

Sunset THE ONE-BLOCK FEAST

How to raise honeybees (and make honey)



WE BEGAN THIS ADVENTURE partly in quest of honey to sweeten our One-Block Feast (sunset.com/oneblockfeast). But we also did it for the love of bees.

You've probably heard the statistic: Bees, traveling from plant to plant and pollinating as they go, are responsible for producing about a third of our country's food supply. Unfortunately for them and for us, they've been dying in huge numbers over the past several years. No one's conclusively figured out what causes Colony Collapse Disorder, as it's been termed.

We figured that by raising bees, we would contribute, in however small a way, to the overall population of bees. We thought it would be easy; we certainly have plenty of plants for them to browse, and conditions that are relatively benign (good weather, a creek nearby). Life should be great for bees at Sunset.

Now, having seen our bees battle ants, bluejays, wasps, buckeye poisoning (the pollen is toxic to bees), and Varroa mites since they arrived in May, we understand just what these hardworking little creatures are up against (for a running diary of our life with bees, see <http://oneblockdiet.sunset.com/team-bee>). And it's deepened our appreciation for what marvelous, interesting creatures they are. (See "Amazing Bees" at the end of this document.)

The stings? Just two so far, and it wasn't a big deal. Bees only sting in self-defense (those two stings happened when we were deep in the hive, pulling frames and irritating the hive). Move slowly and gently, and you can hold them in your bare hands (really; see <http://oneblockdiet.sunset.com/2008/05/the-bee-paradig.html>).

It's been, and continues to be, an incredible experience to raise bees. We'll never taste honey again without a sense of gratitude.

"Ask 10 beekeepers a question and you'll get 12 answers, so choose one beekeeper and follow his advice." —Randy Oliver, beekeeper and bee researcher (and our consultant), on how to begin raising bees

WHAT WE RAISED 2 Colonies of Honeybees

Both our hives are filled with European honeybees (*Apis mellifera ligustica*), known for their gentleness and productivity.

WHAT WE USED Materials, Prices, and Sources

Unless otherwise noted, our beekeeping supplies came from Dadant & Sons, based in Illinois (www.dadant.com or 217/847-3324) but with branches throughout the country; we ordered from the one in Chico, CA (deliveries tend to be unexpectedly slow, so factor in extra time for their arrival). We also recommend Mann Lake Ltd. in Minnesota (www.mannlakeltd.com or

800/880-7694) for beekeeping equipment. Prices don't include shipping.

2 Master Pollinator kits (\$299.50 each).

Each kit includes:

1 telescoping outer cover with galvanized metal top and an inner cover

The inner cover helps insulate the box. The outer cover provides weather protection. Together, they're designed so the bees can't glue the hive shut with propolis (a sticky substance they collect from various plants to bond the parts of the hive together).

2 painted assembled hive bodies These are the "brood" boxes, deep boxes that will be the bees' main home, filled with brood (bee larvae), honey, and pollen. Each box has 10 frames loaded with Plasticell foundation (a thin sheet of plastic molded into hexagonal cells and coated with beeswax to make it easier for the bees to build honeycomb).

1 painted assembled bottom board We did not use this, preferring the "Country Rubes" Bottom board, which helps you screen for mites (see below).

1 metal 10-inch hive tool Used to pry frames apart and to scrape off propolis and stray bits of extra comb.

1 bee brush to gently sweep bees from the surfaces of combs and frames.

1 smoker A small metal bellows that emits puffs of smoke when the fuel inside is lit; smoke calms the bees, making working in the hive easier.

2 lbs. smoker fuel Usually wood chips or cotton. We've also used eucalyptus leaves, dead grass, pine needles—anything that will provide long lasting, cool smoke.

1 entrance feeder We've never used this, as it encourages robbing by intruder bees; we made our own feeders instead—see "Other Equipment," below.

1 zipper veil suit We chose large, to fit the largest member of Team Bee. It's very large.

1 plastic helmet (not the most comfortable, and one arrived broken; however, Dadant cheerfully replaced it). Comes with a veil that zips to the suit.

1 pair leather beekeeping gloves In S, M, L, XL—most of the women on Team Bee found the small to be the best size.

2 books: *The Hive and the Honey Bee*, edited by Joe M. Graham (1992, Dadant & Sons, Hamilton, IL); and *First Lessons in Beekeeping*, by Keith S. Delaplane (2007, Dadant & Sons, Hamilton, IL)

A year's subscription to the *American Bee Journal*

1 Medications brochure
Not included in the kit:

2 queen excluders, one for each hive. An excluder is a screen with a mesh small enough to prevent the queen (larger from the rest of the bees) from crawling up into the “honey super” (a box designated for honey collection) and laying eggs there. \$11.35 each.

2 “Country Rubes” bottom boards, one for each hive These are actually small boxes on which the hives rest, each with an open, screened bottom and a removable plastic board; they're designed to help manage Varroa mites. (See “Pest Control,” below.) \$39.95 each.

2 supers (unassembled), one for each hive. Supers are smaller boxes that are set on top of brood boxes. Can be used for raising brood, but normally are used with a queen excluder to get clean honey. 6⁵/₈ in. size, with frames. \$20.95 each.

20 Plasticell foundations, 5¹/₂ in. size, for the supers. 77 cents each.

2 drone frames, one for each hive (used to combat Varroa mites; see “Pest Control,” below). \$3 each.

3 vented helmets Because we have several people on Team Bee, we needed extra helmets—one per person visiting the hive. These vented helmets are much more comfortable than the plastic helmets from Dadant. One helmet, paired with a round veil (see below)—plus a white long-sleeved shirt, light-colored pants, and closed shoes—works fine as a basic beekeeping outfit, with gloves on occasion for heavy or prolonged work or for days when the bees are grumpy. \$12.95 each, from Mann Lake Ltd.

3 round veils with string tie-ons. \$10.95 each, from Mann Lake Ltd.

Bees

Pre-order as early as the fall and certainly no later than early spring, as bees are only available for a short time in spring (bee-raising begins with warm weather, shortly before the spring nectar flow that provides the bees with food). You can order bees three ways:

1. Packaged bees and caged queen This is the least expensive, but it takes time to build up the colony. One good source is Olivarez Honey Bees, in Chico, CA. \$60 to \$70 for a 3-lb. package; queen included; contact them for a pickup location near you; www.ohbees.com

2. Nuc (short for “nucleus”) A nuc is an established colony with a laying queen; starting this way helps you get a jump on honey production. Buy from a reputable beekeeper to avoid getting diseased equipment or sick bees. We ordered two nucs from master beekeeper Randy Oliver and drove to his location in Grass Valley, CA, to pick them up. \$90 each nuc; queen included; www.scientificbeekeeping.com

3. Swarms or established colonies Not recommended for beginning beekeepers.

Other Equipment

2 hive stands to raise hives off ground (1 per hive). We made ours from scrap 2-by-4s. The stands are rectangles 16¹/₄ inches wide by 20 inches long, with an open top, and 1 foot tall. We painted them with white latex paint.

8 sturdy square plastic food containers, filled with water and used to cup each leg of the hive stand; to discourage ants. 32-oz. size; about \$4 for 4 at a grocery store.

Terro ant bait \$7 for a package of 3; find at any nursery, garden center, or hardware store.

Tanglefoot A goopy, sticky substance that traps ants; used to keep invaders out of a beehive. \$10 for 15 oz. tub at any nursery or garden center.

Apiguard A very smelly gel for fighting Varroa mites (see “Pest Control,” below). \$30 for a 10-pack—enough for 10 individual 50 g treatments; from Dadant & Sons.

2 feeder tops, one for each hive. These boards hold upended jars that dispense sugar syrup down into the hive—food for the new bees, to tide them over until

they're foraging successfully.

To make a board, trim a thin piece of plywood to fit on top of the hive. Then cut a hole with a diameter slightly smaller than that of the feeder jar lid (see below). Put the board on top of the hive. Set a filled jar over the hole, lid down, so that it completely covers the opening. If you want to be doubly sure that the jars won't tip over, nail some wooden blocks around the hole to support the jar. (This probably isn't necessary, but we were afraid that wind might tip over the jars.)

4 (1-quart) glass jars and lids Punch several holes in each lid with a nail, then screw the lid on top of each jar once it's filled with sugar syrup. No need to buy anything special; you can use glass jars from your kitchen.

Granulated sugar You'll need 10 cups—about 4¹/₂ lbs.—dissolved in an equal amount of water to feed each hive per week to start, for at least 3 weeks, or until the bees stop draining the jar. About \$7.50 for a 5-lb. bag at a grocery store.

Powdered confectioners' sugar You'll need 1 cup per brood box per hive per week, as long as you're dusting for mites (see “Pest Control,” below). About \$2 for 2 lbs. (about 7¹/₂ cups) at a grocery store.

Wooden spoons About \$2 each at cookware stores.

Bench scraper From \$8 online or at cookware stores.

Large glass bowl About \$9 online or at a cookware store.

Cheesecloth From \$3.30 for 2 sq. yards at amazon.com or at a cookware shop.

Large stainless-steel strainer About \$25 for a good sturdy one (we like OXO brand) at a cookware store

Honey jars and lids: \$8.95 per 24-count box of 3-oz. hexagonal jars; \$5.95 per 12-count box of 6-oz. jars; from Mann Lake Ltd. (We used 5 boxes of the small jars and 2 boxes of the larger ones to bottle a total first-summer harvest of about 31 lbs. of honey).

5-gal. food-grade plastic bucket with 1¹/₂-inch honey gate To allow the honey to settle; bubbles and foam will rise to the surface and pure honey can be drawn from the honey gate (a kind of faucet) at the bottom. \$17.95 from Mann Lake Ltd.

Labels Use a design/graphics program like Adobe Illustrator. (To learn how we made our own labels, see below.)

HOW WE DID IT A Step-by-Step Guide

1. Choose the location

Bees need:

Sun (afternoon shade where it's hot)

Access to fresh water near the hive We used a plastic plant saucer with stones in the center for the bees to land on (otherwise they drown) and refreshed the water every day. A shallow bubble fountain would work well.

Protection from wind, which increases the overall stress of the hive. Wind can blow rain (or snow) into the hive, making the bees irritable (maybe because they have to work harder to keep the hive warm) and also more susceptible to disease.

Privacy Don't put the bees near high-traffic areas, play areas, swimming pools, or pet areas. Give them plenty of space.

2. Prepare the location Hives should face south, if possible, and need to be kept off the ground to protect them from dampness and critters. After clearing the brush and leveling the ground, we put our hives on cinder blocks at first, but when ants invaded, we put them on hive stands (see above), each leg set in a water-filled plastic container.

3. Install the bees Spring, when the weather is gentle and flowers are beginning to bloom, furnishing a food supply, is the time to put your bees in their hives. Once you've chosen how to buy them (see "What We Used: Materials, Prices, and Sources," above), the best bet is to rely on your source for installation instructions.

Here's what happened when we picked up our bees from Randy Oliver at his property in Grass Valley: He gave us an introductory class in beekeeping, showing us how to use the hive tool and the smoker, handle bees (we scooped them up with our bare hands!), pry apart frames, and check for eggs, brood (larvae—the next generation of bees), and queen (all vital signs of a colony's health). We brought two brood boxes with us, and Randy loaded 5 frames of his gentle hybrid bees

and a queen into each box and sealed the openings by stuffing them with a few of our beekeeping gloves. We used ratchet straps to secure the boxes in the back of the truck we'd rented.

At Sunset, we positioned the brood boxes in their designated locations and removed the gloves from the entrances. (We did this after dark, when bees are less apt to be flying in and out of the hive.)

4. Feed the bees Young colonies have a lot of work to do—storing pollen and nectar, sealing all the cracks and seams in their new home, and taking care of the queen and new brood. To make their adjustment easier, we provided a "nectar" to feed the bees. Here's how: Dissolve equal parts sugar and water and use to fill quart jars. Top with feeder lids (regular jar lids with small holes in them) and invert them into the hole. The lids shouldn't drip—they should be barely moist on top. The bees will drink what they need from the lids. Our nucs drank about $\frac{3}{4}$ of a quart jar per day in the beginning. Over the next 3 weeks or so, it tapered off to the point where we realized sugar water was no longer necessary; the bees were finding their nutrition in flowers. Plus, sugar water makes for insipid honey and so shouldn't be continued if not needed.

5. Inspect the hives inside and out Much of beekeeping is simple observation and response. If you're a novice beekeeper, inspect the hive about once a week for a couple of months so that you can learn; once you feel comfortable, adjust your routine to every two weeks. Make sure the outside of the hive is clean and free of bee poop and that the landing board is free of litter. Open the hives and check frames for larvae and eggs (on warm days only). If the queen is healthy, you'll see plenty of larvae in various stages of development. If you don't see evidence of a healthy queen, consult an expert. Your local beekeeping guild is a good source.

Ultimately, it's better for the health of the hive to inspect them less often. Opening the hives and thoroughly checking them requires smoking to keep the bees calm, and every time the hive is opened and the colony smoked, it stresses the

bees and takes them about a day to recover. As the summer progresses and you learn more, you'll find you won't need to pull many frames to know what's going on inside. And you'll figure out a lot simply by observing the bees as they come and go from the hive.

6. Check regularly for mites Varroa mites are the pest most typically found in hives. Left unchecked, they can cripple and eventually kill the hive (see below for hints about checking for mites and mite control).

7. Expand the hive when necessary Start with one deep hive body/brood box. Let the bees build up brood cells in it.

Then, when it's well filled (7 to 8 frames of bees and brood), top it with a second brood box. Let the bees build up brood cells in the second brood box, too. When the second brood box is well filled (7 to 8 frames of bees), top it with a queen excluder and, finally, the honey "super" (the box from which you will collect most of your honey).

Pest Control

Bees are like flying balls of delicate spun sugar filled with honey. Everything wants to eat them. Here are two of the worst pests we battled, and how we attempted to control them.

Ants Argentine ants are a problem throughout most of the San Francisco Bay Area, and they can kill a hive by robbing honey and eating the brood. To keep ants out of the hives, immerse each leg of the hive stands in water (you could use oil instead, although that will kill bees too, if they fall in). Some people also apply a thin stripe of Tanglefoot (a goopy, sticky substance to trap the ants) on the legs of the stands, but we found that the ants could cross it if any dust blew into the sticky stuff.

We couldn't spray to kill the ants, since that would also kill the bees. We tried Terro ant bait, a less toxic control. These are little containers filled with boric acid mixed with a sweet substance ants like. They take the boric acid back to their colony, feed it to their queen and brood (yes, ants have a social caste system similar to bees) and they all get a terminal

bellyache. The ants seem to like it, but their ranks are still strong, so we're not sure it's working.

Varroa mites The most damaging pests a beekeeper has to deal with are Varroa mites. Virtually unknown in this country until the middle of the 20th century, these pests threaten the survival of a hive once they become established. They suck the blood of adult bees and lay their eggs in brood cells, where their larvae feed off bee babies, infecting them with viruses and weakening and even killing them. To save their bees, beekeepers use a variety of methods.

1. A 24-hour count of a natural mite fall will give you a good idea of a hive's infestation. Coat the bottom of your "Country Rube" board with petroleum jelly (so the mites can't walk away), slide it into the lower part of the bottom board, wait 24 hours, and then pull it out and count the mites. Anything more than 10 mites per brood box indicates you've got a problem.

2. The powdered sugar method lets you both count the mites and control them. Simply sift powdered (confectioners') sugar, 1 cup per brood box, over the tops of the frames and brush it into the hive. The powdered sugar makes the mites lose their grip on the bees and fall off; the bees groom the sugar off their bodies, dislodging more mites. Again, use the plastic bottom board coated with petroleum jelly to capture the fallen mites. If you have a strong hive, you should not see more than a few mites 10 minutes after dusting. If there are more, you have a problem.

3. Drone frames will also help trap Varroa mites. These frames are designed to encourage bees to make drone comb, which is larger than worker comb (meaning each cell in the comb is larger, to accommodate the larger drone larvae). Since Varroa mites prefer drone brood 10 to 1, the drone comb makes a great mite trap. Just before the drones hatch (about 24 days after the eggs were laid), destroy the drone comb (you can freeze it and return it to the hive, or simply cut it out), and replace the drone frame for the next cycle. (Since our queens have already mated and have a lifetime's supply of

sperm inside of them, they don't need the drones in order to reproduce; when our hives' drones do mate, it's with other queens in the area.)

4. Apiguard A big gun in mite control is Apiguard, a gel infused with Thymol, made from the oils of thyme plant and bee balm. It works well, but it makes the honey stored during the treatment unusable (it evidently won't hurt you, but it tastes like mouthwash).

For more information on mite control, see the sources listed under "Helpful Info," below.

Honey Collection

Two months after bringing home our bees, we pulled out the drone frame (for mite control) and found a band of comb full of pure honey along the bottom of the frame. After freezing the comb to kill the mites within, we carefully cut away the clean comb and suspended it in a fine mesh sieve over a bowl for 24 hours. We ended up with about ½ cup of honey.

Then: the real honey harvest, three weeks later. We had four frames packed with honey, each weighing about 8 lbs. Lacking a professional extractor (which would uncap the cells in the combs and whirl the honey out with centrifugal force), we used the following low-tech method.

Cut and crush We balanced each frame on two wooden spoons set, bridge-like, across a glass bowl. Using a bench scraper, we cut the honey—wax and all—off the plastic foundation into the bowl. The honey ran in a bright amber stream off the frame. It was all we could do to keep from licking our fingers and singing like Pooh Bear (as soon as we'd finished, though, we did have a taste. The flavors were intensely floral and pure). Then we used a spoon to crush the honey and wax in the bowl.

Straining and settling We poured this slurry of wax and honey through two layers of cheesecloth and a stainless steel strainer into a food-grade plastic bucket. Then we left it to drain and settle for a couple of days (bubbles and foam rose to the surface).

Bottling We covered the floor with newspa-

pers (spills are sticky) and got our jars ready. Then we loosened the honeygate (the stopper at the bottom of the pail) to release the honey into each jar. In went the honey, on went the lids. It was as simple as that. From four full frames of honeycomb, we reaped 12 lbs., 10 oz. of honey. As for the leftover wax, we rinsed it and froze it. Later, we rendered the wax in a solar wax melter and used it for craft projects like lip balm (for more, see our blog: http://oneblockdiet.sunset.com/team_bee.) We had a second surprise harvest later in the summer, bringing our total to about 31 lbs.

Labeling

We designed the labels, using a photograph of one of our own bees, and laser-printed them onto white Avery 5265 full-sheet labels (www.officemax.com). Atop a self-healing mat (www.dickblick.com) we lined up our metal ruler along a label edge and used a craft knife (www.dickblick.com) to cut out each label. Then it was as easy to peel and stick a label to each bottle. Tip: To get your label on straight, try just barely peeling back one corner of the label and using that sticky spot to help you position the label on your clean bottle surface. Then reach under the label and gently remove the backing with one hand; with the other, smooth down the label as you peel off the backing.

Helpful Info

General websites

www.scientificbeekeeping.com
www.sanmateobee.org
www.sfbee.org
www.beesource.com
www.beginningbeekeeping.com

Websites about Varroa mites and how to control them

www.ent.uga.edu/bees/Disorders/Varroa_mites.htm
www.countryrubes.com/information/informationandpictures.html
www.scientificbeekeeping.com
www.dadant.com/Apiguard-Howtouse_003.htm

Books and Publications

The Hive and the Honey Bee, edited by Joe M. Graham (1992, Dadant & Sons, Hamilton, IL)

First Lessons in Beekeeping, by Keith S. Delaplane (2007, Dadant & Sons, Hamilton, IL)

American Bee Journal, \$24.95/per year (monthly publication); 51 S. 2nd St. Hamilton, IL 62341, 217/847-3324

Amazing Bees

Worker bees—all females—work hard their whole lives. (Not so the males, known as drones. They lounge about stealing honey until it's time for them to fly out and look for a queen to mate with.) But from the moment a working girl pulls herself from her six-sided cell, she begins contributing to the health of the hive—by cleaning her cell in preparation for the next baby bee.

As they age, worker bees take on a series of jobs (although tasks sometimes overlap). At 10 to 17 days, they are house bees, cleaning the hive (bees are very clean), tending the brood (baby bees), taking care of the queen, and unloading the groceries (nectar and pollen) from the foraging bees and storing it in the wax combs. After about 17 days, house bees start taking on other tasks like guarding the hive and ventilating it from within by fanning their tiny wings across the comb. At 21 days, they become foragers, flying up to 10 miles away to find suitable blooming plants. Even as foragers they'll help build comb, ventilate the hive, and guard it from honey-hungry animals.

In the summer, the worker bees work so hard they just wear out after about 35 days. The queen, no slacker herself, lays up to 1,500 eggs a day to provide a constant supply of new workers. In the winter, bees live longer—140 days or more—keeping the hive and queen warm, dry, and safe until spring when the season begins again.