

**Bee Culture's**

# **BEE** *Keeping*

Summer '19®

**Your First Three Years**



**Summer Honey Prices**

**What Your Mentor Forgot  
60 Points of Enlightenment**

**ROOT**  
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# BEEKeeping

Summer '19<sup>®</sup>

## Your First Three Years



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Let your bees do some of the clean up



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# BEE Keeping

## Your First Three Years

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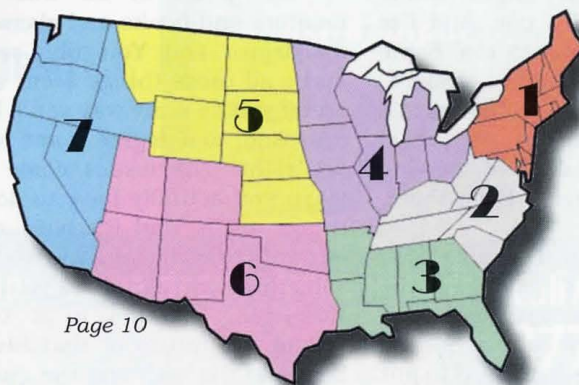
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# The Editor's Hive

If there's anybody guilty of making assumptions about honey bees it has got to be me leading the pack. Add to that all of the assumptions I can, and do, make about knowing what it is I'm actually doing some days when I have a hive open and am supposed to be doing something productive.

Part of this is that we tend to follow the seasons when it comes to what we are doing....Spring this, Summer that, Fall work and then Winter. When Spring comes around again, it's been a year since we did Spring things. And, because I've been doing this for so long, and have done it so many times, and have been teaching others how to do Spring things...you'd think I'd actually know what I'm doing.

Don't be fooled. In late April this Spring I had to put in three packages. One in a 3-story 5-frame nuc that was eventually going to go into a 5-frame observation hive. I've done this maybe 25 times in the past. Put three pounds of bees into a stack of three, 5-frame medium boxes, the top one full of honey, the middle with two frames of honey and three drawn comb, and the bottom the same as the middle. Install the queen in the middle of the middle box. You don't have to feed, you don't have to check, you don't have to worry. Enough food, enough bees and life is good. Moving on.

Second package. Standard equipment for me. Eight frame mediums. That's all I use. And I've done them a lot of times too. Same arrangement as the five frames. Honey on top, some in the middle and bottom, dump in the bees, queen in the middle box, moving on. A no brainer, right? Been there, done that.

"Oh, did you put the candy plug in the queen cage?" asks my wife Kathy. The queen cages come with corks in both ends so the queens can't get out. You're supposed to put in a fondant plug when you install

them so the bees can release them in a few days.

Uh...nope, forgot. In fact, they're still back in the car. I'll have to go get them. And then go back and put one in the first queen cage, too, I thought.

"And while you're at it, bring the smoker you left on the work bench, too", she said.

Fixed the two cages, moving on to the third package and the new hive we have. It's a 6-frame, polystyrene hive, or nuc, or, well, it's new, and I haven't used one before. And I had to assemble it, and some of the pieces were missing, and there were duplicates of some parts - frame rests, entrance reducers....like that. A deep bottom box and a medium top box with honey. I managed to find six deep drawn frames and had honey for the medium, so dumped the bees in the bottom box, put the frames back in the bottom box, stuck the queen and put on the top box.

My wife looks at me and asks, "Are you new here? What about the queen's candy plug?"

OK, take it apart, get the queen cage, put in the plug, put it back together and done, finally. What should have taken a half hour or so took more than twice as long. And when I was done I wasn't quite sure it was all done, or had I forgotten something, left something behind, done something wrong?

The point of all this? Well, mentors and books and classes and magazines and You-tube seem to make all these things seem simple, and if you do it my way you'll be just fine. And, to a degree, some of them are 'right'. The issues come about when you actually have to do these things again, and it's been a year, or two or maybe never and it's not something you can do in your sleep. Everything you do in a beehive affects the future of that hive, the health of the bees and the quality of life they will experience. Putting bees

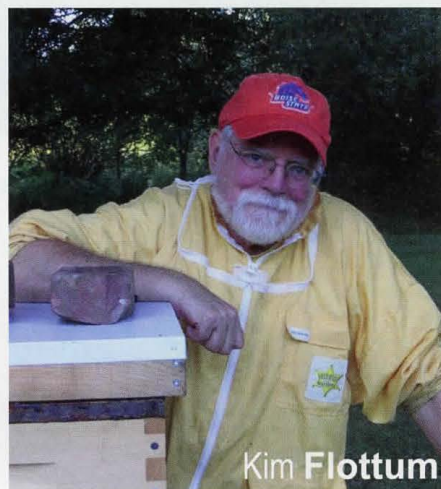
in a box isn't even close to a natural home, putting five hives together in your backyard isn't natural, bottom entrances, rigid frames, smooth wood instead of roughened, propolis covered walls in a hollow tree.... all these things aren't natural, and aren't what bees want or need. So when we get in the way, I guess my thought is to get in the way as little as possible. Keep it simple, easy and as natural as you can. And don't worry about getting it right every time. You won't. That's OK.

\*

One of the things to pay attention to are the digital tools that are showing up. Remote sensors, GPS devices, sound analyzers, environmental indicators...the list goes on and on. And getting longer every day. Some of these are truly wonderful, giving you a heads up on a lot of things that could be going wrong in your hives. Some, just more of the same, but still more than we had even a couple of years ago. Most of these aren't in the catalogs of suppliers. You have to go looking for them. Go. Look. They are the future.



*Kim Flottum*



Kim Flottum





Ann Harman

# 1<sup>ST</sup> YEAR HIVE TASKS

***July is the month to monitor Varroa and treat if necessary for Winter survival.***

- If a chemical treatment is selected, read the label to insure correct application.
- Determine population of small hive beetle and take action if abundant.
- All colonies should be in fully-completed hives by end of July.
- Good ventilation is necessary in hot weather.
- Monitor the bees' water supply. Do not let it dry up.
- Keep beeyard grass and weeds mowed.
- Examine queen's performance.
- If colony is weak, look for disease or other conditions.
- If colony is healthy but weak, plan on requeening or combining colonies.
- Combine the weak colony with a strong colony and eliminate weak queen.
- Never combine two weak colonies; requeening each one is preferable.
- August first is the bees' New Year's Day.
- Be a Plant Watcher and a Weather Watcher to know if a dearth of bee forage.
- If a late Summer dearth, feed 1:1 sugar syrup and possibly a pollen patty.
- Monitor any pollen patties for small hive beetle infestation.
- Feed syrup inside the hive and feed all colonies to prevent robbing.
- Keep hive inspections to a minimum to avoid robbing.
- In cold climates begin feeding 2:1 sugar syrup in September for Winter stores.



*A reliable water source is critical.*



*You can't mow around them. No worries, those dandelions will be back tomorrow!*





## THE HIVE BUTLER

Working...even when you're not!

Beekeepers work hard, and deserve products designed just for them. Products that make their work easier and less stressful! Beekeeping isn't cheap and it isn't always easy. Let the Hive Butler take some of that work off your shoulders.

The 2019 Hive Butler® is a terrific improvement over the original design! Now made to hold 10 frames of all sizes, securely, no matter how you carry it. With double-clasps on all four handles, to keep that lid in place at all times. The solid lid provides for storage and transport of honey and frames. And the optional, ventilated lid is ready to go to work the minute you take it home, for swarms, inspections and splits. Helpful, handy, hardworking, year 'round. Just like a butler should be!

As before, the Hive Butler® is

heavy-duty, food-grade, and made in the U.S. Designed by an engineer AND a beekeeper, to solve problems that plague all beekeepers!

- Heavy, fat honey frames ~ sticking together, gouging each other, leakage = loss \$\$\$
- Delayed extraction ~ want to avoid a gigantic mess?
- Drawn-comb storage ~ cardboard boxes do NOT cut it!
- Swarms! ~ don't carry heavy woodware up a ladder!
- Finding queen cells ~ Ohmigosh! Now what do I do??
- Finding your queen ~ Eeek! Where can I put her?
- Moving frames of bees across the yard or across town ~ Quick - gather up extra woodware!
- Short on excess woodware ~ I don't have any extra woodware!
- Keeping honey frames clean ~ grass bits, bug parts, paint chips!
- Carrying delicate wax foundation

# NEW

frames to the beeyard ~ Oh no! I dropped those frames.

- Bringing in honeybound deep frames. Why are they filling my deep frames with nectar?!

There isn't a season where the Hive Butler® can't help you get things done! Who doesn't need a Butler?

Sign up for our newsletter at our website! [www.thehivebutler.com](http://www.thehivebutler.com)



## The Simple Harmony Farms Uncapper

Our uncapper is a brand new design which offers a simple and superior way for the hobby or sideline beekeeper to uncap honey.

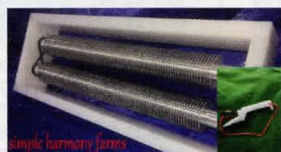
The biggest advantage our uncapper offers is the time it saves. The beekeeper has only to grasp the frame once to bring the frame from the super to the extractor. Both sides of the frame are uncapped at the same time. All other methods of uncapping require re-positioning the frame and hands multiple times during the uncapping process. All other ways waste time processing every frame. We uncap and load our 30 frame extractor in just under 5 minutes.

Some other advantages are:

- The uncapper is designed to work with all sizes of Langstroth frames, including shallows, mediums and deeps.
- There is no heat, electricity or sharp edges.
- Wax waste is minimal, saving your bees the time it takes to rebuild the frame. This also saves you time since your honey strainer will be slow to fill with cappings.
- The uncapper body is made from high density polyethylene and the rollers are cut on a CNC lathe from a solid piece of 2" aluminum bar stock. It is incredibly durable. The body protects the rollers from damage, even if dropped.

See the uncapper pictures, videos and frequently asked questions at: <https://simpleharmonyfarms.com/uncapper>.

The uncapper is \$395. Active duty and military veterans will get a simple harmony farms hive tool for free with their purchase!



## My Tip Stand

As a backyard beekeeper, I found myself gathering honey every Fall. After all the dirty work; removing the super from the hive, extracting the honey and straining the honey into 5-gal. buckets, I started bottling my honey. When the honey level got near the bottom of the bucket problems began.

Many beekeepers use the five gallon bucket to store and bottle their honey. It works great. Until you get near the bottom. Then you have to prop up the bucket to get the rest of the honey out. Doing so requires three hands; 1 to hold the jar below the table, 1 to tip the bucket, and 1 to open the valve. All three have to happen at the same time. I was born with only 2 hands and therefore I have a problem with this procedure. So, I invented the TipZstand to help me out.

The TipZstand is the Bucket Bottling Stand to help you bottle your honey without having to fight with the bucket. The TipZstand holds the bucket high enough that you can put a quart jar under the valve. The jar sits on the table and you open the valve with one hand. The TipZstand is Spring loaded so that the bucket will automatically tilt as the bucket becomes lighter. Bottling honey is now a 1-hand operation using the TipZstand.



The TipZstand also works for other dispensers that you may have for parties. No more need for a trash can in front of your drink dispensers. The TipZstand can be placed away from the edge and a paper towel can be placed under it to catch the dribbles from the dispensers.

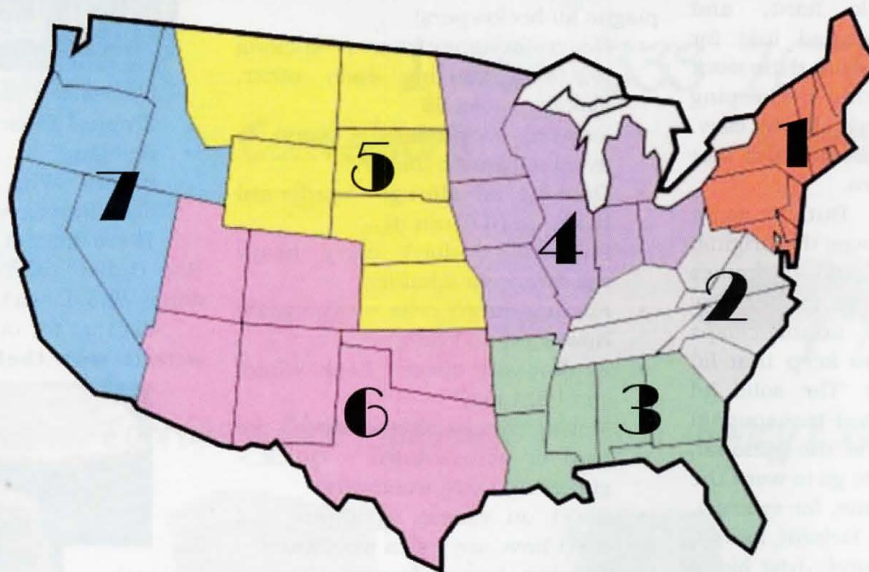
The TipZstand can be used with or without the springs. Or just one spring. When not in use, the springs fit neatly in compartments in the bottom platform. You can even use the TipZstand with the springs and leave the legs tucked away and place it at the edge of the table or counter. The TipZstand collapses down to just 2½" high so it fits neatly in your cupboard.

This is a MUST HAVE addition to your beekeeping operation (or your kitchen). Contact your local bee supplier or go to [www.MyTipZstand.com](http://www.MyTipZstand.com)





# SUMMER REGIONAL HONEY REPORT



## Coming Up

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, 46% believe that the demand for their honey this season is going to increase. This ranged from a high of 83% in Region 6, to a low of 25% in Region 2. Will demand remain steady, we asked? 48% believe it will be about the same this season as last. That ranged from a high of

75% in Region 2, to a low of 17% in Region 6. That makes sense. Will it decrease? Only 17% in Region 7 seem to think it will.

Prices! Will increase think 35% of our reporters, remain steady think 63% and actually decrease feel 2%. Region 2 and 5 had a 50% raise in mind, while only a third of Region 7 felt prices would climb.

Prices will increase for several reasons. Increased demand accounts for 26% of those increases, while 63% of the proposed increases are

due to the cost of keeping bees alive, which continue to soar. Some, not many, but some will increase prices this season because they can, which, all things considered, is kind of anti-marketing, but certainly profit minded. I think we need more of the profit minded beekeepers out there.

As a result of all this, demand, price increase and the rest, 33% of our reporters will increase production this season (providing all the rest fall in place), but fully 55% don't intend to do anything differ-

ent. They will just stay the same. And, interestingly, 12% actually plan to decrease, for reasons not specified, production this season.

Briefly, take a look at the overall prices for each of the products we list. Almost, not quite, but almost everything is down from last month. But interestingly, almost everything is up from last year. Some by enough to wonder why?

	REPORTING REGIONS							SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	\$/lb	Last Month	Last Year
<b>EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS</b>												
55 Gal. Drum, Light	2.27	2.22	2.40	2.50	2.26	1.95	3.00	1.60-3.00	2.23	2.23	2.22	2.36
55 Gal. Drum, Ambr	2.16	2.18	2.21	2.50	2.25	1.80	3.00	1.35-3.00	2.15	2.15	2.09	2.22
60# Light (retail)	211.08	187.10	190.00	208.00	157.50	190.44	200.00	131.74-300.00	206.30	3.44	207.88	201.79
60# Amber (retail)	204.63	189.65	187.50	203.00	204.63	185.95	223.33	119.74-285.00	206.88	3.45	208.31	204.60
<b>WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS</b>												
1/2# 24/case	107.92	76.07	106.80	69.67	74.40	84.00	107.92	57.60-194.40	89.84	7.49	85.54	80.90
1# 24/case	140.27	109.67	137.52	114.80	134.00	127.44	142.20	91.20-211.20	129.34	5.39	132.11	127.06
2# 12/case	140.99	97.63	124.17	108.86	111.84	104.40	114.00	78.00-245.00	120.48	5.02	121.26	107.75
12.oz. Plas. 24/cs	112.40	104.00	100.00	91.09	83.76	92.60	103.20	72.00-172.80	102.40	5.69	98.61	96.27
5# 6/case	150.77	111.80	190.80	144.00	113.16	115.50	150.77	90.00-240.00	136.55	4.55	131.27	125.82
Quarts 12/case	181.97	147.50	133.26	180.00	144.03	152.33	144.00	108.00-300.00	159.95	4.44	154.14	143.93
Pints 12/case	96.78	91.95	78.67	84.42	111.00	82.05	84.00	60.00-144.00	91.57	5.09	89.35	89.19
<b>RETAIL SHELF PRICES</b>												
1/2#	5.38	4.74	4.40	5.25	4.28	5.00	5.38	2.50-9.00	5.01	10.02	4.97	4.60
12 oz. Plastic	6.11	6.08	5.46	5.50	4.58	6.84	6.00	3.50-9.00	5.98	7.97	5.91	5.61
1# Glass/Plastic	9.25	7.16	7.79	7.40	7.11	7.00	9.25	4.50-17.00	7.76	7.76	7.90	7.10
2# Glass/Plastic	15.10	11.94	13.80	12.25	13.39	12.33	15.50	7.93-25.00	13.74	6.87	13.58	12.05
Pint	11.67	10.40	8.16	9.50	9.50	9.98	9.20	4.00-22.00	10.33	6.89	10.94	9.95
Quart	20.13	17.57	15.14	17.67	16.24	18.23	20.38	8.00-36.00	18.27	6.09	18.41	16.58
5# Glass/Plastic	30.05	26.25	40.25	27.00	23.91	26.67	30.05	14.48-48.00	28.87	5.77	29.02	26.61
1# Cream	10.44	8.65	7.00	9.27	10.31	8.50	9.67	6.00-16.00	9.89	9.89	10.06	8.71
1# Cut Comb	12.94	9.95	10.49	13.50	15.50	10.50	14.00	6.00-22.00	11.87	11.87	11.29	10.64
Ross Round	9.70	6.87	9.70	10.00	9.70	11.25	12.49	6.00-13.00	9.90	13.19	9.83	8.75
Wholesale Wax (Lt)	6.99	5.23	4.46	7.17	5.50	4.50	7.40	3.00-12.00	6.48	-	6.52	6.58
Wholesale Wax (Dk)	5.64	4.80	3.68	5.25	5.64	2.75	7.00	2.00-10.00	5.28	-	5.39	5.62
Pollination Fee/Col.	91.42	73.60	70.00	70.00	91.42	92.00	86.67	30.00-160.00	87.85	-	94.48	87.50



# Coming Up



Welcome to NEXT MONTH, where our Honey Reporters share a line or two about what they will be doing NEXT month with their bees. Advice is given for each region so you can see what others are doing where you are, and, of course in all the rest of the regions. Check these out. These reporters are successful in business.

## Region One

- Super early
- Keep yards mowed
- CR for swarm cells-“redistribute” if necessary
- Keep tabs on new Nucs
- Keep up on food supplies
- Medicate
- Electric fencing
- Keep the hive strong but pull frame now and then
- Pest inspections
- Continue to monitor for varroa mites
- Add honey supers to ensure bees have room to store excess honey coming in
- Make splits off the larger hives
- Vaporize with oxalic acid
- Check mite load
- Remove cozies for spring build up
- Raise queen
- Split hives
- Alcohol wash

## Region Two

- Monitor and treat for varroa mites
- Continue swarm prevention
- Check queens
- Super
- Make my hives have a laying queen
- Check at least once a week to see if honey supers need to be added
- Monitor queen laying pattern
- Check to see the honey flow was
- Monitor hive space and honey storage and keep adding honey supers
- Ensure queen right
- Make splits
- Checking for insects

## Region Three

- Control mites
- Trap SHB/ treat for *Varroa*
- Treat with mineral oil/ fogging process
- Make splits to reduce swarms
- Maintain large healthy hives to keep wax moths
- Re-queen
- Check mite count
- Inspect
- Watch for mites and hive beetles
- Keep plenty honey supers on
- Continue to reduce swarming
- Treat for mites
- Check beetle traps
- Give more space
- Monitor pests and disease levels

## Region Four

- Manage swarming
- Supper with drawn foundation
- Find suitable apiary locations
- Check colonies for swarming
- Split
- Re-queen as needed
- Inspect and treat for mites as necessary
- Equalize colonies if need be
- Move out of blueberries, feed pollen
- Add supers for honey flow
- Make sure they have plenty of room for surplus honey
- Merge two weak hives to make one strong hive

## Region Five

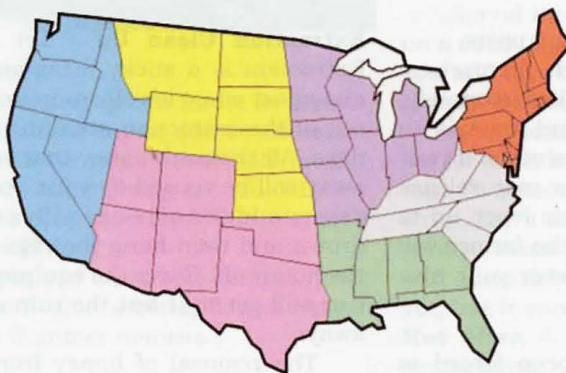
- Replace queens with new ones
- Treat for mites
- Mite check
- Feed if necessary
- Add honey supers if needed
- Check brood population
- Cut drone comb
- Small hive beetle traps

## Region Six

- Check for mites
- Treat after honey harvest
- Keeps mites down
- Keep bees fed
- Watch for swarms
- Don't let too many supers get stacked too high. I had a laying worker on the 4th super. Keeping an eye on full supers and removing them when full.
- Splits- be sure they have queen
- Get supers on early
- Feed if dry
- Check for *Varroa*

## Region Seven

- Splits
- Mite check
- Super for honey flow
- Spot check mite loads
- Feed
- Medicate
- Put them in a location with ample food available



## Honey Reporters Wanted

We are expanding our Honey Reporter population and need new reporters in EVERY region. We ask that you fill in most of the whole-sale or retail or both sections, most months, and our short survey on the back. We give you a FREE subscription for your service. So if you are interested send an email to [Amanda@BeeCulture.com](mailto:Amanda@BeeCulture.com) and put REPORTER in the subject line. Include name, email, phone number and mailing address and we'll get you the next Honey Report form. Sign up today and be a part of the BEST Monthly Honey Price and Bee-keeping Management Report in the industry.







# WHAT YOUR MENTOR FORGOT TO TELL YOU

Ed Simon

The conventional wisdom about beekeeping is that there are no pat answers. Whatever works for you is the right way for you to do something. Of course, most beekeepers are never satisfied and are sure there is always a better way of accomplishing a task or solving a problem. Consequently, if you ask five beekeepers the best way to accomplish something you get seven or more answers. None are wrong they just different, they are what works for that beekeeper at that time. Here is a collection of hints that may help you in your beekeeping endeavor.

## **Air Conditioning** – Hot Hives

On a hot day or when the nectar needs to be dehydrated, bees will form at the entrance to the hive and force air through the hive to cool the insides.

Note: All the bees are facing one direction.

There is an observed phenomenon of the bees lining up at the entrance to a hive and rocking backing and forth. It looks like a bunch of washer-women scrubbing



the floor. As of this publication date, I know of no explanation for this behavior.

**Ants** – They will find an easy meal.

**C i n n a m o n** sprinkled around the feeder rim and on the inner cover

takes care of the ant problem. (Most of the time)

## **Attaching Wild Comb** – Attaching to a frame

After you have collected a wild colony and need to attach the wild comb to a frame, be sure to keep the top at the top. Comb cells have a definite slope to them. The outer edge of the cell is higher than the bottom of the cell. When you attach comb to your frame be sure you keep the top at the top. This is about an eleven-degree slope. Rubber bands work great for attaching comb to an empty frame.

## **Cows/Horses** – Hives make good scratching posts.

Cows are curious and like to scratch themselves. A beehive is just about the right height. Unfortunately, they are not very stable when a 1200-pound cow has an itchy butt. Horses like to scratch more than cows. If your hives are in a pasture or where a farmer may release cattle into the area, then string an electric fence up to keep them away from the hives. Usually the farmer will let you tap into their electric fence to power your hive fence.

## **Crystallized Honey** – Mix it up

Creamed honey is honey that has been forced to crystallize in a controlled state. When starting a new

batch, incorporating it into the liquid honey can be a tiring process. Instead of mixing a couple of pounds of starter culture into 40 or 50 pounds of honey, start by mixing it into a small amount

of honey (4 to 5 lbs.) until it's thoroughly mixed with no lumps. Then add the small amount to the larger amount.

## **Entrance Reducer** – Openings up.

When installing a wooden entrance reducer, make sure the opening is up. That way the entrance will be least likely to get clogged with dead bees and debris. This is very important when closing the hives up for the Winter.

**Extraction Clean Up** – Let the bees do the work.

## **Entrance Reducer** – They never fit correctly.

When building a wooden entrance reducer, make sure the entrance reducer is smaller than the smallest opening you have on a bottom board. Then use a wad of newspaper on one end to work as a spring and force a tight fit of the reducer.



## **Extraction Clean Up** – Let the bees do the work.

Extraction is a sticky mess and your helpers seem to disappear when it's clean up time. Move your equipment out of the extraction area and let it set for a couple of days. All the junk honey that you would normally wash away will be reused by your bees. Wipe up the thicker/deeper puddles of honey with a wet rag so the bees won't drown and then hang the rags up for the bees to clean the honey off. Cover the equipment so if it rains the bees can still get to it but the rain can't wash all the honey away.

The removal of honey from capping wax is easily accomplished by spreading the wax out on a cookie





sheet (I use commercial cookie sheets) and letting the bees reclaim the honey. It's best to take them in at night as the raccoon also like the honey. As a side note, a five-gallon bucket of moderately packed capping wax will yield about five pounds of cleaned wax.



**Feeder Jar Holes** – If they are too large, they'll leak syrup.

When punching holes in a jar lid to make a jar feeder, use a brad gun with an 18-gauge brad. The 18-gauge brad is a nice convenient size for a feeder hole. The brad gun allows for making quick and non-finger smashing holes. Place the jar lid on a soft surface like a piece of polystyrene foam, so the brads won't nail the lid to the workbench.



Removal of the brads is then quite easy. If the holes are too big then use a nail and hammer and put the lid on something solid so just the tip of the nail penetrates the lid.

**Festoons** – Yep, there is a name for it.

When the bees develop a chain where one bee hangs from another bee is called a festoon. This often occurs when the heat inside the hive is too high and the workers go outside to cool off.



**Frame Feeder**

– Bees will drown or get stuck in honey.

When using the one- or two-gallon frame feeders or division feeders that sit inside a super, add straw before filling the feeder. The straw provides a foot hold for the bees. It will allow them to escape if they get stuck in the syrup. The straw needs to come to the top of the syrup.

**Hive Air Flow** – A stick will do it.

Placing a stick or a piece of wood between the inner cover and the top cover will allow a better flow of hot air from the hive during the Summer months.

**Hive Placement** – Do not place your hives in straight

rows.

If hives are placed in a row, the end hives will eventually have more bees. If you have your hives in a row, your bees will tend to drift to the hives at the ends. Place your hives at irregular distances and at angles to one another. This past year I was standing by the end hive in a row. Within 30 seconds there were bees returning to me - not to the hive.

**Hive Placement** – Not in a damp valley.

Hives should not be placed in an area where there is a lot of fog or the possibility of a creek overflowing. A friend looked out his kitchen window one morning and saw the bottom brood box of one of his hives under water. Not a good thing to see first thing in the morning. It makes for the start of a bad day.

**Honey Storage** – Five-gallon pails.

Five-gallon pails are a very easy to use and a great way to store honey. If you fill them full, they weigh about sixty pounds. Before placing the lid on make sure the rubber gasket is in place. Then put a piece of food storage plastic (Saran Wrap) over the top before sealing the pail. This will keep the honey off the top of the pail when you move it. It is also easier to scrape clean than the lid of the pail. Sixty pounds is a lot of weight for the more mature (politically correct) person. Each pound of honey weighs about 12 pounds. Reducing the volume to four gallons can make lifting the pails a lot easier.

As was noted at a bee club meeting, when selecting pails for honey storage do not and I repeat do NOT, NOT use pails that were used to store dill pickles or hot peppers.

**Hive Stand** – Keep your stands low.

Be careful when placing your hive stands. Think about the following items.

The higher your hives, the higher your supers are when you want to remove them. When full they weigh about fifty pounds each. You do not want to climb a ladder to retrieve a super.

**Hive Stand** – Make sure your hive stands have a solid base.

Spend the extra time to insure your hive stands are on a solid/level base. You don't want them to tip over as you add hive bodies and supers.

**Honey Wax Removal** – Wax floats on honey.

After extracting is finished and your new honey has sat for a while, the wax and other debris will float to the top. To remove this scum, use a piece of plastic food wrap. Lay it on the surface of the honey and pat it down gently. When you carefully remove it, much of the wax and other debris will come off with it. I haven't tried this yet, but it sure sounds promising.

**Hot Hive** – This is not, and I repeat not swarm preparation.

On a hot day the bees will congregate on the front





of the hive. They are not getting ready to swarm. It is hot inside, so they decided to cool themselves off and reduce the heat being produced inside the hive. It's like you sitting on the front porch in a cool breeze.

**Inner Covers** – The thick and thin of it.

Some inner covers have a thick rim side and a thin rim side. The thick rim side faces the bees during the Winter.

This allows the bees to navigate above the frames. The thin rim side faces the bees during the Summer. In theory, the thin side is small enough so the bees won't build comb between the frames and the inner cover.

**Inner Covers** – Why use them?

Inner covers allow the telescoping cover to remain loose. The construction of the telescoping cover with dropped down sides would be very difficult to remove if it was glued down with propolis or comb. By using the inner cover, you can remove the top cover with ease and use a hive tool to un-stick the inner cover.

**Installing Bee Packages** – They will miss the hive.

Even though you wet down the bees before shaking your new package into the hive, they seem to miss where you want them to go and spill out over the sides of the hive. To eliminate some of this, use an empty hive body and place it on top of the target hive. Then keep the shipping box inside the top hive body while shaking the



bees into the bottom box. This will help channel the bees into the lower hive box. You can then use your brush to force the bees clinging to the top box down to

the hive.

**Marking Queens** – They will fly away.

Bees tend to move up and to the light. When marking a queen, use this trait. First convince your spouse that queens don't sting. Then hint that the bathroom is an excellent work area. Next ensure her/him that if she escapes you can find her before their next shower.

Close the bathroom door, remove the curtains from the window and turn off all the lights. Then use the window sill as a workstation for the queen marking. From then on everything is fine

Note: Unless you are concerned about the date/year of the queen, then yellow or white are easy colors to find. Red or green on a brown background is very difficult for a person that is red/green color blind to see.

Note: Be sure to allow the marking to dry before releasing the queen.

**Measurements** –

Keep them handy.

Keep a "Story Board" in your work room with all the measurements you need to build your equipment. Here is the one I have for super measurements. It hangs directly above my saw.



**Mouse Excluder** – Keep them out.

When you winterize your hives and you are unable to find any 1/4 inch hardware cloth to use as a mouse excluder. Cut up plastic queen excluder. Unfortunately, it will also stop drones from leaving the hive. So, when the workers drive the drones out, they will be unable to exit the hive.

**Mowing Grass** – The bees really get upset.

It only takes one time of mowing the grass in front of the hives to convince you to not do that again. Unfortunately, your spouse (notice the gender non-specific reference) requires the grass to be mowed.



Old shingles to the rescue - Placing an old but serviceable tar paper shingle in front of the hive will at least keep you from bumping the hive when mowing. A normal shingle will normally suffice. If more depth is needed, then really go overboard and use a second shingle. You will still have to mow the grass, but you won't have to get as close to the hives and possibly bump them with the mower.

A package of unmatched shingles is cheap at the local building supply store.

**Nosema** – Bees can't wait to go.

In the Spring and you found a hive that has a severe case of Nosema, clean it out the best you can, and it should be safe to use it. Then when you put bees in it,



treat the syrup with Honey B Healthy. Hopefully that will stop it from recurring while the bees clean up the rest.

Note: If the comb is over four or five years old then it is best to replace it.

**Paper Towels** – Indispensable

Cheap bulk paper towels that can be tossed away can save you an unbelievable amount of time compared to cleaning out cloth rags.

**Painting** – Extend the life of your woodenware

When painting a group of woodenware, use a paint roller to apply the paint. Then smooth it out and work



it in with a brush. The time saved in not dipping the brush can be significant.

#### **Painting** – Cheap rollers

Watch for sales on the cheap rollers. Buy the cheapest you can get and keep them handy for when you need them. It's easier to toss them in the trash than it is to clean them. A little fuzz on the hive does not stop the bees from using it.

#### **Painting** – Clean the roller pans



To eliminate some labor and mess when cleaning the paint roller pans, put the pan inside a plastic bag. Tape it on so it won't work it's was loose. When you are done painting, return the excess paint to the pail and throw the plastic bag away.

#### **Painting** – Cheap paint

Extra unused paint is usually available from your recycling center. Five-gallon pails of mixed colors can be had for the taking.

#### **Painting** – Multiple coats of paint

After using a roller to apply the first coat of paint to the wooden ware, wrap the roller in a plastic bread bag. This will keep the paint on the roller from drying out and allow you to use the roller for the second coat. You don't even have to clean the roller.

#### **Pails** – Sticking together

Pails made by different manufactures can have a slightly



different diameter. When a pail with a larger diameter is nested inside a pail with a smaller diameter, they can be extremely difficult to separate. Nesting clean pails from the same manufacturer usually causes no problem.

#### **Pasture Gates** – They are there for a purpose.

If you have your hives on a farmer's property, pay attention to the gate positions when going to the hives. If there are animals in the field, be sure to close the gates. If not, then make sure the gate is in the same position when you leave as it was when you got there. A loose animal will lose you your apiary privileges with that farmer (and all his friends).

#### **Removing Supers** – Less sticky supers

The burr and cross comb you didn't cleanup has come back to haunt you. Even if you did keep things orderly the bees have a way of getting ahead of you. Besides it being a mess you lose honey. To help eliminate this problem, try this procedure.

The day before you remove the supers for extraction swap and reverse the supers on each hive.

Remove each super. Place then in order with all the fronts facing the same direction.

Reinstall the supers starting with the first removed. At the same time make sure the front of the next super is now above the back of the previous super. This placement maximizes the possibility that torn comb and runny honey will not be replaced back in the original position.

The bees will clean up all the loose honey by the next day and the removal should be a lot less sticky.

#### **Rocks** – Hive cover rocks

Even a telescoping cover can be blown off the hive with a gust of wind. The extra weight helps keep the cover in place.

#### **Rock's Position** – Positioning of hive cover weights

The position and attitude of the weight can provide information you need to remember. Before starting inspection of the ten or twenty hives in your yard, place the brick or rock in a certain position on each of the hives. Then after the inspection is complete for that hive, place the

weight in a different position. Maybe center of the top for a completed good inspection and the rear center of the top for a hive that needs food. This provides an instant view to the status of each hive.

#### **Swarms** – It will happen – be prepared



Be ready. Have an extra brood box or a nuc available to store the swarm. A cardboard box will do in a pinch. If you can, it also helps to have a prepared site to set the swarm. It doesn't hurt to have an extra stand leveled and ready to go.

#### **Skunks** – They will find a good meal.

Carpet tack strips nailed to the bottom board will stop most skunks. Face the sharp tacks toward the opening. After trapping and killing three skunks this year I finally gave up and installed the carpet tack strips. We still have a lot of skunks, but they don't bother the bees and after eliminating a skunk, I don't have to strip in the garage before my wife will let me in the house.



#### **Smoker Ash Disposal** – Don't start a fire.

Your smoker of ash residue could still be hot. Dump it into a metal bucket. Any still burning fuel can smolder safely without burning your barn down or catching your neighbor's hay on fire. To extinguish the smoker and save some of the fuel, use a cork to smother the fire.

#### **Smoker Cleaning** – Your lid never goes on easily due to soot and



creosote buildup.

Remove the bottom grate and clean. Don't forget the holes in the bottom grate. Burn it out - Use a MAP or propane torch to start the residual creosote on fire. Then use a scraper or screwdriver to chip the rest away and use a wire brush to loosen the soot. After cleaning the big chunks out of the smoker, use a 3" it 4" wire brush on an electric drill to remove the remaining soot and creosote. You'll probably never get it completely clean but, at least you can put the top on easier.

**Smoker - Extinguishing**

Save fuel by smothering the fire when you are finished. Put a cork in it is one way. Another way is it lay the smoker on its side. The air flow will then be above the fuel and not through the fuel. Make sure where ever you place the smoker is not combustible. Laying the smoker on its side was described to me by the U of MN. bee squad member during a queen rearing class.

**Smoker Fuel -** If it burns then you can probably use it as fuel.

Everyone has their own favorite fuel. One year I use dried cow manure mixed with landscaping shredded wood and pine needles. The hard part is collecting the manure. You need to be fast with the smoker when the cow decides to void itself. A second method is to invade a pasture with a wagon and a shovel and get the not so fresh manure. After drying it out on the patio and chopping it into small pieces, store it in the ever present five-gallon buckets. Other forms of fuel are: Jeans, Pine cones, Pine needles, Rags, Sawdust, Wood chips, landscaping shredded wood and bark and anything else that burns. Try for something that is cheap and easy.

**Smoker - Easy start.**

An easy way of starting your smoker are by using a propane or map torch. If you are having trouble starting the smoker, give the fuel a squirt of hand sanitizer. Most sanitizers are about 66% alcohol and catch fire very easily.

Warning: Do NOT use gasoline.

Smoker - Keep it lit

After your smoker is lit, add a much fuel as possible. It always needs to last longer than you planned. Some small action that was only to take fifteen minutes ended up taking a half hour.

**Temperature Requirements - Thermometers get sticky**

One of the most used tools I have in my toolbox as an infrared thermometer with a laser. It will allow you to take the temperature of honey, wax or anything else without having to clean it afterwards. To take a temperature, you just aim it and pull the trigger. Three seconds later the temperature is displayed on a screen. No mess no fuss.

**Veil - Make sure it is secure**

Missing closure of some Velcro on your bee veil can cause problems. Take your time and make sure you are "BUTTONED UP". All it takes is the smallest hole for the bees to find and the next thing you know is that the buzzing in your left ear is louder that it should be. This also occurs at the most inconvenient time possible.

PS: This also goes for the zipper on the front of your pants!

**Wax Cleanup 1 -** Wax is almost impossible to remove completely. Use a paper towel and place it between the iron and your clothes with wax on it. Press the cloth through the paper towel. The towel will absorb the wax when it has melted. It may take a couple of passes to remove most of the wax.

**Wax Cleanup 2 -** A 300 - 500-degree Celsius (centigrade) heat gun and cheap paper towels will clean up the sticky wax. First remove as much wax as you can with a scraper. Then warm the wax a little bit with the heat gun. Use the scraper to remove more wax once it is loosened. As a final pass melt all the remaining wax with the heat gun and wipe it with a clean paper towel.

Heat guns are available at all hardware and lumber supply stores. A hair dryer will do in a pinch. But must hair dryers don't get hot enough to heat the underlying metal or wood for an easy wax removal. They are also not built for continuous use. Spouses tend to get upset when you ruin their hair dryer.

**Wax Molds - How to form wax cakes.**



Cheap and readably available wax molds are:

1 oz. - Mini cupcake mold (look in the Salvation Army Store)

1.5 oz. - ¼ cup - Cupcake baking pans (look in the Salvation Army Store)

8 oz. - 1 cup - Butter containers.

20 oz. - 2 cup - Small baking bread or meat loaf pans (look in the Salvation Army Store)

52 oz. - 6 cup - Larger bread or meat loaf pans (look in the Salvation Army Store)

Be sure to use a releasing agent when forming wax cakes. After they cool you can usually pop them out.

**Wax Moths - How to stop them.**



Wax moths don't seem to bother supers that are stored where it is freezing. I have kept my "DRY" and some "WET" supers in a barn with no problem. Of course, it gets to 20 degrees below zero here in Minnesota.

**Weight of Honey -** A quick easy way to estimate the weight of honey.

Honey weight about 1.5 times the volume of the water.

A gallon of water weighs about eight pounds. A gallon of honey weighs about twelve pounds.

Another conversion that is convenient is that honey weighs about 1.5 times the volume of water. A good example of this is the standard honey bear. It holds eight ounces of honey or water by volume. But it is considered a twelve-ounce honey bear (by weight).

**Weight of Boxes -** A generalized weight for standard bee equipment.

55-60 lbs	Fully filled 9 frame Medium Super
12-18 lbs.	Wet 9 frame super (After extraction)
90-100 lbs.	Large 10 frame brood box



## THINK

The following more thought full items were supplied to me by Kim Flottum editor of Bee Culture. These are not the little "HOW TO" operational items but some of the basic items that you need to further study and be aware of.

### Internet – Be careful

Both Kim Flottum and Larry Connor warned me about this. Larry said that there is a lot of snake oil being sold out there. Kim said that "unless the information is from a University or well-known beekeeping business be careful". At times the Internet is a fantastic source of information. Other times it can easily lead you astray. Question both the provider and the contents of the information.

### Know – What the bees are doing

Right now – TODAY – what should the bees be doing and why. Knowing what to expect and identifying the unexpected can help. What doesn't seem right can lead to the further investigation of a situation. Hopefully before it turns into a disaster.

### Plan – Have a plan

Think about what you are going to do. Some actions are rote, and some are **NOT**. When contemplating non-normal actions, think about them first and evaluate how you are going to perform them. Also give thought to the possible outcomes. There may be consequences to your actions that are not exactly what you intended.


### Prepare – Be prepared – not just a Boy Scout motto.

An extra empty nuc or hive comes in handy when a swarm just shows up. Have extra smoker fuel available. Your smoker will always die just when you need it. Keep your bee jacket in the trunk. You never know when a friend will need help. What about your EpiPen? ETC., ETC., ETC.

### Record – Keep records

When you have one or two hives, you can remember the status of them. When you expand to more hives, there are more things to remember and maybe in the future act upon. A trend in your operation may not be obvious until you look back and see what has been changing over the last series of inspections or observations.

Being reminded to check for a queen or larvae in hive #13 could mean that the hive has gone queen-less and needs help.

Get a copy of Ed Simon's book *Bee Equipment Essentials* with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from [www.wicwas.com](http://www.wicwas.com). 



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# THERE IS MORE TO LEARN

Ann Harman

Learning about honey bees and beekeeping is never-ending, but is thoroughly enjoyable. It has been said that more books have been written about honey bees than anything else. Establishing and using your own bee-library is worthwhile, as is watching your own bees at work. However, there is another way to expand your understanding of these fascinating insects—attending meetings.

No matter where you live in the United States there are beekeepers somewhere nearby. Beekeeping classes are offered, whether in a meeting room or online. But when the classes are over, you may have found there is more to learn. Is that a small swarm on my fencepost in late August? Do bees do that? When do I start looking for Spring flowers in my area? What is the news about pesticides?

Meetings and conferences on honey bees are held throughout the year: local club meetings, state meetings, regional conferences and national conferences! There is also an international conference held every two years, in a different country each time. The amount of information that can be obtained is mind-boggling. Let's take a look at these meetings and see how you can benefit from attending. That's a wonderful way to become a better beekeeper.

If you have not investigated local bee clubs in your area, now is the time to find out. Usually the state bee association has a website that lists the local clubs. If not, contact your Cooperative Extension Service agent or an officer of the state association. You may find one or more local clubs that are close. Some have newsletters, some do not. Some will send out meeting notices to members, frequently by email. Find out the day, time and place and attend a meeting. If more than one local club is close, attend their meetings.

Belonging to a local club and attending the meetings puts you

in contact with beekeepers in your area. Here you will find out when the swarm season is, the forage plants and their bloom time, problems and successes that the beekeepers are experiencing. Most of the time the meeting program features the local beekeepers. However occasionally a special speaker will be on the program. The members of a local club will range from newbees to old-timers. Do all these local beekeepers agree on hives, queens, management? No. They never have and never will. However their discussions will make you think about how to take care of your bees.

Local association meetings may feature one of their members who processes beeswax and makes beautiful candles, or one who makes lotions and lip balms. After seeing the demonstration you may wish to try. If not, now you know where to buy some. During Summer a local club may have a Field Day at a member's apiary. If the beekeeper makes nucs and raises queens you will learn how it is done. You may wish to use some of those local queens and bees. At a Summer picnic you may hear "swarm stories," each one funnier than the one before. Although you may not be able to attend every meeting or event, you will be enriching your knowledge about bees.

Some local clubs own extracting equipment for the members to use. This is an excellent resource for someone owning only a few hives and wishes to extract but does not have storage for large equipment. Local clubs usually have a list of members who retrieve swarms or remove bees from buildings. You can offer to help them and learn how to do those safely. You may then wish to add your name to the swarm list and expand your number of colonies.

Your local club probably announced the next meeting of your state beekeepers association. The state meetings can have a large attendance. States will hold one or two meetings a year. They may be one-day or two-day events. Check

on the website for information about place, times, and about the program. State meetings may be held in different areas of the state each time. In states with a large area moving the meetings around the state will reach beekeepers from the surrounding area. Venues may be local colleges or hotels with meeting rooms. The featured speakers are invited from universities and the USDA bee laboratories. Bee inspectors or the state apiarist may be on the program. Sometimes a banquet or dinner will have a speaker.

Some state meetings will use an afternoon to offer workshops on many practical topics. With a smaller audience, more time can be given to questions from the those attending. Honey shows are held at a number of state meetings. Depending on location, and weather, a few hives may be brought in for some workshops.

A highlight of state meetings is the trade show. Vendors, large and small, will have displays. You will be able to see new gadgets and ask questions about their use. Now you can decide whether it will be useful to you or not. This is a great opportunity to look at a selection of veils and hope to find one you like more than the one you have. Books about bees and beekeeping are always tempting. This is your chance to flip through ones to add to your bee library. New books appear all the time. You can find t-shirts, bee jewelry, beeswax and honey lotions, soaps, candles and electronic hive monitors. Sometimes bee equipment dealers will take pre-meeting orders to be delivered to you at the meeting. For large equipment, such as hive bodies, boxes of jars for honey, the money saved in shipping costs is quite worthwhile.

Dues for state associations are quite reasonable. Some may have a newsletter. So, join! Then attend your state meeting. You will be talking to beekeepers at break times and meal times. A state meeting is a great place for learning.

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The United States has three regional beekeeper associations: Eastern Apicultural Society (EAS), Heartland Apicultural Society (HAS) and Western Apicultural Society (WAS). Each has an annual conference held during the Summer months in the area covered by each. EAS members are principally from states east of the Mississippi River and the eastern provinces of Canada. The HAS territory includes those states west of the river to the mountains plus the Canadian provinces. WAS covers the western states, starting in Colorado and includes Alaska and Hawaii along with the western Canadian provinces. Although the majority of beekeepers attending will be from their particular region, you will encounter beekeepers from all over the U.S. plus Canada and even some from other countries.

Visit the three websites to learn the history of the society, the location of their next conference and view the program and speakers. You may have heard a few of the speakers before if you have attended your state meetings. The topics may be different or new research presented. These conferences will have programs for those new to beekeeping as well as ones on advanced topics. You can choose to attend workshops with demonstrations and open-hive work with hives brought to the venue by local beekeepers. Be prepared to take notes during the lectures. You can review them later when you return home and spend time with your own bees. Look on the conference schedules for any evening programs and a banquet with a speaker. A sight-seeing trip or visits to nearby beekeeping activities may be offered, depending on the conference location. Some beekeepers will combine attending a regional conference with a Summer vacation. No matter where you live you can be a member of one, two, or all three of the regional associations. In that way you can plan which one to attend.

Bee talk continues at break times and meal times. Since the beekeepers attending the conferences are from areas different than yours, you will find out what

problems they face and realize that many problems are common to all. Sharing information, successes and disasters, increases your beekeeping knowledge.

Because many beekeepers will be in attendance the vendor display is big, much larger with more vendors than at a state meeting. Fortunately the conferences are for several days so everyone can find time to wander through all the vendor area not just once, but multiple times. The vendors are always happy to answer



questions. Spending time in the vendor display is a part of becoming a better beekeeper even if you do not buy something. However since some vendors will have a conference special price on certain items, you just might want to bring a bit of extra money.

Not only local, state and regional associations exist, there are actually four national ones. Two of these are large and two are small with limited membership. However all four have yearly conferences, separately or combined. These conferences are given in early January and the locations will be different each year, moving around the U.S. The venues will be conference hotels with large meeting rooms.

The American Beekeeping Federation (ABF), founded in 1943, draws its membership from the entire country, as well as from Canada and other countries. Members will have from a few hives to tens of thousands. They may produce honey or can be large-scale pollinators. The American Honey Producers Association (AHPA) celebrated its 50th year in 2019. Although its members are primarily honey producers, large and small, some would be pollinators also.

One of the two small associations is the American Association of Professional Apiculturists (AAPA) whose membership is primarily scientists from universities and the bee laboratories. Their annual conference is in conjunction with one of the two large national ones. The other small association is the Apiary Inspectors of America (AIA) composed of inspectors and state apiarists. Their main conference is also held with one of the two large national ones. If a beekeeper attends one of the two large national association conferences that also has the AAPA or AIA meeting it is possible to attend all or parts of the smaller association lectures.

Attendance at the annual conferences of ABF and AHPA can be as large as 900. Speakers at the 4-day conference can be from the USDA laboratories and universities, from government, and from beekeepers.

Would a small, new-to-beekeeping beekeeper benefit from attending these big conferences? Definitely yes! Especially if the conference is in a city near you. The information presented in the lectures gives excellent information of the entire world of beekeeping—from new findings about diseases and mites and their treatments to pollination, to pesticide problems.

In addition the trade shows at both the ABF and AHPA conferences are huge! You may see some of the large commercial-size equipment for honey processing on display. Production-line automatic uncappers, extractors, bottling equipment, and perhaps forklifts on display outdoors. Yes, you will find books, clothing, gadgets, treatments also. Look through the conference programs and decide when you will pay visits to the trade show. Your beekeeping education has now widened to include the world of large-scale beekeeping. You are now a better beekeeper. You understand something about the entire world of beekeeping.

Remember, the bees know more than you do and probably always will. But don't let that stop you from learning their secrets by attending meetings, small and large.





# Pollinator Habitat

## Gone Solar



Rob Davis

Across Minnesota workers are preparing dozens of sites in order to seed more than 30 million native, pollinator-friendly plants. These low-growing and shade-tolerant flowers and prairie grasses will be established where you might least expect – under and around ground-mounted solar panels.

Nationwide prices are plummeting for rooftop and ground-mounted solar panels, and large sites are popping up wherever there is low-cost land and access to an electrical substation. And with 25-year land leases frequently paying \$700-\$1,500 per acre, farmers and other land owners are increasingly interested in having solar on a portion of their property.

Recipient of the MacArthur Foundation's "Genius" award, Dr. Marla Spivak of the University of Minnesota Bee Lab, sees a promising opportunity. "It would be great to have pollinator habitat under and around solar panels and arrays."

The timing couldn't be better for commercial bees and wild pollinators, which have suffered massive population losses in our lifetimes in part because of dwindling access to food and habitat. For wild insects and managed bees these sites will be multi-acre buffets of nutritious, native plant pollen and nectar.



Energy policies vary state by state, but between just a handful of states – Florida, Georgia, Minnesota, Maryland, New York, North Carolina, and Oregon – more than 30,000 acres of solar sites are being built this year, and more than 19,000 acres are in development to be built next year. All together, solar projects could provide a world of good for pollinators – and landscape business including Prairie Restorations, Ernst Conservation Seeds, Prairie Moon, and American Native Plants have noticed.

"Within every habitat in North America there is a large variety of pollinator friendly plant species that can be used under solar panels. The panels do create a challenge of some height limitations which will slightly restrict the overall diversity of the plantings, but we can still provide a wide range of forbs and grasses that will be a delight to the pollinators and songbirds native to that area," said Ron Bowen, founder and CEO of Prairie Restorations, Inc. "The seasonal spectrum that can be planted beneath a solar array, and the fact that once it's installed, herbicides and pesticides aren't typically used, makes acreage near solar fields excellent locations for raising healthy bee colonies."

### More Solar, More Privately Financed Pollinator Habitat

Beekeeper Oliver Collins has first-hand experience with colony collapse. "I probably own 20 percent of all the hives in the area – and lost around 65 percent of them this past Winter. There's a strong watermelon industry here, but between the mites and native plants getting mowed or sprayed, my bees can't keep up." A roughly 150-acre solar site that includes abundant foraging habitat for pollinators was recently proposed for a county in Eastern Maryland where Mr. Collins lives and keeps his bees. If approved by local and state authorities, the project will provide pollinator habitat equivalent to every household in a five-county area

having a 6'x12' pollinator garden. The solar project developer, OneEnergy Renewables, a socially conscious B-Corporation, is evaluating use of a pollinator-friendly seed mix for a number of its projects currently under development. "It's a great opportunity for the solar industry as a whole, and we're excited that our projects will provide so many benefits to the communities in which they're located," said Project Manager Gia Clark.

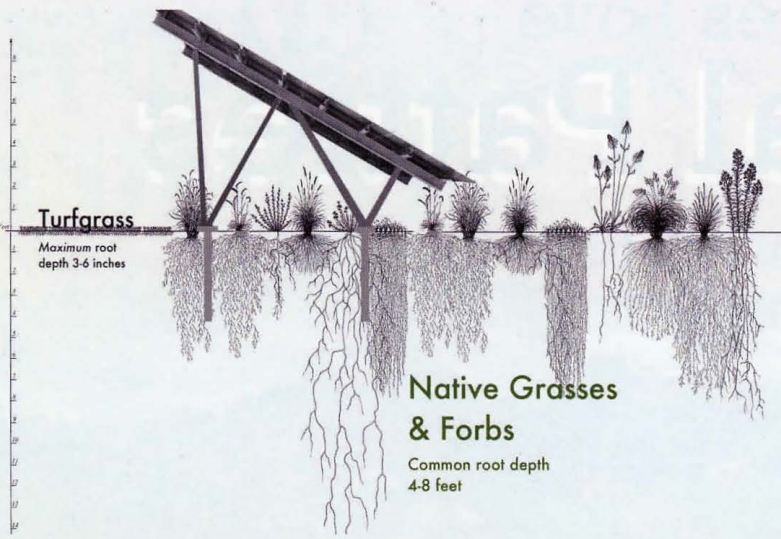
### Agriculture, Community Taking Leading Roles

"Pollinators are an irreplaceable public resource. Insect pollinators, such as bees, butterflies, wasps, flies, and beetles, are critical for the pollination and production of crops and the health of native flora and landscapes," wrote Dave Fredrickson, commissioner of the Minnesota Department of Agriculture, in an email announcing the State's pollinator summit this year.

In fact, one of the Midwest's largest solar projects is leading the way. The Aurora solar project, being built in Minnesota by Enel Green Power North America (EGP-NA), will provide pollinator habitat equivalent to more than 500,000 homes having 6' x 12' pollinator gardens. EGP-NA worked hand in hand with the Minnesota Department of Natural Resources to create a robust solar site vegetation plan that creates a biodiverse habitat for pollinator species while preserving the soil for future farming, and channeling storm-water down into the aquifer.

Noting this collaborative process, during the 2016 legislative session, Minnesota's agricultural leaders worked closely with conservation, energy policy, and



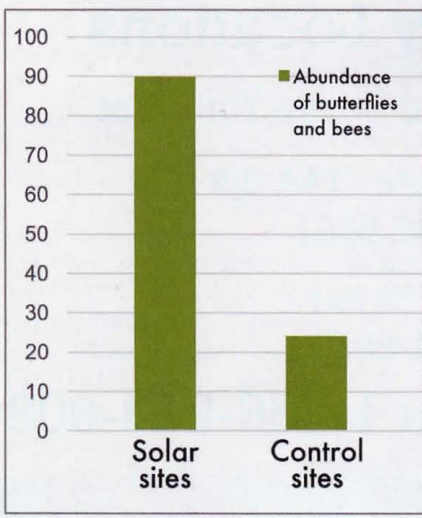


business leaders to establish the nation's first standard for pollinator-friendly solar sites. Authored by Representative Rod Hamilton (R–Mountain Lake) and Senator Dan Sparks (DFL–Austin), the bill establishes robust and flexible vegetation management requirements for any solar project that is promoted as providing benefits to pollinators, songbirds, or game birds. The bill received broad rural, suburban, and metro support, passing the Minnesota House by a vote of 126-0 and the Minnesota Senate by a vote of 62-2. Governor Dayton signed the bill in to law on May 31.

Construction of the Aurora project and many others are underway and it will take time for the native plants to get established and bloom. Over the next several years,

just about every state will build several thousand acres of solar sites that—based on collaboration with each community—may meet or exceed this new “pollinator-friendly solar” standard.

As you drive by these sites, don't just see them for the clean, fuel-free electricity they generate every day, but also notice the benefits provided by the vegetation under and around the panels. The United States has more than 280 million acres of row-crops and just a tiny fraction will be used for solar sites, but these sites can provide a badly needed, and long-lasting, service in providing healthy food to the hardworking commercial and native bees that pollinate our crops.



Rob Davis is a director at Fresh Energy, an independent 501(c)3 energy nonprofit in St. Paul, Minnesota. Follow him @robdfargo and [www.Fresh-Energy.org/author/rob](http://www.Fresh-Energy.org/author/rob).



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# WORKING A COLONY

David E. MacFawn

Based on their knowledge of the bee year in their area, the beekeeper should be thinking at least three to six months in advance when looking at the conditions of their colonies. Consideration should be made for seasonal changes, climate, and weekly weather when planning beekeeping activities. These, and other factors, will affect ordering and installing queens, packages and nucleus colonies (NUCs), feeding syrup and pollen substitute, as well as many more beekeeping activities. The beekeeper needs to understand where, and what condition they want their colonies and when. This takes experience as well as learning from others. Also, before entering a hive, determine why you want to go into the hive and have a reason and a plan for what you are going to assess and accomplish.



Figure 1 Five Frame NUC

After a while you will find using gloves is cumbersome. However, there are times you will want to use gloves. Wearing gloves may make sense during cooler weather when the bees are very defensive, such as the Autumn, Winter, and early Spring when the temperature is in the 50s° F or cooler. You want to work colonies when it is 60° F or warmer, a temperature greater than they visibly cluster (57°F). Other times you may want to use gloves are when rushing through hives, during wet weather, early morning, late evening, or anytime when forager bees are in high numbers within the hive. You may want to try using gloves with the fingers cut out initially to get use to not wearing gloves. Two layers of nitrile gloves also works well.

Move slowly when working colonies so the bees do not become defensive. Don't wear strong perfumes, or scented deodorant. When you do get stung scrape across the stinger from the top to minimize injecting more venom into the skin; do not squeeze and pull the stinger from the skin. Then smoke the area to mask the alarm pheromone. During the nectar flow, bees are easy to work. During dearth or Winter, the bees are more defensive.

Prior to going into a hive, assess the entrance activity considering the time of year. This includes noting:

- Number and activity of bees. More bees in the Spring

and Summer; fewer bees in the autumn and Winter.

- Dead or diseased bees, larvae, pupa and pests
  - Chalk brood: Hardened whitish to gray mummies
  - Poisoning / Chronic Bee Paralysis Virus: A lot of oily looking dead bees in front of the hive.
  - AFB: Perforated sunken concave cell cappings, in an advanced stage one can smell the AFB, you need to make sure the smell is not Goldenrod nectar in the Autumn, the pupa ropes out about one inch. Bees die in pupa stage and are hauled out of the hive.
  - EFB: Bee typically dies in the larvae stage prior to capping. Grey / brown larvae are removed from the comb and hive. Twisted, caramel color, melted look, stress disease.
  - Robbing: robber bees weaving in front of hive and on sides; not going directly into entrance. Are guard bees inspecting arriving foragers; not fighting on the landing board.
- Pollen coming in on the bee's hind legs. This pollen may be various colors depending on the source.
- Behavior on landing board. Fighting between hive guard bees and robber bees occurs when active robbing is going on. When passive robbing is occurring, robber bees may be able to access a weak colony's entrance without robbing. Flight behavior. Robber bees fly nervously to the sides of the hive looking for entrances. Robber bees also fly erratically around the front entrance and you can see fighting on the landing board. It should be noted that it is very rare for robbing to occur when a nectar flow is on. Robbing usually occurs during a dearth.

When smoking the bees, smoke the entrance, under inner cover or migratory cover, puff smoke lightly over frames, smoke the ends of frames so you can pick up / remove frames without squashing bees. Listen to the bees to determine when to smoke. Smoke lightly when bees are looking up at you from between the frames.



Figure 2: Smoking the Hive Entrance



Smoke the bees if they get loud or noisy. Smoking the entrance supports the theory that when bees detect smoke, they engorge themselves with honey in anticipation of possibly having to leave the hive. When engorged, it is more difficult for them to bend their abdomens to sting. Smoking the entrance also supports the theory that smoke interferes with the bees' sense of smell. One word of caution, be careful not to "bang" your smoker against the hive. It should be noted that over smoking can irritate the bees. Just one to two puffs from a well-lit smoker is all that is needed.

When using a standard hive tool, pry under the top bar where the frame is the strongest and thickest to loosen and remove a frame. Do not pry under the frame end which may break the end frame ear in some cases (avoid prying between the end of the frame and the inner hive frame rest rabbit). If you damage some of the comb prying, the bees will easily fix it. Certainly, if using the J-hook hive tool, you can get under the frame end, but sometimes you may break off the frame end. It takes careful work to loosen the outer most frames (frames 1 and 10 in a ten-frame hive). You should scrape the propolis off the top ends of the top bars and pry on the sides of the end bars between the side of the hive and the frame.



Figure 3 Prying and Removing Frames



Figure 4 Smoke, the bees are looking up at You. Drift a Little Smoke Over Super to Keep the Bees Calm

When working the colony, go around the Langstroth hive and not over the frames with your hands / arms. Bees get excited when you move hands over the frames—especially when moving quickly. An experienced beekeeper holds their hive tool in their hand as they sequentially remove and inspect frames.

Remove the second to outside inner frame (typically #2 or #9 in a ten-frame hive) since the outside frame may be propolized to inside of the woodenware. Move slowly without quick motions. Remove frames one at a time. Check the first frame removed for the queen. If the queen is not seen set the frame aside. Sequentially remove the remaining frames, looking at each frame and placing the frame looked at back into the hive. Keep all the frames, except the first one removed, in the hive. Keeping the frames in the hive will minimize the chance the queen gets lost on the ground. Additionally, it helps keep the frames in the correct order and orientation. When replacing frames, be careful you do not "roll" the queen and kill her. Move the frames in the hive apart with your hive tool to ensure there is plenty of room to insert or remove the frame without rolling bees or queen.

When taking frames out; look down between frames to determine initial assessment of:

- Capped brood; worker & drone brood
- Honey
- Pollen
- Number and concentration of bees; for the time of year.
- Consider what a normal brood nest looks like
  - Eggs, larvae, brood in center of nest
  - Pollen band
  - Honey and/or nectar in corners
  - Pollen band and honey may be in box above a deep bottom brood chamber in the Spring and Summer when the bees build up.
  - Often the brood nest will favor and be closer to the "sunny/warm" side of the hive in cold weather.

Keep the colony open for as short of time as possible. When bees get noisy and start "hitting your veil" you need to smoke. This indicates you probably have been in the hive too long.



Figure 5 Opening a Colony After Removing Top Cover



After opening the colony by removing the top cover, look into of the hole in the inner cover. In the late Winter, early Spring if there are a lot of bees in the hole, it may mean you need to feed (if colony is light, 1:1 syrup) and/or add another super if the nectar flow is on. In the autumn or Winter, if there are a lot of bees in the inner cover, you need to check to ensure the colony has enough food stores. If there is not enough honey, you need to feed (2:1 syrup). If the cluster is already at the top of the equipment stack it usually means the colony is out of honey.

Often swarm cells are on the frame bottoms of the feed chamber (super directly above the brood chamber). Examine the feed chamber bottom frames for swarm cells, especially during the nectar flow.



Figure 6 Smoking the Bees Upon Opening the Hive



Figure 9 Inspecting the Brood Chamber



Figure 7 Breaking Apart the Hive for Inspection



Figure 10 Removing and Inspecting Frames/ Comb

Sometimes when removing a super, frames from the super below get propolized/ "glued" to the super you are removing. If this happens, insert your hive tool under the super you are removing to break free the frames. Scrape the propolis off the frames in the below box so the frames will not get stuck again.



Figure 8 Looking for Queen Cells on the bottom of frames in the feed chamber




Figure 11 Inspecting the Brood Chamber; Smoking the Bees Off of the Frame Ends so You can Pick the Frames Up.





Figure 12 Inserting the Frames

The frames should be inserted in the same order and orientation that they came out of the hive. Also, hive bodies and supers should be reassembled in the same order they came apart.

When working a colony, you should have a reason and plan as to why you are going into the colony. The colony should be examined for: diseases and pests, honey, pollen, swarm or supercedure cells and general health. Frames should be removed by prying under the top bar, not the end tabs of the frame. Frames and hive bodies i.e. "boxes" should be reassembled in the same order and orientation they came apart. Gloves can be worn when the bees are very defensive such as during cold weather (less than about 60F). Listen and watch the bees; use a puff or two from your smoker to keep them calm. 

David MacFawn is a Master Craftsman beekeeper living in the Columbia, South Carolina area. He is author of two books, <https://outskirtspress.com/BeekeepingTipsandTechniquesfortheSoutheastUnitedStatesBeekeepingFinance> and <https://outskirtspress.com/gettingthebestfromyourbees>.

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Clarence H. Collison



# YEARS 2 & 3 HIVE TASKS



Ann Harman

- Harvest honey before July 15.
- Immediately after harvest, monitor *Varroa* level.
- If choosing a chemical treatment, read the label for important application instructions.
- Also monitor for small hive beetle. If populous, take action.
- In region of small hive beetles do not put wet honey supers above inner cover for bees to clean.
- Wet honey supers can be put well away from the beeyard for a few hours to let bees clean them.
- Keep beeyard grass and weeds mowed.
- Get honey supers ready for storage. If no brood ever in them, wax moth is not a problem.
- Honey supers that have had brood raised in them must be protected from wax moth.
- Place honey supers in a plastic bag and put into a freezer for a week to kill any wax moth eggs and small hive beetle. Leave sealed in plastic bag upon removal from freezer. Store in a place where mice cannot chew through the plastic bag.
- Make sure the bees' water supply does not dry up.
- Be a Weather Watcher and a Plant Watcher.
- If a dearth of bee forage plants, watch for robbing.
- If feeding a colony is necessary, feed all colonies inside the hive to prevent robbing.
- Keep hive inspections to as minimum to prevent robbing.
- Monitor queen performance during late Summer.
- If a colony is weak with no disease present it should be re-queened or combined with a strong colony. Kill the weak queen.
- In cold climates feed 2:1 sugar syrup in September for Winter stores.
- If feeding pollen patties monitor them for small hive beetle infestation.



# North Valley Swarm Collection

TJ Carr

In late August I was called to collect a swarm from a residence in Dietz Farm, a sleepy and semi-rural area of the Rio Grande valley that runs through Albuquerque, New Mexico. It was early on a Saturday morning when I arrived. As I entered the courtyard of the home, I became aware of a plethora of bees occupying a mature wisteria growing over the gate. Two elderly sisters owned the home and informed me the swarm was in the wisteria, which had been growing over and around the gate for more than forty years. Visitors, the ladies explained, had to navigate

element of the collection procedure and decided to leave the plant and bees as they were when I arrived.

A couple of days later one of the women called and told me she and her sister had changed their minds. She requested I return and collect the swarm, giving me the go-ahead to trim the wisteria as required to accomplish the task. I assured her that I shared her feelings about the plant and would remove only as much of the foliage as it took to access and remove the swarm.

I recruited Chase Bramer, a younger skilled beekeeper, to assist,

SWARM, SWARM  
EVERYWHERE A SWARM



It was a beautiful morning and a beautiful experience as we completed our trimming and cut the branch that hosted the colony. There were thousands upon thousands of bees in the still air, their collective humming and movements devoid of aggression as we transferred the swarm and its resources into a nuc. We placed the nuc on top of a waste bin near the gate and left an open topbar to afford access for the bees come eventide. The familiar smell of the queen would attract the fliers into the nuc, a process aided by the close proximity of the nuc to their previous home.

That evening, after nightfall, I retrieved the nuc and the next day transferred the resources to comb savers. Once the colony becomes settled in the nuc, it will be moved to a standard topbar hive as a permanent home.

Collecting this swarm, which was already beginning to mature into a permanent colony, was a great experience. The bees were easily one of the gentlest colonies I ever worked. The quiet North Valley setting, the wildness of the old wisteria, and the mild temperament of the bees – all of it combined to make the collection one of the most enjoyable I've experienced. The attached photos



*Swarm at first sight*



*Swarm after the bush was trimmed*

past these bees; a situation that at times created much apprehension.

My initial inspection revealed a large swarm attached to one of the wisteria branches. I estimated the mass of bees to weigh at least ten pounds. My visibility of the swarm was limited greatly by the dense growth and I explained to the sisters that I was prepared to collect the swarm then and there, but the process would require me to trim away a relatively large section of the wisteria. The women balked at this

and early the next morning we arrived at the residence to collect the swarm. We carefully trimmed only enough of the wisteria away to access the large clump of bees and, lo and behold, we discovered a mass of honeycomb beneath the large and living veneer of worker bees. My initial assessment of a ten pound swarm was corrected – I now estimated there were approximately five pounds of bees and five pounds of resources, i.e., honeycomb and honey.



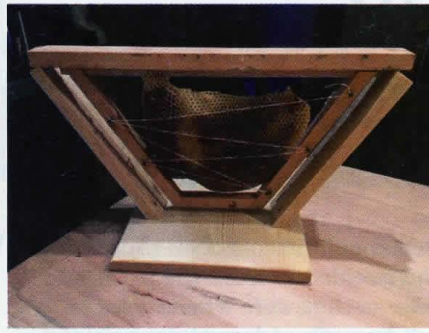
*Cluster after removal*







Cluster in the clear



Combsaver strings in front



Bees with pollen



further document our morning at the sisters' home. Note the abundance of pollen in the workers' collection baskets.

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"O Lord, how great are thy works and thy thoughts are very deep." – Psalm 92:5

# THE STORY OF A.I. ROOT

## *Beginning Bees*

### A.I. Root

raising the box, what a deserted appearance! Not a bee, not a particle of comb. They were all gone—effectively and surely beyond my reach.

In my ignorance of their habits, I had placed them before a west window, with the sash raised, exposing them to the full heat of the afternoon sun and after waiting two days they had probably concluded they could suit themselves better.

The bees were gone, but the interest they had awakened still remained, and I had learned a few facts about bees.

One morning, soon after, I told Mrs. Root that I had important business in Cleveland, 30 miles away. She supposed it was something connected with the jewelry business, but it was really to go to the book stores and hunt up whatever I could find on bees. In those days it took a whole day to go to Cleveland in a stage coach and another to get back. In the bookstores I found three good-sized books, Langstroth, Quinby and one by C.B. Miner. I selected Langstroth and then sat up pretty much all night at the hotel reading it.

#### Reads Langstroth on the Honey Bee

I cannot remember that I ever got hold of anything in my life that gave me such keen pleasure and enjoyment as did Langstroth's wonderful revelations of the mysteries of the beehive. Years before I had read Robinson Crusoe with much interest and enthusiasm, but now I found "truth stranger than fiction."

Very soon I collected all the agricultural papers that contained articles on beekeeping. My sister, who was clerking in the jewelry store, told my wife that it was really too bad, the way I "pumped" every old farmer in regard to what he knew about bees. She said, after they had given me all the information they possibly could, they looked so weary and troubled and evidently wanted to get away so badly that she really felt sorry for them.



Medina Public Square.

I have always been an enthusiastic admirer of old Dame Nature's mysterious ways and workings.

In August, 1865, a swarm of bees passed over us near our place of work. One of my employees, remembering that I had expressed a wish for a swarm of bees, jokingly asked what I would give for them as they were circling slowly along in mid-air. Thinking it impossible for him to get them in their position, I offered him a dollar for them securely boxed.

He shortly returned with them in an old saleratus box and asked me where I would have my property taken. After a hasty consultation, I decided upon what I then thought would be a splendid location for them, that is, an unoccupied third-story room of our manufactory.

In the evenings my instructor in the mysteries of beekeeping (the person who hived them) raised the box, an operation, by the way, which seemed to me almost equal to facing a lion in his den, and showed the busy multitude gathered into a compact cluster in the top, and he informed me that my swarm was not a large one, although the countless number seemed to me an immense multitude.

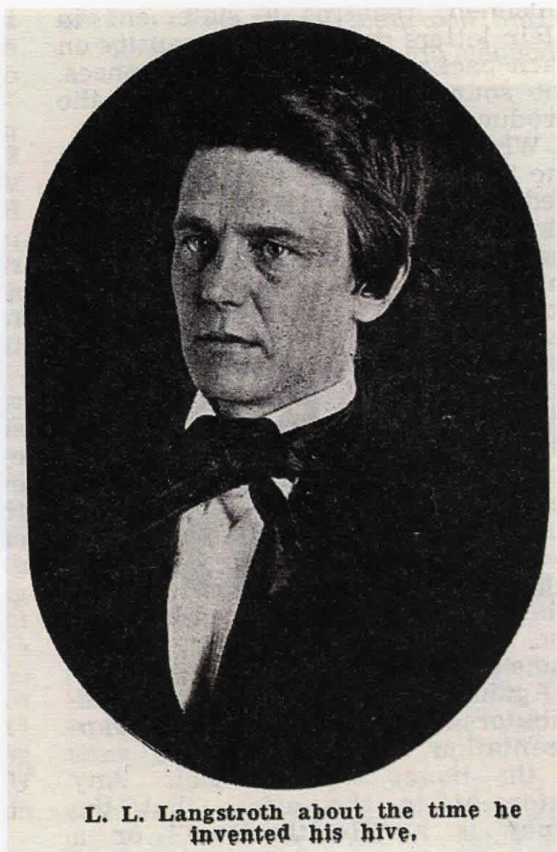
That evening other books and papers had to be laid aside in favor of anything pertaining to bees and bee culture. Our book stores contained nothing on the subject and I had to content myself with what I could learn from the agricultural papers.

The next day, as the bees seemed busily engaged, I supposed them all right. The third day they were still at work, that is, they were doing something. Later on in the day I went up to see how they were getting along, congratulating myself that there must be some pounds of honey by this time, and thinking that I should have to get my glass jars ready. But, where before had been the busy stir and bustle was now all still. On



A Saleratus box..





L. L. Langstroth about the time he invented his hive.



Brand new Langstroth hive.

### First Job of Transferring Bees

Mr. Langstroth's directions for transferring were rather brief for a beginner, but I had unbounded confidence in my skill with bees after having read so much on the subject, and so I intended to transfer them as soon as they had become used to their location. By afternoon, however, they seemed so much at home that I concluded that the thing might be managed almost without their knowing it. It is true, it was a hot day, and Mr. Langstroth had cautioned about handling honeycombs in hot weather, but I could not bear to think of my bees being any longer without the great conveniences (?) of movable-frame hives.

I had provided a bee-hat, a clumsy wire-cloth affair, so I commenced by blowing a little smoke into the hive. I then turned the hive bottom up, removed the sliding bottom-board and put on an empty box. I felt considerably elated at my success, as they seemed perfectly thunderstruck and of course docile. For a decoy hive to catch returning bees, I had used my new hive, as I supposed they would go right in and begin work. But it was so unlike their former home that they only flew around in dismay and refused even so much as to look inside.

The book was near by with a heavy chisel across it to hold it open, and it informed me that the next thing was to drive them into the box, which I did systematically. I removed the box and bees to a smooth board and shut them in tightly, so that they might not fly away as my first ones had done. I discovered later that bees must have ventilation.

The next thing, according to the book, was to pry off one side of the hive with a stout chisel. All right, but the hive was screwed together with heavy screws so badly rusted that I could not get them out, and as a last resort the combs had to be taken out at the bottom and at one side where there had been a pane of glass. As it was August, some of the combs did get a little bruised, so much in fact that I called to my wife for a large pan and poured the honey out of the hive into it, bees and all, as some of them remained in the hive. These were strained out and carried back to lick each other off, as the book said they would do, and I busied myself in tying combs into the frames.

I was thinking at the time that there seemed to be a great many bees about, but supposed it to be those that were out foraging. I felt quite relieved after getting the last piece of comb into the frames, and I put them safely in the hive where it had stood all the time.

The next thing was to put the bees in. On opening my box, the bees shut up there looked as bad as whose which had been

I soon got in touch with Mr. Langstroth, and in that way found out about the Italian bees. I learned that a bee journal had been started and that it had been kept going for three years, but had then been discontinued for lack of patronage. I scraped up an acquaintance with the editor, Samuel Wagner (one of God's noblemen), and by my enthusiasm induced him later to recommence the publication of the American Bee Journal, at Washington, D.C.

Of course, I soon had another swarm of bees, although it had seemed to me for a time as if I should never think as much of any others as I did of the first. About this time I was warned that the whole business was impossible. To take a hive of live bees apart and put them back was sheer madness. Everyone thought I had gone crazy. My new bees I brought home on a stick. A helper taking one end, we carried them by hand the whole mile, as it was hot weather. I placed them upstairs over a wood-house to be out of the way, as "The Ohio Farmer" recommended keeping them on the second floor. The next morning before daylight, I was watching for the first bee to sally forth.

Because of the new surroundings this first bee made a few tours of inspection about its new abode before leaving for the field. It was soon followed by another and then by two, three or half a dozen, until there was quite a scene of activity, all hovering about, with their heads turned toward the hive to mark its location.

After having been called to breakfast several times, I finally concluded that the bees would work just as well without being watched.

I had already manufactured a Langstroth frame hive and had taken pride in having it well made just as he had recommended in his book. I began to feel very anxious to see how much better the bees would work in the improved hive than in the one they were then occupying



strained out of the honey. I put some of them in front, but they would not crawl in (fly they could not). Finally I dumped the whole mass on top of the frames and poked them down through, but they only crawled out again, down into the dirt. A part of them that were better off would persist in clustering up by the window on the roof overhead, in short, anywhere except in that Langstroth hive.

Finally, by night, after much time and trouble, I had some of them in the hive, the robbers having licked them off and also having licked their hive out clean. These robbers were also on hand the next morning bright and early, but I closed the entrance nearly, and as there was not much in the hive I managed with great care to keep them off for two or three days. But I noticed the bees were continually crawling all over the hive and they seemed disconcerted, until one morning I discovered a cluster of them apparently almost dead, on the under side of a bench a few feet from the hive. These I placed on the alighting board and was very surprised and elated to see a strangely shaped, long, black bee stalk majestically from the midst of the cluster to the entrance and go in, and then there was rejoicing both by the bees and by myself as I knew that I had actually seen that famed personage whose existence was so much doubted by many, a queen bee.

After I found that my bees had their queen, my anxiety for them was relieved, and I had no doubt that under my careful management they would yet come out all right. To make sure, I fed them the honey I had strained them out of, thinking it would be better for them to take it back after they were strong again. Of course, the frames had to be taken out occasionally to see that they were all right and to get an occasional glimpse of that mysterious queen once more.



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# THE **3** "MUSTS" OF BEEKEEPING



Jim Berndt

The primary goal for any new beekeepers should be to keep their bees alive through the first couple of years. But the amount of information new beekeepers are being asked to assimilate from books, blogs, classes, and from other beekeepers can seem overwhelming; trying to take it all in can be like drinking from a firehose! It is important to take a step back and understand that many bits of information and advice are helpful and interesting, but only a few are really essential. I have tried to condense what I consider the bare essentials of responsible beekeeping down to three things which must be done to give your bees the best chance of surviving that first year or two.

## 1. Your Hive Must be Queen-Right

Your hive is entirely dependent on having a healthy, laying queen for its long-term survival. She is the mother of all the other bees in the hive and is responsible for all reproduction. As worker bees only live an average of 42 days, she must lay enough eggs to replace the entire hive population every six weeks just to keep the number of bees stable, more during the spring population build up.

If you cannot find the queen it may lead you to believe that the hive is queenless. However, queens can be difficult to spot, even for experienced beekeepers. I usually make at least two complete passes through all of the combs, and the walls, and the floor of the brood box before admitting that I cannot find the queen. Having your queen marked with a dot of paint makes this process much easier.

If I cannot find the queen, the next step is to look in the brood combs for eggs. If I see eggs in the bottom of cells I know that the queen

was there and laying within the last three days. That does not mean that she is still alive and well today, but it is a pretty good indication that all is well. If I cannot find the queen but see eggs I will close the hive up and come back in three days or more. Upon returning I will look to see if I can see any more eggs. If I find eggs on my return visit I can be reasonably sure that there is a laying queen in the hive.

Having a "queen-right" hive is more than just having a live queen in the hive. It also means that the queen is laying adequately and that her eggs are hatching into healthy larvae. A virgin (unmated) queen does a hive little good until she successfully mates and begins laying eggs. An older queen may have exhausted her supply of stored sperm and may only lay drone (unfertilized) eggs. A purchased queen installed to a queenless hive is only helpful once she is accepted by the hive and begins laying. So determining "queen-rightness" is more than just seeing a queen and eggs in the hive.

If you see a queen in the hive but do not see any brood, it is possible that the queen is a virgin who has not yet mated and begun laying. A mated queen, either provided with a package of bees or introduced to a queenless hive, may take several days, up to a week, to begin laying a noticeable numbers of eggs. If the queen does not begin laying after a week or so, it is probably time to take some action.

Either a drone-laying queen or laying workers will doom a hive since there is no worker brood being produced. If you see a queen in the hive (or not) but notice that all of the brood are drones, you may have a drone-laying queen. If the hive has been queenless for several weeks you may see spotty drone brood

appearing on the brood combs and/or cells with multiple eggs. This indicates that the hive has developed laying workers. Laying workers develop in a hive when the queen pheromone, which suppresses the development of ovaries in workers, has been absent for a period of time (usually several weeks). Since these laying workers have not mated, they can only produce drone eggs.

The obvious solution for a hive that is not queen-right is to provide them with a new queen. There are many strategies for requeening a hive, but the details are beyond the scope of this article. In general, the strategies consist of either encouraging the hive to raise a new queen of their own or giving them a new queen. A hive that has recently become queenless is often able to raise an emergency queen if given a frame of young open brood from another hive. Alternatively, the beekeeper can provide the queenless colony with a ripe queen cell, a virgin, or a mated queen from another source. All of these strategies can be successful (and all can fail); this is a great opportunity for a new beekeeper to work closely with their mentor or another experienced beekeeper and learn about the requeening process.

## 2. You Must Control *Varroa*

The *Varroa* mite (*Varroa destructor*) is the bane of modern beekeeping and is responsible for the death, either directly or indirectly, of more honey bee colonies than any other cause. This parasite weakens the bees, making the hive susceptible to viruses carried by the mites. If you do not control *Varroa* your hive will eventually succumb to this parasite.

As insidious and dangerous as *Varroa* is, it does not make sense to manage what we do not understand.





*Varroa* populations rise and fall over the course of the year and can vary considerably from hive to hive in the same yard. It makes sense then to start with an assessment of the problem by counting the number of mites in your hives. In my opinion, the best way to assess mite levels is to perform an alcohol wash of a sample of bees. For an alcohol wash, a sample of about 300 bees are rinsed in an alcohol solution (unfortunately this does kill them), the mites fall off the dead bees and the mites can then be counted. The number of mites counted is divided by three to give the number of mites per hundred bees. A similar test can be done with powdered sugar (this does not kill the bees), but it typically underestimates the number of mites. The details of how to perform



these tests are widely available in beekeeping literature and on the web. The test is quick and simple to perform and is not beyond the ability of a beginning beekeeper. The threshold number of mites in a sample which indicates action should be taken varies somewhat from region to region and in the opinion of various people. If I find more than three mites per hundred bees in my samples, I take steps to reduce the mite population.

Treatment for *Varroa* has gone

through an evolution since the first *Varroa* mites appeared in the US in the 1980s. We initially used strong synthetic pesticides to eliminate mites, to which they quickly developed resistance. Since then, the concept of integrated pest management (IPM) has been considered the best-practice for mite management. IPM is the use of various management techniques to reduce mite populations, resorting to chemical treatment only as absolutely necessary. There are many management techniques such as brood breaks, splits, use of resistant stock, and culling of drone brood which can be effectively used to slow the growth of *Varroa* in a hive, sometimes to the point that chemical intervention is not necessary. If management techniques alone are not enough to keep the *Varroa* population down, there are a variety of chemical treatments available.

Chemical treatments fall into the general categories of synthetic pesticides (fluvalinate, amitraz), acids (oxalic acid, formic acid, hop beta acids), and essential oils (thymol). All of these treatments have their advantages and disadvantages. The best thing for the new beekeeper is to work with a mentor or other experienced beekeeper, who shares your philosophy of beekeeping, to develop a *varroa* treatment strategy for your hives. Beware of anyone who claims that there is only one "right" way to do things – there are many effective ways to manage *Varroa* (and bees in general), which path you choose will depend on your personal approach to beekeeping and how much time and effort you want to invest.

### 3. You Must Have Adequate Winter Stores

Winter comes every year; it is never a surprise! Some Winters are harsh and some are relatively mild and we do what we can to prepare our bees for the worst and hope for the best. All beekeeping is local, however

almost all of the US experiences a period of prolonged nectar and pollen dearth. For many of us that dearth corresponds to the cold of Winter. The strongest, healthiest, queen-right colony will not survive if it starves before the first Spring nectar flow.

The honey bee has adapted to these periods of nectar dearth by storing nectar as honey to consume when nectar sources are unavailable. As beekeepers we are thankful that the bees are as industrious as they are, since they are able to store a great deal more honey than they need to survive the Winter/dearth. That surplus honey is what we harvest for our own use. How much honey they will need to survive the Winter varies significantly with the local climate – bees in northern Minnesota will need significantly more Winter stores than a similar size hive in southern Florida. Talking with experienced local beekeepers will give you a good idea of what hives in your area typically need to make it successfully through the Winter. In my area of the Midwest, many beekeepers are successful taking hives through the Winter in two deep brood boxes, the top box of which is mostly full of honey. This translates to 80-100 pounds of honey per hive.

Once you have an idea of how much honey your bees will need to get through the Winter, adjust your harvest expectations accordingly. It is better to under-harvest than over-harvest. After a few seasons you will




develop a feel for how much honey you will need to leave your bees for Winter.

Feeding bees sugar is not ideal, but it is better than having them



starve. Bees overwinter reasonably well on sugar but it is important to start feeding early in the Fall rather than later. Bees still need time to store and dry down the sugar syrup in the Fall for it to be useful for them as overwinter stores. I use the occasional warm day we get in January or February to take a quick peek under the cover of my hives. If I see bees through the hole of the inner cover, or if I am using a candy board and I see that it is partially consumed, then I know I need to do some emergency feeding. Mid-Winter feeding can be done with dry sugar or fondant to get the hive get through to the first nectar flow.

One of the things I love about beekeeping is that there is always something new to learn. As a new beekeeper it is important to walk before you run. Focusing on the essentials will give your hive a good chance of surviving the year. Make sure your hives remain queen-right and are producing good healthy brood which will build large colonies of healthy bees. Manage *Varroa* and the associated *Varroa*-vectored diseases to give your bees the best chance for staying healthy and strong through the season. Ensure that your large colony of healthy bees have plenty of food for the Winter so they will come into the following Spring strong and ready for the first nectar flow.

As you continue to add skills to your beekeeping repertoire you will learn about many alternate management techniques – some very good and some not so good. I encourage you to critically evaluate new information. Look to respected main-stream publications, classic beekeeping texts, university publications, and respected successful local beekeepers as primary sources of information. Learning about honey bees is a life-long process, but you don't have to know it all right now. Take your time, absorb new information at your own pace and just remember to do the essential things you must do to keep your colonies alive and healthy. 

1 The Honey Bee Health Coalition™ provides a free document called "Tools for Varroa Management" which describes how to perform an alcohol wash or sugar shake to monitor varroa populations. The guide is available at: <https://honeybeehealthcoalition.org/wp-content/uploads/2015/08/BBHC-Guide-Varroa-Interactive-PDF.pdf>

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# DRONES

Ernie Schmidt

Langstroth, (the father of the modern beehive) in 1878 wrote, *None of the reasons previously assigned seem fully to account for the necessity of so many drones. For a long time I could not perceive the wisdom of the existing arrangement; although never doubted that there was a satisfactory reason for this seeming imperfection. To have supposed otherwise, would have been highly unphilosophical, when we know with the increase of knowledge many mysteries in nature, once inexplicable, have been fully cleared up.*<sup>1</sup>

Dr. Currie wrote in his 1987 drone research paper, *A Published research about drones is far less extensive than about either worker or queen bees because drones do not contribute to brood production, pollination or honey production.*<sup>2</sup>

Dr. Thomas D. Seeley – *Drones are definitely the understudied members of a honey bee colony. It is interesting that the Harrison paper<sup>3</sup> reports that drones do contribute to the heat production in a colony. So yes, they may do more than provide sperm.*<sup>4</sup>

## Why?

The drone has little or no value other than to breed with a queen and is – in fact – a liability, consuming valuable colony resources. Why is that description readily and willingly accepted as a scientific fact?

The drone indeed has a single purpose and primary focus in his life – to breed with a queen. The vast majority of Drone scientific study is related to that specific behavior of mature drones. However, he does have other behaviors that are beneficial to the colony. Through no fault of the drone or mankind, the drone has received a bum rap in history's court of public opinion. Upon closer inspection (and research), the drone has been found

to be a valuable member of the colony. The drone not only earns his keep he makes significant contributions to the colony. The drone is a victim of that old saying, repeat something long enough and it becomes a fact. Much of what we know about drones has been repeated over and over for hundreds of years with little reason or motivation to discover if it is indeed true or not. There has been an astute, curious few over the years that have pondered and believed there was a part of the life story of the drone bee that was missing. What we knew, or what we thought we knew about the drone, just didn't seem right or complete. Given the choice of building their own comb, colonies will build considerable drone cell. So great is that instinct that even in hives with foundation comb they will find places to produce drone cells. The drones help themselves to honey, nectar, and pollen directly from workers or from stores. The colony freely allows the drones to help themselves to the valuable, hard earned food. So great is the colony's generosity of drones that a colony will accept and feed drones that drift in from other colonies. The very sustenance that the colony needs to feed the brood and put into stores to survive the Winter they will give freely to the drones. It has been accepted for years that the drones appear to contribute nothing more than sperm in return for the valuable food.

There is little doubt of the extensive study and research into the drone's perceived single purpose in apiculture, breeding with queens. Even after centuries of keeping the bee, because of the lack of a monetary value purpose, mankind has been unable to find any other reason for them in apiculture. On the other hand, I had a different motivation to look that can be summed up in

one word. Why? Why do healthy colonies want a large population of drones and will exert considerable energy, effort and determination into that endeavor? Why produce hundreds or thousands of drones when only fraction of them may have a remote chance of breeding with a queen from a competing colony in the area? And after all this, why are they evicted to die when this single human perceived purpose is no longer needed?

## Is It More Likely Than Not

Allow me to first discuss the preponderance of evidence that the drone is not the useless lazy loafer that common knowledge would lead us to believe.

The colony as a whole will control all individuals within the hive that are perceived to be a liability to the success of the colony. The queen, arguably the most important individual in the colony, will be superseded by the colony if they feel she has become unproductive. Injured, old, worn workers will be prevented from remaining in the hive. In fact, many workers in such conditions will leave on their own rather than become a liability to the colony. The drones are ejected in the Fall. Clearly something has happened at that point in time that they are now a liability and no longer of any benefit to the survival of the colony. The colony exhibits that it knows

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Showing clear indication that the drone had some form of value to that particular colony up to that point in time. If they were of the same of no use or benefit to the colony during the year they would have been ejected all year long. Only a tiny fraction of all drones a colony produces in a year ever get a remote chance to breed. If the drone had no other purpose then to breed, a colony would only need to produce enough of them to satisfy that purpose. A colony produces a population of drones far exceeding the numbers needed for that to be their only purpose.

There is fossil evidence that early ancestors of the honey bee date back 100 million years and evidence of direct ancestry dating back 35 million years. The honey bee has remained virtually unchanged for millions of years. They honed their existence to such a fine point that they did not need to change or evolve to adapt to their environment. In



fact during those millions of years, 100s of plant species changed and evolved to adapt to the honey bee. The importance of attaching the honey bee for pollination was so great that flowering plants changed and evolved methods of attracting them. So fine tuned as an organism for survival is the honey bee that they did not need to change or adapt to their environment for millions of years. Their environment literally adapted to them. An organism that has perfected its ecological niche and survived that well for that long would have fine tuned the value of the number of Drones it produces. The modern Honey Bee now

produces the number of Drones they do because it has a direct survival value to the colony.

### The Happy Bees Theory

Studies indicate that colonies with healthy drone populations appear to produce more honey.<sup>5</sup> There are a couple of possible explanations offered for this behavior. There is a group that feels that a population of drones in a colony makes the bees feel happy and that happy bees make more honey.<sup>11</sup> This is referred to as Anthropomorphism which is the attribution of human traits, emotions, and intentions to non-human entities. I will meet the happy bees description halfway by accepting it as a simple explanation of a balanced, healthy colony with a low level of stress or imbalance. The activity and behavior within the colony is governed greatly by the presence or absence levels of various chemicals and pheromones. Despite

our best efforts to prevent it, a colony will put forth an incredible amount of effort to produce drones. I suggest it is a short leap to say that it makes a colony happy because a desired level of balanced chemicals and pheromones in the hive involves a population

of drones. I find this suggestion interesting, however I wanted something less emotional and more intellectual.

Another school of thought feels it is a matter of Homeostasis which is the maintenance of a stable equilibrium, especially through physiological processes. For further clarification in this definition, the word physiological means - characteristic of or appropriate to an organism's healthy or normal functioning. This theory would suggest that things run smoother with a healthy population of drones thus a benefit for things like more honey production. Okay that's getting closer, but I still wanted

an explanation of specific drone behaviors resulting in increased honey production. I discovered the behaviors for the increased honey production in relation to drone population is actually a natural behavior. In a community such as a bee colony, when a group of individuals, such as nurse bees, find they are no longer needed to keep the brood warm, they will gravitate to the next most important job the colony needs. An increase in foragers would result in an increased honey production. So what is a specific behavior of drones contributing to colony that frees up the workers to graduate into foragers?

### Cheap Source of Heat

Drones have a similar life cycle to the workers, in that immediately after emerging they will spend several days as house drones. Spending most of their time on the brood frames eating and maturing before leaving the hive for trips to the drone yard. During this time on the brood is when they display one benefit to the colony. The drone is a cheap source of heat for the brood. One drone can produce 1-2 times the amount of heat that a worker can with the same amount of food. Drones create heat the same way workers do by contracting their thoracic muscles. Older drones contribute more than younger drones. Both age groups contribute to keeping the brood area warm as a reaction to a low temperature brood area.<sup>6</sup> It is not any kind of a maternal instinct from either aged drone group. They will produce heat when the brood area gets cold and prefer to congregate in the brood area because food is easily obtained from working nurse bees feeding larva. A population of drones keeping the brood warm frees up workers to gravitate into other positions such as foraging. It costs the colony less in energy to feed drones in the brood area, then for a large group of workers delegated to keeping the brood warm. Also studies have shown that when workers moved into cooling brood areas with drones on it, the heater workers do not displace the drones but took advantage of the drones heat production and worked in unison with them to warm the brood area.



## Drones as a Worker Bee Predator Diversion

*That various kinds of birds are fond of bees, every Apiarian knows to his cost. The King-bird (Tytannus musicapa), which devours them by the scores, is said- when he can have a choice- to eat only drones.*<sup>7</sup>

The drones are slower, larger, more nutritional, noisier, congregate in groups in specific areas, and are defenseless. Exactly what predators watch for and are attracted to. They stand out as an easier prey from the more dangerous stinging workers. It would not be unreasonable to state that they seem to be a perfect prey. Through predatory birds will eat both workers and drones, they show a clear preference for drones<sup>8,9,10</sup>. The honey bee species has developed a predator strategy for protecting the members that are more valuable to the survival of the colony. Even with the time and resources it takes a colony to produce drones it is cheaper to sacrifice them to predators than to lose valuable workers. Producing an excess of expendable colony members to insure colony survival is not usual in nature. It is very common for some species to produce incredibly large amounts of offspring to insure a small number survive. Both termites and ants produce vast numbers of queens and kings to go forth and establish new colonies. Under normal, natural conditions, the vast majority of them will fall prey to predators. Only a tiny faction will succeed in establishing new colonies. The honey bee differs from ants and termites in that there is only one queen in the breeding behavior. However under normal conditions there is a huge number of drones involved. The value to having vastly more expendable drones than needed for breeding is the protection they provide the queen similar to the schooling of small fish like herring and sardines – there is safety in numbers. A single fish or single queen bee mixed in with large school or swarm has better odds of surviving and not being eaten. The larger the Drone Congregating Area, (DCA) the better the queen's odds of surviving are.

### In closing

In the world of beekeeping there are few always and nevers. As in

bees- always do this or bees never do that. As I continue to learn more about this amazing insect, I find myself asking more questions. I find it difficult to accept answers to my questions like – because that is the way we have always done it or that's the way it's always been. There is always more than that to the story of the honey bee. I have no doubt if we were to even look further into the hidden world of the drone, we will find even more answers to- Why?

### A Story behind the Story

As I neared completion of this report, I read Rev Langstroth's book, Langstroth's Hive and the Honey-Bee The Classic Beekeeper's Manual. I was amazed how much of his work is so applicable to today's beekeeping and was so ahead of his time in 1878. He talked about several things in his book that related to my report and I went back and revised this report to incorporate his knowledge and quotes. It is small wonder his hive has survived the test of time. His personal affection for the well-being of the bee and his care about them comes through in his work. After reading his book, anyone with a deep affection for the honey bee cannot help but feel a friendship with the Reverend.

In closing I must quote the Reverend one more time,

*Bee-keeping is regarded in Europe as an intellectual pursuit, and no one who studies the wonderful habits of this useful insect, will ever find the materials for new observations exhausted.*

I have found that I could not agree more.

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# The Sweet And The Sting Of Beekeeping

Ben Wozniak



South Western Michigan is an ideal location for gardening. Our front yard is loaded with flowers, so why not try for something edible?

With unlimited enthusiasm, my wife and I were certain we could grow all the fruits and vegetables we needed, in addition we were going to grow enough squash and pumpkins to decorate all Fall. Some years we would have miles of pumpkin vines and hundreds of squash blossoms with nothing tangible to show for all our efforts. Our thirty blueberry bushes produced enough fruit for ONE pancake. We are not the types to give up. So, one Fall I visited a few pumpkin and blueberry farmers and asked them for advice. The common answer was that they rented bees during pollination season.

Rent bees I asked? Yes, there is an entire industry around bee rental they explained. My thought was why rent when I can own? With help from a local beekeeper, YouTube, a gag gift of "Beekeeping for Dummies". **I was going to save the planet, or at least our small part of it.**



I had been reading how extremely important bees and other beneficial insects were to our food supply, and being 6'7" and 250 pounds, food supply is more important to me than most. I read how the honey bee was endangered, and backyard beekeepers were making a difference in saving the species.

Turns out that many of our local crops are almost entirely dependent upon the honey bee. Michigan State University estimates that 15 crops in Michigan alone would go extinct without the honey bee. Many are my favorite: apples, blueberries, cherries, pumpkins and even onions to



Two girls dressed for work

name a few, even the Summer sensation WATERMELON! Who doesn't love cold watermelon on a hot Summer day, or an apple crisp with brown sugar crumble? Makes me hungry just typing. Washington State estimates the value of crops pollinated by bees in the U.S. alone to be in excess of \$14,000,000,000. I wasn't really trying to save the entire world, I just wanted a few pumpkins and blueberries. Simple I thought, I will become a beekeeper.

My first purchase was a custom made extra-large tall beekeeping suit! Then on to the hardware. Wooden boxes, frames, stands, covers and honey extraction tools. Oh, and three packages of bees. Yes, bees are sold in packages of 10,000. Complete with one queen per package. Install the bees from the package to the boxes with frames, and you have a hive. Multiple hives constitute an apiary or bee yard. It's that easy, or so I thought.

My first year, I got stung at least 30 times. My wife, our neighbors, and friends have yet to be stung to my knowledge. In fact, honey bees do not like to sting, they do it as a last resort because they die after stinging, unlike hornets and wasps, that can sting endlessly just for fun. I even cleared a half acre of our property to recreate a native Michigan wildflower habitat.

I have come to recognize that the honey bee is an AMAZING creature. Take a few minutes this Summer and if you are lucky enough to see one working, just watch and discover how beautiful their efforts are. All the honey bees you see out working are female. In fact, 95% of the hive are unfertile females and only the queen is fertile. All have what looks like a mink stole. It's like they dress up for work, but the hairs hold and spread pollen. This past Summer just one squash vine produced over 30 squash thanks to our bees.

A beehive is a social community of workers. By mid-Summer one hive alone can grow to 20,000/30,000 or more. Only about half of the bees are out gathering pollen, nectar and water on sunny days. They stay home on cloudy or rainy days because they navigate by using the sun. Speaking of home in the hive, there is an entire





Can you locate the queen?

support staff of bees inside the hive doing many chores.

One entire group just looks after the queen. They feed her, bathe her, and take care of her every need so she can do her sole job of laying eggs, which is typically 1,000 or more per day. Others in the work force guard the hive, while some clean up debris and remove any waste. In fact, the hive is sterile clean, and smells amazingly

sweet. Nurse bees feed and tend to the newly emerging brood. Guard bees wait at the entrance to the hive and check every incoming bee for any intruders that may steal their honey. Still others regulate the temperature inside the hive to keep it a balmy 90 degrees both Summer and Winter. That's right, when it gets above 90 in the Summer, bees will position themselves at the hive entrance and fan their wings to cool the hive. In the Winter they cluster together around the queen to keep her warm even during a polar vortex.

Still other bees are scouts that go out and look for specific flowers they like. When they find them, they fly back to the hive to perform an elaborate dance in total darkness that tells the pollen gathering bees how far and in what direction to fly to find the whereabouts of the good stuff. The bees all work as one organism, all controlled by the pheromones sent out by the one queen. It's good to be the queen. There are entire groups that build the wax, store the pollen, save the nectar, and produce the honey. In the entire life span of a worker bee, it may take 12 to 16 bees just to produce 1 teaspoon of honey. It takes an estimated 50,000 flight miles to produce just one pound of honey. Every location where honey is produced has a distinct flavor from the flowers, water, and nectar found. That is why local honey tastes so good. Ours tastes like Summer at Birch Lake!

Since the bees are doing all the work, one might ask, what does the beekeeper do? The beekeeper's

main function is to assist and protect the bees. Feeding them when they need some help in early Spring after all the honey stores have been eaten. Extracting honey in Summer so the hive is not congested. Dividing a large colony, so they do not fly away. Maybe you have seen on the news when a bee colony swarms away? Beekeepers also treat bees for pests that might endanger the colonies.

Imagine my shock and HORROR when last Fall while cutting the grass, my tongue started to tingle and I felt dizzy. When I stopped the mower, I saw my neighbor had contracted a pesticide spray company to fog his property. They were power spraying a blue fog up into the trees and bushes on his entire property! In a panic, Vanessa called him to find out what was going on. He and his wife were safely cocooned in their home. They told her the spray was "natural" but they were told to stay in the house and keep all their windows and doors closed. No one told us? Within days, six of my eight hives were completely dead. That's about 180,000 dead bees. You see, bees gather pollen and nectar and bring it back to the hive. If the pollen and nectar are covered in poison, they unknowingly bring it back to the entire colony to be poisoned. Years of effort and struggle gone. All of those wooden boxes, all the wax frames, the stores of honey no longer usable or fit for human consumption, all the worker bees and queen destroyed. I estimate my monetary loss to be around \$4,000, but the eco loss is immeasurable.

**Fogging indiscriminately kills all bugs. Mosquitos, yes, butterflies certainly, dragonflies, lightning bugs, crickets, caterpillars, all bugs, even the bees sadly.**

I love the sound of singing crickets on a hot Summer evening. I love the flashing of fireflies in a field at dusk. I love the flutter of the Monarch, Swallowtail, and other butterflies in the breeze. I love the taste of a warm apple crisp and cool watermelon and blueberry pancakes, and I loved Birch Lake Honey!

One last thought, if you must spray, be a kind neighbor and warn others so they too can protect themselves, their pets, and their garden. Warn a local beekeeper so hives can be protected. Think before you use chemicals. Better yet, try to do your little part to save your part of our planet. You don't have to spray poison.



Photos show one dead hive that once buzzed with over 30,000 bees.





# Cooking With Honey

Ann Harman

Some delicious fruits become available during the Summer months. Peaches can be wonderful—sweet and juicy—or blah and boring, depending on sunshine and rainfall. Honey to the rescue! Peel the boring peach if you wish then slice in easy-to-eat pieces. Drizzle some honey to coat the slices. Wait! Come back in 15 minutes and the boring peach will taste much better—not a perfect peach but definitely better. Use some good-tasting peaches in this next recipe.

## FRESH PEACH WALDORF SALAD

4 fresh ripe peaches  
1 cup celery, diced  
½ cup walnuts, coarsely chopped  
2 tablespoons honey  
½ cup sour cream  
Fresh strawberries for garnish  
Salad greens

Wash peaches, peel, cut in halves, remove pits and slice. In large bowl lightly toss peaches, celery, walnuts and honey. Chill. Just before serving, gently fold sour cream into peach mixture. Serve on salad greens; garnish with fresh strawberries. Serves 4 – 6



The Honey Kitchen ed. Dadant & Sons

## SUMMER FRUIT SALAD

This will make a large quantity, enough for guests at your barbecue.

4 cups cubed cantaloupe  
4 cups cubed honeydew melon  
3 cups seedless red grapes  
3 cups diced, peeled and cored pineapple  
1 medium papaya, peeled and cubed  
1½ cups fresh strawberries, halved  
1 tablespoon Balsamic vinegar  
8 fresh mint sprigs for garnish

### Honey-Lime Dressing

⅓ cup light honey  
⅓ cup fresh lime juice  
½ cup plain low-fat yogurt  
2 teaspoons grated lime zest



Make Dressing: Whisk honey and lime juice together in small bowl to a smooth consistency. Add yogurt and lime zest; set dressing aside.

Combine fruit, except strawberries in large bowl. Sprinkle strawberries with Balsamic vinegar, then lightly mix with other fruit. Cover dressing and fruit separately and chill until ready to serve. Mix dressing into fruit. Let stand 15 minutes to blend flavors. Garnish with mint sprigs and serve.

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