

stands and natural food stores, marketed by mail order and local advertising, or sold to commercial honey processors for domestic and foreign consumption.

Baked goods containing honey, such as cookies and cakes, stay fresh and moist for a long time. Many recipe books for honey cooking are available. When honey is substituted for sugar it is usually necessary to reduce the amount of liquid in the recipe by 1/4 cup for each cup of honey. Many fine beverages, such as mead (honey wine), can be made.

Honey is a quick energy food and can replace candy in children's diets. It may be used as a preservative for canned and frozen fruit.

One great advantage in hobby beekeeping is that honey can be harvested fresh from the hive and consumed immediately without further processing. Honey is at its best when eaten in the comb along with the natural beeswax. Yet it can be extracted easily from the comb in liquid form when desired.

Periodic hive inspections are necessary to insure good health for the colony, abundant food, and a prolific queen.

Honey bees are a living lesson in biology for children, and often chosen as projects by boy and girl scouts or 4-H Clubs.

Aside from standard outdoor hives, bees may be kept indoors in a glass-walled observation hive to provide viewing of activities such as egg laying by the queen and communication dances by foragers. And there is no fear of stings by beginners because the hive is never opened indoors.

Properly constructed observation hives are easily detachable and portable for use as living visual aids when giving talks at schools or clubs.

Beekeeping has its social aspects too. Hobby beekeepers by the thousands are forming and joining local bee clubs to share beekeeping experiences. Many vacationing beekeepers attend national or regional meetings where bee scientists and other professionals present the latest developments in bee culture and equipment.

Getting Started

Before starting, determine if bees are permitted in your area. Most localities have reasonable restrictions on the number of hives permitted in residential areas. Unduly restrictive ordinances usually can be changed, especially when the benefits of bee pollination are documented properly.

Beginning beekeepers usually enjoy starting with new hive equipment, sold in kit form by bee supply companies that advertise in bee publications or the telephone directory. Ex-

perienced beekeepers may be willing to help you assemble and stock your first hive.

Frames of beeswax comb foundation are the "backbone" of the colony. Assemble them with great care. Paint new equipment and allow it to dry thoroughly before use.

Stock the hive in spring with commercially available packaged bees, containing three pounds of worker bees (approximately 12,000) and a queen. Or if you wish to stock your hive with a swarm, call your local fire and police departments and offer your swarm-catching services during the spring.

Starting a new colony costs less than \$100 at this writing.

Established colonies can be purchased from a beekeeper. Be sure the colonies are healthy, well fed, and in standard dimension equipment with movable frames. Keeping bees in miscellaneous containers is impractical.

New colonies should be fed sugar syrup (equal volumes of sugar and water) to supplement natural nectar supplies until

Equipment list

Item	Approximate cost
Protective clothing	
Bee veil	\$ 7
White coveralls	20
Work boots (optional)	30
Bee gloves (optional)	5
Tools for hive work	
Hive tool	3
Bee smoker	8
Bee brush (optional)	2
Equipment for one hive	
Hive stand (optional)	4
Standard bottom board	6
Brood chambers (standard hive bodies with frames)	20 (each)
Honey supers (shallow with frames)	12 (each)
Hive cover (need inner cover with telescope style)	12
Queen excluder	4
Wax comb foundation	
Brood chambers	6 (each)
Honey supers	4 (each)
Sugar syrup feeder	2
Equipment for extracting honey	
Electric uncapping knife	26
Honey extractor	100
Honey storage tank (optional)	65

all combs are constructed. Feeding also helps bees store enough food to ensure survival during the first winter. Don't expect to harvest honey the first year if the bees are required to construct new combs from foundation.

The beginning beekeeper ideally should start with only one or two hives the first year. Backyards usually accommodate up to five hives if they are placed strategically near hedges, fences, or buildings to direct bee flight upward. Pets and children should be excluded from the immediate hive area.

Nectar and pollen from flowers of certain plant species supply the total food of bees. They forage within at least three miles in every direction, an area of around 20,000 acres. Nectar and pollen availability is seasonal.

Under most circumstances colonies produce far more honey than the 150 pounds needed annually for survival. The surplus is harvested as liquid honey or can be eaten in the natural honeycomb.

Biology of Bees

Honey bees are highly organized social insects. Each colony contains up to 50,000 worker bees (non-reproductive females), several thousand drones (males) during the spring and summer, and one queen.

In nature, bees nest in cavities, such as hollow trees, crevices in rock cliffs, or the space between walls of buildings. They cluster inside the nest on a series of combs arranged side by side with just enough space between to permit free movement. Combs are made of pure beeswax that is secreted by worker bees and fashioned into precise hexagon-shaped cells.

During brood rearing, worker bees maintain a remarkably constant nest temperature (94° F) even when the hive is covered with snow or exposed to scorching desert temperatures up to 120°. A combination of fanning and distributing tiny water droplets provide efficient evaporative cooling during hot weather. In cold weather warming is achieved by muscular activity and clustering together.

In this controlled, dark environment, the queen lays around 1,500 eggs daily, one per cell. Eggs hatch after three days of incubation, producing tiny larvae that are fed by nurse worker bees for 5 to 6 days. Cells are then capped, and adult worker bees emerge from the cells 21 days after the eggs are laid.

Immediately the cells are cleaned by housecleaner bees and the queen soon lays another egg, starting another brood cycle. Many cycles of brood in all ages and stages are developing from late winter to early fall.

If You Are Stung

Less than 1 percent of people are hypersensitive to bee stings and should not keep bees as a hobby. Fortunately, there is a recent medical advance for treating the problem—desensitization by an allergist using pure honey bee venom antigen.

If you are stung by a honey bee, immediately scrape the easily visible sting away with a fingernail before it has time to deliver the venom—thus minimizing the effects greatly. Then wash with water to remove the alarm odor, a chemical signal which directs guard bees to the “enemy.”

A typical reaction to a bee sting is minor discomfort near the sting site. An ice cube pressed over the area eases the pain.

Beekeepers enjoy their hobby without special concern for stings. The stinging tendency of guard bees is controlled easily by puffing smoke into the hive before and during examination. Protective clothing is also worn. Slow movements near the hive are essential. Fast movements alert guard bees.

Experienced beekeepers examine colonies during maximum flight when many bees are out foraging and the incoming nectar places the bees in a “good mood.” Never examine colonies at night, early mornings, late afternoons, during rainy weather, or other times when they are more defensive.

Managing Hives

In some areas hives can be kept in one location throughout the year. However, in many areas colonies are relocated seasonally near nectar-producing plants to maximize honey production and to “choose” special nectar and pollen sources. For example, to produce citrus honey, hives must be placed near citrus groves.

Consult local experienced beekeepers to determine the kinds and locations of plants most beneficial to bees. In most areas the small-scale beekeeper doesn't have to move hives elsewhere because enough forage is usually provided by a great variety of fruit trees, ornamentals, gardens, lawns, cultivated crops, and wild flowers within foraging range.

Hives are moved best at dawn before bee flight starts. Moving hives to foraging areas is the only practical way for beekeepers to influence the selection of nectar and pollen plants. Hives must be moved at least 5 miles to prevent foraging bees from returning to the original hive location.

Efficient management is based on a thorough knowledge of bee biology and seasonal changes that affect growth of colonies. A summary of management is shown in the illustration.

By fall (I) each colony must have enough stored pollen