

Using

BAIT HIVES

The Right Box, In The Right Place At The Right Time.

Tom Seeley

The basic process of capturing honey bee swarms with bait hives is extremely simple. You just put up a box of the right design in the right location and at the right time of year.

This article will tell you how to capture swarms using bait hives. If you need additional colonies of bees, this can be efficient and fun way to get them. There is no need to dash off at a moment's notice to an unfamiliar address. And there is no need to coax the swarm bees to accept your hive as their new home. The bees will come to you and they will do so all on their own.

In most places where beekeepers keep bees in hives, there are also colonies living in hollow trees and buildings. Bait hives enable you to automatically harvest swarms produced by all these colonies. I have been capturing swarms in and around Ithaca, New York for over 30 years. In some years, nearly 80 percent of my bait hives are occupied by swarms, while in other years only about 20 percent of them are occupied. On average, I expect to capture one swarm for every two bait hives that I set up. Your success rate will depend on the density of colonies where you live. It might be much higher than you suspect.

Bait Hive Design

The first step toward success with bait hives is to build wooden boxes that will be attractive to honey bees looking for a home. In the 1970s, working with Professor Roger A. Morse at Cornell University, I conducted experiments aimed at learning what makes a dream home for honey bees. I offered wild swarms specially built bait hives (usually cube-shaped) in groups of two or three. The hives in each group differed in only one respect (cavity volume, entrance area, etc.), thus each group presented an array of candidate home sites that differed in just one property. I observed which hive within each group was occupied first by a swarm. Over the years, I recorded the choices of 124 swarms, and so learned what things do and don't matter to the bees as they choose their homes.

The results of these multiple-choice tests given to the bees yielded eight recommendations regarding bait hive design.

1. Cavity volume: 1.0 to 1.5 cubic feet.
2. Cavity shape: not important.
3. Entrance area: 1.5 to 2.5 square inches.
4. Entrance shape: not important.
5. Entrance position: near the floor of the hive.
6. Entrance direction: facing south or southwest is preferred, but other directions are acceptable.

7. Dryness and airtightness: dry and snug.
8. Odor: the odor of beeswax is attractive.

(A note regarding odor: commercially available scents that mimic the assembly pheromone from the Nasonov's gland of honey bees are helpful, but are not needed. They apparently work by making bait hives more conspicuous to scout bees.)

Some variables of bait hive design remain to be investigated, including the thickness of the walls. The experimental bait hives used in my research were built of 5/8-inch-thick plywood, but you can probably get away using thinner stuff. Lightweight molded papier-maché plant pots (available from nurseries and bee supply dealers) have been used with some success in the southwestern United States.

Building Bait Hives

Now that you know what bees seek in a home, you are ready to build your bait hives. You may find it easiest to use some of your old hives, because there will be a strong and attractive odor of beeswax inside them. I have made many of my bait hives out of old, full-depth, 10-frame Langstroth hives. They have a volume of 1.5 cubic feet. But I favor making my bait hives out of old "nucleus hives" that hold five or six frames and have a volume of



Bait hives used to determine what size cavity honey bees prefer when they get to choose their own nest site. The bait hives had volumes of 10, 40 and 100 liters (0.35, 1.4, and 3.5 cubic feet). Swarms usually chose the middle sized one.



Bait hive built from an old Langstroth hive, with an entrance hole drilled on the front and boards nailed on the top and bottom.

about one cubic foot. Both sizes of bait hive are attractive to the bees, but the smaller ones are much easier to set up, take down, and transport. If you use old hives, make sure to reduce the size of the entrance to about two square inches by blocking off most of the original entrance opening. Reducing the entrance opening to this size is VERY important. You will also want to attach the bottom board to the rest of the hive, so that it will be easy to move the whole thing about. Another way to convert an old hive



Bait hive mounted on a simple platform at a suitable height in an oak tree. Notice the small entrance opening, as preferred by the bees. This bait hive has been repeatedly occupied by swarms.

into a bait hive is to drill a 1.5 inch diameter hole on one side of the hive, fasten a plywood board to the bottom, and install a removable lid. Be sure to hammer a nail across the entrance hole to exclude birds and squirrels.

If you are building your bait hives from old hives, you will want to equip them with standard frames filled with drawn comb or beeswax foundation. This will strengthen the odor of beeswax in each bait hive. Perhaps even more important, this will make it easy to transfer the bees from bait hive to regular hive when you collect a swarm. Furthermore, placing frames with foundation in your bait hives will enable the swarm bees to build you beautiful, new frames of comb.

The color of a bait hive's exterior appears to be unimportant; I have had good occupation rates with various colors. Darker boxes may overheat in hot climates unless they are fully shaded. If you use colors that make the bait hive inconspicuous (dark green or brown), you can reduce vandalism without discouraging the bees.

Positioning Bait Hives

All right, you have your bait hives built and you are ready to set them out. Where will you place them so they are conspicuous and attractive to the bees? My studies with Professor Morse yielded three recommendations regarding bait hive location.

1. Height: about 15 feet above the ground. The multiple-choice tests of the bees' housing preferences revealed that bees greatly prefer a residence that is high off the ground. You will find that bait hives only six to 10 feet high will attract swarms, but hives that are still higher are probably even more attractive. To get adequate height, you can set your bait hives on high porches, low roofs, or simple platforms built in the forks of trees (see Figure 3.).

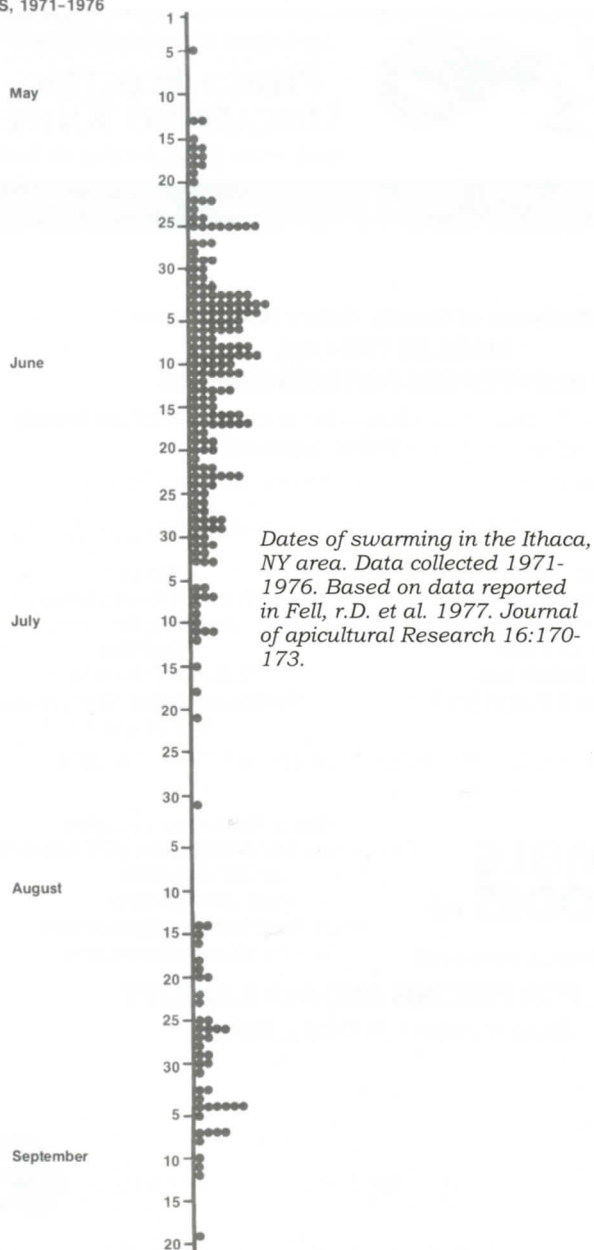
2. Shade and visibility: well shaded, but highly visible. Bees tend to avoid or abandon bait hives in direct sun.

3. Distance from your apiary: at least 300 feet. I have had little success with bait hives mounted in trees near my apiaries. Bees may prefer to nest well away from other colonies.

Time to Set Out Bait Hives

To be successful with bait hives, you need to know when swarming is most likely to occur in your area. In my hometown, 80 percent of swarming takes place between May 15 and July 15, and another 20 percent takes place between August 15 and September 15. A similar pattern probably holds in other places in North America, except that swarming starts considerably earlier toward the south. I've read that swarming in Maryland starts in April, for example, and in Florida in late February or March.

Whenever swarming starts in your area, you will want to have your bait hives set out a few weeks in advance to maximize their chances of being discovered by scout bees. The departure of a swarm from its parent colony takes only five to 10 minutes, but noticeable preparations begin up to 10 days in advance. We now know, for example, that colonies preparing to swarm send out nest-site scouts to search for possible dwelling places several days before the entire swarm issues. You can see these scouts flying up and down tree trunks investigating knotholes and other openings. If you have your bait hives set up before the



start of swarming, then sooner or later you're apt to see scout bees investigating them too.

Checking and Taking Down Bait Hives

Let's say the day has come when you see a crowd of bees at the entrance of one of your bait hives. Before you take it down to collect your free bees, be sure that you spy bees entering the hive carrying loads of pollen. When several dozen scout bees are inspecting a bait hive together, it can look like it is occupied but actually it isn't. To avoid taking down your bait hive prematurely, check for pollen-bearing bees going into the hive; they are a sure sign that a colony has taken up residence. Nest-site scouts do not carry pollen.

Another way you can distinguish between scouts from a homeless swarm and foragers from a resident colony is by noting the pattern of flight around the bait hive. Bees scouting a potential nest site move repeatedly in and out of the entrance, sometimes taking short flights, but returning again and again to further inspect the hive's

interior. Most foragers, in contrast, leave the entrance quickly or stand there for a while, rapidly groom themselves, and then fly off directly.

You should approach and handle an occupied bait hive just as you would any hive of bees that you are moving. Work when darkness, cool temperatures, or rain has caused all the bees to move inside. Gently puff smoke in the entrance and at any bees still clustered on the outside of the hive, to coax them inside. Then use duct tape or a staple gun to fasten wire screening over the entrance opening. You can also use tacks, but hammering them in will stir up the bees.

When using a ladder to take down a bait hive, use a rope to safely lower the hive to the ground. If there has been a good honey flow, your bait hive may weigh 50 to 70 pounds and it is not easy to climb down a ladder while holding such a heavy object. You can use one end of your rope to secure the hive and then pass the other end around a limb above the hive and tie it to the ladder. After you have the bait hive unfastened and hanging free of the ladder, untie the rope from the ladder and slowly lower the hive to the ground. Thinking ahead, perhaps a pair of large eye hooks on top would make this easier.

If you picked a cool morning or evening for your harvesting operation, you won't have problems of the bees overheating inside the bait hive, despite the bait hive's small entrance and the limited ventilation that it provides. Under no circumstances should a bait hive remain screened all day, especially if it is exposed to the sun, because the screened entrance cripples the bees' ability to cool the nest. Overheating can quickly kill a colony.

You will probably want to check your bait hives fairly often, maybe every week or so. For one thing, it is fun to see if scout bees are checking them out. More importantly, it is good to know when they have been occupied. It is much easier to take down a recently occupied bait hive than one that has been left in place until the weight of the honey and the population of bees have increased greatly.

By the end of the swarming season, if you built your hives properly and positioned them carefully, and if nature endowed your region with plentiful swarms, your bait hives should have yielded you several beautiful swarms of bees. If so, then congratulations, for you are now entitled to call yourself not just a bee keeper, but also a bee trapper! **BC**

For further reading:

- Fell, R.D., J.T. Ambrose, D.M. Burgett, D. DeJong, R.A. Morse, and T.D. Seeley. 1977. *Seasonal cycle of swarming in honey bees (Apis mellifera L.)*. *Journal of Apicultural Research* 16:170-173.
- Rangel, J., S.R. Griffin, and T.D. Seeley. 2010. *An oligarchy of nest-site scouts triggers a honeybee swarm's departure from the hive*. *Behavioral Ecology and Sociobiology* 66: 979-987.
- Seeley, T.D. and R.A. Morse. 1976. *The nest of the honey bee (Apis mellifera)*. *Insectes Sociaux* 23:495-512.
- Seeley, T.D. and R.A. Morse. 1978. *Nest site selection by the honey bee*. *Insectes Sociaux* 25:323-337.
- Seeley, T.D. 2010. *Honeybee Democracy*. Princeton University Press.
- Visscher, P.K., R.A. Morse, and T.D. Seeley. 1985. *Honey bees choosing a home prefer previously occupied cavities*. *Insectes Sociaux* 32:217-220.