MAAREC
Mid-Atlantic Apicultural Research & Extension Consortium
Delaware, Maryland, New Jersey, Pennsylvania, West Virginia and the USDA cooperating

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FALL MANAGEMENT

Fall management is primarily concerned with preparing honey bee colonies for winter. Successful wintering depends largely upon the condition of the colonies in the fall. Prior to the spread of parasitic mites, about 10 percent of colonies were normally lost each year because of poor management, starvation, weak colonies, or other unexplained reasons. After tracheal and Varroa mites became widespread, typical winter losses increased to 20 to 70 percent. However, winter losses can be reduced if colonies are properly managed and treated for mites and diseases.

Typical fall management consists of checking colonies for the proper arrangement of hive equipment, proper hive ventilation, adequate food stores, and adequate colony strength once or twice during the fall. Treatments for Varroa mites and tracheal mites should also be applied in the late summer or early fall and then removed from colonies prior to winter. A fall Fumidil-B® treatment for Nosema disease is also recommended.

HIVE EQUIPMENT PREPARATION FOR WINTER

All surplus honey and any honey supers that are empty or only partly-filled should be removed from colonies at the end of the fall honey flow or after a killing frost. All queen excluders should be removed at this time to prevent the queen from becoming trapped below the excluder when the cluster moves upward in the colony during winter. If queen excluders were not used, the brood should be consolidated in the bottom of the hive as much as is possible, and any extra equipment should be removed. Colonies should never be wintered on foundation or on partially-drawn frames; these do not allow proper cluster formation and will cause bees to freeze.

Most colonies in the Mid-Atlantic region are wintered in their summer locations, with reduced entrances (see below), and no wrapping or other insulation. The majority of colonies usually survive the winter. Winter survival can be increased slightly (perhaps 5%) by wrapping hives with tar paper. Wrapping colonies would only be profitable for the hobbyist with a few colonies, due to the costs of time and materials involved versus the small gain in survival.

MOUSE PROTECTION

Mice are a cold weather pest of bee hives. During fall and winter when bees are clustered, field mice and deer mice may commonly enter hives to take advantage of a warm (heated by the bees), dry nesting place. They usually do not disturb the bee cluster, which is not broken during cold periods. However, mice will chew large holes in 4 to 5 adjacent combs to gain room to construct their nests. Hardware cloth (1/2" mesh) or an entrance cleat (with a vertical opening of less than 1/2") placed in the main hive entrance in early fall will help to keep mice out of hives.

HIVE VENTILATION

Many beekeepers place an entrance cleat (or entrance reducer) in the main hive entrance during early October to restrict the entrance to about 3/8-inch high by 4 inches across to conserve the heat generated in the colony. The cleat should be placed with the opening turned up rather than down, to reduce the chances of the entrance becoming clogged with dead bees and debris.

Winter survival can be increased by providing colonies with both upper and lower entrances. A top entrance is particularly important for providing additional ventilation which facilitates removal of excess moisture from the hive. Top entrances help to keep the hive dry, the bees healthier and the combs free from mold, while protecting the bees from suffocating if the lower entrance becomes clogged with dead bees or snow. The top entrance may be a 5/8-inch hole bored through the top hive body at one side of the hand hold, or a small stick inserted under the front edge of the inner cover. Top and bottom entrances are both placed in the front of the hive so as not to create a steady draft. In addition, the rear of the hive should be elevated slightly higher than the front to prevent rain and condensation from pooling on the back of the bottom board.

WINTER STORES

Colonies need sufficient room for cluster formation and winter honey stores. Normally, 2 to 3 hive bodies (or the equivalent in supers) are required. In the Mid-Atlanticregion, late fall stores should consist of at least 60 pounds of honey for winter food. The broodnest area should also contain several frames of stored pollen, which is essential for early spring broodrearing and build-up.

The quality of winter food is of considerable importance. Thin or unripe honey gathered from wild asters in late fall also cause dysentery if the bees are unable to properly ripen the nectar due to cold weather. Aster honey, a common regional fall honey source, also crystallizes very rapidly, which can prevent the bees from moving it into the clustering space or can cause them to starve if they are confined without water-gathering days in the early spring (bees use water to reliquify crystallized honey). Feeding syrup in the fall can help to improve or correct this situation.

The distribution of food in the hive is also very important. Most of the honey should be located above the cluster since the bees move upward during the winter as they consume their stores. Even if a colony is starving, the bees will not move down to reach honey that is located below the cluster. The uppermost hive body or super should contain a minimum of 40 to 45 pounds of honey, and there should be 2 or 3 partially-full frames in the center which contain a small bit of empty comb. The small portion of empty comb is essential for proper cluster formation and heat conserva-

tion; bees cannot cluster on capped honey. If the uppermost hive body is totally honey-bound, then one or two frames in the center should be exchanged with partially-filled ones from the lower hive body. Two deep hive bodies (or the equivalent in supers), bees, and sufficient stores for an average winter should weigh about 100-110 pounds.

If stores are not sufficient, concentrated (heavy) sugar syrup should be fed during September and October until the bees have at least the equivalent of 9 full deep frames of honey (in addition to pollen stores). The syrup is prepared by mixing white granulated sugar with hot water at a ratio of 2:1 (2 parts sugar to 1 part water) by volume. If necessary, heat only until all of the sugar is dissolved; do not boil. Allow syrup to cool before giving it to the bees. Some sources recommend adding one teaspoon of cream of tartar per 20 pounds of sugar to help the bees invert the sucrose and reduce the danger of honey crystallization during the winter.

Each gallon of syrup that is fed to bees increases their reserves by about 7 pounds. Syrup is normally fed using either a jar or a ten-pound plastic (friction-top) pail which has 6 to 8 small nail puncture holes in the lid. Fill the jar or pail with syrup and invert it over the hole in the inner cover. Protect the syrup container with an empty super and replace the outer cover. Syrup can also be fed using a Boardman or division board feeder, but these two methods require the bees to break cluster during cold weather to collect syrup. For fall and winter feeding, we recommend using either the pail-on-top feeding method described above, or one of the commercial varieties of top feeders, which do not usually require the bees to break cluster.

NOSEMA TREATMENT

Fall is an ideal time to apply treatment for Nosema disease, a protozoal infection of the bee's gut. Nosema can cause dysentery (bee diarrhea), decreased honey production and increased queen supersedure. Nosema can kill colonies, most often during late winter or early spring. Fall Nosema treatment consists of mixing the appropriate amount (follow package directions) of Fumidil-B® powdered medication into heavy sugar syrup and feeding each colony 2 gallons of medicated syrup during mid-fall. Some beekeepers also apply an early spring Nosema treatment, using light (1:1) sugar syrup.

BEE POPULATIONS

Only strong colonies should be overwintered. Weak colonies (<15 frames covered with bees) should be united with strong colonies or combined with other weak colonies during late summer or early fall to allow the bees time to rearrange their broodnest and stores before winter. You should destroy AFB diseased colonies and colonies that have been exposed to pesticide poisoning (since food stores may be contaminated with pesticides). Weak colonies that manage to survive the winter will build up slowly in the spring and probably remain weak throughout the spring flow.

A large population of young bees that live 5 to 6 months through the winter is vital to successful wintering. Strong colonies with young queens are a must; young queens lay more brood in general, and lay later into the fall and begin laying earlier in the spring than older queens. Extra brood in the fall and early spring is important in helping colonies survive tracheal mite infestations. We recommend that colonies be requeened periodically, preferably every other year. Fall requeening should be done during the golden rod and aster flow in late August or September, so that the colony has time to build-up before winter.

VARROA MITE AND TRACHEAL MITE CONTROL

Parasitic mites have dramatically increased the challenges of wintering colonies successfully. Most colonies in the United States are infested with two parasitic mites: V*arroa jacobsoni*, the Varroa mite, and *Acarapis woodi*, the honey bee tracheal mite. Populations of both mites should be minimized before winter.

Varroa mites peak in late summer and may cause colonies to die between July and November. Varroa treatment should be applied as early in fall as is practical considering fall honey crops, or during a July dearth period if possible. All surplus honey and honey supers must be removed prior to treatment application.

Tracheal mites increase throughout the fall and peak in late winter. They typically kill colonies from February through late April. It is important to reduce tracheal mite levels prior to mid-fall so that the majority of bees which overwinter will have low tracheal mite infestations.

For complete information on controlling honey bee mites see the following MAAREC bulletins:
- Varroa Mites
- Tracheal Mites
- Integrated Pest Management (IPM) For Beekeepers
- Chemicals Approved for Legal Use in Honey Bee Colonies

MAAREC, the Mid-Atlantic Apiculture Research and Extension Consortium, is an official activity of five land grant universities and the U. S. Department of Agriculture. The following are cooperating members:

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Participants in MAAREC also include state beekeeper associations, and State Departments of Agriculture from Delaware, Maryland, New Jersey, Pennsylvania and West Virginia.

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