and aster, but by then I feel it is too late to get queens mated in nuclei that will be strong enough in terms of young bees and stored honey to survive the Winter as nuclei.

Nuclei that we attempted to mate in August either produced drone layers or failed to produce any queen at all. Recently my Spring inspections revealed colonies filled with frames of mixed drone and worker brood, as supercedure queens mated in August that were running out of semen. Ironically, the criticism many northern beekeepers have made of early spring queens from the south – that of being poorly mated – stared us in the face in the north with our own queens! We need to get queen replacement done while there is a nectar flow underway. If you are in an area where the last nectar ends in June, you have a long, hot Summer dearth during which colonies must be protected from robbing (from both other colonies and social wasps) as well as fed if their stores are too rapidly consumed.

All this being said, I suspect that the best time for me to make increase nucleus production starts when the drones appear in late April and ends sometime in July. This is a frightenly short time for a beekeeper to generate these colonies, and, as always, requires careful care and management to make sure the queens are well mated and the colonies strong enough for Winter.

Feeding is a partial answer, but this adds to the cost and time of keeping bees. Better is to get all drone production and increase nucleus complete during May through early July and call it quits for making increase. Manage strong queens with a balance of bees and brood to be added to weaker colonies and ensure all are able to survive long periods of Winter confinement.

Swarms and The Ecosystem

Bees and plants communicate in several ways. The most obvious way is during the pollination process; during which bees collect pollen from flowers and perform acts of pollination so the plant's reproductive mechanism moves on to pollen germination and the fertilization process. Once this occurs, many flowers reduce or terminate their attractiveness to bees and other pollinators by stopping nectar production and terminating growth and production of new flowers. This can be seen in plants like cucumbers, melons and squash – as flowers are pollinated there is a slowing of growth on the vine and reduction of new flower formation. This ensures the full development of the fruit that have been pollinated will be well supported by the plant. Should there be a failure in pollination the vines will continue to grow and continue to produce new flowers. Without pollination the grower will have lush vine growth and few fruit.

When weather or a shortage of pollinators reduces successful flower visits in sweet clover, the plants will continue to grow and hold the flowers for days and even weeks to provide reward to pollinators. But once the flowers are visited by bees and the ovary of the flower is fertilized, additional growth of the plant slows. In areas with large numbers of pollinating insects the sweet clover flowers will be set quickly; mowing and grazing, when developing seed is removed, will often result in regrowth of the plant and the development of new flowers, especially if Summer rains renew the plant's vigor.

Bees are electrostatic pollen magnets; attracting the fine, dry pollen to their bodies to ensure their body is covered with the agent of fertilization the other flowers may need. As bees visit new flowers, more pollen is attracted to their bodies but some may be deposited onto the receptive stigmas of the flowers, where the fertilization process occurs. The bee grooms her body to remove pollen from her body by using the front legs. A small structure on the middle of the front leg is the antenna cleaner, which the bee uses to remove pollen from her highly sensitive antennae.

When bees visit flowers they leave odors from their bodies on the flower that trigger a pass response by additional foragers.

When bees visit flowers they leave odors from their bodies on the flower that trigger a pass response by additional foragers. Some of these odors come from the worker bee's tarsal pads, which produce a footprint substance that other foragers detect and move to a new flower. This increases pollination efficiency, giving the flower time to secrete more nectar and perhaps dehisce more pollen. This is typically seen in plants that have a longer bloom period. But in flowers that are open for only a few hours, like the above-mentioned cucumbers and squash, there are few chemical odors hat deflect pollinators. We see bees hovering over flowers and hesitating before landing on the structure. They are apparently monitoring chemical signals from the flower and the previous flower visitor before they waste the time to probe for nectar when the flower has just been visited.

These bee and flower interactions lead me to ask the question: *Do swarms have similar feedback mechanisms with the ecosystem in which they are produced?* Do they monitor chemical signals produced by flowers and foliage to determine when to swarm?

There is a clear pattern of maternal favoritism by swarms in an isolated area. Since feral colonies are respread in the ecosystem, found in suitable nesting cavities and near favorably water supplies, especially in areas where moisture is in short supply.

After swarms enter a new area, its bees work to forage area flowers and collect pollen and nectar. This may increase the population of flowers that benefit by honey bee visits in terms of greater seed production, fruit yield and fertilization success. The presence of a new swarm in a new territory has a positive effect on their ecosystem by fully supporting flowering plans pollination requirements. Successful swarms quite often swarm their second season, and may produce multiple swarms. The parentage of success of these swarms surviving to reach their first anniversary is less than 20 percent, based upon work by Seeley and others.

But the founding swarm has improved the ecosystem where it exists and this should mean that more bees could be supported in their region (all things being equal). So if the founding colony produces a swarm and it does NOT reach its first anniversary, it does not mean that the colony has failed to support future growth of the bee population in the ecosystem. Why? Because that nest or cavity contains beeswax comb that required an enormous amount of bee energy to produce and build. Should the founding colony survive for several years, and continue to generate swarms nearly every year during this time period, subsequent swarms will benefit by discovering the nest of 'older sister swarms' that died. Scout bees are attracted to beeswax comb, and the younger sister swarms will often 'vote' to move into a previously constructed nest rather than start anew. That comb may represent the equivalent of 20 to 40 pounds of honey the older sister hive collected and digested to produce beeswax; this is honey that the younger sister hive will be able to use for growth and winter food storage.

We have a very poor understanding of this tremendous change that occurred in the Americas as *Apis mellifera* spread across the two continents hundreds of years ago when Spanish and Puritan settlers introduced colonies. Relationships with honey-bee friendly plant species favored both bee colony and plant populations of these selected plants. Other insect pollinators faced new competition from these aggressive foragers and may have experienced a suppression of population levels as their share of the food supply diminished.

But of course, the addition of Western cultural practices, related to farming and ecosystem alteration, had an even greater effect on pollinating species, many of which are undoubtedly facing extinction. BC

DOWNTOWN

Life is what happens, so you should make other plans.

Beekeeping Emergencies In The City

Sudden, fast moving situations take place in beekeeping wherever you set up your hive stand, so why should urban beekeeping require any special consideration? This could be opinion, but events that have happened in apiaries for thousands of years seem to have a wider and potentially more destructive impact in situations where they affect a greater number of people.

Cities are just another habitat – one with a lot of people in it, and centered on their needs. You have heard that here before. Partly, we owe it to our human fellow citizens to consider how our beekeeping choices and plans concern their welfare. Maybe being a bit more selfish, we also have to worry about how the management decisions of beekeepers impact our own future in urban (and even suburban) settings. So talking about emergencies in the city is really talking about how we deal with people when unpredictable yet highly probable events, natural and otherwise, take place.

This is repetition, too, but it needs to be said: you will be amazed how many friends you will make just by showing up with a veil and a plan. In many ways, preparedness is next to godliness and you should make it your maxim should any of the events that make beekeepers lose sleep happen to any of your hives.

Bee-us Ex Machina: Bee Misbehavior

Swarms, of course

Every colony is a dynamic, internally motivated superorganism which the beekeeper cannot command, and can struggle to manage when human and honey bee priorities collide. Swarming is, of course, the single most common headache of this nature, and there always seems to be a swarm somewhere a drooling TV news crew can make much of every year. I like to consider prevention, pre-organizing a response, and including some public education as part of our local Emergency Preparedness Plan.

First, please consider splitting any hive that comes out of winter strong. I know, *I know*, this impacts your honey harvest, and sometimes queens are not yet available, etc., but every swarm is an opportunity for a well-publicized media freakout, if not a perceived stinging incident.

If the bees do swarm, as they certainly will, since there are feral colonies out there, it really helps to have developed (before swarm season starts) a call list of interested beeks around your area who can respond, and who already have the tools on hand to do so. Just providing a list of helpful swarm capture gear to every beekeeper in your area, as well as the information that swarm season peaks before a major nectar flow, will at least get people thinking about this.

There is also before and after public awareness work to do: make sure public safety authorities know whom to call, and it does not hurt to inform neighborhood networks and pest control companies, either. After a swarm issues – while you scramble to gather it – take some time to explain what has happened, how it is a marvelous second kind of reproduction that honey bees employ in particularly beneficial circumstances, how gentle they are, and *how wonderful it is that such a bee-friendly community exists where people do tremendous green good just by calling you in!* In one conversation, your freaked out neighbor can switch from someone running scared to a person patting themselves on the back. This is gold.

Robbing

The average human has no idea that robbing behavior exists, but it probably presents the single most threatening beekeeping phenomenon if your hive is in a congested area. A honey bee robbing frenzy, which commonly occurs around times of dearth or where big differences in hives strength exist, can easily spread across property lines, with aggressive and defensive bees in a fight to the death with each other and the occasional hapless person they meet. Many urban beekeepers are not aware that robbing behavior can extend beyond their apiary, but they need to pay attention. And almost all of the game here is prevention.

Learn when periods of dearth are likely to occur in your area, and try to monitor beekeeper communications about whether they are starting to see it anywhere nearby. Myself, I like to place robbing screens on my city hives starting in August: if robbing does not have a chance to get started, it does not have a chance to go exponential. If you don't want to deal with screens, be ultra careful about opening and feeding hives during dearth, and try to maintain hives of roughly even strength. Close openings in

hives, like beat-up corners, warps or cracks in woodenware. If you have been lax about painting your hive bodies, reconsider your reluctance to throw on a couple of layers that might help your gear stay bee tight.

If robbing gets started, you must react as quickly as possible: close up your hives, hose down your apiary if you can. After sunset, you might just need to get the victim hive the heck out of there. Hives that succeed in robbing often keep it as a strategy, however, so your time of watchfulness has only just begun.

Bees in Structures (or Sometimes Trees)

I call bees in structural cavities "The Swarms That Got Away," and while I do not consider them to be the time-critical sort of emergency which robbing is, city homeowners who find themselves host to a colony of only a few thousand bees would beg to differ. Most urbanites pay an insane portion of their personal wealth for housing, and consider any threat to that investment to be existential. If we beekeepers want to lose friends in the city, an epidemic of hives in homes would do it. However, a helpful beekeeper who can be found easily, who responds promptly, and solves the problem effectively becomes a superhero: one you want to keep around.

If you have published a list of swarm responders, many of these homeowners will find you. Still, getting the information that folks who can respond are out there – via club websites, Facebook pages, etc. – anywhere Google can fine them is really helpful. This is advanced work, however, and you need to learn how to do it. Learn from folks downtown or in surrounding areas who have done it, take a look at Cindy Bee's fabulous *Honeybee Removal: A Step by Step Guide*, review samples of agreements between beeks and homeowners before taking this on, and build up a shared reservoir of specialized tools, like bee vacs, that make this work feasible.

Bees in Trees

Many beekeepers don't realize that the average age of trees in many urban canopies can exceed suburban plantings by almost a hundred years: that means a lot of old, hollow habitat trees are out there, and feral colonies have found them. Here, we hear about such colonies when one of two events happens: the tree is taken down, or the bees start to use an entrance where people can see them.

In my experience, it takes a village to address an urban bee tree. Usually, when I show up in my veil, tree contractors will do almost anything I ask them to: cut the trunk here, lift the thing into the back of this pickup. But I need a place to bring the darned thing to take it apart, the loan of a chainsaw and someone less likely to hurt themselves with it than I am, and some helpful souls willing to place combs into frames, etc. In almost every case, my allies from outside the city have proven to be true-hearted friends with the bees' interests at heart and a willingness to teach. Don't forget to turn to them, as well.

The public education angle works here, too: "Your community is so green that these bees were able to survive in perilous times with no human intervention! Would be a pity to lose them!" Sometimes this buys the bees more time in place while you organize a response. Sometimes this gets you some non-beekeeper helpers.

Human Hijinks

Vandalism

In cities, the truth is that bees have way more to fear from people than vice versa. Here in DC some cowardly jerk sneaked onto private property to spray insecticide into a hive. At the Arboretum, someone knocked over a hive at the Youth Garden two years ago. Rule of thumb: there is nothing stupider than three teenagers (any age, any gender, any nationality, any planet). The first one says, "Hey, that's a beehive!" The second one says, "I hear bees sting!" And the third one says, "I dare you . . ." Teenagers are widely abundant in urban settings.

How you site your hive and your general awareness of its vulnerability are your best tools here. I sometimes place a "honey bees here!" sort of sign (in places folks could just stumble onto) and sometimes I don't (in places where they know darned well they should not be, and I do not want to raise hive profiles). I think hive colors that blend into the background are a good idea, as well as restricted lines of sight.

Your bees will be less vulnerable to vandalism the lower their profile and the greater your control of access (this is one reason roofs are great).

Why you shouldn't let me run the chainsaw. Author with Scott Seccomb. (photo by Maggie Mills)

Sean McKenzie removes a feral colony four stories up! (photo by Greta Hendricks)

Nonetheless, you need eyes on the prize as frequently as you can manage in case something happens. At least pass by your hive a few times a week, or have folks nearby check in for you. If something bad happens, you can piece the hive bodies back together and ensure colony survival better the sooner you respond. If a poisoning has occurred, you have a better chance of identifying when it happened and engaging the authorities (this is a *crime*, after all) if you maintain basic awareness.

Neighbor Issues

The emergency I have feared the most is The Enraged Neighbor, a conflict where I might have to choose between living in peace, having to move my bees, or being sued. The best chance you have here is to follow the best management practices for your area: many jurisdictions (including this one) have them written into law, and proof you have followed the rules may protect you.

Also protective is maintaining a good relationship with your neighbors in general: even before you bring in bees, and whether or not you choose to tell them that the hives are there. If you think of every habitat as an equilibrium, you have strengthened yours if you already communicate and cooperate with your neighbors. If you are already not on speaking terms, what the heck are you going to do when a conflict breaks out?

When I've had bee issues (and I have) my neighbors tend to end up thinking they are wearing halos, because they participated in the fruitful solution of a problem. I tell them they are wonderful, and share my harvests. They deserve it.

Mother Nature's Antics

Since I've been a beekeeper, we've had earthquakes, horizontal tornadoes, hurricanes and super storms: something every year. Considering how many city hives are on roofs, this is a sobering thought. But we have survived.

When I worry about wind, it is not usually so much about the bees themselves. I have righted many an overturned hive, and have yet to lose one (though I've yet to do THAT without a generous dose of apitherapy). I am worried about lofted hive parts meeting heads or windshields, about fire companies responding to blazes with bees on top, about innocent passersby getting stung by upended bees. I'm a worrier.

One model for figuring out how much you are gambling with the forces of the universe is a simple equation: *Risk = Probability x Impact.* All beekeeping is local: what is most likely to take place in your apiary? What would happen if it did? If you needed help, from whom could you get it?

Know your hive site. If wind is a threat, don't settle for a brick on that telecover: go for a cinder block. Or two. Set up ultra-stable hive stands, and consider strapping or bracing if extreme weather is predicted. If flooding is a possibility, have a high stand, or recruit a back up apiary when trouble is predicted. Jim Fischer of New York City told me that beekeepers there set up an emergency apiary for beekeepers affected by Superstorm Sandy. If *you* have a safe harbor, consider letting people know it.

And watch the weather: if you know a bad one is coming, do what you can ahead of time and check in as soon as you can after. Even if your hive is at ground level, downed tree limbs, flying lawn furniture, and just totally random strangeness can intersect with a hive near you.

What About Insurance?

Beekeeping insurance is available, and if beekeeping is legal where you are located, it may be possible to get a rider to your existing homeowner or liability insurance to include your hives and activities. It might be wise, however, to pursue a separate policy, since getting such a rider might change your risk profile in the eyes of an existing insurer who has no idea what beekeeping is about. Remember, there are many different kinds of insurance, from financial protection of your beekeeping gear to shielding you from personal liability for events related to your bees. Word on the street is that coverage does not come cheap, and is most manageable through member organizations like the ABF.

A Package of Prevention is Worth a Nuc of Cure

If there are a couple of common threads in this long lecture, it's that unplanned things happen in the urban apiary, but any preplanning you can do benefits your bees, your community, and you. In those crisis times when seconds can feel like hours, they feel a whole lot more comfortable knowing what you can do and how you can do it. Whether the madness begins with honey bee reproduction, with a human mistake, or with a natural phenomenon of historic proportions, you and your fellow city beeks can do a lot just by talking things through ahead of time, and making a few easy plans. BC

Toni Burnham keeps bees and rescues swarms in the Washington, DC area where she lives.

Lots of honey on the hives creates a good problem to have, whether to take the honey off and extract it now, or wait until later in the season?

The Honey Harvest – Early, Or Later

When Is The Right Time For You?

Ross **Conrad**

In much of the Northeast, the bees have typically stored honey in great quantities by the end of July. Thus the dilemma: to harvest honey now, or wait? Many beekeepers in Southern and Western states enjoy more than one honey harvest a year, but in the Northeast, most beekeepers don't have such luxuries. Let's explore some of the numerous benefits and drawback to harvesting at different times during the season.

Benefits of the Early Harvest

Harvesting honey early in the season while there are still many weeks or even months of nectar gathering to go, can allow the beekeeper to reap some special benefits. Top among them is the ability to harvest honey varietals. Blueberry, Orange Blossom, Buckwheat and others honeys are only possible when the honey is harvested immediately following the major bloom and before the bees have the chance to forage on a different crop. Honey varietals can be delicious, highly sought after and command a premium price. In many parts of the Northeast, harvesting late in July or early August will yield a honey that is primarily composed of the nectar from clover and alfalfa blossoms. Such honey is exceptionally light in color and flavor. Since the honey was harvested prior to the goldenrod bloom, it will tend to take a long time to crystallize, even when the honey is not heated at all during the extraction and bottling process.

An early harvest can also provide the beekeeper with a marketing edge by allowing them to be the first to offer local honey harvested in the current season. Such a benefit is especially helpful to beekeepers seeking to overcome intense competition in areas with many other beekeepers, or when trying to break into a new market.

The early harvest allows plenty of time to treat before colonies begin the process of raising the all important Winter bees that will carry the hive through the Winter season. This is important because most commercially available treatments to control mites are not approved for use when honey supers are on the hive. It may be helpful at times to break the work of harvesting and extracting up so that there is not so much work to do all at once at the end of the season.

Drawbacks of the Early Harvest

The biggest problem with taking honey early is that it can make it difficult to accurately predict how much honey to take and how much to leave in order for the colony to survive Winter. While it is possible to harvest early and still have the bees collect enough honey during the remainder of the season in order to have plenty stored for Winter, it is also possible that the rest of the season will be a bust requiring that all your hives will need to be fed a lot of syrup to make up for the honey that was taken earlier in the season.

If there is a strong flow late into the year and honey will be harvested both early and later in the season, there is the issue of the extra work required to clean and set up the extracting equipment not once, but twice during the year. Given the extra work involved, it is important to make sure that the price you are getting for that varietal honey is worth it.

The Benefits of the Late Season Harvest

The big benefit of waiting until the very end of the honey season before harvesting and extracting your honey crop is the ability to accurately gauge how much honey is excess that can be safely harvested, and how much should be left on the hive for the colony to over-winter on. Sure you can get a lot more money for your honey than it will cost to purchase sugar for syrup, but when factoring in not only the cost of purchasing sugar, but the time and labor involved in mixing up the syrup, feeding the bees and then cleaning the feeders afterward, the benefits of leaving honey on the hive become more apparent.

Then there is the recent study published in the Proceedings of the National Academy of Sciences (Mao, Schuler, and Berenbaum) that discovered that substances found in pollen, such as *p-coumaric* acid, turns on the honey bee's detoxification genes, as well as some of the bee's antimicrobial peptide genes. Since small amounts of pollen naturally get into the honey during the colony's process of collecting nectar and converting it into honey, the consumption of honey is far better for a hive's health than sugar substitutes. In effect, the researchers found that honey may act like a neutraceutical helping to regulate the honey bee's immune and detoxification processes. The benefits of pollen-laced honey in the diet

Given all the work involved with setting up, extracting, and then cleaning up, beekeepers with langstroth-style hives will often wait until the end of the season and harvest and extract all at one time. Alternatively, topbar beekeepers may have to harvest a few frames from each hive every couple of weeks or so in order to keep their colonies from becoming over crowded.

are especially important for hives that are exposed to toxic chemicals and pollutants. The researchers report that when p-coumaric acid is added to a diet of sucrose, it greatly increased the honey bee's ability to metabolize and detoxify coumaphos, the active ingredient found in the varroa mite treatment Checkmite+. These findings may help explain why the artificial diet that so many hives must contend with these days has been linked to the nutritional stress that is one of the factors correlated with the dramatic increase in colony loss experienced in the U.S. during the past six years. Even if you are mixing pollen into your sugar syrup, I suspect that it is better to harvest late and leave plenty of honey on the hive, than to harvest early and have to feed colonies honey substitutes.

The Drawbacks of the Late Season Harvest

A big problem with harvesting honey late in the season is that the honey becomes difficult to harvest. Since nectar sources are drying up late in the year, robbing is rampant among the hives and clouds of robbing bees can make the process of harvesting honey a miserable chore. In the Northeast, temperatures are falling significantly late September and October and this makes the job of extracting more difficult since cold honey becomes thick and does not flow as readily as warm honey. This will make the job of extracting combs more time and energy intensive. Some beekeepers let honey supers sit in a warm room for a couple days and allow the honey to warm up before beginning the process of extracting.

A late harvest can also be the death-knell for colonies that have high levels of *Varroa* mite infestation. As mentioned above, if colonies are not being managed in a way that keeps mite levels low throughout the year, hives must be treated early enough in late Summer or early Autumn in order to become healthy enough to raise healthy Winter bees so the hive will have a good chance of surviving Winter.

Just Right . . .

The right time to harvest your honey will depend on many factors including geographic location, climate, and preferred mite control methods. If you are producing comb honey in the Northeast for example, July is a great time to harvest those comb honey supers, before the bees have the chance to track up the cappings of the comb honey with travel stains.

When producing liquid honey, it is ideal if one can wait until it is possible to determine how much, if any, excess honey is on the hive that can be harvested safely while still leaving plenty to see the colony through Winter. Timing should be early enough in the season that any mite treatments that may be needed can be successfully applied well before Winter weather sets in, and early enough that for hives that do not have enough Winter stores, there is still plenty of warm weather left to feed colonies if necessary and allow them to evaporate the moisture from the syrup before Winter. And the right time will be before all the forage in the area dries up causing the bees to start robbing in earnest and cold temperatures lead to making the honey harvest and extraction more difficult than need be. Your timing must balance with the desire to harvest the maximum amount of honey possible and any specific varieties of honey you hope to obtain, with everything else we have going on in our lives. The right time to harvest the honey crop is similar to the right way of managing our hives in that it will be different for each of us and it will be different from year to year, especially as the climate continues to shift and become less predictable. BC

Ross Conrad is author of the newly released Natural Beekeeping: Revised and Expanded 2nd Edition, that delves into many of the changes in the industry that are mentioned in this article.
www.dancingbeegardens.com

INHERITANCE

Learning Dad's Bees, And Dad's Life

Kirsten **Traynor**

It was still too cold to be driving with the top down, but Liam didn't care. He was almost there, almost home again. "Strange," he mused, "back on this road again." Liam hadn't been here in 25 years, not since the day he finally stood up to his widowed father and ran off their rural homestead to make his own way in Philadelphia. Now the stubborn old man had left him the family farm, forcing him to return one last time to wrap up his father's affairs.

The paved road petered out into dirt. On each side the trees fell away, leaving a view of the two open valleys. At this time of year all you would find down there was stubble from last season and the new hay crop just starting to grow again. Straight ahead on the ridge's plateau stood the house, a wooden clapboard building.

Liam parked the car in the gravel drive. "Smaller than I remember," he thought as he climbed out, admiring the new coat of bright white paint set off by cobalt blue shutters. "Smaller and cleaner." Glad to be out of the car and on his feet again, he walked down the slate path toward the porch. Crocus sprung up on either side in a thick carpet of purple, blue, yellow and white. Several honey bees worked the open blossoms furiously. He watched them scramble along the stamens and pick up coats full of pollen. Just like his pa, they worked relentlessly, exploiting the fleeting hours of the day. The sun dipped behind the clouds, starting its descent.

"The nights come down quickly in the mountains," Liam remembered from his childhood. He hurried up the porch steps to the front door. Without thinking he turned the handle as he had when a boy. The door opened. A hint of a smile flickered across Liam's face, disappearing as quickly as it had arisen. He wouldn't need the metal key that pressed through his silk pants pocket against his thigh after all. His father had never learned to lock doors.

"I don't have anything worth stealing," his father's voice drifted back through the memory of time, haunting Liam's mind. "Besides, I'm much too good a shot for anybody to try coming through that door uninvited," he could hear the man say with a half snort and chuckle.

Liam flicked on the light switch, illuminating the family room. His eyes raced around the chamber. He expected to find the worn, cramped space of his childhood. Instead an airy expanse unfolded before him. Two walls had been taken down. Fine wood paneling glowed in a warm honey color. Had pa won the lottery? He couldn't afford such elegant woodwork.

"Matthew planed that wood himself," a deep, yet feminine voice rang out. "Wormy chestnut he rescued from the shambles of an old Mennonite barn."

Liam spun round toward the sound, his body tensed like a cornered cat. Countless walks home after work through late Philly nights left him skittish. Against the setting sun stood a wiry woman, her hair tied back from her face. Liam wanted to demand who she was and how she snuck up on him, but before he found his voice, she spoke again.

"I was heading out to do some chores, when I saw the car in the drive. Reckoned I best check to see who was nosing about. Matthew wouldn't like no strangers in his place."

Red flushed into Liam's cheeks. "I'm not a stranger," he was about to argue.

"I can see," she continued, "from the way you stand and the line of your face that you're Matthew's boy come home again. He'd be mighty glad to see you too, if he was still here. Shame it took his passing to bring you back."

Her voice wasn't accusatory nor sad, just matter of fact. Her attire matched her attitude; straight cut jeans that hugged her hips and a burnt orange ribbed tank – nothing extra, nothing wasted. A pause settled between the two as they evaluated each other.

"I am forgetting my manners," the auburn haired stranger said, taking a step toward Matthew's son. Liam flinched, as if his old man had reached out through time to rebuke him again.

"My name's Savannah Eby," the lanky woman said, wiping her hand on her jeans, before extending it toward Liam. "I'm your father's closest neighbor." She lingered a moment over the last two words.

Liam grasped her hand. It was solid, much stronger than he would expect from a woman. She must work with her hands, he thought, wondering if she was a potter.

"I'm Liam. Liam Beard," he added unnecessarily. "Pleased to meet you."

"I'll introduce you, if you wish," Savannah offered.

"I beg your pardon?" Liam said. Had this lady been living out here by herself too long and lost her grip on reality? They had just introduced themselves, hadn't they?

"To the monarchy," Savannah explained.

"You're going to introduce me to royalty?" Liam questioned.

"Yes, sir, I am," Savannah replied with a chuckle, unconsciously brushing some escaped strands off her brow. "But these queens don't sit on any throne. They never have a moment to sit at all. Royalty is not all it's cracked up to be. If you'll just follow me down to edge of

"You're Matthew's boy, come home again."

"There's a lot of things you don't know about him, but you'll find out."

the garden, I'll introduce you." She turned and walked back out the front door.

What a loopy woman, Liam thought, but he followed her out. She didn't speak as they marched around the house, but Liam heard her hum a tune below her breath, an unfamiliar, soft, sweet country ditty.

"Blake Shelton," she said, stopping short and spinning round to face him. "Damn song of his refuses to leave my head. Your pappy gave me his CD for Christmas. But we better get a move on or they'll have disappeared inside," she said, hurrying down the back lawn.

Liam could still see the old veggie patch where his mother had grown the sweetest tomatoes and cantaloupes. But the rest of the garden had been transformed.

"Can you see them?" Savannah asked. Liam's gaze followed her outstretched arm. A row of fruit trees followed the fence line. The stalks of climbing roses clung to a wooden arbor. Everywhere he looked, blossoms nodded in the fading light: a profusion of daffodils and long swathes of grape hyacinth.

Underneath a row of apple trees just starting to bud out he saw a motley array of boxes. The boxes were painted bright blue and crimson red, emerald green and purple. Some had stripes, the others polka dots. Painted flowers bloomed on another.

"Meet your pappy's honey bees," Savannah said, "each hive headed by a queen. He has a dozen colonies here. And more apiaries dotted around the valley."

"I didn't know my father kept bees," Liam said, as they approached to watch the last few stragglers fly in, their back legs loaded down with yellow or gold pellets of pollen. A fountain gurgled in the background. His father had put in a small pond and transformed the grounds into a flowering haven.

"There's a lot of things I reckon you don't know 'bout your pappy," Savannah said. "He was a good man. Real hard worker. Good with tools. Good with his hands. Unbelievable with wood. They don't make 'em like that anymore."

Not knowing how to respond, Liam said nothing. The two watched the sun slip away. As the color faded from the sky, Savannah broke the silence.

"I taught your pappy how to keep bees," she said. "In return, he built equipment for me and helped me move colonies."

"You're a beekeeper?"

"Third generation," Savannah said. "I was going to check on the hives tomorrow morning. Make sure the queens are gearing up for the locust bloom. Let you know what they're worth, so you can sell them for a fair price. You certainly won't be keeping them."

"What makes you say that," Liam demanded. Though he had no intention of keeping the bees, her quick assumption peeved him.

"You wouldn't stick your hands into a hive of stinging insects. Not the type."

"I'm not scared of bees," he retorted. "I'll look them over with you."

"Fine then," Savannah replied. "We'll start tomorrow morning at nine. It should have warmed up enough by then. Be sure you've eaten a hearty breakfast." As Savannah turned to head back up to the house, she muttered under her breath, "You'll need all the energy you can get, city boy."

Night had descended.

"You and your big trap," Liam muttered to himself. "You can forget about sleeping in and trying to catch up on all those missed hours of sleep."

It was strange to be back in his childhood home after all these years. The house smelled like the mountain after a spring rain. A long forgotten memory of his mother swam out of his past, triggered by the crisp scent. He could see her in a white summer dress, her arms bronzed by all the hours she spent working her vegetable garden. Blond hair escaped from the loose braid down her back. With a large wicker basket pressed against her hip with one arm, she expertly unpinned laundry from the line with the other hand. She had died the following Winter, three days after Liam turned 12, killed in a car crash.

To shake the memory of his mother, he cut his way through the house, flipping on lights as he went. Everywhere he looked, beautiful hand carved wood furniture stared back at him. His father didn't have the money to buy such fine pieces, so where did he get them? Had he inherited money? Robbed a bank?

He tried to picture his pa demanding cash from a bank teller quivering at the point of his trusty Remington hunting rifle. A smirk pulled at Liam's lips. His old man was too damn ramrod straight to commit a crime.

Savannah's words drifted back. "Good with tools. Good with his hands. Unbelievable with wood." Perhaps his pa really had crafted them. During their infrequent telephone conversations, he'd never mentioned any skills as a woodworker.

"There's a lot of things I reckon you don't know 'bout your pappy," Savannah's voice echoed through Liam's head.

"True," Liam whispered, "but I intend to find out."

Dressed in a pair of jeans and one of his father's work shirts, Liam waited for Savannah to show up. The night's sleep had done him well and he was looking forward to working the bees. If his father could manage them, then so could he.

With a mug of coffee in his hand, Liam slipped outside onto the front porch. A curl of white steam snaked off the hot coffee into the cool morning air. Liam thought about settling down onto the porch swing, when he caught sight of Savannah's lanky form slink through the trees.

She eyed him, her appraising gaze settling on his loafers. "You might want to change into boots. You don't want your bare ankles turning into a dart board for bees."

Liam nodded his head and hustled back into the house. He thrust open the closet and found a neat row of shoes, everything from hiking boots to knee-high rain galoshes. Liam slipped a pair of work boots onto his feet and hurried back outside.

Savannah handed him a long sleeved white jacket

with an attached hood screened in the front by black mesh. He slipped it on and she looked him over to make sure he was completely sealed in.

"No gloves," she said. "Gloves make you sloppy. With bare hands you learn to handle the hive gently. But you always carry a pair just in case the buzzing ladies are having a bad day and get hot," she said, holding a pair of doctor's gloves. "These work better than the thick leather ones, I've found. Nitrile gloves they ignore. Leather?! Smells like an animal and only riles them up," she tucked the thin purple gloves into the breast pocket of his suit. "You ready to work some bees?"

"Never been readier."

"Good," she said with a nod. "I'll teach you how to light the smoker."

Liam watched her pry open the lid of the metal can with an attached bellows. "A hive tool is your best friend," she explained, as she scraped the blackened insides down and dumped the ash into a metal can stored under the porch. She rummaged in a black plastic trash bag on the ground beside it. Her hand emerged with a thick fistful of pine needles. "Pet bedding and dry pine needles burn well. My granddaddy used to burn tobacco leaves in his smoker, but we stopped growing that cash crop before I was born."

She stuffed the handful into the barrel of the smoker. Protecting a match from the wind with her cupped hand, she struck it against one of the paving stones. The red tip burst into flame. She dipped it into the smoker, holding it between her fingers until the pine needles caught fire.

"A few gentle puffs to fan the flames," she explained gently compressing the smoker's bellows. "Once you have a good fire going, add some more pine needles. You want a cool, white smoke to work the bees. Too hot and you just provoke them."

"Looks easy enough," Liam said.

"Looks can be deceiving." She thrust the smoker into his hands. "Keep that puffing!"

She turned back to the porch, pulled out two more fistfuls of pine needles, and thrust them into the smoker in between Liam's puffs. Using her hive tool, she pushed the overflowing needles down into the smoker's chambers. Satisfied, she flipped the hinged lid back on.

A long white stream of smoke billowed out the front and lifted up into the air on the gentle morning breeze. Liam watched the smoke ascend. The secret fear caught in the back of his throat dissipated as he watched the smoke unfurl into the heavens. He'd never been a religious man, but somehow he felt as if his father's eyes were on him, watching him with grudging approval, a "Let's see how you do, boy!" smirk on his face.

"Let's go look at your hives," Savannah said.

"Meet your pappy's honey bees. I taught him how to keep bees. He built equipment for me."

They retraced their steps from the night before. As Liam approached, he could see the bees were already taking advantage of the warm Spring morning. The hive entrances zipped with activity as a steady cascade of insects took to the air. Others jostled for position in their return descent, hovering for a moment, before dropping to the narrow landing board that protruded out the front. A metal screen covered two-thirds of the front. Bees laden with pollen scrambled along the mesh, climbing over any nestmates in their path, before disappearing inside.

"Why are the entrances partly blocked?" Liam asked.

"Early Spring is a tough time of year on the hive," Savannah explained. "The bees expand the brood nest rapidly. With so many young in the nursery, they tear through their honey and pollen larder. Bees know how to exploit their resources. If they can find a poorly defended colony, they'll rob it bare. Stealing honey makes for lighter work than producing it from nectar. I keep the entrances reduced, so the bees can better defend their fortress against a raiding party. As I said, royalty is not all it's cracked up to be. Kind of like the middle ages, where the fiefdom next door could always come pillaging."

A few bees ricocheted off Liam's veil, buzzing him loudly. He had stepped in front of the colony to get a closer at the flight activity.

"Never block the flight path to the entrance with your body," Savannah said, pulling him gently toward her. "You always want to work the bees from the side or back."

"Whenever you approach a hive you want to work, announce your arrival," Savannah said, puffing a few billows of smoke into the hive entrance. "Give a puff or two under the cover, then close it again and wait a moment for the smoke to settle in the hive. The bees will be much easier to work."

He watched her calm yet decisive movements.

"If you have other colonies right next door, say hello to them too." She blew a few gentle puffs into the neighboring colonies.

She lifted the hive cover off the colony and placed it upside down on the grass behind her.

"I overwinter the colonies in three medium hive bodies," she explained, pointing to the stack of three boxes. "Gives the hive a whole box of food stores for the Winter. They move up, eating through their pantry of honey and then build out strong in the empty cells, expanding their nursery of baby bees."

She peered into the top box, where bees milled about.

"In early spring the hive has moved into the top two boxes, leaving the bottom one filled with empty combs. That's when it's time to reverse the boxes and move the brood nest back to the bottom. Bees prefer to move up, rather than down. So let's make life easy for them."

Prying her hive tool between the two boxes like a lever, she lifted the back of the top box. She repeated the movement on the front. "Makes it easier to lift off," she explained. "Sometimes the bees build burr comb bridges between the two."

She rocked the top box up in the front, balancing it on the back edge. In one clean motion she swung the box off the stack and placed it down on the lid behind her.

"Don't sit it in the lid, but let the corners hang over the sides. The bees can cluster below and you'll crush

"No gloves," she said. "Gloves make you sloppy."

less of them."

Liam stared at the large egg-shaped cluster of bees her actions had revealed. The moving mass of bees stretched from the front to the back of the hive, but not fully out to the sides.

"See they're not centered anymore," Savannah said, "they've migrated toward the southern side, eating more of the honey stores on the side warmed by the sun. The queen's in this box, I bet. We will find her soon enough."

Again she pried the boxes apart with her hive tool and swung the top one around behind her, placing it perpendicular and on top of the first.

"Spring cleaning time," she said, scraping down the top of the combs of the final box. He watched her methodically scour the tops of the frames, dropping the burr comb into a plastic bag she had pulled out of her pocket.

"Usually I will place an empty hive body on the entrance stand, so the returning bees have somewhere to go while I rearrange the nest. But Matthew never finished the last coat of paint on all the boxes we cleaned over the Winter. Without him, I've been so busy. Haven't yet found the time to finish what he started. So we will just swap the middle box into its place."

She pried the lowest box loose from the bottom board, then nodded at Liam to pick it up. He complied, holding the empty box in his arms. While he cradled it, Savannah placed the former middle box laden with bees back onto the stand. She gestured for him to place his load on the ground.

"Queen seeking we shall go," she said, her eyes agleam like a child on a treasure hunt. "This is where my darling J-hook tool comes in," she said, whipping a long, narrow metal tool out of her bee suit's pocket. "Perfect for prying up frames."

She maneuvered the J-shaped end under the tips of the outermost frame, then jacked it up lightly, using the tool like a lever.

"Never go straight for the center. Always remove an outside frame to give yourself room," she said, propping the frame she had pulled out against the legs of the hive stand. "We're going to go frame by frame through the hive, looking at the brood pattern, how evenly the queen laid eggs. The best way to work a hive is to keep your eyes open. The bees will teach you, if you watch and learn."

"The world will speak to you if only you will listen. When you open your ears – and your heart – you can hear her song."

Liam watched her work her way methodically through the hive, pulling up each frame and inspecting one side, then the other. After she had checked both sides, she passed it to Matthew's boy. The first frame had been flecked with bright yellow and orange cells.

"Bee bread," Savannah explained. "The protein stores of the hive. They collect pollen, then layer it with a thin coat of honey so it becomes a fermented food and doesn't spoil. The ones with the glaze are from last Fall. Fresh pollen isn't shiny, but more vibrant in color. The bees always line the brood nest with a ring of pollen. The next frame will be developing brood."

She gently placed the frame back in the hive, pushing it up against the side wall so she still had room to work.

Sure enough the next frame she pulled out was filled with capped brood, light tan colored cappings that differed greatly from the white wax of the honey stores.

"Watch that cell," she said, handing him the comb and pointing to the center. Liam followed her finger and saw what looked like a small black hook pierce the capping from inside the cell. The ragged hole enlarged as he watched.

"She's chewing her way out," Savannah explained. "Had enough of sitting inside her cell and wants to get out into the busy streets of the hive. 21 days ago the queen laid that egg. Now the worker emerges as an adult, already set to work."

As Liam watched, the bee struggled with the capping, chewing a bigger hole. Her head peeked through, but the rest of her body still stuck. With her forelegs she pulled herself up and out of the cell.

"She looks different than the others," Liam said. "Lighter in color."

"Good eyes," Savannah said. "She has hairs on her thorax. They're slicked back at the moment, but they'll dry and fluff out. They disappear as the bee works and ages."

The lesson in the hive continued. Liam saw young larvae floating in a milky white substance. He saw the big, fat white larvae curled tight in the cell, ready to be capped. The bullet shaped cappings of drone brood surprised him. The eggs laying down on their side, ready to hatch into larvae and the eggs still standing up straight, freshly laid by the queen.

Savannah turned the frame gently in her hands, revealing the other side. "There you are," she said and Liam followed her gaze. From her elongated size and the way she walked calmly through the crowd of her hive, surrounded by a cohort of attendants, Liam realized they had found the queen.

Liam sat on the raised deck overlooking the valley and watched the night come in. Slowly the color faded from the sky, leaving a murky world of shapes and sounds. Strange insects and other animals of the night filled the evening with a soft concerto. An unknown sensation filled Liam, pulling at his chest. He wondered briefly if he had strained a muscle lifting one of the heavy hive boxes, but it didn't feel like that. It was a sense of warmth spreading

out from the pit of his stomach into his throat.

Liam leaned back in the wooden rocker and closed his eyes. The day ran through his mind, a blur of hive after hive. They had gone through all twelve colonies, rotating the empty boxes on to the top, rearranging the broodnest into the bottom box. They had robbed frames of emerging bees from overflowing hives to bulk up the two stragglers in the apiary. In one hive they had found the bees starting to draw out queen cells, getting a head start on the swarm season, Savannah had explained. She'd made more room in the brood nest and given each hive an empty frame to draw out natural comb into drone brood. His head reeled with information, his arms ached with the day's exertion, but he felt strangely calm.

He let the night songs wash over him. His father's voice rang out over nature's evening melody. "The world will speak to you, if you only listen. When you open your ears and your heart, you can hear her song."

Those had been his father's words of wisdom on the day they buried Liam's mother. At the time Liam had been twelve and thought his father was a bit balmy. He hadn't realized with what care his father had chosen those words.

"I have been deaf for many years," Liam whispered to the descending night. "But tonight I hear your song."

Liam knew he should go inside. His boss would be calling any minute to find out how soon he would be back in the office. Charles would want to know if he had finished putting the house on the market and when he was coming home.

Liam didn't have an answer for him. Not yet. All he knew was that he could hear himself think. The air was fresh and brisk. He filled his lungs deeply, enjoying the coolness of the night. He could breathe again.

Through the thick glass of the patio door, Liam heard the muted shrill of his cell. "Strange that I left it inside," he thought, patting absentmindedly at the pocket where his phone usually lived. He forced himself to rise. As he walked inside the heaviness fell from his step. He had an answer. When his boss asked him when he would be coming home, he'd tell him he was already there.

BC

TWITTER

Promoting Your Business With Twitter. Like Facebook, Only Different!

Jessica **Dally**

More on Promoting Your Beekeeping Business or Club With Social Media

We've talked a bit about Facebook and blogging for your beekeeping business or club but what other tools are there? And what do you do when you make a mistake or have a difficult customer?

What is twitter?

Twitter is basically another online social networking service. Like Facebook you can follow people on twitter and they can follow you. There are, however, a number of differences between the two platforms.

The most important difference is that you're limited to 140 characters on Twitter. This means every post must be concise and enticing to elicit any response from followers. It also means you get a very good idea of what is being posted and if it's worth your time to view.

For businesses and others it's hard to say if Twitter is a boon or a waste of time. That said, there are some very good uses of twitter.

Why use twitter?

One of the best uses of twitter is to get links to important articles and bits of information. Because twitter is limited to 140 characters, most posts include links to other places on the web, news stories, pictures, blogs, etc.

Posting a status to twitter is called a *tweet*. Each person who tweets has the desire to make the information they're posting enticing. This means they're going to summarize the entire interesting point of an article for you. No need to read the entire thing to see if it's worthy. The tweet itself will tell you what the article is about as there's simply no space to waste in description.

Another great function of twitter is something called a *tweet chat*. Basically this is a live event that happens online where anyone can follow and join. Think of it as a conference call except that everyone can speak at once and you can still hear (or in this case read) what is being said.

Finally, twitter can be a great place to aggregate information for your own blog, facebook postings, etc.

Looking at twitter to find interesting articles is far easier than searching the web.

Terms You Need To Know and What They Do

Tweet- this is your status update on twitter . . . basically what you or someone else posts to twitter. In often includes pictures, links and hashtags.

Retweet- this is what happens when you or someone else reposts a tweet. Basically it means this person found a tweet to be interesting and they want to share it too.

Hashtag – a hashtag is literally the pound sign # but on twitter it serves a very specific purpose. First, the symbol is always followed by words and those words can be one of two things.

Keyword – turning beekeeping into #beekeeping means that people who are following a specific hashtag will find your tweet. While a term like beekeeping is easy enough to find without the hashtag, using a hashtag for terms that might not usually be one word helps people find the information they're looking for quickly and correctly. For example school garden will turn up things related to schools and to gardens but #schoolgarden will (hopefully!) only turn up things related to the two terms together.

Chats and Conferences – Many conferences have what's called a back channel chat happening over twitter. Think about sitting in a conference with someone speaking and you didn't quite get the website they spoke about. You could stop the whole talk and ask, try to get that question in later or, in the twitter world, post a tweet asking about the link. If you're lucky someone might have posted the link even before you had a chance to ask. But how will you find those folks who are tweeting this information?

Many conferences create a hashtag specifically for the conference. By putting that hashtag at the end of tweets everyone following along can watch for content related to that conference.

Similar to conferences there are tweet chats on twitter that regularly use hashtags. #BeeChat happens every Sunday on twitter and you can follow along using one of the many

twitter tools available. The simplest one may well be tweetchat (**www.tweetchat.com**). Simply enter the hashtag (in this case #beechat) in the top bar and voila! Every tweet with that hastag shows up on the page. It updates regularly as people post new tweets using the tag.

If you're looking for a broader topic #agchat is a keyword people regularly use to post about agricultural issues.

Do note that chats and conferences can have a lot of tweets and reading can be difficult so learn to skim for information you really want to see.

Finding people to follow

Not unlike Facebook there are some easy ways to find people to follow on Twitter. A simple google search for your local beekeeping organization and the word "twitter" will help you find if your org or group uses twitter. You can do the same with businesses you buy from, local beekeepers you may know and simply by keeping an eye on webpages you visit to see if they have a twitter symbol on the page. If they do they likely have a twitter account as well.

Shipping hives.

Your first tweets

When you first start posting on Twitter there are a few things to consider.

Brand – Like Facebook what you tweet from your business account is a reflection of your business. Make sure your tweets are appropriate and applicable to those who might follow you.

Include hashtags – Talking about beekeeping? Simply put the hashtag in front of the term to attract those who are following that term. Beekeeping becomes #Beekeeping and more people will hear what you have to say.

Don't abbreviate words to the point that no one will understand. It will be hard at first to be brief but eventually you'll be able to tweet with very few abbreviations.

How will people find you?

Some people will find you as you participate in chats and as you retweet other people's tweets. But the easiest way to help people find you is by sharing your twitter handle on your website and in real life. There are many people who are on twitter but not on Facebook so this outreach can help you gain more overall followers and hopefully help you get some free advertising and help you grow your customer base.

OK, so now what about problems on all of these social media sites? How do you deal with difficult customers? Can't you just delete their comments? You can, but we'll talk about a better way that will actually help you gain credibility with the customers who matter.

Handing Problems

No matter where you are in the "real world" or online you'll occasionally have to deal with problems and difficult customers. While it might seem like the end of the world when someone posts something negative about you, it can actually be a huge benefit if handled correctly. People make mistakes and no one expects you, your business or your club to be perfect. But how you handle a problem is now very public and doing it wrong can have very negative consequences.

Here's some typical issues and what you might want to do:

Dealing with mistakes you make.

Maybe you posted something incorrect on Facebook. Maybe you forgot to mention the end date of a sale when you posted something to your blog and now you're customers are unhappy. Maybe you posted personal information to your business account when you meant to post it to your personal account.

These kinds of things happen. Like an email accidentally sent to the wrong person, often we can't take these things back.

Don't cover it up or pretend it didn't happen. Basically it's like calling your customer a liar or crazy. No one likes that and you can turn a semi unhappy customer into a fuming customer with that action alone.

Be transparent and admit your mistake and then do what you need to do to make it right. Maybe you honor that sale for a day or two more or perhaps you simply post an "I'm sorry folks!"

Will everyone be happy with your resolution? Of course not but most people understand that we're all human, all make mistakes and as long as you make a good faith effort to rectify the issue most will respect you for your honesty about the problem. You can't really cover things up in the age of the internet and trying causes people to question your credibility . . . something that's far more dangerous than simply admitting to a mistake.

Dealing with difficult customers

We'd all love it if our customers and fans were nothing other than perfect angels all the time but we also know that isn't reality. Of course it's one thing to have someone yell at you on the phone and quite another when they're yelling in a public forum.

So what do you do so this one customer doesn't impact your business and drive all your other customers away?

The first thing to do is determine if the customer has a valid complaint. If they do have a valid complaint deal with it publically so your other customers can see that you will indeed deal with and rectify any true issues. Again, few expect perfection and will take a good faith effort as a sign that you're running an honest business. It

can actually enhance your credibility with your customers.

But what if the customer is making a complaint that isn't valid? Maybe they want something that is simply ludicrous (give me all the free honey I want forever!). In general it's rare that we have to deal with these folks but it can happen.

First, don't attack the customer. Remember that you want to be as professional as possible in all public forums when dealing with complaints. Next clarify with the customer to make sure that their complaint is what you believe it to be. It could be that they did not express their problem well in writing.

If their request is completely unreasonable simply respond that you're sorry but that you can not complete that request. And remember, do this publicly.

If the customer is truly unreasonable your other customers will see this and will appreciate your professional response. Everyone knows that there are crazy people out there who want something for nothing or expect to be catered to and by keeping both the crazy customer comments and your responses public you're customers will see that the other person is indeed being unreasonable.

Of course it doesn't mean that your bad customer will stop there. Sometimes they'll become a troll, someone who simply posts as many negative comments as possible. At this point you can publically call them out on their behavior, telling them that if they don't stop their attacks that you will ban them from your page. You can also report this to Facebook as it's quite possible this person is attacking many pages at the same time. And then of course once you've told them to stop and they don't, ban them!

(If only we could do that in real life!)

The reality is that you'll likely never have to ban someone but if you've done everything reasonably possible and this person simply won't stop attacking your business there is absolutely nothing wrong with blocking them from posting. You would do the same thing if a customer came into your shop and harassed you so there's no reason you shouldn't do that on an online forum as well.

While banning works for Facebook it will not work for twitter or your blog. On twitter you can report the poster as a spammer. On most blogs you can set the comments so that you must approve them first. Frankly, most blogs do this to deal with spam problems anyway so customers won't likely be surprised if their comments don't show up right away.

If you really love social media there are a number of other venues to try to grow your business . . . Google+, Pinterest and others can be great tools for someone who has the time. But if your time is limited stick to Facebook and a blog. You'll likely grow more fans and followers in these venues than anywhere else. BC

Jessica Dally is a professional in the social media business, running the social presence for Wildlife Media (Chris Morgan Wildlife and BEARTREK), World of Beekeeping, Seattle Free School and recently assisting with the Puget Sound Beekeepers. She has worked with TechSoup, an international nonprofit, assisting and teaching other nonprofits on the use of social media. And she keeps the Bee Culture *social media machine running as smooth as silk, too.*

It's Farmers' Market Time

Ann **Harman**

This is your first year to participate in your local farmers' market. Although you came here previously to buy fruits and vegetables, now you find yourself on the other side of the table, one of the sellers, with your honey. It's a different world.

Since you have the only honey sales, and many desire honey, sales should be very good. But being a part of a farmers' market does require thinking about many small details.

The market opened last month and will continue until the end of October. That first month was a good time to assess your stand and discover the problems – how to fix? – and successes. This was the test month for your introduction to that other side – one of the sellers.

Some of the first things you considered were the requirements of the market. Do you pay for a space? How much? And if so, how will that cost affect your profit? How big is the space? You already do know the days and hours the market is open since you were a customer. But as a seller you need to have more information.

By this time you have discovered the weather. Most farmers' markets are out in the open, perhaps a large parking lot. Depending on your part of the country you will meet sun, clouds, heat, chilly days, wind and even fog and drizzle. A stiff breeze is really no help. You have probably discovered that tablecloths flap around and any decorations blow over or away. Fortunately honey is heavy enough to stay put. Some farmers' markets are fortunate to have a building so weather is not a factor. Here some decorations can be used.

Although taste samples of your honey seem to be a way to encourage sales, are taste samples allowed? Some state or even local regulations prohibit taste samples. Did you find out this information before offering samples? Still keeping in the area of regulations, is your label a 'legal label?' Sometimes local inspectors come to farmers' markets just to see if anyone is violating some regulation. You need to have a legal label. To find out what is required, go to the National Honey Board website, **www.honey.com**, and put 'labels' into the search block. You will find lots of other good information about honey on this website.

Depending on your climate and expected weather some vendors put up a simple pop-up tent, a roof with a bit of awning, for sun protection and also as a place to hang signs and decorations. However, some markets may not allow these. A strong wind can blow one over.

At your farmers' market you must provide your own table. Now is the time to consider your choice. Does it wobble on the uneven ground? Too small? Customers need a place to put their basket of previous purchases while paying for your honey. Some will set it on the ground but others may just plop it down on your table. Sometimes children and people in a hurry have bumped against it. What sort of tables do the other vendors have? You can get much information from other vendors, especially those who have been selling for several years.

Today bee fabrics are difficult to find. However, search for cloth or even plastic tablecloths with a bee motif. A bee background for your jars of honey will be worth the search. Can't find anything with bees? Try flowers.

Your first year at a farmers' market is the time to see what sort of containers your customers prefer. You chose only queenline type. Try everything! The one-pound inverted jar with a honeycomb pattern is gaining in popularity. It makes liquid honey much less messy. Honey bears, of course, are loved by all. The hex jar and the Muth jar. Larger sizes, such as two-pound jars. Has anyone asked for really large quantities, such as five pounds? You may spend some evenings pouring honey from one container to another to have a test selection. Once you have found your customers' choices you can then have an appropriate label selection. Yes, labels to fit your selected container shapes and sizes.

Since customers coming to farmers' markets are in search of local produce, enhance your containers with a LOCAL HONEY label. A large variety of this label can be found at the label supplier, R. M. Farms, 734-722-7727, **rmfarms@hotmail.com**. Labels, such as the LOCAL HONEY one, put on the lids give especially good visibility at farmers' markets. You can also obtain a nice small label with information about honey naturally crystallizing and what to do.

Stop for a minute and think back to being a customer during the past

few years. Do you remember any of your particular frustrations as you shopped around the vendors? These frustrations should make you review your position as a vendor so that you and your display are frustration-free.

As a beekeeper you will be considered a 'different' kind of vendor compared to someone selling tomatoes. By this time you have been asked hundreds of questions. Not only questions but also you have also heard customers' stories. At closing time you feel you have listened to the same ones over and over. You have been asked and heard about stings, allergies, CCD and 'bees living in the ground' (yellowjackets). You have been asked about the queen bee and how honey is made. And more. To help with the questions and stories a good solution is to have handouts. For the person who still wants to buy honey in December, or any time the market is not open, have a business card to give. Some customers will make use of it and some not. But you will have some off-market sales.

You can create a three-fold informative brochure. Yes, you can sit down at your computer and use a template and make your own. However, you will make a better handout if you get some professional help. I have a big stack of three-fold beekeeper-made brochures that represent the worst possible presentations. Misspelled words, really bad grammar, badly arranged information, incorrect information, too much information crammed into whatever space available, and more. Professional help will give a professional brochure. Perhaps all the information you wish to give would make two brochures – the story of honey and another, the story of bees.

A handout can be given to a customer who will not stop talking about a TV or radio program while you wish to make a sale to a patiently waiting customer. A handout does not have to be given to each customer unless you wish. A word of caution about the questions you will receive. Customers may ask 'does local honey **cure** my allergies?' or 'what is the nutritional value of honey?' You may be asked 'I am a diabetic so can I eat honey?' **Make no health claims.** If asked about 'a cure' your best answer is 'try honey and see if it helps.' For nutritional information go to the National Honey Board website, honey.com. You could have a short handout to help you give the customer information. Just remember, make no claims!

Recipes, however, can be given to each customer. These recipes encourage honey consumption and therefore help your sales. The National Honey Board has various recipes on their website. Simple and seasonal recipes are always appreciated. You can purchase small recipe brochures and hang tags for containers from the Honey Board. Try to feature a 'recipe of the week,' one recipe using fruits and vegetables sold at other stands. Salad dressings, BBQ sauces for holidays and, as the market comes to an end in October, give recipes for apples and cookies for Halloween.

At this point you should be covering all your costs – those of the market itself, honey containers, labels and handouts. So now is the time to give some thought to your sales, not just at the end in October. However, now is not the time to suddenly increase the price of your honey. That increase is for next year.

Does your local association have a beginning beekeeper course? If so, you may wish to keep a list with contact information for those who indicated interest in keeping bees. They can be kept informed about dates, location and other details. You could have a registration form available. Some will sign up and some will forget about it. Encourage wannabees to take a course. Without education the bees are frequently the losers.

If your local association has a newsletter have a few copies available to give to those customers who seem very serious about beekeeping. Information and an invitation to the meetings is a good way to give the interested customers an introduction to beekeeping.

Although decorations for your honey display may be difficult you may wish to bring a sample seasonal bee flower to show customers. It could be a wildflower or a garden flower. Since people hear about bees and the environment you may be asked about what they could plant to help the bees. Here is the possibility of another handout or include plants in your bee information handout. You can mention that bees visiting flowers will not attack and sting, a popular misconception even with the Africanized bee.

For a way to increase off-market sales have you considered offering various packaging for events? Small hex jars decorated suitably as favors for weddings, birthdays, or conferences. You could have a poster or information sheet on display at your honey table.

Perhaps you have made some very nice candles. These sell particularly well in late summer and autumn. Don't be surprised if someone wants orange candles for Halloween or some color other than exquisite natural beeswax. Perhaps non-beekeepers think that bees on pink flowers make pink wax.

Have you ever had barely sticky jars of honey? They can be highly annoying when selling at a market. You end up with slightly sticky fingers trying to handle money or shake hands with a frequent customer. Want to know the secret of non-sticky jars? When you bottle your honey be certain the threads of the jar are totally, completely, positively free of even the slightest film of honey. Also have a container of water and a cloth handy for any honey accidents.

By this time you have discovered your problems and have fixed at least most of them. Some will have to wait until later or next year. You have also thought of other ways of enhancing your sales. All is well.

Oops! You have just found out that next season another vendor will be at the market. This one will be selling mostly unusual oriental vegetables and herbs – and some honey. Now what? Well, you have the winter to do something about the competition. Look carefully at the finances of your venture to consider what sorts of extra enticements you could try. Competition always makes us try harder.

Perhaps adding honey stix – it's not your honey but everyone likes them. Make some samples of beeswax Christmas ornaments – or maybe hearts for Valentine's Day – and take orders. Think about making creamed honey. With customer contact you can explain what it is. Open a jar and turn it upside down. (Be sure you made it right!) Keep it in a cooler if weather is hot.

Next year – a long time away. No it's not. Your products and display will be great if you start planning now. BC

FLAX

Whether to wear, admire or eat, Flax is an important plant.

Connie **Krochmal**

All of the various flax species are good bee plants. This group includes those grown for fiber and oil crops as well as a number seen in gardens and landscapes.

There are perhaps 150 species worldwide. Some of these are native to the U.S. The Latin name for the genus, *Linum*, means thread in Greek and Latin in reference to the plant's use as a fiber source. Depending on the species, these plants can be shrubs, perennials, biennials or annuals.

The most commonly grown ones are hardy annuals or perennials. Beekeepers can use these in perennial beds and borders, meadows, and wildflower gardens. Dwarf cultivars are often grown in rock gardens.

General Description of Flax

These tough, rugged plants can be anywhere from six inches to four feet in height, depending on the species. Many are only two feet tall or so. The slender stems have a wispy appearance.

Generally alternate, the leaves are occasionally opposite. The narrow, entire foliage resembles those of most all flax species.

The flowers display an assortment of colors. These can be white, blue, red, yellow, or gold. The plants bloom for at least four to six weeks. Flowering is extended to two or three months when certain perennial species are grown in partial shade. The annuals can start blooming about two to three months after the seeds are sown. For earlier blooms, plant the seeds indoors.

Although the fleeting, single, delicate flowers only last a single day, the plant continues to produce new blossoms daily over the blooming period. These are funnel-like to saucer-shaped. They open mostly in terminal clusters and occasionally from the leaf axils.

Flax blossoms have five oval petals and five sepals. Most blossoms are about an inch wide. However, they can vary from ¾ inch to two inches in diameter, depending on the species and variety.

Planting Flax

The ornamental flax should be spaced about one to two feet apart. These can be grown from seeds, divisions, and cuttings. Once flax is planted, it tends to self sow.

The annual species and most perennials are easily grown from seeds, which should be lightly covered. Generally planted in the Spring, these can be direct sown where they're to grow.

Seeds germinate when temperatures are between 65 and 85°F. The higher the temperature, the quicker these sprout. The best germination occurs between 70 to 73°F. with the seedlings emerging in only four to eight days. Overall germination time ranges from one to four weeks.

The flax grown for oil or fiber crops is planted in well prepared fields. The seeds can be broadcast or sown with a grain drill. The rows are spaced about 16 inches apart. In order to allow for branching, the oil seed varieties are spaced farther apart than those grown for fiber.

Growing Conditions for Flax

The fiber and oil flax crops are grown in temperate and tropical zones pretty much worldwide. This crop prefers a well-drained clay loam or loam with a pH of five to seven. Full sun is usually best.

Ornamental flax thrives in an ordinary, well drained garden soil. They dislike wet soils, especially in Winter. This is particularly true for the alpine species. Excessive heat can bring on premature death. In areas where drainage is less than ideal, raised beds and rock gardens are two options.

The ornamental species generally need full sun unless noted otherwise. Perennial flax can be short lived when growing conditions are less suitable.

The ornamental species are usually suitable for zones three to 10, depending on the species. The shrubby ones are the least hardy.

Caring for Flax

Generally, flax is easy to grow.

The seedlings and young transplants are subject to wilting if the soil becomes dry. Once they're established, allow the soil to dry out just slightly between waterings. Flax has few insect or disease problems other than aphids and slugs.

Fertilize on a regular basis based on soil test results. These need a steady supply of phosphorus and potassium.

In dry areas, mulch is recommended for ornamental flax. Keep the mulch away from the stems. When growing perennial flax in cold climates, apply light, airy, Winter mulch, such as pine needles, wheat straw, or evergreen boughs. Remove this in the Spring.

Staking is recommended for taller ornamental types. Should the perennial flax become leggy during the Summer, cut them back after they finish blooming. The shrubby flax species benefit from a Spring pruning. Remove straggly stems at that time.

Cultivated Species of Flax

In addition to the flax grown as crops, a number of species are grown as garden plants in the U.S. Garden catalogs list flax seeds and plants, including improved fiber varieties. In addition to the commonly cultivated ones, seeds of native flax are sometimes included in wildflower meadow seed mixes. The following species are recommended for bees.

Common flax *(Linum usitatissimum)*

This hardy annual is grown as a cool season oil and fiber crop. Occasionally it is used in flower gardens. The fiber varieties have escaped and naturalized in parts of the U.S. as a casual weed. It is typically found around railroad yards and in waste places. This occurs mostly in the Northeast.

Preferring cloudy, humid, cool weather, this plant needs adequate moisture. Hot dry weather is particularly undesirable for the fiber crop. In warm climates, flax is often planted in the Fall.

This plant reaches around two to four feet in height, depending on the type being grown. It has erect, greenish-gray stems. The alternate, linear to lance-like leaves are 1½ inches in length.

The size and growth habit for the oil and fiber crop varieties can vary somewhat. Typically, oil seed varieties are bushy and branched, 1¼ to 2½ feet in height. The fiber plants tend to be slender, erect, and non-branching. They're two to four feet tall.

The one-half-inch-wide blossoms typically open from June through August, depending on the planting time. The flowers are often white or blue. But, they can also be lavender or pink.

Flax oil is widely used for industrial and pharmaceutical purposes. The oil cake serves as a fertilizer and cattle feed.

Flowering flax *(Linum grandiflorum)*

Native to Algeria and North Africa, this erect, branching, hardy annual is considered one of the best garden flowers. Sometimes, it can occur as a casual weed in a number of states. These include California, Colorado, Utah, Texas, Florida, Kentucky, Ohio, and New York. Widely grown, it reaches one to 2½ feet in height. The greenish-gray, softly hairy foliage is linear to egg-like.

Flowering flax has very showy blossoms, 1½ inches wide, in loose panicles. Typically in various shades of red, the blossoms can also be white and purplish-blue. These flowers often have dark eyes.

Rubrum is a variety with silky looking, scarlet blossoms, an inch across. Seed catalogs also offer Charmer Mix with an assortment of flower colors. These include white, various reds, and salmon, all with dark eyes.

Golden or yellow flax *(Linum flavum)*

This erect, upright, branched perennial is suited to zones four through nine. With a one foot spread, it can reach about 1½ to two feet in height. A native of Europe, this has a woody base and grooved stems. The veined leaves, 1½ inches long, are lance-shaped to spoon-like. Golden flax is an excellent landscape plant.

This free flowering plant blooms in Summer. It bears large, golden yellow to bright clear yellow blossoms, an inch in diameter. A single crowded flower cluster can contain around 50 blossoms or so. Several cultivars are available. These include several dwarf ones that are only ¾ to one foot in height.

Harebell flax *(Linum campanulatum)*

Suitable for zone five through nine, harebell flax reaches about one to 1¼ feet in height. This European perennial can be woody at the base.

The pale yellow blossoms with orange veins are 1¼ inches wide. These open in loose cymes during the Summer. This plant is similar to golden flax except for the foliage, which has whitish margins.

Narbonne flax *(Linum narbonense)*

Narbonne flax is suited to zones five through nine. It is found as a casual weed in about ten states or so. This occurs mostly in the East and Midwest. Native to the Mediterranean region, this long lived perennial is erect. It reaches eight inches to two feet in height with a spread of 1½ feet. The pointed, lance-like leaves, ¾ inch in length, have rough margins.

A very dependable, free flowering garden plant, Narbonne flax needs a well-drained soil. Forming a clump, it grows in partial shade and full sun.

This is grown for its gorgeous, white-eyed, blue flowers, which are 1½ to two inches in diameter. These form few flowered clusters. Flowering occurs in the Spring and early Sum-

mer. Heavenly Blue is considered one of the best cultivars. This needs no staking.

Perennial flax *(Linum perenne)*

Easy to grow from seed, perennial flax is considered one of the most long lived and highly reliable perennial species. Native to Europe, this erect, branching plant forms a clump. Best suited to zones three through nine, it does well in the South.

This reaches 1½ to two feet in height with a spread of one to two feet. Dwarf cultivars are available. One dwarf subspecies is only six inches tall. While most cultivars are upright, some display arching stems. The fine-textured, small, narrow, linear to lance-like, greenish-blue foliage is an inch wide.

The single, soft blue to pale blue blossoms are ¾ to 1¼ inch in diameter, smaller than those of Narbonne flax. Perennial flax blooms from April to August, depending on the location. The loose flower clusters are much-branched. Seeds for a white-flowering variety are available.

History of Common Flax

The exact origins of common flax are unknown. Commonly cultivated in Europe and the Middle East, it was grown in Assyria and Mesopotamia around 5000 years ago. This is among the oldest cultivated plants. Flax remains have been found in the Swiss lake dwellings, and date to almost 10,000 years ago. Common flax was among the earliest cultivated fiber crops in Asia and the Mediterranean region.

It was very well known among the ancient Egyptians during the time of the pharaohs. Egyptian mummies were routinely wrapped in linen. Egyptian tomb paintings depict the cultivation and processing of flax. This was mentioned by a number of Greek and Roman authors, including Pliny and Homer. Jews introduced the plants from Egypt to Palestine.

The European colonists brought this to America during the early 1600s. Colonial authorities encouraged flax cultivation and production by awarding prizes to those producing the best linen fabrics and flax yarn. It was one of the most widely grown plants during the Colonial era.

The fiber crop is no longer commonly grown in America since it is more expensive to grow and produce than cotton, particularly since the invention of the cotton gin.

Value of Flax to Bees

When the oil seed crop is pollinated by bees, higher oil yields are the result. According to IBRA, the common cultivated flax is an important honey source around the world.

Yielding nectar and pollen, all species are of equal value to bees. The plants attract many bees, which show equal interest in flax and sweet clover blossoms. They work the flax flowers very freely from sunrise to around 1 pm. The plants yield a lot of nectar, which is clearly visible to the naked eye. The blossoms have five small nectaries.

Flax provides a moderate honey crop of 25 pounds or more per colony. The color of the honey can range from white to water white or light colored. BC

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

It's Time To Get ORNERY!

Les **Crowder**

Growers, Beekeepers And People Who Eat Are Worse Off Because Of Pesticides

Colony Collapse Disorder (CCD) has caused some beekeepers huge losses, put some out of the business and threatened to make some of our food scarce. It has spurred research into its cause and this research has revealed new truths about how bees, crops and pesticides interact.

All the players in the game of growing food are involved. We all need to make a living, and I had a theory of late that we all need to rise together, beekeepers, almond and apple growers, agricultural supply companies, food eaters and even bees, butterflies, earthworms because we are all in this life together and we all need to help each other survive and thrive. If we leave anybody behind everybody eventually gets held back. We **ALL** need to rise together. Pollinators, and by extension beekeepers, are being left behind and everybody will get mired with us eventually. We deserve consideration, our needs are everybody's needs because we all need bees and trees and food, a healthy vibrant environment to live and thrive in. Thanks to CCD we are learning something that will make an improvement in the world.

We have watched the scientific community struggle to figure out what causes CCD for a good many years. The investigations have led us into new territory, sub-lethal and synergistic effects of pesticides.

Sublethal effects weaken and disable our bees without actually killing them. A study done at UC at San Diego fed bees low doses of a neonicotinoid insecticide and it made them less inclined to forage on all but the very sweetest of syrups. "In other words, the bees preferred to only feed on sweeter nectar and refused nectars of lower sweetness that they would normally feed on and that would have provided important sustenance for the colony," says researcher Daren Eiri. "In addition, bees typically recruit their nest mates to good food with waggle dances, and we discovered that the treated bees also danced less."[1] The neonicotinoids have been shown to slow learning in bees.[2] The hive becomes slow witted, and less able to respond to the floral landscape, like a basketball player slowing down and losing track of the ball. Hives of honey bees owe their lives to the floral landscape and have to be quick and efficient. Very low doses of imidacloprid have been shown to greatly increase honey bee susceptibility to Nosema.[3] This implied disabling of the immune system of bees could explain why bees with CCD are found to be full of pathogens. Some pesticides at certain doses don't kill worker bees instantly but reduce worker longevity.[4] Others delay pupation, and that gives *Varroa* mites more time to reproduce.[5] Fungicides used in almonds have been shown to repel bees and interfere with pollen storage.[5]

Synergistic effects are only beginning to be untangled out of a very complicated soup of compounds used in the farm landscape that beekeepers pollinate. A common farmland mix of fungicides and neonicotinoids magnifies the toxicity of the insecticide.[6]

A hive of bees can and must be efficient at the collection of it's floral resources. It takes billions of quick trips to flowers to pull in the resources the hive needs to grow and store up food for Winter or dearths. Sublethal concentrations of toxins can kill beehives by steadily dragging the hive out of it's "zone" of exuberant activity into depressed malaise. The LD 50 (the dose that kills 50% of the tested bees) only determines the amount of pesticide needed to kill a worker bee, not invalidate it by taking out it's immune system or it's IQ. The LD 50 does not protect beehives.

Presently the company that is going to profit in the sale of a pesticide does it's own LD 50 testing. The foxes get to officially guard the henhouse. Even if they are doing an unbiased job we need a better test or tests than the LD 50.

Worker longevity is very important and relatively easy to test. It is important because high worker longevity becomes the source of high hive populations once the queens are laying at their maximum capacity. Add a few hours or even a day or two to the longevity of workers and the hive population soars exponentially.[7] Large populations give the hive many vibrant hands to work the flowers. This leads to good honey production or strong hives that can be divided on the pollination circuit.

A foraging test also seems necessary. No use having plenty of workers if they are brain damaged and unable to forage efficiently.

The pesticide companies will howl and gnash their teeth. We will hear how agriculture will be unable

to feed the people. But our back is against the wall and they need us to pollinate many of their customers crops so we **all** can feed the people. These companies are full of very intelligent and good hearted people that want a good place for their great-grandchildren to live. I believe a shift from toxic chemistry to biological and life enhancing agricultural aids will in the end be the only way to make money. Roundup resistant weeds and dead soil will take the profit out of toxic chemistry just about as fast as litigious butterfly lovers and beekeepers.

Some of the compounds that are killing bees are compounds beekeepers put into the hives.[8] These "approved" compounds have been found to reduce queen and drone weight, viability, and fertility. The miteicides (acaracides) some beekeepers use to protect bees from mites are building up to levels that are weakening the bees they are trying to protect.

If we want to see a less toxic agriculture we need to lead the way. At the American Honey Producers Association conference this year in San Diego Dr. Danka demonstrated that honey bees have several methods of naturally resisting *Varroa* mite proliferation in the hive.[9] Some bees groom the mites off each others, others uncap and throw out parasitized larvae before the mites can reproduce, others shave time off the pupation interval and thereby cheat the *Varroa* of development time in the cocoon. If we keep using the various chemical treatments we never let the bees select for natural mite resistance. I have not used any mite treatment since 1995. Many beekeepers in the state of New Mexico have never used miticidal treatments of any kind. There are plenty of *Varroa* mites in New Mexico. Initially I lost quite a few bees to *Varroa*, one year 98%. But since the Russian and VHS bees have been selected and available we now see very little damage from *Varroa*.

If all beekeepers could take the plunge, even with a percentage of their hives, and breed from survivors we could easily eliminate the use of miticides in beekeeping. The same is true for antibiotics. Many a New Mexican beekeeper has never used antibiotics and I have not used them with my few hundred hives since the early 80s. We need to learn from our beekeeping predecessors how to breed disease and parasite resistant bees and how to manage beehives to help them stay strong. We need to work with natures resistance rather than fight it. We need biological rather than chemical solutions to our pest problems.

One of the management techniques we need to get back to is the elimination of old comb. Often in the past we thought of our old combs as an asset. The bees use from eight to 11 pounds of honey to make a pound of beeswax and it takes time and labor away from honey production. But back in the 80s Dr. Elbert Jaycox in Illinois, found that old combs with their thick cocoon encrusted walls reduced honey production, darkened honey and increased the bees susceptibility to brood disease. We have found that toxins that beekeepers put in the beehive, such as coumaphos in Check Mite and fluvalinate in Apistan, and toxins bees run into in the fields, accumulate in the old combs to levels that damage bees![10] Old combs are no asset. We need to regularly renew our beeswax combs to help bees stay healthy. This represents a major investment. Just when beekeepers need to invest in tires for their trucks and a motor for the forklift. Many of us don't have the money to invest back into our combs with the income we get.

Seventeen years ago I chose a radical way to stay in the bee business. I quit working for a large 4,000 hive operation and began keeping bees in topbar hives as a small business. There were several reasons for that choice. The first consideration at the time was money. I could build 30 topbar hives from some new and some scrap lumber for about $10 each. I did not have the money to invest in more langstroth equipment. The reason I had experimented with topbar hives in the first place was when I heard about the deleterious effects of old comb I began to chafe at the expense and labor of frames and foundation to renew the combs in the broodnest. There is no frame or foundation, no out of pocket cost or labor to the beekeeper to renew combs in a topbar hive. Once I tried 30 topbar hives for a couple of years I felt liberated from frames and foundation. The hives made about 75-80% of the honey the Langstroth hives made and made up for that loss with six times the wax production. Many new beekeepers are choosing topbar hives for the above reasons and due to the fact that there is no lifting of heavy supers nor storage of supers. Storage of supers is job that takes time and requires another toxic chemical, paradichlorobenzine. Our honey and beeswax products are sold for a premium at retail prices at the farmers market. I wish we could promise there are no pesticides in the environment where we keep bees, but at least we don't put any in the beehives ourselves. And we do not have to buy the chemicals. Staying profitable is as much about cutting costs as it is about increasing production. But my way of keeping bees is not at this time going to meet the pollination needs of the industrial, and at least from the bees perspective, poisonous agricultural system that is currently keeping the grocery store shelves full.

We **ALL** need healthy bees. We need less -icides in and around our beehives.[11] We need to know when a chemical sprayed around our hives is going to make our bees sick and weaken them. We need to protect queen fertility, worker longevity, and hive IQ. Beekeepers need to make enough money to be comfortable and inspire the next generation to keep bees. The economics of honey in barrels getting world market prices is long gone. The pollination circuit is expensive and grinding. We are getting left behind. We need to make a lot of noise, put on a show of force, get the attention of the media, congress, and the EPA. I am not one to want to march around with a sign yelling some slogan. What about a caravan of trucks with dead-outs ending in a big bonfire? How do we get heard in some creative, legal, and newsworthy way. In a way that makes EPA actually **p**rotect bees! BC

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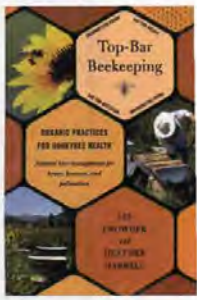

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GLEANINGS

JULY, 2013 • ALL THE NEWS THAT FITS

Maybe We Should Be Growing Food, Instead?

If the climate continues to evolve as predicted by the Intergovernmental Panel on Climate Change, the United States stands little to no chance of satisfying its current biofuel goals, according to a new study by Rice University and the University of California at Davis.

The study published online in the American Chemical Society journal Environmental Science and Technology suggests that in 40 years, a hotter planet would cut the yield of corn grown for ethanol in the U.S. by an average of 7 percent while increasing the amount of irrigation necessary by 9 percent.

That could sharply hinder a mandate set by the Energy Independence and Security Act of 2007 (EISA) that by 2022 the nation derive 15 billion gallons per year of ethanol from corn to blend with conventional motor fuels, according to principal investigator Pedro Alvarez, the George R. Brown Professor and chair of Rice's Civil and Environmental Engineering Department. Alvarez is a member of the Science Advisory Board of the U.S. Environmental Protection Agency and chair of Rice's Energy and Environment Initiative.

The policy is based on the idea that blending ethanol into gasoline cuts harmful emissions from vehicles and lowers the nation's dependence on foreign oil, he said. But the cost in water may outweigh those concerns.

"Whereas biofuels offer a means to use more renewable energy while decreasing reliance on imported oil, it is important to recognize the tradeoffs," Alvarez said. "One important unintended consequence may be the aggravation of water scarcity by increased irrigation in some regions."

The authors of the new paper have long questioned the United States' support of biofuels as a means to cut vehicle emissions. In a 2010 white paper on U.S. biofuels policy produced by Rice's Baker Institute for Public Policy, authors including Alvarez and Rice alumna Rosa Dominguez-Faus found "no scientific consensus on the climate-friendly nature of U.S.-produced corn-based ethanol" and detailed what they saw as economic, environmental and logistical shortcomings in the EISA.

Their 2009 feature article in Environmental Science and Technology suggested the amount of water required to bring biofuels to market may be prohibitive; they calculated it takes 50 gallons of water to grow enough Nebraska corn to produce the amount of ethanol needed to drive one mile.

They suggested at the time that potential consequences to the water supply needed further study. With the new research, they have taken on that challenge and tied their models to estimates of how climate change -- reflected in predicted regional levels of atmospheric carbon dioxide, temperature and precipitation -- could affect agriculture in the nation's heartlands.

The team built computer simulations based on crop data from the nation's top 10 corn-producing states – Iowa, Illinois, Nebraska, Minnesota, Indiana, Ohio, South Dakota, Wisconsin, Missouri and Kansas. They also used estimates of carbon dioxide, a greenhouse gas, and other elements from a number of models, including the government's well-tested Environmental Policy Integrated Climate (EPIC) model. They used the simulation to predict crop outcomes over the next 40 years in relation to expectations of climate change.

The researchers found states in the Corn Belt (Iowa, Illinois, Indiana, Ohio and Missouri) and the Great Lakes (Minnesota and Wisconsin), where corn growth is primarily fed by rainfall, would be subject to more intense but less frequent precipitation, especially during the summer. Maintaining crops would require a 5 to 25 percent increase in irrigation, which would in turn require more extensive – and expensive – water catchment infrastructure.

On the Northern Plains of South Dakota, Nebraska and Kansas, where the growth of corn for ethanol already depends heavily on irrigation, the study found that crop yields would decline even if irrigation continued to be "applied as needed," the researchers wrote. In fact, the 2012 drought has already damaged Great Plains farmlands where long-reliable aquifers used for irrigation are beginning to run dry.

The researchers said agriculture costs the water supply in two ways: through the drawdown of groundwater from irrigation and through loss to the atmosphere via evapotranspiration (ET), by which water moves through plants and evaporates. Higher atmospheric temperatures increase ET at a cost to groundwater, they wrote.

The production of one liter of gasoline requires three liters of water, according to the researchers. The production of one liter of corn ethanol requires between 350 and 1,400 liters of water from irrigation, depending on location. A liter of ethanol also translates into 1,600 liters of ET water that might not directly replenish the local watershed.

The researchers suggested the growth of crops for ethanol was already questionable because of its impact on the environment. Rising temperatures in the decades to come, they wrote, could lead to reductions in crop yields and an increase in irrigation demands to the degree that the government mandate is no longer economically viable.

"The projected increases in water intensity due to climate change highlight the need to re-evaluate the corn ethanol elements of the Renewable Fuel Standard," Dominguez-Faus said.

Dominguez-Faus, lead author of the paper, is a postdoctoral researcher at the University of California at Davis. Co-authors are Christian Folberth of EAWAG Aquatic Research, Dübendorf, Switzerland; Junguo Liu, a professor at the School of Nature Conservation, Beijing Forestry University; and Amy Myers Jaffe, executive director of energy and sustainability at the UC Davis Institute of Transportation Studies.

CHINESE HONEY SMUGGLED INTO FRANCE

Chinese honey smugglers, facing a crackdown in the U.S., are turning their attentions to Europe.

French public service radio station RFI reports honey is shipped from China to Eastern Europe where it is relabeled to say "French origin" and then sent to France.

FPI says a recent study released by the laboratories from the French Centre of Technical Beehiving Studies in Moselle (Cetam) found misleading labels, false country of origin, and additional sugar are plaguing 10% of honey marketed in France.

"The majority of the honey we are worried about is that being sold cheaply and sold in big quantities," says Cetam director Paul Schweitzer, a pollen specialist. "About 10% of samples sent off for analysis were doubtful.

"These honeys that have undergone adulteration and have a dubious quality are essentially coming from Asia, namely China."

French National Union of Beekeeping (Unaf) spokesman Henri Clément says this also involves acacia honey from Hungary, Bulgaria, Romania and Poland.

He said specialists are determining the true origin of the product through the traces of pollen in the honey.

Unaf says honey imports are increasing in France because of a fall in local production. It says this is primarily from the use of pesticides that have killed more than 300,000 bee colonies a year.

"In 15 years, the production of honey in France has been halved, mainly because of pesticides, meanwhile the rate of importing has tripled," Clément says.

PFI says that in 1995, France produced 33,000 tons of honey a year and imported 7,000 tons, but last year it produced only 16,000 tons and imported 26,000 tons.

The radio station says mislabeling of the origin of the product is not the only problem.

Analysts at Cetam say many of the products being sold as honey are made with the addition of sugar syrup.

"Laws limit the quantity of sugar in honey, but this is based on the amount of sucrose found in the product, whereas much of the sugar added to these honeys comes from maltose" Schweitzer says.

Since 2003 it has been illegal for honey to contain more than 5% sucrose, fructose, glucose, sugar cane, or beetroot sugar.

Cetam analyzes 3,000 honey products a year.

Alan Harman

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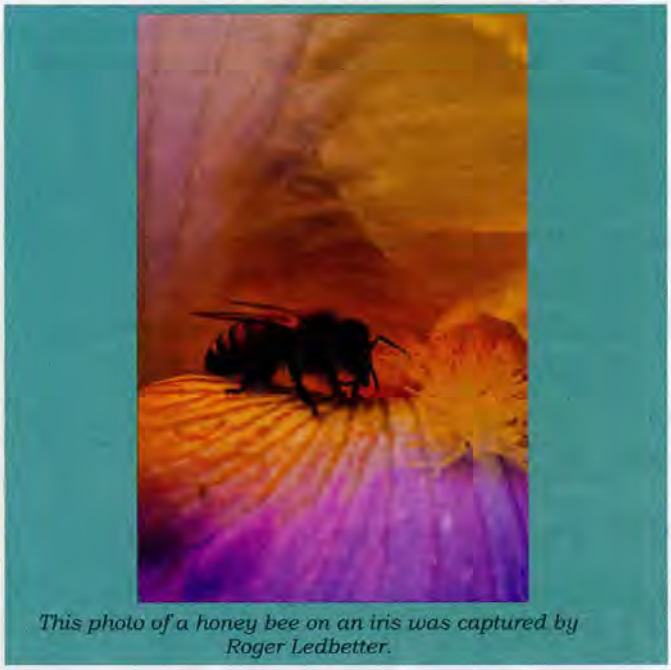

This photo of a honey bee on an iris was captured by Roger Ledbetter.

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I recently read an ad for a "bee guardianship" seminar over the hill in Paonia. "Guardianship" involves organic methods and apparently goes way beyond simple beekeeping. Now that bees have become trendy, there's no shortage of honey bee gurus. Don't confuse me with one!

Waiting for my gal Marilyn at the physical therapist's office the other day, I thought I might catch up with what's new in *Bee Culture*. I no sooner set my magazine on my lap than a woman walked up to me. "Are you a beekeeper?" she queried. When I replied in the affirmative, she said, "What kind of hives do you have?"

"If I understand your question, the answer is that I use standard Langstroth equipment. Why do you ask?"

"Oh," she said. "It's just that I know there are two ways to keep bees. I've never had bees, but I'd like to get a top bar hive."

I got her drift. I get this all the time from the radical raw food, bee guardian crowd. Top bar: good; Langstroth: bad, because some expert said so.

This woman didn't know a drone from a worker from her Royal Majesty the Queen, but she knew she wanted a top bar hive.

"Wonderful!" I said. I tried to sound encouraging. It's a free country. She can do whatever she wants. I don't know why I get all worked up about this.

Speaking of raw food, I know the experts say that raw milk can kill you, but Bob and Darlene have been producing and selling it for 40 years, with not one fatality to show for their efforts. Marilyn buys a gallon a week, and she shares the driving to Bob and Darlene's with a couple of our neighbors. One of them thought he might like to acquire a hive of honey bees.

"Why?" I asked.

"I never get any apples off my trees." he said. "And of course I'd like to get some honey."

"A lack of pollinators might not be your apple problem." I said. "Your apples should be blooming right now. I've got 50 bee colonies within a mile of your place. On a warm day, your tree should be alive with bees. Maybe you should check. A lack of honey bees might not be your problem.

"Look, if you want bees, you should have them. But you can't just plop down a hive in your backyard and expect it to thrive. Honeybees can carry all kinds of diseases and parasites. I mean, you can do it. But you've got to work at it."

I told him that a bee with a *Varroa* mite on her back would be like him with a tick-like creature as big as a dinner plate on his back, chewing away and spreading disease.

"Gross!" he said. "Yeah, well, after hearing all that, maybe I don't need bees."

Ever since I bought a 40-colony yard this Spring from Paul, I've been reassessing my approach to beekeeping. Ordinarily I haul bees 70 miles to Palisade and Grand Junction to pollinate the fruit orchards in March and April, then bring them home to Peach Valley for the dandelions. Later, I truck them to Carbondale and Garfield Creek for a dose of higher elevation dandelions, before I move some of them even higher to the rolling meadows of Flat Tops alpine wildflowers and to the ski slopes of Aspen Mountain.

I don't do this with a fork lift and four-way pallets. I use a hand truck to push individual hives up a ramp and onto my pickup or my flatbed truck. On a good year, the hives come back from Palisade plugged with honey, so they can be heavy.

Meanwhile, I have apiary solar electric bear fences to erect, aging vehicles to keep roadworthy, hive divisions to make, queens to introduce, and of course the weather to watch, as I time my moves

to coincide with the receding snow line, drying roads and the dandelion bloom at higher and yet higher elevations. It's a challenge to keep up.

But the bees in my new yard aren't going anywhere anytime soon. They're going to stay right where they are, three and a half miles from my driveway. This is a reportedly good spot, so maybe they'll make some honey. In the Fall, the ones that make the grade can go to California with Paul's bees for the almonds. They're on clipped pallets, so a fork lift can load them in nothing flat.

And they pay you to send your bees to California. I'm stubborn and generally do things the hard way. Maybe I can cut a few corners and try something new. All I'll have to do, God willing, is throw on a few supers, take off honey, treat for mites. I can come home for lunch. It sounds simple. They're just beehives. What could possibly go wrong?

Ed **Colby**

What Could Possibly Go Wrong?

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