



Feeding Your Bees

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Yes, bees have survived for thousands of years without human intervention, but for the Beekeeper who wants to be successful raising bees, sometimes your bees will need supplemental feed. Maybe you have your hives located where there aren't enough floral resources available year-round to sustain the colony. Maybe the weather is too cold, wet or windy for a long time and colony resources are depleted. Maybe you've just installed a swarm into a new hive. All of these instances are good reasons to supplement the naturally available floral resources with feed.

Whenever the colony could be in danger of starvation, it is a good idea to provide either sugar, syrup, candy, or pollen substitutes to tide them over until floral resources are more available. Supplementary feeding may also be advantageous to build colonies before a major nectar flow, or to help a colony have the resources necessary to build honeycomb on new frames.

Sugars

There are three types of sugars that bees use for food: Glucose, Fructose and Sucrose. Glucose is a simple sugar found in all living cells and is produced by photosynthesis in green plants. Fructose is another simple sugar and is the sweetest of all simple sugars. Sucrose is a disaccharide, or two sugars, made of glucose and fructose. Nectar is mostly sucrose, and bees use it for energy. Worker bees will consume small amounts of nectar while foraging so they have the energy to continue foraging, but most of the nectar they consume is just stored in their honey stomach until they get back to the hive and transfer that nectar to a hive bee for storage and transformation into honey.

Sugar Syrup

Mixing granulated sugar with water is one of the easiest ways to supplementally feed bees. One gallon of sugar syrup at a ratio of 2 parts sugar to 1 part water can increase the food reserves of a colony by seven pounds. The ratio of sugar to water is adjusted according to the reason for feeding



In hive feeder in bottom brood box.

and time of year. A 1:1 ratio is best for Spring feeding. A ratio of 1:2 is best for stimulating brood rearing and mimicking a light nectar flow. A ratio of 2:1 is best for fall feeding, so the bees will stand the best chance of curing the syrup before temperatures get too cold.

Use only white granulated sugar for syrup. When mixing heavy syrup it will be easier to get the sugar into solution if hot water is used, but water out of the faucet is hot enough. Never boil sugar syrup as it can easily burn without detection and will form Hydroxymethylfurfural (HMF) which is toxic to bees. If your bees aren't feeding as heavily as desired you can add a drop of Lemon Grass essential oil to a gallon of syrup, and they will be stimulated to feed better.



Entrance Feeder

There are several options for feeding the sugar syrup to your colonies. **Entrance feeders** are easy to access for refilling, but they are also prone to robbing, and are generally small so that daily filling is required. Entrance feeders are however a great option for providing water. **Hive top feeders** usually require an empty deep or medium hive box on top of the brood boxes to house the feeder. These are also easy to access for refilling, and will usually hold a gallon or more, so refilling can be less often. The feeder may be a jar or bucket with small feeder holes in the lid inverted over the hive inner cover. Some hive top feeders are more box like with screened access for the bees to reach the syrup. In Hive feeders are usually in the shape of a frame but slightly wider. They require that a frame or two are removed and the feeder goes into that space. Older versions were just open trays, but newer versions are closed on top with feeding tubes so the bees can access the syrup without drowning. If these in hive feeders are located on the outside edge of the top box, they can be easily filled by sliding the inner cover over just far enough to access the filling hole. There is also the option of placing a plastic gallon Ziploc bag full of syrup on top of the frames and poking a few small holes in the upper side of the bag. Bees will access the syrup until it is depleted, and a new bag can be placed at the next feeding. Regardless of which type of feeder you decide to use, once you start feeding it is extremely important to not let your colony run out of syrup until the natural floral resources are sufficient to feed them.

Dry Sugar

It is also possible to feed with dry granulated sugar as an emergency food source during late winter or early spring to prevent starvation. This is especially good during the

cold winter months when condensation from the heat of the colony will dissolve the sugar into syrup. Sugar should be placed as close to the bee cluster as possible. It can be spread around the opening in the inner cover and replaced as necessary. An easy way to treat for Tracheal mites is to mix dry sugar with vegetable shortening until it forms a patty. This can be fed to the winter cluster. The shortening will coat and smother the Tracheal mites as it is consumed by the worker bees.

Candy

Candy is simply granulated sugar that has been partially dissolved in water and then hardened so that it can be placed in the hive. An easy way to make candy is to spread a layer of granulated sugar on a pie pan or paper plate and then moisten it thoroughly with a spray bottle of water. Then allow to dry overnight. Once dry it will be brittle but should hold together well enough to place on the inner cover near the opening for the bees to feed.

Pollen

Pollen is the main source of protein for bees. Since pollen comes from a wide variety of plants, the protein content is also widely variable anywhere from 8 to 40 percent. Usually, plants that are wind pollinated have lower protein content, but even among the plants that pollinators visit for nectar, the protein and lipid ratio of their pollen is quite varied. This is why providing your bees with a wide variety of floral resources will lead to the best pollinator health. The average colony will need to collect up to 125 lbs of pollen per year. This pollen which is mixed with small amounts of nectar to make it sticky enough to form pellets which can be transported back to the hive in the pollen baskets on her legs, will be deposited into cells near the larvae. As a cell is packed full of pollen pellets, a house bee will top it off with a drop of nectar from her honey stomach. This starts the fermentation process which enhances the nutritional value of the pollen and turns it into bee bread. This is the source of not only protein, but lipids, minerals, and vitamins for larvae and adult bees. Pollen and bee bread are consumed in greater quantities in fall which extends the life expectancy of worker bees from 6 weeks to over three months. Bee bread is also the food that nurse bees need to feed on to produce royal jelly for both larvae and the queen. Beekeepers can stimulate rearing of brood by feeding pollen or pollen substitutes. A plentiful supply of pollen is necessary to maintain the rearing of brood throughout the season, but nectar availability also plays a role. That's why it's always a good idea to feed sugar syrup at the same time you are supplementing pollen.



Pollen patty on inner cover next to hole for bee access.

If you have a really strong colony when there is an abundance of pollen available, you can harvest pollen with a pollen trap, dry it, and store it for later use. Otherwise you will need to purchase pollen patties or supplements. They are available from large commercial suppliers and can be kept in the refrigerator or freezer until needed. Once you start feeding in the spring, do not stop until the bees stop taking it.

Bees prefer natural nectar over sugar syrup and plant pollen over pollen substitutes or supplements, so once floral resources are available in large enough quantities, the bees won't be attracted to your substitutes any longer.

References

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