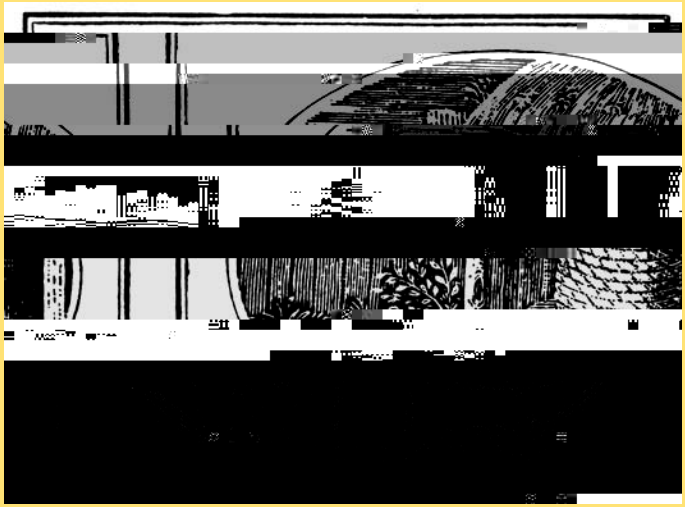
B a c k y a r d

Beekeeping

Alabama Cooperative Extension System
Alabama A&M University and Auburn University

ANR-135



ALABAMA

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Tips and Additional Information

With a reputation for producing high-quality queens at affordable prices, Alabama, Mississippi, and Georgia have historically been known as prominent queen and package producing areas. Though queen production is still an important component of beekeeping in the Southeast, hobby beekeeping, providing pollination, and gardening beekeeping are also important in this area.

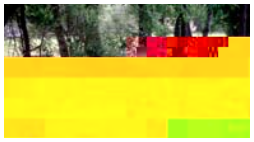
Nearly anyone can keep a hive or two of honey bees. The majority of beekeepers are hobbyists, who keep bees just for pleasure. Men, women, teens, or young children, to some extent, can all be beekeepers. Gardeners, retirees, professionals, teachers, physicians, construction workers, airline pilots, and lawyers are among the types of diversified occupations enjoying beekeeping. A sideline beekeeping hobby can earn extra income if colonies are managed efficiently.

Even if you do not have a place to put a few colo-

owner on whose land to place colonies. If you enjoy biology, outdoor activities, woodworking, gardening, animal care, or if you are just looking for a sideline income, beekeeping will probably interest you.

Stings

Everyone knows that bees sting. Rarely, however, does a colony become so agitated that large numbers of bees attack, though it may seem like large numbers to the person being stung. The stinger and poison gland will remain attached to your skin if you are stung. Scrape or wipe off the stinger. It is thought that pulling the stinger with your fingers will force all the venom into the wound. Generally, the honey bee is the only stinging



A productive bee yard in South Alabama.

insect to leave its stinger behind after a stinging incident.

You should have some idea about how stings affect you before investing money in bees and equipment. Some swelling, redness, and itching at the site of the sting are considered normal. If you experience rare, extreme insect sting and bite reactions, such as difficulty in breathing or rashes away from the sting site, consult your physician before undertaking beekeeping.

The Cost of Beekeeping

Whether you are interested in keeping bees as a hobby or as an occupation, you probably are interested in the cost in time and dollars. Beekeeping is not a particularly expensive hobby. It can be a profitable business as well as a source of pleasure and relaxation if you can withstand the occasional sting and if you are willing to take care of your bees.

Bees require more time at certain periods than they require at others. The amount of your time needed will depend on the number of colonies you keep and on your commitment. If you have only a few colonies, you will probably spend more time per colony than if you have a larger number.

Cash investment will depend on the equipment chosen. Cost of bees and equipment varies from year to year. Generally, a new hive with new bees will cost about $100 to $150. Request a catalog from bee supply dealers and compare prices. See the list at the end of this publication.

Common Bee Races Used in the Southeastern United States

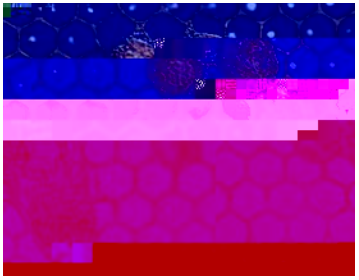
Italian bees—Italian bees are the most common race used in the Southeast. These bees are generally yellow and are gentle and calm. Brood rearing starts in late winter and continues until late fall. Excessive summer brood rearing by these bees is considered by some to be a disadvantage. Food consumption is high in overwintered colonies. Swarming is not excessive. Italian bees produce brilliantly white cappings on their honey.

Carniolan bees—The Carniolan bee has been described as a grayish-black Italian bee. These bees are exceptionally docile, and they are, in general, good honey producers. They winter with smaller clusters. However, Carniolans have a strong dispensation toward swarming. Brood production is linked to pollen availability so they have large summer but small winter populations.

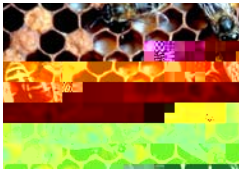
Caucasian bees—Caucasian bees are grayish-colored and are gentle and calm in the hive. Though they are excellent brood producers, they do not reach full strength until midsummer.

Mature queen cells produced by a commercial queen breeder.

They are weak swarmers but great producers of propolis (bee hive glue). In the fall, they may actually nearly close their hive entrances with propolis, leaving0( )-15(l)v



A capped queen cell, two capped drone cells and a queen cup.



Carniolan worker bees on comb.

while eggs she does not fertilize develop into drones. The queen can be distinguished from the workers that surround her by her size and shape. She is larger than a worker and longer than a worker or drone, though not as broad as a drone. Her wings are much shorter in proportion to her body length than are the wings of either workers or drones. The queen appears more wasplike than the other bees appear because of her tapering abdomen. She is usually surrounded by a court of young workers who feed and care for her.

The queen hatches from a fertilized egg and develops in a special cell called a queen cell. The queen cell is easily distinguished by its larger size, peanutlike appearance, and vertical position on the comb. When a new queen chews her way through the bottom of her cell, she first feeds on nectar and pollen. Then she begins to search for other queen cells. She chews a small hole in the wall of each queen cell that she finds, stings, and kills the developing rival queen. If two queens emerge from their cells at the same time, they fight until one is killed.

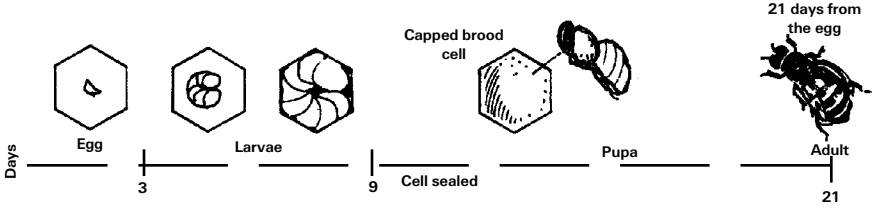
The young queen will mate when 6 to 8 days old. She mates while flying. She may fly and mate for 2 or 3 days with an average of 8 drones total. But once the mating process is complete, she returns to the colony and after 2 to 4 days, begins her life of laying eggs without ever mating again. She can lay either fertilized or unfertilized eggs, according to the needs of the colony.

When a colony prepares to swarm, the worker bees build several queen cells, and the queen lays a fertile egg in each one. The bees that are left behind will have a new queen to replace the one that leaves with the swarm. If the queen is suddenly lost by accident or disease, the workers change a worker cell that already has female larva less than 3 days old into a larger, longer queen cell. This larva is fed nothing but royal jelly, and, as a result, a queen develops instead of a worker.

The queen bee may live 3 to 5 years, but the average length of a queen's life is about 2 years. Under warm conditions most queens wear themselves out laying eggs in 1 or 2 years and should be replaced.

Worker bees are infertile females that develop from fertilized eggs in worker-size cells. They are the smallest members of the colony and form the greatest part of the colony's population. A colony may contain 50,000 to 90,000 workers at the height of the season.

The worker bee is remarkably well equipped for doing all of the work of the colony. She has a long tongue for collecting nectar, a honey sac (or crop)



Development cycle of the worker honey bee.

for transporting nectar, pollen baskets on her hind legs for transporting pollen, four pairs of wax glands on the underside of her abdomen for secreting wax to make a comb, and glands for secreting royal jelly. Royal jelly is a food that is fed to all bees for the first 2½ days of their lives and to a queen larva during the entire larval period. The worker has a barbed stinger for defending herself and the colony. When she uses her stinger, it usually remains attached to the victim and is torn from her body. She dies soon afterward. She has many other physical and behavioral adaptations for performing her duties in the colony.

The workers build the combs; clean the hive; clean and polish the cells; collect pollen, nectar, water, and propolis; convert nectar to honey; feed the immature bees; feed and care for the queen; and guard the hive.

Workers reared during the spring, summer, and early fall usually live only 4 to 6 weeks, while those reared in late fall usually live through the winter, possibly for about 4 months.

The worker usually does not lay eggs. When a colony becomes queenless for a long period, one or more workers are fed royal jelly by other workers, and their ovaries and reproductive systems develop so they are able to lay. Since they are unable to mate, the eggs will all be unfertilized and will produce only drones. The presence of several eggs in one cell, usually on cell walls, is an indication that laying workers are in the colony. Ask for advanced help with such a colony.

Drones are the males of the bee colony and develop from unfertilized eggs laid by the queen in large, drone-size cells. A drone is much larger and stouter than a worker or a queen although not as long as a queen. A young drone feeds himself from honey cells within the hive. Drones soon learn to solicit food from workers and are fed, by workers, for the remainder of their lives.

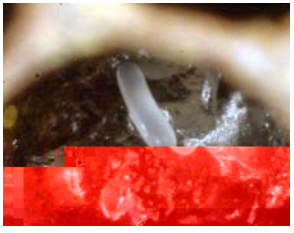
The drone has no pollen basket, no honey sac, no wax glands, no stinger, and can perform no hive duties. His only known function is to mate with a young virgin queen. He mates with the queen while flying. After mating, the drone falls to the ground and dies.

Normal colonies begin to rear drones in the spring when nectar and pollen become plentiful. Special cells are made by workers for rearing drones. These cells are larger and less numerous than worker cells. Drone cells are normally built in areas at the bottom or top of the combs or in areas where worker cells have become misshapen. The number of drones in a colony varies from a few hundred to several thousand.

The workers stop feeding the drones when the nectar flow stops in the fall, and the drones become weak from starvation. The worker bees then carry them from the hive to die. Drones can live about 8 months if not killed during the mating process.

Development Stages

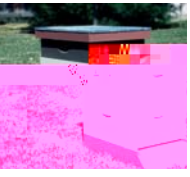
There are four stages of development in the life of the honey bee. These are the egg, the larva, the pupa, and the adult. Developing bees, from the egg stage to the time they emerge as adults, are commonly referred to as brood. The brood from which workers emerge is called the worker brood; drones emerge from the drone brood. The number of days required for the development of the queen, worker, and drone differs. The worker requires 21 days to develop while the queen requires only 16. The drone bee requires 24 days to complete development.



The small honey bee egg attached on the cell bottom.

The Bee Hive Design

The hive is the home of the bees. Bees' natural hives may be a hollow tree, the wall of a building, or a small cave in rocky areas. However, in many states it is illegal to intentionally keep bees in hives without removable frames.



A newly assembled and painted hive.

Moveable-frame hives have several advantages. You can get three to ten times more honey from these hives, and the honey is much easier to harvest. In addition, it is much easier to check the progress and health of your bees at any time and to control swarming. Each part of the hive has a specific function.

The **hive stand** is the base on which the hive sits. You can buy or easily make a stand, or you can use bricks, concrete blocks, or short posts set in the ground. The important thing is to get the hive a few inches off the ground.

The **alighting board** (landing board) makes it easier for bees returning from the field to enter the hive. This part is often combined with the hive stand.

The **bottom board** forms the hive floor. Bottom boards are reversible having a deep side and a shallow side. Some modern bottom boards may have a screen opening to help control Varroa mites.

The **entrance reducer** or **entrance cleat** is used to reduce the size of the hive entrance, especially in winter. Its primary purpose is to keep mice from entering the hive. This should be removed in the summer and during periods of heavy nectar flow to allow faster entrance and exit of the field force and to aid in ventilation.

A colony with an entrance reducer in place in preparation for winter.

The **brood chamber** is where the young bees that eventually maintain colony strength are raised. This equipment part is frequently called the hive body.

The **frames** surround and support the combs, which are built by worker bees from the comb foundation. The combs are used for brood rearing and for storage of honey and pollen. You will also need beeswax foundation (commercially prepared wax sheets on which bees will build combs) and materials for installing them. A wide selection of foundations is available. Plastic frames and plastic foundations are readily available commercially and are faster and easier to use.

A woodbound queen excluder.

The queen excluder is a device placed between the brood chamber and the supers where surplus honey is stored. This keeps the queen from laying eggs through- out the hive. The openings in the queen excluder are large enough to allow only workers to pass through to fill the combs in the supers with nectar.

The super is where the surplus honey is stored. You will get honey for your use from here. There are four different kinds of supers: deep, medium-depth, shallow, and section. Select supers according to your personal preference. The deep super is the same size as the standard brood chamber. In fact, they are the same equipment with different uses. Deep supers, when filled with honey, are heavy and difficult to handle. Many beekeepers prefer the shallow super, especially
if they are producing cut-comb honey. A common practice is to use two deep supers as brood chambers and several shallow supers for honey storage.

The **inner cover** fits evenly around the edge of and over the super and serves to keep out drafts of air, ants, and other enemies of bees. More importantly, it allows the outer telescoping cover to be removed without damage to the hive. A bee escape placed in the hole in the inner cover converts it to an escape board, which may be used to remove bees from the combs of honey at harvest time.

The **outer cover** is the top of the hive. It should be covered with galvanized metal or aluminum to protect the wood. The telescoping outer cover fits down over the inner cover, giving added protection. If a nontelescoping outer cover is used, an inner cover is not needed.

Plastic beekeeping equipment has been available for years. It is becoming more common in traditional beekeeping. Plastic frames, bottom boards, inner covers, outer covers, and hive bodies are all available in various kinds of plastic. Beekeeper opinions vary when comparing wooden hive components to plastic hive components.

Paint the outer portions of your hives with two coats of white paint several weeks before you get your bees. Do not paint the inside of the hives, but paint both sides of the bottom board. Latex is the type of exterior finish for hives.

Building your own or buying used equipment are ways to lessen the cost of equipment. If you buy second-hand hives and parts, have them inspected by the state api0(t)TJETBT/.343 9m-15(a)10(n)1dit

Do not expect to harvest much, if any, surplus honey the first year. Your bees may need all the honey they can store the first season to overwinter in good condition and to produce well the second year.

It is best to start with two colonies. Having two gives you the advantage of being able to exchange

as little smoke as possible and handle the bees and equipment gently. Remove the empty queen cage, remove any burr comb that the bees may have built around the queen cage, refill the feeder with syrup, and close the hive quietly.

The purpose of the first inspection of a packaged colony is to see if the queen is alive and laying. If you see eggs in cells, don't look for the queen. You know she is present and laying. If the queen is not present or laying after 7 to 8 days, you must do one of the following:

(1) Immediately introduce another queen.

(2) Give the colony a comb with eggs and larvae.

(3) Unite the bees with another colony.

There are no other alternatives. Providing the new colony with a new queen is the best option.

Since queens in colonies started from packaged bees may die or be superseded during the first 6 weeks, you should check your colonies about once a week to make certain all is well. A clue that things are not going well will be the presence of developing queen cells. It usually takes about 12 weeks for a colony started from packaged bees to reach a large population.

Remember to continue feeding your bees until all the frames have wax combs or until the bees no longer take the syrup. Bees should be fed any time there is a shortage of nectar during the first year.

By checking your bees regularly, you will know when to add another hive body or super. Regular checks will also help you gain experience in working your bees, so your experience and your colony grow at the same rate. This experience may save you bees, honey, money, time, and disappointment later.

Established Colonies

Use care when buying established colonies from another beekeeper. Hives offered for sale may be homemade with poor combs. Sometimes, the bees may be diseased or have high mite populations. However, in general, purchasing an established colony is a good way to start beekeeping. There is nothing wrong with good homemade equipment built to proper dimensions, but hive bodies and frames made without regard for the proper "bee space" are worthless. The bees themselves can be improved at slight expense by requeening the colony. The state bee inspector may be able to help when purchasing established colonies.

Nucleus Colonies

A nucleus colony is a small colony made up of three to five frames of bees with a queen. It is frequently called a "nuc" (pronounced "nuke").

The advantage of starting beekeeping with nucleus colonies is that you have developing bees (brood) that will quickly increase the size of the colony. Be sure the bees are from colonies free of disease. The nucleus colony will need incoming nectar,

Hiving a Swarm

A springtime bee swarm on an apple tree limb.

Though not as common as it once was, it is still possible to start your colonies by using swarms. Getting a swarm is unpredictable and swarms are not usually available as early in the spring as packaged bees. Swarms contain old queens that should be replaced before supersedure begins.

When you find a swarm of bees clustered on the limb of a tree or bush, cut the limb as gently as possible. If you can't cut the limb, shake the bees into a container you can cover. Carry the bees to an open hive you have prepared with foundation, and dump them into it. Though not necessary to find her, try to locate the queen, and be sure she goes into the hive. Put a frame of unsealed brood in the hive if you have other bees. This will help keep the swarm in your hive.

Selecting an Apiary Site

The location and arrangement of an apiary is important to the bees and to the people and animals close by. Location may make the difference between success and failure of your bee project.

Choose a well-drained area that is shaded at least part of the day. Pine trees make good shade for hives; the edge of a wooded area is also good. Avoid deep shade, tall weeds, and shrubs where air cannot circulate.

Characteristics of a Good Bee Yard

A good supply of clean water near the apiary is helpful to your bees for cooling the hive and for processing honey. Bees cause problems by collecting water at such places as faucets, swimming pools, and birdbaths. They will continue to use a water source all during the flying season when they become accustomed to it. Provide a dependable water source for your bees if you are in a hot climate where water is routinely scarce or if there is a drought. A hose or faucet dripping on a board usually meets the need.

A nice, shaded apairy location.

If possible, hives should be located where you can haul equipment in and out and have room to manipulate the hives. They should be at least 4 feet apart to make it easier for worker bees to find their own hive. Worker bees will enter the wrong hive if they are closer together. This is called drifting. If possible, place each hive so the entrance faces east or south so the morning sun can warm the entrance in the early spring and late fall.

Another very important consideration in locating your apiary is a source of nectar and pollen throughout the spring, summer, and fall. The plants from which the bees gather nectar determine honey color and flavor. Though honey bees can gather food and water 1 to 2 miles from the colony if necessary, they get most of their nectar and pollen from within about a half-mile radius of the hive. Location, from this standpoint, should not be a problem for two or three hives, even in cities.

Do not locate hives near a field that is routinely treated with insecticides. Unfortunately, many insecticides are highly toxic to honey bees, but not all insecticides are equally hazardous.

The hives in many apiaries are arranged in neat, straight rows. Though this looks nice, it is much better to place the hives in some irregular pattern so that field bees will more likely return to their own colony. Field bees drift to the end hives increasing their population at the expense of the colonies in the center of rows. A semicircular, U-shaped, S-shaped, or other irregular arrangement reduces drifting.

The ideal winter location for bees is one that receives full sunlight part of the day and where water and colder air will drain away from the hives. Hives may be located on the southern slope of a hill or in an area protected from cold winds by trees, shrubs, buildings, or some other windbreak. A windbreak is beneficial to the colony in late winter and early spring when there is a large amount of brood in the hive that must be kept warm.

Examining the Colony

Until you gain some experience in working your bees, the best time to examine a colony is between 10:00 a.m. and 3:00 p.m. on a warm, calm, sunny day when the bees are working. Bees are much more defensive during cool, chilly weather, early in the morning, late in the afternoon, during cloudy or rainy weather, or when the nectar flow has been suddenly interrupted.

A beginner should close the hive and wait until another day if the bees seem restless. Bees may be extremely defensive one day and unusually calm the next. Don't try to work unruly bees until you have gained some experience.

The first step is to light your bee smoker. Select a smoker fuel that will hold fire, burn slowly, and make plenty of white smoke. Cotton or burlap rags, well-dried rotten wood, or pine straw make good smoker fuels. Many Southern beekeepers use pine straw, which works well. Give several puffs with the bellows to be sure that the smoker is well lighted and giving off cool, white smoke.

Put on your bee veil and be sure your pant legs are tied above the ankle or tucked into your socks or boots. Use gloves if necessary. Stings are unavoidable but can be kept to a minimum using protective clothing.

All movements in working bees should be slow and gentle to minimize disturbing and exciting them. Your examination

bees' line of flight. It is best to stand to one side of the hive and blow two or three puffs of smoke into the entrance to subdue the guards.

The next step is to remove the outer cover of the hive as gently as possible to avoid arousing the bees. Then gently pry the inner cover loose with your hive tool. It probably will be necessary to pry from more than one corner to loosen the cover without jarring the hive. Blow two or three light puffs of smoke through the gap between the inner cover and the hive body. Let the inner cover down again for a moment. Gently lift it up again and blow in two or three more light puffs of smoke. This should be enough smoke to drive down any bees at the top of the hive. Be careful not to oversmoke the hive. Oversmoking will cause the bees to stampede and make handling much more difficult.

Place the covers upside down near the hive entrance but out of your way as you remove them.

You are now ready to lift out the frames. They may be stuck together with propolis (bee glue). With your hive tool, gently loosen the frames, one at a time, at the ends. It is always best to take out the first or second frame from the edge of the colony. The queen is less likely to be found at the side of the hive, so there is less danger of injuring her. Handle the frame containing the queen very carefully.

The outside frames may need loosening along the sides of the hive. If the outside frame is difficult to remove because of ar si o210(e)10( )4s danger sides is e o055(

the removed frame. For convenience, set the empty deep hive body on the upturned outer cover. A less desirable method is to lean the frame against the hive while you work. This may be the only frame you will need to set out of the hive. The others may be lifted out, examined, and moved to the sides. Burr comb and propolis may need to be scraped off before frames can be replaced in the colony.

When you are ready to close the hive, replace the frames in the order in which they were removed. Push all of the frames to one side to give you room to put back each frame after you take it out. After all the frames are back in place, space them so there is about ¼ inch between the side of the hive and the outside frames. Gently replace the inner and outer covers. Take extra care not to pinch or crush too many bees because this might disturb the entire colony and result in more stings.

Remember, clear, warm days, proper use of your smoker, and gentle, slow movements will help you reduce trouble when you examine your bees.

Fall and Winter Management

The beekeeper's year begins in the fall. How you manage your bees in the fall determines, to a large extent, how productive your bees will be the following spring. Fall is the time to prepare your bees for the coming winter.

To be in first class condition for wintering, each colony should have a young, vigorous, laying queen; a minimum of 40 to 50 pounds of honey (this is about two shallow supers of honey or a well-provisioned hive body and one super of honey); the equivalent of 3 to 5 well-filled standard-sized combs of pollen; a population of disease-free bees that will cover 10 or more frames; and hive location where there is sunlight, water, good air drainage, and protection with some kind of windbreak.

The best time to requeen in the Southeast is

Bees cannot begin or maintain brood rearing without pollen. Pollen should be stored in the hive to be available during late winter, because normal colonies begin brood rearing several weeks before a good supply of pollen is available in the field. If you have a colony that is short of pollen, it should be fed pollen supplement in late winter to start and maintain early brood rearing during late winter and early spring.

For various reasons, you may have weak colonies in your apiary from time to time. In most cases, it is poor management to overwinter a small or weak colony because in most locations the weak colony will not have time to increase to its peak population for the spring nectar flow. In early fall, a weak colony

In February, clear the entrance of dead bees, check the food supply, and see if the queen has started laying. If you find a colony queenless, it should be requeened, united with a stronger queen-right colony, or provided with a comb with eggs and/or larvae not more than 3 days old so that the bees themselves can raise a queen. At this time of year, requeening is difficult because of the scarcity of replacement queens and drones for mating.

Any time a dead colony is found, the hive should be closed, made bee-tight, and removed from the apiary. As soon as possible, the remains of the colony and the hive should be examined to determine the cause of death. If death of the colony was caused by disease, it should be handled according to recommendations for disposing of diseased bees and equipment. The hive should be cleaned and stored for future use if there is no evidence of disease.

Spring Management of Overwintered Colonies

Your bees must be ready for the nectar flow if they are to store a good amount of surplus honey. The ideal situation is to have all of your colonies at or near maximum strength as close to the beginning of the nectar flow as possible—not too early and not too late.

Brood rearing will begin about Christmas or soon after. Your bees will be using the stored honey and pollen to feed the developing bees. Pollen is the bees' source of protein, and honey is their source of energy.

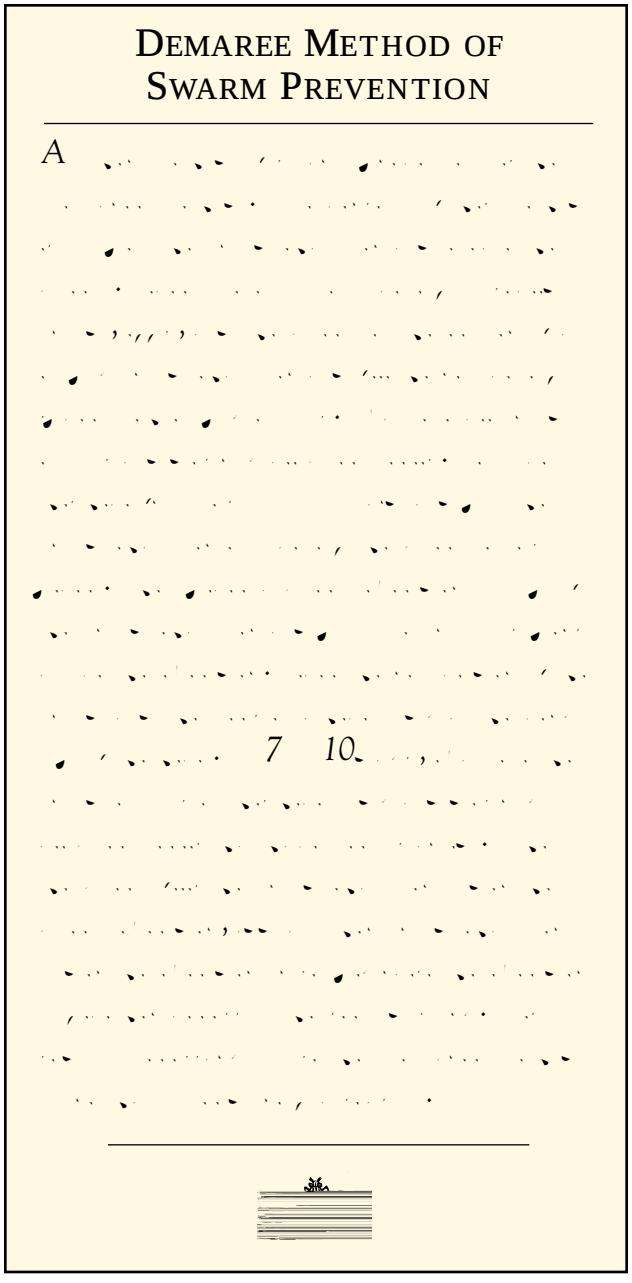
It may be necessary to feed the bees if you did not leave them enough honey or if they did not store enough honey and pollen during the fall. A sugar syrup and/or pollen supplement or substitute may be fed in the late winter or early spring to have the colony strong when the nectar flow begins.

Late winter/early spring is a critical period for a colony of honey bees. Keep a close check on the amount of honey and pollen stored in the hive. A colony of honey bees should have 15 to 20 pounds of honey stored in the hive at all times. A strong colony with a good queen may use up all its stores just before the spring nectar flow. Such a colony, with a large amount of brood to feed and keep warm, will greatly increase its consumption of stored honey and pollen. It may use all the food in the hive and die of starvation within a few days of the time nectar is available in the field. Don't let them die of starvation when one or two combs of honey or one or two gallons of sugar syrup will carry them to the nectar flow. Though sugar syrup is good, honey is the best food for bees. You can use combs of honey that have been saved for this purpose or from colonies with a surplus if there is no danger of spreading diseases. If combs of honey are not available, feed your bees sugar syrup made of 1 part sugar to 1 part water.

Pollen is essential to brood rearing. If your bees don't have pollen stored in their hives during the late winter and early spring, they cannot start brood rearing. If a colony starts brood rearing and runs out of pollen, brood rearing will stop. If your bees don't have pollen, feed a substitute available from bee supply houses.
It is not usually
necessary to feed
pollen substi

The first step to prevent swarming is to requeen each colony in the fall since the queen has a tremendous influence on whether the colony swarms.

Demaree Method of Swarm Prevention



The major nectar flow is a thrilling and busy time for any beekeeper. It is when plants are yielding nectar and bees are collecting it. It is also when the bees are making and storing surplus honey. The time of the nectar flow will depend on where you live. April and May are usually the months of greatest nectar flow, and the best surplus honey is stored then.

Check your bees regularly to see that the queen is laying abundantly to assure a large force of workers. If the brood nest becomes crowded with bees and honey, add another brood chamber.

How often you need to check your bees will depend on several things: the size of the colony, the availability of nectar, and the time that each major nectar flow starts. The length of time between checks is more or less a matter of judgment. Close observation is necessary.

A queen excluder confines the queen to the brood nest to prevent her from laying eggs in honey

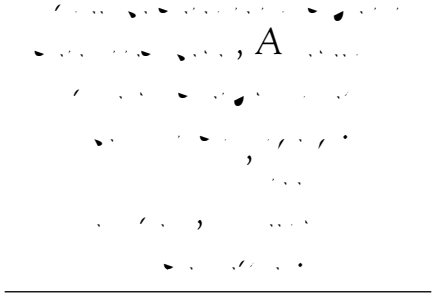
The honey crop may be processed as cut comb, chunk honey, or extracted honey. Select combs that are completely capped if you wish to package cut comb honey. Remove the comb by cutting around the inner face of the frame with a hot knife; lift off the frame and cut the comb into proper size pieces. It is best to let the cut edges drain. Carefully place each piece in a separate container so you won't break the caps on the cells of honey. Plastic containers are available from bee supply houses.

Chunk honey is a combination of cut comb honey and liquid extracted honey. If you prefer chunk honey, select combs that are filled and capped. Remove the comb the same way you do for cut comb honey, then cut it into pieces just large enough to pass through the mouth of the jars you plan to use. Usually, two pieces of comb honey are put in each jar. Honey that drips from the comb during the cutting process or honey that you extract or squeeze from the

Diseases of Bees

Several diseases may affect your bees. The most serious are those that attack the brood, but be on guard for diseases and pests that affect adult bees. It is most important that diseases be detected in their early stages. Contagious diseases can spread rapidly within a colony and from one colony to another. Learn how to identify and control bee diseases, and make routine inspections for disease.

Brood diseases cause young larvae or pupae to die in the cells. Carefully examine dead brood to detect and identify the disease. Be sure to check cells that have sunken, discolored, or punctured cappings. Carefully note the dead brood's appearance, position in the cells, age, color, and consistency. This will help identify the disease. The remains of diseased brood can be seen better if you hold the comb in a position so that sunlight will shine directly into the cells.



is the most dreaded brood disease. It is caused by the spore-forming bacterium . This disease does not affect adult bees or humans. Once the disease starts, it is very difficult to combat. In the early stages of the infection, you may find only a few dead larvae or pupae in the colony. Sometimes AFB will spread rapidly within the colony and seriously weaken or kill it during the first year. Many times, it will be the second year before the colony is despJET184 92.707-15(11 295

pupae die, their color changes gradually from pearly white to a coffee color and then to almost black. It takes the dead brood a month or more to decay and dry. When they dry, the remains stick very tightly to the cell wall and are very difficult to remove.

The body wall of the larvae or pupae can be easily ruptured about 3 weeks after death. Stir the decaying mass in the cell with a toothpick or twig. If American foulbrood was the cause of death, about an inch of brown, gluelike material will string out before breaking when you withdraw the toothpick. This is known as the ropey stage. When dead brood reaches this stage of decay, a foul odor that is typical of this disease can be detected.

The ropey stage of American foulbrood disease.

American foulbrood can be spread in several ways. Nurse bees can give food contaminated with the spores of the disease organism to young larvae. Honey stored in cells that once contained diseased brood becomes contaminated and may be fed to young larvae. Robber bees can take contaminated honey from a colony that has been weakened or killed by AFB back to their own colony. Alternatively, you can spread the disease by using equipment from a diseased colony and then using the same equipment with a healthy colony. Unfortunately, beekeeper spread is the primary method of scattering American foulbrood.

The tongue characteristic of American foulbrood disease.

Though Terramycin applications may mask the presence of AFB, the only totally effective remedy is to kill infected colonies and burn hive bodies, frames, combs, and bees. Contact the state apiary inspector if you think your bees are infected.

(EFB) is caused by the bacterium . This disease organism does not form a spore like the one that causes American foulbrood. For this reason, it is not usually as difficult to combat as AFB. In some areas, European foulbrood may occur more often than American foulbrood. Adult bees are not affected, only the immature bees or brood. Some strains of bees are more resistant to this disease than are others. If you have trouble with EFB, you should requeen your colonies with queens that are resistant to the disease.

European foulbrood may be difficult to detect in its early stages. It spreads rather slowly within the colony, killing only a few cells of young brood in the beginning. However, in some cases, it spreads rapidly and the colony is seriously weakened. This disease occurs more often in the late spring when brood rearing is at its peak.

In most cases, EFB kills larvae before their cells are capped; they usually remain curled in the bottom. When killed by this disease, the larvae change in color from the normal glistening, pearly white to a faint or grayish yellow. When larvae have been dead long enough to begin turning brown, the tracheal (breathing) system becomes visible as white lines. The decaying larvae do not usually form the ropey stage. However, some people can detect a typical sour odor. Dead larvae dry and the remains form a scale in the cell. This scale does not stick tightly to the cell wall. It does not become brittle but remains flexible and can be easily removed.

Since any material only suppresses mite populations temporarily, beekeepers should be prepared to contend with tracheal mite infestations indefinitely. Normally, tracheal mites are not as harmful to the colony as are Varroa mites.

(SHB) (A
Murray) are the newest beehive pest to invade some honey bee colonies in various southeastern, midwestern, and northeastern states.

Small hive beetles appear to be primarily pests of stored equipment, especially full honey supers awaiting extraction. In states where the beetles have become established, it has proved to be a problem in some areas while being of little consequence in other areas within the same state. These beetles appear primarily to be pests of full honey supers awaiting extracting and are, therefore, honey house pests. Though comprehensive descriptive information on small hive beetles is presented here, these beetles have not yet shown themselves to be general pests in all areas. They are presently new pests, and beekeepers are learning to cope with them. They may or may not be a problem for you.

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The adult small hive beetle (SHB) is dark brown to black and about one-third the size of a worker bee. Larvae are elongated, whitish grubs that have three pairs of legs and can be mistaken for wax moth larvae. However, small hive beetle larvae do not spin cocoons and must complete their development outside the beehive in the soil. In severe infestations, larvae may be seen crawling out of the hive entrance or from stored honey supers.

Beetles, like moths and bees, undergo complete metamorphosis. The beetles' life cycle starts with eggs that are laid in the hive and within 2 to 3 days hatch into larvae. Ten to 16 days later, the larvae crawl from the hive and drop to the ground outside, where they burrow into the soil and pupate. In about 3 to 4 weeks, they emerge as adult beetles and reenter the hive a week later. This process may repeat itself several times a year, especially during the warmer months.

Colony damage does not occur when only a few adult beetles are present in the colony. Small hive beetles must build up their population significantly before they can take over and destroy a hive. The beetles, in their various development stages, feed on honey and pollen in the hive, foul the honey, and destroy the comb and bee brood. The beetles' armor resists attempts by bees to sting them. The destruction eventually causes the bees to leave the hive.

Because they defecate in the honey and the resulting fermentation and odor make it unattractive to the bees, larvae of small hive beetles are most objectionable to adult bees. The small hive beetle larvae also damage wax honeycombs, especially newly drawn, delicate combs. When wax combs stand for a few days to a few weeks in the honey house, ready to be extracted, beetle larvae infestation can be most troublesome. This damage to honeycombs happens when beetles are actively reproducing in the colony and are taken into the honey house.

Looking for small hive beetles in a colony may be difficult—the adult beetle is darkcolored, moves fast, and avoids light. Beetles are likely to be found in crevices in the hive or on the bottom board, although when temperatures are cooler, the beetles remain with the bee cluster and do not move onto the bottom board. Many times when separating a hive consisting of two deep hive bodies, the beetles can be found along the frame rest grooves.

A simple technique used to look for beetles in bee colonies is to remove the outer cover, place the cover upside down on the ground, remove the deep super or brood chamber, and place on the up-turned outer cover. If beetles are present, they will move out of the super away from the light and into the outer cover, and they may be seen crawling in the cover.

PROPER DIAGNOSIS

Since many types of beetles commonly appear in beehives, don't assume all beetles are small hive beetles. Preventative use of unapproved insecticides in and around beehives is potentially risky and is not recommended. Beekeepers should become familiar with the small hive beetle to properly diagnose and manage the beetle should it occur. Populations of small hive beetles are known to be established in Alabama, Georgia, Florida, and South Carolina as well as other surrounding states. Sound pest management begins with positive diagnosis of the pest.

GOOD HIVE MANAGEMENT

Several colony management tools are effective against infestations when integrated with the use of available insecticides. They are the following:

- Maintain a strong bee population in each hive.
- Inspect every hive at least once a month.
- Move the hive to disrupt the life cycle of the beetles.
- Maintain close mowing or bare ground around the hive to facilitate chemical controls and provide less shelter for beetle larvae leaving the hive to pupate.

BASIC PRECAUTIONS FOR USING GARDSTAR 40% EC

GardStar 40% EC poses a higher risk to bees and humans than does CheckMite+. Because permethrin is highly toxic to bees, beekeepers must use extra caution when applying it around a beehive. If a hive is SHB-infested, here are two ways to approach the problem:

- Move a hive to a site where GardStar 40% EC has been previously applied to reduce potential insecticide exposure to bees.
- Mix concentrate from the original container.

is caused by a protozoan called . The bees' ingested food or water can become contaminated with the spores of the disease organism that germinate and multiply in the gut. As a result, the bees die sooner than normal. In many cases, the level of infection does not become serious and the colony is able to overcome the disease.

There are no specific visible symptoms. The only way to positively diagnose the presence of nosema disease is to use a microscope to examine the alimentary tract for the presence of spores. In most cases, the level of infection reaches its peak in the spring and declines to a very low level during the summer. A small increase in the level of infection usually occurs in the fall.

This disease can be spread in several ways. When an infected colony is overwintered, the bees may defecate on the combs. Contaminated food will help spread the disease. Contaminated cages used to transport queens and packaged bees may spread this disease.

is an adult bee disease caused by a

The wax moth larvae may seriously damage comb honey. Normally, the eggs are laid on the combs or frames before the honey is harvested. The eggs hatch after the honey is in storage and the young larvae bore through the cell caps. The honey will leak through these holes, making the comb unsuitable for marketing as comb honey.

Low temperatures will kill all stages of the wax moth. Using low temperatures avoids the problem of chemical residues, and equipment can be reused without endangering the bees. The minimum temperatures and exposure times required to kill all stages of the wax moth are 20 degrees F for 4½ hours, 10 degrees F for 3 hours, or 5 degrees F for 2 hours.

After treatment, properly store the comb honey or empty combs to protect them from re-infestation.

sometimes become a major problem in apiaries, honey houses, and individual colonies. Unfortunately, all insecticides recommended for control of ants are toxic to honey bees. However, in some cases the ant problem can be solved without using insecticides outside the hive.

An old technique that still may be applicable involves devising ant barriers. If you have only a few colonies, place the hives on a bench-type support with the legs in cans of kerosene or used motor oil. You must shield the oilcans to prevent rain from floating the oil out. This must be done in a way so the ants cannot bridge the space between the sides of the oil cans and the rain shields. Check5(s)10(p)10(a)10(c)10(e)10( )-15(b)10(e)10(t)10(w)10(e)10(11 0 0 1

It is often difficult to make positive diagnoses of bee diseases in the apiary, especially by inexperienced beekeepers. In some cases, positive identification cannot be made except in the laboratory. The U.S. Department of Agriculture provides laboratory diagnoses. If you suspect your bees are infected and need help in diagnosing the problem, be sure to follow these instructions for collecting and shipping a sample to the laboratory.

If you suspect a brood disease, cut a 4-inch square section of the brood comb. Make sure this piece of

Beekeepers should let farmers and custom pesticide applicators know where their bee yards are located to reduce accidental spraying or dusting. Farmers and custom pesticide applicators should let beekeepers know when a material hazardous to bees must be used. Whatever action is necessary to protect the bees can then be taken.

In cases when only a few colonies are involved, it may be worthwhile to cover the colonies with wet burlap before a hazardous pesticide is applied in the area. Cover the colonies at night when all the bees are in the hives. During the day, keep the burlap wet with water. Covering the hives is not practical where repeated applications of hazardous pesticides are made.

Applicators and beekeepers can contact the county Extension office for information concerning the relative toxicity to honey bees of commonly used pesticides.

Miscellaneous Management Techniques

One way to increase your number of honey bee colonies is to divide one large hive into two or more smaller hives. A good time to divide a colony is in late spring or early summer. Select the colony that is to be divided and have all equipment that you will need on hand. Open the hive and find the queen. Place the queen, about half of the adult bees, and about half of the combs of brood (mostly unsealed) in a hive body on the original bottom board. Be sure to leave enough adult bees to adequately care for the brood. Fill the remaining space in the hive body with empty brood combs or comb foundation. Place another hive body with empty brood combs and combs of honey on top and close the hive.

Put the other half of the combs of brood in a hive body on a new bottom board and fill the remaining space with empty brood combs or foundation. Most of the brood in this hive body should be sealed. Shake about half of the worker bees into this hive body. Close the hive and screen the entrance. Move this hive to a location at least 2 miles away. Introduce a new queen to this colony no sooner than 2 hours and no later than 24 hours after moving the hive.

Do not plan to harvest any surplus honey from these colonies the first season. Most new colonies will need all the honey and pollen they can store to build up, get through the first winter, and be ready to harvest a surplus honey crop the second spring. There may be some locations where new colonies have time to increase their populations and store a surplus crop of honey the first season.

Another way to increase colonies, if you have several strong ones, is to remove one or two combs of brood and bees from each strong colony when the population is at its peak. Replace these combs of brood with empty brood combs or frames of foundation. Place the removed combs of brood and bees in a hive body on a bottom board. Close the new hive and screen the entrance. Move it at least 2 miles away. Introduce a new queen to this colony in not less than 2 hours or more than 24 hours. Do not take

enough brood or bees from any one colony to reduce its population to the point that it will be unable to store a good crop of surplus honey. This method of increasing hive numbers is a good way to control swarming if done during the swarming season.

Eventually, you will find it necessary to move a hive of honey bees. This is not a complicated job, but you should keep a few rules in mind. Field bees are oriented to the location of the hive. These bees will return to the previous hive location unless you move the colony at least 3 miles. A good time to move honey bees is during the summer after the major nectar flow is over. It takes a colony 7 days to become oriented to the new hive location and forage area. The best time to move bees is at night when they are all in the hive. Harvest surplus honey before moving the hive. This will reduce the weight of the hive and the chance of breaking and ruining combs of honey during the move.

The first step in moving is to prepare the new location. Prepare hive stands. Position them so that when the hive is placed on the stand, the bottom board will slope very slightly from back to front but will be level from side to side. This allows moisture to drain out of the hive and off the bottom board. Remember that, if possible, the entrance to the hive should face east, southeast, or south and the

How to Get Help

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If only one hive of a group is moved a short distance, its field bees will return to the original location and join nearby hives. If all of the hives in a group are to be moved a short distance, it is better to move them at the same time a few feet at a time.

The proper use of smoke is probably the most important part of the job of moving bees; use it liberally. Keep the smoker well filled and tamped down, so the smoke stays cool.

The second step is to prepare the colonies a day or more ahead of the move by fastening the hive parts together. You can use hive staples, wooden strips with the proper size nails, or plastic or steel straps. Close all holes in the hive except the entrance.

The colony must have ventilation while it is being moved. Do not suffocate your bees. Cover the entrance with window screen. If the weather is warm, remove the hive cover and cover the top with window screen.

Remember that you should wait until night to move your bees, using no more light than is necessary.

Now you are ready to load the hives. Place them in a vehicle with the entrance facing forward. Place them close together and tie them down so they cannot bounce or shift around during the move. Leave the vehicle engine running while loading and unloading the hives. Vibrating the hives seems to cause the bees to be calm on the combs.

When you reach your destination, light the smoker and smoke the hives. Place them on their stands and smoke the hives again. Remove the screens from the entrance and the top. Move away quickly; the bees will be upset. When conditions are suitable for flying, the bees will leave the hives and

Requeening is good insurance against swarming. It helps you keep strong, productive colonies and is a way to improve stock or change from one race or strain of bees to another. There are several methods of introducing a new queen to a colony. The ones used by successful beekeepers work well under specific conditions but fail when conditions are not ideal. The "mailing cage" method is used by many beekeepers. Here is one version of this method:

When you order a queen bee by mail, she arrives in a small cage with several workers. The cage is plugged at both ends with a cork or a plastic plug. In one end is a white candy material used for food during shipment. As soon as the queen arrives, give the workers two or three drops of water on the screen side of the cage. Put the caged queen in a dark, cool place until you can get everything ready to introduce her to your colony. Never put a caged queen in direct sunlight. She should be introduced as soon as possible.

When you have everything ready, open the hive, remove the old queen, and kill her to ensure that she will not return to the hive. Remove the cork from the end of the cage that has the candy plug. Place the cage, with the new queen still inside, directly over the brood nest with the screen side down and facing the opening between two frames. Or, place the cage lengthwise between two frames in the center of the brood nest. Be sure that the bees have access to the screen side of the cage and the candy end. The bees should release the queen in about 48 hours.

Check the queen cage after 2 to 3 days to be sure that she has been released. If she has not, punch a small hole through the candy plug with a toothpick or similar object. Be sure you do not release the queen. Let the bees release her. If the queen has been released, do not look for her at this time. Wait about a week after placing her in the hive. By this time, she should be laying and there is less danger of the bees killing her.

When checking to see if the queen has been released, use as little smoke and disturb the colony as little as possible.

Bees sometimes steal honey or sugar syrup from another colony. This is called robbing. Robbing can be a serious matter iy1 (o)10(k0( )-15((o)10(p(o)10(b)10(b

cut brood comb and replace with new foundation and install a new queen. Many beekeepers use special vacuums to pick up bees within the nest but this would be an advanced procedure.

If time is not short, use a simple cone trap made of aluminum window screening. The

Beekeeping Literature

Numerous books and other forms of literature are available for the study of honey bees and beekeeping. Some of these may be in your public library. Get a more extensive list from your library or bee supply manufacturer.

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Common Questions and Comments From People Considering Beekeeping

“I could never keep bees. Stings are painful and I swell when I get stung.”

“Should I subscribe to a bee magazine?”

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