

Stymie: "You want some candy, Uncle George?"

Bumbo: "Yum yum, eat 'em up! Eat 'em up!"

- "The Kid from Borneo", *Our Gang*

The "Uncle George" episode of *Our Gang* (The Little Rascals) is one of my favorite childhood memories. "Uncle George" eats everything that is offered to him and the kids believe his insatiable appetite will eventually include them.

A lot of beekeepers have reason to think their bees are like Uncle George: bottomless pits of sugar consumption. Beekeepers know they must feed their new start-up colonies, but a common question is, "When can I stop feeding them?"

To answer the question of when it is safe to stop feeding, we must first closely examine why we started in the first place. There are at least three reasons to feed:

1. Prevent starvation (now and later)
2. Stimulate comb building
3. Stimulate brood rearing

Each of these goals has its own rules.

Prevent starvation

This is obvious but it bears repeating. Buckets-full of nectar don't drip from our flowers year-round. Even if they did, honey bees cannot forage effectively when the temperature is too cold (below the low 50s). This is why the industrious honey bee prepares for food shortages by filling the pantry with carbohydrates that she has dehydrated and chemically altered to give them a long shelf life.

If the cupboard is bare and a strong nectar flow isn't in progress, the hive is at risk of starving. It is important to realize that honey bees are pure Marxists: they operate on the principle of "from each according to ability, to each according to need." As such, we don't see half a hive starve; it is all or none. The risk of starvation is high when a colony has just been established (a new package or nuc) and has no stores; when the population is growing rapidly but the nectar flow suddenly slacks off (see [Beware the Ides of March](#)); the summer dearth



Too much of a good thing may not be a good thing after all, as Violet Beauregard discovered in *Willy Wonka's Chocolate Factory*.

(July and August); and of course winter (see [Controlling Winter Losses](#)).

I have visited new beekeepers in July and advised them to feed their colonies, only to have them respond, "But sugar is so expensive! Do I really need to feed them?" The answer is simple: nobody is forcing you to feed during a dearth. Instead, you can let those bees die and start over next spring. Which is cheaper: 25 pounds of sugar (about \$12 at WalMart) or a package of bees? You get to decide.

What are the signs that you need to boost a colony's stores? In the spring and summer, I like to see at least three or four full deep frames of honey or nectar at all times. Even if abundant nectar is coming in, a rainy day can disrupt the supply. I check periodically to ensure the bees are staying ahead of their consumption.

In fall, I like to see a 10-frame deep full of capped honey. This should be enough to hold a hive over until spring. If a hive is light, it is best to feed early and beef it up before cold weather sets in. Bees in winter cluster cannot collect and properly cure syrup.

Don't feed when honey supers are on the hive. If the nectar flow is strong enough to fill supers, the bees don't need additional food. Sugar syrup "honey" isn't real honey and tastes bland. Selling it as honey is fraud. (By definition, honey comes from nectar or honeydew.)

Stimulate comb building

The wax that is used for comb building comes from the bees' abdominal wax glands. It takes a lot of energy in the form of carbohydrates to fuel the wax glands' production. It is said that it takes a frame of honey to produce a frame of wax.

Bees won't create wax unless there is a strong nectar flow going on (either natural or artificial). The best time to expect comb-building is during April and May. The rest of the year, you'll need to feed thin syrup (1 part sugar to 1 part water, or even a bit thinner) to try to coax the bees to make comb.

New colonies need to draw comb on the equivalent of 20 deep frames before the end of the season in order to have space to hold winter stores plus space for the queen to lay. If they don't have a full complement of comb completed by the end of the spring nectar flow (July 1st at the latest), it will be a real challenge to get them to finish it off in time for winter. Feeding will be required. If the bees are filling and capping cells with syrup instead of building any new comb, try thinning the syrup a bit. During this phase, we want the bees to consume the syrup so their bodies will secrete wax, not store it all.

Once a full complement of comb is drawn, this goal is complete.

Stimulate brood rearing

A well-behaved hive will adjust brood rearing depending on the strength of the nectar flow and pollen availability. This is exactly what we want: we need lots of bees in the spring as a honey-producing workforce, but we don't want to have to support lots of deadbeat, do-nothing bees during times of nectar dearth.

However there are times when beekeepers may want to stimulate brood rearing ahead of schedule. These include building up hives in very early spring to pollinate early-flowering crops such as blueberries. Or you may want to create nucs for sale or apiary expansion so you need lots of bees early in the season for splits.

If you do have a need for lots of early bees, you must ensure that the hive has abundant

nectar/syrup and pollen. You must supply both; they go hand-in-hand. Feed thin syrup (1-to-1 or thinner) and supplemental pollen. If you feed a pollen substitute rather than genuine pollen, make sure the bees are actually eating it rather than just dumping it out as trash. Note that small hive beetles love pollen too so don't feed more at a time than the bees can consume in a few days.

If you feed to stimulate brood production, you must keep it up until the natural nectar flow begins in earnest. Otherwise you'll be creating an unnaturally large population at risk of starving. You must also take proactive measures to prevent swarming.

Most of us (including me) don't need to stimulate pre-season brood rearing in order to meet our beekeeping goals. Don't do it "just because" or you'll be creating issues that you aren't prepared for.

How much is too much?

Can you feed too much syrup? Yes! If all the available cells are filled with nectar/honey/syrup, brood or pollen, the queen will have no place to lay eggs. In spring, this will likely cause the hive to swarm. Other times of year, if the hive doesn't swarm, lack of space to lay will inevitably result in a dwindling population and a disproportionate number of aging bees. The hive will be in the same shape as poor Violet Beauregard in Willy Wonka's Chocolate Factory: too bloated with sweets to be healthy and successful.

So how much feeding is too much? I like to see three or so frames worth of completely empty comb (no eggs, brood, nectar/honey/syrup, pollen) at all times as available space. If there are too many frames of honey/syrup, it is easy to fix the situation: take those frames out of the hive and replace them with empty comb or, in the spring, frames with foundation. Put the full frames in the freezer and save them for later when the cupboard is bare.

What should we feed?

Honey bees need sugar. They can make use of it in many raw forms; that's what they do for

a living! Their sense of taste selects for gradients of “sweet”; they don’t care where the “sweet” comes from. Bees are not food snobs.

Most hobbyists feed sugar syrup made from sucrose (table sugar) mixed with water. The traditional fall/winter mix is two parts sugar to one part water; it is difficult to get more sugar than that to stay in solution. Spring feeding is typically one part sugar to one part water or thinner (e.g., one part sugar to two parts water), which is similar to the concentration in typical nectars. Thin syrup stimulates brood rearing and comb building. Note that these proportions are not part of the US Constitution. They are only general guidelines. Close enough is close enough. The measurements work out roughly the same whether using pounds of water versus pounds of sugar or quarts versus quarts. If you cross the measurement units, 1-to-1 roughly means 10 pounds of sugar to 5 quarts of water.

The complex sugar sucrose is broken down into the simple sugars glucose and fructose by the enzyme invertase while the sugar is in the bees’ honey stomachs. Some rich beekeepers buy very expensive invert sugar which is already broken down. Since the bees are perfectly equipped to do this themselves, I do not understand why they need help. I don’t want somebody digesting my food before I eat it. Why would a bee?

High fructose corn syrup (HFCS) is commonly used by commercial beekeepers to feed their bees. They buy it by the tanker load and it is very convenient for them to use. Mixing thousands of gallons of table sugar into solution is a big chore; HFCS is already bee-ready.

Debate over HFCS versus sucrose sugar syrup pops up every few years, with the opinion about which is “best” changing as frequently as the weather. Who cares? It is all sugar, and that’s what the bees need. As with just about everything else in beekeeping, the deciding factor should be, “What is more convenient for the beekeeper?”

Some beekeepers claim that real honey is the best supplemental food for their bees.

Clearly there is nothing wrong with feeding your own honey to your own bees, but it isn’t true that this is hands-down better than the alternatives. Issues with honey include:

1. Honey is a major vector for spreading diseases between hives. If you do feed honey, only feed honey collected from your own apiary.
2. Honey contains many impurities, e.g. ash, which bees cannot digest. Too much ash in over-wintering hives can result in dysentery. Sucrose syrup, on the other hand, is pure sugar without any extras.
3. Educated beekeepers know that there isn’t any such thing as generic “honey”. Honey is only as good or bad as its nectar source. Titi and jasmine honey are toxic to bees. Goldenrod honey has a high ash content. The bee colonies a mile from our county waste site enthusiastically collect sweet stuff from household garbage. When people say “honey is best”, what “honey” are they talking about?
4. Ironically, the purity of sucrose syrup is sometimes criticized by saying that it doesn’t contain vitamins and minerals which bees need. However these are only present in minute, trace amounts in honey. Bees rely on pollen, not honey, as their primary source of vitamins and minerals.
5. Finally, the retail price of sugar is less than 50 cents per pound. The retail price of honey is \$10 per pound. Need I say more?

Final word

So when should you feed? Whenever you need to do so with respect to your goals. When should you stop? Whenever you have reached those goals. Study your hives and take it from there.

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