

Supplemental Feeding for Honey Bees

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Honey bees are looking for three things when they forage: water, nectar, and pollen. Nectar is the honey bee's primary source of carbohydrates while pollen is their primary source of proteins, vitamins, minerals, and other micronutrients. Best beekeeping practices suggest that providing a nearby water source at all times of the year is beneficial. Beekeepers can provide supplemental sources of carbohydrates and protein as needed to build and maintain colony health. This publication will focus on the supplementation of water and carbohydrates.

Providing Water

In Alabama, honey bees use water year-round in the hive. It is used to regulate temperature and humidity in the hive, process pollen into bee bread, produce honey, and liquefy crystallized honey in the hive. Providing a nearby communal source of water will minimize the amount of time and energy colonies spend foraging for it.

When providing supplemental water, the source must be clean and uncontaminated by any chemicals. Bees are better able to find a water source that is in the sun, so do not place supplemental water in the shade.

The size and shape of the supplemental water source is up to the beekeeper. Some examples include ponds, cattle troughs, bird baths, buckets, and chicken waterers. One important feature of the supplemental water container is that it has shallow spots, floats, or other landing pads so that the bees can safely land to take in water. Bees do not swim well, and the lack of good landing spots will lead to many drowned foragers.

Installing your water source very early in the season will help establish it as the preferred source throughout the year. Honey bees also appreciate getting additional minerals while foraging for water, which is why they are so attracted to saltwater pools. Adding 1-2 teaspoons of non-iodized edible salt per gallon of water may entice your colonies to begin using your preferred water source (Figure 1).



Figure 1. Water source with gravel added for landing spots. Photo by A.M. Shabel.

Providing Carbohydrates/Sugar

Nectar is the preferred source of carbohydrates for honey bees. Nectar not only contains carbohydrates but may also contain micronutrients as well. Unfortunately, there are times and situations where additional sources of carbohydrates are needed. These additional carbohydrates are supplemented in the form of either solid or liquid sugar. The decision of how to supplement sugar depends on the individual hive's needs, the time of year, and the equipment on hand.

Feeding Newly Established Colonies

A colony that has been recently established from a package or nuc in the spring has a lot of work to accomplish in its first summer. It needs to produce wax, honey, and brood in quantities large enough to sustain itself through the winter. Accomplishing this task will require exceptional amounts of food resources. Providing a close source of sugar will hasten the establishment process and boost the colony's chances of winter survival.

Feed newly established colonies immediately upon installation with a light syrup. Once floral nectar sources

begin blooming, the colony may shift away from supplement sources in favor of nectar. Once summer dearth has begun, offer light syrup again to help support brood production.

In the fall (approximately late October), assess colony honey stores and consider providing heavy syrup if needed to build up winter honey stores. A colony will need approximately 60 lbs. (1 medium super) of honey stored to survive through winter.

In late winter (approximately February), assess the colony's stores again. If there is any shortage in honey stores, add a solid sugar source on top of the colony for emergency use. A few times each month, check to see if the sugar source needs to be replenished. Once floral nectar sources begin blooming in early spring, remove the supplemental sugar.

Feeding Established Colonies

Colonies that have made it through their first winter are better equipped for survival than newly established colonies. They are beginning their year with enough comb that they do not have to expend as much energy on producing wax and can devote more efforts to foraging nectar and pollen to build honey stores. Therefore, they will need less supplemental sugar feeding.

Some beekeepers offer light syrup very early in the spring, a few weeks before the nectar flow, to encourage brood production in established colonies. This will produce a larger forager workforce during the spring nectar flow, which may increase honey production. Beekeepers may also offer light syrup to established colonies after harvesting honey, especially if they inadvertently harvested too much or if the dearth is unexpectedly long.

In the fall (late October), beekeepers are encouraged to assess the honey stores for each colony. If stores are low, it is advisable to feed heavy syrup until stores are built up to approximately 60 pounds per colony. Plan to add large quantities of syrup all at once, to encourage storage. Each colony may need up to four gallons of heavy syrup to be fully prepared for winter. Alternately, the beekeeper can equalize honey stores across the apiary by pulling excess honey frames from strong, disease-free colonies and providing them to weaker colonies.

As with newly established colonies, winter starvation may occur. Begin assessing honey stores in February and add a solid sugar source as needed until spring nectar sources begin blooming. This can be done without opening the colony by lifting the entire colony from the rear to estimate food stores (Figure 2). Replenish the solid sugar source every two weeks or as needed.



Figure 2. A beekeeper lifts the back of a hive gently to assess winter food stores. Photo by A.M. Shabel.

If you are planning to harvest honey from a hive, care should be taken when feeding so that no sugar syrup is stored as honey. When an established colony is in the process of storing honey, all feeders should be removed. Any frames with sugar syrup stores should be marked so that they are not taken during the honey harvest.

Types of Sugar Feed

When adding supplemental feed to a colony, the source of sugar is important. Honey bees should be fed table sugar, either beet or cane, or high fructose corn syrup. Most backyard beekeepers choose to use table sugar because it is inexpensive and readily available. Do not attempt to use raw sugar, organic sugar, molasses, brown sugar, or confectioners' sugar, as these forms contain compounds that honey bees are unable to digest and may prove harmful to colony health.

Supplemental sugar is added to the individual colony as either a liquid syrup or in dry form, usually a solid cake. The decision as to whether to supplement it with dry feed or syrup depends on the season and temperature.

Solid Feed

Solid feed should be used when temperatures are below 50° F. The main use of solid feed is to help prevent

starvation over the winter. Many beekeepers add it to hives preventively, as it will keep in the hive for quite a long time if it is not eaten. It can be added on top of the inner cover, or if the beekeeper is using feeding shims, it can be placed over the brood cluster or on top of the honey supers. Beekeepers may also use a candy board above the supers.

Solid feed can take multiple forms, including fondant (Figure 3), sugar cake, or mountain camp (Figure 4). The feed placement and form depend on the needs of the individual hive. Recipes and placement options for winter feed can be found in Table 1. Please note that baker's fondant is not the same product as beekeeping fondant and should not be used to feed a colony.



Figure 3. Fondant patty on a hive. Photo by Geoff Williams.

Table 1. Winter feeding options.

	Fondant	Sugar Cake	Mountain Camp
Ingredients	<ul style="list-style-type: none">■ 2 cup table sugar■ 2 tbsp corn syrup■ 1.5 cup boiling water	<ul style="list-style-type: none">■ 10 lbs. sugar■ 4 cups water■ 1 tbsp. white vinegar	<ul style="list-style-type: none">■ Up to 4 lbs. sugar■ Water to moisten■ 1 sheet of newspaper
Directions	Combine the sugars and pour boiling water over. Once it is cool enough, stir the mixture until a soft fondant forms. Pour in trays and leave overnight to firm up.	Combine ingredients thoroughly. Pour onto a lined cooking sheet and dry overnight.	Lay a sheet of newspaper across the frames on the top box. Pour sugar on and moisten. Add a feeding shim to provide room for bees to reach the feed.
Hive Placement	Place above brood cluster or on top of honey supers using a feeding shim.	Place above honey supers using a feeding shim or in a candy board.	Place above honey supers.

Liquid Feed

Liquid feed should be used when temperatures are above 50° F. The sugar concentration of the syrup should depend on the season. In the fall, feeding heavy syrup will encourage honey bees to store it for winter instead of using it for immediate needs. Because of the reduced amount of water in the syrup, bees will not need to spend valuable time drying out the syrup to store for winter. Heavy syrup consists of 2 parts sugar to 1 part water by weight, or 2 lbs. of sugar for every 1 lb. (2 cups) of water. When feeding heavy syrup, place it above the honey supers to expedite storage.



Figure 4. Making mountain camp feed using dry sugar, water in a spray bottle, and a feeding shim. Photo by A. M. Shabel

In spring and summer, bees should be fed with a light syrup that they can use for immediate needs, including building comb and feeding bees and brood. Locating light syrup close to the brood will make it more convenient for the bees to use it, although it is not required. This can be accomplished by adding a frame feeder to the brood box or using an entrance feeder. Light syrup consists of 1 part sugar to 1 part water, or 1 lb. of sugar to 1 lb. (2 cups) of water.

Make liquid supplements by mixing sugar into warm water, never boil the mixture to combine. When adding sugar syrup,

leave the feeder in place for one week. If the colony has not used it in that time, then they have located an alternate source of nectar. At this point, remove the feeder until the next seasonal shift.

Considerations for Liquid Feeders

There are a few key considerations to keep in mind when choosing a feeder. First is the ease of accessibility when refilling. Feeders on top of a hive may be refilled more quickly and easily than those inside the brood box. Alternately, feeders located in the brood box are more difficult to access when monitoring and refilling.

Second, consider the use of the syrup. If bees need the syrup to help increase brood production, an internal feeder may be more effective. If the goal is to provide heavy syrup to increase winter storage, a hivetop feeder would be best.

The third consideration is the volume of the container as compared to the needs of the colony. Those that hold large volumes of syrup are more likely to ferment than those that hold smaller volumes. If a colony only needs a small amount of syrup, consider using an appropriately sized feeder.

Types of Liquid Feeders

Open Feeder

Open feeding consists of a large communal feeder set up in an apiary to give many colonies the opportunity to feed at once. In Alabama, open feeders are not recommended. They may encourage robbing and spread disease. Additionally, open feeders are utilized more readily by the stronger colonies in the apiary than the weaker colonies.

Entrance Feeder

An entrance feeder, or Boardman feeder, sits on the bottom board of a hive and slides slightly inside, with the sugar syrup container exposed to the outside (Figure 5). The sugar syrup is slowly released by bees from under the lid of the container as needed. Entrance feeders should not be used in any season except spring, as they may encourage robbing. Additionally, the syrup being exposed to light may lead to mold formation.

Division Board Feeder

Division board feeders are used in place of a frame in the brood box to provide quick access to workers as they raise brood and build comb (Figure 6). They are available for both medium and deep boxes and hold anywhere from one half to two gallons of syrup. The syrup is encased on all sides with the exception of two 'ladders' bees crawl down

to access the syrup. Care must be taken to keep the syrup inaccessible from all points except the 'ladders' to prevent bees from drowning.



Figure 5. An entrance feeder placed on the bottom board in the spring. Photo by A.M. Shabel.



Figure 6. A division board feeder in a brood box. Photo by A.M. Shabel

Hive Top Feeder

A hive top feeder consists of a large, sub-divided horizontal plastic tray housed in a shallow super (Figure 7). The bees enter through the middle from below to access syrup through a mesh screen. Care must be taken so that the mesh does not develop holes, otherwise many bees will drown in the syrup. These can hold large or small amounts of syrup and are easy to refill with minimal contact with the colony. The disadvantage of a hive top feeder is that they are bulky to store when not in use.



Figure 7. A hive top feeder holds larger quantities of sugar syrup and can be situated just below the inner cover. Photo by A. M. Shabel

Plastic Bag Feeder

Many beekeepers use heavy-duty zip-top bags as feeders (Figure 8). While zip-top bags are readily available and inexpensive, they can create quite a bit of plastic waste as each bag can only be used once. The bag is laid on top of the super and surrounded by a feeding shim. Holes are strategically cut on the top to provide bees with a place to feed. The danger in using a plastic bag for a feeder is leakage and extra care should be taken to prevent it. Leaking bags can damage brood cells, attract insects, and increase hive moisture.

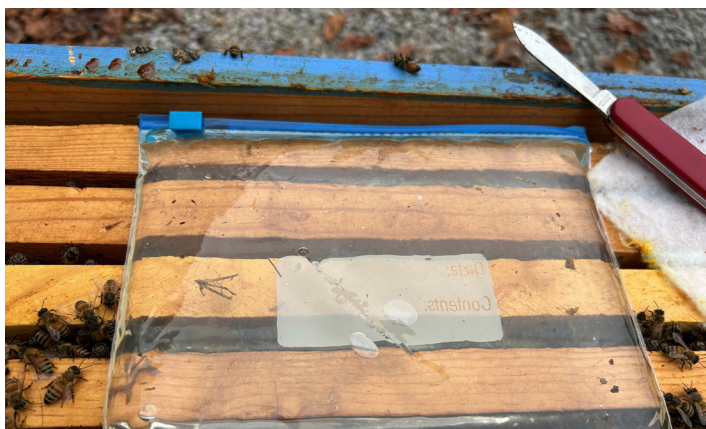


Figure 8. Feeding with a plastic bag placed directly on top of frames. Photo by A.M. Shabel

Other feeder options

There are many other liquid feeder options available (Figure 9). Most liquid feeder containers sit above the top hive box, surrounded by a hive body to make them inaccessible to other colonies. Choose the feeder that most closely fits the needs of the individual colony regarding container volume, refill frequency, and seasonal usage of the syrup.



Figure 9. Liquid feeders range in size and shape. Choose one that best fits your needs. Photo by A.M. Shabel

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