

The Hive: A House for Your Bees

In the wild, honeybees will seek suitable cavities to create a home. Bees can live inside hollow tree trunks, underground in a cave space, or even inside an abandoned car, as long as there is enough room to build comb and protection from the environment. Honeybees that are not housed in a hive and are not managed by a beekeeper are called feral bees.

In tropical climates, feral honeybees will sometimes build their nests out in the open, usually under the shelter of a large tree or a building's eave. The feral colony pictured here, built large combs out, approximately XX cm from top to bottom, in a macadamia orchard. The abandoned comb below is evidence of a feral colony that began to settle on that branch, but for some reason, decided to move on and abandoned this brand new white wax comb.



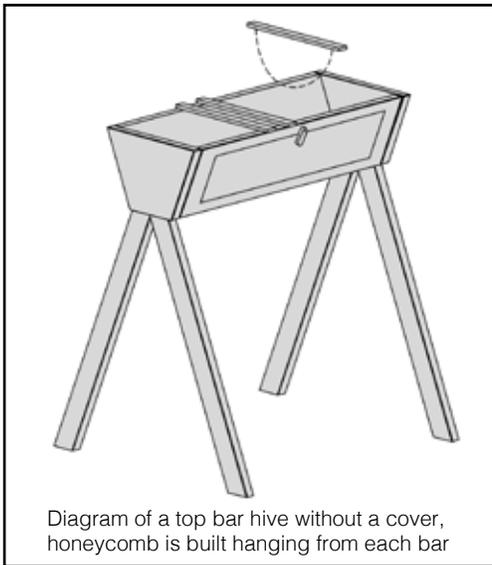
The flexibility in nest location adoption has allowed people to develop many styles of beekeeping. In Medieval times for example, bees were kept in straw or wicker type baskets called "skeps". Skeps were sometimes given a coat of mud, or even cow dung, to make them impermeable to weather. Beekeepers commonly sheltered the skeps during the winter months to improve bee survival. However, the collection of honey and wax from the skeps, most often meant killing the bees, using sulfur gases or by drowning the colony, and then removing the hive products.



An ink drawing from 1568 by Pieter Bruegel the Elder (left) clearly depicts beekeepers wearing protective clothing while working with skeps.

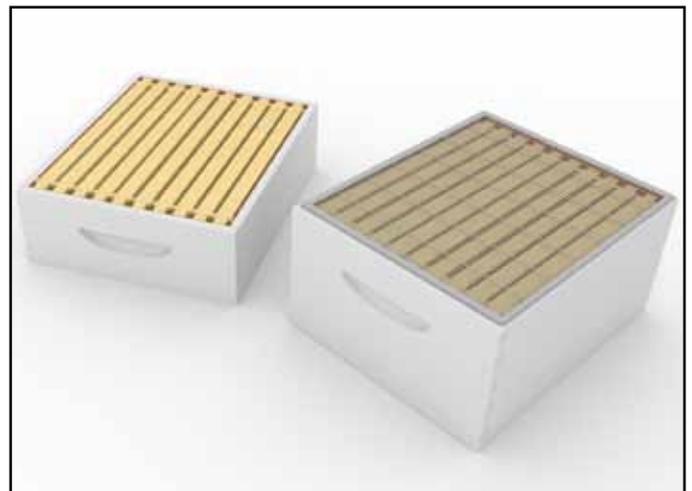
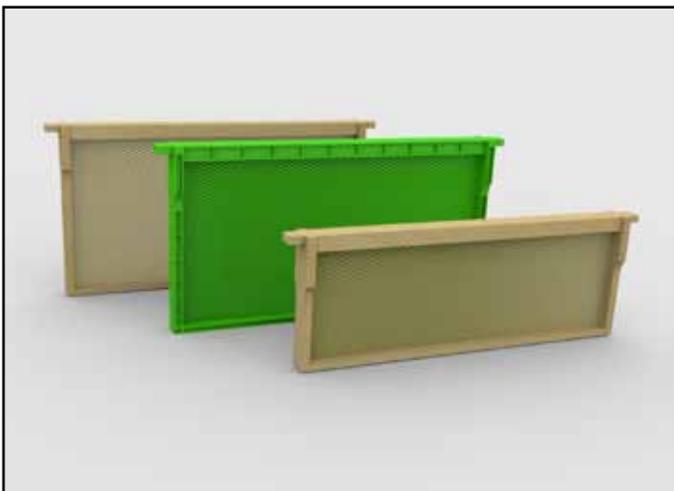
In some developing countries, such as Kenya, bees are simply kept inside hollowed out logs or large clay pots, which greatly reduces the cost for beekeepers. Kenyan beekeepers have learned to prepare logs and attract swarms to these semi-natural homes. The colonies grow inside these structures and, when the season is right, the bees are smoked out, and comb is harvested by inserting a knife and cutting pieces the length of the log. It is important to note that in an effort to prevent diseases from spreading, current US and European laws prohibit keeping bees in any structure where the comb cannot be lifted out of the hive and inspected, as such, hives like the skeps are more a historical curiosity and only occasionally used to catch "swarms" (colonies that are looking for a new home). These swarms can then be transferred to more modern beehive options.

Bees can also be kept in “top-bar hives”, which are basically large rectangular wooden boxes with wooden bars from which the bees hang their comb. Top-bar hives are particularly common in Africa, where beekeepers use local materials to reduce the cost of hive construction.



As is the case with many beekeeping practices, there are pluses and minuses to the use of top-hive bars. One drawback is that the hanging combs are delicate, and inspection of the hive has to be done with great care. Treatment for some pests may also be problematic with the physical set up of this hive. In addition, because honey extraction equipment is designed for more modern hives, honey stored has to be extracted by hand. On the other hand, these hives are easy and inexpensive to build, and may prove to be useful to growers in some areas in Hawaii, in particular those islands that remain free of the varroa mite (see bee pests).

Finally, in most industrialized countries, beekeepers use movable-frame hives as illustrated by the “Langstroth” hive, named after its creator: Reverend Lorenzo Langstroth. This hive is the most common beehive used by US beekeepers. It is composed of a series of wooden boxes, some of which are used for the queen to lay eggs, and some for honey storage only. The hive boxes are filled with wooden or plastic frames in which the bees build their comb. One very important improvement over previous hives designs was the addition of easy to remove frames, which allowed for quick inspection and manipulation of the bee brood and honey.



Langstroth hives are relatively more expensive to make and/or purchase, and require more maintenance than other hives, however they can also be easily inspected, transported, and harvested with less danger of damaging the structure of the nest or the queen.

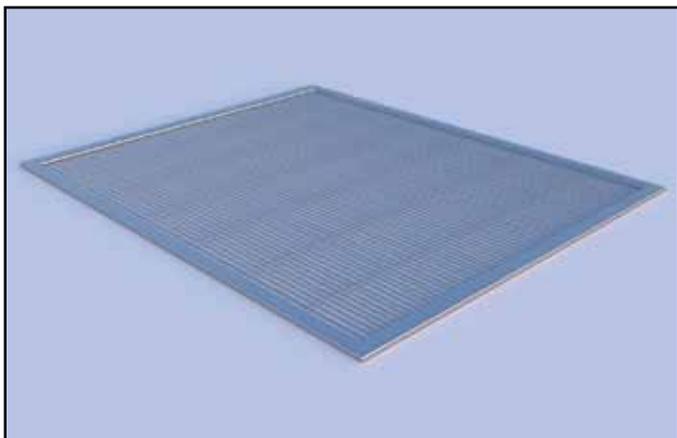
The elements of a typical Langstroth hive:



Notice that the brood box, where the queen lays her eggs is at the bottom, and the honey boxes sit on top of the brood box. The brood box is usually the largest box in the hive, called a “deep”. The honey boxes can be of different sizes, the smallest ones are usually called “supers” and the bigger ones are called “shallows”. The hive in the picture has two shallows on top of one deep. The boxes sit over a bottom board

Queen Excluders

Many beekeepers like to keep the queen and bee brood separate from the honey production areas. To achieve this they use a queen excluder. The queen excluder is a plastic or metal grid that permits the passage between the deep box and shallow box (honey super) by only worker bees.



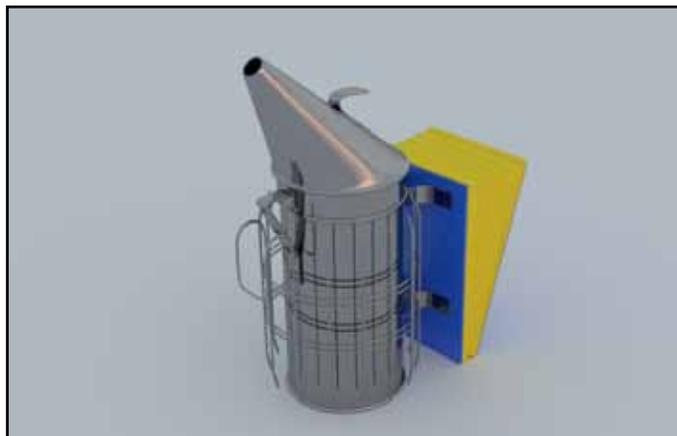
Queen excluder on deep box

One advantage of restricting the queen to the bottom of the hive, is that the honey boxes are filled with only honey, rather than having some brood cells. Finally, the queen excluder reduces the risk for queen to be injured when beekeepers open the hive for honey collection.

Smoker

The most important tool for beekeeping is the smoker. Opening a hive can cause a defensive response by the hive. Even a well-protected beekeeper can be stung through their clothing. It is always good practice to have a smoker nearby. A couple of puffs of smoke can have a calming effect on the honeybees.

The most common smoker fuels used in Hawaii are: ironwood pine needles, dry grass, dried bamboo, dried koa leaves, dry wood chips or shavings, and strips from burlap bags. We recommend not using woods or plants that were previously treated with toxins (ie paints, oils, pesticide).



Hive Tools

The hive tool is an essential piece of equipment for working with honeybees. It is used for prying boxes/frames apart and scraping wax and propolis (plant resin brought back by the bees and used to cement the frames). There are many different styles of hive tools, some have hooks to help lift the frames out the box.

Frames and Wax Foundation

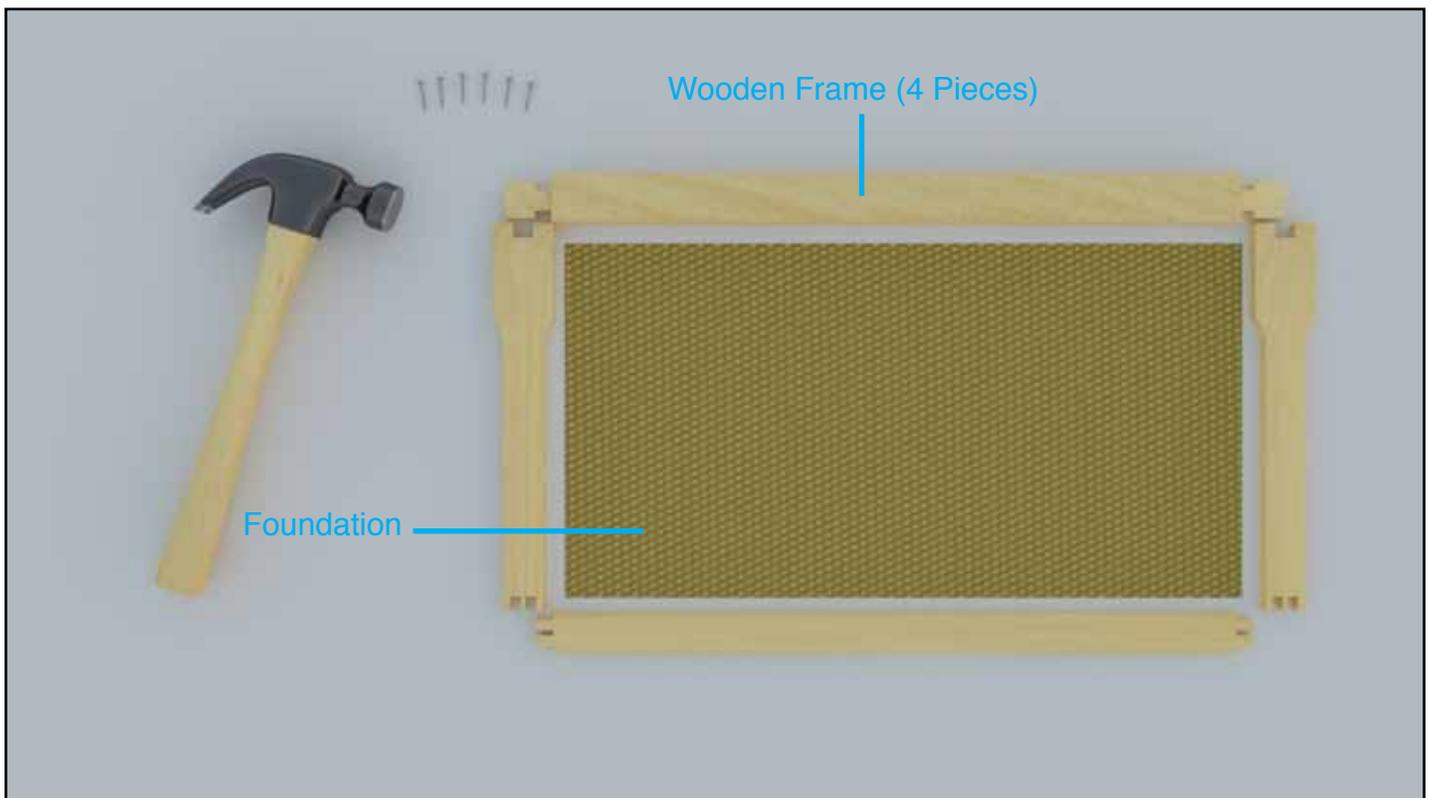
To manage honeybees for pollination and honey production you will need to add many "frames" filled with a wax foundation. The foundation will act as a blueprint for the bees to make comb in the hive. The frames can then easily be moved and inspected by the beekeeper, as shown below. A typical frame consists of four pieces of wood that fit together to hold a sheet of honeycomb (foundation). There are also one-piece molded plastic frames, but we recommend the use of wooden frames to reduce the hiding spaces for the small hive beetle, a honeybee pest.



Frames are usually bought pre-made but the beekeeper assembles them together with nails. Proper placement of nails during the building of a frame can prevent future breaking of the frame during hive inspections.



Diagram of a top bar hive without a cover, honeycomb is built hanging from each bar



Hive Stands

The use of hive stands is a common practice in Hawaii. The stands act as a protective barrier from certain pests (toads and ants) of honeybee colonies. Cane toads (*Bufo marinus*) were introduced to Hawaii in the 1930s to control beetles on sugar cane, since their introduction, cane toads have expanded from their intended diet and they now feed on bees as the foragers leave or enter the hive. Local beekeepers are familiar with the toad's behavior and have simply responded by raising the hive off the ground at least a foot to reduce predation by the toad. In areas where ants can be a problem, beekeepers prefer to use four-legged stands, which allows for reduced contact with the ground. Tanglefoot or other sticky substances can be added to the legs of the stand to reduce predatory insect access to the hive.



The Hive Location

When introducing colonies to your area, adopt a “good neighbor policy”, that is to make sure that your bees will not be a nuisance or danger to your neighbors. Place your colonies facing away from houses, as the bees may be attracted to lights at night. Provide sources of water for your bees to avoid them going over to other people's yards or houses in search of water. If at all possible we recommend placing your hives directly in the sun, as it seems to reduce pest problems. Provide a wind breaker barrier for your hive, especially if your farm is located in windy areas.



Screen enclosures can protect passersby by directing the bee's flight path

Protective Clothing

Even the calmest colony can have a rogue bee that may act defensively and sting the beekeeper. Because bees respond to the alarm pheromone of nestmates, a single sting can lead to more bees attacking, which will cause discomfort, and in some cases can be life threatening. We always recommend wearing protective clothing when managing your hives.



Beesuits provide the best protection for beekeepers. The headpiece is attached via zippers to the beesuit. The picture to the left shows two local farmers wearing two different styles of protective clothing.



Gloves are also important protection for beekeepers; they are usually made of leather and come in different sizes. Rubber gloves, like the ones used for dish washing or bathroom cleaning are an alternative option to the more official beekeeper gloves.

