

**Complete Beekeeping Short Course**

**Part 8:**

**Second Year Bee Colony Management**



**late winter & early spring**

- a critical time for bee colonies!
- the queen has begun to lay eggs
- temperatures often allow flying
- increased activity & brood requires food
- no flowers yet!
- cold snap may chill the brood
- colony may need emergency food



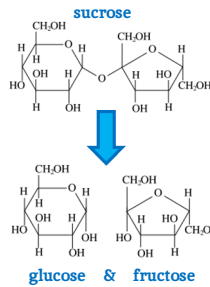
**emergency feeding**

- feed syrup inside the hive during winter
- candy boards
- dry sugar



**feed your bees plain white sugar**

- bees add an enzyme that converts nectar (sucrose) into honey (glucose & fructose)

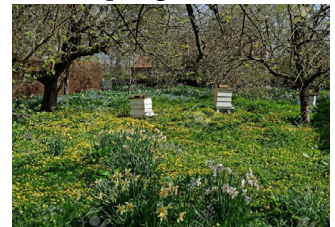


**not what to feed your bees !!!**



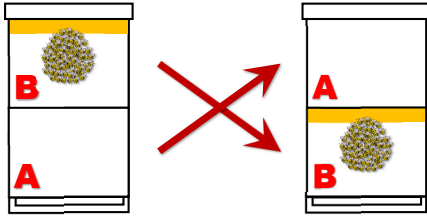
**a new year with the bees**

- overwintered colonies have a big advantage over hives started new in the spring
- by the time your nucs or packages arrive, overwintered colonies may be twice as strong because they have had over a month of spring pollen to eat and produce brood



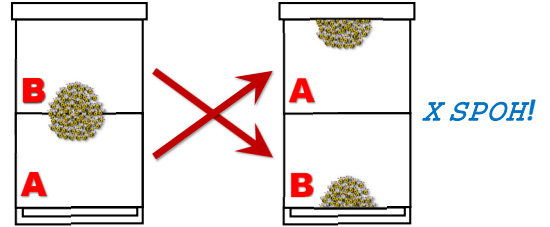
**a new year with the bees**

- **spring reversal:**
  - restores the bee brood to bottom
  - empty space above the brood encourages honey storage



**a new year with the bees**

- do not reverse colonies if the cluster or brood nest is partly in both boxes



**spring build-up**



**spring build-up**

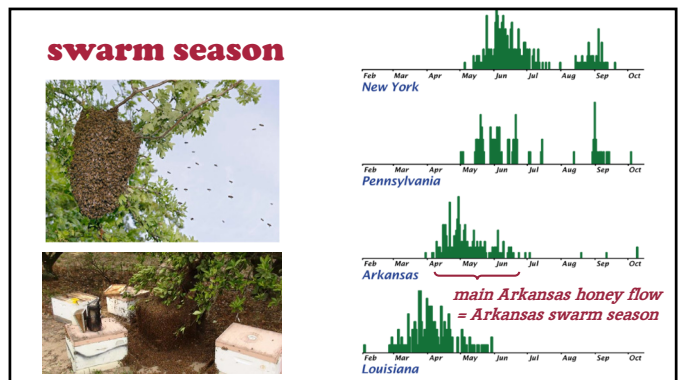
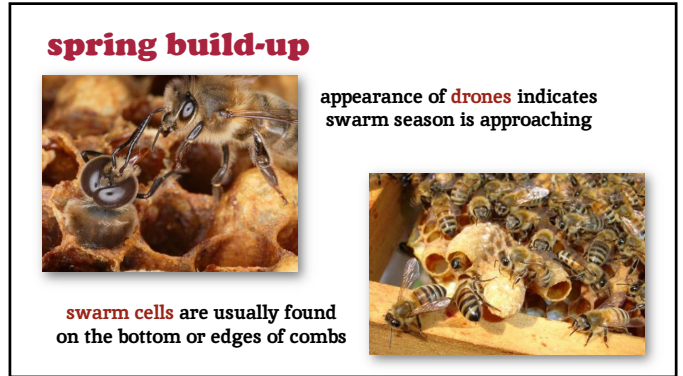
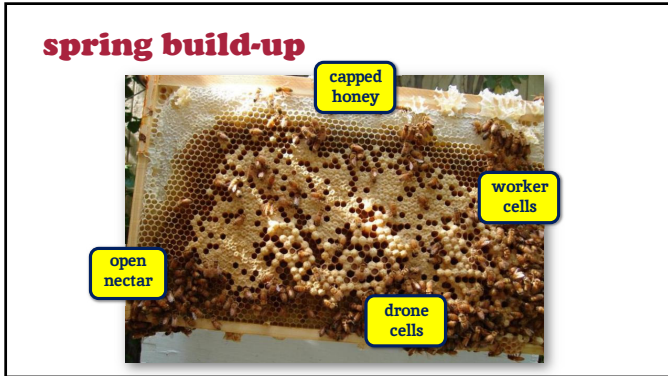


**spring build-up**



**spring build-up**







**swarm season**



**swarm season**



**swarm season**

- **swarm prevention tips**
  - ensure plenty of extra space during build-up
    - spring reversal of hive bodies
    - add another super on top
    - break up the brood area by placing empty comb between each frame with brood
  - remove queen cells
    - they may be rebuilt quickly
    - be sure there is a healthy laying queen first
    - use them to re-queen another hive, or make a split
      - cut out the cell carefully
      - use the whole frame

**swarm season**

- **swarm prevention tips**
  - split the hive – an artificial swarm
    - move frame with queen to center of new hive
    - give her 2 frames of food (honey & pollen)
    - move another frame of open brood & bees
    - move a frame or two of capped brood
    - fill in spaces with frames of comb or foundation
    - brush/shake in extra bees from open brood combs
      - many will fly home
      - old hive will raise a new queen
        - be sure to leave them some young brood/eggs
        - capped brood will emerge soon to repopulate
  - create splits early in the season (after adult drones seen)
    - can prevent swarming



**the honey flow**

- a short time when most of the colony's surplus honey will be gathered for next winter
  - takes 21 days for a worker bee to become an adult
  - takes 24 days for an adult worker to begin foraging
- to ensure a strong foraging force: brood production should be strong **45 days before the major honey flow begins in your area**



# Feeding Honey Bee Colonies

**There is no better food for honey bees than their own honey. However, sometimes it becomes necessary for beekeepers to supplement their colonies' food supplies.**

**Establishing new colonies:** When we establish a new colony, those bees have the tremendous job of drawing out new combs from foundation. Honey bees must consume the equivalent sugar in about 1 pound of honey in order to produce just 2 ounces of beeswax. Each colony must construct some comb before their queen can begin to lay eggs, and before they can begin to store pollen and nectar. In the spring we feed bees 1:1 syrup (1 part sugar to 1 part water). This thinner mixture is considered a *stimulating syrup*. It simulates a nectar flow, and because it has more water than the thicker *fall syrup*, it encourages the bees to draw out more comb in order to have room to store all the food coming into the hive.

**Summer dearth:** In heavily agricultural parts of the state, irrigated cotton and soybeans may provide a continuous nectar supply all summer. Urban colonies may be surrounded by plenty of well-watered gardens and landscape plants. Colonies in other rural areas may need a little help. When hot dry conditions prevail for extended periods, a colony can consume more honey than it produces. Particularly with new or weak colonies, the beekeeper may need to feed them to ensure that they can make it through the summer. Colonies also need a consistent supply of fresh water during this time.

**Fall prep:** The fall honey flow is extremely variable in Arkansas, and should not be relied upon to fully replenish the bees' stores for winter, especially if the summer was extremely hot and dry. Some years bring a fall with moderate temperatures and sufficient rains to keep plants in bloom for a while. Different regions of the state vary greatly. As soon as the last of a beekeeper's surplus honey has been harvested, hives should be consolidated to the overwintering volume. Place the queen and all brood frames, plus any frames containing large quantities of pollen, into the lowest hive body. All frames containing honey should be placed above. Put capped frames of honey in the outside positions of the upper box, with empty frames in the center. Feed as needed to encourage bees to fill in all upper frames, and allow bees to back-fill empty cells in the lower box as the brood nest shrinks for winter. Fall syrup is mixed 2:1 (2 parts sugar to 1 part water). This syrup is made thicker so that the bees will be able to store it more efficiently without having to remove excessive moisture before capping it.

**Emergency winter feeding:** Gently tilt the hive back on its bottom board periodically during the winter. The relative weight and center of gravity of the hive should give the beekeeper a fair idea of how much honey remains. If a hive seems light, emergency feeding is probably in order. Emergency syrup can be fed using any type of feeder, but internal feeders are recommended if daily high temperatures remain below 55°F. Honey bees will not be able to efficiently take syrup from an entrance feeder during cold conditions. Granulated sugar can be fed to bees if syrup is not available. Place sugar directly on top of inner cover, or on a sheet of newspaper placed on the top bars, with an empty super around to provide space. Sugar can be fed in division board feeders or hive top feeders. *Candy boards* can also be used.

**Medicating hives:** If hives require treatment for Nosema disease or other conditions, mix the medication with syrup according to the product label and feed it to the bees as appropriate. Fall medications are stored in the combs and consumed by the bees throughout winter. Spring treatments can also be fed to bees if symptoms of disease are seen. Feed treatments to colonies early, so all medications will be consumed at least 4 weeks prior to placing the first honey super.

**Never** feed your bees honey purchased from any unknown sources. Many commercial brands of honey (particularly from overseas sources) contain spores of American Foulbrood. These spores are harmless to humans, but can induce lethal and contagious infections if fed to honey bee colonies.

**Never** feed brown sugar, molasses or artificial sweeteners (aspartame, saccharine, etc.) to honey bee colonies. Unrefined sugar contains excess plant material that cannot be digested by honey bees. Bees that are confined in the hive for extended periods (due to excess cold or wet weather) must store bodily wastes until conditions are right for cleansing flights. Bees that are fed brown sugar, for instance, will have substantially more waste, and exhibit symptoms of dysentery in the hive, which may be confused with Nosema disease. If you must feed your bees sugar syrup, *use only refined sugar*.

**Should you feed them?** If you aren't sure if you need to feed your bees or not, err on the side of caution. If the bees don't need it, they won't take it. Especially with granulated sugar, they may even toss it out of the hive if they don't want it. But a little wasted sugar is preferable to a starving colony. ***Do not feed anything to bees while honey supers are on the hive.***

## How To Mix Sugar Syrup:

To make sugar syrup, first bring the water to a gentle boil. Reduce heat to a simmer, and then add the sugar. Stir until all sugar is completely dissolved, otherwise it may granulate in the feeder or in the combs. If any additives or medications will be mixed with syrup, wait until it has cooled to room temperature before mixing. Never feed hot syrup to bees.

**Additives:** Beekeepers often add a teaspoon of white vinegar, apple cider vinegar, or lemon juice per gallon of syrup to reduce the incidence of mold if the bees don't consume it all quickly. Thoroughly washing feeders between uses also cuts down on mold. Mixtures of emulsified essential oils (Honey B Healthy®, Essential Bee®, HiveAlive®, etc.) are "feeding stimulants" and may be added to syrup to encourage bees to consume it more quickly, but are not labeled as medications. Fumagillin (Fumidil-B®) is an antibiotic used to treat Nosema disease in honey bees. Mix it according to label instructions.

**Note:** Mixing sugar syrup is often directed to be done by weight, rather than volume. However, if you don't have an accurate kitchen scale, measuring by volume will generally be close enough for this purpose. You can add a little more water if you want to be precise (but for the purpose of feeding bees, it's not that important):

1 cup of white sugar = 8.82 oz.

1 cup of water = 8 oz, 1 tsp water = 0.167 oz.

1 cup + 5 tsp. water = 8.835 lb water

**Candy Boards:** A candy board is a block of hard sugar candy that is given to the bees to supplement their winter feed. The humidity that builds up inside an overwintering hive will usually soften the surface of the sugar enough for honey bees to eat. Candy boards were traditionally made by pouring the melted sugar into a wooden tray about the size of an inner cover, which fits on top of a Langstroth hive. If the bees run short of honey during the winter, they are usually at the top of the hive, and so will be in contact with the candy.

Some beekeepers will add pollen (or pollen substitute) to the mixture. Others will place a protein patty in the mold before the sugar solution is poured over it. This way, after the bees have consumed most of the candy, they expose the protein and begin to feed on it just as the brood cycle begins in the spring. Essential oil mixtures may be added to the candy to attract bees to feed on it. Additives should be thoroughly stirred into the candy mixture as it begins to cool down.

Candy can be made in smaller molds, such as pie pans, and stored in large discs or blocks. These individual blocks of candy can be placed onto the top bars of hives that need a little extra food. A spacer or shim may be needed to provide a little extra space in the hive for the candy. Even though this may violate the bee space, bees will not build burr comb in this empty space during the winter.

**Cooking Candy:** Boil 1 pint of water in a large pot. Add 5 pounds sugar (11 ¼ cups). *Using a candy thermometer*, heat the mixture to 240°F. At this point the candy mixture will foam up and nearly double in volume. Use a long spoon and a deep pot to allow for the sugar to expand! Stir the solution continuously to prevent caramelization. The candy mixture will become cloudy, but then clear as it reaches 240°F. Immediately remove the candy from heat and allow to cool to around 180-200°F, stirring continuously. At this temperature, the mixture is still runny, but *it will set up quickly!* Pour the mixture into the candy mold before it solidifies. This recipe will make enough candy for one mold that is 16 1/4" x 19 7/8" x 3/4" deep (a size that fits neatly on top of a Langstroth hive).

***Be extremely careful when cooking candy! Boiling sugar is more dangerous than boiling water, as it will not run off of your skin if you spill or splash it — it sticks to you and continues to burn!***

### No-cook Candy Method:

- 5 pounds sugar
- 5 ounces cold water
- 1 tablespoon white vinegar or apple cider vinegar

Measure sugar into a very large pot. Add water and vinegar a little at a time, mixing well. When thoroughly mixed, it should have the consistency of wet sand. Other feeding stimulants (essential oils) can be added to this mixture in place of vinegar. Pack sugar tightly into candy board mold and allow to dry until firm (1-3 days, depending on the temperature). Candy should not fall out of mold when inverted. Place the candy board in the top of the hive, sugar side down.