Types of hives

Warre

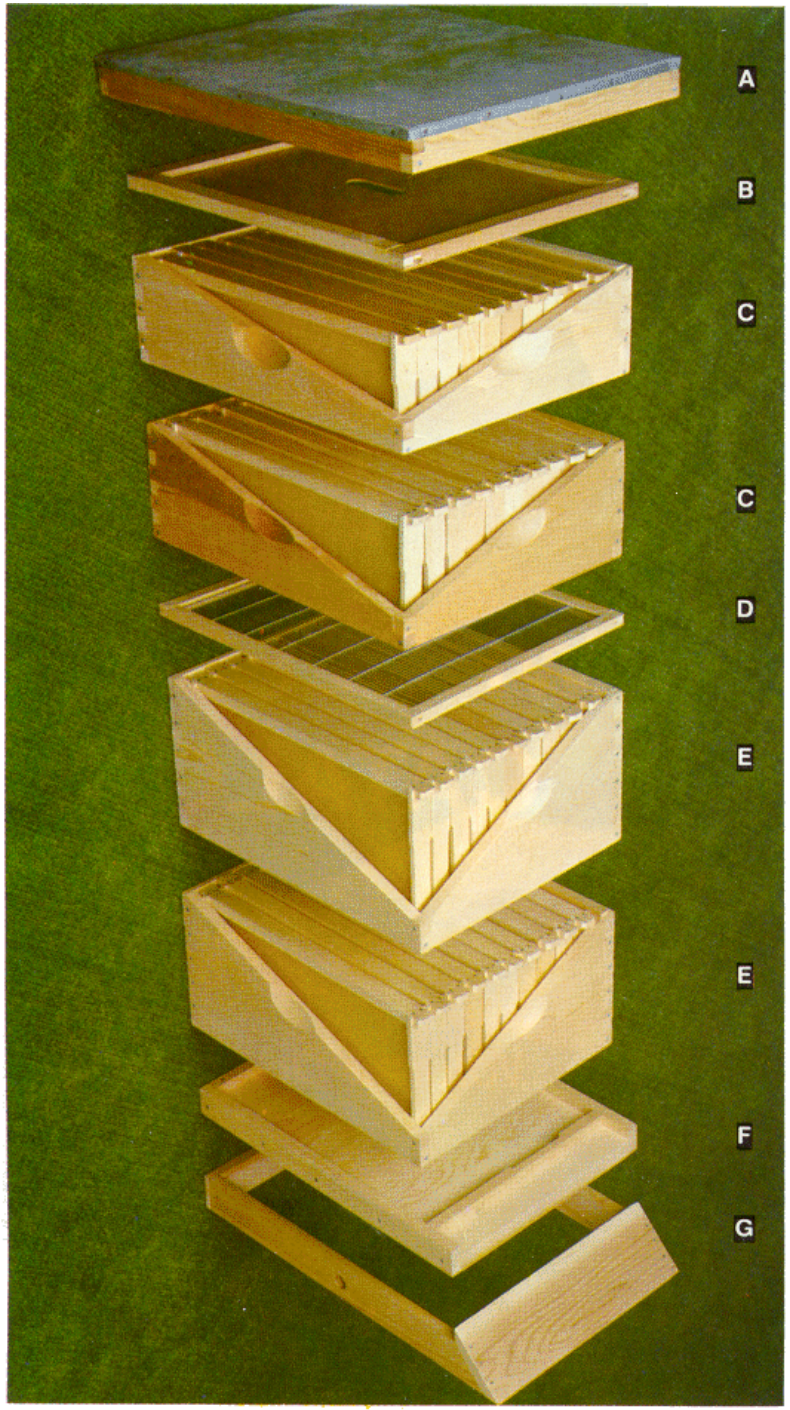
8 frame Langstroth

10 frame Langstroth

Top bar

5 frame nuc

Flow™ Hive



The modern bee hive is like a highly efficient multistoried factory with each "story" having a specific function. These "stories" work together to provide a home for bees and a honey factory for the beekeeper.

A) Hive Cover — telescoping cover "telescopes" over the sides of the top super to protect the hive. Galvanized covering.

B) Inner Cover — Creates a dead air space for insulation from heat and cold.

C) Shallow Supers — For "surplus" honey storage. Bees store their extra honey in these for the beekeeper to take. 6⅝", 5¹¹⁄₁₆" supers, or even hive bodies may be used.

D) Queen Excluder — Keeps the queen bee in the brood chambers as she is too large to pass through the excluder.

E) Hive Bodies — "Brood Chambers" are the bee's living quarters. Queen lays eggs in these chambers and brood is raised. Honey is also stored for the bees' food.

F) Bottom Board — Forms the floor of the hive. Shown with wooden entrance reducer in place to keep mice and some cold out during winter.

G) Hive Stand — Supports the hive off the ground to keep hive bottom dry and insulate hive.

Successful beekeeping means easy manipulation of the frames of brood and honey to provide a "surplus" of honey beyond that needed by the bees to live on and rear their replacements. It is this "surplus" that the beekeeper removes and markets.

Components of the Hive

Bee Culture
The Magazine of American Beekeeping
(http://www.beeculture.com/)

NOVEMBER 1, 2014

DEEPS, MEDIUMS, SHALLOWS, OR? . . . DECISIONS, DECISIONS, DECISIONS

All boxes are not created equal. Pick the one best for you.

by Ross Conrad

In the old days choosing a home for your bees was relatively easy. Bees were kept in a portion of the original tree that the swarm had moved into (log gum), or other handy containers made of wood, mud or straw (skeps). Beekeepers being the way beekeepers are, started to experiment

over time with various designs and styles in an effort to "make 'em better." Some developed frames (or top bars), designed to be placed inside the skep. Others developed additions that could be placed on top of the log gum, or under the skep in order to provide the colony with additional room for expansion when needed. One thing led to another, and today we have so many options and choices for bee hives that it can create a bewildering experience for the beginning beekeeper.

Now if you are just getting started and preparing to choose the style of hive your bees will call home, the easy thing to do is to just ask your mentor, the instructor of your beekeeping class, or your neighborhood beekeeper what hive is best. This approach will help you cut through all the options to the best choice for you and your area…or will it? The person you ask is likely to simply recommend what they use which is usually what they were taught to use by their mentor or teacher. Their decision may work well for them, but is it really the best choice for you? In order for you to make a more fully informed choice, here is a summary of the primary options currently available.

Double deeps, all mediums, a mix of deeps and shallows – the number of permutations available for today's beekeepers when it comes to choosing a hive can be overwhelming.

The Conventional Deep Langstroth Hive

The hive patented in 1852 by L. L. Langstroth that opens from the top and features movable frames has become the most commonly used style of hive in the world.
The deep Langstroth-style hive body that is 9-5/8 inches high, holds 10 frames and designed with bee space in mind has long been the standard brood box for managed colonies. While a single deep box is often sufficient for bees in Southern climes, in Northern regions, two deeps are usually utilized for the hive proper in order to provide additional room for brood rearing and food storage. The deep super can weigh upwards of 80 pounds when filled with honey, so having an additional empty deep box into which

frames can be transferred during manipulations/inspections rather than moving the whole hive body at once, might just save your back. Of all the options, the deep Langstroth hive body tends to provide the greatest expanse of uninterrupted comb into which the queen can lay her eggs (something that queens seem to prefer). Nowadays however, the conventional Langstroth hive made up of deep brood boxes is starting to become not so common and conventional.

Mediums

With the advent of so many backyard beekeepers taking up the craft of apiculture during the past decade there is a growing trend in the use of medium sized boxes for hive bodies which, at 6-5/8 inches tall, only weigh about two-thirds as much as a comparable deep when full. This size box is often called a Western, or Illinois Super. The big advantage of using all medium boxes for both the hive body and the honey supers is that you only have to inventory a single frame size for all your equipment and never have to worry about the incompatibility of your frames of comb and boxes. When three medium boxes are used for the brood chamber it creates just about the same size hive cavity as two deep hive bodies. Beekeepers down south may use two medium supers in place of a single deep. The drawback to using all mediums is that you will need to use more pieces of equipment and will end up with significantly more frames to handle when conducting frame manipulations and inspections compared to deep brood boxes. Also due to their shorter height, more medium boxes will be required for honey storage than when deep supers are used. The additional frames will significantly increase the amount of work needed to extract honey during the harvest.

Shallows

At 5-11/16 inches high, the shallow box is the lightest option for regular use as a hive body or honey super. Shallow boxes can be used as hive bodies if need be, but they have the same drawbacks as the medium sized boxes only accentuated! As a result, shallows are most commonly used as honey supers. You may see boxes that are 4¾ inches deep being offered for sale by beekeeping supply companies. These are not extra short shallow supers, but specialty boxes made especially for comb honey production.

Eight-Frame Equipment

Another fairly recent development is the popularity of eight-frame Langstroth-style equipment. Available in either the deep or medium sizes, an eight-frame box is lighter by about 20 percent than its 10-frame counter part and being narrower, the center of gravity when grasped with both hands is closer to the body making it easier to lift. The downside is that an eight-frame hive will need to be taller than a comparable 10-frame hive due to the smaller cavity space created by the eight-frame box. This can provide an additional challenge in years when there is a strong honey flow and the supers are stacked up like a skyscraper requiring use of a ladder to reach the top. The narrow base can also make the eight-frame hive more likely to topple over in heavy winds, especially when top heavy during those good honey years. Since the majority of beekeepers still use 10-frame equipment, it may also be harder to resell used eight-frame equipment to another beekeeper should you ever decide to give up your beekeeping career.

Mixing It Up

Today the hive that is made up of a single sized box is relatively rare. Most hives utilize one size box for the hive body and a smaller box, either a medium or shallow for the honey supers above. Down South for example a medium is often placed above a single deep, while the double deep more common in Northern regions, is often topped with medium or shallow supers that are placed above for the collection of honey that is intended for harvest. Eight- and ten-frame equipment however, cannot be used on the same hive very effectively due to the varying widths. This lack of interchangeability suggests that one should get either eight-frame equipment, or 10-frame equipment and stick to that size throughout their beekeeping days. Otherwise the day will inevitably come when a ten-frame super is needed and all that is available are supers designed to hold eight frames, or vice-versa.

Top Bar Hives

Alternatives to the Langstroth hive have become popular. The most common alternative to the Langstroth hive is the Top Bar Hive (TBH). The Top Bar Hive comes in two styles, the Kenyan TBH that features sloping walls, and the Tanzanian TBH that has straight walls. Top bar hives typically consist of a single box, but since their use and production has not been standardized in the way that the Langstroth hive has, the TBH comes in a wide variety of sizes. Beekeepers who build or purchase top bar hives that feature a top bar that is the same size as the Langstroth top bar find that their compatibility with the Langstroth hive is very convenient when performing certain hive manipulations or if they decide to move their bees from one style of hive into the other. Top bar hive inspections can only be conducted one frame at a time. Unlike with Langstroth-style supers, there is no ability to move large numbers of frames quickly and honey production tends to be limited requiring a lot of additional labor. This is why it is unlikely that the majority of commercial beekeepers will ever switch over to top bar hives.

Warré Hives

The Warré hive offers another alternative to the Langstroth hive. Unlike the top bar hive however, the Warré has established interior dimensions that are standardized and the hive has the ability to be "supered" from the bottom as the colony expands. As with the TBH, combs are typically attached to a top bar and allowed to be built naturally without the aid of sheets of foundation. Warré hives tend to be better for honey production than TBH, though raising the entire hive in order to add a super to the bottom of the colony may be challenging.

Unique/Original Designs

In the continuing effort to improve upon bee hive design, some beekeepers will experiment with their own unique hive designs. Here again, designs that feature frames or top bars that are compatible with the standard Langstroth hive make life easier, especially when transferring bees, brood and comb into or out of a Langstroth hive. As long as the hive design incorporates the bee space and a removable frame into its design, it should not run afoul of the bees' preferences, or state laws that require a movable frame to enable inspections for diseases and pests.

So what type of hive is best for you? If lifting heavy objects is a concern the top bar hive, or a Langstroth hive – especially those made up of eight-frame medium boxes – may be the best options. Much also depends on your purpose for keeping bees. If honey production is important then a Langstroth or Warré hive is likely to be more satisfying. If you will be keeping bees such as Italians that tend to build up early in late winter/early spring, Langstroth and Warré hives rather than a TBH will allow for easier expansion of the honey storage area in order to help ensure enough room for the extra honey that the Italian bees will need to survive the winter without supplemental feeding. Just remember that if you experiment with more than one style of hive, try to ensure that the top bars from each hive are the same length so that combs may be moved from one hive to another to simplify any hive manipulations that you may want to make in an attempt to correct hive issues or relocate colonies.

Bees are incredibly resourceful and adaptable and are able to thrive in almost any type of cavity that we provide. From my point of view, it is not the box that you keep your bees in that is critical as far as the bees are concerned, but how you care for them that matters most.

Ross Conrad is author of Natural Beekeeping, revised and expanded 2nd edition. Join Ross and the Colorado Beekeeping Association in Broomfield, CO from 8:30-5:00 for an advanced beekeeping workshop on Saturday January 24, 2015. http://coloradobeekeepers.org/ross-conrad/

Comparision of the 8 and 10 frame beginner beekeeping kits.

	8-Frame Kit	10-Frame Kit
Standardization	8-frame hives have been in use for over 100 years and are again increasing in popularity. Some components like the frames are interchangeable between 8- or 10-frame hives, but other parts like supers will fit one size hive or the other.	10 Frame is the more common sized hive used in the US over the last several decades. This hive would be compatible with the majority of hives/hive components in use today.
Management flexibility	The English Garden Hive consists of all medium (6-5/8") height brood chambers and supers. Having all uniform size chambers means that any chamber can be used for any purpose (either as a brood chamber, as a feed "super", or as a true super for surplus honey). It also means that frames can be moved between brood boxes and supers, which opens up several helpful management options.	10-frame hives use one or more deep (9-1/8") brood chamber(s) to which shallow- or medium-height honey supers are normally added. Having different sized chambers is a slightly more specialized way of doing things.
Decorative style	The appearance of the English garden hive stands out chiefly because of the decorative A-frame top covered in solid copper. (The decorative copper top is also available for 10-frames hives, but is only standard on the English garden hive.)	Our standard 10-frame hive comes with a flat, aluminum-covered telescoping top and looks very standard.
Heavy lifting	A completely full English garden super can hold close to 30 lbs of honey or over 40 lbs total including the weight of the wood and all. The center of gravity is also closer to the body making it easier to lift and carry. In the case of the English garden hive, a brood chamber is the same size as a super.	A completely full 10-frame medium super can hold over 35 lbs of honey or close to 50 lbs total including the weight of the wood and all. A deep 10-frame brood chamber can weigh close to 80 lbs total when full.
Smaller hive?	Although the individual levels of 8-frame hives are smaller (by 2 frames) than 10-frame hives, that doesn't make any real difference in the size of the colony. 8-frame hives simply expand upwards sooner than 10-frame hives which expand outwards further. Some beekeepers feel that the relative upward orientation of an 8-frame hive more closely meets instincts of bees that naturally build their nests in tree hollows.	
Cypress vs. Pine	We make our English garden supers from all cypress wood. Although paint or clear varnish is normally used to protect cypress woodenware, cypress also has some natural resistance to decay.	We use pine lumber to manufacture our standard 10-frame hive as well as most of our hive bodies and supers. Paint is normally used to protect pine woodenware.

How to Become a Beekeeper in North Carolina

Introduction

Beekeeping is a very enjoyable and rewarding pastime that is relatively inexpensive to get started. Moreover, it's a hobby that can eventually make you money! The following is a primer on how to start your first hive and begin keeping bees.

Beehive Equipment

The minimum amount of equipment you will need to become a beekeepers is one complete 'starter' hive, which consists of a *bottom board* (the hive "floor"), a *hive body* (the main box) with 10 *frames* (on which the bees build wax comb), an *inner cover* (the hive "ceiling"), and a *lid* (the hive "roof") (Figure 1). A colony of bees can live very successfully in such a hive and can store enough honey for its own needs. They may quickly out grow this space, however, and produce a swarm (where approximately half of the bees will fly away to start a new colony). To keep the bees from swarming, and to harvest their surplus honey, you will likely need additional hive equipment. But if you don't want to collect honey, then a starter hive is all the equipment you will ever need.

Most beekeepers are not content with watching half of their bees fly away, and so they will try to prevent this from happening by furnishing more hive space in the form of additional boxes, called '*supers*', on top of the original box. This gives the colony more space to grow and the bees more room to store honey. If you wish to remove honey from the hive, adding supers is a necessity.

We recommend that a first-time beekeeper start with two full beehives. That way, you will have a minimal frame of reference to compare your new colonies and to develop your management techniques.

In addition to furnishing a beehive, you will also need some other equipment. There are three items that are required to safely work a beehive: a *smoker* (to pacify the bees and reduce their defense response), a *hive tool* (to pry apart hive equipment and frames), and a *veil* (to protect the head and face). Beginners often feel more comfortable with the extra protection of a full-body beekeeping *suit* and *gloves*, but eventually they are not necessary if the bees are handled properly.

Session 2 - Equipment

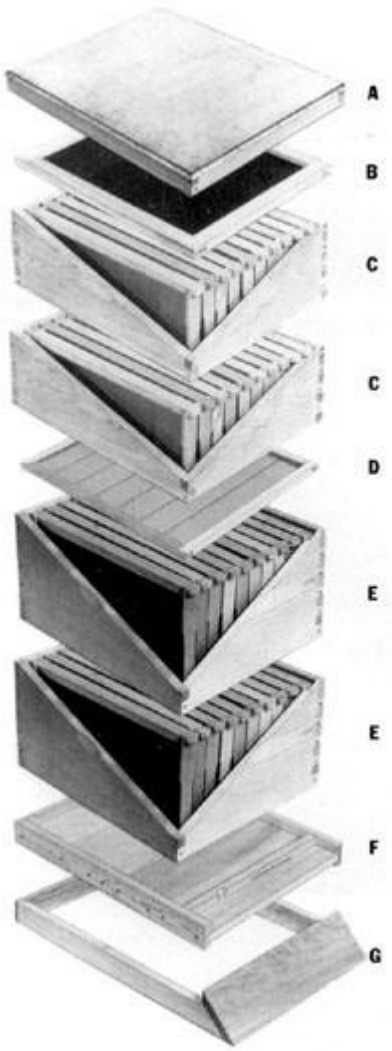


Figure 1. Basic hive equipment.

Getting Started

Equipment is available from any one of several beekeeping supply companies (listed below) and may be purchased in a variety of ways. Most companies have ‘starter kits’, which usually include a complete starter hive (without bees), smoker, hive tool, and veil (Figure 2 and Figure 3). There are also ‘deluxe kits’, which include the previously mentioned items, as well as additional equipment to add to the hive as the colony population grows. The prices of these kits range from about $125.00 for the starter hive to about $325.00 for a deluxe kit. You can also buy the individual (pre-cut) parts of the hive and assemble it yourself (listed in Table 1).

Once a hive is assembled, it is ready to house bees. There are three main ways to acquire a living honey bee colony. First, you may purchase a five-frame ‘nucleus’ colony (or “nuc box”) from a local beekeeper who is registered to sell bees (contact the NC Department of Agriculture & Consumer Services for a current listing; see below). A nuc box usually contains five frames of 10,000 adult bees, wax comb (with honey and pollen), brood (developing young), and an egg-laying queen. Starting a colony this way can cost between $70-100, but it will become a mature hive very rapidly and be less likely to fail. Second, you may purchase a three-pound ‘package’ of bees with a queen. Any number of beekeeping operations nationwide will send through the mail a screened wooden box with live bees, costing $45-65. The bees can then be shaken out of the package, and they will establish themselves in the hive. Third, you can capture a swarm that has escaped from another hive. Although not as common as they once were, wild swarms can be obtained in the early to mid-spring (late March, April, and early May). Local beekeeping clubs often have “swarm-call” lists to assist beekeepers in capturing swarms reported in their area, and beginners usually need help with capturing their first swarm. These latter two approaches are more cost effective (virtually free in the latter case), but the bees will need more time for the colony to develop and become productive.

Of course, honey bees have the potential to sting in defense of their hive. The frequency of being stung, however, is much lower than what is commonly believed. If managed properly—using smoke, a hive tool, protective clothing, and gentle manipulation—stings are quite unlikely. If a beekeeper is stung, localized pain and swelling is a normal reaction and one that should not cause undue concern. Nonetheless, bee venom can be a serious allergen for certain people, with 1 in 200 persons having a true allergic reaction requiring immediate medical attention. Consult with a physician if you have any concerns about being stung.

Individual Hive Item	**Approximate Price (or range of prices)**	**Description/Purpose**
Bottom board	$10.00	Hive body sits on this and acts as the floor of the hive.
Hive body	$8.00-10.00	Standard size is 9 5/8 deep. Holds 10 full-size frames. Also called a deep super.
10 deep frames	$8.50	Full-size frames used by the bees to construct their wax comb.
10 wax sheets	$7.00	Foundation used by the bees for building their honey comb.
Inner cover	$8.00	Thin board between top box and outer cover. Helps with ventilation.
Outer cover	$17.00	Covers the top of the hive. Provides shelter from the elements.
Smoker	$24.00-30.00	Used before opening a hive to help calm the bees and make them less likely to sting.
Hive tool	$4.50	Used to pry apart pieces of the hive that have been stuck together with 'bee glue' or propolis.
Veil	$11.00-25.00	Covers the head and face of beekeeper to prevent stings to these sensitive areas.
TOTAL	**$98.00-120.00**	
Additional Items		
Bee suit	$50-150	Complete suits cover whole body to help protect from stings.

Gloves	$10.00-20.00	May be used to prevent stings to the hands, but they can make it more difficult to manipulate the hive.
Entrance reducers	$1.00	Minimizes amount of entrance space the bees need to guard and minimizes the flow of cold air in winter.
Queen excluder	$6.00	Placed below the honey supers to prevent queen from laying eggs in the honey comb.
Feeder	$4.00-17.00	During times of food scarcity, bees may need to be fed sugar water. There are several types of feeders available.
Supers (assembled with frames)	$35.00	Any box placed on top of the hive body to give the colony more room. Honey supers are used for producing honey.

Figure 2. An assembled 'starter' hive.

Figure 3. Beekeeping gear: hive, tool, smoker, and veil.

Resources

Books

The Beekeeper's Handbook, by Diana Sammataro and Alphonse Avitabile. Designed for beginners, this book has very nice drawings and diagrams that describe the parts of the hive, what is necessary to get started, how to obtain bees, and general seasonal management. Also discusses bee pests and diseases, an important aspect of modern beekeeping.

*First Lessons in Beekeeping***,** by Keith Delaplane. Introduction to beekeeping with descriptions of necessary equipment, basic biology of the colony, honey plants, and pollination. Good overview of management of a colony in different seasons.

*Beekeeping for Dummies***,** by Howland Blackiston. Designed for beginners with good step by step directions on practical aspects of beekeeping, but limited information on background biology.

Honey Bees and Beekeeping: A year in the life of an apiary, by Keith Delaplane. Instructions for the beginner on setting up an apiary and how to maintain it throughout an entire year. In addition to the book, there are two videos with topics in beekeeping for beginners.

The Hive and the Honey Bee, edited by Joe M. Graham, Dadant & Sons. The ultimate reference book! Very detailed information that is designed for the more advanced beekeeper. In-depth information on honey bee biology, seasonal management, diseases and hive pests, even starting a beekeeping business. Ideal for looking up information on any topic, but not designed to read from cover to cover.

Periodicals

Bee Culture (http://www.beeculture.com): Monthly Issues, 1 year subscription- $25.00; TEL: 800-289-7668 or 330-725-6677; FAX: 330-725-5624

American Bee Journal: Monthly Issues, 1 year subscription- $24.95; TEL: 217-847-3324; FAX: 217-847-3660; EMAIL: abj@dadant.com (mailto:e-mail:%20%20abj@dadant.com)

Speedy Bee: Monthly Issues, 1 year subscription $17.25 , TEL: 912-427-8447; FAX: 912-427-8447; EMAIL: speedybee@bellsouth.net (mailto:speedybee@bellsouth.net)

Beekeeping supply companies

North Carolina

Brushy Mountain Bee Farm (http://www.brushymountainbeefarm.com), 610 Bethany Church Rd Moravian Falls, NC 28654; TEL: 800-BEESWAX (800-233-7929); FAX: 336-921-2681; EMAIL: sales@brushymountainbeefarm.com (mailto:sales@brushymountainbeefarm.com)

Miller Bee Supply (http://www.millerbeesupply.com), 11562 North Highway16, Millers Creek, NC 28651; TEL: 888-848-5184; Customer Service: 336-667-7513; EMAIL: woodnwax@earthlink.net (mailto:woodnwax@earthlink.net)

Other states

Mann Lake Ltd. (http://www.mannlakeltd.com), 501 S. 1st St Hackensack, MN 56452; TEL: 800-880-7694; Customer Service: 218-675-6688; FAX: 218-675-6156; EMAIL: beekeeper@mannlakeltd.com (mailto:beekeeper@mannlakeltd.com)

Dadant & Sons Inc. (http://www.dadant.com), 51 South 2nd, Hamilton, IL 62341; TEL: 888-922-1293

The Walter T. Kelly Company (http://www.kelleybees.com/), PO Box 240 Clarkson, KY 42726-0240; TEL: 800-233-2899; EMAIL: kelleybees@kynet.net (mailto:kelleybees@kynet.net)

Contact information

North Carolina State Beekeepers Association (http://www.ncbeekeepers.org)

North Carolina has approximately 60 county beekeeping associations across the state, which are part of the larger North Carolina State Beekeepers Association (NCSBA). Most of these chapters meet monthly with instructional programs, and many clubs offer new beekeeper classes each year. These local associations serve as valuable resources where experienced beekeepers offer advice and can act as mentors to beginning beekeepers. If you would like some hands-on experience before you start your own hives, offer to help a beekeeper in your area when they are working with their bees.

North Carolina Department of Agriculture and Consumer Services, Apiary Inspection (http://www.ncagr.gov/plantindustry/Plant/apiary/index.htm)

North Carolina is fortunate to have an active Apiary Inspection program, which is part of the NC Department of Agriculture & Consumer Services (NCDA&CS). There are six regional inspectors across the state who serve as important resources for beekeepers to keep their hives free of diseases and pests. All new beekeepers should contact their regional inspector so that they may register their hives and have them periodically inspected.

North Carolina State University Apiculture Program (http://entomology.ncsu.edu/apiculture)

The Apiculture Program at NC State University has been a leader in honey bee research, outreach, and instruction. Part of the program's mission is to assist beekeepers by helping to develop and disseminate information about new management techniques to improve colony health and productivity. For further information about the program, contact your local Cooperative Extension Agent (http://www.ces.ncsu.edu/index.php?page=countycenters).

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Session 2 - Equipment

Bee gear


Protective gloves


Hive tool


Frame grip

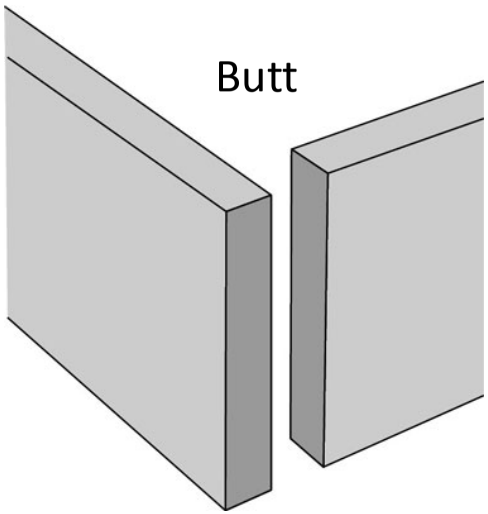

J-hook hive tool

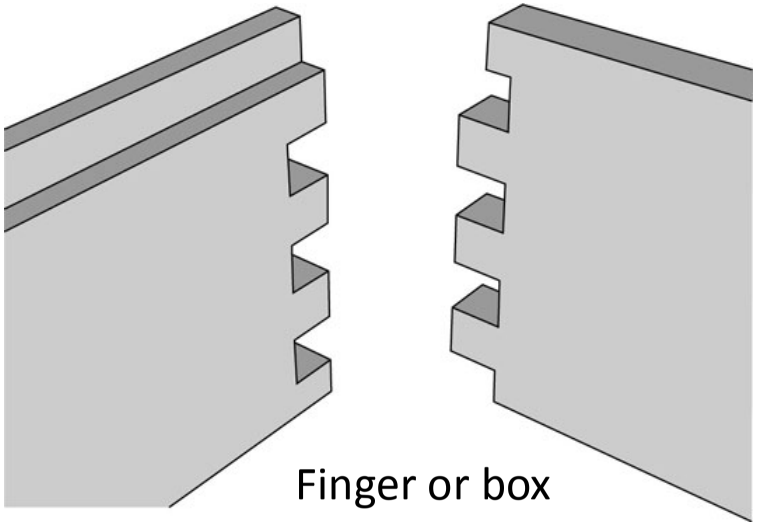

Beekeepers Veil

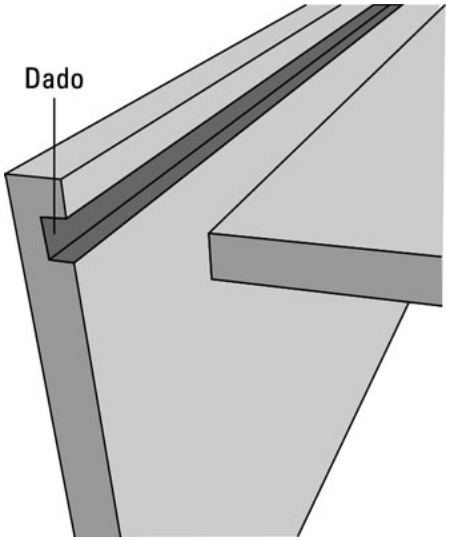

Bee brush

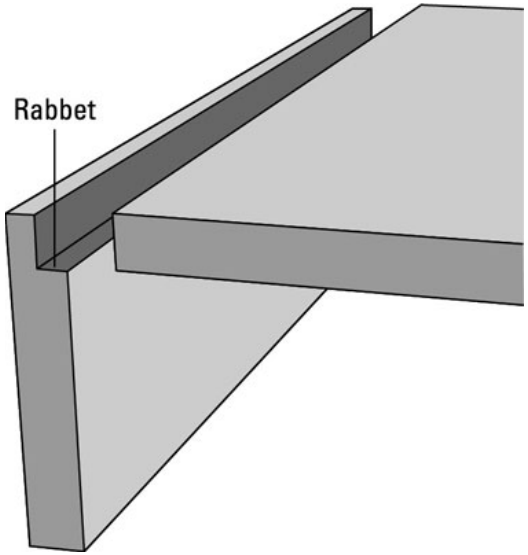

Smoker

Beehive Joints









Beekeeping Equipment

Equipment needs vary with the size of your operation, number of colonies, and the type of honey you plan to produce. The basic equipment you need are the components of the hive, protective gear, smoker and hive tool, and the equipment you need for handling the honey crop.

The hive is the man-made structure in which the honey bee colony lives. Over the years a wide variety of hives have been developed. Today most beekeepers in the United States use the Langstroth or modern ten-frame hive. A typical hive consists of a hive stand, a bottom board with entrance cleat or reducer, a series of boxes or hive bodies with suspended frames containing foundation or comb, and inner and outer covers (Figure 9, next page, includes dimensions for those wishing to construct their own hives). The hive bodies that contain the brood nest may be separated from the honey supers (where the surplus honey is stored) with a queen excluder.

The Hive

HIVE STAND

The hive stand, actually an optional piece of equipment, elevates the bottom board (floor) of the hive off the ground. In principle, this support reduces dampness in the hive, extends the life of the bottom board, and helps keep the front entrance free of grass and weeds. Hive stands may be concrete blocks, bricks, railroad ties, pallets, logs, or a commercially produced hive stand. A hive stand may support a single colony, two colonies, or a row of several colonies.

BOTTOM BOARD

The bottom board serves as the floor of the colony and as a takeoff and landing platform for foraging bees. Since the bottom board is open in the front, the colony should be tilted forward slightly to prevent rainwater from running into the hive. Bottom boards available from many bee supply dealers are reversible, providing either a $\frac{7}{8}$- or $\frac{3}{8}$-inch opening in front.

HIVE BODIES

The standard ten-frame hive body is available in four common depths or heights. The full-depth hive body, $9\frac{5}{8}$ inches high, is most often used for brood rearing. These large units provide adequate space with minimum interruption for large solid brood areas. They also are suitable for honey supers. However, when filled with honey, they weigh over 60 pounds and are heavy to handle.

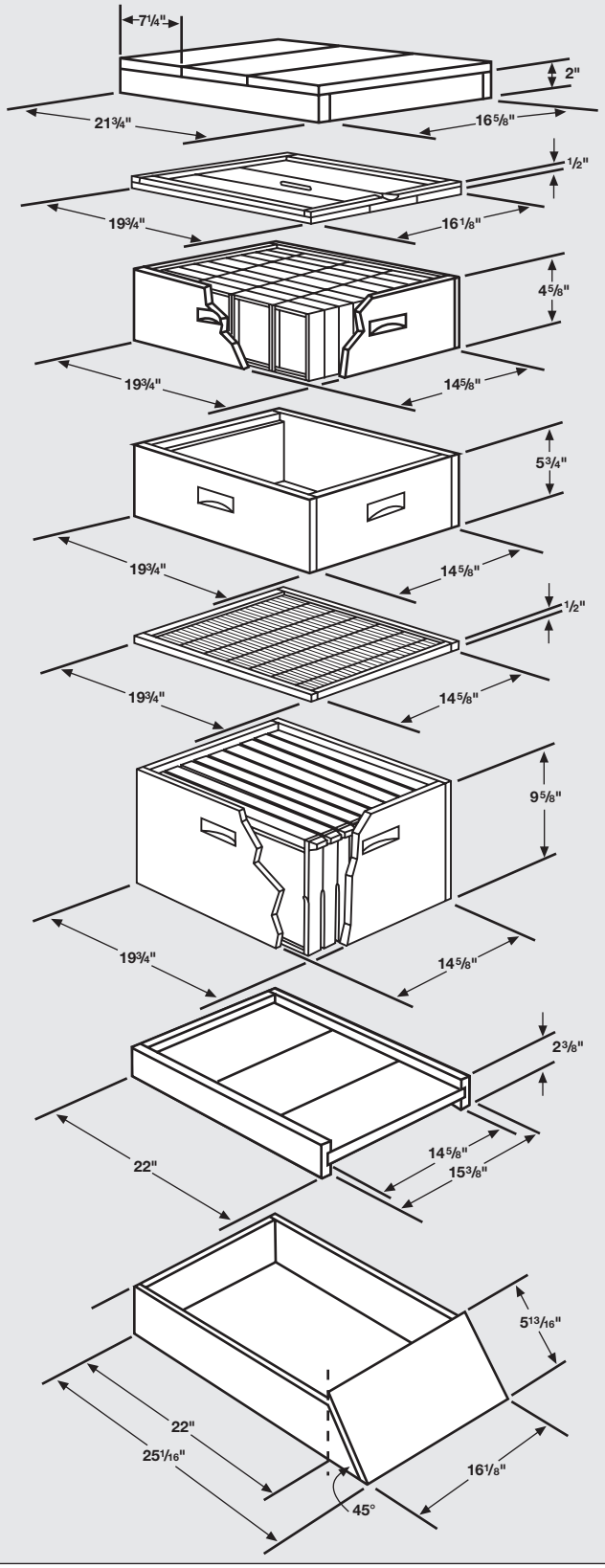
The medium-depth super, sometimes called the Dadant or Illinois super, is $6\frac{5}{8}$ inches high. While this is the most convenient size for honey supers, it cannot be cut efficiently from standard-sized lumber. An intermediate size ($7\frac{5}{8}$ inches) between the full- and medium-depth super is preferred by some beekeepers, especially those who make their own boxes.

The shallow-depth super, $5\frac{1}{16}$ inches high, is the lightest unit to manipulate (about 35 pounds when filled with honey). This size has the greatest cost of assembly per square inch of usable comb space.

Section comb honey supers, $4\frac{5}{8}$ inches high, hold either basswood section boxes or plastic rings and section holders. Section comb honey production is a specialized art requiring intense management and generally is not recommended for beginners.

Some beekeepers prefer eight-frame hive bodies. These were mostly homemade, but one U.S. bee supplier is now selling eight-frame boxes as English garden hive boxes. Beekeepers rearing queens and/or selling small starter colonies (nucs) prefer to use a three- or five-frame nuc box usually with standard deep frames. These can be purchased from bee supply dealers and are constructed from wood or cardboard, the latter for temporary use only.

Different management schemes are used according to the depth of hive bodies utilized for the brood area of the hive. One scheme is to use a single full-depth hive body, which theoretically would give the queen all the room she needs for egg laying. However, additional space is needed for food storage and maximum brood nest expansion. Normally a single full-depth brood chamber is used when beekeepers want to crowd bees for comb honey production, when a package is installed, or when a nucleus colony or division is first established. Most beekeepers elect to use either two full-depth hive bodies or a



Outer Telescoping Cover

3 pieces 7¼" X ¾" X 18⅛" (top)
2 pieces 21¾" X ¾" X 2" (sides)
2 pieces 16⅜" X ¾" X 2" (ends)

Inner Cover

2 pieces ½" X ¾" X 16⅛"
2 pieces ½" X ¾" X 18¼"
2 pieces 6" X ⅜" X 19¾"
1 piece 4⅛" X ⅜" X 19¾"

Section Comb Super

2 pieces 19¾" X ¾" X 4⅝" (sides)
2 pieces 14⅝" X ¾" X 4⅝" (ends)

Shallow Extracting Super

2 pieces 19¾" X ¾" X 5¾" (sides)
2 pieces 14⅝" X ¾" X 5¾" (ends)

Queen Excluder

2 pieces 19¾" X ¾" X 5¾" (sides)
2 pieces 14⅝" X ¾" X 5¾" (ends)

Full Depth Hive Body

2 pieces 19¾" X ¾" X 9⅝" (sides)
2 pieces 14⅝" X ¾" X 9⅝" (ends)

Bottom Board

3 pieces 7⅛" X ¾" X 15⅜" (floor)
2 pieces 2⅜" X ¾" X 22" (sides)
1 piece 2⅜" X ¾" X 14⅝" (end)

Hive Stand

1 piece 3" X ¾" X 14⅝" (back end)
2 pieces 3" X ¾" X 25 1/16" (sides)
1 piece 5 3/16" X ¾" X 16⅛" (front end)

ILLUSTRATION BY PETER KAUFFMAN

Figure 9. Equipment and dimensions for a standard Langstroth hive.

Figure 10. Typical honey bee colonies with two hive bodies and one super (front two colonies). The colony on the left is on a hive scale. (Courtesy Dewey Caron)

full-depth and a medium or shallow for the brood area (Figure 10). However, using hive bodies similar in size permits the interchange of combs between the two hive bodies. Beekeepers who wish to avoid heavy full-depth hive bodies may elect to use three shallow hive bodies for the brood nest. This approach is certainly satisfactory, but it is also the most expensive and time consuming in assembly since it requires three boxes and thirty frames instead of two boxes and twenty frames.

FRAMES AND COMBS

The suspended beeswax comb held within a frame is the basic structural component inside the hive. In a man-made hive, the wooden or plastic beeswax comb is started from a sheet of beeswax or plastic foundation. After the workers have added wax to draw out the foundation, the drawn cells are used for storage of honey and pollen or used for brood rearing.

Frames are $17\frac{5}{8}$ inches long and either $9\frac{1}{8}$, $7\frac{1}{4}$, $6\frac{1}{4}$, or $5\frac{3}{8}$ inches high to fit the various hive-body depths. Each frame consists of a top bar, two end bars, and a bottom bar. Top bars may be either grooved or wedged; bottom bars are split, solid, or grooved. Some types may have advantages over others, but the choice is generally a personal preference that includes consideration of cost. Top bars are suspended on ledges or rabbets in the ends of the hive body. V-shaped metal strips or metal frame spacers are often nailed on the recess for reinforcement. A popular commercial end bar has shoulders to help ensure correct bee space between adjacent frames and side of the box.

The comb foundation consists of thin sheets of beeswax imprinted on each side with patterns of worker-sized cells (Figure 11). Two basic types of comb foundations are distinguished by their relative thickness: thin surplus foundation is used to produce section comb honey, chunk honey, or cut-comb honey; a thicker, heavier foundation should be used in the brood chamber and in frames for producing extracted honey. Thicker foundations often are reinforced with vertically embedded wires, thin sheets of plastic, metal edges, or nylon threads. When deciding whether to invest in plastic beeswax foundation in plastic frames versus pure beeswax foundation in wooden or plastic frames, initial cost, assembly time, durability, and length of expected use are all factors you should consider. Plastic foundation and frames are becoming increasingly popular.

When using beeswax foundation in wooden frames, securing the foundation within the frame with either metal support pins or horizontal wires is necessary. The thin wedge of the top bar secures wire hooks extending from one side of the vertically wired foundation to help secure the foundation, ensuring that it remains in the center of the frame for proper drawing by the bees. Combs may be strengthened further by embedding horizontal wires (28 or 30 gauge) into the foundation with an electric current from a small transformer or by using a spur wire embedder. This activity is time consuming and difficult to master, but only a well-supported foundation results in well-drawn combs.

Figure 11. A sheet of comb foundation suspended in a wooden frame. (Courtesy Dewey Caron)

Frames with new foundation should only be given to rapidly growing colonies such as a package, swarm, or colony split (division) or to established colonies during a major nectar flow. Workers build beeswax combs of six-sided cells by adding wax to the cell base imprints on the sheet of foundation. When foundation is given to colonies during a nectar dearth, the bees will often chew holes in the foundation, thus resulting in poorly drawn finished combs.

Beeswax is produced by four pairs of glands on the underside of the worker's abdomen. As wax is secreted and exposed to the air, it hardens into flat wax scales. To produce comb, the bees remove the wax scales from the underside of the abdomen with spines located on their middle legs. The wax scale is then passed to the mouthparts where it is manipulated until pliable and ready to be formed into six-sided cells.

QUEEN EXCLUDER

The primary functions of the queen excluder are to confine the queen and her brood and to store pollen in the brood nest. It is an optional piece of equipment and is used by less than 50 percent of beekeepers. Many beekeepers refer to queen excluders as "honey excluders" because at times workers are reluctant to pass through the narrow openings of the excluder to store nectar in the supers above until all available space in the brood chambers is used up. To minimize this problem, allow the bees to begin storing nectar in the supers before installing the excluder. Nectar stored in drawn comb will entice the bees to pass through the excluder. Never put supers of foundation above a queen excluder.

An excluder is constructed of a thin sheet of perforated metal or plastic with openings large enough for workers to pass through. Other designs consist of welded round-wire grills supported by wooden or metal frames.

Frames of honey in the super directly above the brood chamber or comb sections act as a natural barrier to keep the queen confined to the brood nest. Properly timing the reversal of brood chambers in the spring with supering during a surplus nectar flow will serve the same purpose as a queen excluder. For this reason, queen excluders are sometimes used with the addition of the first supers (but again, installed only after some nectar has been stored in the supers) and then removed. Since beeswax combs used for brood darken with use, a queen excluder can help ensure separation of brood combs from honey combs to avoid unnecessarily darkening honey.

Queen excluders also are used to separate queens in a two-queen system, to raise queens in queenright colonies, and for emergency swarm prevention. An excluder also may help in finding the queen. If you place an excluder between two hive bodies, after 3 days you will be able to determine which hive body contains the queen by locating where eggs are present.

INNER COVER

The inner cover rests on top of the uppermost super and beneath the outer telescoping cover. It prevents the bees from gluing down the outer cover to the super with propolis and wax. It also provides an air space just under the outer cover for insulation. During summer, the inner cover protects the interior of the hive from the direct rays of the sun. During winter, it prevents moisture-laden air from directly contacting cold surfaces. The center hole in the inner cover may be fitted with a Porter bee escape to aid in removing bees from full supers of honey.

OUTER COVER

An outer telescoping cover protects hive parts from the weather. It fits over the inner cover and the top edge of the uppermost hive body. The top is normally covered with a sheet of metal to prevent weathering and leaking. Removal of the outer cover, with the inner cover in place, disturbs few bees within the hive and allows the beekeeper to more easily smoke the bees prior to colony manipulation.

Beekeepers that routinely move hives use a simple cover, often referred to as a migratory lid. Covers of this type fit flush with the sides of the hive body and may or may not extend over the ends. In addition to being lightweight and easy to remove, these covers allow colonies to be stacked. Tight stacking is important in securing a load of hives on a truck.

OTHER PIECES OF HIVE EQUIPMENT

In addition to the basic hive components, adding other pieces of equipment is possible. A few beekeepers like to use the slatted bottom board, others a different English-style cover. Beekeeping offers much room for creativity and individualization.

PLASTIC HIVE EQUIPMENT

The basic parts of the hive traditionally have been made out of pine, cypress, or redwood. Today all hive components are available in plastic. Plastic hive components and plastic frames that snap together are durable, strong, lightweight, easy to assemble, and require little maintenance. While plastic frames and foundation are becoming increasingly popular, plastic hive covers, bottom boards, and hive bodies have not proved to be as useful because plastic does not breathe and does not allow easy moisture ventilation. Plastic also warps easily, and some types let in too much light, which makes drawing foundation difficult.

PAINTING THE HIVE PARTS

All parts of the hive exposed to the weather should be protected with paint. Do not paint the inside of the hive; the bees will varnish it with propolis (a mix of plant sap and wax). The only purpose in painting is to preserve the wood. Most beekeepers use a good latex or oil-based, exterior, white paint. A light color is desirable because it prevents heat buildup in the hive during summer. Although white is a traditional color, various combinations of colors will help reduce drift between colonies.

SUPPLIERS

New bee equipment is generally "knocked down" or unassembled when purchased, but you can also purchase assembled equipment for a higher price and shipping fee. Assembly directions are furnished by bee supply dealers and are usually easy to follow. Novice beekeepers are strongly encouraged to seek the help of a more experienced beekeeper in assembling the hive components for the first time. Beginners should purchase their equipment early so that they can put together and paint hives before the bees arrive. Sheets of foundations should not be installed in the frames until needed because storage temperatures and handling may cause the wax to stretch and warp, resulting in poorly drawn combs.

Some beekeepers find they can save money by making their own equipment or by purchasing used equipment. With both approaches, the equipment must be a standard size. When constructing beekeeping equipment, a thorough understanding of bee space is a necessity. You can consult readily available construction plans, such as those supplied on page 8, or use commercial pieces as a pattern. Many beekeepers find they can economically make covers, hive bodies, and bottom boards, but frames are more difficult and time consuming. Success depends on availability and cost of materials, proper woodworking equipment, and the beekeeper's woodworking skills.

Purchasing used equipment can present problems and is not recommended for the beginner. Initially you may have problems simply locating a source of used equipment and determining its value or worth. In addition, secondhand equipment may be of non-standard dimensions or contaminated with pathogens that cause various bee diseases, despite considerable time in storage. Always ask for an inspection certificate indicating that the state apiary inspector examined the hives and did not find any evidence of disease.

For additional information and sources on beekeeping equipment and supplies, see the list of dealers in the appendix or consult local and regional beekeeping newsletters, your local county extension office, national and regional beekeeping publications, or the MAAREC Web site (maarec.cas.psu.edu).

Ancillary Equipment

SMOKER

A bee smoker and hive tool are essential for working bees. The smoker consists of a metal fire pot and grate with bellows attached. The size of the smoker is a matter of individual preference. The 4 x 7 inch size is probably the most widely used. Plan to purchase/use a smoker with a heat shield around the firebox to avoid burning clothing or yourself if you intend to support the smoker between your legs as you work a colony. Some beekeepers like the model with a hook to hang the smoker over the open hive body as they inspect it, thus keeping the smoker handy at all times.

To produce large quantities of cool, thick smoke, coals must be above the grate and unburned materials must be above the coals. Suitable smoker fuels

include burlap, corn cobs, wood shavings, pine needles, cardboard, punk wood, bark, sumac bobs, cotton rags, dry leaves, and bailer twine. An alternative liquid smoke is available that you mix with water and spray onto the bees with a mister-type applicator.

HIVE TOOL

The hive tool is a metal bar essential for prying apart frames in a brood chamber or honey super, separating hive bodies, and scraping away wax and propolis (Figure 12). Holsters to hold hive tools are available, but many beekeepers prefer to hold the hive tool in the palm of their hand to keep it accessible and to keep their fingers free for lifting boxes and frames. The hive tool should be cleaned from time to time to remove propolis, wax, and honey. This may be done simply by stabbing the tool into the ground or by burning it in the hot fire pot of a smoker. Both cleaning methods help prevent the spread of bee diseases. A screwdriver or a putty knife are poor substitutes for a sturdy hive tool and may cause frame/hive body damage.

Figure 12. A hive tool being used to remove burr comb from the top bars on the comb. (Courtesy Dewey Caron)

Protective Clothing

You should wear a bee veil at all times to protect your face and neck from stings. Three basic types of veils are available: those that are open at the top to fit over a hat, completely hatless veils, and veils that form part of a bee suit. A wire or fabric veil that stands out away from the face worn over a wide-brim, lightweight hat that fits securely offers the best protection. Veils without hats, although lightweight and fold easily for transport, do not always fit as securely on the head as they should. The elastic band that fits around your head often works upward, allowing the veil to fall against your face and scalp as you bend over to work with bees.

A wide variety of coveralls (bee suits) is available to beekeepers in a wide price range. The most expensive bee suits are not always the best or easiest to use. Coveralls are useful to avoid getting propolis on your clothing and greatly reduce stings if maintained properly and laundered regularly. Coveralls or shirtveils (long-sleeved shirts) made especially for beekeepers with attached, removable veils are popular.

White or tan clothing is most suitable when working bees. Other colors are acceptable, but bees react unfavorably to dark colors, fuzzy materials, and clothing made from animal fiber. Windbreakers and coveralls made from ripstop nylon fabric are excellent for working bees, although they may be too hot to use in the summer.

Beginners who fear being stung should wear canvas or leather gloves. Many experienced beekeepers find gloves cumbersome and decide to risk a few stings for the sake of easier handling. Form-fitting gloves (such as those suitable for lab work or household chores) reduce stings and sticky fingers from honey and propolis. Ankles with dark socks and open wrists are areas vulnerable to stings. Angry bees often attack ankles first because they are at the level of the hive entrance. You should secure your pant legs with string or rubber bands or tuck them inside your shoes or socks. Secure open shirtsleeves with Velcro, rubber bands, or wristlets to reduce stings to these sensitive areas.

You should avoid using after-shave lotions, perfumes, and colognes when working with bees because such odors may attract curious bees. Regularly launder clothing and gloves used in inspection to eliminate sting/hive odors that might attract/irritate bees.