Swarming Reviewed

Tony Jadczak, former Maine State Apiarist

Swarming is the natural reproductive behavior of colonies. Honey bees are unable to reproduce via individual queens, as is the case with solitary bees, bumble bees and wasps. Instead, reproduction occurs on a colony basis where one-half or more of the population leaves with the queen in search of a new nest site. In Maine, the swarming season usually begins after the apple and dandelion bloom and continues throughout the locust, berry and early part of the clover flow.

Swarming is usually more intense in years in which the bees are confined due to rain or cool temperatures during the late spring/early summer nectar flows and in years with intense nectar flows and insufficient supering. Several factors are thought to contribute to swarming. The most common trigger to swarming behavior is presumed to be congestion within the brood nest where the amount of brood, pollen, nectar and honey stores restrict the queen's ability to lay eggs. Hives in this condition are often called honey bound or plugged out. When this situation occurs, there are a disproportionate number of nurse bees and bees of wax producing age without a job. Compounding the matter, the foragers have no place to store incoming pollen and nectar. Due to a lack of space and work, the colony initiates reproductive (swarming) behavior.

The age of the queen also influences swarming in part due to the reduced secretion of pheromones or queen substances. Pheromones are chemical substances that are secreted by animals that elicit behavioral responses in other members of the same species. The queen substances are primarily secreted from the queen's mandibular gland and abdomen and are circulated among the workers via food exchange or as volatiles. Functions of the queen substances include the prevention of ovarian development in workers and inhibition of queen rearing. It is thought that when the titer of these chemicals are reduced due to distribution and sharing by a large population of bees or a decreased level of secretion by the queen, preparations for swarming or supersedure will begin.

Entire books and hundreds of articles have been written on the subject of swarming since the mid- 1800's. Demaree (1884) published an effective

method of swarm prevention that is still used by some beekeepers. This method essentially involves separating the queen from most of her brood by placing her in a bottom brood chamber with a frame or two of capped brood and drawn comb. One or more empty supers are placed above the lower box (with the queen and an excluder) and the remaining brood is placed above the supers.

The Demaree method is cumbersome and there are slight variations of the theme regarding the use of additional excluders and hive body reversals. However, the system is effective in swarm prevention and maximizing honey yields. Every beekeeper should try this method at least once during their beekeeping experience.

Another method of swarm prevention promoted around the same time period was know as the Padgen system later modified by Heddon. This method is somewhat like splitting a hive where the queen and frame of capped brood are removed from a hive that is preparing to swarm and placed into an empty hive body with drawn comb. The parent hive is picked up and moved to another site in the apiary (while the bees are flying) and the hive body with queen and frame of brood placed at the parent hive's location. The parent hive either raises a new queen or one is introduced.

Heddon modified the system by placing the hive body with queen and frame of brood on the parent's location and moving the parent hive slightly, turned at a right angle to the original location. After two days the parent is moved to the opposite side of the hive body with queen, facing 180 degrees from the previous placement. After two more days the parent hive is moved to another location within the apiary. The Padgen, Heddon and Demaree methods involve work!

L. E. Snelgrove wrote an entire book on the subject of swarming and a mechanical means of swarm prevention. He is credited with the invention of the Snelgrove Board, which is a double screen with four paired entrances, one above, and one below the double screen. This device is still sold by some bee supply companies. Swarm prevention is accomplished by placing the queen and a capped frame of brood into a box full of empty honeycombs on the bottom board. Supers are added to the colony, then the Snelgrove board and the boxes containing brood above the board. The

upper top entrance (facing the front of the hive) of the board is opened. After one week, queen cells are cut in the boxes above the board and the front upper entrance is closed. An upper entrance is then opened at the rear of the hive and the lower front entrance of the board opened. Bees fly out the back and enter the lower unit in front. The Snelgrove board is a great way to make splits before the hive actually prepares to swarm and/or means to rear a new queen. When making a split or nuc with this system, place three frames of brood (2 capped, 1 eggs/larvae) in the box above the board and situate a frame of honey next to the capped brood and a frame of pollen and honey next to the open brood. Open the upper rear slot. Unless one has plenty of time and a strong back the swarm prevention methods just cited are daunting.
However, the Snelgrove board or double-screened board has a useful purpose in beekeeping but not necessarily as a swarm control method per se. All of these historic methods essentially involve splitting the strong hive that is preparing to swarm while trying to maximize the bee population in order to produce a honey crop. If one follows basic beekeeping management practices, swarming can be minimized in most situations. Keep in mind that the day honey bees loose their instinct to swarm, will likely result in their demise.

Following are some basic strategies to minimize swarming in wintered hives and newly established packages or nucs when environmental factors favor premature swarming:

For wintered colonies, practice normal spring management by reversing hive bodies (if necessary) at fruit/dandelion bloom. Do not split the brood by reversing if the pattern occupies the upper portion of the lower box and the lower portion of the upper box. If the bees are situated only in the upper box then reversal is in order. Do not reverse colonies too early in the spring because the bees will be inclined to move upward where there is heat. When the dandelion flow starts, super with drawn comb so the bees have somewhere to move the incoming nectar at night to clear the brood chambers where the incoming nectar was stored during the day. The drawn supers mitigate plugging out the brood chambers. Strong, second year colonies and especially those with older queens are predisposed to swarm. It is best to manage these colonies and hives that are making preparations to swarm with more drastic measures such as making nucs or splits. The

splits can be made in the usual fashion or by way of a double screen.

Avoid splitting the parent colony to less than 6-8 frames of brood at dandelion because honey production will be reduced. When making nucs or splitting hives, replace the frames of bees and brood with foundation. The bottom brood chamber should have honey in frames #1 and 10, pollen/ brood in #2 and 9 and brood in the center. Any remaining brood should be centered in the upper hive body with 2 frames of foundation or drawn comb on either side of the brood and honey or comb on the walls. The addition of foundation serves the purpose of keeping the wax builders busy and culling old brood comb. When the bees get going on the foundation, super in anticipation of the honey flow before the bees again plug out the brood nest.

Swarming episodes among packages and nucs in past years have occurred for two reasons that involved environmental factors. These included periods of rain with sporadic opportunity for foraging and cool nights. Therefore, the bees were forced to cluster on the brood in cool weather and were slow to draw foundation into comb. When the weather finally settled the bees had no place to store the incoming nectar, resulting in a congested, plugged out brood nest. One cure would have been the introduction of drawn comb but that is not an option for new colonies managed by new beekeepers.

Elongation of the brood nest would have enticed the bees to draw foundation in the second hive body thereby reducing congestion and adding comb. When a nuc or package has occupied most of the lower hive body, place 2 or 3 frames of brood in the upper hive body with brood directly below. Place the frames of foundation in the #2 and #9 positions of the lower hive body and drawn comb on the walls. The procedure, especially in conjunction with feeding syrup gets the bees to work foundation in the upper hive body.

In a slightly different scenario a cool, rather late spring was followed by an intense nectar flow in June. Again, the bees had not drawn the foundation in the upper hive body and had nowhere to store the tremendous incoming nectar flow. Again, congestion and a plugged out situation even though there was room to expand. Each year is slightly different, but young

queens, timely management and drawn comb are what it takes to maximize one's honey crop and keep the bees out of the trees.