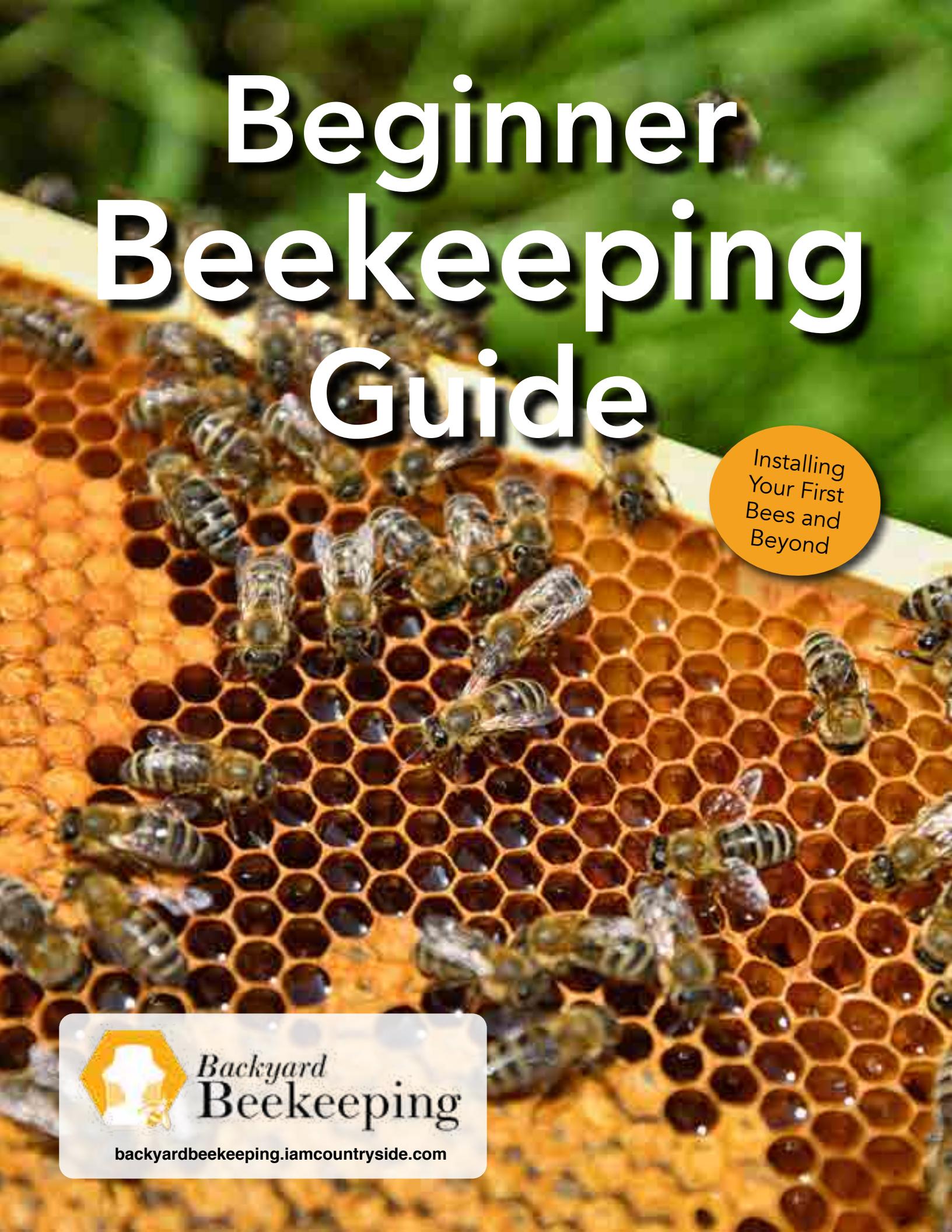


Beginner Beekeeping Guide

A detailed close-up of a honeycomb frame. The frame is covered with bees, some on the surface and others inside the hexagonal cells. The honey cells contain varying amounts of golden-yellow honey. The background is a soft-focus green, suggesting a natural outdoor environment.

Installing
Your First
Bees and
Beyond



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How to Install Package Bees in a Langstroth Hive

By Steph Merkle

Learning how to install package bees isn't all that difficult, but if you are new to beekeeping, it can be helpful to review the process from start to finish.

Supplies for Installation Day:

- ~ Spray bottle with sugar water
- ~ 1:1 sugar water for feeder
- ~ Mini marshmallow (one per queen cage) — if your queen cages don't have a candy cork
- ~ Small piece of clean cardboard (minimum 6"x6" should be plenty)
- ~ Hive tool
- ~ Pocket knife
- ~ Veil
- ~ Suit
- ~ Gloves
- ~ Lit smoker (optional)

Pick Up Your Package Bees

You'll want to pick up your bees as soon as possible from your local dealer or from the post office. To control temperature and ward off any stray bees flying around your vehicle, a big sheet comes in handy. Keeping them in a trunk is acceptable as well, as long as it isn't an exceptionally hot day. If you are unable to install them promptly, keep them in a temperate location (not too cold or hot), like a dark, draft-free basement, garage, or outbuilding. If they have run out of feed — generally a tin can inserted into the package — you can mist the outside of the package screen twice a day

with a 1:1 sugar syrup in a clean spray bottle.

Okay, Let's Install!

1. Remove the telescoping cover, inner cover, and three to four middle frames and set them aside.
2. Mist your packages with sugar water. If it's below 60 degrees F, avoid this step as you don't want to chill your bees. This gives the bees a little boost after a long journey.
3. Give the package one forceful shake to knock as many bees as possible to the bottom.
4. Remove the feeder container from the package.
5. Place a piece of clean cardboard or some other "lid" to prevent the bees from flying out at this point.
6. Grab the tab or the queen cage and shimmy it out. Remove the queen cage and inspect her (without releasing her!). She will have other bees clustering around her. You can brush them off gently with a feather or your gloved hand.
7. Replace the cork with a mini marshmallow. This gives the colony time to get used to their new queen while they eat through the marshmallow.
8. Place your queen cage. Position her evenly between two frames. If your queen cage has a metal tab, bend it around the frame. Otherwise, you can rubberband the queen cage around the frame until the queen is released.
9. Next, dump the bees into the hive.
10. Place the nearly empty package near the hive entrance and let the bees make their way into the hive throughout the day.
11. Gently replace the frames until all of your frames are back and evenly spaced.
12. Place a pollen patty on top of your frames between the inner cover or the top feeder, depending on your setup.
13. Place your feeder of choice — Boardsman, top feeder, in-frame feeder, to name a few. Fill your feeder with 1:1 sugar water and Honey B Healthy.
14. Return your inner cover and telescoping cover. You'll want something heavy on top — like a brick — to protect against predators or a windy day. ☘

What's a Nuc?

The Best Way To Get Started With Bees



BY ED DANE

There are several ways to get started with bees. Most beginners start with packages because they are the most readily available. Another way is to catch a swarm. I believe this is preferable to a package. But the best way to get started is to buy existing hives, be they nuclei (nuucs) or one or two story complete hives. Now let's consider what the differences are and I think you will see why one is preferable to the other.

OPTION 1: THE PACKAGE

The package is without a doubt the most popular way to start, but is it the best? Well, consider how a package is made up. Generally, bees are shaken from several different hives into a package or cage setting on a scale. When the proper weight is achieved, a queen in her own small cage is added, then a can of sugar water and the package is sealed. The worker bees are from several different hives and the queen may be from another hive in a completely different yard. This

means they are all unrelated. We don't know all there is to know about this yet, but research shows that the relationship of the bees in a hive has an effect on the equilibrium of the hive.

OPTION 2: THE SWARM

In a swarm, usually the mother queen leaves with the first swarm. The worker bees in the swarm may have different fathers, but they all have the same mother, so they are all half-sisters. They have this advantage from the start.



OKAY, SO WHAT IS A NUC?

A nuc consists of two or three frames of brood, a frame or two of honey, pollen, and possibly one empty frame of drawn comb or foundation. It has roughly two or three pounds of bees to cover the brood and a queen or queen cell. Basically it is a miniature hive.



balance. If it doesn't reach that point or if it loses its balance for some reason and can't recover, it will die.

Some things that help make a hive balanced are the relationship of all bees in the hive, as we've already discussed. These include the stages of developing brood in the brood nest, be it eggs, larva, or sealed brood, the number of bees and the space available in the hive, the amount of stores (honey and pollen), the amount of open space in the brood nest for the queen to lay, the amount of queen pheromone, and more. All these have an impact on how balanced the hive is. Even a small nuc can be balanced if all these things are in place. That is why a nuc can be over-wintered successfully, even in Michigan where I live. All these factors relate to one another and if one of them gets out of balance it can affect the whole. So that's why it is important to get a new hive to the point of balance as soon as possible and work to keep it that way. The success of the hive depends on it.

Many things can impact the balance in a hive. For instance, predators or disease may weaken the bees. Pesticides may build up in the hive and affect the reproduction of the queen. This can happen from an outside source (agricultural spray) or from the use of miticide in the hive by the beekeeper to control varroa. The queen may fail and the workers are unable to replace her. The beekeeper may injure the queen or split the brood during manipulation or inspection of the

hive. There are many ways this imbalance can occur. This is where the experience of a mentor comes in handy.

SUMMARY

These are all things to consider when starting out with bees. I know it's harder to find nuks and existing hives, but I see more nuks advertised now than before, so they are becoming more available.

One way to find and obtain bees is to contact a commercial beekeeper in your area and volunteer to help him or her. They may be happy to have help lifting all those heavy supers of honey and you might learn something in the process. You may also be able to buy some bees from them.

That's kind of how I got started. I was 14 years old and interested in bees. I knew a man in our church who was a beekeeper and I started asking him questions. He invited me to go with him while he worked his bees. One afternoon he called me to ask if I would like to accompany him while he captured a swarm. I was delighted. So he picked me up at my home and we went out and shook this nice swarm out of an old apple tree. When he dropped me off at home, he asked me where I wanted to put the hive. I asked him what he meant and he said he was giving me the hive because he wanted to help me get started in beekeeping. That was 51 years ago and I'm still in love with bees. ☘

Happy Beekeeping!

They have also gorged themselves on honey before leaving the hive. If they are put on foundation comb they can begin to draw wax immediately. In fact, I have captured many swarms that have only been on a branch for a couple hours and there is burr comb on the branch. This is because when they gorge themselves on honey their body starts making wax. A swarm that is put in a hive with only foundation wax can sometimes draw that whole super of foundation (10 frames) in a matter of three or four days. What an advantage for the beginner beekeeper who doesn't usually have access to drawn comb but has to start with foundation. A package is sometimes referred to as an artificial swarm, but I think you can see that there is a big difference.

OPTION 3: THE EXISTING HIVE

You should know what a "nuc" is by now, and if it is made up properly, it has the same advantages as a full-sized hive. The hive is balanced; this is the key. What do I mean by "balanced"? Well, there are many factors involved and we are still learning how they all interplay, but every hive strives to achieve its own equilibrium or

Catching Swarms Means Free Bees



It is recommended to start with swarms that are organized and proven survivors.

BY ED DANE

Do you get sticker shock every time you see the price of bees? How would you like some free bees? Have you ever thought about trapping a swarm?

Swarms have been harder to find the last couple of years because of the loss of so many bees due to mites, disease, pesticides, CCD and harsh winter weather. Therefore, there has been stiff competition for the ones that exist. This is where setting traps can give you an edge.

I personally value swarms second only to purchasing a nuc or an existing hive and far superior to a package, for

two reasons. One is because they are free and the other is because a swarm is a survivor. If you think about it, these bees have had to survive the last winter and be strong enough in the spring to build to the point of swarming. That makes them much more appealing to me. Now if they happen to come from a feral hive, that makes them even more valuable because they have done all that on their own without any help from a beekeeper. This is the hive I want to make splits and raise my own queens from. I have trapped many swarms over the years and I'd like to share with you how to do it.

I have used two types of equipment to trap bees. Both work but one is far

superior to the other. You may have seen one of the cone-style traps advertised in the bee supply catalogs. This is a container that is a little larger than a five-gallon bucket and is shaped like a large flower pot. It is brown and made from shredded wood pulp. It has a cover on the large end and an entrance hole in the smaller end. It attaches to a tree and looks like a part of a limb with a hole in it for the bees to enter.

Before attaching it to the tree it is recommended that you add some bee lure. This can be purchased from the same catalog and consists of either some artificial pheromone or some essential oils that attract the bees and help them locate the trap.

I have used this type of trap only once and I would not recommend it because of one basic flaw that I learned about the hard way. Swarms are very good at drawing wax. In fact, I have had them draw a whole super of foundation in three or four days. This is because they have gorged themselves on honey before leaving the original hive. This is a good thing if you are a beginner and don't have access to drawn comb, but in one of these traps, it can be a disaster. If you don't check the trap every day, or better yet at least twice a day, the bees can fill that trap full of wax and you can't get them out without a real mess on your hands. So I don't recommend you use this type of trap.

This is how I do it. I take two 2-by-4 studs and cut one into a rectangle-shaped frame. To one of the narrow ends, I attach the other 2-by-4 stud. This stud works as a leg and the rectangle-shaped frame is attached to the tree by a couple of screws. Then I put a complete single-story hive with a bottom board, an inner cover and telescoping cover on the frame and attach it with a stretch cord. Inside I add 10 frames (six foundation and four drawn comb). I put the drawn comb in the middle. This has two purposes. One is to give the queen someplace to start laying right away and the other is to add to the attraction of the hive because drawn comb has some scent to it, especially if it has had brood raised in it. If you don't have any drawn comb, it will be fine with just the bee lure but if you have it, I think it helps.

The lures can be purchased from the bee-supply catalogs and work well, but I make my own by using a method that my mentor showed me 51 years ago when I first started keeping bees. I carry a small bottle with some rubbing alcohol in it, and when I find a hive that is always cross when I try to work them, I replace the queen. The old queen goes into the bottle. I keep this bottle and collect any dispatched queens all summer long. Then next spring when I am setting my swarm traps I take a Q-tip, break it in half, dip it in the bottle and toss it in the trap. The alcohol evaporates and the pheromone is left to attract the bees. I like this arrangement because I have a trap that is easily removed from the tree stand, so I don't have to transfer the bees to another hive. It also gets the trap in the air, so it appears more like a hollow tree to the bees. They like this because it is more natural. I have had many swarms move into a dead-out



hive that I had setting in one of my bee yards, but I think they prefer one in a tree. This method keeps the trap high enough to be attractive to the bees and low enough so I can use a stepladder for easy removal. Actually, I'm tall enough that I can stand on the tailgate of my truck and remove the hive without a ladder.

One word of caution: don't forget to staple the hive parts together so the hive won't come apart when you remove it. I would also recommend that you move the hive after dark so you get all the bees and don't leave any field bees that may be out gathering nectar.

You will also want to move the hive at least two miles away. The rule is, if you move a hive, you should move it less than two feet or more than two miles. This is because the bees use the angle of the sun and visual signs to help them locate their hive. If you don't move them at least two miles away, the field bees may go back to the original location by mistake. ☘

Good Luck &
Happy Beekeeping!

Preparing For The Queen

Getting Your First Hive Means Building Your Setup Just Right



This is what the queen's box looks like. A few bees did escape, which is normal.

By Romie Holl, Wisconsin

There is a decision to be made when you order bees: do you want the two-pound or three-pound hive? You will only get one queen, but how many worker bees do you need right off the bat? That depends on your hive.

If you are starting a new hive (one with no comb on the frames), you will want the three-pound hive. If your hive has comb on the frames, then the two-pound one is fine, unless the comb needs to be rebuilt and you want to get more workers.

When you get the queen, she is ready to start laying eggs. But she is unable to do so until the comb is built. The more worker bees you have, the faster it can be built. Since worker bees live an average of 21 days, you want the queen to start laying ASAP, and queens live roughly four to five years.

After you order the bees, you have to decide where you want to put them. Having the front of the hive face south (or southeast) is the best, because the early morning sun will get the bees out of the hive faster. You will also want five to six feet in front of the hive so they can fly in easier (they can make do with less room, but seem to be happier with this amount of space).

When you place the hive, do not put it on the ground for a few reasons. One is comfort. It is easier to work on the hive when it is roughly waist high. But the more important reason is because of mites that attach themselves to bees when they are out collecting pollen. You will want the bottom of the hive at least six inches off the ground. Your landing board should have a screen built into it. When mites fall off the bees, you want them to fall to the ground. If you have a

solid bottom, they can attach a ride with the next bee that walks past them. Some commercial hives also have a drawer on the bottom (with sticky paper) so you can see the amount of mites that fall. If you have more than one hive, keep three to five feet between them. This makes it easier to work on the hives as the year goes on.

Readyng The Queen's Residence

Once you have the stand (and landing board down), I always add a queen excluder. These can be made from plastic, wood or metal depending on your choice. Because the queen is a lot bigger than the worker bees, this will stop the queen from escaping the hive and taking the bees with her. (I learned the hard way one year.)

On top of the excluder goes the "living quarters" of the queen. You will have to decide if you want an eightframe or a 10-frame box and then use that size box for that hive. There are three sizes of honey bee boxes (for both the eight- and 10-frame): Shallows are 5.75-inches tall; mediums are 6.625-inches tall; and supers are 9.625-inches tall. Normally you will use two "supers" for the living quarters for the queen.

On the top box, leave one frame out of the box for now (so only nine in the 10-frame or seven in the eightframe). You will be using this space later when you install the queen. After the queen is installed, you will put the missing frame in the box. Put the top on the box and you are ready for when the bees come.

Picking Up Your Bees

Bees are shipped on skids (120 hives per skid). When you pick up the bees, they will cut the connecting wood between the hives to separate them from the other hives on the skid. Some bee sellers will ask you if you need a mini marshmallow for the bees (same as what is used in hot chocolate). If you don't have any or don't want to buy any, you will get one for each hive you are bringing home.

On top of the hive there is a metal can and you will see a strip of metal in a slot. The can is where the food, the sugar water, is kept for the bees. The metal strip is attached to the queen's box inside the hive. When you transport the hive home, make sure the hive stays vertical so the sugar water doesn't leak out of the little holes on the bottom.

When The Bees Get Home

After getting home, I use welding gloves and my bee suit to protect myself and I am ready to install the bees into their new home. Before pulling the metal can out of the wood box, make sure you grab the metal strip securely using a vice grip. You don't want to accidentally drop it into the hive box and have to fish it out surrounded by the bees.

Using a screwdriver, pry out the edge of the metal can until you can grip it. What you want to do is pull the can out, while sliding the metal strip to the hole and pulling out the queen box. Then replace the metal can until the queen is installed, keeping as many worker bees in the hive box as possible. A few bees will escape, but it is easier to work on the queen's box if you limit the amount.

What holds the queen in her box is a cork on the bottom. You will remove the cork (I use an ice pick) and put that mini marshmallow where the cork was.

After bending that metal strap that is attached to the queen's box into a hook, you will hang the queen's box in the hive over a frame. Remove the can from the hive box and set it to the side. Flip the box over so the opening is on the bottom and shake the box to make the bees fall out and cover the queen. I place the near empty box on the ground next to the hive so the stragglers can find their way to the queen.

Put the inner cover on top of the bees (this is a board with a hole in the middle for feeding the bees). The can might be almost empty from the trip. Place the feeding can on the hole and go make food for the hive. I use canning jars to feed the bees for the first two weeks. This allows me to see from a distance how they are eating and when I need to feed them again. I drill 1/64-inch holes in the lid. This will allow the bees to suck the food out of the can, but it will not drip out when the jar is vertical.

Fill the can one-third full with sugar and the rest with warm (not hot) water. Walking back to the hive, I shake it to thoroughly mix it.

Back At The Hive

When back at the hive, remove the can and set it off to the side so the bees can get to it. Remove the inner cover. By this time, the bees will be all over the hive and not on top. I place a second queen excluder

The bees are in their hive, and the temporary feeders are in place.



here. This will keep the queen from laying eggs in the honey boxes later. Replace the inner cover and put on the jars of sugar water over the opening (with the holes down) so the bees can get to it.

By the time it takes the worker bees to chew through the marshmallow (about a day) to release the queen, the hive will smell like home and the queen should be happy and start laying eggs if the hive has comb already.

In two days, go back to the hive and remove the queen's box and put in the frame that you had set aside earlier. Put the inner cover and feeder back. Now you are done for about a week when you either remove the canning jars of sugar water and install one of the several types of feeder (frame, top, or others) or re-

place the canning jar with a full one every week or so, depending on how fast they eat the food.

In Six Weeks

In about six weeks, you will remove the feeder you are using, add the first honey box to the hive and put the feeder on top. The size of honey box you use will depend on how much you want to lift later.

A "super" will weigh 70 pounds when full of honey. A "medium" will weigh 50 pounds when full. And a "shallow" will weigh 30 pounds when full. So while the bigger boxes mean less work in adding new boxes or removing the honey less often as the year goes on, they are heavier than the others. (The weights are based off a 10-frame box.) ☀️

Honey Bee Boxes

Name	Size (8- and 10-Frame)	Weight* (10-Frame)
Shallows	5.75 inches tall	30 pounds
Mediums	6.625 inches tall	50 pounds
Supers	9.625 inches tall	70 pounds

*when full of honey

Spring Cleaning



BY CHARBEE KOENEN • BEEPPODS.COM

Spring is a time when beekeepers open their hives to do cleanups and count dead-outs. Today it's different, spring doesn't always spring in spring, fall doesn't fall in fall and sometimes we don't have winter. How does that affect the bees? Well bees are creatures of pattern and we beekeepers are pattern recognitionists. So since the pattern is now no pattern, and we're likely in part responsible for it...it's up to us to help them out.

In a top bar hive like the Beepods, bees draw their own wax combs horizontally with "bedrooms" by the entrance and "pantries" deeper inside. In preparation for winter, the colony cuts back in size and back-fills the bedrooms with

honey. Honey is not only food, but also the bee's thermal blankets. Bees cluster tightly around their queen like a Rugby scrum. Some go headfirst into the cells, dislocating their wings and shivering to create friction and heat much like flannel sheets, once you wiggle your feet a bit. The small cluster heats the area around their queen to 90°F, so her "mommy parts" stay warm and healthy. Once they've used the honey for heat, they eat it up and melt a doorway in the comb, and all move through to the next honeycomb blanket. This repeats until the cluster moves from the front of the hive to the back. Hopefully they stored enough honey to make it until spring brings new nectar sources.

Bees do best with consistent winter

Spring doesn't always spring in spring, fall doesn't always fall in fall and sometimes we don't have winter.

How does that affect the bees?

temperatures. But with our crazy weather, they break cluster more often and when temperatures drop quickly they may not get back in time to protect the queen, or worse, they reconvene too far from the honey stores. Assuming they survived, your job in spring is to clean out the dead, and return the bees to the front entrance so they can begin foraging and growing their family again.

Winter bees live a lot longer, but there will still be plenty of bodies inside on the floor and in the comb cells. The Beepod has a sliding screen floor for easy cleanup, otherwise just scoop out the bodies by hand. I try to extract as many of the dead head-first heater bees from their cell graves, gently tapping the bars on the side to eek out their bodies far enough to grab their wingtips and pull them out of the cells.

By helping the bees we let them move onto other important tasks, like prepping beds, gathering propolis, pollen and nectar. And if we run across a failed colony it's no doubt a sad moment, but these days we can celebrate giving a new colony a home and hoping that they'll learn the new patterns of food, forage and weather so they'll one day become survivor stock and produce resilient offspring.

In recent years everyone has been experiencing rather dramatic mortality rates among their bee colonies. So I always tell my new beekeeping friends to not get too attached to their colony, for spring cleaning may be more than a reset. Just remember the goal is to help bees breed into survivor stock that can regain strength as nature's principal pollinators. 

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What to Know as Spring Unfolds Into Summer



BY TOM THEOBALD, COLORADO

If April is the beekeeping equivalent of planting time, then May is when our efforts start to germinate. As the problems we face as beekeepers have grown, I've begun to question what my role should be here. Should I continue to use my 40 years of experience to give new beekeepers a sound foundation or should I discourage them, knowing that the evidence is mounting rapidly that their experience may be costly and disappointing?

I haven't answered those questions yet. Initially at least I plan to focus on the good side of bees and beekeeping, the happy side that's kept me transfixed for most of my adult life. I'll touch on some of the challenges from time to time, but won't dwell on them...yet. It would be irresponsible of me though, I think, not to ultimately look closely at some of the

new challenges we face as beekeepers.

As I say in every beekeeping class, I teach tongue-only-partly-in-cheek, "You don't keep bees, you marry them," and because of that marriage, that choice to become a beekeeper, you sign on to confront anything that threatens your charges. If you don't you aren't a beekeeper, you are what we call a bee-haver.

This craft isn't some great mystery, but it's more than just hanging out a bird house, far more challenging now than it was even 10 years ago, and if you are a bee-haver I can assure you that your bees will likely be dead in short order, one season, perhaps two. In many parts of the country you may see these same results even with the best of care. Getting into beekeeping is like hopping a freight train—you may see the country, or you may be headed for a train wreck, maybe both—but the only way to find out is to hop on. If you want to be a beekeeper and

are willing to give it your best shot, willing to spend the time and attention necessary to do it right, it will open you up to a magic kingdom, a rare window into the natural world where you are an intimate participant not merely an observer.

Welcoming Spring

On the far wall of my Honey House where it will be one of the first things I see when I open the door is a bumper sticker I found somewhere years ago—Just Another Ho Hum Day In Paradise.

Of course it overstates things. Over the years, I've had my share of wrecks and rodeos. I've spent many a long night out closing in bees to protect them from spraying, wondering if there might be a mountain lion or a bear out in the dark watching me work. I could go on with a long list that would look like a script to a Laurel and Hardy movie, one disaster after another, but you get the idea.

Beekeeping is farming, just with a different kind of livestock, and because it's farming, there is always something about to go wrong just around the corner.

Interspersed with the disasters though were the sunny spring days spent with the bees, watching them happily bringing in nectar and pollen, warm summer evenings when the air around a beeyard is redolent with the fragrance of new nectar and filled with a soft hum coming from the hives as thousands, millions of wings fan to distill that nectar down into honey.

Nearly every month in beekeeping is critical in one way or another, more so the warm months because these days represent the productive season. These are the days when the crop is made or lost and the plotting starts back in March, even February, here in Colorado.

If you are in dandelion country, and most of us are, the bees should be bringing in some of their own nectar, but it doesn't hurt to continue feeding them, even into the summer. If they stop needing it they'll stop taking it. The queen should be laying well and you should have a nice brood pattern with brood in all stages on two to four frames of honeycomb.

"Brood" is a term that covers all the stages of the new bees as they develop. Honey bees share the same life cycle as butterflies, which many people are more familiar with, the difference being that the life cycle of a bee occurs within the hive. It begins with the queen laying an egg, about the size of a tiny grain of rice, which she sticks to the bottom of the cell,

standing up. The egg will hatch in three days into what in the butterfly world would be a caterpillar, a larva. Larvae grow rapidly and at the end of seven days have grown to fill the cell in the honeycomb. They spin a cocoon within the cell and the hive bees cover the cell with a breathable form of beeswax, brown, the color of shopping bag paper. This is what we refer to as "sealed brood," and your packages should have sealed brood filling nearly all of two to four frames of honeycomb.

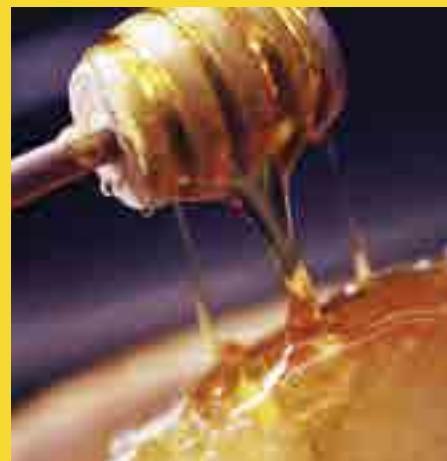
The total brood cycle covers 21 days, from the day the egg is laid to the emergence of a new bee, her downy body fuzz matted down from her close confinement. In an hour she will be dried out and fluffed up, looking like a little chick. Her first responsibility is to turn right around and clean the cell she emerged from, and while she's at it maybe a few more in the immediate vicinity. Then she will begin feeding her still-developing sisters, the larvae. For the first three days the nurse bees eat large quantities of honey and pollen, bee bread, which a specialized gland in their jaws convert to a high octane baby food, royal jelly. For the next four days, the larvae are fed bee bread directly, then spin their cocoon and the cell is sealed.

they've eaten their way up into their honey stores and the brood and most of the activity will likely be in the second story and the first story will be mostly empty. This isn't always the case: a really strong colony may be using both boxes, but on average most of the occupancy will be in the top box.

Beekeeping is farming, and because it's farming, there is always something about to go wrong just around the corner.

Nearing Summer

If you are an experienced beekeeper or if you started a year ago and have successfully overwintered a colony, May presents a different set of circumstances. Your bees are in two hive bodies—deep supers—and are growing rapidly. Bees' natural patterns are to move upward. During the winter





A colony of bees will more readily recognize space above them rather than below, and this has some important consequences in the spring. If a colony is in the top story, bumping the top, they will begin to feel crowded even though there may be a box of empty comb below, and in the spring this crowding starts the bees on a course to divide and multiply, or swarm. Swarming is a natural occurrence in the spring, but as a beekeeper you don't want your bees to swarm. These are your workers. These are the bees that are going to make your honey crop, pollinate your garden or your fruit trees. If you are keeping bees in an urban or suburban environment, you need to control swarming not only to maintain a strong population and produce a honey crop, but while swarms may be natural, when they are hanging from your neighbor's door knob or moving into the wall of their house it may be a strain on neighborly relations.

How Do You Control Swarming?

Giving bees more room is the key. If the lower story is empty the two hive bodies can simply be reversed, putting the empty space above the bees so they can

move into it. If both boxes are occupied, then this reversal has to be a little more surgical, moving brood frames down and honey or empty frames up. For really strong colonies these rearrangements may begin as early as mid-March and be done several times. Just remember, keep the empty space above the bees.

Eventually though the bees will begin to exceed the capacity of the two hive bodies and still need more room, and May is when most colonies reach that point. This is where the honey supers come into play.

Honey supers are put on a colony for one of two reasons: to provide space for honey storage or to give more room and relieve the crowding pressure. This means that honey supers are often put on in the spring long before they are needed for honey storage, but to relieve the crowding pressure and discourage swarming.

When you do this, there is a distinct risk that the queen will move up into these honey supers and begin laying in them. This doesn't present any problems for the bees, to them comb is comb and it doesn't matter if that comb is in a hive body or a honey super. It does make a difference to the beekeeper, however. The comb that has had brood in it will be darkened, and that in turn can darken the resulting honey subsequently stored in those darkened combs. Also, it will require time and additional manipulations to work the queen out of the honey supers soon enough that all of the brood will have emerged before the supers are pulled to extract the honey.

The simple solution to this is a device beekeepers designed many years ago for just this purpose—a queen excluder. A queen excluder is a frame the size of the outside dimensions of the hive, with parallel bars spaced so workers can pass through, but the larger queen can't. This goes under the honey supers and keeps the queen down below. The colony will have plenty of room for brood rearing in the two hive bodies and the empty supers will take the crowding pressure off and discourage swarming. Like much of beekeeping, this is both art and science. It will usually be effective, but sometimes a slimmer queen will slip though the excluder, and sometimes the bees just have their minds made up and they will swarm regardless of how much room you give them.

Learning To Anticipate

One of the most important skills for beekeepers to cultivate is anticipation. A colony of bees may go into the winter with a population of 30,000 bees, lose half or more and then begin to build again when the days begin to lengthen, early tree pollen begins to appear and the queen commences laying again. By mid-April, certainly by mid-May, the population of a good overwintered colony may be peaking and if the beekeeper doesn't take some of the steps I've described, the bees will be "hanging in the trees."

As beekeepers we have to stay ahead of the bees, anticipate what's up ahead. A good queen can lay about 2,500 eggs a day. She is limited in the early spring by the size of the colony population, the number and ability of the nurse bees to feed the larva, and the size of the nighttime cluster on the coldest nights (any brood not covered will chill and die). As we get further into March and then April, the colony population is increasing and the nights are warming, so the queen can lay closer to her capacity. If she is laying 2,500 eggs a day, this means that 21 days down the line there will be 2,500 new bees, and the next day, and the next. As beekeepers, we are shooting at a moving target somewhere out there in the summer, the summer honey flows. We want the population of a colony to peak just prior to the onset of the major honey flow. We want the maximum number of fielders to harvest the crop. If the colony peaks too early then we have created a large number of consumers, if it peaks too late, we've missed part of the honey flow. Once again, this is a mix of art and science, this is what we shoot for, but a lot can happen between spring and summer.

This may all sound a little too mercenary, but it isn't really. For 40 years my bee business was based on honey production, as that's what paid the bills. By focusing on honey production both the bees and I prospered, their objective after all was the same as mine: honey production. The deal we had was that under my care they would produce more than they needed for the coming winter and I got the surplus. We both benefited. It was a perfect marriage.

So in May look forward to June and July. Know when the major honey flows are likely to occur in your area and begin to shoot for them. If you aren't already aboard, the freight train is pulling away. Hop on. 

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Supering up for a Honey of a Summer

By TOM THEOBALD, COLORADO

June brings an end to the procrastination of springtime and the price that goes along with it. The spring months, March, April and May, are the time when a beekeeper sets the scene for what's to come, and if the essential things that needed to get done weren't tended to it's too late now, what's done is done, or not done as the case may be. By June spring is behind us and beekeepers are supering up.

In the beginning beekeeping classes, I encourage new beekeepers to go into their hives at least every seven to 10 days to see how things are going. While a healthy colony of bees in a healthy environment will follow a generally predictable course, growing in population as spring advances, swarming, building again, then capitalizing on the summer honey flows, there are a lot of variations on this theme and a lot can go awry in a relatively short time. Problems tend to

propagate themselves if not dealt with early, a small problem uncorrected becomes a bigger problem, then an even bigger problem, then a disaster. The beekeeper's role is to keep things on course.

Think of putting a few young children in a room to play. You parents know that you wouldn't just leave them unattended for hours at a time, you would check on them every so often. Bees are no different. A lot can happen in the course a colony is on in just two or three weeks, so it's important to keep track of the status of each colony. For newer beekeepers, if you haven't already done so, spend some time with the books and with YouTube videos so you understand what the course should be and what you should be looking for at any given time in the season.

While there's a practical reason for regular inspections, there's more to it than just that. A colony of bees is a unique, intimate window into the natu-

ral world and even though beekeeping has been a business for me I've still always felt privileged to be allowed in. For you newcomers and hobbyists this is part of your learning. Pull up a chair or an empty hive body to sit on, position yourself so the sun is over your shoulder and start by removing an outside frame or two to give yourself some room to work. Put the frames you've removed in an empty hive body that's on a drip board and cover them, then settle in. Pull out one frame at a time, it's like leafing through the pages of a book.

If it is a warm sunny day and the bees are busy bringing in nectar and pollen they'll pay little attention to your gentle intrusions. If resources are in short supply then the bees may be more defensive, more protective of the hive. In the bee world when times are tough each colony will start testing the defenses of every other colony, looking for those colonies that are too weak to defend themselves. The result is a general state of alert and

a defensiveness that you might not have seen just a day or two before. Reading a colony's mood is particularly important if you are keeping bees where your neighbors are close by and you have to know when to close a colony up and come back on a better day.

As you work your way in, frame-by-frame, you will come to a frame that has a lot of pollen. This is the pantry, this is the frame right next to the brood nest and the bees store the pollen where it is close at hand for the nurse bees. With the sun over your shoulder, shining down into the cells, you can easily see eggs and larvae and you should begin seeing the brood right after the pollen frame. You don't have to find the queen every time, you just need to see the evidence of her activity, good brood in all stages that may cover several frames. The books will give you much more detail on what you should be seeing. Make a few notes every time you go into a hive, over time it will help you understand what you are involved in much better.

If you got packages in April or early May they should be filling out their first story by now and be ready for a second. This will give them room for continued expansion of the brood nest and storage of the summer honey that will carry them through the winter. Here in Colorado we would expect that colonies started from packages in the spring would, on average, fill out two hive bodies and make their winter stores by fall. This can vary somewhat depending on the season and the part of the country you are in, and under favorable conditions a package might produce a super or two of surplus honey the first year, so be prepared, but don't count on getting a crop the first year.

By early summer the queen is laying about 2,500 eggs a day, round the clock, and for good overwintered colonies the population may peaking at 50,000 to 60,000. It is this large summer population that enables a colony of bees to store enough honey to carry them through the six months of the year when there will be no blooming plants, at least in the northern U.S., the part of the country I'm most familiar with. In Colorado the winter consumption for an average colony in an average winter would be about 75 pounds, and this is what we have to leave for the bees. This is probably representative of most of the northern tier of states, but colonies may need more further north



When inspecting the frames, be careful to gauge the mood of your swarm that day, especially if you have neighbors close by.

where the winters are longer and more severe.

I remember listening to a talk early in my beekeeping career by Jim Kuehl, a Nebraska beekeeper who was one of the first to winter bees indoors on a commercial scale. Jim moved the colonies into a light-tight, climate controlled building in October and kept them in until March. Air exchange was a critical consideration, carbon dioxide can build up quickly and kill the bees, and the other critical ingredient, the temperature, was held at 48 to 49 degrees. At that temperature the bees consume the least amount of honey. If it gets colder than that the bees cluster together and need to consume more honey to generate heat to keep the cluster above survival temperature, and if the temperature rises much above 48 to 49 degrees the bees are more active and consume more honey because of that.

Jim found that at 48 to 49 degrees he could overwinter a colony on 12 pounds of honey. This meant that he could har-

vest more honey in the fall and this added honey covered the cost of the indoor facility and then some.

The point here is that how much to leave for the bees is quite variable, but it's better to err on the plus side rather than short the bees and leaving 75 pounds or more is a good target. A second story nearly filled with honey plus honey in the outside frames of the first story will meet this requirement.

One of the real advantages of the Langstroth approach to beekeeping (those white boxes everyone is familiar with) is the ability to expand or contract the capacity of a hive based on the dictates of the bees and the season. The Reverend L.L. Langstroth is generally regarded as the father of modern beekeeping. In 1851 he struck upon the concept of the "bee space." From his observations he saw that bees left a fairly uniform spacing between their combs, what he called the bee space (about 3/8 of an inch) and he speculated that if he

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built a hive where all of the free space was 3/8 of an inch and put the comb in wooden frames, the bees would leave that free space open and he would be able to remove the combs and examine the hive without destruction. He designed such a hive, it worked beautifully, and the Langstroth Hive and that elegant little concept of the bee space has been the foundation of American beekeeping, much of beekeeping worldwide, for the past 164 years.

The year 'round home for a colony would be two hive bodies, deep boxes a little more than nine inches tall with nine or 10 frames of honeycomb in each.

Extracted honey gained in popularity around 1900 and since one hive body full of honey might weight 100 pounds or more, for ease of handling beekeepers sensibly opted for shorter boxes for storage of the year's crop of honey. There were various sizes available over the years and the popularity of many of these varieties waxed and waned. Collectively these boxes came to be called "supers."

Nobody knows for certain what the origin of this beekeeping term is, but our best guess is that these were boxes that were "superimposed" on a colony, thus super for short.

The Langstroth approach is well suited for honey storage and harvesting. To maintain the proper bee space a Langstroth box should have 10 frames of comb. We cheat a little in the honey supers and use nine evenly spaced combs. The bees will compensate for this by drawing adjacent combs out a little further, reestablishing the proper bee space. This results in fatter combs.

The bees seal each filled cell with a wax cap, which must be removed in some efficient manner to "extract" the honey at harvest time. With fatter combs, a hot knife can follow the plane of the wooden frame and remove the cappings quickly and efficiently. The now-open combs can then be spun out in a piece of beekeeping equipment called an "extractor," basically a big centrifuge that spins the honey out of the comb by centrifugal force.

Nationally honey production has run about 70 pounds per colony, varying up or down a few pounds depending on the year, but in recent years the national average has seen a considerable drop. Beekeepers with a small number of colonies can devote more individual attention to their bees and far exceed the averages—given good bees, good management and a productive season. In our area the average over the years has been about 75 pounds, but I practice a form of beekeeping called Double Queening, where through a series of manipulations a second queen is established in the colony. My two queen colonies would average about 240 pounds, and my personal record was 320 pounds from a single colony. That added production comes at a cost though—and includes a lot of manipulations of heavy boxes and careful timing—but it was that added production that kept my small honey producing business alive.

Nationally we have seen a dramatic growth in small-scale beekeeping and for most, honey production isn't paramount. Nevertheless, a healthy, thriving colony under the care of a good beekeeper is going to produce more honey than it needs in most years, and by June those strong colonies need to be supered up. In a good year, with a good colony, by the end of summer they may be higher than your head. ♣

Honey Extractor

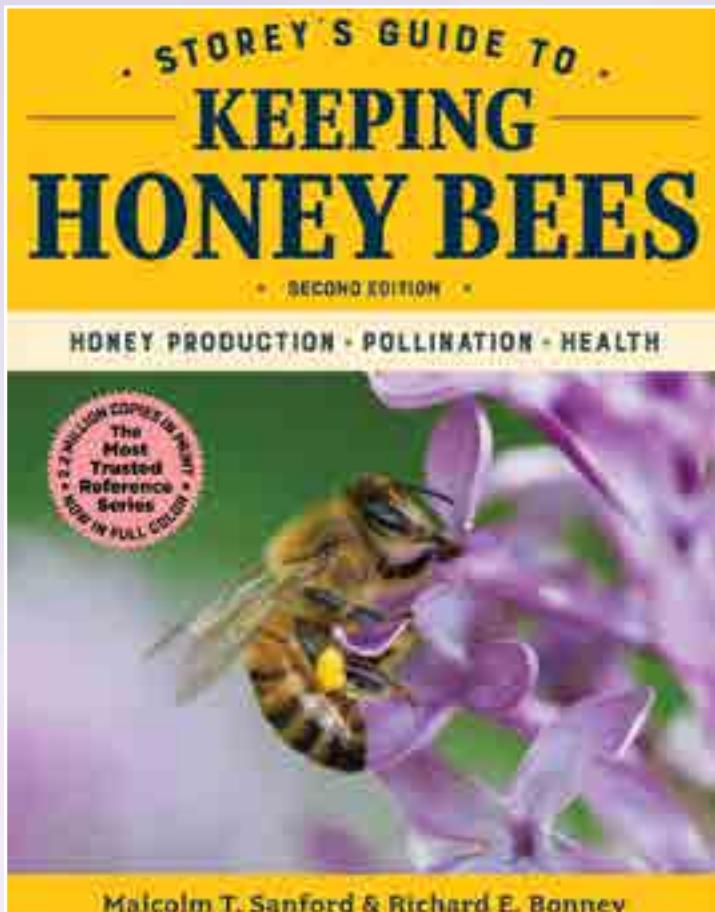


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Allowing good ventilation during the move is key. Also, doing so at night will ensure you don't lose any bees that are out foraging.

How to Move the Hive

From Point A to Point Bee



BY ED DANE

When I sell bees to a new beekeeper, the question of moving bees often comes up. I get questions like, "Why do you move them after dark?" or "Can I move them again once they are set?" or "Why do they have to be moved at least two miles away?" These and other questions about the subject are not easily understood and can be very confusing to beginners. Yet, the more we learn about bees the easier they are to understand.

The first thing to remember about bees is that you cannot make a bee do anything. They are programmed to be a bee and do what bees have always done. But you can sometimes manipulate them into doing what you want them to do if you understand a few basic things about them. So let's answer a few of the questions about moving bees and why we do it the way we do.

When a bee first emerges from the comb, the first thing it does is clean its own cell. For the next couple of weeks it's job is to take care of the brood; what we call

a nurse bee. Next, it might graduate to a honey processor or a wax builder. Then it moves up to the position of guard bee and guards the entrances. The last phase of its life is as a field bee. Bees only live six or eight weeks during the summer months when the honey flow is in full swing because they work themselves to death in that short time.

A bee doesn't need to orient to the hive until it starts foraging. This is why you can make a split from an existing hive and leave it setting in the same yard and not worry about all the bees going back to the original hive. The field bees will return to the original hive but the nurse bees will stay with the brood. If you make sure you have enough nurse bees by shaking a couple extra frames of bees into the split, you will usually be successful. You'll want to keep checking to make sure that you have enough nurse bees to keep the brood warm and possibly shake more bees if necessary for a few days though, just in case.

However, if you want to move the whole hive to another spot in the yard, you may have a problem because the field bees will all go back to the original spot unless you move the hive at least two miles away. That is why the rule is to move bees less than two feet or more than two miles.

Bees have an exceptional ability to orient on the spot where the hive sits. They use the angle of the sun and also line of sight of prominent features of the land to help them locate their hive. So if you set a hive of bees in your yard and then decide that you don't want them there but would rather have them in another spot in the same yard, you first have to move them to another spot at least two miles away for a few weeks until they have reoriented on that spot and then bring them back to the new position in your yard. If you bring them back too soon, the foragers that were foraging when you moved them will remember the old spot and go back to it and you will have defeated your purpose. You want to leave them there long enough for the old foragers to die off before you move them back. So I always tell new beekeepers to make sure that where they set the bees is where they really want them to be, permanently. Yes they can be moved, but it isn't that easy.

The main reason for this is so that we

don't leave any bees behind. If you were to move the bees to another spot during the day, all of the foragers that were out collecting nectar and pollen when you moved the hive would be lost because the hive would be gone when they returned. If there was another hive within a foot or two of the spot where their hive sat, they would most likely assimilate into that hive and survive. If not, they would die. This could amount to several hundred bees if the nectar flow was in full swing. At the price of bees today, you don't want to lose any of your precious bees if you can help it.

Don't Close the Hive Completely

The bees will need ventilation so they don't overheat and die on the trip to their new location. The best way to assure this is to use some screen to cover the entrances.

This keeps the bees in the hive and also gives them ventilation. Be sure to remove this screen as soon as the hive is set on its new location otherwise they won't be able to get out of the hive in the morning.

Don't Shine Any Light Directly at the Hive

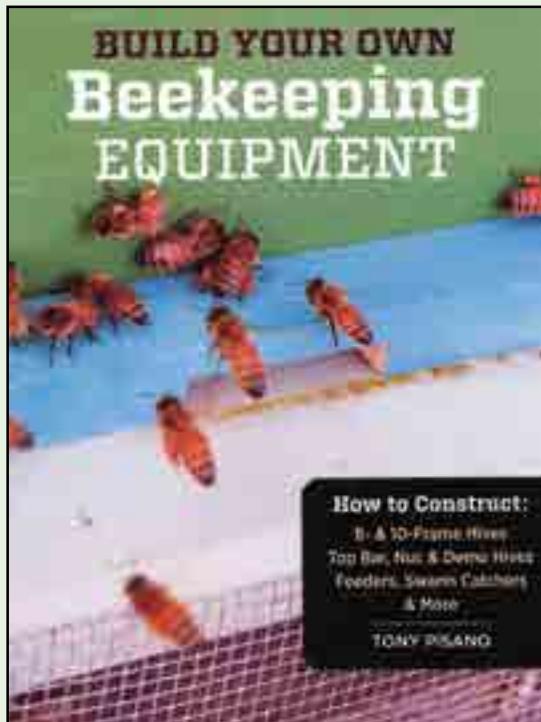
Bees don't fly at night but like any insect, they will be drawn to light. One of the beekeepers I sold some bees to learned this the hard way one evening when we were moving his bees. I told him not to shine his flashlight at the hive entrance but he just couldn't help himself because he was so interested in watching the bees. The next thing I knew, he was swatting himself and running for the cab of the truck. I had to chuckle because I learned that lesson the same way myself many years ago.

Secure the Hive Before You Move it

One more thing to always remember is to staple or strap everything together before you try to move the hive. If it's been a week or two since the hive has been opened, the bees will probably have it glued together with propolis, but why would anyone want to take a chance knowing what could happen? It's always better to be safe than sorry. ✕

Happy Beekeeping!

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Time to Winterize Your Beekeeping Gear

A Few Tips to Best Store Your Bee Equipment for Winter



BY ALEXIS GRIFFEE, FLORIDA

When the cooler weather rolls in, our thoughts on the farm often drift to the major winter tasks. However, for beekeepers, there are still some tasks to complete before hanging up your bee suit for the year. Proper storing and cleaning of your beekeeping equipment is not only vital to the life and functionality of your equipment, but also to the health of your bees.

As the honey flow winds down and your honey has been extracted, it is time to clean and put up your supers, frames and foundation. On our own farm, we always take this time to clean and prep all of our equipment so that we are not left chasing our tails as we scramble to assemble it all while catching a swarm or in the middle of the bee yard. It is pretty common to find a frame that has gotten a bit off kilter from use, especially after being in an extractor for the honey harvesting! We take this time to rebuild what we have that was damaged during the year. It is also at this time that you can take inventory of your supplies. If you know that you had a certain item that was irreparably damaged, now is the time to write down what will be needed for replacements.

During this time, we go through and scrape off any extra propolis and wax, and inspect all of the frames for sturdiness. When scraping off your frames and boxes, it is important to pay special attention to the corners or any cracks. These are the areas that some pests will hide and lay their eggs. Not only is it important to eliminate these pests, but this will also tell you if there is a bigger problem brewing within your hives.

It is also through these inspections that we can really have a good look at what is going on with our bees. If there were any problems with pests like wax moths or hive beetles, it will be clear when you inspect these parts. If we do find a hive or frames that have pests on them, we often will freeze them in our deep freezer to kill off any eggs. Many beekeepers will do this to all of their equipment, space permitting, as an extra precaution.

However, if you find yourself lacking freezer space, another tried and true method to sterilize your equipment is to use a blowtorch. Many beekeepers will use a blowtorch lightly on the insides of all of their boxes and on wooden frames. This will not only help to burn off any residual wax and propolis but kill any eggs that may have escaped your inspection. This method is chosen often because it is fast, precise and does not take any particular skill all while being effective.

Chemical sterilization, although harder to use, is another method that is used commonly by commercial beekeepers with a large amount of equipment. Chemical sterilization of your hives and components has proven through the years to be effective with threats to your hive. While more commonly utilized overseas, the use of acetic acid to fumigate your equipment has been proven very successful.

To use this fumigation method, the hive components need to be bagged, wrapped or stored in a sealed, preferably wooden structure. To use acetic acid, you will need 80 percent industrial grade. This can be acquired from beekeeping supply stores as well as some chemical supply stores. For the treatment, you will need to place a dish of acetic acid, usually about 50ml worth, on top of a stack of hive parts. This is where many people seal the hive components up depending on their storage locations. The hives and the acid should be left undisturbed for approximately one week. After this time, the acid can be disposed of and the beekeeping equipment can be aired out so that it is ready for use before next year. Once this, or other cleaning and sterilization method has been completed, your equipment is ready for storage.

However, a word of caution when using acetic acid. Acetic acid will corrode metal as well as concrete. Due to this, it is recommended that you cover all metal parts with Vaseline to prevent the corrosion. Additionally, do not store your metal extractor in the same enclosed area as your other equipment when you are using this method! If your fumigation area has concrete floors, be sure to bag your hives and seal them tightly before you begin this process so that it does not cause damage to your floor. Also, be sure that you wear proper eye protection as well as gloves when handling acetic acid to prevent injuries. Always keep acetic acid clearly

During this time, we go through and scrape off any extra propolis and wax, and inspect all of the frames for sturdiness.

labeled and away from children and pets.

Despite the extra caution needed when using acetic acid, there are many benefits. This method is especially valuable to the beekeeper that has dealt with pests and unexplained hive loss. Acetic acid is proven to kill nosema parasites, chalk brood spores, wax worms and other problems that have plagued beekeepers. No matter what method of cleaning your equipment you choose, all provide valuable benefits and are crucial to keeping healthy hives.

After you have your equipment repaired, cleaned and sterilized, it is time to store it for the winter. While you are preparing your own home to endure a cold winter, so are many pests. Areas that are prime for storing your equipment are also perfect for pests like mice, moths, snakes and roaches to spend their winter, too. It is no secret that mice alone can do a lot of damage to property. Mice are attracted to the sweet smell of the foundation and equipment. The boxes make great starting points for their nests and the wax gives them something to chew for the long winter. Aside from the obvious damage that this will cause your equipment, this is not sanitary. These same boxes will be holding honey next spring so keeping them clean should always be a priority.

As with anything in nature, for every action there is a reaction. In the winter, snakes need a couple of things: warmth and food. In your storage shed if it is not properly maintained, your bee equipment can be a supplier of both of those needs. Snakes will follow the rodents, and sometimes that may mean into your storage area. While they are just following their food source and do not have a specific interest in your beekeeping supplies, this can still be problematic. Obviously some snakes are venomous, and even those that are not can still give you a nasty infection if you are to get bitten. Like the mice, it is best to prevent the problem before it starts.

It is not just larger pests that can cause major damage to your beekeeping equipment. Moths, roaches and other scavenging bugs are drawn to the smell of foundation in particular. They will eat, destroy and lay eggs on your equipment. Aside from negating all of your previous work with cleaning and preparing your equipment at the end of the season, this will also put you at risk for introducing pests into your hives next spring.

One of the easiest and cheapest ways to keep your bee equipment pest free through the winter is to use moth balls. Moth balls will repel most major pests and keep them out of your equipment storage area. Generally speaking, moth balls should be replaced every year to ensure that they are still potent enough to do the job effectively. To use these, simply sprinkle them around the base of your equipment. When we stack our hive bodies and supers, after every few, we put a layer of cardboard in between the boxes. On this, we lay some more moth balls. This tried and true method is used commonly by beekeepers all throughout the United States.

Homesteaders are hopeful people and are always planning and looking forward to the next season in their life. Beekeepers are no exception to this rule! It is during these winter months where you can take the time to plan out your apiary and determine your plan for next year's success. It is also in this time that you will need to get your bees on order. This can be done by placing your order through a mail order company or by contacting other beekeepers in the area that catch and sell swarms or split their own hives for resale purposes. It is important to not end your beekeeping duties as soon as the cold weather sets in. Through a little hard work and planning with your equipment, you will be setting yourself up for a productive spring. 

Natural Comb Building: Boon or Bust?

STORY AND PHOTOS BY
LAURA TYLER, COLORADO

The construction of natural bee comb is a wonder to behold. Festooning bees clasp legs to form hanging chains, a behavior many beekeepers describe as measuring, and set to work building hexagonal cells using wax flakes they excrete from abdominal glands and shape with their jaws. Each bee appears to work independently, yet somehow cells built by many bees working on different areas of comb come together seamlessly. It is astonishing. And when you consider that natural bee comb has the added benefit of being free of the pesticide residues found in manufactured foundation, it's no wonder that interest in foundation-free beekeeping is on the rise, especially among small-scale beekeepers seeking to minimize pesticides in the hive. Yet foundation-free comb is a challenge to work with. It takes attention and an experienced hand to manage it successfully. Do you have what it takes to go foundation-free in your Langstroth setup? And if you do, will it benefit your bees?

The first step you can take toward reducing contaminants in your hive is to simply cull old pathogen-laden comb and replace it with empty frames, whatever style you have on hand, for the bees to draw anew. Do this in the spring before your bee population peaks, and when they are primed to build new comb. Avoid taking comb containing eggs or young brood. Once comb culling becomes a habit, you are one small step away from transitioning to foundation-free beekeeping. If you keep bees in Langstroth equipment, inserting foundation-free frames into

your culling routine is one way to go foundation-free gradually. You can also start new colonies on foundation-free frames. We started adding foundation-free frames to colonies at my apiary eight years ago and are currently using three different frame styles: traditional brood frames with foundation and two styles of foundation-free frames, T-frames and V-frames.

Two Langstroth-Compatible, Foundation-Free Frame Styles

We use two styles of foundation-free frames at my apiary, T-frames and V-frames.

We build T-frames using commercially milled frame parts. If you were building a typical Langstroth frame, the "T" strip you see underlining the top bar in this photo would be rotated 90 degrees and



used to hold the top edge of a sheet of foundation securely in place. Eliminate the foundation, turn the strip 90 degrees and you have created a great starting point from which the bees can string their first arcs of comb.

Our V-frames are homemade frames milled from two-by-fours using a table saw. The top bar of the frame in this photo is shaped like a shallow V. The bees will build comb starting at the low point of the V and draw it down. It is unnecessary to add beeswax, either strips of foundation or a melted strip of wax, to either of these frame styles. The bees will use the structure of the frame as their guide.

Pros and Cons

Foundation-free beekeeping, as lovely as it may appear, isn't for everyone. Here are some of its benefits and drawbacks.

Benefits:

- Foundation-free bee comb is pesticide free. "All foundation beeswax pressed into sheets and used as templates for comb construction sampled from North America is uniformly contaminated," according to Pesticides and Honey Bee Toxicity. This scientific paper published in 2010 listed many beekeeper-applied pesticides (used to control varroa and other pests) as contaminants and cast confusion on the role of pesticides in bee decline. Going foundation-free removes these contaminants from your beekeeping equation, giving you a clean slate on which to start your bees.

- Savings of cost and time. Going foundation-free eliminates the recurring expense of beeswax foundation and allows you to skip a step or two when preparing new frames for your colonies.

- Good for bee health? While I'm not aware of any studies that explore the relationship between natural comb building and bee health, biodynamic beekeeper Gunther Hauk mused on the subject in his 2002 book, *Toward Saving the Honeybee*: "Just as we derive our strength to a great degree from the health and stability of our bones (for walking, jumping, running, lifting, etc.), so does the bee derive her strength to raise healthy offspring from the substance the bee has 'sacrificed' from her own body, this precious wax."



A natural comb being built in process.
Note how the bees interlock their legs.
Right: On top, a T-frame, and
on bottom, a V-frame.



- Foundation-free comb is fun to watch. As someone who enjoys early spring beekeeping tasks including comb management, the opportunity to watch natural comb being built by bees adds a layer of depth and interest to my work with them. I enjoy observing the bees' creativity and seeing the greater variety of forms they come up with when left to their own devices as opposed to working on foundation. Watching bees make natural comb makes beekeeping even more interesting to me.

Drawbacks:

- Foundation-free comb requires extra management. While bees have the potential to build squirrelly comb on any style of frame, the potential for off-center, undulating comb of varied widths is greater when you go foundation-free. You need to be prepared to go into your hives every week when bees are laying down natural comb to keep an eye on things and keep frames movable. What you don't want to have happen is for the bees to build cross comb or other shapes that render frames unmovable.



A natural frame, fully drawn and packed with honey.

- Foundation-free comb is fragile. Naturally drawn bee comb has a fluid quality when warm. When naturally drawn comb is heavy with brood or honey you cannot ever position its wide surface parallel to the ground or gravity will pull it down. To inspect both sides of a foundation-free comb you cannot flip the comb up and down like a visor as you may be used to doing with conventional comb. Instead of flipping, you must master a swooping motion where you rotate the comb like the hands on a clock dial, or around like a carousel.

- Foundation-free comb slows hive management down. If your handling isn't practiced and you don't have time to manage comb construction, foundation-free beekeeping will present new inconveniences that make it feel challenging to get in and out of the colony, thereby discouraging your engagement with your bees. If you get yourself into a situation where entering your colonies feels overwhelming because of comb issues, then natural comb building is not for you. You must keep your bees in a state where you are comfortable engaging with them at any time.

Is natural, foundation-free beekeeping right for your Langstroth colony?
If you are a beginner, probably not.
But if you are an experienced beekeeper who enjoys getting in there with your bees and doing comb management, it may add something wonderful to your beekeeping experience.

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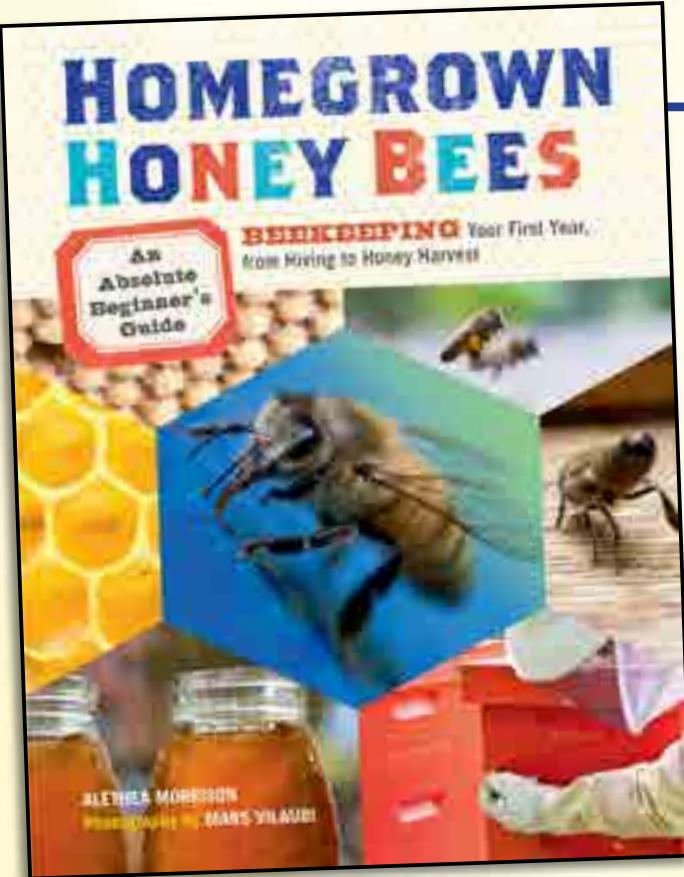
After several years of foundation-free beekeeping my husband, who is my beekeeping partner, and I are assessing. Has it helped our bees? And if so, how? This is hard for us to judge because we haven't approached our natural comb building experiments scientifically. We both enjoy the peace of mind we get from eliminating one potential hazard, contaminated foundation, from our colonies. Since overseeing comb and new brood production is one of my favorite beekeeping tasks, I am happy to continue working with foundation-free comb, even if it means more work. My husband, who values speed in the hive, is less enamored of the process than I am, and is lobbying for us to go back to conventional bee comb with foundation. What we have decided for the moment is to continue using both the foundation and foundation-free comb depending on short-term needs. Fortunately, the two frame styles are interchangeable. The only drawback to using both styles at once is remembering to be consistently careful when handling them.

While I am always interested in new ways to improve things for my bees, I'm not under any illusion that management decisions, like whether or not to use foundation or go foundation-free, have a tremendous impact on them. There may be effects, but they are subtle. Alas, it is the widespread incidence of pesticides in the environment that presents the biggest challenge to all pollinators, not just honeybees. It doesn't matter what new handling techniques I introduce, if the larger environment is hostile to my bees' well-being, they will suffer. The trick for concerned beekeepers is to remain engaged on two levels, looking inward at what we personally can do for our bees, and looking outward at what we can do politically in the larger world to also support them. While the inward stuff may give us a satisfactory feeling of being in control of something, a feeling we don't always get to experience in the wider world, it is not a substitute for engagement in the political sphere, which we must attend to as well. ✝

Beekeeping Your First Year, From Hiving to Honey Harvest

HOME GROWN HONEY BEES

By Alethea Morrison • Photographs By Mars Vilaubi



Discover the joys of harvesting honey from your own backyard. Alethea Morrison outlines what you'll need to know to make it through the first year, while stunning macrophotography by Mars Vilaubi brings the inner workings of the hive to life. With in-depth discussions of allergies, colony hierarchy, bee behavior, and more, this approachably informative guide bursts with enthusiastic encouragement. Keep your own bees, and enjoy the sweet buzz. 160 Pages

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Candles Made From Beeswax

How to Make Devine Beeswax Tapers



Candles and the dipping vats.

STORY AND PHOTOS BY
LAURA TYLER, COLORADO

Beewax comes in a range of colors, from lemon-yellow to warm, grizzly brown. Depending on its age and what part of the colony you harvest it from. While wax from all areas of the hive is useable to a degree, it is cappings wax, the newest wax you collect as part of your honey-extracting process, that makes the most divine beeswax tapers. It can take years for even the most productive small-scale beekeeper to save enough wax to fill a dipping vat with the material to make a single set of tapers.

But since beeswax candles make a most precious gift representing a marriage of effort between the bee and the beekeeper, they are absolutely worth saving for.

Like many beekeeping families, my husband and I divide our beekeeping work between the two of us. Beeswax rendering and candle making are his domain. His engineer's mindset and interest in systems make for efficient and consistent candle production. While you don't need to be an engineer to make beautiful hand-dipped candles, it helps to be methodical. And with a measure of patience you will do just fine.

Preparation

- Collect your equipment before you start. Look to beekeeping and candle supply companies for specialty materials like wick, wax melting containers and dipping racks. Equipment like water bath pots and cooling racks can be easily thrifted, or perhaps can be found in your home. Food and craft don't mix, so whatever you appropriate from the kitchen for candle making should remain candle making equipment forever more.

- Give yourself time and space. Candle dipping is a slow craft that you will enjoy more if you set aside the time for it to happen at an unhurried pace. Also, if you are using your kitchen for candle dipping, don't plan to also use it for cooking while your stovetop is occupied with wax.
- Make sure you have enough melted wax, and then some, to fill your dipping vat. It can take 10 or more pounds of wax to fill a 15-inch dipping vat, depending on its diameter. The wax level in your vat will drop as your candles grow so keep a pouring pot of melted wax nearby to add to your vat as needed.

- Heat your wax safely. Beeswax melts at around 145°F. At temperatures above 185°F it will discolor, and at 400°F it becomes explosive. The ideal range for candle dipping is between 155°F and 175°F. Melt your wax in a water bath to maintain a safe temperature. Never melt your wax directly on a stovetop. Electric warming containers with a rheostat that allow you control the temperature are also available. Use a candy thermometer or laser thermometer to test wax temperature throughout your candle-making session. Invest in a fire extinguisher for your work area if you don't already have one.

- Protect your lungs by ventilating. While beeswax fumes are relatively benign, the beeswax molecule starts breaking down into respiratory irritants at temperatures of 220°F and above. Reduce your potential exposure to these irritants and any other colorants or scents you may use by ventilating your space. A range-top hood provides good outflow. Leave a door or window cracked to allow fresh air in.

How To Render Beeswax

Rendering is the process of heating and melting unprocessed wax to filter out impurities. I recommend using only cappings wax for dipping beeswax tapers. It is easier to clean than wax from other parts of the hive and makes for an exquisite, aromatic candle.

MATERIALS:

- 1 or 2 nylon mesh straining bags available from most beekeeping suppliers
- 2 wax pouring pots with handle and spout
- Water bath (large cooking pot filled part way with water)
- Paper towels
- Silicone molds (cupcake size molds recommended for easy handling)

METHOD:

- Set water bath to boil.
- Use warm (not hot) tap water to rinse honey residue from cappings wax in mesh straining bag.
- Fill wax melting pot halfway with a 50/50 mix of rinsed cappings and water.
- Set half-filled melting pot in water bath to melt.
- Pour melted 50/50 mix through an empty mesh bag into your second wax melting pot. The goal of this first pour is to filter larger bee parts and detritus from cappings.
- Set pot in water bath to re-warm and settle.
- Wax and water will separate. Wax will settle on top. A layer of slumgum will settle under your wax on top of the water.
- Gently pour clean layer of wax into silicone molds. Avoid pouring slumgum and water into molds.
- Allow any remaining wax, slumgum and water to cool in wax melting pot. When cool, it will separate from the sides of the container allowing you to remove it from the pot. Discard water. Save cooled wax/slumgum disc for further rendering. Try using a single ply of a two-ply paper towel instead of mesh bag when rendering further for a finer result.

How To Dip Beeswax Tapers

Candle dipping rewards a slow and steady hand. It also has a meditative quality that can bring great joy to those for whom the skill is a good fit.

MATERIALS:

- Water bath (large cooking pot filled part way with water)
- Dipping vat tall enough to accommodate the height of candle you'd like to make
- 1 (or more) wax pouring pots with handle and spout
- Rendered beeswax, enough to fill dipping vat and replenish as needed while dipping
- Thermometer
- Taper dipping frame (optional)
- You may also dip candles freehand by tying little weights (nuts or washers) onto ends of wick.
- Wick for tapers, 2/0 square braid cotton wick recommended, but you are free to experiment
- Cooling rack (try using an old fashioned clothes drying rack)
- Blade for candle trimming



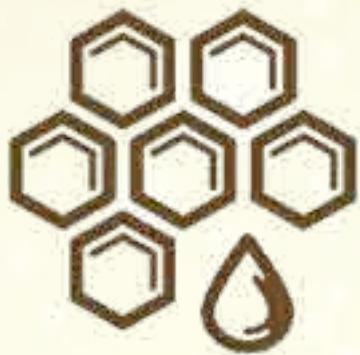
METHOD:

- Set water bath to boil.
- Place dipping vat in water bath and fill with beeswax. The dipping vat will float when empty but should settle neatly on the floor of your water bath as you add wax weight.
- Prepare a reserve of melted wax to replenish dipping vat as you dip your candles. If you can get your wax pouring pot wax to fit in the same water bath as the dipping vat, great. If not, prepare a second water bath.



Wicks are strung through the candle dipping rack.

- Monitor wax temperature using a thermometer. The ideal range for beeswax candle dipping is between 155° and 175° F. Do not allow wax temperature to exceed 185° to prevent wax from darkening.
- String wick through candle dipping rack per instructions. Skip this step if you plan to dip your candles freehand. If dipping freehand, simply tie nuts or other small weights to wick ends before dipping.
- Dip candle dipping rack or weighted wick to desired depth in dipping vat. If this is your first dip wait for bubbles to rise from the wick before you remove it from the dipping vat. When the air bubbles stop rising it is a sign that your wick is properly saturated with wax. Do not wait for bubbles on subsequent dips.
- Place on rack to cool.
- Candle is ready to be re-dipped when it is still warm, but not hot, to the touch. You will learn to judge this as you progress.
- Continue the process of dipping, cooling and re-dipping until you reach desired candle width. Create a nice tapered tip on your candle by dipping it just deep enough to submerge previous high wax mark each time you dip.
- Count your dips and make notes for your next candle making session.
- Use a blade to trim the bottom ends of your candle pairs. Dip candles two to three more times after trimming to finish ends.



TROUBLESHOOTING:

- Candle making takes practice and good old-fashioned trial and error to master.
- If your candles appear rippled it may be because the wax is too hot, or you are dipping the tapers too fast. First, go slower. If that doesn't fix the ripples, lower the temperature in your dipping vat.
- If your candle ends look like ringed tree trunks when you trim them it means your layers have failed to bind. Either your wax in the dipping vat was too cool, or you allowed the tapers to cool too long between dips. Next time increase the temperature in your dipping vat and/or allow less time to pass between dips.
- If your candles fail to build mass it means your wax is too hot and you are melting your previous work each time you dip. Or you are dipping your tapers too slowly. Reduce your heat and try again. The trick to mastering hand-dipped candle making is to find the right combination of temperature and dipping speed.
- Dip candles at a consistent, steady rate to prevent ripples. ☀

PROPOLIS:

Bee Glue that Heals

How to Use the Resin Bees Leave Behind

BY LAURA TYLER, COLORADO

There are non-urgent tidbits of beekeeping lore that the experts won't tell you when you are just getting started with bees. Not because they are secret. But because the amount of information available to new beekeepers is vast, and so much of it is need-to-know, that less pressing but still interesting details—like deciding what to do with that gob of propolis you have been adding to all summer—fall by the wayside. But as you are ready, your willingness to continue learning and trying new things can feel like an initiation drawing you deeper into the world of bees.

What Is Propolis?

Honeybee propolis is a brown or reddish resinous substance made by bees to protect the hive against animal and bacterial invaders. The word “propolis” is a compound of the Greek words “pro” and “polis” and translates to, “Before the city.” Bees use propolis as a building material to fill gaps and crevices, varnish combs and shape entrances, sometimes creating fantastic gobs that supposedly aid ventilation in the hive.

People have observed bees using propolis to corral insect pests like small hive beetles into tiny propolis “jails,” and to embalm dead mice. It has potent antiviral and antibacterial properties that aid in protecting the colony from infection. Made up of plant saps gathered by bees, redolent

of beeswax, pollen, and essential oils, propolis has a warm and spicy aroma that suggests comfort and mystery. Its use as a folk medicine dates back thousands of years. Today people use it to treat ailments ranging from oral

problems and fungal infections to allergies and sore throat.

Cultivating Propolis

The quantity of propolis a bee colony will produce depends on its nature and the conditions in the hive. Some colonies produce big, peanut buttery swaths of propolis that require diligent scraping on your part to move frames around. Others run a drier ship, highlighting the edges and ends of your equipment with a thin, almost delicate, reddish varnish.

Occasionally, when the right trigger is applied, bees will produce a terrific quantity of propolis, the size of a man's fist or larger, in a single area, typically near the main entrance to the hive. I have seen this happen in my own colonies, usually when something has gone wrong. One time, the bottom edge of a frame came loose, touching the bottom board. The



Photo
by Laura
Tyler

bees took this as an invitation to fill the space between the comb and bottom board with many square inches of potent, immaculate propolis. Another time, a piece of grass that fell into the colony near the entrance inspired a similar behavior. While these feats are exciting to witness, they are difficult to replicate or predict. When I see a colony has a propensity to make propolis, I will insert twigs along the bottom board near the entrance to inspire propolis creation with mixed and often disappointing results.

The simplest and most reliable method of harvesting propolis is to scrape it and save it in a designated bucket each time you work your hive. Look for the bigger, cleaner areas of propolis that collect along the top edges on each frame. Also, there are many fun looking styles and shapes of propolis traps available from beekeeping suppliers.

Beekeeping literature is full of negative information about propolis, how it gums up your equipment and requires continual scraping to maintain frames in moveable condition. Propolis is “unnecessary in modern apiculture, apparently useless to the bees and a disadvantage to the beekeeper,” according to the 34th edition of A.I. Root’s beekeeping classic, The ABC and XYZ of Bee Culture. Curiously, the book goes on to extoll propolis’ importance as, “the base of an important antiseptic preparation used by surgeons ... highly recommended as a domestic remedy for wounds and burns.”

That is the nature of propolis. Challenging but important. And highly recommended to beekeepers seeking to expand their role as providers of bee products in their communities. ♣

How to Use Propolis

I swear by propolis as a preventative remedy when I am traveling or feeling run down. I have also found it useful in treating a sore throat. I prefer to take propolis raw as opposed extracted in a tincture or blended in a salve. My favorite way to use propolis is the way I learned from a beekeeper friend in my second year of beekeeping:

Collect quality propolis, the rich looking, clean stuff free of bee parts and splinters, as you work your colonies throughout the year.

Store it loose in a sealable container, either a bucket or plastic bags at room temperature. You may also freeze it.

Choose a piece about the size of a pea, roll it into a ball and stick it on the back of a tooth, or the roof of your mouth. Hold it in your mouth for as long as you like, minutes or hours (after awhile it will break down) and then swallow or spit. Do not chew. Propolis has an intense yellow color that will temporarily stain your teeth and mouth. It also has a mild anesthetic quality. A mild tingling or numbness in the mouth is normal when using propolis.

Caution: Some people are allergic to honeybee products including propolis. If you experience an allergic reaction, discontinue use and consult a physician.

