Equipment

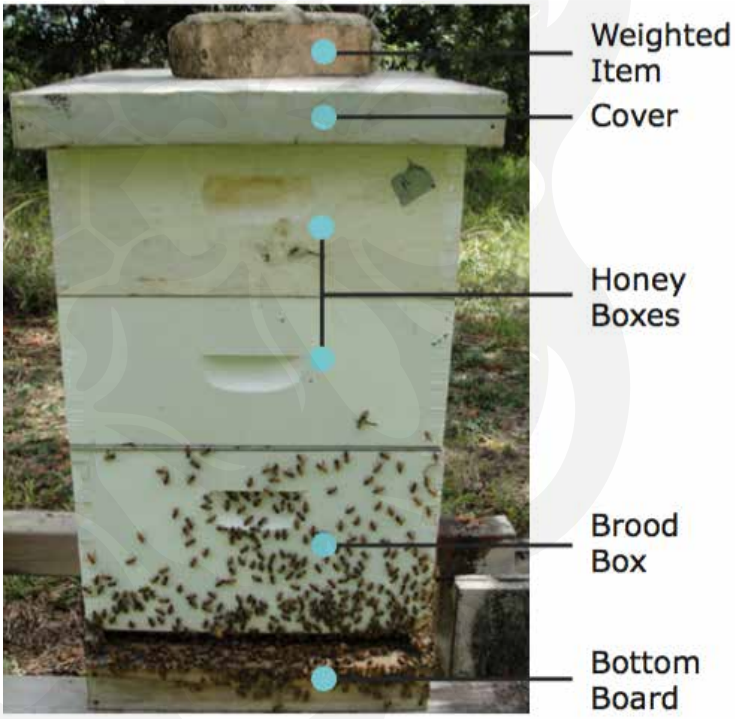
The Hive:
A House For Your Bees

In the wild, honeybees will seek suitable cavities to create a home. Bees can live inside hollow tree trunks or branches, underground, in a cave space, or inside an abandoned car, as long as there is enough space and protection from the environment. This flexibility in nest adoption has allowed people to develop many styles of beekeeping. In some developing countries for example, bees are simply kept inside hollowed out logs or clay pots, which greatly reduces the cost for beekeepers.

Bees can also be kept in "top-bar hives," basically large rectangular wooden boxes with wooden bars from which the bees hang their comb. Top-bar hives can be made with local materials and allow for some manipulation of the honeycomb. Finally, in most industrialized countries, beekeepers use movable-framehives such as the Langstroth Hive. This hive 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 includes wooden or plastic frames in which the bees build their comb. This type of hive is relatively more expensive to make and/or purchase, and requires more maintenance than other hives, however it can also be easily inspected, transported, and harvested with less danger of damaging the structure of the nest or the queen.

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.

A Langstroth Style Beehive



Kenyan Top Bar style beehive.

Hive Stands

It is very common to see hives on elevated stands in Hawaii. Colonies that are off the ground are protected from extreme soil moisture and flooding and also from the predatory behavior of introduced toads. A stand 12 -14 inches tall provides increased circulation and safety for the bees. Stands can be built out of wood or cinder blocks with wooden or metal posts.

Elevated hive stands can accommodate more than 1 hive, and/or can be fabricated to support single hives. Beekeepers in many tropical areas use metal stands to elevate their colonies off the ground, especially if predatory ants are a concern. Thin metal bars can be covered in protective materials or even water containers to prevent ants from attacking weak colonies.

Bottom Board

The bottom board, as its name implies, is the floor of the hive. The bottom board will rest on top of the hive stand, and the hive body will sit right over the bottom board. Bottom boards can be solid or screened, for more ventilation. The bottom board has a rim of wood on three of the four sides; this rim creates a space between the body of the hive and the floor.

The space is large enough to allow bees to walk into the hive after a landing and walk out to the edge of the hive before leaving to go forage. Because the front end of the bottom board is open, it is possible that in heavy rains water will enter the hive. Tilting, very slightly, the hive forward can reduce this danger.

Entrance Reducer

Often times when a beekeeper purchases a bottom board, it will come with a small piece of wood that has 2 notches. This is the entrance reducer, which can be placed resting between the hive body and the bottom board to reduce the size of the entrance to the hive. Entrance reducers can help protect a new or young hive from robbing by more established hives. In colder climates they are also used to protect against cold by reducing airflow into the hive. In most tropical areas entrance reducers are only used when colonies are weak and need protection against other bees or wasps. It is easy to make your own entrance reducer or even find a suitable replacement in the field; use a stick of the appropriate diameter and length and wedge it between the bottom board and the hive body to reduce the gap through which bees exit and enter.

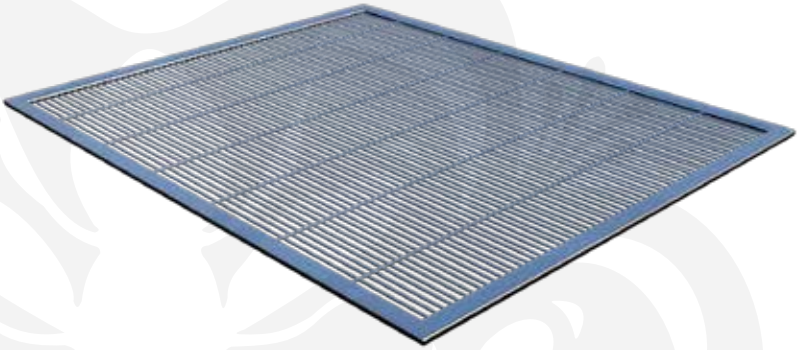
Note of caution: always remove the entrance reducer when treating for mites with fumigants such as formic acid or thymol. The bees need to be able to move the vapors produced by the treatment out of the hive and a reduced entrance will interfere with air movement.

The Hive Body (Deep or Broodbox)

This is the biggest component of the hive. It is simply a four-sided box, without a floor or a top, inside which the bees and the queen will build honeycomb, and produce more bees. The deep or brood box as some beekeepers call it is the nursery of the hive, here the queen will lay her eggs and larvae will develop into new workers. There are usually 10 frames where bees can build honeycomb per each brood box. Most colonies in Hawaii only have one deep, although in some exceptional times more nursery space is needed and another deep box can be added.

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. In addition, since the queen is confined to the bottom of the hive, the queen excluder reduces the risk for queen to be injured when beekeepers open the hive.



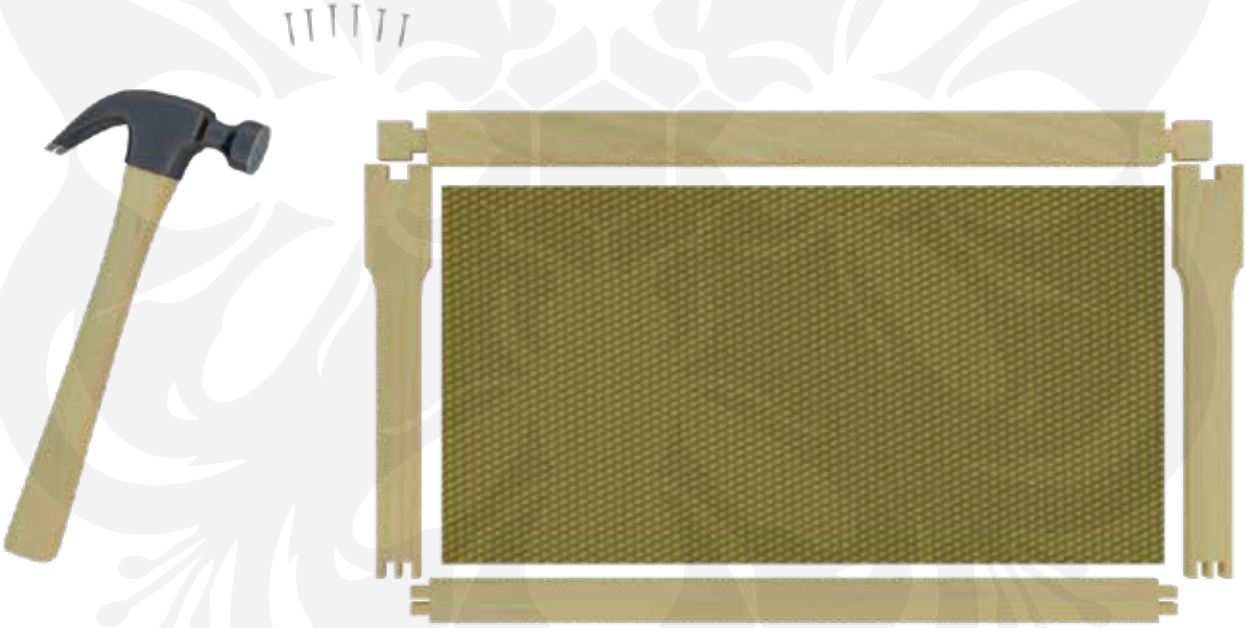
Honey Supers

A honey super is the part of the hive that is used to collect honey in managed hives. Supers come in different sizes, some beekeepers use a deep box as a super, however these boxes can be very heavy, and for that reason most beekeepers use slightly less tall boxes as supers. The shorter supers are sometimes called mediums, and shallows based on their reduced height. Bees will use any of these boxes, so it is really a beekeeper preference and it also relates to the type of honey flow that occurs in a particular region. In some areas, there are strong peaks of flowering that lead to a burst in honey production, while in other areas a more constant but moderate flow is expected.

Hive 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 is 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.



Parts used to build the frame.

A fully assembled frame.

Frames

In a Langstroph hive the combs built by the bees are inside removable frames. This simple fact allows the beekeeper to remove out of the hive and examine the honeycombs built by your bees.

Frames are available in plastic and wood. Both of these types of frames contain a hexagonal imprint to guide the bees in the construction of their cells. Bees tend to accept more easily wood frames filled with a sheet of wax called “foundation” (see below) however, plastic frames are quite durable since they don’t rot. The decision of what type of frames work for each beekeeper is somewhat influenced by personal preference for natural components, labor, and equipment cost.

Foundation

Foundation is a thin flat sheet with hexagon imprints that encourages bees to build comb. The foundation sheet is inserted in a groove along the inner part of wooden frames. Foundations are available as plastic covered with wax or pure wax sheets which bees tend to prefer. Wax may become brittle in very cold weather but that is not a concern in tropical climates. Pure beeswax foundations are wired for strength, this means that short wires run vertically across the sheet to stabilize it.

Inner Cover

The inner cover is a flat piece of wood with a small oblong opening in the center. An inner cover provides the right “bee space” under the hive lid. In addition, an inner cover aids with hive ventilation., and also prevents bees from “gluing” telescoping lids to the hive body.

Cover

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Being a Good Neighbor

When introducing colonies to your farm 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.

Tools For The Beekeeper

There are a number of tools that make it easier and safer for a beekeeper to manage their bees.

Hive Tool

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.

Flat end used to pry boxes apart.

Curved end used to move and lift frames out the box.

Frame Grip

A frame grip provides a secure grip to the top bar of a frame. This can provide help during the removal of frames from the hive bodies.

Because of the pinching action of the frame grip pay special attention not to crush workers as you begin to clasp around the top wooden bar of the frame.

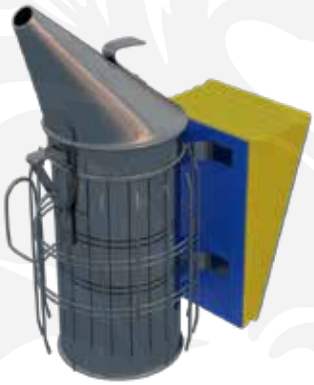
Bee Brush

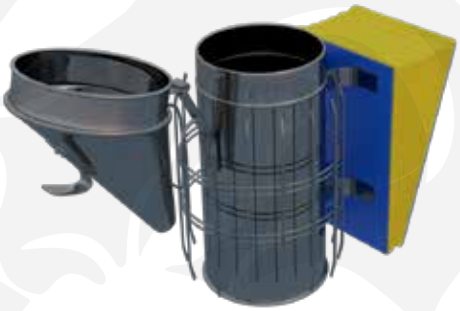
The bee brush is used to gently remove small numbers of straggler bees that are left on a frame or other piece of equipment. Bee brushes are not meant to be used to push large numbers of bees off a frame, that is usually done by securely holding the frame and giving it a quick and sudden shake over the open colony. Bee brushes can be used to sweep unwanted debris off frames or from the hive bottom board. If a large number of bees have attached themselves to the brush, a good shake will often dislodge them off.

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).





When starting a smoker first pack the fuel lightly and keep the smoker lid open while you pump air with the bellows, as the fire gets going, pack more fuel on top of the burning materials. Close the lid and pump more air. Your smoker is ready when the smoke coming out is not hot. To test blow some smoke on your bare hand, if it feels too hot, then it would be too hot for the bees.

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 above 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.

Ordering Hive Parts

There are no local outlets of beekeeping equipment in Hawaii at the time of this publication. Ordering beekeeping supplies can be done online, from a number of companies, however, keep in mind that there are high costs for shipping. The shipping charges are often calculated based on the weight and the volume of the item, so it is important to order hive parts unassembled to reduce the cost. Items shipped by boat and in ordering in bulk are good ways to save money. Beekeepers can get together and place joint orders, which are handled as a large order and may be less expensive to ship in a per/item bases.