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When I was growing up, my grandpa raised honey bees on his five-acre tree nursery. As kids, we didn’t bother the bees, and they didn’t bother us. The reward was sweet, aromatic honey, fresh from the hives.

When I started keeping my own bees, I was sure the flavorful honey would be my favorite part. It’s not. I do love it, of course, but I think that’s more about pride than taste. Like most beekeepers, I gain enormous satisfaction from sharing a harvest with friends and family.

There are two things I love most about keeping bees. First, keeping bees makes me keenly aware of the natural world around me. I hone in on the needs of these tiny creatures each season and frequently ask myself, how can I invest in the environment that serves them, or better yet, leave it undisturbed? The second thing I love about beekeeping is the way it lights up my senses. I love the fresh air when I hike out to the hives. I love the smell of the smoker and how the scent lingers on my bee suit, even after the chores are done. I love the aroma that wafts out of the hives, hitting sweet and earthy notes at different intensity, depending on the season.

Be warned: When you fall in love with beekeeping, you fall hard. I hope this guide serves you well, and you find pleasure and success on your beekeeping journey.

Steph Merkle
Community Manager
Backyard Beekeeping
Keeping bees isn’t free and so I’m often asked, “What is the cost of beekeeping? If I’m looking to start a honey bee farm, what is the expected initial investment?” Let’s find out together!

Over the past few years, I’ve enjoyed the honor of teaching fresh-eyed beginning beekeepers as they embark on the fulfilling adventure of caring for honey bees. Beginning beekeepers (aka Beeks) tend to be excited and nervous, curious and tentative, and I’ve been touched by how genuine their concern is for our buzzing buddies. With people like this committing to their wellbeing, the future for honey bees looks bright!

What Do We Need? What Does It Cost?

1) Bees

Of course, we can’t keep bees if we don’t actually have bees. Acquiring bees isn’t quite as simple as a trip to the pet store, but it isn’t too complicated either. There are FOUR common ways to get some bees. I’ll list them and the range of typical costs below:

Bee Package: Every year, late winter to early spring, large-scale beekeeping operations (primarily in California and Georgia) create packaged bees to sell to beekeepers around the country. Typically, these packages consist of two to three pounds of bees in a box with a young, mated queen hanging in a smaller box inside. Packages tend to become available in or around April, and are sold in a variety of ways: local pick-up direct from the provider, local pick-up from the bee club who obtains several packages for their members to buy, or purchased online and shipped to the beekeeper. Obtaining a package is the most common method of obtaining bees as a beginning beekeeper.

COST: $100 – $135
Nucleus Hive: A nucleus hive (or Nuc) is essentially a mini-colony of bees. They typically come in a box with five frames of bees, brood, pollen, nectar/honey, and a fertile, laying queen bee. These tend to be available in or around April unless they are obtained from a local, established beekeeper in which case they may not be available until May or June.

COST: $125 – $175

Split or Full Hive: A split is made when several frames from an existing, thriving colony are taken and put into a new hive box. The old queen is included, the bees are allowed to make a new queen, or a new mated queen is introduced. Sometimes beekeepers will sell an entire hive setup including an existing colony.

COST: $150 – $350

Swarm: You can always catch a swarm of bees. Of course, you have to FIND them first.

COST: FREE!

2) The Hive

We tend to think of a beehive as a bunch of stacked boxes but it’s a bit more complicated than that. The most common hive setup, known as the Langstroth hive, consists of a bottom board, two deep boxes including frames and foundation, an inner cover, an outer cover, an entrance reducer, and some sort of stand. You’ll also want to have some honey supers around in case you get a good nectar flow and these will need frames and foundation as well. I typically recommend beginning beekeepers buy one medium super their first year. Lastly, every beginning beekeeper should have some sort of feeding device for their new colony in case they need to receive supplemental sugar-water.

COST: $150 – $300

You can find some great beginning kits sold by Dadant, including the entire hive at dadant.com/catalog/beginners-kits.

3) Accessory Equipment

Unless you’re planning on being a Bee-Haver instead of Bee-Keeper, you’ll need some accessory equipment to help you care for your bees. At the very least, you’ll want to have protective equipment (such as a veil, suit, and gloves), a hive tool, a bee brush, and possibly a smoker. Beyond that, there are myriad ancillary tools and gadgets to help enhance your beekeeping experience. You can find many of them at places like Mann Lake or Miller Bee Supply.

COST: $100 – $300

4) Mite Treatment

I firmly believe EVERY beekeeper is eventually a mite-keeper — even in your first year. I strongly encourage you to learn all about the varroa mite, options for mite control, and settle on a system of mite control that works for you. This may (should) include some sort of active mite treatment as part of an Integrated Pest Management (IPM) plan.

COST: $20 – $200

Total Expected Initial Investment

What I’ve listed here is what I consider to be the basic essentials to start. You’ll notice the cost of beekeeping
equipment varies as there are copious options for many different supplies. For example, do you want your hive woodenware to come painted or “raw?” Would you like a simple veil or a full body bee suit? Will you buy a smoker? What type of mite control will you buy and use?

In the end, when someone just wants to know the average start-up costs for a beginning beekeeper who is buying bees (in lieu of catching a swarm) I tell them to expect to pay approximately $500 for the first hive and roughly $300 for each additional hive.

Where Do We Get Our Supplies?

I’m a huge proponent of buy local. In Colorado, we have excellent local options for buying bees and bee supplies. Most of the regional bee clubs procure large amounts of packages and nucs each spring to sell to their members, and we have some mid- to large-scale beekeepers around the state who sell packages and nucs from their bees (some of which were actually over-wintered locally and bred from local genetics). We are also fortunate to have a few well-stocked beekeeping supply stores throughout the state, some of which sell woodenware made in Colorado. If you have these options in your area I encourage you to take advantage of them.

For some of us, the online shopping experience is the way to go. If that’s the case for you, here is a list of some great suppliers:

1) Miller Bee Supply (www.millerbeesupply.com)
2) Mann Lake (www.mannlakeltd.com)
3) Dadant (www.dadant.com)

Are There Any Cost Saving Options For a Frugal Beginning Beekeeper?

Yes there are! We already discussed one above — catch a swarm! Catching a swarm has a couple of benefits: the bees are FREE, which greatly reduces your total cost of beekeeping, and you’re getting bees who came from a local colony strong enough to send off a swarm. Some bee clubs maintain a “swarm hotline.” These hotlines consist of a phone number the public can call when they spot a swarm in their area. The bee club member takes the call, gathers the information, and consults a list of beekeepers in the area willing to catch the said swarm. If your club maintains such a hotline find out how to get your name on that list!

You could also look into buying used beekeeping equipment. For a variety of reasons, local beekeepers may be selling (or giving away) some or all of their used equipment at a discounted rate. A word of caution about this approach — some diseases transfer with equipment, especially woodenware. If you acquire used equipment do all you can to be certain it isn’t bringing a nasty bug along with it.

ABOUT THE AUTHOR

JOSH VAISMAN is an avid beekeeper and instructor in Northern Colorado. An active member of the Northern Colorado Beekeepers Association, Josh has been involved in the education of new beekeepers on behalf of the association and privately. Like most people who study apiculture, Josh started into beekeeping as a hobby, and offers valuable experience to those wanting to start beekeeping about the learning curve involved, what to do, and what not to do when getting started. When not tending to his hives, Josh is a Positive Change Ninja with Flourish Veterinary Consulting, a company he co-founded to apply the science of well-being to the veterinary workplace. He lives in Firestone, Colorado with his wife, Greta.
Be respectful and thoughtful of your neighbors by following good beekeeping practices.

KNOW YOUR LOCAL LAWS REGARDING BACKYARD BEEKEEPING.
If beekeeping is allowed, you may still be restricted by how many hives you can have on your property or how far away they need to be from neighboring properties. Do your homework BEFORE you start keeping bees.

ALWAYS HAVE WATER AVAILABLE FOR YOUR BEES.
In the summer, a bee colony can drink a quart or more of water a day. If you don’t provide water, they may visit your neighbor’s pool or other watering holes away from your property.

POSITION YOUR HIVE OPENING AWAY FROM YOUR NEIGHBOR’S HOMES.
Your bees will be coming and going all day and it’s best to have them leaving their hive and flying toward your home and not your neighbor’s home.

USE FENCES, SCREENS OR HEDGES TO ALTER THEIR FLIGHT PATTERN.
Bees keep a flight pattern when leaving and returning to their hive. A fence, screen or hedge near the front of the hive forces bees to fly high and steep when taking off and landing.

BE HELPFUL.
Educate your neighbors on beekeeping and bee behavior. Most neighbors will be excited or, at least, intrigued by your bees. You may consider asking them to plant a pollinator garden and refrain from spraying chemicals. Take legit bee allergies seriously.

ENCourage YOUR NEIGHBORS TO GROW POLLINATOR-FRIENDLY PLANTS.
Planting plants that attract bees is a great way for them to be a part of what you’re doing and they’ll have a good harvest because of the bees.

SHARE YOUR HARVEST
People are most excited about things they benefit from, so every so often, share a jar of your honey with your closest neighbors. If you want a quick win, purchase honey from another backyard beekeeper because it will take a while for your first harvest.

ONLY KEEP GENTLE BEES – THIS IS THE MOST IMPORTANT RULE.
The more populated the area you live in, gentler your bees need to be. This is especially important if you live in an area that has Africanized genetics in the bee population.
Sun and Shade for Bees: What Is the Right Mix?

Selecting a Beehive Location Can Be a Difficult Decision

By Rusty Burlew

Many factors are important in determining a beehive location, including the relative amounts of sun and shade for bees. Many beekeepers insist that honey bee hives should be placed in full sun. But like most aspects of beekeeping, it’s impossible to make one rule for all locations.

If you travel through wide open farmlands, you will often see beehives placed squarely in the blazing sun, perhaps sitting in a field of clover or alfalfa. It’s easy for those who are just starting beekeeping to look at hives belonging to experienced beekeepers and think, “Full sun must be the right way!” But stop and think. Do you see shade anywhere? Those hives might be in full sun because there is no shade. Remember, too, that many of those hives will be moved once the bloom is over, meaning the full-sun position lasts only a few weeks. Just because we often see hives in full sun doesn’t mean it’s the best choice.

The Case for More Sun

Back in the days when there were fewer threats to honey bees, beekeepers learned that when a hive
was warmed by the morning sun, the bees got to work earlier in the day. Likewise, if the hive got evening sun, the bees worked till dusk. All of this benefited the beekeeper by maximizing honey yields and profits.

But researchers who studied feral colonies to see what the bees preferred found something different. Given a choice, feral honey bees nearly always chose a shady spot on the edge of the forest. Most of these wild colonies have an entrance that faces south. When the light pokes through the southern opening, the bees know it’s time to go to work.

Feral hives can also be found in locations that get no direct sun from morning till night. These hives might be high in the leafy limbs of a tree, built into the framing of a barn, or even wedged into a concrete utility box on the shady side of a building. All of these bee-selected locations prove that a colony can thrive in full sun, part sun, or no sun.

**Sun Creates a Hot Hive**

When you’re thinking about sun and shade for bees, you also have to think about heat. Beehives in direct sun can get incredibly hot, and the hotter it gets, the harder the bees have to work to keep the hive cool. The brood — all the baby bees including eggs, larvae, and pupae — must be kept at a constant temperature of about 95 degrees Fahrenheit. To do this, the bees first collect water and spread a thin film of it around the edges of the brood comb. Then they stand on the comb and fan their wings at an incredible rate to make air currents that evaporate the water. This is called “evaporative cooling” and it works like an air conditioner.

The hotter it gets, the harder the bees must work to keep the brood from overheating. In addition, too many warm bodies inside the hive make the problem worse, so some of the bees may leave the nest and assemble on the outside of the hive in clumps. We call this bearding, and it’s a sure sign of a hot hive.

**Too Much Heat is Unhealthy**

If a colony in full sun has to work too hard to stay cool, the colony may eventually swarm or abscond. In extreme situations, where there is inadequate ventilation and no water, the wax combs can melt, killing the bees. This is especially true in hot climates with long days.

To keep your bees healthy and happy, make sure they have a plentiful supply of water and adequate ventilation. Even if your bees must be in full sun, a screened bottom board, a screened inner cover, an upper entrance, or a combination of all three can improve the flow of air through the hive and keep it cool. Also, a hive painted a light color like white or yellow will reflect sunlight instead of absorbing it.

**Seasonal Changes**

Beekeeping in winter presents the challenge of keeping your hives warm. Direct sun in winter can keep the hive warm even in very cold temperatures. You can maximize the warmth in winter by reducing air flow through the hive and absorbing any excess water that accumulates. Adding a windbreak, such as a wall of straw bales, can also help keep the hive warm.
If you live in a very damp location that is swampy or gets lots of rain, a hive in a shady location may have trouble staying dry. Some beekeepers believe that shade encourages small hive beetles, but not all agree. Everything in beekeeping is dependent on local conditions, so you may have to spend some time finding the perfect hive location for your climate.

The Ideal Amount of Sun and Shade for Bees

The ideal situation would be early morning sun, late afternoon shade, and evening sun. A colony in those conditions would warm up early in the day and start flying. By late afternoon when temperatures spike, the bees would be shielded from direct sunlight. And then, late in the day when the temperature begins to drop, the hive will warm up again before the evening coolness sets in.

When you’re looking for the perfect combination of sun and shade for bees, don’t forget to look up. Do you see bare branches? Deciduous trees can be great for honey bees because the bare branches of winter allow the sun to warm the hive and keep it cozy. Then, in the hot days of summer when you are trying to keep honey bees cool, the leaves keep the hive shaded and cooler. No wonder feral colonies are so fond of deciduous trees!

The Perfect Beehive Location

But remember that the ideal beehive location isn’t always possible. Since honey bees are adaptable to various amounts of sunlight, you can give the sun or shade decision a lower priority. Keeping your bees away from neighbors and livestock is more important, as is putting bees in a place that is comfortable for you to work. Remember, nothing is worse than a bee suit on a hot day.

You can’t maximize all parameters all the time, so when it comes to sun or shade for your bees, think about it but don’t worry about it. Most honey bees do well, in spite of their keepers.

What have you discovered? What is the best proportion of sun and shade for bees in your local area?

Ask the Bee Expert!

Visit backyardbeecpeaking.iamcountrysidemag.com and get answers to your beekeeping challenges through our live interactive chat!

You can also email us at editor@countrysidemag.com or mail your inquiries to P.O. Box 566, Medford, WI 54451

ABOUT THE AUTHOR

RUSTY BURLEW is a master beekeeper in Washington State with an undergraduate degree in agronomic crops and a master’s degree in environmental studies with an emphasis on pollination ecology. Rusty owns HoneyBeeSuite.com, and is the director of the Native Bee Conservancy of Washington State.
Dave writes:
I’m new to beekeeping. My bees seem hot in this 90+ degree weather. They are bearding a lot. What are your suggestions for keeping them cool? I have a screened bottom and a slide in a bottom board. Can I remove that solid board to give them more air?

Hi Dave,
I hope you are enjoying your first year of beekeeping! First off, yes, you can remove that solid bottom board and give your bees more ventilation.

Bees are pretty amazing creatures. They can be found in almost any climate and learn to adapt well. Up here in the frigid north, our bees survive several days of subzero temps.

Bees know what to do when the temperatures get hot. Bearding is a natural part of the process, so if you see bearding, it means your bees are taking care of their desire to keep the hive at 95 degrees F.

Here are three things you can do:

1) SHADE: Try to provide some shade for your hives, especially in the hottest parts of the day. Hopefully, when you set up the hives you thought this through — a good mix of sun and shade is important.

2) WATER: Water is crucial in the hot, dry days of summer to keep the colony productive as well as for each bee’s personal survival.

3) VENTILATION: Ventilation is important for the hive all year long. As the bees bring in water, the humidity in the hive rises and it’s harder for the nectar to dry, so they fan more. They use an incredible amount of energy fanning air that can go nowhere without ventilation.

I hope this helps! Good luck!

- Steph Merkle, Community Manager
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.
A Langstroth hive is the most common beehive in developed countries. Lorenzo Lorraine Langstroth (the creator) observed that if 1 cm space was left between the cover of a hive and the top bars, that the bees would not fill it with burr comb or propolis—it was deemed walking around space. He realized that if he built a hive with this exact space he could have completely movable frames. The Langstroth hive is basically a box with 10 wooden frames in it. The frames can have a foundation already installed or they can be foundationless. The bees fill one box at a time and when the box is 70% full, the beekeeper adds another box on top.

**A COMMON LANGSTROTH HIVE SETUP**

**TELESCOPING COVER:** This is the “roof” of your hive. The cover hangs over 2". A brick, rock or other object should be used to weigh down the cover to keep predators out and the lid securely in place during a storm.

**INNER COVER:** This sits on top of the topmost hive body (or super) and underneath the telescoping top cover.

**SUPER:** This is a hive box used by the beekeeper to collect excess honey. Placed above the brood chamber, a healthy colony may fill several honey supers for the beekeeper in a single season.

**HIVE BODY:** This is a hive box that provides the honey bees a place for the queen to lay eggs and storage area for pollen and honey to be consumed.

**SLATTED RACK:** This is also called a brood rack. It provides an insulating pillow of air below the brood chamber to keep the honey bees cooler in summer and warmer in winter.

**SCREENED BOTTOM BOARD:** This option is said to give beekeepers greater mite control (because the mites fall out through the mesh instead of falling onto a solid board) and greater ventilation within the hive.

**SOLID BOTTOM BOARDS:** This option is the original design of a Langstroth hive, and can help keep the hive warmer but doesn’t offer the ventilation of a screened bottom board. Some beekeepers believe that a solid base encourages earlier brood rearing.

**STAND WITH LANDING BOARD:** This is the base of your hive. A hive stand reduces the amount of moisture getting into the hive form the ground and increases the longevity of your bottom board.

**FEEDER OPTIONS**

Entrance feeder aka Boardman feeder (pictured above)
- Top hive feeder
- Division board feeder
- Baggie feeder
- External hive top feeder

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Urban Beekeeping Benefits
You and Your Neighbors
Can You Keep Bees in the City and Keep Your Neighbors Happy?

By Josh Vaisman

The list of urban beekeeping benefits is extensive, so long as we approach it in a neighborly way. Being a courteous beekeeper in a city or suburb goes a long way.

We live on a tenth of an acre in a dense suburban area. Our backyard beehives are mere feet from our neighbor’s house and their flight path goes directly over the home right behind ours. Yet for five years, we’ve had this exact setup without incident. In fact, our neighbors regularly ask about the well-being of our bees!

How have we cultivated such a peaceful context in our cozy little community? I’ll walk you through the steps we took.
If you do not provide your bees with a quality source of water, they will find one. This means a neighbor’s pool, hot tub, pond, or leaky hose.

Keeping Urban Bees and Neighbors Happy

Can I keep bees in the city? The very first thing every urban beekeeper must do is answer this question. Many municipalities have rules regulating urban beekeeping. Some don’t allow it at all. Some have particular restrictions on the number of hives, location, or even distance from the property line. To further complicate matters, your Home Owners Association (HOA) may have its own set of rules. Neither our municipality nor our HOA has any beekeeping restrictions so, from a legal standpoint, we were good to go.

Don’t surprise your neighbors! The first step in keeping your neighbors happy is to keep them in the loop. In my opinion, much of the neighbor conflict that arises from urban beekeeping comes from the uninformed.

Three months before our bees arrived, after completing our beginning beekeeping class, we sat down with our neighbors to let them know we are preparing for this wonderful hobby. We shared all the current information about bees and beekeeping and answered all their questions. They were, understandably, apprehensive. But, they appreciated our candor and agreed to come directly to us if there was ever a problem.

Plan your hive location. Keeping bees on large parcels of land has its own set of best practices. Ideally, the colony would be protected from harsh elements, facing a particular direction, have easy access to water and food sources, and be touched by the sun in some way. As an urban beekeeper, the hive location options are likely limited. Additionally, the urban beekeeper must add “neighbor impact” to the list of best practices.

Our hives sit in a narrow space between our home and our next door neighbor. The hive entrance is less than 10 feet from the neighbor’s house and their flight path, left unimpeded, would send them straight into the neighbor’s back yard.

This serves a couple of purposes; first, it gives a little psychological comfort as the visual to the hives is blocked, and second, it helps direct the bees’ flight path away from the neighboring house. By the time the bees are over any neighbors, they are dozens of feet in the air.

Create a high-quality water source for your bees. Bees will travel as far as five miles from their hive to find and gather resources. As an urban beekeeper, you cannot possibly provide your bees enough pollen and nectar on your small piece of land (or balcony or roof). However, bees are efficient foragers and the
To help ease our neighbor’s concerns, we built a large privacy fence between the hives and their home.

amount of water they require is substantially less than pollen and nectar.

To be sure as many bees as possible got water on our property, we created bee water sources near their hives in our back yard. Initially, we bought two large bird baths and filled them with stones. We then filled them with clean water just deep enough so that the stones became little islands for the bees to land on. Finally, we added a little bit of Honey B Healthy to attract them to these sources of water. It worked (mostly) like a charm.

One summer, though, they discovered the hot tub across the street. Luckily, these neighbors had already become fans of our bees and weren’t bothered by it at all. In fact, they started rescuing bees that had fallen into the tub! Still, we didn’t want this to become a habit so we eventually had a large year-round fish pond built in our front yard. Our bees LOVE it and use it almost exclusively for their water needs.

Share the bounty! Good urban beekeepers share their honey with their neighbors! Every fall we give at least a jar of honey to all our immediate neighbors as a gift for supporting our bees. And they’ve begun returning the favor by sharing the crops from their vegetable gardens. After all, it was likely our bees that helped pollinate their plants!

Manage your hives to minimize/eliminate swarms. Overwintered colonies want to swarm. It’s how they spread their genetics and propagate into the environment. Once a colony swarms, unless they are captured, they will find a new home as quickly and efficiently as possible. In an urban setting, these new homes often end up inside the walls of someone’s house. That’s a very expensive and invasive problem to solve. A best practice for urban beekeeping is preventing swarming as best you can.

Our first year we explained to our neighbors what a swarm is so they would know what to look for. We also made sure they had our phone numbers so they could call if they ever saw one. In the spring, we make sure to be proactive in our swarm management practices. Our goal is to never have a backyard colony swarm. We’ve been very successful, minus one exception!

A couple of years ago we had a swarm happen mid-day while we were both at work. By this time our neighbors’ concerns about our bees had totally dissipated and, they knew what to do. They excitedly called us on our cell phones. My wife was able to escape work early and got home in time to capture and re-hive the swarm. The neighbors got a huge kick out of the whole adventure.

More times than not communicating with your neighbors and following courteous practices as best you can is enough to create community harmony as an urban beekeeper. It’s worked well for us all these years and we hope it works for you too. Urban beekeeping is a real joy and, recent research suggests honey bees may do better in an urban setting!
Why Feed Honey Bees?
Supplemental feeding is necessary when bees lack these critical food resources: nectar or pollen.

**NECTAR**
Nectar, which becomes honey, is the carbohydrate source bees need to produce energy for life and work. They store honey to eat during a nectar dearth in the environment. To supplement nectar, create sugar water.

**POLLEN**
Bees also collect plant pollen as their source of protein, primarily for raising their brood. To supplement pollen, provide a pollen patty.

**SUPPLEMENTAL FEEDING**

**NEW COLONIES**
Feed new colonies supplemental sugar water until they have built comb in both deep brood boxes.

On average, for every 10 pounds of honey a colony produces, they are only able to produce one pound of beeswax.

As long as they are building comb, you should be supplementing with carbohydrate-laden sugar water.

**SPRING FEEDING**
1:1 granulated cane sugar to warm tap water + Honey B Healthy (1 tsp per quart)

Warmer weather encourages bees to leave the hive. Unfortunately, early spring offers very few natural nectar sources.

Spring ushers in a rapid increase in the colony population. Often colony growth outpaces the available natural resources, which results in the bees consuming most or all of their stores.

In early spring, track the weight of the hives by gently lifting the back of the hive with one hand. By feel, you can tell if the colony is getting too light on honey stores. If they are, and if the ambient temperatures allow, begin supplemental food, including sugar water and a pollen patty.

**FALL FEEDING**
2:1 granulated cane sugar to warm tap water + Honey B Healthy (1 tsp per quart)

After you pull honey supers in late summer, evaluate how much honey is available for winter stores. If it’s not enough to get the colony through, start supplemental feeding.

Leave at least one full deep box of honey for a full-sized colony. This is about 90-100 pounds.

**FEEDER OPTIONS**
- Entrance feeder
- aka Boardman feeder
- Top hive feeder
- Division board feeder
- Baggie feeder
- External hive top feeder

**POLLEN PATTY**
A pollen patty substitute gives bees protein when they need it most. Place it on the top bars of the top box in a Langstroth beehive.

**FONDANT**
Fondant is a supplemental source of carbohydrates. It’s essentially sugar candy placed inside the hive over winter. It softens as warmth and condensation form from the bee cluster.

**FEEDING DON’TS**
- Don’t use brown sugar, beet sugar, powdered sugar, or honey as a supplement.
- Never feed bees while honey supers are in place.
- Bees should not be fed all year long.
Another Beautiful Day in the Apiary

Connect with these helpful beekeepers online and through social media for tips and tricks from their own bee yards.

Photo by Angela Ferraro-Fanning, New Jersey. Follow online at: axeandroothomestead.com
axeandroothomestead, axe and root homestead

Photo by Michelle Marine, Iowa. Follow online at: simplifylivelove.com
simplifylivelove

Photo by Ashley Lankosz, North Carolina. Follow online at: our.barnyard.life
our barnyard life
Honey bees currently face three difficult challenges to their survival — a lack of quality nutrition, ubiquitous pesticides in the environment, and the scourge of the varroa mite. Beekeepers can have some positive impact on the lack of nutrition by planting bee-friendly flowers and encouraging others to do the same. We can also reduce or eliminate our own use of chemicals in our environment and educate friends and family to do the same as well. The greatest opportunity for impact, in my humble opinion, comes in the form of varroa mite management in our bee hives.

In this article, I’ll discuss the basic life cycle of the varroa mite and how long varroa mites live, how these pests have such a powerful negative impact on honey bees, and a brief overview of testing and mite treatments.

**Varroa Mite Life Cycle**

*Varroa destructor* (its scientific name) are tiny arachnids that evolved alongside the Asian honey bee. At some point, it “jumped” to the European honey bee. At some point, it “jumped” to the European honey bee with devastating consequences. Among the pests found in beehives (such as mice, ants, wax moths, and hive beetles) varroa mites are, in my opinion, the worst.

There are female and male mites. The female is significantly larger than the male though neither get much bigger than the head of a pin. Males are typically white while females are red.
Varroa exist in two stages — phoretic and reproductive. During the phoretic stage, the female mite feeds on adult bees for between five to 11 days during brood rearing times. When there is no brood present, mites remain in the phoretic stage semi-permanently. As they tend to prefer the ventral (belly) side of bees, phoretic mites often avoid visual detection by the beekeeper. From time to time, the beekeeper may see a phoretic mite on the dorsal (back) side of a bee, though the general rule of thumb is, “If you see mites, you have too many!”

The reproductive stage occurs entirely under capped brood. Just before a bee larva is capped, a female, phoretic varroa mite sneaks into the cell and hides beneath the larva. After the bees cap this cell, the mite attaches itself to the larva/pupa and begins to feed on it. About three days later, the female mite will start laying eggs. The first egg she lays is unfertilized and will become a male. Every egg thereafter, laid approximately 30 hours apart, will be fertilized and destined to become female mites. As the daughter mites emerge they will mate with the son mite and slowly mature to adult form. When the bee pupa becomes an adult bee and emerges from the cell, the original mother mite and any mature daughter mites will emerge as well and continue their life cycle.

Varroa mites prefer honey bee drone brood to reproduce. As drone brood take roughly three days longer than workers to mature and emerge, it provides the mites an opportunity to lay more eggs and have more daughters mature. In fact, in drone brood, mites can produce between two to three times more mature adult daughters than in worker brood.

If left untouched (by treatment or bees biting them off) in the colony, mites can live for weeks or even months.

**How Does the Varroa Mite Kill the Colony?**

The European honey bee is ill-equipped to meet the challenge varroa mites present. Mites decimate honey bee colonies in two ways — slow weakening and transmission of viruses.

Recent research suggests the varroa mite feeds off the fat bodies of the honey bee. This has at least three significant negative impacts on the bee. First, during the reproductive stage the mother, son, and daughter mites feed off the bee pupa they are growing alongside it. This weakens the pupa during its most critical growth phase resulting in a “less than healthy” adult bee. Over time, this has
a negative impact on the entire colony as the mite population grows.

Second, during the phoretic stage, the mites are feeding off adult bees and slowly them. As these are the bees charged with caring for the hive from brood rearing to foraging for resources, one can imagine how this has a cumulative negative effect on the colony.

Lastly, the bees’ fat bodies are a critical physiological component to winter survival, especially in a climate like Colorado where I live. The mite population grows alongside the bee population. In late summer, the bees begin slowing down brood rearing and reduce the size of the colony. The mites, however, continue reproducing. This disproportionate increase in mite population occurs right when the bees are rearing the “winter bees.” The result is weak winter bees unable to survive the many months of winter cold and dearth.

All the above would be bad enough but the mites don’t stop there — they also transmit several viruses to the bees. One virus, deformed wing virus (DWV), is common in bee hives with high mite populations. DMV results in bees with unformed or deformed wings leaving them unable to fly. They are otherwise fully functional so they move through the stages of life within the hive like most other bees. However, when it comes time to leave the hive and fly, they fall to the ground, crawl off, and perish. Unable to become foragers, they must be replaced by another bee within the colony. This constant “changing of duties” means fewer and fewer bees inside the hive caring for brood, building comb, defending the hive, or other important duties. Eventually, the colony collapses.

**Varroa Mite Testing and Treatment — A Brief Discussion**

It’s pretty clear that the survival of our honey bees depends on a considered approach to varroa management. Testing for mite populations can be an important tool in such management.

There are two common methods of testing for mite loads — natural drop and sugar/alcohol rolls. For the natural drop test, place a white sticky sheet on the bottom board of the hive. After 24 hours, pull the sheet and count the number of mites that have fallen to the bottom of the hive. In a large colony (10 frames of bees or more), if the number of mites exceeds 40 it is time to treat. In a small colony, if the number exceeds 20 it is time to treat.

For the sugar/alcohol roll, place about 300 bees from the brood chamber in a jar and roll them in powdered sugar or alcohol. This knocks the mites off the bees. The beekeeper can then dump the mites on a white sheet or plate and count them. The rule of thumb is, if the mite count exceeds 3% (nine mites per 300 bees), it is time to treat. My personal recommendation is to do this test on at least three different brood areas to get as accurate a count as possible.

In my humble opinion, testing is unnecessary. Due to natural mite migration, even a colony that has zero mites today will have many mites tomorrow. In fact, one mite in a colony of Colorado bees on January 1st results in more than 1,300 mites by the middle of summer! Because of this, I’ve stopped testing and created my own varroa mite treatment program resulting in zero colony losses for more than two years.

Current effective and organic treatment methods include oxalic acid vaporization (OAV), Mite Away Quick Strips (formic acid), Apiguard (thymol), Hop Guard II (hops beta acids), and others.

Now you have a greater understanding of the varroa mite and a strong appreciation for the deep challenges it provides our beloved honey bees. ✰
What is Honey Bee Dysentery?

How Honey Bee Health Can Suffer in an Unrelenting Winter

By Rusty Burlew

Beekeeping is rife with confusing terminology that can baffle even experienced beekeepers. Honey bee dysentery is a perfect example.

In humans, dysentery is a contagious illness caused by bacteria that are associated with unsanitary conditions. But in honey bees, dysentery is not caused by a pathogen. Instead, it is the result of an excess amount of fecal matter in the honey bee’s gut. It’s not a disease, but simply a condition.

Honey bee dysentery is a problem that colonies encounter in winter when the outdoor temperature does not allow them to fly. Waste products accumulate inside a bee until she has no choice but to empty her intestines, regardless of where she is. Sometimes she may exit for a quick flight, but because it is too cold to go far, she defecates on or near the landing board. This accumulation may be your first sign of a problem.

A colony with dysentery is unpleasant for both the bees and the beekeeper. Even though the dysentery was not caused by a disease organism, a hive full of bee excrement leads to the unsanitary conditions. The bees try to clean up the mess and, in the process, they spread any pathogens that were carried within individual bees. In addition, the smell within a soiled hive may mask the scent of the pheromones that are vital to communication between bees.

Nosema and Dysentery

To add to the confusion, honey bee dysentery is frequently confused with nosema disease. *Nosema apis* is caused by a microsporidian that produces severe diarrhea in bees. It, too, occurs mostly in the winter, and is indistinguishable from dysentery. Lots of folks assume their bees have *Nosema apis*,...
Honey bee dysentery is a problem that colonies encounter in winter when the outdoor temperature does not allow them to fly. Waste products accumulate inside a bee until she has no choice but to empty her intestines, regardless of where she is.

When they actually do not. The only way to know if a colony has nosema is to dissect some bees and count spores under a microscope.

In recent years, a new wrinkle in diagnosis appeared when a separate disease, *Nosema ceranae*, became common. Unlike *Nosema apis*, *Nosema ceranae* is a summer disease that does not cause diarrhea to accumulate in a hive. The important point to remember is that nosema and dysentery are separate conditions that you can’t distinguish without a laboratory analysis.

No-Fly Days and Honey Bee Health

For now, let’s assume your soiled hive tests negative for nosema. You would like to prevent this condition in the future, but how? Why do some colonies get it while others overwinter without a hitch?

Like most other animals, honey bees have an intestine that moves food from the stomach to the anus. It can stretch when necessary, which expands its capacity. In fact, a honey bee can hold 30-40% of her body weight within her intestine.

In warm weather, bees can empty their intestines while foraging. In winter, they need to go on periodic, short “cleansing” flights. Afterward, they quickly return to the hive and join the winter bee cluster to warm themselves up. But sometimes winter can be unrelenting, providing very few days warm enough to fly.

Ash in the Honey Bee Diet

As you know, food has varying amounts of indigestible matter. We humans are encouraged to eat lots of fiber, which helps keep things moving through the digestive tract. This is exactly what honey bees need to avoid in winter. When a honey bee eats excess solids, they must be stored within the bee until the next cleansing flight.

Solids in the bee diet are in the form of ash. Technically, ash is what’s left over after you completely burn a sample of food. Ash is made of inorganic materials such as calcium, sodium, and potassium.

Honey, which is the main diet of winter honey bees, has variable amounts of ash, depending on what plants produced the nectar. The difference between honey types explains why one colony may get dysentery while a neighboring colony did not — they simply collected nectar from different sources.

Honey Color Matters

Darker honey has more ash than lighter honey. In chemical analyses, darker honey consistently shows higher levels of vitamins, minerals, and...
other phytochemicals. In fact, all the extra stuff inside dark honey also makes it more nutritious. But in the winter months, these extras can be hard on the bees. As a result, some beekeepers remove the dark honey from their hives before winter and give them lighter honey instead. The darker honeys can be used for bee feed in the spring when the bees are flying.

When it will be used for winter feed, sugar should also be as ash-free as possible. White sugar has the lowest ash, while darker sugars such as brown sugar and organic sugar have much more. A typical sample of light amber honey has about two and a half times as much ash as plain white granulated sugar. Because of the way it’s processed, some organic sugar has 12 times as much ash as light amber honey. The exact numbers vary with the manufacturer, but lighter is better when it comes to bee feed.

**Climate Makes all the Difference**

How much attention you need to pay to winter feed depends on your climate. Where I live, it is not unusual to get a 50+ degree day in the middle of winter. On a day like that, the bees will make quick flights. If you have snow on the ground, you can easily see how important those flights are. 

The fewer flying days you have, the more important the quality of winter feed becomes. For a beginner, this will be hard to determine, but you may be able to find historical records of daytime temperatures on the internet. If you have a good flying day once every four to six weeks, you probably don’t have to worry about dark honey in your hives. If you won’t have a flying day for three or four months, a little planning may prevent a problem with dysentery.

**A Note About Water**

You will sometimes hear that excess water causes honey bee dysentery, but water by itself will not cause dysentery. However, too much water in the early spring may push bees over their limit. If the bees haven’t been outside, and if they are approaching the maximum amount of waste they can hold, the gut material may absorb part of the water, exceeding the bee’s ability to carry it. That is one reason why many beekeepers prefer to feed sugar cakes or bee fondant rather than syrup in the early spring.

You can help your bees avoid dysentery by adding upper entrances, removing dark honey, and carefully selecting winter feed. Just remember to tailor your management to suit local conditions.
Emergency, Swarm, and Supercedure Cells, Oh My! How Do Bees Make a Queen?

By Josh Vaisman

I remember seeing the queen in our first ever hive and thinking to myself, “I’ll never find supercedure cells since I’m going to do all I can to keep her alive forever.” Of course, that’s not the reality of beekeeping.

Even into our fifth year keeping honeybees we still feel giddy when, upon inspecting a thriving colony, we locate the queen bee. It’s like we’ve won the lottery, completed a treasure hunt, and found ourselves in the presence of royalty, all in the same moment!

For a variety of reasons, a colony of bees will eventually need to make or replace their queen honey bee.

In this article, I’ll share with you a few of those reasons and explain the basic answer to the question, “How do bees make a queen?”

Common Reasons Bees Make a Queen

1) Swarming: We tend to think of bees as a group of 50,000 or so individuals going about their business. A queen bee (or two!) spending her days laying eggs, some drones bumbling about, and many worker bees hustling and bustling to keep the colony going. Rather than so many individuals, I encourage you to think of the colony as a singular organism. A swarm is the result of reproduction on the colony level.

When conditions are ripe, the colony is strong, and resources abundant, the natural inclination of the bees is to swarm to spread their genetics and propagate. One key preparatory step is to create swarm cells in which new virgin queens will be raised. In a Langstroth beehive,
these are typically found toward the bottom of the brood frames. When these cells are capped for the pupating larvae, the current queen leaves the hive with roughly half the workers to go find a place to make a new home. A growing bee in one of the swarm cells will become the new queen bee. When it all goes well, one colony becomes two.

Beekeepers seeking to increase the size of their honey bee farm enjoy catching swarms to place into empty hives or creating “splits” to increase their colony numbers. Splits are essentially artificial swarms, a topic for another article.

2) Supercedure: I find it interesting we use the word “queen” to label the largest bee in the hive, as if she sits upon her throne ruling over the colony. The truth is quite the opposite — as the ultimate democracy, it’s the workers who rule the hive!

The queen emits a special pheromone, the queen pheromone, which lets all the workers know she is present, healthy, and doing her job laying eggs. If she is injured, becomes ill, or simply ages enough, the pheromone will weaken. When this happens, the workers know it’s time for a new queen and they create supercedure cells.

Supercedure cells tend to be found in the center of brood frames in a Langstroth hive. The workers will decide where to place them and how many to make. The first virgin queen bee to emerge from one of these supercedure cells will likely become the new queen as she and some of the workers will seek to eliminate the remaining growing queens … and the current, older queen.

3) Emergency! Sometimes, due to age, illness, or often the clumsiness of the beekeeper (not that I would ever be clumsy … ha!) the queen dies. What happens when the queen bee dies? In short order, due to the absence of her queen pheromone, the entire colony knows there is no queen and they quickly call 911. Well, their version of 911 — some nurse bees.

The nurse bees will quickly convert some brood cells to queen supercedure cells to raise a new queen. This assumes the proper brood cells exist. More on that below.

How Do Bees Make a New Queen?
Every single worker began life identical to a queen bee. It’s true! It’s also a critical fact to the survival of the colony. I’ll explain.

As the queen moves about the wax comb, she settles on a cell to lay her next egg. She first sticks her head into the cell and, using her antennae, measures the size of the cell. If it’s a larger cell she lays an egg meant to become a drone. This will be an unfertilized egg possessing one set of genetics from her. If the cell is of the smaller variety she’ll lay an egg meant to become a worker. This will be a fertilized egg possessing two sets of genes: one from her and one from a drone she mated with.

The eggs will take two-and-a-half to three days to hatch. Upon hatching the tiny larvae will be fed a nutrition-dense product of the hive called royal jelly. Nurse bees will feed the young larvae royal jelly for the first three days of their life after which they will switch to feeding them something called bee bread. Unless they want this worker larvae to become a new queen.

When the workers decide to raise a new queen they choose cells containing larvae younger than three days old — that is, larvae that have only ever been fed royal jelly. They then continue to feed these larvae royal jelly even beyond the typical three days. This results in the larvae growing much larger than a typical worker as they develop fully functional reproductive organs. This also accelerates the larva’s growth, reducing the amount of time it takes the fully formed virgin queen to emerge. Given what you know about when the bees make a new queen bee, why do you think this accelerated growth is advantageous?

Kind of changes our perspective on our 50,000-plus worker bees when we realize any one of them could have been “royalty” had they just been fed the nectar of the gods a little bit longer.
Lou Sutton writes:

Good afternoon. I only have one hive, and they are doing well. However, the queen is two years old and I’m worried about how to deal with her age. There is no sign of swarming, but there were two play queen cups when I looked a few days ago. There is a lot of advice on taking a frame from another hive with new eggs but since I don’t have another hive, what should I do?

Hey Lou!

Congrats on getting a queen to two years old! In this day and age, that’s no small feat.

If I’m understanding you correctly — and please let me know if I’m not hitting the mark — you’re concerned it’s time to replace your queen but you’re uncertain of the best approach. If that’s the case, here are my thoughts.

First off, if her laying pattern is still good, the colony population is to your liking, and the workers haven’t tried to replace her yet, you could consider just leaving her in there. I recently had a hive that finally replaced their original queen after three years. Maybe she’s got one more winter in her!

You mentioned you saw queen cups. As you suggested, that may or may not mean they are getting ready to replace her themselves. All colonies keep those "practice" cups around at all times. If the cups have no egg or larva, then they aren’t being used.

If they are replacing her, depending on where you live, you may be coming to the end of the season for a hive-raised queen. I’m in Colorado, and I’d be really nervous about letting one of my colonies make their own queen late in the season. So another option would be to buy a young, mated queen either locally or mail-order. If you buy a mated queen, you can kill the current queen and do a normal queen introduction (in the cage for a couple/three days, then release).

Even if they are making a new queen, you could do this but the timing is critical — you’ll want to introduce the new, mated queen BEFORE the virgin queens they are raising emerge. In fact, once you introduce the new queen you should remove any actual queen cells.

That said, if they are making their own new queen this may not work. Bees are stubborn and once they decide to do something, often they do it no matter what. If they stick to their guns, the virgin queen they raise will kill your nice new mated queen and you’ll be out the cash it cost you to buy her.

I hope this helps! Let us know what other questions you have.

- Josh Vaisman
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We actually had a small honey harvest our first year of beekeeping! It was also the year we saw firsthand what hive robbing could look like. After running the frames through the extractor, we realized there was still a bit of honey left in those cells. Being the “new-bees” we were, we didn’t want it to go to waste. So, we put 20 freshly extracted frames out on our front patio. The bees will come to take the excess and put it to good use, right?

Oh yeah. They came.

A short while later my phone rang. It was my neighbor.

“Um. I think there’s a swarm of bees on your front porch.”

We had created a feeding frenzy. While this wasn’t really a flock of robber bees, in the traditional sense, I gained a real understanding of what robbing might look like.

What is Hive Robbing and What Does it Look Like?
Honey bees are efficient, opportunistic collectors of resources. If given the choice, they’ll stay close to the hive to forage for water, pollen, and nectar. Of course, if the resources they need aren’t close by, they will fly long distances to get what they need — as far as five miles from home.

What I did after that first late summer extraction was create a large depot of resources within 100 feet of two honey bee hives. It was irresistible and, in short order, they showed up in droves. There would be no stopping them until the sun went down — and even then, a few stragglers stuck around and spent the night.

This is essentially what robbing is.

When you see honey bee robbing, you’ll know. It looks like insanity. Bees are buzzing all around the hive, darting forward and back, desperately looking for a way in. The amount of bees is massive — as much or more than mid-summer orientation time or even a pre-swarm — and continues to increase. Fighting occurs at the entrance as the guard bees of the robbed hive try their best to defend the colony. It’s a mess.

Why Does Hive Robbing Occur?
For robbing to occur there has to be something to rob. While that sounds simple (and obvious!) digging into the details of the food availability
Hive robbing is an almost desperate commitment, en masse, to maximizing a resource. Only, in robbing, that resource belongs to another colony. Bees from one (or more) colonies enter the hive of and steal from another colony.

is important.

It’s early August in Colorado as I write this article. In my backyard are two hives or varying size, both with substantial stores of honey. At another apiary is the same situation. Both have plenty of food available inside, yet no robbing occurs.

Now, let’s imagine one of my colonies begins to struggle. Perhaps the queen dies unexpectedly or they are overcome by varroa mites. As their population decreases, foragers from other colonies begin to test the limits — “Can I get inside this hive?” Eventually, the ability of the weak hive to defend itself is overcome by the persistence and sheer numbers of the interested foragers. Honey bee robbing begins.

When Does Hive Robbing Occur?

In truth, robbing can (and will) occur at any time during the active bee season. As I mentioned, bees are opportunistic and if they have the chance to grab a large, easily accessible bounty of honey from another hive, they will do it in a heartbeat.

In early spring, our bees are coming out of winter and populations are growing. That’s more mouths to feed on the dwindling stores they carried through the winter. With the natural sources of food just beginning to kick off, the foragers might be desperate.

Often added to this is the beekeeper. Maybe one of your colonies came through winter a bit on the weak side. Maybe they ate their way through house and home. You decide to feed them sugar syrup to give them a boost — a necessary act of husbandry.

If they are weak and that sugar syrup is easily accessible to “outsiders,” robbing can occur.

In the late summer, the population of bees is still quite large (though starting to shrink) and, at least where I live, available flowers are beginning to dwindle away. This is, again, a recipe for desperate foragers who will quickly take advantage of “easy” access to food.

Does Hive Robbing Harm the Hive?

Robbing absolutely harms the colony. A colony is being robbed because it has been overwhelmed. Eventually, all their food stores will be taken. Worse, they offending thieves may end up killing the robbed out colony.

How to Prevent Hive Robbing

The good news is, there’s a lot you can do to prevent robbing! Here are a few things to consider:

Keep Strong Colonies: The greatest deterrent to robbing is a strong colony. A large, healthy colony of bees will easily fend off any thievery
— not just from other bees, but from wasps, moths, even mice! Maintaining quality beekeeping practices will go far in cultivating a colony strong enough to defend themselves.

Reduce Access: Sometimes you run into a situation in which a weak colony is out of your control. Perhaps a queen died and you let them naturally replace her — a break in the brood at a time when other local colonies are continuing to grow. Or, as mentioned above, a particular colony needs supplemental feeding of sugar syrup. In these cases, reducing access for robbers is critical. One simple way to do that is to shrink the size of the entrance. The smaller space the weak colony has to defend, the easier it is to defend it. Another method is using a robbing screen. This is a specialized entrance reducer that makes entrance into the hive, for bees not from that hive, quite challenging.

Feed Intelligently: Have a weak colony you need to feed? By all means, do it! But do it smartly. If you’re using an in-hive feeder make sure the ONLY access is from inside. For example, make sure the box around your hive-top feeder doesn’t have holes or gaps that allow uninvited visitors from outside. If you’re using a Boardman feeder at your entrance, make sure it is fully inside the hive, doesn’t leak, and perhaps consider reducing the entrance size beside it. Lastly, do not use any feeding equipment that leaks. A leak, anywhere, is an open invitation to hungry bugs and critters.

Can Robbing Be Stopped Once it Starts?
Possibly. As calmly as you can, light up your smoker and don your protective gear. Use the smoker to get to the hive and significantly reduce — or close up entirely — the main entrance. Find any other possible entrances and close them up. You could even cover the hive in a lightly dampened bed sheet. Leave things like that for at least the rest of that day. Tomorrow, your primary goal should be to find out what this colony needs to get strong enough to defend themselves.

We left those frames on our front patio until after dark, all the while watching through our front window and listening to the loud buzzing. I’d never seen so many bees and wasps so actively buzzing about in such a small space! Well after sunset, when it was dark and cool, I went outside and collected the frames, gently shaking off the bees who stuck around for the after party. I cleaned the patio of all the battleground’s remnants. Dead bees and wasps, bits of wax, honey on the concrete, and all the hive equipment.

It was a good day or two before the foragers stopped looking for their free lunch up there. I’m just grateful UPS wasn’t scheduled to deliver that day!
What Bugs Your Bees?

Earwigs, Stink Bugs, Mice, Ants ... Should You Be Worried?

By Rusty Burlew

Even before we open our first beehive, we are warned about pests that may live within. Small hive beetles, wax moths, and varroa mites are things we dread, so early in our training we learn how to deal with them. But beekeepers are often dismayed to find an array of other critters living inside a hive, organisms no one mentioned in bee school. What should you do about them?

Remember that a bee hive is a haven in the unforgiving outdoors. It is warm, dry, protective, and comes with a fully stocked pantry! No wonder so many animals find them irresistible. Each beekeeper will have their own set of challenges because the roster of squatters will vary with the local environment.

Most of the creatures you find in a hive are minor inconveniences and pose no long-term threat to your colony. Some, like mice and shrews, you definitely need to get rid of. Others, like most invertebrates, appear when the colony is clustered in winter and disappear when the colony becomes active in the spring. Although they are harmless, no one wants to see things like earwigs in a bee hive!

Spiders

For me, the biggest problem in winter is spiders. I have Langstroth hives with telescoping covers, the kind that usually come as standard equipment. Between the cover and the side is a space about 3/8-inch wide. Where I live, that space is coveted by western black widows. Ugh.

Black widows pose no harm to your bees and, in any case, they are not actually inside the hive. Nevertheless, I always wear gloves when pulling off the outer cover, and then I clear the spiders away with my hive tool. No doubt, other kinds of spiders will find this cozy space attractive, so remember to check before you grab one unaware.

Before you toss the cover on the ground, remember to look inside. Depending on the season, the cover may contain spiders, ants, earwigs, small slugs, or mysterious larvae. Take a quick mental inventory of this hive-top zoo before you scrape it into the grass, always checking for your queen before you dump. Why queens like to hang out there, I have no idea, but I’ve seen them many times.

Ants

Whether or not ants are a problem depends on the species. Most ants are just opportunists looking for an easy meal, although some ants, like the Argentine variety, can run a colony out of the hive. Ant problems are usually worse in southern areas, and the type of ant varies with locale. Whether ants are a problem in your area is a good question for your local beekeepers’ club or your mentor. But stay calm: North America is home to about 1,000 species of ants, but very few are a problem for beekeepers.

Beetles

I get more mail about beetles than
any other insect. It seems that when a beekeeper sees a beetle in the hive, she automatically assumes it’s a hive beetle. But as with ants, there is no reason to panic. According to recent estimates, North America boasts upward of 30,000 species of beetles, but only one of those is a problem in bee hives. Once you learn to recognize a small hive beetle, you can dismiss the rest.

**Earwigs**

Earwigs also come in many varieties, but beekeepers are most likely to see the common earwig, *Forficula auricularia*, introduced from Europe in 1907. These insects are nocturnal, hiding in small cracks and crevices during the day and feeding at night. They are considered scavengers, and will eat live plants, dead and decaying plant material, and small insects such as aphids. They use tight spaces in the hive for protection, but are not considered a threat to honey bees.

**Stink Bugs**

Recently, beekeepers have reported seeing brown marmorated stink bugs in the hive. This crop pest (*Halyomorpha halys*) was accidentally introduced to the US in 1998, but it has already spread across the continent. It is a sucking insect that can do extensive damage to plants and, like the earwig, it uses the hive as a convenient hiding place.

These insects survive the cold months by finding shelter in homes, door frames, beneath siding, and in barns and garages. Once they find a suitable hiding place, they normally go into hibernation for the winter. But if they get too warm, they may awaken and begin walking or flying around. Apparently, the warmth of a bee hive is enough to rouse them because beekeepers see them strolling across the top bars while the colony clusters below.

**Springtails**

Most creatures in a bee hive try to hide from their hosts, and springtails are no exception. Because springtails prefer moist environments and love to eat pollen, they are often found on a bottom board or varroa tray. Springtails are scavengers that eat spores, fungus, animal remains, live plants, bacteria, and pollen. A damp, detritus-covered bottom board is perfect for a springtail, and you can sometimes see them leap and frolic in the decaying matter.

Apparently, springtails bring out the child in otherwise staid adult human beings. If you nudge one of these tiny creatures with your hive tool, it will jump four to eight inches high, exploding like a kernel of popcorn or a spring-loaded seedpod. Their energy and speed is startling, so don’t miss an opportunity to play in the detritus yourself.

**Mice and Shrews**

If you happen to find either mice or shrews, they should be cleared out of your hive as soon as possible. Mice will build nests between the frames or on top of the frames and then take advantage of the honey supply. The colony can easily die of starvation if the mice are allowed to stay. Often, the first hint of mice is bits of moss on the bottom board which the mice bring in for nest building. Pools of honey can also be a clue to mouse damage. The best mouse detection tool is an infrared camera because it shows you exactly where the nest is.

Shrews are very small mammals that can go through a normal mouse guard. They live primarily in northern areas and invade bee hives in the winter. A shrew grabs a cold, sluggish bee from the outside of the cluster, removes its head, and eats the contents of the thorax. Shrews leave lots of parts behind, including the abdomen, wings, and empty thorax. A quarter-inch mesh across the hive entrance is small enough to keep them out.

**Summer**

While many creatures may choose a honey bee hive for its warmth and protection in winter, other animals are attracted to bee hives in summer. Most of these animals do not attempt to enter the hive — after all, that’s an intimidating proposition. But many hang around the outside, hoping to catch a bite of bee or a taste of honey.

Besides wasps, your hives may lure in slugs, lizards, birds, frogs, skunks, raccoons, possums, and bears. Depending on the visitor, the threat to your hive can range from none to enormous. Let’s take a look at some of these pests from smallest to largest.

**Insects**

Ants and wasps are the most troublesome summertime insects. Ants are generally attracted by the idea of a free meal of luscious, high-energy honey. On the other hand, wasps — most frequently in the form of yellowjackets or hornets — are hunting for insect prey to feed their young. The less aggressive wasps will simply collect dead bees from the ground around the hive. Oftentimes you will see them dart under the landing board and snatch whatever bodies were dropped there.

More aggressive wasp species may attack live bees as they go in and out of the hive entrance. Some will pounce on bees on the landing board, while other species will snatch bees in flight. On occasion, hornets will knock
a bee out of the air, follow it to the ground, and battle with it, rolling and buzzing until the bee gets free or dies.

Because ants, bees, and wasps are so closely related, it is hard to kill one species without harming the other. Ants can sometimes be deterred by physical barriers such as oil traps, sticky substances, or repellents such as cinnamon. Some wasps can be lured into pheromone traps or containers baited with meat. Many beekeepers use robbing screens to prevent wasps from entering the hive.

**Slugs and Snails**

Depending on where you live, slugs and snails can leave an unsightly mess on hives. They may deposit slime trails and feces on the sides of a hive or on the outside covers. But unpleasant as they are, slugs and snails will not hurt your bees. They tend to eat decaying organic matter — both plant and animal — as well as live plants, mushrooms, and lichens. Around bee hives they can find dead bees, bee feces, and pollen pellets to munch on. You can flick them away with your hive tool or let them stay — no harm done.
Reptiles and Amphibians
Small lizards, frogs, toads, and salamanders are often found around bee hives. In the south, beekeepers may find six or seven lizards crawling up the side of a hive. Frogs are frequently found on or under a hive, and I’ve even found small snakes slithering across the bottom board. Tree frogs are commonly seen around pollinator housing, but many are too small to eat bees — or at least not a lot of bees.

All of these animals are insect eaters, and are probably attracted to bee hives because of the diversity of bugs on the menu. Bees and wasps are eaten by some species, but wax moths, beetles, earwigs, and ants also make a nice snack. Usually, these animals don’t hang around for long. I view them as part of the ecosystem and only incidental pests to bees. If you feel your hives are being threatened, try moving them to a different location.

Birds
Although most birds don’t bother bee hives, there are a few that do. Woodpeckers, kingbirds, shrikes, titmice, mockingbirds, swifts, and martins will all eat bees, but they don’t single them out. They tend to eat many types of insects, and so the number of bees consumed per bird is small. You can screen your hives with poultry netting to keep birds away if they become a real problem, but generally they are not worth the worry.

On the other hand, woodpeckers can be quite damaging to tube-nesting bees such as masons and leafcutters. They can systematically peck at the mud plugs, then reach in to eat the first larvae or two. If woodpeckers are pestering your tubes you can cover the nests with poultry wire. Once the tubes are filled, you can store them in a cool cellar or garage, which will also protect them from predatory wasps.

Small Mammals
A number of different mammals can bother your bees without actually entering the hive the way mice and shrews do. One of the worst is skunks. Skunks particularly like hives that sit close to the ground. They approach the hive at night and scratch at the opening, which causes the guards to come out and investigate. As soon as they exit, the skunk swallows them down like peanuts. Yum. A skunk can continue this behavior for long periods, severely damaging the population. Other animals, such as raccoons and opossums can exhibit similar behaviors.

Elevating your hives on hive stands offers good control, because the animals cannot crouch in front of the opening. If that is not possible, surrounding the hives with wire mesh also works well.

Bears
The biggest threat to beehives comes from the biggest predators. Contrary to all the cartoons, bears come not so much for honey as for the brood. Brood is a high-protein energy food that can help bears fatten up for the winter. Of course, they will eat the honey too. But a hive without honey is still attractive to bears, as long as there is plenty of brood.

Bears simply smash the hive to bits to get at the combs of brood. Most of the common bear deterrents, such as electric fencing, work until a bear actually finds the hive. From then on, they may provide little protection. Once a hive has been breached by a bear, it’s best to move the hives to another location because the bears will come back again and again, waiting for their lucky day.

Other Pests
I’m sure there are other pests that you may encounter based on your location. Even farm animals, such as cows, can easily tip over a hive, if only by accident.
Marcia Mundell from Moneta, Virginia writes:
Bears destroyed my beehive a couple of years ago. What can I do to deter them so I can try again? Some say electric fence … some say electric fence doesn’t work.

Rusty Burlew replies:
Once a bear learns the location of a beehive, it will keep coming back for more. So the best defense against bear predation is avoiding them in the first place.

Site selection is important. If at all possible, hives should be set away from the forest edge. As little as 50 feet away from the tree line may help, although more is better. Some wildlife agencies recommend up to 300 feet.

The prevailing winds are also important. Before selecting a site, tie yarn or survey ribbons onto a few bamboo poles and stick them in the ground so you can monitor the typical wind direction. If the wind will carry hive scent toward bear territory, it is not a good site. You want the wind to carry the hive scent away from where the bears live — perhaps toward homes or open fields. Try several different locations. Hills and buildings can have a surprising effect on local wind patterns.

Bears are extremely sensitive to odors, so it is important to collect all hive debris and move it out of the apiary. This includes wax and propolis scrapings, dead bees, burr comb, and even used mite strips. If a small animal such as a raccoon or opossum moves any of these things closer to bear territory, the bears will know food is close by and may start looking for the source.

Other bear attractants include fruit trees, compost piles, pet and livestock feed, bird feeders, and even outdoor grills. Keep your hives far from anything that may smell appetizing to a hungry bear.

After a bear successfully ravages an apiary, the problems are different. At that point, you most likely need an electric fence. To be successful with them, however, requires the opposite strategy.

Bears have thick fur and long claws, so they can very often rip apart an electric fence with little effort. To be successful with them, you need to zap the bear where he can feel it, which is around the muzzle.

To use an electric fence successfully, you need to bait the fence in a way that causes the bear to feel the shock around his face and mouth. Many people wrap the wire in several locations with bacon or with peanut-butter-filled aluminum foil. These items need to be secured tightly to the wire so the bear has to work at getting them free. A few zaps to the muzzle will usually keep bears away in the future.

Just remember: Never bait an electric fence before bears become a problem because the scent will attract them. If bears are already a problem, then go ahead and bait.

- Rusty Burlew
In a honey bee colony, thousands of individuals are in close physical contact as they feed and groom each other. While the hive is generally quite clean (bees leave the hive to defecate and to die), it’s still a pretty great environment for diseases and parasites to proliferate. As warm and crowded with babies as a preschool classroom, the brood nest can host diseases such as American foulbrood and chalkbrood, or pests like the Varroa destructor mite.

Honey bees have two categories of response to health threats: individual immune responses, and group, or “social,” immune responses. An individual immune response is the activation of a bee’s own tiny immune system. Social immune responses are behaviors that contribute to overall colony health, sometimes at the expense of the individual bee.

One form of social immunity is called hygienic behavior, wherein many young workers resist the spread of pathogens and varroa mites by detecting, uncapping, and removing unhealthy brood.

The colony loses some individual larvae, but is able to control or even eliminate chalkbrood and American foulbrood; hygienic behavior can also keep varroa mite reproduction at livably low levels.

**Why Don’t All Bees Exhibit Hygienic Behavior?**

Hygienic behavior is a genetic trait, meaning it is heritable. But because genes involved in its expression are recessive; and because each queen mates with many drones, hygienic behavior must be persistently selected for over time.

The way hygienic behavior works is truly complicated: The top scientists and breeders of hygienic bees are still trying to understand the nitty-gritty details, such as how many genes are involved in producing this trait, and what scent or scents, exactly, trigger hygienic bees to detect, uncap, and remove infected or infested brood.

But don’t despair. You don’t really have to understand polygenic traits to get the gist of hygienic behavior and how it can support your own bees’ fight against
pathogens and pests.

The hygienic behavior trait is found in all stocks and races of bees. Just like any trait, such as gentleness or small brood nest size, beekeepers can select for hygienic behavior by testing for the trait and using the queens they find to be most hygienic to raise daughter queens.

Testing for hygienic behavior requires patience, as does selecting for it; it can take years of close observation and selection choices before your stock becomes really hygienic. Unless a bee breeder is artificially inseminating her queens, she will also need to be making sure she’s got plenty of hygienic drones near her mating yards (remember, this trait is recessive and therefore requires the father’s hygienic input).

**Famous Hygienic Bee Lines**

I’ll go over just a few rather famous hygienic lines, while emphasizing that any bee breeder can select for hygienic behavior, and should.

**Brown Hygienic bees: Dr. Rothenbuhler** coined the term “hygienic behavior” in the 1960s, specifically to describe particular bees’ response to American foulbrood: he noticed that some bees would detect the disease in recently sealed brood, then uncap and remove that brood — all before this bacterial disease entered its contagious stage. The line of hygienic bees Dr. Rothenbuhler worked with back then was known as Brown bees, and were very defensive. He was probably so excited to select for hygienic behavior, he forgot to select for niceness.

**Minnesota Hygienic bees: Speaking of “niceness,” Dr. Marla Spivak** and Gary Reuter developed the now-famous Minnesota Hygienic line of bees in the 1990s. They used artificial insemination to ensure that the drones the breeder queens were mated with were also hygienic. Spivak distributed some queens to commercial beekeepers, who were able, by raising daughter queens, to make their overall operations pretty hygienic. Those commercial beekeepers then sold Minnesota Hygienic queens to other beekeepers across the country.

Spivak discontinued raising and inseminating her MN Hygienic queens in the late 80s, in part so that her stock didn’t diminish genetic diversity of honey bees by showing up in too many apiaries across the country. Dr. Spivak thought it made more sense for many beekeepers to actively select for hygienic behavior amongst their own stock than for everyone to purchase hygienic queens from a few genetic lines, which might or might not be suited to a particular beekeeper’s climate or operation’s goals.

Varroa Sensitive Hygiene, Baton Rouge: A specific type, or aspect, of hygienic behavior in bees is referred to as Varroa Sensitive Hygiene (VSH). VSH bees were first developed at the USDA Bee Breeding Lab in Baton Rouge, Louisiana in the late 1990s. A team of researchers bred bees that were somehow keeping mite reproduction levels incredibly low, even while the colonies around them exploded with the pests. At the time, the researchers didn’t recognize these mite-suppressing bees as hygienic, so they named them Suppressed Mite Reproduction (SMR) bees.

Later studies revealed that SMR bees are in fact expressing hygienic behavior by detecting reproductive mites in a sealed pupa cell, then uncapping and removing that pupa before the mites have a chance to reproduce on their host. The SMR trait was renamed Varroa Sensitive Hygiene.

Now, you may notice that your own bees do a bit of uncapping here and there — a kind of snooping around behavior. Uncapping is the first step in hygienic behavior.

A worker makes a little hole in the top of a sealed cell to see (or rather smell) what’s going on. Sometimes other bees within the same colony will go a step further and remove the abnormal pupa.

I hope you’re convinced that the hygienic trait is an important tool for your bees to have in their healthcare toolkit. But perhaps you only have one colony and are not in the business of raising your own queens. If this is the case, you can buy hygienic queens. You’ll need to get to know your local queen breeders, and, just like you’d inquire about race or disposition, ask if their queens have been selected for hygienic behavior before purchasing them. You want your bees to be excellent at fighting mites and diseases, which, let’s face it, aren’t going away. Why not help bees help themselves with hygienic behavior?

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**ABOUT THE AUTHOR**

BRIDGET MENDEL is the Program Manager at the University of Minnesota’s Bee Squad. She takes care of bees, teaches classes for beekeepers and the public, and manages interdisciplinary, pollinator-focused programs. She also writes grants and communications for Bee Squad’s programs and research projects. Outside of Bee Squad, she teaches creative writing to college students. Her own work has appeared in DUSIE, Noo Journal, Beekeeper’s Quarterly, and Nous Zot Press. Bridget is the recipient of a Minnesota Emerging Writers Grant, and holds a BA from Northwestern University and an MFA in Creative Nonfiction from the University of Minnesota.
15 Easy Beekeeping Projects for Winter

Winter is a Great Time to Tend to Beekeeping Equipment and Tackle Beekeeping To-Do’s

By Rusty Burlew

Just when you think winter will never end, you suddenly awaken to an azure sky. You hear sounds you haven’t heard in months: frogs, birds, kids. Without warning, honey bees you haven’t seen since fall are circling overhead, stretching their wings and looking for nectar.

Right then, you remember the hole in your bee veil, the unassembled honey supers still packed in a box, the new brood chamber you haven’t painted. You also remember you haven’t ordered mite treatments, and you wonder if you have the equipment you’ll need to make a split.

The panicky feeling you get when the work seems overwhelming is not fun, and it can spoil the blue-sky euphoria. To prevent that sinking feeling, here’s a list of beekeeping projects you can tackle in the winter while your bees are tucked away in their hives.
1. **Paint your hive tool.** I once estimated that I spent about 40% of my beekeeping time looking for my hive tool. I scour the ground, retrace my steps, reopen hives, and pat my pockets. Things happen fast in a bee hive, so hive tools are not your first priority until you need them in a hurry. The best solution for me has been bright pink paint. Pick any color you like as long as it catches your eye.

2. **Buy a butterfly net and learn how to use it.** My butterfly net is my second most indispensable tool. I use it for catching bees that get in the house, and for pulling bees out of puddles and pools. But its most important function is catching yellowjacket and hornet queens. Every queen you catch in early spring is potentially one less colony your bees will have to deal with in the fall. A little practice can save you a lot of frustration later.

3. **Design your honey label.** Why not have a honey label that is unique to you and your apiary? Modern printing companies that allow you to upload your own file are inexpensive and fun to use. Get together with your family and design a label you love. Cute or unique labels sell lots of honey, so put in the time now to be ready for your next harvest.

4. **Render your beeswax.** All summer long I toss bits and pieces of beeswax in a bucket. By fall, I usually have enough to make the very messy rendering process. You can make gifts, household products, or your own starter strips for your spring bees. Or, if you use plastic foundation, you can paint them with a fresh layer of your own beeswax.

5. **Make a swarm charm.** Yes, rendering wax is messy, and if you melt brood combs you will be left with an unsettling byproduct called slumgum. In spite of its appearance, slumgum makes a great swarm lure. Simply dip an old rag in melted slumgum and let it harden. In spring, throw a rope over a tree limb near your hives and hang the charm 15-20 feet from the ground. With any luck, an escaping swarm will settle on your charm while scout bees search for a new home. When it does, just untie your rope and lower the swarm into a cardboard box.

6. **Rough up the interior of empty bee boxes.** If you have any empty brood boxes, take advantage of the winter season to rough up the interior surfaces, using something like rough-grit sandpaper. Honey bees smooth out rough surfaces with propolis, and propolis has antimicrobial properties that help keep colonies healthy.

7. **Try a new honey flavor.** The holidays are a great time to try a new-to-you honey and share it with friends. Get online and search for something out of your geographic area. Try to describe its flavor and imagine how you might pair it with cheese or fruit. My pick for this year is chestnut honey. What’s yours?

8. **Prepare for tax time.** If you’re running your bees as a business, remember that tax time and swarm season coincide. It’s best to collect your documents and run your numbers in the winter. Then, come spring, your bees can get all the attention they need.
9. Stock up on supplies. The holidays are filled with all sorts of deals, so be sure to check on supplies you will need in spring. You may be able to find honey jars, straining cloths, mite treatments, foundation, and even sugar on sale. Not only can you find good deals, but you save time when you need it most.

10. Repair your bee suit. The veil of my bee suit had a tear in the black mesh fabric. I was meaning to mend it, but I kept putting it off. Last week, while checking on winter stores, I kept seeing a bee in my peripheral vision. I thought, “That’s funny, she looks like she’s on the inside.” Turns out, she was. And she proved it. Ouch! So go get a needle and thread — don’t wait.

11. Join iNaturalist. iNaturalist is a site that can help you identify just about anything that lives. If you see a plant, a bug, a mushroom, or a bird, just snap a photo with your smart phone and upload it. Specialists in many different fields will help you identify whatever it is. What’s the name of the plant your bees find so enthralling? Just click and learn.

12. Choose a try-it. Every year I try one new experiment that will improve my knowledge of beekeeping. It can be something easy like a new kind of forage plant, or something difficult like raising queens. It doesn’t matter if you are successful or not. The point is to learn something new. I use the winter months to prepare for the next year’s try-it.

13. Rethink your hive location. If you had any doubts or misgivings about your hive location, winter is a good time to make a switch. Since the bees are inside for the winter, you won’t have problems with re-orientation come spring. Just close off the entrances, tie the hive together with ratchet straps, and move the whole thing at once.

14. Read at least one beekeeping book. Beekeepers are compulsive readers, so select a good read for those cozy winter evenings. It can be a how-to book, a memoir, or a biology of bees. Or expand your reading to include other pollinators or the biology of plants.

15. Build pollinator housing. Remember all those hollow-stemmed plants you saved? Now is the time to take your collection of lovage, teasel, and joe-pye weed and turn them into tubes for spring pollinators. If you have no stems, just use paper straws. It’s a fun project to tackle over a mug of hot chocolate.
“Insect hotels” readily attract mason bees, leafcutters, and other cavity-nesting species, and are a fun way to observe solitary bees up close. Houses for bees may be elaborate or very simple; just remember these tips to create your own!

Provide tubes made from paper straws or hollow plant stems. Bamboo works great, but you’ll find hollow stems in a wide variety of garden perennials, especially plants in the carrot family. Tube diameter should be around \(1/4\)-\(1/2\)”. Cut tubes to be at least 4” in length, but not longer than 8”. This ensures females will lay enough of both male and female eggs to support the population next season.

Place tubes in a sturdy frame with a back on it. Instead of tubes, you can also choose to drill holes in a block of wood using a \(3/8\)” bit. Cedar is said to repel insects, but most other untreated scrap wood will work fine. Avoid toxic paints and varnishes and instead brush on mineral oil, which gives an excellent protective finish to tube frames and drilled blocks.

Hang your bee box facing east toward the rising sun, in a spot with some protection from heavy winds and rain. Cover the front with small-gauge chicken wire if woodpeckers are a problem; their long tongues can reach deep into the cavities where young bees are developing.

Native bees are adapted to your local climate, so there is no need to take your nesting box inside for the winter. To avoid buildup of pests or disease, replace old tubes and clean out drilled holes with a pipe cleaner dipped in a 5% bleach solution every couple of years.

Provide plenty of bee-friendly plants for forage, then sit back and enjoy watching your busy native bees at work!
It seems like just yesterday I was making spring splits and unpacking honey supers. Now, I look outside and see red and brown maple leaves on my patio and the hot morning coffee is just a bit cozier in the crisp, early air. Where did the summer so quickly run off to?

The truth is, in Colorado, if you haven’t been preparing your bees for winter for a while now, you’re behind the 8-ball. Still, it’s important to understand what winterizing beehives look like for a backyard beekeeper like you and I.
In my world, preparing bees for surviving the Colorado winter began months ago. So I’ll start there:

**Spring**

For my beekeeper brain, spring begins when the dandelions and early spring fruit trees blossom. The bees who have successfully overwintered are now able to gather groceries from the environment when it’s warm enough to forage. This could be as early as March or April.

This is when my winter preparations begin. I’m getting into hives and making sure they have a healthy queen with a solid laying pattern. I’m also assessing their food situation and providing supplemental feed, if necessary, by way of sugar syrup and/or pollen substitute patties. Ultimately, my goal is to support the colonies in growth so, when the nectar flow of summer arrives, they are primed to collect as much of it as possible.

**July**

A mentor once shared a mantra with me that has stuck in my head. “Queen-right by July 4th.”

By the beginning of July my goal is to have all my colonies happy, healthy, and booming in population. If they aren’t, I’m considering combining them with my strong colonies or, if they are particularly unwell, limiting the resources I offer them and letting them go their own way.

If I’ve done a good job from spring to now, all my colonies are rocking and rolling by July, as they were this year. They’ve all got honey supers on and have received at least one summer mite treatment.

**August**

In Colorado we generally have two strong nectar flows; a big one in summer, and a smaller one toward fall. The general rule of thumb where I live is to make sure each hive weighs around 100 pounds by November, when the dearth has really set in.

My top priority as a beekeeper is to actually keep bees. Second to that is harvesting honey. So, I remove honey supers the third or fourth week in August, depending on my schedule.

This has two benefits. First, it means my bees get the full benefit of the fall nectar flow. Rather than packing my supers with that nectar they keep it in their brood chamber where it’s easily accessible during the dearth and cold to come. Second, it gives me a large fall window in which to minimize the presence of varroa mites.

There are two kinds of worker bees in a hive, depending on the time of year. They are summer
bees and winter bees. Winter bees have substantially larger fat bodies to help them live longer. This is of great benefit since the colony has limited (or no) ability to raise more brood during the cold winter months.

Varroa mites feed on fat bodies. As you can imagine, keeping the varroa population as low as possible during the winter is critical. But there’s more to the story.

Where I live, my bees begin raising the “winter bees” around September/October. So, by pulling my supers toward the end of August, I have the opportunity to seriously knock down the varroa population right before the bees begin raising their super-fat winter sisters.

Of note, occasionally a colony will abscond in the fall. I’ve seen it as late as November in Colorado. Where I live, a colony that swarms or absconds this time of year is doomed. There simply isn’t enough time to build a new nest, raise enough bees, and collect enough food to make it through the winter.

So here’s my plea to you — please properly manage your varroa population.

**September**

Now that my supers are off and my varroa treatments are going, I begin monitoring the weight of my hives. I don’t have a scale but I do have several years of experience so I simply lift the back of the hive with one hand and get a pretty good idea of if it is heavy “enough” or not.

If it isn’t, I begin to feed them sugar syrup.

In some ways, fall feeding is one of the most important responsibilities of a beekeeper. More often than not, bees don’t die because of the winter cold, they die because there wasn’t enough food in the hive. They need those simple carbohydrates to shiver to keep themselves warm.

If I have a colony that needs to be fed, I’ll feed them sugar syrup until either they have stored enough for winter, or it’s too cold to continue doing so. If you find it’s too cold to continue feeding sugar syrup and your bees still need supplemental food, you can consider fondant or a sugar board for inside the hive.

**October/November**

If I’m feeding my bees I continue to do so as long as the ambient temperature won’t freeze the sugar syrup.

Sometime in October or November, depending on weather and what I’m seeing around the hive, I reduce the size of the entrance to the hive. The population of the colony has been slowly shrinking for a couple months now and the wasps and other bees in the area are getting desperate for food. Shrinking the size of the entrance with an entrance reducer means a small space to defend against opportunists.

We get some big temperature swings this time of year in Colorado. It could be 80 degrees F on a particularly warm day and 40 degrees that night. When I see the overnight lows consistently dipping below about 40 I think seriously about closing up the screened bottom board in my hives.

When the daily high temperature starts to dip below around 50, I wrap my hives with a Bee Cozy for the winter. I implement one important alteration, though. When bees cluster in the winter they produce a bunch of heat and evaporation. Those water droplets rise with the warmth coming off the cluster and collect at the top of the hive. Far enough away from the cluster the water cools and even approaches freezing. When there’s enough water up there it drips down on the cluster, freezing and killing the bees it hits.

To minimize this condensation issue, I prop up the front of my outer cover and create a gap for airflow. This allows much — or all — of that wet air off the cluster to actually escape the hive and minimizes water collection within. It seems a bit counterintuitive to have a gap for air at the top of your hive but I’ve done this for the last few years and haven’t lost a winter colony in more than three years.

At this point, I’ve done all I can for my bees and it’s typically gotten too cold to intervene with the hives.

I’ll spend the next few months reading the latest research on bees and beekeeping and, from time to time, gently placing a stethoscope on the outside of a hive to listen to gentle hum of the cluster.

When I’m lucky, I’ll be home on a particularly warm winter day to watch them all come out on their “cleansing flights.”

Then, just before I know it, as quickly as winter came, spring will appear and I’ll be right back at it, supporting my bees in getting ready for next year’s winter slumber.
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