

Bee Culture's

BEE Keeping[®]

Summer 2020[®]

Your First Three Years



**Build Your Own Boxes
First, Second and Third Year
To-Do Tasks This Summer**

All About Honey Bee Drones

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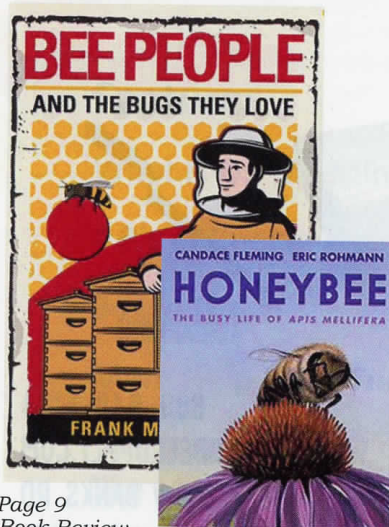


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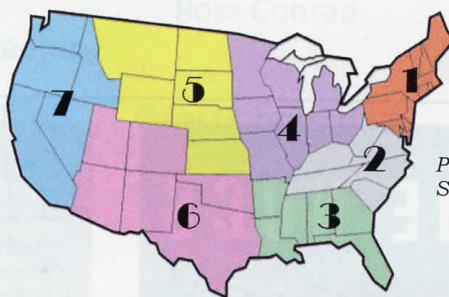
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A Connecticut beekeepers keeps the grass down in his beeyard. Photo by Kim Flottum

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I have never been to April 29, 2020. I have never experienced this thing called a COVID-19 Pandemic. I have never been forced to work from home, which continues here in Ohio. I have never experienced working with Great people like Kathy, Jean, Amanda and a dozen or so fantastic writers on *BeeKeeping* from a remote digital platform. I have certainly lived through various historical markers that, for the most part, I have only seen on the 6 o'clock news or PBS News Hour. But I have never lived in a moment in history such as now. A history driven by an invisible agent. I must believe my elected governmental leaders, the media, health care and bankers. It is scary and interesting. We don't know when it will end or what it will look like when it does and what changes in society and culture and financial system are going to be artifacts.

colony often and if there is a visual weakening of the colony figure out why and then fix it. Most of the time its *Varroa* weakening the colony and the beekeeper has not been on the game. You are the Honey Bee manager in 2020. Do it!

QUESTION
NO BEES LEFT

I hope you are well. Quick question. One of my hives absconded. One week they were there and the next week they were all gone. This was a healthy appearing group of bees. I treated with oxalic acid vapor earlier in the season.

My question is, can I use the equipment and the sugar honey from fall feeding in other hives without risk?

Thanks
Bill Fleming

ANSWER

First you have to understand that the colony made the decision that this hive/location wasn't a good place to be living in. They were losing population getting weaker because they were most likely 'sick'.

Sick generally means *Varroa* and the *Varroa/Virus* Legacy. My question is did you follow the protocol in the 'Tools for *Varroa* Management Guide' developed by the HBHC (Honey Bee Health Coalition)? How often did you sample and when you treated did you sample after to see if the treatment worked?

Unless you had an AFB secondary infection most likely all the equipment and stored food resources will be OK to start another colony.

I would encourage you to download the "Tools . . ." Guide and memorize it.

QUESTION
QUEEN DIFFERENCE???

What is different between Russia Hybrid Queen and Purebred Russian Queen ?

Thanks!!
Vinnie

ANSWER

Virgin queens' mate in an open air location called a Drone Congregation

Most expensive dress right now



I, like you are a puzzle piece on this personal and societal journey. Selfishly I don't want to be part of the older 10% who get COVID-19. And I think about and worry about my children, grandchildren, long time beekeeper friends, neighbors and my community at large.

So, I am going to work from home efficiently with the goal I can bring some value to those that read *BeeKeeping* and have trust and confidence in *BeeKeeping* I will get outside and take walks by myself, go to the Big Box and buy what's left off the concerning almost empty shelves and wait like you for the all clear.

Be safe. Be well and lets trust ourselves and our neighbors more than we have in the past so when we come out of this our neighborhoods, and communities, places of worship, stores, stop light and every place we get the chance for eye contact with our brothers and sisters will register friendship, respect and acceptance.

Now how about some Q&A's. Jerry

if it's life cycle can somehow be interrupted.

Thanks, Dan in Southern California

ANSWER

Remember that SHB are a secondary predator of honey bee colonies. They are looking for a colony that is weak or weakening so they can reproduce and make baby SHB and there simply are not enough honey bees to 'guard' the colony.

Once the hundreds of SHB females have laid their eggs, an egg is an egg for 1 day, and the aggressive larvae are present with the kodamaea slime (just like cow snot) caused by a colleague yeast its for all intents and purposes over. Why try to catch the larvae? It's after the fact. You failed.

What the management goal is or should be is to be checking your

QUESTION
SMALL HIVE BEETLE LARVAE

Can you address controlling the LARVAE stage of the SHB? It seems like intervening here is a great control method, given that the larvae jump from the landing board in order to pupate in the ground below as an integral part of its life cycle. I've tried placing a few inches of pea gravel directly below the board in hopes of deterring pupation, but I've read that the larvae can simply wiggle away to "greener pastures" once they land. I'm wondering if anyone has any experience or ideas regarding interrupting the SHB life cycle by preventing pupation and therefore reproduction?

Perhaps something akin to the West Beetle Trap but placed below the landing board instead of on top of it, with a grate designed specifically for larvae rather than for the beetle itself, and that somehow prevents their escape to the outside?

I don't have a major problem with SHB, but it seems easy to control

From The Editor —

Area or DCA with Drones/males who are attracted to DCAs from miles around hoping to mate and spread their genetics. She will mate with 20+ Drones and store sperm in an organ in her body called a spermatheca for use the rest of her active life.

Impossible to control what drones from whose colonies with variable races of managed honey bees and feral populations go to the DCA. Unless the queen is artificially inseminated with declared 'pure' Russian Drone semen with the cost of the Queen at several hundred dollars or more there is no such thing.

There are no such things as Italian, Carniolan, Caucasian, German bees etc. In North America because we can't control drones in the DCA for commercial Queen production.

We have mutts.

QUESTION
DON'T MOW!

I am living in Appleton, WI. Someone here has recommended to the city to make May a "no mow" month. To help with the bee population. I am not so sure it isn't just people that don't like to mow their lawn.

If it passes, it would actually be mid June before residents would be required to have their lawns mowed.

Do you think it would actually help the bees to do this? I would think maybe planting early blooming flowers may be a better idea?

Thanks for your input. Any ideas you may have are really appreciated!

Take care. Dode Walsh

ANSWER

There are approximately 50 million acres of suburban lawns in the U.S., taking approx.. 80 million lbs. of chemicals and 10,000 gallons of water each to make them look like the 18th Hole at Augusta.

In the best of cases and worst of

cases grasses are wind pollinated and have little value for ANY pollinators.

Can you imagine 2%, 3%, 5% of 50 million acres being converted into pollinator friendly forage? Doesn't have to be the whole yard but maybe along the driveway, or next to the house or that spot in the backyard. Short story is you are right.

QUESTION
MITE TOOLS

I'm a backyard beekeeper on Cape Cod. Haven't had bees for a few years because I keep losing them to the mites and other possible reasons. What is your current advice for mite treatments? Thanks so much.

Bob Baron

ANSWER

Memorize this and put into action EXACTLY and you will be incredibly more successful. I promise or I owe you lunch.

https://honeybeehealthcoalition.org/wp-content/uploads/2015/08/HBHC-Guide_Varroa-Interactive-PDF.pdf

QUESTION
SWARM TRAPS

I hope you are well. When using swarm traps, should the bees be left to build out some comb and settle in for a week or should they be transferred to a empty hive as soon as possible?

As always thanks for your help.
Bill F.

ANSWER

If the swarm trap is an empty container and is not using honey bee comb or beeswax as an attractant the swarm attracted to it should be relocated as soon as convenient to a hive with frames and comb/foundation. This allows them to begin consolidating their colony and begin brood rearing as soon as possible. The goal.

Project Apis m.

Your "go-to" non-profit honey bee research organization, with programs in the USA & Canada

PAm is dedicated to enhancing the health of honey bees while improving crop and honey production.



PAm has infused over \$6 million to support honey bee health since 2006:

- * Funded BIP Tech Transfer Teams
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- * Scholarships for PhD students
- * Expanding forage resources
- * Invested in new technologies
- * Discovered new pathogens
- * Supporting long term stock improvement, bee germplasm preservation, new Varroa controls

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1ST YEAR HIVE TASKS

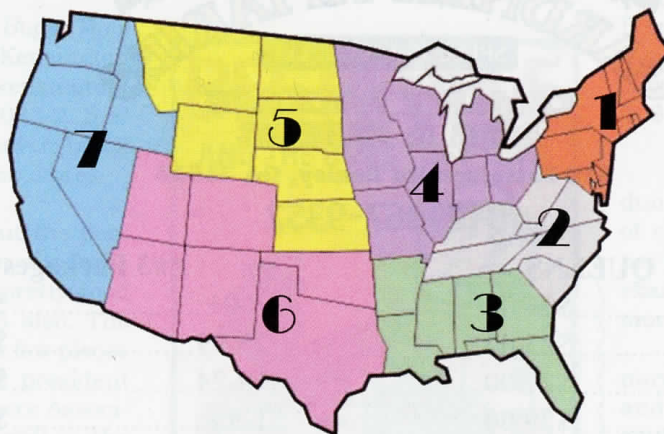


Ann Harman

- Monitor *Varroa* with alcohol wash and decide on *Varroa* treatment in July. Winter survival depends on *Varroa* control during July.
- If choosing a chemical treatment, **read the label** for important application information.
- Monitor small hive beetle and provide traps.
- Packages and nucs started in Spring should be in fully-completed hives with all foundation drawn by the end of July.
- Keep weeds and grass mowed in beeyard.
- Beekeepers monitor themselves for ticks acquired in beeyard.
- August begins the bees' New Year.
- Monitor bees' water supply—do not let it dry up.
- Examine queen's performance.
- If colony is weak examine for disease or other conditions.
- If colony is weak because of poor queen, plan on combining or requeening.
- Never combine two weak colonies—combine weak with strong; eliminate weak queen.
- Maintain good ventilation in hives.
- Be a Plant Watcher and Weather Watcher to know if a dearth of bee forage.
- If a dearth, feed 1:1 sugar syrup and possibly a pollen patty.
- Be sure that small hive beetles are not infesting a pollen patty.
- Feed sugar syrup inside the hive and feed all colonies to prevent robbing.
- Keep hive inspections to a minimum to avoid robbing.
- In cold climate areas feed 2:1 sugar syrup in September for Winter stores.



SUMMER REGIONAL HONEY REPORT



So what's the prognosis for the honey market this coming season? We checked in with our reporters again this year to see what they think is going to happen. Overall, 54% believe that the demand for their honey this season is going to increase. This ranged from a high of 67% in Region 6, to a low of 40% in Region 7. Will demand remain steady, we asked? 38% believe it will be about the same this season as last. That ranged from a high of 60% in Region 2, to a low of 25% in Region 4. Will it decrease? Only 9% overall think demand will decrease this season.

Prices will increase think only 18% of our reporters, remain steady think 75% and actually decrease say

7%. Nobody is very optimistic about increasing prices but just over 50% think that increase in demand will drive prices up a tad, while 38%, those who keep good records, think costs will make them raise prices, and then there are the 11% who will raise them because they can, primarily due to the cost of keeping bees alive, but also simply to increase their margins and annual profit. I think we need more of the profit minded beekeepers out there.

As a result of all this, demand, price increase and the rest, fully 45% of our reporters will increase production this season (providing all the rest fall in place), which is up from only 33% last year, but fully

52% don't intend to do anything different. They will just stay the same. And, interestingly, only 3% actually plan to decrease prices, for reasons not specified, this season. Now, take a look at the overall prices for each of the products we list. And if you routinely don't, take a look at last month's prices and last year's prices now and note how the market is changing. That \$0.75/lb imported honey is slowly changing the world market, and price, of honey. And read the Annual honey report in this month's issue too. Note that per capita consumption isn't up, but imports are up, and U.S. production is slowly changing from honey production to pollination production.

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	\$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.07	2.27	2.25	2.05	2.25	1.80	3.00	1.503.00	2.16	2.16	2.17	2.23
55 Gal. Drum, Ambr	2.04	2.15	2.30	2.01	2.14	1.70	3.00	1.35-3.00	2.11	2.11	2.02	2.15
60# Light (retail)	231.67	185.33	211.06	160.00	160.00	185.25	219.00	120.00-325.00	199.62	3.33	204.23	206.30
60# Amber (retail)	236.25	189.13	185.00	157.33	212.22	163.25	213.00	119.74-325.00	202.07	3.37	203.69	206.88
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	98.03	74.10	99.20	81.50	61.20	108.81	108.81	57.60-194.40	91.63	7.64	91.93	89.84
1# 24/case	148.65	109.93	153.03	109.39	152.50	111.00	128.40	45.00-300.00	137.07	5.71	131.62	129.34
2# 12/case	133.24	102.70	137.11	100.53	111.84	96.00	114.00	79.20-246.00	124.71	5.20	124.58	120.48
12.oz. Plas. 24/cs	100.36	102.47	86.50	89.14	80.32	96.00	103.20	37.20-172.80	95.24	5.29	99.09	102.40
5# 6/case	147.26	106.73	170.33	116.93	113.16	105.00	146.00	71.50-240.00	136.26	4.54	133.14	136.55
Quarts 12/case	186.06	176.27	147.30	110.01	157.92	192.00	222.00	50.00-300.00	166.00	4.61	143.36	159.95
Pints 12/case	100.79	102.04	96.00	87.28	105.50	94.67	84.00	69.84-144.00	97.49	5.42	90.17	91.57
RETAIL SHELF PRICES												
1/2#	5.83	5.31	5.15	4.91	4.40	5.74	5.74	3.09-9.00	5.44	10.88	5.08	5.01
12 oz. Plastic	6.99	6.88	5.00	5.26	5.05	7.00	6.93	3.79-12.00	6.33	8.45	6.19	5.98
1# Glass/Plastic	8.98	7.75	8.83	6.72	6.86	7.45	9.33	3.65-17.00	8.11	8.11	8.20	7.76
2# Glass/Plastic	15.42	13.50	15.00	12.14	11.35	12.00	16.50	6.99-25.00	14.19	7.09	14.21	13.74
Pint	13.93	10.84	10.00	11.33	10.08	11.67	8.40	4.00-22.00	11.52	7.68	11.05	10.33
Quart	31.42	26.15	38.67	26.00	23.03	25.50	29.75	15.00-45.00	29.51	5.90	18.28	18.27
5# Glass/Plastic	31.42	26.15	38.67	26.00	23.03	25.50	29.75	15.00-45.00	29.51	5.90	28.94	28.87
1# Cream	11.63	8.38	11.55	10.55	11.06	11.55	12.33	6.00-18.00	11.11	11.11	9.99	9.89
1# Cut Comb	13.39	13.08	8.00	11.93	12.33	13.82	13.82	6.00-24.00	12.63	12.63	12.85	11.87
Ross Round	10.01	7.55	10.73	12.00	10.00	11.00	14.16	6.00-15.60	10.67	14.22	11.11	9.90
Wholesale Wax (Lt)	6.91	9.32	4.67	6.36	8.75	6.45	8.67	2.70-16.00	7.08	-	6.70	6.48
Wholesale Wax (Dk)	5.11	5.13	2.55	4.88	8.00	6.47	10.00	2.00-15.00	5.79	-	5.54	5.28
Pollination Fee/Col.	97.22	65.00	82.50	91.67	100.00	120.00	47.50	45.00-190.00	86.46	-	88.97	87.85

Good Reading For Strange Times –

BEE PEOPLE And The Bugs They Love. Frank Mortimer. Kensington Publishing Corp. www.kensington.com. ISBN 978-0-8065-4083-2. 5.5" x 8.5", 312 pages, hard cover, black and white, \$25.00 at book stores.

This is far more about the people who keep bees than the bees themselves, but it does a pretty good job of telling about them also. The author, who has written a few pieces for this magazine, is the president to the Northeast Beekeepers Association and has guided it well in the decade he's been in that position. He's also a Master Beekeeper, so has done much of the homework needed to do right by his bees.

He's also met some really interesting people in his day, and, not surprisingly, some of these people are just like the beekeepers you've already met, or will if you stick to this long enough. Knowing them is one thing, knowing about them before you meet them is altogether different. You'll see.

There's lots of learning going on here, and if you haven't already started with bees the author goes over a lot of things you won't have to learn the hard way, which is how a lot of beginners seem to learn.

First packages, first spring, first Summer, first harvest, first bee meeting, mentors, friends and

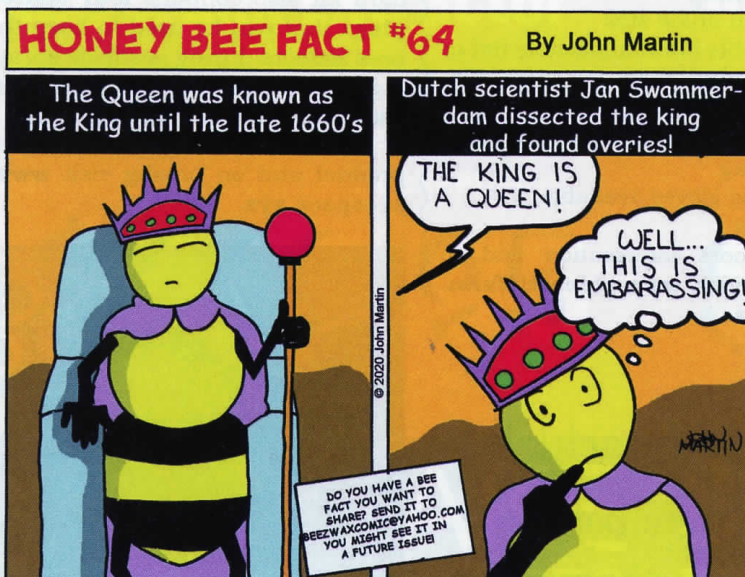


neighbors. As he learns, he makes mistakes, just like we did. But if you haven't started yet, you can avoid some of the most common, and, most dangerous of these and save your self a whole heap of trouble.

If you are just getting started this is background you should be aware of. You'll end up meeting some, maybe most of the people Frank meets, because beekeepers tend to be more alike than not. You'll see these people here, before you meet them out there.

Kim Flottum

Due to current restrictions, publishing has been delayed.



HONEYBEE. The Busy Life Of Apis mellifera. By Candace Fleming and Eric Rohmann. Published by Neal Potter Books:Holiday House Publishing Inc. 40 pages, 10" x 12", color, Hard cover. ISBN978-0-8234-4285-0. \$18.99.

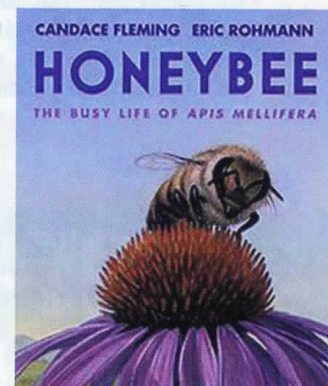
This multiple award-winning duo has published a whole library of children's books about all manner of topics, and this exceptional example should gather them even more awards.

The full-page art is extraordinary in detail and color and design, and it simply and completely describes the life of a bee. She emerges from her cell and begins to eat. After a bit she begins cleaning other cells, then starts taking care of her younger sisters. Next comes queen care until she's about 12 days old. Building waxen combs then is her job, and she's waiting, waiting to fly. But not yet.

Guarding is next, keeping out the bad guys and helping keep her home safe. But finally the day arrives and she can fly, finding millions of flowers and coming home filled with nectar and carrying all the pollen she can muster. And she returns triumphant, sharing what she has found, and where she found it with her very, very happy dance. But, gradually she grows old, becoming thin, losing hair and hardly flying at all. And one warm, sunny morning, Apis is still. But back at the nest a new bee is born, and the life of the colony and cycle of her bees continues.

At the end of the book there is a drawing of a bee showing, and explaining, all of her body parts, and a couple of pages of what people can do help bees and beekeepers. There's even some references for more of this story. If there is a child in your life, this is a must share story book. And I think maybe even experienced beekeepers will learn something from this up close and personal story.

Kim Flottum



NEW



The Sentinel Queen Bee Women's Beekeeping Suit – The Modern Beekeeping Suit designed exclusively for Women

For beekeepers, stings are an occupational hazard – which is why in 2018, we launched our 'virtually sting-proof' Sentinel Pro Bee suit.

We're delighted with the fantastic response from beekeepers who have told us how the suit has revolutionized their chosen pastime. Extremely lightweight, it keeps you cool in Summer months and offers the protection needed against bee stings – therefore giving the beekeeper more confidence when working with bees.

Since then, we've had many requests for a suit specifically designed for women. Having spent some time looking into the prospect, we could see that all bee suits are sized generically – without consideration for a woman's size and shape. So, after much research and delib-

eration, we made several prototypes, and finally, the Sentinel Queen Bee Range was born.

Now we can offer women a bee suit that's designed to fit from size 10 to 24 in a subtle shade of lilac. It has all the features of the Sentinel Pro range, but importantly it is designed to fit the characteristics of the female body.

- AVAILABLE IN UK WOMEN'S SIZES 10-24
- GREATER PROTECTION THAN CONVENTIONAL BEEKEEPING CLOTHING
- THE VENTILATED BREATHABLE MATERIAL HELPS KEEP YOU COOL
- PREVENTS BEE STINGS
- LIGHTWEIGHT, COMFORTABLE & PRACTICAL TO WEAR
- DESIGNED BY A BEEKEEPER FOR BEEKEEPERS

Features of the Sentinel Queen Bee Beekeeping suit include:

- Dual security at neck junction
- Excellent visibility through strong, clear view veil
- YKK durable zips
- Velcro fastening at cuffs
- Waterproof kneepads
- Two lined hive tool pockets
- Queen marker pen pocket on sleeve
- Mobile phone breast pocket with zip fastening
- Extended ankle zips
- Detachable interchangeable hat or veil
- Machine washable
- The suit is lightweight, weighing just 1.2kg
- Matching gloves available

For more information and to purchase visit www.oldcastlefarm-hives.com.

The Upstairs Downstairs Intrace from BeeSpace in the UK

The basic kit contains four entrances. Normally, three are placed in the bottom brood box in place of the standard long opening, and one is placed further up. The kit can be used with either wood or poly hives as long as they have standard dimensions that respect bee space. Following the instructions included in the kit, you start by drilling three one-inch holes in the bottom brood box. A super-sharp, high-quality **Forstner bit** is included, should you need it.

The UD Intrace starter kit contains all the parts you need to convert your current hive.

Inside the brood box you attach three internal entrances with the stainless-steel screws provided. These are plastic devices with openings on the bottom that direct the bees downward to get inside the hive. The space inside the plastic device is like a vestibule of sorts. From outside, the bees enter the one-inch hole and then must go through a second opening on the bottom on the device to actually access the hive.

The fourth internal entrance is included for installation into an upper brood box or a honey super, depending on your set up. In addition, **four solid plugs** are included that can be used to reduce wintertime ventilation or for temporarily closing your hive to facilitate oxalic acid vaporization. On top of that, the standard kit also contains **four vented plugs** that can be used to keep the bees indoors during pesticide spraying or to quickly block extra entrances in case of robbing.

For more information on the product and on pricing visit www.beespace.xyz.



If you rip a hole in a net, there are actually fewer holes in it than there were before.

What Is On My Mind

Jeremy Barnes



Two things caught my eye on November, 22nd. The first was a comment by Uber manager Scooty Braun, reacting to the public spat over Taylor Swift's music: "We live in a time of toxic division and people thinking that social media is the appropriate place to air out on each other and not have conversations." The second came in an address to the Anti Defamation League by the British comedian Sasha Baron Cohen: "Just think what Goebbels could have done with Facebook."

Ironically, on the same day 232 years ago in Boston, James Madison published the tenth of The Federalist Papers in which he addressed the question of how to reconcile citizens whose interests were contrary to the interests of the community as a whole. The nature of man, he suggested, makes factions inevitable – as long as people hold differing opinions, have differing amounts of wealth and own differing amount of property, they will form alliances with those similar to them and will sometimes work against the public interest and infringe upon the rights of others. Recognizing that the country's wealthiest property owners formed a minority, Madison feared that the unpropertied classes would come together to form a majority faction that gained control of the government. A century later Karl Marx was to express the same concern but offered a very different

solution.

Madison's fear, to steal a phrase from a podcast by Jonah Goldberg, was too much pluribus and not enough unum. His solution was a large and diverse republic, in part because it would be difficult to spread dissension over such a vast area. The U.S. Constitution included mechanisms to slow things down, to let passions cool and to encourage reflection and deliberation by means of elected representatives. In other words, to bring the 'crystalized brain' into play by deliberately and wisely examining issues from a wide variety of life experiences.

Size and distance did not curtail the passions that led to the Civil War or the resentments of the slave community in the U.S., to the feelings of injustice among many women or to the outbreak of war in Europe in 1914, but on the western front of the First World War the vulnerability of telegraph lines resulted in the development of wireless communications, from which emerged the radio. The success of Adolf Hitler is explained in large part by the invention of the microphone and public broadcasting, which meant that his voice and his message could

reach into every home. Television followed the radio although, unlike sound movies, the production of TV sets was halted by the Second World War; nevertheless by the time President Eisenhower took office about one half of the homes in the United States had sets in their living

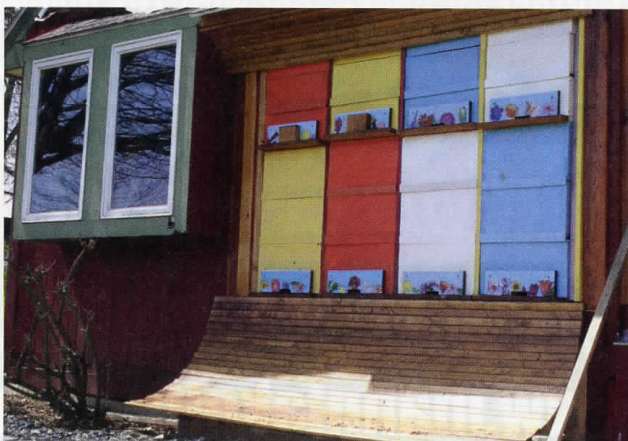
room.

The point is that radio, television and the movies were expected to make the world more connected, thus engendering greater understanding and awareness which would in turn be good for democracy. Certainly public media played a critical role in kindling public support for the Civil Rights movement in the US, in undermining support for America's involvement in the Vietnam War and in cementing opposition to the Soviet occupation of eastern Europe after the Second World War.



What has been labeled 'the outrage culture' can be tracked back to the 1980's with the increased traction of cable television and talk radio. New levels were reached with the appearance of Friendster, Myspace and Facebook between 2002 - 4, each of which was designed to help friends connect, albeit through highly curated versions of themselves. In 2006 Twitter's Timeline provided an unending stream of content which unwittingly provided the spark for contagious outbursts, most of them irate and accusatory. Facebook followed with the News Feed, the Like button, and in response to Twitter's Retweet button, the Share button. The coup de grace came in 2013 with the use of algorithms to find headlines that generated the highest click-through rate.

Thus was created the metric for the popularity, rather than the



validity, of content. Any post by any producer would remain at the top of the feeds as long as it generated engagement – a personal blog appeared as credible as a story from the New York Times, a car accident might appear as newsworthy as genocide in Rwanda, and Donald Trump is masterful at using his twitter feed to capture the news cycle.

Social media, besides having become a powerful accelerant for anyone who wants to start a fire, has the feel of too much communication and too little conversation; of too much connection and profound loneliness. And because we get angry before we think rationally, immediate gratification is no longer fast enough.

Certainly there have been successes, for example the #MeToo movement, but many on-line discussions, often with anonymous strangers, have been shown to be more incensed and less civil. Networks of partisans create world views that are more extreme, disinformation campaigns spread lies and bigotry, and violent ideologies lure recruits to some of the most reviled ideologies of the last century – Nazism and white supremacy – which have been given a second life by young people desperate for a sense of belonging. This is the same generation, two thirds of whom have never heard of Auschwitz, which is losing faith in democracy.

The Age of Reason, Cohen argues, is ending. “Democracy, which depends on shared truths, is in trouble. Autocracy, which depends on shared lies, is on the march.”

Why is this important to us? First it feels as if we are living in a perpetual state of fluidity, without the necessary time to process relentless items in our inboxes in the light of the accumulated and tested wisdom of humanity. The latest cat picture, scandal, political intrigue or public shaming dominates the headlines without an understanding of the longer term context

to provide perspective. Politics in the U.S. has become particularly acrimonious, the Brexit debate and lead-up to the December 12 election in the UK was acerbic, and in the last month there seems to have been a significant increase in mass shootings to the point that there is one

every day somewhere in the world, many of which no longer make the headlines.

The second reason involves another synchronicity. 2006, the year of Twitter’s Timeline, was also the year in which Colony Collapse Disorder hit the headlines, and no doubt the Like and Retweet buttons account in part for the significant public interest in the plight of honey bees. Some responded by wanting to keep bees themselves, and those who continued through the initial romantic perceptions discovered, as with many other activities, opportunities for moments of quiet and reflection, of learning age-old skills, of connecting with something



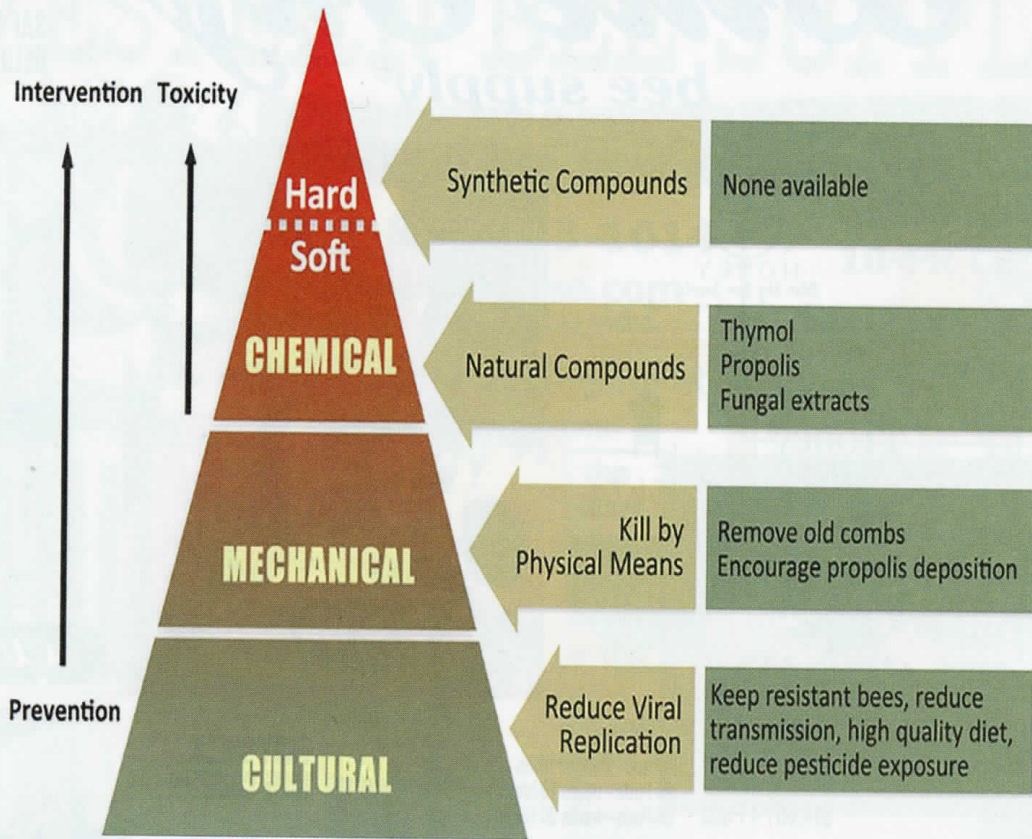
that has withstood the toils of time – in the case of honey bees, millions of years – as a counterpoise to the haste and confusion of the post-Reason era.

This, perhaps, is one of the many reasons why Tom Seeley titled his 1998 book, *The Wisdom of the Hive*. Wisdom is difficult to define because it encompasses so much – we recognize it when we encounter it – but common factors include an understanding of what is right combined with actions based on knowledge, experience, common sense and insight.

That sounds to me a whole lot like a colony of honey bees and not much like our human cyber colony. Nor are there any obvious solutions; indeed it may be easier to help the bees than it is to recover civility in the public forum.

An advertisement for The Bee & Butterfly Habitat Fund. The background is a close-up of a bee on a yellow flower. In the top right corner, there is a logo consisting of three hexagons with different patterns inside, followed by the text "The Bee & Butterfly Habitat Fund" and "A Unique Conservation Solution." Below the logo, the text "GIVE THE GIFT OF HABITAT" is written in large, bold, white letters. Underneath that, in smaller white text, it says "Your support of just \$100 will plant 1 acre of high-quality habitat for honey bees, monarch butterflies and other wildlife. Donate today at beebutterflyfund.org/donate."

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The 4 P's of Beekeeping

Michelle Colopy

Pests, pathogens, pesticides, and poor forage impact honey bee health. Pesticides contaminate forage, destroy forage, and are used in and around the hive to control pests and pathogens.

Pesticides comprise insecticides, herbicides, fungicides, and the adjuvants and surfactants in the formulated product. Research has shown synergisms are created when mixing pesticides, as well as synergistic effects provided by the adjuvants and surfactants. The synergisms most often increase the toxicity of the active ingredient. Pesticides kill a diverse array of organisms among the class of target species, and therefore have the opportunity to kill non-target beneficial organisms like honey bees and native pollinators.

Always use any pesticide carefully. The very purpose of a pesticide is “to kill.” Pesticides are an intentionally created product for the sole purpose of killing a pest, a plant, a fungus: a living organism. As a beekeeper who may be addressing a pest inside the hive, you should always ask yourself the following:

- Why do I have the pest?
- How can I control or eradicate the pest with the least harm to my bees, their forage, and the environment?
- How do I keep me, my family, my pets, and my neighbors safe while controlling the pest?

1. Why do I have a pest?

Assessing your beekeeping management is vital in controlling pests. Sometimes you have a pest because your neighboring beekeeper has a pest. You can work together with your beekeeper neighbor to control for *Varroa*, small hive beetle, wax moths, and more. Address the pest problem together and both beekeepers will improve their beekeeping management.

You may have a pest because your bee yard is set-up for the pest, more than to protect your bees. Hive placement is key to a healthy hive. Review the two reference articles to analyze your own bee yard to keep the pests out.

2. How can I control or eradicate the pest with the least harm to my bees?

After you have determined why you have a pest, examine the solutions for control or eradication. There is a plethora of information available for controlling *Varroa*, small hive beetle, wax moths, and more. Read the directions of any hive management process, and follow them. Short-cuts in directions just lead to failure. Directions of a management process and directions for the use of a pesticide, are vital to effective application and results. If you “cut corners” on your beekeeping management then you should refer to question 1, “why do I have a pest?”

Chemical treatments, organic or synthetic, are chemicals you are placing into a hive, a living organism’s

home, in order to control for a similarly sized or smaller insect threatening your hive. It is difficult to kill one living organism that is feasting on another living organism. Chemical treatments require you the user or applicator to read the label directions . . . and follow them. If you have difficulty following the label directions, *do not use the product*. If you do not understand the directions, or the directions are too difficult to implement: do not use the product. Not all products, chemical or synthetic are easily applied. Know your limitations and protect yourself.

When using a chemical treatment in your bee hive, you must understand what the chemical will “do to your bees,” and “what harm it can do to you.” If the directions advise to wear a half or full face respirator with acid gas cartridges when applying oxalic acid to your colony, then wear it or you risk major personal health damage.

If the directions for using formic acid pads for *Varroa* control specifies two pads, do not add more pads or install them at the wrong temperature range than stated by the directions. Much research has taken place to ensure the products on the market will help to control in-hive pests, and not kill your bees, or you. Follow the product directions!

3. How do I keep me, my family, my pets, and my neighbors’ safe while controlling the pest?

Refer to question #1 – why do you have a pest? Improve beekeeping management, and bee yard maintenance, and neighbor beekeeper issues to address the “why.” By following beekeeping management procedures completely, and reading and following product label directions, you are following safe practices in using any chemical, synthetic or organic, to protect yourself, your bees, and neighbors.

If you cannot answer questions 1 and 2, then you will not keep yourself, family, pets, and neighbors safe. If you cannot make yourself safe, then you “should not put it in the hive.” Your beekeeping management and in hive control for pests and pathogens should not “volatilize” and travel outside of your bee yard.

Practicing safe and effective beekeeping management will keep you, your neighboring beekeeper, and your bees safe and healthy.



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[HONEYBEEHEALTHCOALITION.ORG/
HIVEHEALTHBMPs](http://HONEYBEEHEALTHCOALITION.ORG/HIVEHEALTHBMPs)

VARROA MANAGEMENT TOOL

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VARROATOOL](http://HONEYBEEHEALTHCOALITION.ORG/VARROATOOL)

Spirit of the Top-Bar

The Langstroth lads ask
How we do it so well:
Pulling bars full of honey
While they're going through hell.

The answer ain't science
Or the work we put in.
It's the guardian spirit
That's lurking within.

A pointy black beard,
Skin like smooth, yellow wax.
You'll rarely see him
As he lives in the cracks.

But with offerings made,
Like a thimble of gin,
He might grant you access
To the secrets within.

His mystical powers
Ensure our bees thrive,
As he leaves sticky prints
Down the side of the hive.

For crushing hive beetles
He carries a mallet:
"Their presence", he told me,
"I simply won't have it!"

And at night when then bees
Lie in blissful repose,
He produces a comb
That he holds with his toes.

He grooms for varroa
With his comb's teeth so fine.
On the bees' hemolymph
They can no longer dine.

Now as winter's cool veil
Drapes the hive like a bride,
Rest assured that the team
Remain cozy inside.

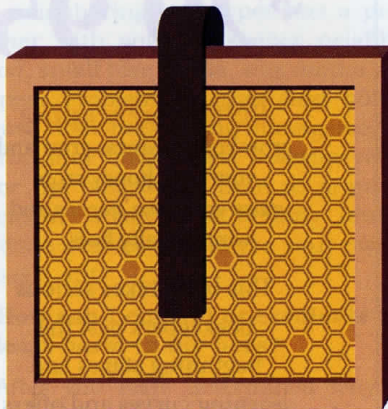
He puffs on his pipe,
Keeping embers aglow,
And the bees "hibernate"
Safe from frost, hail and snow.



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Boxes 101

Zachary Lamas

Measure Twice, Check Once, Cut A Few Hundred Times

Building boxes can be quite profitable and rewarding for small scale beekeepers. If you have a little space, comfort around a table saw, and access to inexpensive lumber, then building bee boxes can be a great supplement to your beekeeping income. In this article I will explain the reasons why I make surplus boxes, and how they assist with the company's profitability. I will also depict how one person with a few tools and a smart setup can efficiently turn out a lot of equipment. Lastly, there are pictures to help demystify simple joints and the frame shelf for anyone unfamiliar.

Small scale production: simple and quick

When I started expanding my apiaries I could not afford to have as many colonies as I wanted without taking out a loan. The equipment costs were going to be too much. Luckily, I was working as a carpenter, and had the ability to greatly reduce the cost of most of my equipment. Bottom boards, inner covers and covers were low hanging fruits in the potential cost-saving department. At their core they are all just flat surfaces with rails tacked onto them. The boxes themselves aren't difficult. If you have a great source of lumber, then you're set to save a lot of money. Here is how I did it.

Sawmills are in a minor quandary when producing graded lumber. Lumber is graded, by the quality of the grain and knot sizes. The higher the grade, the higher the price fetched per board foot. A long board may fetch a low price per board foot because of some gnarly knots. However, if these knots fall on the ends, then they can be cut off, and the shorter, knot free board can fetch a lot more money. This is simplified, but characterizes the quandary mills get themselves into. They produce and accumulate a lot of short, knotty lumber during their milling. These short pieces are often bundled onto

pallets, and offered for sale at a great discount. I've been able to get boards to make quality bee boxes for as little as 16 cents a board foot. With approximately 6 linear board feet in a bee box, you can see we can make boxes at a discount.

Making boxes isn't just a cost cutting method. They are a great resource to improve your beekeeping and to increase sales. I make surplus boxes during the Winter months when I have free time to work in the shop, and I make more than I think I will need. If the season is great, I am guaranteed to have extra equipment on hand. I focus on making good decisions on my beekeeping, and not a limited resource e.g. boxes I don't have. The extra equipment is great to sell. Hobbyist beekeepers are not incentivized to stockpile extra equipment, which means a small sideliner can have easy Spring and Summer sales as local beekeepers need boxes on the fly. (I actually just leave boxes on my front porch, and request patrons toss money through my mail-slot. It saves me a lot of time not manning a store, and works with other's schedules).

Passively selling extra boxes makes great investment sense. With my markup, I need to sell less than 20 boxes out of 100 to pay for all the lumber. With those few sales, I recoup my initial expenses, and all the extra boxes, including the ones I am putting on my colonies are paid for. I highly suggest this for retired

beekeepers who are bringing in a side income or small scale sideliners. We can increase profitability without losing track of our primary focus: keeping productive, healthy bees.

Case Study: A weekend with dad

My dad is pretty handy, and wants to supplement his income when he retires. He likes bees, and sees a small bee store as a possibility while selling nucleus colonies. He isn't looking to replace his income, but rather supplement his retirement. He is comfortable working with power tools, and enjoys working outside. Making his own boxes means he has an inexpensive supply of his own beekeeping equipment, as well as inventory to sell from time to time.

We took the opportunity after Christmas to build boxes. We started with a truck load of lumber, and finished with unassembled boxes. Day one was easy and took about 2.5 hours. I drove to the lumber yard, and bought 1,150 board feet of off grade lumber for 40 cents a board foot. These were all 12 inch widths of $\frac{3}{4}$ lumber that ranged from 6 to 16 feet long. Once strapped, I drove home. Day 2 was the "break down day". On this day boards are cut into the sides or ends of a bee box with one saw, and then "ripped" to width



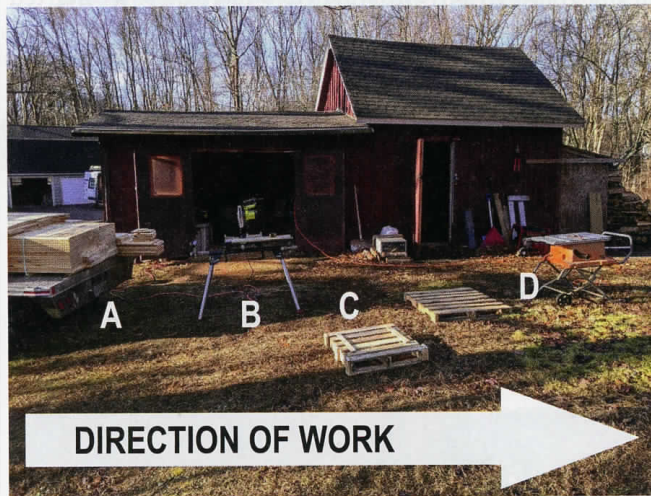
on another saw. Each saw is setup once. That old adage, measure twice and cut once? Well, we measure twice and cut a few hundred times. Day 3 the ends receive a rabbit joint and the frame rest. Both cuts are made with a “dado blade”, which is pictured below. At this point our boxes are considered “unassembled” and can either be stapled together or stored flatly in a dry area.

Day One: Picking up the Lumber

We source the lumber for our bee boxes directly from mills. The markup at hardware shops and box stores is prohibitively expensive. The same quality lumber can be purchased by calling around to your local mills. Some mills do not retail at all, while others do. You’ll have to call around to find out. You’ll want to know if the lumber is planed, and kiln dried. Planed means the lumber has shaved down to final dimensions. The surface and edges will be smooth. Kiln dried means the lumber had been placed into a special shed to remove most of the moisture from the wood. Be careful with using air dried lumber for bee hive boxes.

Most mills sell planer outs or shorts. Either are lingo for off grade lumber that can be purchased at a steep discount. We don’t need perfect long boards to make beehive boxes. With practice you can learn to cut around the knots in off grade lumber. In my opinion, it is often worth the slight extra work. When you contact the mill, ask if they sell off grade lumber, shorts or bundles of end cuts or planer outs. Each mill is different.

Day Two: Setting Up



Setup: I really like to work in one direction. This prevents unneeded stepping throughout the day. I set the first saw right near the load of lumber. Boards move from the truck directly to the chop saw. The person on the chop saw makes one repetitive cut over and over, placing the cut pieces of wood occasionally on the pallet marked C. The person at Station D. is making a different cut on the piece of wood already cut from person B. We turn out boxes quickly because the saws are set only once, and the same cut is performed repeatedly. We calmly, steadily work in one direction from A to D.

A friend once said 5 minutes of setup is worth an hour of work. He couldn’t have been more correct! You do not need a fancy shop or the best tools on the market to enjoy making beehive boxes. A little thought into the setup goes a long way. We are doing a repetitive task, often for several hours without stopping. Our setup should be safe and

ergonomic foremost. This means properly stationed tools, walkways and standing areas are free of trip hazards. A poor setup means you’ll be repetitively bending in ways that will hurt your shoulders and back. We want to limit reaching over or lifting items while extended. Our wood scrap should not land around our feet either. They accumulate quickly, and become pesky as we work.

If you have indoor space then your setup will have to include a proper dust collection system. This is a must and there is no way around it. Cutting lumber creates visible and invisible dust particles. They are hazardous to your health. We worked outside and wore dust masks.

Day 2: First Cuts-Measure twice, Check once, Cut a few hundred times.

Cutting to Length

We want to make our boxes quickly. We do that by only setting our saws once a day. Afterwards we just make the same cut over and over again. On the first day we are making two almost identical pieces. The sides of our box will be 9 5/8 inch high, 19 1/8 long. Our ends will be 9 5/8 high and 16 1/4 long. Each piece is 3/4 of an inch thick, and the ends are square, straight cuts. To get the lengths, we are making one repeated cut over and over again. There is no need to use a tape measure each time we need to make the same cut. Instead, we will set the distance of the saw blade to a “stop” at the exact length of our desired cut. We slide our board to the stop, and then make the cut. If that piece measures correctly, then we begin cutting the many pieces we will need. Make sure to first square up the end of your board first!

Cutting to Height

Now that our pieces are cut to length, we will want to cut them down to the final 9 5/8 height of a deep box. I am fortunate that my lumber supplier sells edged lumber with little wane in the board. I do not edge my boxes ahead of time. If your lumber has a lot of “crown”, you may need to trim this or edge it. As a friendly public service announcement- it probably doesn’t matter much.

I use a table saw to cut my boxes to height. Set the saw to 9 5/8 and pass a piece of scrap wood through. Measure and if this works, then start passing your pieces through. You’ll want to cut the worst knots out during this phase. Sometimes a piece will have a horrible knot that can be completely cut out by turning it into a 6 5/8 medium box instead of a deep. This is a great way to use otherwise unsalvageable wood.

Be good to yourself while using a table saw, and follow good practices. We are making one repeated cut over and over again. Take breaks to break up the rhythm. Never force a board through the blade. Importantly, be willing to toss a piece of wood if the pitch pockets or knots make cutting too difficult. These pieces tend to kick back wildly, and you should never feel like you are forcing anything through the saw. If you find yourself doing this, stop, abort mission. Check your setup. Your fence may have come out of square or the blade is now dull. Some boards hold a lot of tension in the grain of the wood. This is caused by how the tree grew. I find flipping those boards and cutting from the opposite side is a quick fix. If it still fills tenuous, then consider passing on that particular piece.

Day one overview:



Here we have a piece that has already been trimmed to 19½". I am now "ripping" the piece to height on the table saw. The portion of the board to the right of the saw will be my bee box. The portion to the left will be scrap. Notice by cutting it this way my final product will not include this nasty knot.



Our worksite in action. Dad is making one cut on the chop saw. I am making another on the table saw. You don't need a state of the art shop to make quality bee boxes. Keep ergonomics and safety in mind and you can efficiently make boxes from a simple setup.



Dad grabs a board right from the truck. The saw has already been set so he doesn't use his tape measure anymore. He squares the end and then begins cutting. He moved a trash can to his right.. To limit bending, he just sets his cut pieces there until he finishes a board. Then he walks the few pieces over to the stacks on the pallets. I trim the pieces on the table saw. The defective boards are very knotty or have visible splits in them. They will be used to make bottom boards later on.

Day Two: Making joints and the frame shelf

The sides of our boxes were completed on day one. On day two we will focus on making the rabbit joint and the frame shelf for our ends. This is super simple. It does require you to have a dado blade and a table saw setup for one. This includes a zero clearance insert and a wooden guard on your fence. *Note: In these photos I do not have a zero clearance insert and the wooden guard is held on by clamps. Don't do this.



From left to right: We need to make 3 cuts with our dado blade. One on each side, and one on the top for our frame shelf. The frame shelf is ⅜" high, and ⅜" deep. Pictures one and two. The sides that make the rabbit joints are also ⅜" deep, but they are ¼" wide.




At the end of day 2 this is what we have. The top is our box end with frame shelf and rabbit joint. The bottom is our box side. They fit together as seen in the photo to the right. This makes our rabbit joint. These simple boxes are easy to make, and are durable for all beekeeping operations.

Safety/Hands

We don't have to work fast, just steady. It is repetitive work with fast moving sharp and slow moving, soft things. i.e. saw blades and fingers. So there is never any rushing. If a saw gets out of square, we stop. If a particular board is difficult to cut from excessive knots, we don't cut it. If we get tired, stop. Take a break. Power tools can be used daily and safely, but much of that comes from your own decisions. Make those decisions each day, and moments within the day. Fingers are expensive, not replaceable. Always wear ear and eye protection along with dust protection.

Cutting around defects

Ignore the defect. There is a perfect beehive box to the left and to the right of this nasty break in the board. Notice how there are no knots, and a great smooth grain on each side. These bee boxes will be beautiful and strong. By cutting around this defect, we end up with select grade boxes. What little waste becomes kindling. 



A dado blade is a stack of special blades that removes a notch of wood, unlike a normal blade that cuts through a board. This is pictured on the left. The blades are spinning. Only the exposed blades not under the wooden guard will cut our frame shelf and rabbit joints. Note: The homemade clamped guard is not advised. My mom took over and made all the rabbit joints and frame shelves. It is very easy, repeatable work. We made 120 unassembled deep boxes in a short time.



A BRAND NEW USDA BEE RESEARCH LAB

Julia D. Fine
Arathi Seshadri

On January 7th, 2020, a new USDA-ARS laboratory located on the University of California Davis campus hosted a ribbon cutting ceremony to introduce the facility and two new scientists, Dr. Julia D. Fine, and lead scientist, Dr. Arathi Seshadri, to the university community and stakeholders. In attendance were representatives from ARS Washington DC and Albany offices, members of the UC Davis community, including the Associate Dean of UC Davis College of Agricultural and Environmental Sciences, Head of the Department of Entomology and Nematology, and a large number of stakeholder representatives including members of the American Honey Producers Association, California State Beekeepers' Association, the American Beekeeping Federation, and the Almond Board of California.

The ceremony commenced at 1 PM, those gathered to celebrate with us enjoyed hearing from speakers including Dr. Paul Pratt, the research leader of the Invasive Species and Pollinator Health Research Unit which oversees the new laboratory, USDA-ARS Pacific West Area Director, Dr. Robert Matteri, Associate Dean of the College of Agriculture and Environmental Sciences, Dr. Anita Oberbauer, USDA-ARS National Program Leader, Dr. Kevin Hackett, and UC Davis Apiculture Extension Specialist Dr. Elina Lastro-Niño. Rounding out the speaker list were Darren Cox, owner of Cox Honey of Utah and board member of the American Honey Producers Association, and queen breeder Jackie Parks-Burris, board member of the California State Beekeepers Association, representing the broad range of stakeholders coming from near and far for this event.

Dr. Hackett spoke about the origins of this new facility, specifically the discussions with beekeeper stakeholders and the California almond industry which resulted in the formation of this new research lab. Describing this as a homecoming,

he said the "REALLY significant reason" why it's so satisfying for him to be back here is that even though he received his Ph.D. from UC Berkeley, he did his research with Dr. Robbin Thorpe on bees at Davis. Dr. Oberbauer described the collaborative opportunities that the unit will generate with the UC Davis researcher and student communities.

Dr. Lastro-Niño spoke about the long-standing legacy of pollination research at UC Davis dating back to the 1920s when a USDA employee named George Vansell began investigating the toxicity of buckeye blossom to honey bees. Also of note is Professor Harry Laidlaw, Jr., who is known as the "father of honey bee genetics" for his contributions including developing the first tools to artificially inseminate honey bee queens and selective breeding projects that helped lead to early mapping of the honey bee genome. Dr. Lastro-Niño elaborated on other eminent researchers that have been a part of the UC Davis Laidlaw Bee lab - Distinguished Emeriti, Dr. Robert E. Page, Jr., a pioneer researcher in the field of honey bee behavioral genetics and Dr. Robbin Thorpe, known for his expertise and passion for native pollinators, especially bumble bees.

Today, researchers at UC Davis including Dr. Lastro-Niño, Dr. Neal Williams and Dr. Brian Johnson are continuing this legacy. Following the ceremony, the stakeholders generously donated their time to discuss with us their needs and how we as researchers might address them. The overwhelming consensus was that research pertaining to the effects of nutrition, pesticides, parasites, pathogens, and interactions between these factors is warranted, with a focus on long-term colony health and the identification of practical tools and solutions that address real-world problems. We heard from many beekeepers representing family-run operations that the practice of beekeeping has drastically changed

within their lifetime, requiring them to adapt quickly to new or worsening challenges such as *Varroa* mites and introduced pathogens. As industry outsiders but long-time admirer of *Apis mellifera*, we note that this kind of dynamic resilience in the face of adversity mirrors that of the social insect colonies beekeepers tend.

We are thrilled to be joining the ranks of the many ARS and university researchers who are currently working to address the needs of beekeepers and growers. We both come from applied research backgrounds and look forward to finding ways to contribute and grow our research programs to effectively meet stakeholder needs.

Dr. Fine's interests are in identifying and characterizing the effects of stress on aspects of honey bee biology that can be difficult to diagnose due to the complexities of the hive environment, such as impaired queen performance and brood development. These effects, which may go unnoticed for some time inside a hive, could have long-term consequences for the entire colony.

Dr. Seshadri's work focuses on identifying applied aspects of plant-pollinator relationships including the positive effects of plant-produced chemicals (phytochemicals) on honey bee health. By combining our expertise, we hope to help diagnose problems and identify ways to solve them.

Just as we've seen in the past, the coming years are sure to bring new and perhaps unexpected developments to the beekeeping industry. Now that we're here in Davis, California, right next door to the United States almond industry which hosts the largest managed pollination event in the world, we're looking forward to weathering these changes with beekeepers and growers and helping them navigate new and existing challenges effectively.



YEARS 2 & 3 HIVE TASKS



Ann Harman

- Harvest honey during first two weeks of July, depending on climate and nectar flow.
- In small hive beetle areas do not put wet honey supers on hive for bees to clean.
- Wet supers can be put well away from hives for a few hours for bees to clean.
- If no brood at all was raised in honey supers, then wax moth is not a problem.
- If any brood was raised in supers, they can be put into plastic bags then into a freezer for a week. Do not take bag off until ready to use for honey again or for needed repairs.
- Protect stored honey supers from mice.
- Monitor for *Varroa* immediately after harvest.
- Take action against *Varroa* if more than 1 mite per one hundred bees are found.
- If using chemical treatment read the miticide label, noting temperature information.
- Keep small hive beetle under control with beetle traps.
- If using pollen patties, monitor them for small hive beetle infestation.
- Bees need from 1 to 2 gallons of water during intense Summer heat.
- Maintain good ventilation.
- Mow grass and weeds in beeyard to give bees easy flight.
- Monitor yourself for ticks acquired in beeyard.
- Robbing can be a problem, especially during a dearth of blossoms.
- Feed all hives and feed inside hives to help prevent robbing.
- Monitor queen performance and requeen if necessary.
- Do not combine one weak colony with another weak colony. Combine weak with strong and kill weak colony queen.
- In cold climates feed 2:1 sugar syrup in September for Winter food storage.
- Always be a Weather Watcher and a Plant Watcher.

Make sure bees have a water source during the hot Summer months.



THE NEXT GENERATION

Erin Hayes



Checking bees after 1 week.

I call it 'fiddling' in the hive. I like opening it up, looking at all the bees, finding the queen and just fiddling". In his first year, Justin got a 5-gallon bucket of honey and was able to leave some for the bees to eat throughout the Winter. That 5 gallons equaled 100 bottles that he was able to sell to the local community.

I asked Justin what his goal was with his bees and he said: "to keep growing and splitting hives every year until I outgrow my space and have to move to a bigger one". He has taken very good care of his bees by giving them sugar syrup, fat bee food, probiotics and insulating the hive for the cold Utah Winter. He is also very proud that he hasn't found any mites on his bees and the last time he checked his bottom board, there wasn't any there either!

Justin takes 2 classes a month at the *Deseret Hive Bee Supply* store in Ogden Utah and harvested his honey in their kitchen last Fall. The latest class he took, he learned about wax rendering and has enjoyed expanding his education on honey bees in such a hands-on learning environment.

Last Summer Justin got to volunteer at the Utah State Fair at their honey bee booth and he got to help kids find the queen in the observation hive and answer questions alongside other beekeepers. Justin hopes that "other kids will get interested in Honey Bees and want to raise them. I didn't realize how important they were and that they were dying until I started my own bees. I hope we can all save the bees!"

In a rural town in northern Utah lives Justin Jacobs. Justin is an 11 year old beekeeping enthusiast and has been successfully keeping bees for a year now. Justin got into beekeeping when he found his Mom's old bee suit from when she was 12 years old in their attic. He wanted to know more and got his first nuc in May 2019. He said, "I was scared at first and almost backed out of getting it but, I was mesmerized seeing all the Bees in the hive and decided to get one".

Justin has had a great mentor at *Slide Ridge Honey* in Logan, Utah named Martin James. He has helped Justin getting started and answering all his questions.

Justin chose to get a regular hive and a flow hive; he wanted to see which he liked better. The jury is still out on that.

Justin's Papa is a huge supporter and they do all things "bees" together. When asked what his favorite part of beekeeping was Justin replied "I



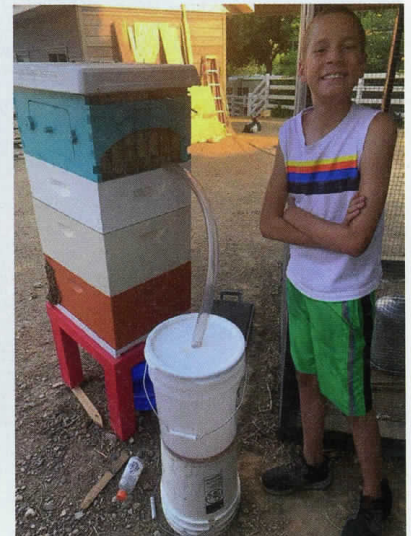
Honey ready to harvest.



Justin, mom Heather Jacobs, and papa Dave Schoss.



He loves his first batch of honey. He ended up processing another batch after this one. Ended up with a full bucket his first year.



Processing the Flow Hive

WHAT NOT TO WORRY ABOUT DURING YOUR FIRST YEAR BEEKEEPING



Ross Conrad

Beekeeping has gotten complicated: Feeding, mites, diseases, hive beetles, wax moths, choosing an apiary location, having the right equipment on hand when you need it and a host of other issues need to be considered. One way to help get a handle on this steep learning curve as a beginner is to separate the grain from the chaff and let go of the things that you don't need to worry about during your first year. Here are eight common worries most first-year beekeepers can safely ignore.

1. Harvesting honey

Yeah, honey is one of the sweet rewards of beekeeping. Nevertheless, in their first year, most colonies in your average apiary are not going to produce a much if any surplus of honey that can be safely harvested without creating a shortage of honey in the hive and the potential for colony starvation during Winter. Plan on not harvesting honey your first year. You can put off spending money on an extractor and other harvesting tools and equipment which are expensive and help ensure the bees have enough honey to get them through 'till Spring at the same time.



Identifying the queen among thousands of workers is like looking for a moving needle in a haystack. Difficult and not necessary if you know what to look for in the brood nest.

2. Crushing bees

I get it. Folks get bees in order to help them thrive and so there is a strong reluctance to allow any bee to get injured or crushed. It's important to remember that a honey bee colony is a super organism. A single individual made up of many parts. Each bee in the hive is like a cell in your body. Every day many of your cells die, and your body creates many replacement cells. The same thing

happens with bees in a bee hive. Just as you can safely donate a pint of blood or a kidney and continue a healthy productive life, you do not need to worry about crushing a dozen or so bees when checking on and managing your hive. The one exception to this of course is the queen. You do not want to accidentally crush or injure royalty.

3. Burr comb

Burr comb is the beeswax a colony will build inside the hive that is not neatly surrounding by the four sides of each frame. Unless the burr comb is in the way and preventing you from performing a hive manipulation, such as installing a mite treatment, this excess comb does not need to be removed. Besides, it is a lot easier to clean the burr comb off frames when there are no bees crawling all over them. Wait until the equipment is off the hive and clear of bees to remove the burr comb from the frames, supers and hive bodies. And don't forget to collect all this wax so you can melt it down, clean it and put it to good use or at least give it to someone else who can use it.

4. The drone population

Drones, the male honey bee, does no work within the hive. Drones don't have stingers to defend the hive. They don't build comb, forage for pollen or nectar, or feed the brood. It is well established that it is the female worker bees that do all the hive work and make all the honey. As a result, sometimes a beginner beekeeper will get worried when they start to see a lot of drones or drone brood in their hive. Just as a colony needs to be queen-right, during the swarming season, a colony needs to be drone-right. Don't be worried about many drones in your hives. Do not even be worried about a lot of drone brood unless accompanied by very little to no worker brood, in which case it may mean that the colony is a drone layer and needs a new queen.

5. Spotting the queen

You want to make sure your colonies have a fertile, laying queen. However, making sure hives are queen-right has little to do with actually seeing the queen. Mostly you should be looking for the signs that prove a colony is queen-right: large patches of capped worker brood and normal looking unhatched eggs. Spotting the queen amongst the many workers can be exciting but it does nothing to tell you if she is up to the job of leading the colony toward a fruitful and prosperous future.

6. Comb color

While freshly built comb has an off-white/pale yellow color, comb will darken over time. Pigments from pollen

and propolis will cause the comb to become a dark yellow, while generations of brood raised in the comb will turn the comb a dark brown. Over time the comb may become so dark it will eventually turn black. More and more, old comb is recognized as a potential liability to honey bee colonies, as it tends to contain elevated levels of disease, chemical and pesticide residues. A diligent beekeeper will want to weed out the old combs in their hives. This means removing the combs that a nucleus colony comes with, and not using old combs from former beekeepers that have gotten out of the business.

In their first year however, a nascent colony will need every bit of drawn comb they can get to help them build up and prepare for Winter in time. It is better not to worry about removing old combs during a colony's first year and wait until its second year to start rotating old combs out of your colonies. Unfortunately, comb color is not a very reliable indicator of comb age. Brood comb

that is only a year or two old can be very dark because of brood consistently raised in it. It is best to use some kind of system to track the age of all frames of drone comb in the hive and work on removing combs of unknown age as soon as reasonably possible.

7. Too many bees in the hive at the end of Summer

By the end of Summer a healthy colony should be crowded with lots of bees. This can create anxiety on the part of the beginning beekeeper worried about swarming and having too many mouths to feed through the a long, cold Winter. By the end of Summer as temperatures get cooler and forage less abundant, most colonies will tend to resist the urge to swarm. Since the major nectar flows are over and the beekeepers efforts turn to getting

colonies prepared for Winter, adding supers of empty comb or foundation is not a good idea at this time. It is typically better to let the bees crowd the hive and pack in the last of the honey flow so the colony has plenty to eat. A large healthy population of bees occupying the hive as it heads into Winter will have an easier time raising Winter young and absorbing the loss of the older bees as they die off during the Winter dearth. They will also have an easier time keeping each other warm during a blast of cold air from an arctic vortex.

8. Disturbing the bees

Many beginner beekeepers worry about bothering the bees too much and preventing their colonies from doing their work and staying healthy. This fear of disturbing the bees combined with the natural intimidation a novice beekeeper will feel about being in the middle of thousands of stinging insects is fertile ground to rationalize the need to leave the bees alone. Unfortunately, this is not a good idea especially for the beginner.

Opening the hive is the only way to be sure the colony is queen-right, disease and pest free and has enough food to prevent starvation. The first-year beekeeper also needs all the practice they can get, opening hives, using their smoker and hive tool, observing the inner working of a colony so they can readily recognize the difference between healthy bees and sick bees, etc. Claims that a honey bee colony takes days to recover from the disturbance created when a beekeeper smokes a colony, opens the hive and removes combs for inspection is nonsense. Unless the queen is accidentally injured or killed, a colony will be back to its usual routine within 15 minutes to half an hour after being closed back up. Less if your talent as a keeper of bees is advanced. Do not let the fear of disturbing the bees keep you from getting the important experience you need to become a successful and skilled beekeeper.



As long as the brood is found in consistent patches and most of the brood is worker brood, finding large amounts of drone brood in hives is normal during the swarming season and not something to worry about. If the majority of the brood is drone brood, or the drone brood is not found in consistent patches and inter-mixed with worker brood as shown here, then there is a problem.



Time & Money Saving Tips & Tools

Darryl Gabritsch



A lot of books and bee schools tell you what major equipment you might need such as protective equipment, hive components, honey production, etc. Seldom does anyone tell the inexperienced beekeeper what tools and tips there are to make beekeeping less expensive and less time consuming. Listed below are time and money saving tips as well as the majority of the tools I use to make my own beekeeping equipment. A beekeeper can save a lot of money if he/she learns how to make his/her own equipment. You don't need a lot of carpentry skills, but you must learn how to safely use any power tools before using them. I'm not a carpenter by any stretch of the word. My bees are healthy living in what I make for them. It's OK to make minor flaws in the final products. The bees don't care if there are imperfections. They will fill in holes and gaps with propolis and wax. All costs listed below are approximate. Costs will vary among vendors and locations.

1. Tips.

- A. Structured self-education. Learning how to keep healthy honey bees can be intimidating for new beekeepers. There is a lot to learn and the information out there can be overwhelming. Set goals for what you want to learn each year then read good books and watch YouTube videos by experienced beekeepers.
 - i. Join your local beekeeping club and ask for a mentor then set up mentoring sessions with the mentor at least once a month; preferably more often during key times (Spring buildup, Summer honey harvest, and Fall to get ready for Winterizing the honey bees).
 - ii. Enter the Master Beekeeper Program (MBP) if your state has an one. The MBP is a self-paced program that teaches the beekeeper how to become a better beekeeper. The North Carolina State Beekeepers Association (NCSBA) has the best program in the nation (biased opinion of course).
 - iii. Read books, articles from national beekeeping magazines, and watch reputable YouTube videos by professionals in the industry. I usually advise my mentees to stick to .edu (university) sites, .gov (government sites), and known reputable sites such as, but not limited to: Honey Bee Health Coalition, MAAREC, and leading beekeeping author websites. Try to avoid backwoods beekeeper type YouTube videos until you determine what is science based and what is simply opinion. Going through the Master Beekeeper Program will help you figure out which sites and books are good and which ones promote bad habits and unreliable information. Start procuring books for you own library. I've slowly built up to over 90 books that I periodically re-read or search through when I prepare classes and beekeeping articles.
 - a. 1st year. Get my first bees and enter the Master Beekeeper Program with the goal to be a Master Beekeeper in three years (NCSBA earliest timeline at the time) and use the MBP program as a study guide structure for my education. I also had the goal of getting my bees through the season alive. I read several books including *The Hive and The Honey Bee* (best book on the market in my opinion). I also attended state beekeeper conventions to learn more. Complete the Certified Beekeeper requirements if your state has one.
 - b. 2nd year. Make some splits, extract honey, process beeswax, and learn how to make my own woodenware. Continue reading books and watching videos on beekeeping. Complete the Journeyman Beekeeper requirements.
 - c. 3rd year. Continue reading books and watching videos on beekeeping. Make splits with different methods and complete the MBP Master Beekeeper requirements.
 - d. 4th and 5th years. Continue reading books and watching videos on beekeeping. This year I will be focused on mass honey production and queen rearing by grafting.
- B. Inexpensive smoker fuel. Bag up free long leaf pine straw or buy a bale of pine straw and store it in a bag in a covered storage area to have inexpensive, dry smoker fuel all year long. I don't store it in my house in order to keep chiggers and ticks out of the house.
- C. Down season effective time management. Take advantage of Fall and Winter months to get ahead on equipment production. The time to make a part is not exactly when you need it. If you anticipate apiary growth you can make and assemble extra woodenware and have complete frames with foundation ready when you need it the most. Example: I built 20 honey supers and wired in foundation in all the needed frames in November and December in anticipation of using them in March during our major nectar flow in North Carolina. Doing it in December allowed me leisurely construct the pieces on a relaxed timeline.

Last year I built woodenware and wired frames and foundation in December to expand my apiary to 15 hives starting in March through aggressive splits. I went from two hives to 14 hives in six weeks with aggressive splitting using the On The Spot (OTS)/cell notching Queen Rearing and equal split techniques.

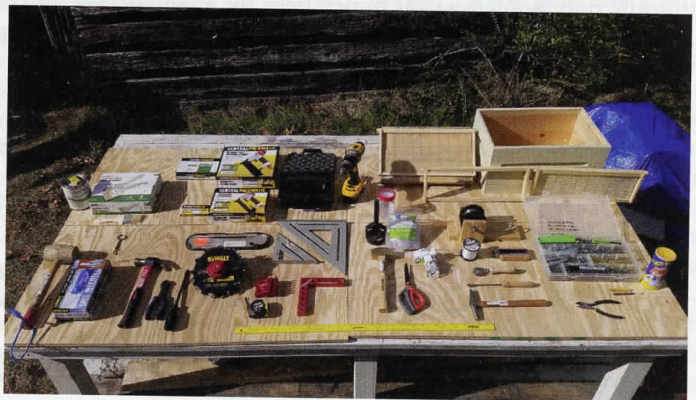
- D. Cheaper woodenware. Get or make a first item to use as a template then mass produce the item yourself without needing to take measurements; simply use the template piece to set up saw blade spacing settings. I usually buy a wooden item (hive body, honey super, hive top, etc.) first then copy the design to use a template unless it is more time beneficial to simply buy the item in bulk. Example: I don't make my own frames since you can buy them for about \$1 or less when you buy a case of 100 frames or more. For most wood items I make careful measurements to make component part templates. I then use the unassembled component templates to quickly set up power tools to the correct dimensions by using the templates instead of measuring the out the saw spacing each time for each part.
- E. Make and keep unassembled templates. I have separate unassembled part templates that are marked with what it is, e.g. 8 frame end medium template, 8 frame side medium template, 8 frame end deep template, 8 frame side deep template, frame rabbet cut template (measured so the solid wood of the template rests between the tabletop saw and rip fence (the template also has a $\frac{3}{4}$ " wide rabbet cut so the saw blade depth of cut removes enough wood to match a 1" board thickness ($\frac{3}{4}$ " actual), 8 frame entrance reducer, etc. Example of savings are about half of the full price item:
- i. New unassembled deep or medium hive body: \$12 to \$15
 - a. My cost to make the same item: \$7.50 or less.
 - b. I don't factor in the cost of the tools, since the cost becomes negligible after a while of making equipment; plus, I have the tools to make things other than for bees.
 - c. A 1" x 12" x 8' untreated board provides six 8-frame end pieces or five 8-frame side pieces. You then have scrap lumber 8' long and about 4" wide (depending on whether you cut medium or deep board widths from the 1" x 12" board that can be used to make parts for other projects such as telescoping tops, hive stands, entrance reducers, etc. Put all scrap material into a large trashcan to save for future projects or test cuts.
 - d. New entrance reducer: \$2. My cost to make the same item: \$0.00 (Free) (scrap wood from other projects)
 - ii. New Telescoping top: \$22
 - a. My cost to make the same item: About \$1.50 each.
 - b. One sheet of 23/32" or $\frac{3}{4}$ " untreated plywood makes around 16 tops.
 - c. The sides and ends of the telescoping top are made from scrap wood from the hive body and honey super projects.
 - d. I don't use a metal top on my telescoping tops because:
 - e. It adds unnecessary costs (tools and sheet metal)
 01. It adds heat (sun on metal makes a hot surface compared to sun on a painted surface).
 02. The metal top isn't needed. Two to three coats of paint will waterproof the top and last for decades.
 - iii. New sloped landing board hive stands: \$12. My cost to make the same item: Free or less than \$3.00. Sloped landing board, sides, end, and middle support bar cut from scrap material (free if using scrap, otherwise \$3.00 each if you buy wood specifically to make the stands).
- F. Inexpensive wood.
- i. Get 1" x 12" x 8' boards for 50% off. I go to my local hardware store (example: Lowes or Home Depot) and search through the stack and pick out any boards with cracks or holes all the way through the board. Ideally the crack is on the outside 4 inches of the board (long axis) or on the end or edge of the board. That section is usually scrap that gets used for other equipment such as entrance reducers, hive stands, or pieces for the telescoping top. I then tell the manager I'm a beekeeper and ask for the boards to be marked half off. This trick works 90% of the time. If the manager comes back with anything less than half off price then I politely tell them no thanks and that they can put the boards back. The next time I ask for the discount I usually get it. Example: A normal 1" x 12" x 8' board goes for \$15. I get cracked boards for \$7.50. Very little goes to waste if you save the scraps to use in other projects, thereby reducing the cost of the other woodenware items.
 - ii. Ask for a military discount (10% usually) for more savings if you are a retired veteran, active duty veteran or dependent of a veteran.
- G. Inexpensive latex paint.
- i. Search the paint section for mis-tinted paint. You can usually get a quart for around \$3.00 and a gallon for around \$9.00. New paint is around \$16/quart or \$52/gallon.

- ii. It doesn't matter if it is interior or exterior – (Painters will tell you it matters. My personal experience is that it doesn't matter. Interior paint will mildew (discolor) over time. It's still waterproof. **THE HONEY BEES DON'T CARE WHAT IT LOOKS LIKE!**
 - iii. I always put two to three coats of paint on the outside surfaces and ends of the boxes to ensure I have a waterproof seal.
 - iv. The base color doesn't matter and you don't need a primer coat. The first coat serves as the primer coat. I paint the first coat with the least desired color I have. I've used pink in the past since I got it at a discount. I covered it with a desired second coat color (also purchased at a discount).
- H. Inexpensive, but good tools and equipment (but do your homework first).
- i. Harbor Freight sells good quality tools
 - ii. I love my pneumatic nail guns. They are around \$25 each at Harbor Freight. They are around \$100 at Lowes and Home Depot for name brand items. I've used mine a lot for over 3 years with no problems.
 - iii. Get throw away 2" paint brushes instead of expensive brushes you need to clean after use (time management). A box of 36 brushes is \$13 (\$0.37 each brush).
 - iv. Get latex gloves to keep your hands clean for \$8 for a box of 100 gloves.
 - v. Get 1" ratchet straps: Four strap pack for \$13
 - vi. Note: I save money where I can, but I buy higher quality tools and calibration tools from name brand vendors to ensure quality work.
- I. Cheaper foundation and frames. Buy in bulk to save a lot. A frame can cost \$2 in small quantities. Foundation is up to \$2 in small quantities. Buy them in bulk of 100 or more and you can cut the costs in about half plus get free shipping from most large bee suppliers. I buy 25 lbs. of wired medium foundation (about 275 sheets) and store them until I need them. Wax moths don't touch foundation, so you can store it for years. Can't afford it yourself? Purchase the bulk items as a group and split the costs.
- J. Become your own assembly line to save time and energy.
- i. When you make items one component part/step at a time you get into a rhythm that speeds up the process for that component part. When you build one piece at a time you slow down the overall process when you have to reset power tool settings, spacing, etc. to get ready for the next part to be made or assembled. Example: Make all your side boards at one time for the 20 hive bodies you intend to build. Then set up the table saw spacing again to make the end pieces for the same 20 hive bodies. Then make the cuts on the end boards where you can use the rabbet spacing template you made to set up the cuts to make the frame rests and rabbets for the side boards (I use 3/4" rabbets on 3 sides (side boards and frame rest) to speed the assembly process up.
 - ii. I often don't have the time and energy to do multi-step projects as I get older, so I break the tasks down into steps to complete incrementally over time. I store the component parts until I find time to complete the next step. I have racks built to hold assembled frames and boxes.
 - iii. Example: To get an unassembled frame with foundation ready to put in a hive the steps are: Remove the wedge cleat, assemble the frame, put tacks in the wedge, drill (clean out) the foundation wire holes in the end bars, insert grommets into the end bar holes, insert cross wires into the end bars, crimp the wire (tensioning), trim the foundation to fit in the frame so it doesn't bow, insert and tack down the wedge, then finally embed the cross wires into the foundation. Who has time to do 100 at a time (getting supers ready for a nectar flow)?
 - iv. I might go over the shed and do nothing more than put angled starter tacks into wedge cleats and store them in a box until they are ready to go into a frame. The next time I might go over and use a cordless drill and 1/8" drill bit to bore out the end bars on assembled frames. The next time I might insert grommets in a bunch of frames. Each completed smaller step saves time in the long run or when you really need something, but don't have time to complete all steps at the same time.
 - v. If making hive bodies, telescoping tops, etc., I might saw and store extra component parts to assemble at a later date.
- K. Use quality tools for precision and power tool calibrations. I buy higher quality, name brand power tools from my local hardware stores and reputable on-line dealers. Power tools are an area where I don't cut corners. I use quality, but reasonably priced, DeWalt table saws, sliding compound miter saw, miter saw stand, and DeWalt dado stack blades (fit the DeWalt table saw arbor better than higher price



name brand blade such as Freud – I have both... Freud blades get stuck on the arbor, DeWalt blades don't get stuck). I also buy quality precision tools to calibrate the power tools and to make accurate alignments. Ensure you learn how to safely operate the power tools before you use them!

- i. Woodpecker tools: <https://www.woodpeck.com/>
 - a. This is the brand I use for most of my calibration and alignment tools, squares, one-time tools such as dado-stack gap gauges, etc
 - b. You have to watch for production runs of their one-time tools to get niche tools when they periodically make them again. I love the dado setup fixture & gap gauges to get the dado blade width correct the first time I run the saw through a scrap piece of wood.
- ii. Infinity tools: <https://www.infinitytools.com/>
 - a. 8-Pc. Precision Tool & Project Setup Blocks
 - b. I use these to set up my gap widths such as for slats in a slatted rack.
- iii. Power Tools I use to make most of my woodenware and produce equipment (with purpose in parenthesis).
 - a. Black and Decker corded leaf blower model # BV3600 (room and power saw cleanup)
 - b. WEN 12-Inch Variable Speed Drill Press Model # 4214 (specifically to make queen castle feeder holes and sugar shaker lid holes) – not needed by most beekeepers
 - c. Kobalt roller stand Model # SGY-WS5 (wood in-feed support)
 - d. Bostitch 6-Gallon Single Stage Portable Electric Pancake Air Compressor with 50' hose
 - e. DeWalt 10-inch job site table saw. Model # DWE7491RS (rip cuts, dado cuts, and sloped board stand slope board's 45 degree angle cuts)
 - f. Kobalt 42-Inch saw horses (two horses for wood outfeed)
 - g. DeWalt 12-inch sliding miter saw Model # DWS780 (crosscuts and 45 degree angle cuts on sloped hive stand base)
 - h. DeWalt heavy duty stand model # DWX723 (holds sliding miter saw – It's usually a package buy with the miter saw)
 - i. Bag for plastic jars for sugar shaker jar kits (temporary storage of the jars as I make the shaker lids)
 - j. Scrap wood trash can for use in other projects (32 gallon or larger)
 - k. Trash can (for trash)
 - l. Rubber stall mats (clean, level, comfortable working surface in my barn)
- iv. Specialty tools (with purpose in parenthesis).
 - a. Rubber mallet (paint lid closure)
 - b. Mis-tinted latex paint (painting)
 - c. Harbor Freight 2" paint brushes (painting)
 - d. Harbor Freight Hardy nitrile gloves (painting)
 - e. Paint can opener (painting)
 - f. 16 oz claw hammer (nail set to sink exposed nails and pneumatic staple gun mis-fires)
 - g. 6-inch diagonal wire cutters (trim off excess wires and exposed nail ends)
 - h. Large flat tip screwdriver (nail set to sink exposed nails and pneumatic staple gun mis-fires)
 - i. Harbor Freight: Pneumatic nail gun # 63156 (woodenware assembly)
 - j. Harbor Freight: Pneumatic stapler # 68029 (woodenware assembly)
 - k. Zero clearance table saw insert plate (cut thin parts cuts such as frame cleats for quilt boards and ventilation boxes)
 - l. Woodpeckers one-time tool: Dado setup fixture (precise dado width storage – or Use a $\frac{5}{8}$ " bolt, washers and nut to store pre-set dado stack blade configurations so you don't have to figure out the stack configuration each time = time saver)
 - m. DeWalt 8" dado set (works best with the DeWalt table saw – other brands get stuck on the arbor)
 - n. Metal yard stick (straight edge for marking and use as cutting edge guide – such as trimming foundation)
 - o. 16' tape measure (measure 3" down from hive body top for handle placement)
 - p. Woodpeckers one-time tool: Gap gauge (precise dado blade width measurement)
 - q. Woodpeckers tool: Clamping squares (quickly align woodenware angles)
 - r. Johnson squares (7" and 12") (power saw blade angle calibration)



- s. Infinity Tools: Precision setup blocks (precise blade height setup such as for slatted rack tenon joints)
- t. DeWalt cordless drill with 1/8" drill bit (bore out frame end bar holes to be easier to insert brass grommets)
- u. 2 lb. brass hammer (used with the arch punch to knock out sugar shake jar screen mesh)
- v. Wiss 10-inch general purpose scissors (trim 1/8" wire mesh for sugar shake jars, ventilation boxes, etc)
- w. MSC brand 2 3/4" Arch Punch (for sugar shake jars)
- x. AdTech high temp mini glue gun (glue 1/8" wire mesh circles into the "Simply Jiff" peanut butter jar / sugar shake jar lids)
- y. Harbor Freight: Pittsburg 7 oz tack hammer (long head tack hammer for frame wedge / cleat nailing)
- z. Crimp wire groove spur embedder (small head) (Best size and type head for wire embedding)
- aa. Crimp wire spur embedder (large head) (worst head type for wire embedding – shown for comparison)
- ab. Wood handle foundation wire crimper (Best type wire crimper – available on Amazon) (I use wire cross wires for honey supers since I won't need to cut out queen cells)
- ac. 15 lb. fishing line (for cross wiring foundation) (I use fishing line on brood chamber frames since I may have to cut out queen cells and need to cut through the fishing line to make queen cell splits)
- ad. Metal wire dispenser (homemade item)(for dispensing untwisted wire for foundation cross wires)
- ae. Form board (shown with deep hive body on it with fishing line cross wires) – Board is used with metal wire cross foundation wires. Form board is periodically coated with mineral oil to keep foundation from sticking.
- af. Medium frames with metal cross wires (with and without foundation) (comparison of wire vs fishing line)
- ag. Nail kit (small parts box with various tacks, hive staples, box cutter, grommet tools, etc. in one place)
- ah. Diagonal wire cutters (trim off excess foundation wires when you trim the foundation to fit frames)
- ai. Small tip grommet tool (shown with and without Plasti Dip coating)
- aj. Plasti Dip coating (keeps tools from rusting)
- v. Nail kit containing:
 - a. Electronic parts storage box (Plano brand from Walmart is the one I have, but any will do)
 - b. 7d galvanized nails for hive body assembly (if not using pneumatic nail gun with 1 1/2" staples)
 - c. 3/4" nails for frame end bar nail (horizontal side nail)
 - d. 5/8" nails for frame cleats (wedges)
 - e. 1 1/4" nails for frame assembly
 - f. Hive staples (I keep about 10 in the box to quickly attach bottom boards if needed)
 - g. Foundation pins (I stopped using them – I wire foundation with wire or 15 lb fishing line)
 - h. Brass or aluminum grommets (horizontal wire when wiring frames for foundation)
 - i. Grommet tool (small tip to easily unload the grommet). Dipped in rubber "Plasti Dip" (to keep tool from rusting)
 - j. 6" diagonal wire cutters (cut foundation wire from spools)
 - k. Small head brass wire embedder tool (embedding cross wire into foundation)
 - l. Box cutter razors
 - m. Small multi-tool
 - n. Sharpie marker and ink pen to mark items as needed

Final thoughts. You can become a very successfully beekeeper if you set realistic goals, have patience with yourself; knowing you will make mistakes, and maintain focused on getting better. Success story: I went from literally only knowing that honey bees fly, make honey and can sting you to being a Master Beekeeper in three years and having enough knowledge to be published in several magazines to pass along the shared knowledge with others. I live by the motto: Knowledge is power... SHARE IT.



Darryl Gabritsch is an NCSBA Master Beekeeper and has been beekeeping in North Carolina since 2016. He has been published in several magazines and mentors the next generation of beekeepers.

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Keeping Bees Lessons From The Ultimate Coop

Jackie Hough

A few months ago, a good friend who works with cooperatives provided me with a link to the *International Cooperative Alliance* <https://ica.coop/en/whats-coop/co-operative-identity-values-principles>

From their website I learned that “a cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise”.

After reading those words I thought, well, if that doesn't describe a colony of honey bees, I don't know what does! And then I thought, wouldn't this be a great angle from which to speak about bees to a public gathering? As beekeepers – especially those of us pursuing a Master Beekeeper program in our state – we often find ourselves being asked to speak to groups and organizations.



Let's face it, most people like honey. And many members of the public are in favor of “saving the pollinators” and want to do what they can. But few in the public without a beekeeping background really understand

the inner workings of a hive – nor would they readily understand the terminology that we use. I've found that I have the best success with a presentation when I speak directly to my audience, and relate to them where they are, using concepts they understand.

The article shown below offers one example of how you, a prospective public speaker, can explain the organization of the colony. The main points of the article can readily be converted into phrases typed onto slides for a PowerPoint presentation with photos from your own apiary (see “Power Points” in the October 2019 *Bee Culture* to find ways to improve the actual structure of your PowerPoint presentation), and you can fine-tune the talking points to focus on whatever group will be hearing your presentation. I recall speaking to a civic group some years ago – the members were stunned that I actually took the time to look up the focus of their group, and devoted time in my presentation to connect what I do with a few of that organization's goals.

In addition, the article below offers some links to online articles that you could provide in a handout to your listeners, (or in an email a day or two after the presentation) and some links to videos that could be shown in part (a few are long) or in their entirety during your talk. In creating this article, I selected as my ‘target audience’ the members of a cooperative to which I belong: the North Carolina Electric Cooperatives. I used terms that would be meaningful for fellow cooperative members, and included a photo of a friend (and fellow beekeeper) who belongs to a different branch of the EMC (electric membership cooperative) than I do. At the close of the article, you'll find information for a slide that you can revise to highlight upcoming bee schools or other information that you want to provide as the final note of your presentation. Read on, and be thinking about your next



presentation.

Good luck!

As a beekeeper, I feel that there are few organizations in the world as industrious, as productive, and as focused on cooperation as honey bees. The International Cooperative Alliance website offers seven Cooperative Principles by which human-formed cooperatives operate. Though all seven principles do not apply to an insect “co-op” like a hive of bees, four of the principles in particular so clearly illustrate the bees' work and interactions that the bees might as well have written the principles themselves. The first cooperative principle that bees embrace is **Voluntary and Open Membership**: “Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership...” From the time a new bee emerges from her wax cell, she becomes a member of the cooperative colony. <https://www.youtube.com/watch?v=f6mJ7e5YmnE>

She commits her life to caring for the colony, and acts selflessly for the good of the colony. Other young worker bees in the hive, called nurse bees, greet the new bee and offer her food. She soon begins to feed herself, and then turns her attention to her life of service. She starts by cleaning out the cell from which she emerged, and goes on to help clean other cells in preparation for the queen to lay more eggs. Many more tasks are ahead of her as she becomes a contributing member of this cooperative society.

Individual worker bees do not have a long life span. In the main growing season, each honey bee

worker lives about 6 weeks. The tasks she accomplishes are related to her age, though some flexibility occurs depending on weather, food stores, and overall health of the colony. Generally, from 3 through 11 days of age, the young worker serves as a 'house bee', cleaning the wax cells, feeding developing bees arising from the eggs that the queen lays, and attending to the queen herself. In doing this, the worker is helping to grow the workforce that will provide ongoing care and resources for the colony.

The worker bees' contribution to the colony showcases the cooperative principle of **Member Economic Participation**: "Members contribute



equitably to, and democratically control, the capital of their cooperative". From day 12 through 22 of life, the worker bee advances to new tasks such as helping to ventilate the hive and shaping the wax comb structure. In the final few weeks of her life, the worker engages in receiving nectar and other resources brought into the hive by the older, forager bees. She helps to guard the hive, and ultimately flies out to become a forager herself to share in bringing home the nectar, water, and pollen that all members of the colony need and use, as well as the tree and plant resins that seal and protect the structure of the hive and its occupants. The colony members make these resins into a sticky substance known as propolis, a term that has early Latin and Greek origins. 'Pro-' means 'for', while 'polis' means 'city'. 'Propolis' does indeed create a protective envelope for a cooperative city of bees.

By now you may be wondering who directs all this activity and organizes the bees to work and cooperate as they do. Not the queen!

Honey bees embody yet another cooperative principal: **Democratic Member Control**: "Cooperatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions". In his landmark book, *Honeybee Democracy*, Dr. Tom Seeley of Cornell University reveals the inner workings of a hive and shares the decision-making processes that bees put in motion to reach consensus on matters such as finding a new home, raising a new queen, and entering into the reproductive act of swarming. <https://www.cornell.edu/video/honeybee-decision-making>

There is no formal training program in a hive for new bees emerging from their cells. Later in their lives, however, in their search for nectar and pollen the bees of the hive will accomplish much more nectar- and pollen-gathering if each bee is able to educate her hive-mates regarding the location of especially desirable floral resources. Thus bees embrace yet another principle of cooperative structure: **Education, Training, and Information**: "Cooperatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their co-operatives". Though they prefer not to, honey bees can fly as much as 5 to 6 miles from the hive if necessary in search of high quality nectar and pollen resources. Naturally, if a bee finds an especially desirable source, she wants to share the good news with her hive-mates. To accomplish this, upon her return to the dark interior of the hive, the forager bee will begin to dance on the surface of the comb to attract attention to her newly-discovered food source through the vibrations generated by her dance.

The honey bee dance language takes several forms. Two of the dances relate to foraging. A honey bee will perform a 'round dance' on the comb if the food source is less than about 50 meters from the hive. For sources at a significant distance (greater than 150 meters from the hive) the forager will perform a 'waggle dance' which includes specific movements to inform the colony of the direction and distance to the floral resource. <https://content.ces.ncsu.edu/>

honey-bee-dance-language

Perhaps the most fascinating cooperative effort by honey bees is the collective decision to swarm. After the workers determine that swarming is desirable, part of the colony will make preparations and then they (and the current queen) will depart to seek a new home, leaving behind about half the workers and one or more cells containing growing queens, one of whom will replace the departing queen. After an initial short flight, the swarm clusters on a shrub or tree branch, and 'scout bees' fly off in search of a suitable new home. Returning scouts who have found a home site will dance on the swarm surface to advocate for their choice. Members of the swarm evaluate the dances, and more scouts will fly to assess the most ardently 'advertised' home sites. In true cooperative fashion, the best site is ultimately selected by the members. The swarm then flies to its new home to establish a colony in a new location. <https://www.smithsonianmag.com/science-nature/the-secret-life-of-bees-99559587/>

Want to learn more? From early January throughout the Spring season, beekeeping schools are humming all across North Carolina! Come and learn what the buzz is all about. With over 4,500 members, the North Carolina State Beekeepers



Association is the nation's largest state beekeeping organization. Visit the website to find a bee school near you: <https://www.ncbeekeepers.org/calendar/courses-bee-schools>



Jackie is a North Carolina Master Beekeeper. She teaches at bee schools and at North Carolina State Beekeepers Association chapter meetings across central North Carolina.

HONEY BEE DRONES POSSESSORS OF SOME VERY SPECIALIZED EQUIPMENT

Graham Kingham

Honey bee drones, the males of the species, have similar sex organs to other bees; however these differ in shape at eversion. This species-specific design stops them from cross mating with other bee species. It has also been noted that when drones from different races within the same species congregate at mating sites, they seem to prefer to mate at different heights, but no one seems to know why. A very brief description of some parts of this fascinating organ is given below, when displayed externally.

The endophallus is a multi-part organ with each part playing its part in sequence. At the proximal end is the thin tube known as the cervix, behind this is a ball shaped chamber, the bulb which must pass through the cervix at stage two of eversion, the bulb will contain the semen and mucus. Either side are two yellow horns, the mating sign. At stage two of eversion the hairy pad the vestibulum, is exposed, this acts as an aid when the following drone has to remove the mating sign left by the former.

The drones' mating organ, the endophallus, meaning a 'penis held within', consists of a large complicated tube inside its abdominal cavity. In order to ejaculate semen the drone must first evert it outside of its body. This is achieved via the opening at the tip of the abdomen, the phallotreme, which is also the exit for the anus.



Figure 1: The drone's external opening, the phallotreme, the arrow shows the claspers.

There are also specialized small claspers on either side of the opening. These do not seem to offer any assistance during mating in honey bees so their function is unclear. In other insects they aid in mating and clasp onto the female. Being quite small in the drone, they might act as a support for the endophallus as it leaves

the phallotreme.

There are no muscles or nerves in the endophallus. It is everted by muscular pressure which forces the haemolymph (bee's blood) and air, under pressure, to evert the endophallus in two stages. This pressure also forces semen to be ejaculated at pressure into the queen's ovary ducts. The pressure, normally applied by internal musculature, can also be generated externally, for instance between finger and thumb, with similar effect. Thus, a captured, sexually mature drone will evert its endophallus in two stages presenting sperm on the end, which can then be collected for use in instrumental insemination. An audible pop can often be heard due to the intense pressure involved in eversion.

The black arrow showing the tube, the cervix (meaning



Figure 2: This shows the first stage of eversion, the white arrow showing the dorsal plate of bulb, a structure within the bulb that keeps it rigid. The black arrow showing the tube, the cervix (meaning neck), which is inserted inside the queen before the second stage can take place.

neck), which is inserted inside the queen before the second stage can take place.

It is through a tiny space in the cervix that the bulb seen above must pass through. Note the yellow colouring on the two horns. The function of these is described below.

At the commencement of the second stage the end of the tube is inserted into the queen's bursa copulatrix (the mating pouch) which doubles as the sting chamber, and then the second stage full eversion begins.

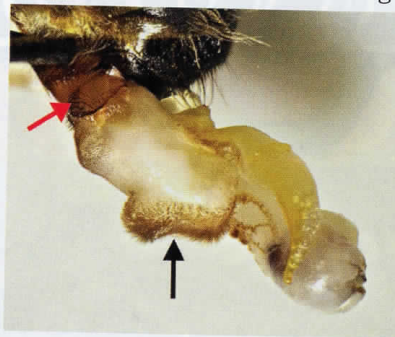


Figure 3: The second stage of eversion of the endophallus.

Note that in mating the bulb at the end would already have been inserted inside the queen; however it is only the tip, the cervix, which is inserted first, before it becomes fully inflated inside the queen's mating chamber. It is at

this stage the mating sign from a previous mating is forcibly removed by the final eversion of the mating drone. (Note the arrow position, showing the vestibulum, see below for an explanation.) Red arrow showing claspers

Mature drones can only mate once their sperm are fully developed - about 12 days post emergence from the cell. One way we can see if the drone is sexually mature is to examine the two horns, the cornua that appear after the first eversion. These act as an attractant to other drones who see them fluorescing in ultra-violet light. They form part of the mating sign that is left behind after mating.

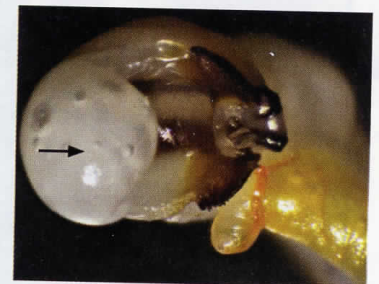


Figure 3: The second stage of eversion of the endophallus.



Figure 5: Part eversion of an immature drone, showing the horns lacking in a yellow membrane



Figure 6: Close up of the brush at the first stage of eversion, black arrow. Tip of cervix, showing close proximity to the brush where it is ready to be inserted inside the queen, white arrow.

Immature drones do not have the yellow coating; hence these specimens would be discarded if manually collecting semen.

In order to mate with the queen the remaining mating sign from the previous drone must first be removed, as explained above. This occurs when the tip of the cervix is inserted and the second eversion takes place, forcing the signal out. The current thinking is that the hairy pad, the vestibulum, shown in figures 3 acts as a brush-like collecting mechanism to help remove the sign.

Mating takes only a few seconds per drone; they then flip over backwards at the final stage of mating, leaving behind their own mating signal, finally falling to the ground where they die having successfully passed on their genes.



This article is a summary of one chapter taken from the 'Honey Bee Drone. Specialist in the field', plus some additional photographs, by Graham Kingham.

All photographs by G Kingham.

Source: Prof J Woyke by kind permission.



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Urban Swarms: Why You Should Care

Marcel E. Durieux

One of the happy differences between beekeeping and managing other livestock is that our bees live with us voluntarily. We don't confine them. They can leave and abscond any time they wish to go (and on rare occasions, they do). We provide them with as good a living space as we can, we take care of them as good as we can, and most of the time they willingly stay and pay us back for our care in honey and wax. To me, this makes the experience quite different from, say, keeping rabbits or goats.

In the same manner, by providing as good a space as possible, we can induce a swarm of bees to come to a place we offer them, rather than have their scout bees select one of the multitude of other nesting sites available. It is hard to imagine now that before 1975 this had never been done, or at least never been described, but thanks to the work of Seeley and co-workers, we have a very good idea of what scout bees are looking for in a future nesting site (Seeley, 2010). If we provide them with a space that fits their needs, they'll come. This activity doesn't yet have a name that truly expresses the completely voluntary nature of the bees selecting your space: "swarm trapping" or "swarm baiting" doesn't quite do it justice.

Admittedly, there are some downsides. You don't know where the swarm came from and what diseases it might possibly carry. Bees like their nesting sites inconveniently high up in trees, which makes retrieving the box with the swarm a bit of an adventure. And, if we base our stock on swarms, it is at least conceivable that we might be selecting for bees that are likely to swarm again in the future. But by and large attracting swarms is a great way to save hundreds of dollars in obtaining bees. In this article, I want to make the point that there's more to it than that: offering new homes to bee swarms is of critical importance to the bees themselves, particularly in the urban environment.

We all know now that urban beekeeping is not only feasible and enjoyable, but that it also is a great way to bring nature into the city and to help pollinate the urban setting. In fact, there's a regular feature about it in this Journal. But bees in the city not only bring us pleasure and benefit: city life makes bees thrive as well. Bees do wonderfully well in the urban environment. A good test for this is the ability of new colonies to live through their first Winter. This is not an easy thing, and feral colonies in the wild are more likely than not to succumb during the cold season: only about 25% of swarms survive (Seeley, 2010). Of colonies managed by humans, about 40% survive. But

these are data from the more typical rural settings where bees are kept. Of colonies managed in urban areas, more than 60% make it through their first Winter (Wilson-Rich, 2012)! In other words, young colonies do better in the city than they do in the countryside. We see a similar trend if we look at production: first year honey yield in rural areas in one study was 17 lbs, whereas in urban areas it was 26 lbs - close to twice as much (Wilson-Rich, 2012).

Why is it that new colonies do better in the urban setting? It is not because there are fewer pesticides in the urban environment. It is not because they are exposed to fewer diseases. Both these issues have been investigated: the urban environment actually carries a higher pesticide load (all those people spraying their small backyards?) and there are more bee diseases around. The difference appears to be in the availability of a diverse habitat and a large variety of plants to forage on. Recent studies have shown great differences in the number of plant species foraged on by bees (and therefore present in honey) from different locations. In rural areas, typically 150 species are found in honey. Moving to the suburbs, the number drops to about 100. But in the urban environment, more than 200 are present (Wilson-Rich, 2018)! So city bees choose from a wider range of

flowers. Other explanations for bees doing so well in the urban setting have been suggested, but have not been investigated: for example, cities are somewhat warmer than the countryside, which might help during that first Winter.

Now, let's get back to attracting urban swarms. As we saw, a feral bee swarm has only a one-in-four chance to survive. For a feral swarm in the city survival will probably be even less likely, as many swarms will find housing where they get in the way of humans, and may be destroyed. In contrast, we also saw that if you provide that swarm with a city home, their survival rate will more than double! In addition, they will thrive, bringing in more honey from more plant species than would be the case in areas outside the city. Thus, providing housing for swarms in the urban setting is of great benefit to the bee population there.

Importantly, that urban bee population might be the future of the species. There are those who feel that the "urban islands" in the sea of agriculture are in fact where bees will be able to thrive again. Open grassland has been and is being eliminated at a high rate to support intensive farming. Urban areas may become the new countryside



The author watches the arrival of a swarm at a bait box on his porch. Photograph by Marijke Durieux, with permission.

for bees (Benjamin, 2014). Supporting the bee population in urban settings may therefore be of critical importance.

This is not the place to discuss the technicalities of attracting swarms. Seeley and Morse's classic pamphlet on "Bait Hives for Honey Bees" is freely available on the web and explains it all (Seeley and Morse, 1989). It's fairly straightforward: all it takes is a box of the right size, some comb, some lure, and some knowledge of bee preferences. The biggest hassle in putting up bait hives - getting them high enough - is less problematic in the cityscape. As mentioned, bees like their nests high (15') in trees, presumably because they are more safe there from large predators. Unfortunately, getting a box up a tree that high is impractical, it can't be checked easily, and everything becomes even more exciting when it needs to be lowered again, full of bees! In the city, this is all easier, since typically it will be very feasible to find a ledge, balcony or roof at about the right height, and where access is straightforward (see Figure).

In summary, for the urban beekeeper, attracting swarms is so much more than getting free bees. It is even more than a way to get more bees into the city, improve pollination and get a new generation of city dwellers to become familiar with these amazing creatures. It is, truly, a way to sustain our bee population at a critical juncture in their millions of years of history.

CATCH THE BUZZ

HONEY BEE EXPOSURE TO PESTICIDES

Honey Bee Queens' Exposure to Pesticides Weaken Reproductive Success and Colony Development

(Beyond Pesticides, April 9, 2020) Honey bees (*Apis mellifera*) remain in severe decline, with U.S. beekeepers losing 30% of their managed colonies each year. A Texas A&M study provides evidence that chemical-intensive farming practices contaminate honey bee hives with pesticides that cause developmental delays. Researchers found that toxic pesticides adversely affect honey bee queen physiology and worker bee performance. Moreover, pesticides exacerbate the health risks associated with the declining honey bee population. When maturing honey bees' exposure to pesticides is limited, there is an improvement in honey bee queen health and colony behavior.

In agricultural settings, honey bees are exposed to an amalgamation of pesticides. Texas A&M researchers determined which pesticides (miticides, insecticides, and fungicides) are commonly used in combination and then used those pesticide combinations to expose honey bees to field-realistic doses in the lab: tau-fluvalinate and coumaphos, amitraz, or chlorothalonil and chlorpyrifos. Researchers cultivated maturing honey bee queens in plastic cups coated with either pesticide-free or pesticide-contaminated beeswax. Honey bee queens were transferred into hives upon maturation and bred naturally. Researchers measured their egg-laying frequency along with worker bee entourage size. Post-reproduction, scientists performed a bioassay (a measurement of substance potency or concentration effects on living cells) on the honey bee queens to examine the chemical components of the mandibular glands.

Pesticide-contaminated beeswax impaired honey bee colonies during the queens' maturation. This led to reproductive dysfunction that significantly decreased worker bees' entourage size and the queens' egg-laying rate.

Worker bee performance decreased in response to the queen's change in pheromone secretions and reproductive

ability. Worker bees favored queens raised in pesticide-free conditions and formed larger cohorts to tend to the queen. Author Elizabeth Walsh, Ph.D., and co-authors at Texas A&M state, "These results indicate that pesticide contamination of the queen-rearing wax directly affects queen physiology and behavior and further affirm that queen mandibular pheromones seem to act as honest indicators to workers of a queen's reproductive capacity and overall health."

The health of an adult queen can be significantly altered by pesticide exposure during developmental stages. Adverse effects on a queen act as an indicator of the overall fitness of a colony. Much research on honey bee health focuses on the specific class of neonicotinoid (neonic) insecticides and its associations with diminished grooming and health.

Exposure to neonics has been linked to the decline of pollinators worldwide. Not only do these chemicals weaken worker bee flight behavior directly, but also indirectly impacts worker bee performance. This research broadens the understanding of the range of pesticides that can harm honey bees.

Pesticides intensify honey bees' vulnerability to health risks (such as pathogens and parasites), and colony collapse as pesticide-contaminated conditions limit colony productivity, growth, and survival. As has been widely reported, pollinators (such as bee, monarch butterflies, and bats) are a bellwether for environmental stress as individuals and as colonies. To help pollinators by eliminating pollinator-toxic pesticides, support and adopt organic land management, The BEE Protective Campaign strives to protect honey bees and other pollinators from pesticides.

Learn more about bee pollinator decline, pesticide-free zones, bee-friendly habitats, and what you, or your state representative, can do to protect our pollinators.





MAKE A CALENDAR

For Your Bees



Ann Harman

Each year in January we get a new calendar to hang up. Although today we may use our cell phones to keep track of events a decorative calendar still is handy to remind us of things to do and places to go. Our calendars run from January through December because that is our (human) year. It does not matter where you live, whether in a cold or in a hot climate. However the honey bee has a different calendar.

The bee calendar year is different from that of humans. Although their events are basically the same for them over a period of time, the timing of when their events occur depends on where you live.

You can certainly put notes about your bees and their needs on a regular calendar or on your cell phone or computer but making a calendar designed for bees in your climate will certainly make you think about their life through the months. The calendar you make will start at your bees' New Year, a bit different from human's. And definitely appropriate for your climate.

You have some choices in making your bee calendar. If you make your own, each month can start on the same day. But if you choose a Sunday you will have endless Friday the 13ths. That's OK, the bees don't mind. You can use a decorative calendar you received from last year or even several years ago. Exact dates generally do not work very well with bee calendars. Weather can influence certain events. However you can use dates as a guide for you.

Your bee calendar can be a perpetual one. This would be one where you will just note certain things that occur in the bee's year and have to be done or checked inside the hive throughout the seasons. Or you can just make a new one each year and keep records on it, such as rainfall. Rainfall is important in many ways: your bees need a source of water during their active seasons; too much or too little rain affects the nectar and pollen plants; endless days of rain affects bee flight time for collecting nectar and pollen. How good are you at remembering what the weather was like last Thursday? If you have not put rain in your bee records, now is a good time to do that. So is the opposite—lack of rain, drought. Weather is inconsistent from year to year.

If you have been attending your local beekeeping club meetings you have become aware of your bee's year. You have heard about swarm time, enough food for the Winter months, time to put honey supers on and take them off for harvest, as well as testing for *Varroa* and any other health conditions. If a local beekeeping club is not convenient, beginning beekeepers who have mentors can make use of their information. If all you have are some

excellent books you will have to adjust the information to your climate. The bees' year in Maine has different dates and times from that in Arizona.

As soon as you have 12 calendar pages you can start to create your bee calendar. New Year for bees begins at the time our Summer is coming to a close. The hours of daylight are becoming less. Plants are responding to the changes in length of daylight and also to any temperature changes. Bee New Year begins around the time when the queen starts to produce Winter bees and then prepares to take a break from egg laying. Although there really is no exact day you can choose one for your bees.

That day will remind you to check for adequate food stores that must last the duration of your Winter months. You still have some time to provide syrup for Winter stores if the bees need it. If you plan to do a *Varroa* check enter that note on your bee calendar.

Have you been keeping records throughout your beekeeping time? Although this is not the ending of your bee season, now is a good time to review those records. Do you see anything you need to change for the coming year? Is there something you forgot to do because you simply forgot? You can put a reminder on your bee calendar right now.

After the population of Winter bees has been established, it is now time for the queen to take a rest from egg laying. Again, climate dependent, her rest maybe very short or extend over several months. Note on the bee calendar the approximate day she begins and ends her "Winter vacation." A broodless time may be when you wish to do a *Varroa* treatment. Having the information on the bee's calendar is a good reminder.

As the colony is progressing towards Spring the bees are approaching their swarm time. Have you noticed when you have first seen drones at the entrance preparing to take flight or have noticed them inside the colony? You can now make a note on the bee's calendar that it is "drone time."

This time is followed by "swarm time." That is an important item to put on your calendar. Not every colony will swarm but those with older queens may do so. You may wish to let them swarm for a break in the brood cycle to help control *Varroa*. You may be hoping to catch the swarm to increase your number of colonies. Or you may wish to prevent a swarm, especially if your honey-crop plants bloom in early Spring. A swarm decreases the number of worker bees. No matter what you wish to do, put "beginning of swarm season" on your bee calendar. That reminder will help you plan your bee year.

Do you know the honey-crop plants in your area? You should know what those plants are and the approximate bloom date. Some parts of the country have more than one honey-crop time. If so, don't forget to note both of those

periods on the bee calendar. Do you have your honey supers ready? If you have noted on the bee calendar when bloom starts you should be able to harvest honey (if your weather cooperates). Keep watch on those plants and your bees.

At some point all those honey-crop plants will finish blooming. Here is another date to record—end of bloom. Now you know it is time to let the bees finish ripening the honey and capping it. The next event is removing the honey supers and harvesting your honey. You can note the day you begin that project. That information will help you next year.

Your separate beekeeping records should have your plan for *Varroa* tests and controls. If you live in small hive beetle area those comments would also go into your own general records. Neither *Varroa* nor beetles are part of the bee calendar. This calendar is for events in the lives of bees and their interactions with their world. Your records for results of *Varroa* tests and treatments are very important but they are not controlled by the bees. Think of what the bees plan to do with their lives.

After honey harvest time do you know what your bees are planning to do? Perhaps the bees have no particular project until preparation for Winter. It could be a time for supersedure. This is frequently a rather quiet bee-initiated project. Queen cups are made and torn down throughout bee season so it is easy to overlook any progress being made with one of them. So perhaps you can make a note on their calendar as well as in your records. Since the colony may not do that every year you can put a question mark on both their calendar and in your records. It would be a reminder to check those queen cups. One problem with supersedure late in the Summer is the lack of drones. The queen may get mated but not with a sufficient number of drones for a good mating. Your own records need to have that information

for clues to future problems.

Drones are an event in the bee calendar. You can note “drones out!” if you wish. You watched them appear in the Spring. Now you may notice drones being dragged or shoved out of the hive. You may see them being harassed at the entrance. The bees know that they are old and that there is no need for mating flights. However, do not be worried if, in the middle of Winter, you see a drone or two inside the hive. He is just living happily, feeding himself, but will be dying of old age some time during the Winter. The bees will tolerate the presence of a few drones throughout the Winter months. They are not depleting the honey stores.

As your Summertime is winding down you do need to pay attention to the world around your bees. Their needs are simple—water and food. Not only for daily survival but for the Winter days to come. You need to make sure the bees are storing enough pollen and honey for their Winter months ahead. In all but a few areas of the country the food supply will cease and bees will be in a cluster.

You need to note on the bee calendar when the queen seems to be stopping, or has stopped, laying eggs. The queen is “on vacation” until the days begin to lengthen. Just consider it her “time on a cruise to the tropics.” She will be kept warm, well-fed and groomed.

You have completed the bee calendar. It really is a simple calendar compared to ours. But if we recognize the events that occur in a bee year we can do a better job of beekeeping. The important thing to remember is that a bee calendar is made appropriate for the climate, even the microclimate, the bees are living in. In years with strange weather events, such as a warm Winter in a cold climate, the bee calendar will need to be modified. However the sequence of events will remain the same.

I am sure the bees will appreciate their own special calendar. After all, it is making you a better beekeeper.



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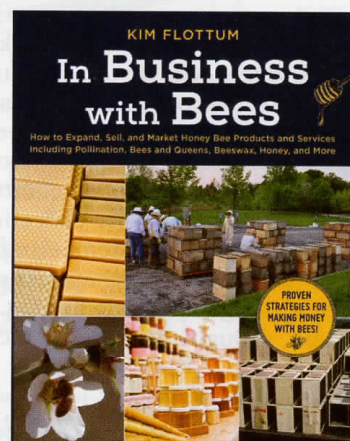


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ON DARWINIAN BEEKEEPING

Malcolm Sanford

The board of directors applauds Dr. Tom Seeley's work describing something he calls "Darwinian beekeeping." His keynote presentation at Apimondia 46 in Montreal Canada described the basic ideas for this concept, developed over several decades working in the Arnot Forest at Cornell University and other locations, that are the basis for his several recent books, including *Honey Bee Democracy* and most recently, *The Lives of Bees*.

Darwinian Beekeeping is an "evolutionary" approach seeking to help humans provide managed honey bee colonies with living conditions that are as close as possible to those of our wild honey bee ancestors. The goal is to harmonize as much as possible apicultural methods with the natural history of our species, *Apis mellifera*, encouraging us to make full use of adaptations that we have evolved over the last 30 million years. Dr. Seeley's work provides the basis for a series of reasonable, and now almost obligatory, practices for beekeepers to consider centered less on treating a bee colony as a honey factory or pollination force, and more by nurturing the lives of its inhabitants. Our conclusion: What took humanity so long to realize that a great many of our activities are driven by the same natural forces as other organisms, including domestic animals and even themselves?

The idea that several populations of honey bees coexist seems obvious to us. Yet this has not necessarily caught the attention of much of the human beekeeping community. Dr. Seeley emphasizes these differences by comparing environmental adaptations found in wild ("natural") colonies with current circumstances exhibited in ("domesticated") beekeeping operations.

"Location, location, location" is the mantra of most humans, when choosing a place to live. Driven in a similar way, we honey bees have been "selected" to find and live in suitable residences, although not having the human luxury of shaping the dwelling and/or environment to fit our needs. As a consequence of this, all bees are not alike. The evidence is plain and we urge it be kept upper

most in the mind of the human beekeeper at all times.

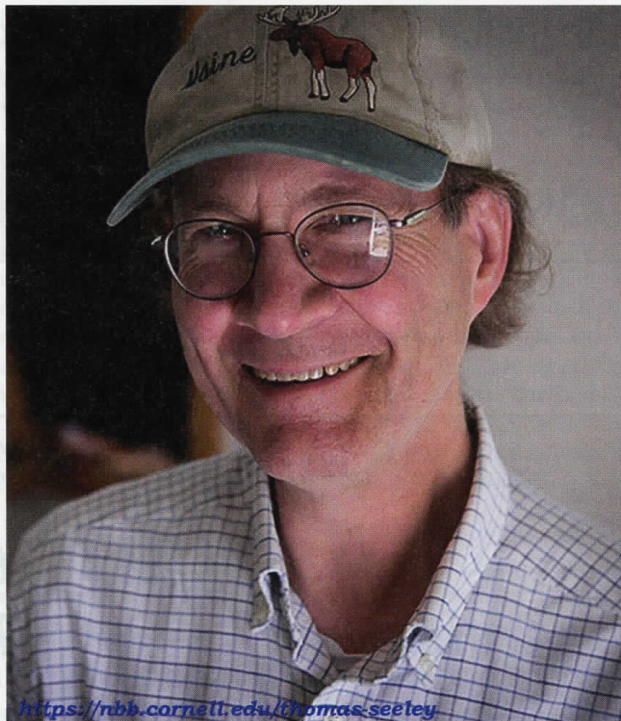
We are proud of our diversity, etched by natural selection in ways that allow us to survive in almost every environment found on Planet Earth. This is reflected in both structure (body color, size, hirsuteness) and behavior (clustering to produce and conserve heat; dancing to communicate to each other the size and quality of both nest sites and foraging opportunities). Human classifiers of biology (taxonomists) have found at least 30 distinct groups scattered across the globe, collectively calling us by the name or species, *Apis mellifera* (honey bringer).

We are then divided into subgroups of, based on location and behavior, also known as subspecies or "ecotypes."

Two global groups of honey bees (*Apis mellifera*) exist, principally due to whether we are located in temperate or tropical areas. The biggest challenge is keeping the brood nest, what has been called our "social uterus," in a consistent temperature range between 32 to 35°C. (89.6 to 95°F). In temperate zones, we produce heat by vibrating our wings, and then clustering to conserve loss, while in the tropics, we cool the nest via fanning and evaporation of water. Both take various amounts of energy to accomplish their goals, some more so than others, providing great variability.

Beyond temperature control, groups in temperate zones (usually characterized as "European") are challenged by various other circumstances quite different in tropical areas ("Africa and South America"). The former must ensure they have enough honey stores to make it through Winter. They are also challenged by relatively few diseases (American and European foulbrood (bacterial), *Nosema* (protozoan) and pests (mice in Winter), bears, skunks, when compared to their tropical cousins, which also have to deal with a wider-range of potential organisms, including honey badgers and others.

Our tropical sisters have one option generally always available to them, the ability to pull up stakes and move if things get too bad. Often incorrectly called "swarming," this behavior has nothing to do with reproduction, but



Dr. Thomas D. Seeley is the Horace White Professor in Biology at Cornell University. He is based in the Department of Neurobiology and Behavior, where he teaches courses on animal behavior and does research on the behavior and social life of honey bees. His work is summarized in three books: *Honeybee Ecology* (1985), *The Wisdom of the Hive* (1995), and *Honeybee Democracy* (2010).

is simply a survival technique known as "absconding." Those in temperate areas must hunker down in Winter time and suffer through major cold spells. Moving under such conditions is out of the question.

Collectively, therefore, all the above potential variables necessary for our survival have parsed us into a reasonably stable, worldwide, genetically adapted population of honey bees. Into this comes something, we are not prepared for, forceable relocation by human beekeepers.

Dr. Seeley concludes that colony transplant experiments even from regions fairly close in proximity such as Paris to Landes in France (less than 500 miles), reveal marked differences in annual brood cycle between two resident ecotypes, revealing a genetic basis. He concludes, "This example shows us that shipping mated queens, and trucking whole colonies, to hundreds of or thousands of miles away – for instance, from Hawaii to Maine or Italy to Sweden – is likely to force colonies to live in environments to which they are ill suited."

His resultant advice for the Darwinian beekeeper is clear: "Work with bees that are adapted to your location." Thus, if you live in the northeastern United States, then either rear queens from survivor colonies or buy queens and/or nuclei from proven stock that has thrived in this harsh climate despite long Winter. If you don't want to raise queens, but have wild colonies nearby, consider trapping honey bees or collecting swarms that are locally adapted with bait hives. Most importantly, try to keep those bees isolated from fellow beekeepers, who might be purchasing queens shipped in from far away.

On Nest Location

Nest placement is perhaps the most important thing we bees have options to consider when searching for a new home. Dr. Seeley agrees. His considerable research shows that in the wild, honey bee nests are located relatively far apart. Crowded colonies, he says, create greater competition for forage, increased risks of being robbed, and potential problems in reproduction. The latter category includes swarms combining when leaving hives and queens entering wrong hives after mating.

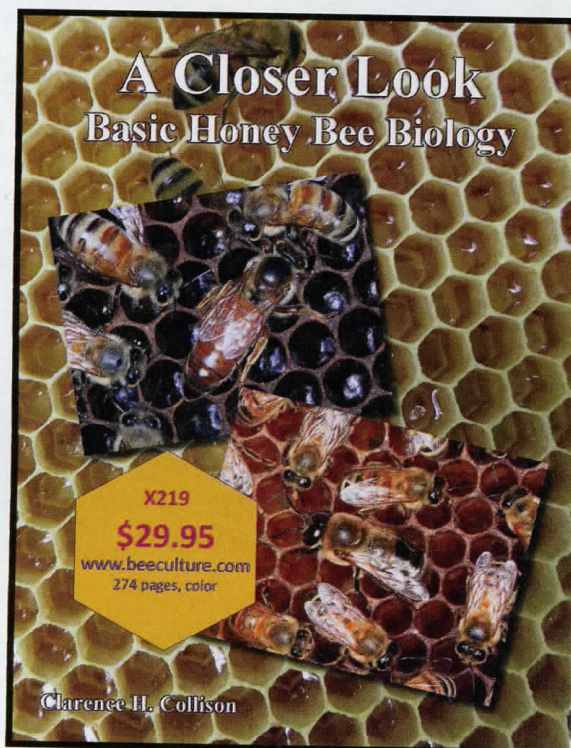
Most harmful, however, he thinks is that a crowded nest landscape boosts pathogen and parasite transmission among colonies. This also creates opportunities for virulent strains of organisms to become introduced and spread more quickly.

Unfortunately, spacing out colonies flies in the face of human beekeeping practice, which demands crowding into groups of colonies or apiaries. Dr. Seeley finds that wild nests in central New York State are spaced roughly 800 meters (.5 miles) apart. This distance is almost impossible to maintain in human-managed apiaries. It is fortunate, however, according to Dr. Seeley, that research shows spacing colonies just 30-50 meters (100 to 160 feet) apart reduces the likelihood of drifting drones, and potentially workers as well. The Darwinian beekeeper, therefore, can take advantage of distributing honey bee colonies across the landscape more extensively than generally found in the management style currently practiced. We bees would appreciate more attention paid to this by our human partners.



"As someone who has devoted his scientific career to investigating the marvelous inner workings of honey bee colonies, it saddens me to see how profoundly and ever increasingly conventional beekeeping disrupts and endangers the lives of colonies."

Thomas D. Seeley



Bee Culture

The Magazine of American Beekeeping

Written by Clarence Collison, Professor Emeritus and former Head of the Department of Entomology and Plant Pathology at Mississippi State University and the former beekeeping/pollination specialist and livestock entomologist at The Pennsylvania State University.

Professor Clarence Collison has performed the meticulous scholarship so desperately needed by beekeepers and scientists alike. He has reviewed the vast body of research: the biology, physiology, biochemistry and behavior of *Apis mellifera* and presented it in an concise and objective manner. This book will be required reading of all serious bee scientists, and on the desk of every beekeeper for fact-checking and scientific clarification. (Lawrence John Connor)

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Cooking With Honey

Ann Harman

Our grills become our choice of cooking stoves for the Summer months. Hamburgers just taste better fixed on a grill. We experiment with different sauces for them as well as for steaks or chops. Honey can certainly be an important ingredient in marinades and sauces, not only for meats but also for veggies. But grilling with honey in recipes requires a bit of attention since it will scorch or burn more easily than when using sugar. But don't let that stop you from experimenting to design your extra-special marinade or sauce.

We usually think of meats or vegetables for grilling. That's fine. but try this recipe for a delicious addition to a meal or as a dessert.

FRUIT KEBABS

- | | |
|--|---------------------------------|
| 1 pound hulled strawberries | 2 tablespoons balsamic vinegar |
| 2 cups pineapple chunks | 1 tablespoon canola or corn oil |
| 2 cups watermelon chunks | 2 teaspoons honey |
| 2 medium bananas, peeled and cut into thick pieces | |

If using 9" to 12" wooden skewers, soak them for about 10 minutes in cold water to keep them from charring, or use metal skewers. Preheat grill on medium high.

Thread the fruit onto the skewers in this order: strawberry, pineapple, watermelon, banana, strawberry, pineapple, watermelon, banana. Transfer skewers to a platter or baking sheet.

In a small bowl, using a fork, whisk together the vinegar, oil and honey, Using a basting brush, brush about half the vinegar mixture over the fruit to glaze it. Grill the kebabs for about 8 to 10 minutes, or until the fruit is caramelized, turning the kebabs several times and basting with the remaining vinegar mixture.



Serves 4

After a hot day in the beeyard you can fix yourself a **BLUEY SMOOTHIE**

- 2 cups fresh or frozen unsweetened peach slices (see Tip below)
- 2 cups tightly packed fresh spinach (see Tip below)
- 1 cup fresh or frozen unsweetened blueberries (see Tip below)
- 1 cup milk (can be fat-free)
- 1 teaspoon honey

In a food processor or blender, process all the ingredients until smooth, about 1 to 2 minutes, stopping to scrape down mixture if necessary. Pour into glasses. Serves 2.

Tips: You can substitute ½ cup frozen spinach for fresh but you may need to add a few more splashes of milk. You can use fresh fruit by using the same quantities and **ADDING 1½ CUPS ICE CUBES.**



Both recipes from COOKING IN COLOR by American Heart Association

