Dr. James E. Tew

It was only a few years ago, that beekeepers just let the bees take care of themselves year round. A common recommendation was to take the spring honey for the beekeeper while the darker, stronger fall honey was winter stores on which the colony was to pass the winter. Well, that is probably not the best advice any longer. The health of productive honey bee colonies has become too valuable to leave to chance.

Feeding bee colonies in the spring is logical. Many of you have always done that. It's a good way to get the bees started...to wake them up early and then get off to a good productive year. That's still an excellent recommendation. Keep on doing it. The spring season is exciting and promising.

Alternatively, the fall season is one of resolution - of dedication. The honey production year is over. The crop - for better or worse - is in. For us, there are meetings to attend, school is starting and summer is ending. Blah. It's hard to get worked up to do bee work; yet, thanks to mites, it has become more important than ever to get bee colonies prepared for winter. That preparation must be started long before the cold weather arrives. It's much easier to feed colonies during warm months compared to trying to feed during the erratic, cool days of the following early spring.

**Bees Are Not Always So Smart.**

We like to think that the bees always know what's best for them (and they usually do), but there are still ways we can help. Several scientific papers have presented results concluding that sucrose - common table sugar - is normally a better winter food than the honey that bees collect from natural autumn sources. A good clean supply of sucrose, converted to honey and stored in the combs, will provide better wintering stores than honey collected from natural sources. Commercial beekeepers have frequently extracted ALL fall-season honey and then fed colonies either sugar syrup or corn syrup in quantities great enough to provide all the winter food the bees would need. An old memory comes to mind....Many years ago while I was beekeeping in Maryland, some of our wintering colonies began to show signs of dysentery. Conditions got worse by the day. Colonies were streaked by fecal matter, dead and dying bees were piled in front of the colonies and neighbors were complaining of bee poop spots on their cars. This was disconcerting. The colonies had been strong in the fall and showed no signs of any disease. We had no history of Nosema. I enlisted the help of an insect pathologist who reported no high levels of honey bee pathogens, but he did find high levels of melezitose, a sugar commonly found in honey dew. In the few days it took for us to academically conclude this, the colonies died. Bees are not always so smart. Our best guess was that the colonies had stored honey dew honey, a low quality honey, and were not able to pass the winter on it.

**Getting Bees to Take the Feed**

When it comes to feeding bees, it's difficult to determine if bees are not so smart or conversely, if they are too smart for their own good. Bees have no obvious way to transmit information concerning food that is literally in front of their bee noses. It's not uncommon to watch a colony that has just had feed put on show a great deal of flight activity near the front of the hive. Individual bees, having discovered the feeder, have no easy way to tell other bees of the find. In their dance, they essentially say that a food source is somewhere within a few yards of the hive when in reality, it is probably somewhere within the hive. Each bee that takes syrup from a feeder must learn to do it individually. Some bees learn faster than others. Indeed, some bees will never learn to take the food efficiently. This inability of some colonies to learn to take syrup explains why some colonies take syrup so fast while others will leave feed on so long that it will
actually ferment.

If there are only a few colonies to be fed, frames of honey (sugar syrup) can be taken from "smart" colonies and given to the slower colonies. This is labor intensive, but it will get food in the right form to all colonies in the correct quantity. Intensive feeding, as is being described here will, on occasion, stimulate brood rearing. I am not sure how that can be prevented. I suppose I would rather have a colony too strong going into winter as opposed to being weak. Having them produce brood is the lesser of the potential evils.

**How much is enough??**

When you feed for storage rather than stimulation, feed syrup that is as thick as you can make it. Corn syrup can be fed straight while sugar syrup should be mixed with hot water. Keep in mind that five pounds of sugar in 50 gallons of water is still just five pounds of sugar. The thicker the syrup, the greater the benefit to the colony. Since it requires no mixing, corn syrup is easier to feed, but it may be more difficult for the smaller beekeeper to get.

When do you stop feeding? A strong colony going into winter will need around fifteen deep frames of capped honey - but there are a lot of variables not the least of which will be the climate where the colony is wintering. However, even colonies in warm climates will require similar amounts of food stores - the biggest difference is that colonies in warmer climates will be able to take more cleansing flights. This will enable warm-climate bees to winter easier on lesser quality food stores. However, taking more flights during times when absolutely NO nectar is available only deletes honey stores more rapidly.

A two-story colony going into winter should have a gross weight of (at least) 165-185 pounds - again depending on many variables. For the average person, the colony should feel so heavy as to be difficult to tilt from behind. If the colony is obviously light and can be shifted rather easily, continue to feed it. As the weather becomes cold, bees will finally stop taking the feed.

**What Kind of Feeder to Use??**

Through the years, beekeepers have devised an incredible number of ways to get sugar to bee colonies. Many of these feeders have restrictions such as weather conditions, hive size, cost, or quantity of syrup delivered. Feeders range dramatically in complexity ranging from sugar on the top bars to gasoline-driven comb filler.

Open Feeding. Open feeding is one of the simplest ways to get syrup to a large number of colonies. The problem is that the colonies may not always be yours. Also, weaker colonies may have problems getting their fair share if competing with stronger colonies. Until mites destroyed much of the feral honey bee populations in the US, open feeding was not commonly used. It may be time to try it again.

Essentially, all you do is take a large container - a galvanized tub, a 55-gallon drum cut in half, or a plastic child’s wading pool, and put sugar syrup in it. It will need either gravel or straw placed in it for the bees to stand on while feeding. Keeping it loosely covered will help keep out rain. Don’t put so much out that the bees can’t take it in a day or so. We have had colonies take 60 gallons of syrup in one day. Naturally, be cautious when doing this in crowded neighborhoods and don’t try it in cold weather. It may take a few hours for foraging bees to find it, but once they do, it’s a fast way to get stores to the colonies.

**External Feeders**

Boardman Feeders. For beekeepers with smaller numbers of colonies, using the common Boardman feeder is practical. It’s easy to tell when it needs filling, it’s easy to fill without disturbing the bees, and it’s easy to install it, plus it’s cheap. This feeder sounds perfect - but it has problems. It can incite robbing if it leaks near the entrance of the hive. It requires glass jars which easily break in route to the bee yard and most
importantly, bees can’t readily use this feeder during cool weather.

**Internal Feeders**

Division Board Feeders. In beekeeping years long gone, there were pieces of beekeeping equipment named “division boards” that were used to compartmentalize a hive. Essentially, four or five frames were partitioned off using a temporary wall made of a one-half inch board. It was only a small step to make the board wider and hollow and use it as container for an internal hive feeder. Earlier ones were made from wood, but all are plastic now. They take the place of a single frame and are usually located at the sides of the brood nest. To fill it, maneuver hive equipment so the filler spout is reachable and fill it with about a gallon of sugar syrup. It needs to have a float in the feeder or bees will drown. The bees take feed from this gadget very well, but it requires removing a frame and moving equipment to fill it.

Hive Top Feeders. There are many models of hive top feeders - including several antique models. As with division board feeders, current hive top feeders are now made of plastic. The basic premise of all styles of hive top feeders is for bees to move through openings up into the feeder which is positioned directly beneath the inner cover. The positioning of the various openings varies with the style of feeder. These work well. They are easy to fill and have a large capacity - sometimes as much as two gallons. However, they must be completely removed before any other hive manipulation can be accomplished. Older style feeder had a tendency to seep rather than outright leak. Naturally, this would encourage robbing.

Friction Pail Top Feeders. Simple, efficient feeders can be devised by using friction-top metal cans with a few small holes punched into the lid. The can is then inverted over the hand hold in the inner cover. Bees can move into the small area between the inner cover and the lid of the pail and feed from syrup drops hanging there. Since a vacuum is formed in the can and prevents syrup from flowing out too fast, it is important the lid fit tightly. There are also friction-top plastic pails that are in common use now. Though not totally necessary, the pail can be surrounded by an empty deep super. This will keep the feeder from being knocked off by wind or animals.

**Comb Fillers**

Gasoline-Powered Fillers. Comb fillers are used for spraying syrup into cells. In this manner, entire frames - full of syrup - could be placed near the brood nest. Bees will consolidate and manipulate the syrup into honey or will use it immediately. This is probably the fastest way for bees to get sugar syrup feed. But, sugar syrup that is not consolidated will granulate quickly. This is not really a major problem for the bees, but it does result in sticky, crystallized syrup all over the place.

Garden Type Compression Sprayers. Common “pump-up” garden sprayers can be used in exactly the same manner as described in the section above. These are much cheaper, but will only fill a few frames before the sprayer, itself, must be refilled.

**Dry Feed**

Candy Boards. I don’t hear of candy boards being used too much any more. I suppose they are labor intensive. A fondant-type candy was made from simple recipes, molded into a wooden frame and put on top of the colony. A recipe commonly to make sugar candy is:

- a. 15 pounds of sugar
- b. 3 pounds of glucose or white syrup
- c. 4 cups of water
d. One-half teaspoon of cream of tartar

Dissolve sugar in water by stirring and boiling the mixture until the temperature of the syrup is at 242 degrees F. Let it cool to 180 degrees F and beat thick. Pour into molds and allow to harden.

Feeding Dry Sugar. This is the simplest, cheapest, and probably least effective way to feed bees. Normally, granulated sugar is poured around the hand-hold in the inner cover. Bees will need water to covert dry sugar to simple syrup. Occasionally, some bees will laboriously remove the sugar and toss it out front, but most hive will use it reasonably well. This procedure is frequently used during hard cold weather, but will also work very well during late fall to early spring.

The Messy Granulated Corn Syrup Method. Corn syrup granulates rather easily. I have known beekeepers who will take (literally) handfuls of granulated corn syrup and spread it on the top bars of the brood nest. Messy that it is, it is also fast, simple, and near the bees. It work alright if you can stand the sticky hands.

**What kinds of Sugar To Use and Not To Use**

Occasionally, I have heard of some unusual “free” sugar sources. Contaminated soft drink syrup, out-of-date pre-sweetened Jell-O products, and by-products from chewing gum manufacture. If something sounds too good to be true, it probably is. Any sugar product that has a lot of indigestible by-products will cause the bees harm during winter months (including bulk powdered sugar which has small amounts of corn starch in it).

High fructose corn syrup is questionable now. Before concern developed, vast amounts were fed to bee colonies around the world.

**Feeding Bees in Cool Weather**

Feeding bees in cool weather is never a good plan, but sometimes it can’t be helped. Select a feeder that can be filled without undue disruption to the colony or the beekeeper. Select a feeder that gets the feed as closely to the bees as possible in a form that is as ready to use as possible. Feeding bees in hard winter is nearly impossible. If you must feed wintering bees, combs of capped honey can’t be beaten, but are not normally available. I’d go with the dry sugar on the inner cover, but you chances for getting a strong colony coming out of winter are not good. Do the best you can to feed them, but try not to get caught in this same situation next fall.

Review the procedure for feeding during winter using granulated sugar, newspaper and an empty hive body. This is a fairly common procedure in the Midwest.