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Preparing Hives for Winter

There are many opinions on how hives should be prepared for winter in Wisconsin. In this handout we will discuss some of the fundamentals for overwintering and describe some of the configurations people use in this area.

The Fundamentals

Preparation for winter really starts in the summer. Going into fall there are four things that need to be in place:

1) **A young, productive queen -** Overwintering colonies must be "queenright," preferably with young, productive queens. The term queenright is defined as: a colony of bees with a properly functioning queen. Young queens lay eggs later in fall and begin earlier in spring than do older queens. Additionally, the queen's mere presence increases worker survival.

2) **Adequate food reserves and distribution of the reserves in the hive -** Determining whether the bees have enough food is critical to their survival through the winter. In Wisconsin it is recommended that 60 to 90 pounds of honey or syrup be in the hive. If the colonies are "light" heavy syrup (2:1) can be fed until the temperatures drop to 50 degrees. Bees don't readily take cold syrup. Even with daytime temperatures rising above 50 degrees it is often the case that the syrup will not warm up sufficiently to be palatable to the bees. If it is too late to feed syrup, or you are concerned that the bees may still be short on stores you can put "emergency" feed in place. Emergency feed can be granulated sugar, winter patties, or candy boards.

   The arrangement of food in the hive is almost as important as the quantity. The frames of honey should generally be configured so that there are 7-8 full frames of honey in the top brood box. The lower brood box should have frames of honey placed to the outside so that the center 3 or 4 frames are open which will allow the bees to cluster.

3) **Relatively healthy bees (low mite levels, low nosema levels) -** Mites weaken the bee's immune system and provide a vector for transmission of many diseases. Test your mite levels throughout the summer and fall and implement treatment strategies throughout the year that fit your beekeeping philosophy

4) **Ventilation -** Provide adequate ventilation. During winter, the temperature at the center of the cluster is maintained at 90 to 93 degrees F. Without adequate ventilation, the warm air from the cluster rises, hits the cold inner cover, and condensation drips down onto the bees as ice-cold water. To guard against this, you can prop the outer cover open with a small stick, or cut a notch in the rim of

the inner cover to allow moist air to escape. Note, the bees do not heat the interior of the hive. They only heat the cluster.

Weather and Intruder Protection

Finally, when your colonies are well fed, well configured, ventilated, healthy, and queenright you can turn to weather protection. Year-round, colonies should face south to southeast to maximize sun exposure; they should be on high ground to limit dampness, and they should be shielded from direct wind. Beyond that there are various ideas on what to do for winter.

The Minimalist Approach - Reduce colony entrances using an entrance reducer to minimize drafts and to exclude mice from the hive. Mice can also be excluded by using a mouse guard in place of the entrance reducer.

Minnesota Light Pack Approach – In addition to keeping mice out, some people will wrap their hives with a tar paper wrap or a cardboard wrap. The concept is that the radiant heating of the hive interior by the sun will give the cluster a greater opportunity to break and move to stored honey. Bees occasionally starve in the hive even though they are right next to honey simply because the cluster couldn't move laterally to get to those frames. Vertical movement generally isn't a problem. Some will also put a moisture wicking board on the hive on top of the inner cover in this configuration. There is debate about increases in frost and vapor condensation on the inside walls of the hives with light wraps.

Survivalist Approach – Insulated wraps, insulated/ventilating covers, and other products are typically part of this approach. Insulating wraps can help in three ways 1) the black color of most insulating wraps provide some radiant heating of the interior of the hive, but not to the extent that a tar paper or cardboard wrap does since the insulating material tends to buffer the heating effect 2) the impermeable nature of the wraps provides a barrier to wind and drafts, similar to tar paper and cardboard wraps 3) the wraps help mitigate temperature swings, such as those seen in early spring and helps move the condensation temperature zone outward. 4) Shifting the location of the condensation zone outward. Condensation tends to occur in noticeable quantities and cause problems at surfaces where there is a sudden change of permeability, which causes an increase in local relative humidity sufficient to create dew point conditions. Additionally, if the condensation occurs on a hygroscopic surface (such as the wooden parts of a hive), the moisture is absorbed, lowering the vapor pressure and increasing the vapor pressure gradient, driving more moisture toward that surface. This becomes, effectively, a water vapor "pump" which continues to drive moisture toward the condensing surface.