

CLEANING HORN-FACED BEE TUBES EACH WINTER WILL PREVENT MITE BUILD UP

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Osmia cornifrons, horn-faced bee (HFB), is a pollinator that is native to Japan where they pollinate over 80% of Japanese apples. Horn-faced bees are solitary and because they are not part of a social colony like honeybees, all females are capable of reproducing and each female must forage for its own offspring. This intensive foraging behavior is necessary to supply provisions for their larvae, and this foraging activity makes them desirable as pollinators in orchard settings. HFB adults are active for 6-8 weeks, April through June, which are the peak pollinating months. These bees are easy to manage, reproduce without difficulty, and do not sting. They require minimal management because after pollination, the offspring develop in their nesting boxes and adults are not seen outside the colony until the following spring. There is only one generation of HFB per season.

We have been experimenting with HFB in cherry orchards in northwest Michigan and have had good success with these alternative pollinators. Unfortunately, many of our HFB colonies have developed a mite problem, likely caused by the reuse of tubes for housing developing HFB larvae. The genus of mites that is causing issues on HFB is *Chaetodactylus*, and we are still in the process of identifying the mites to species. Because both the mites and HFB reside inside the tubes, the process to clean the HFB is somewhat time consuming, but can be done now during the slower winter months. From our preliminary work at the Northwest Station, we have found that regular cleaning will reduce mite populations and help with HFB regeneration and health of the bee colony.

The most effective cleaning protocol is as follows:

Slice open the tubes with the capped ends first. This capped end is an indicator that the tube is relatively filled, or at least partially filled, as they fill the tubes from inside out. Depending on time, tubes without capped ends can be cleaned, but in the interest of time, we started with the capped tubes.

Tubes should be cut along the length of the tube, and the blade should not cut too deeply into the tube so as to not cut into the HFB cocoons inside. Essentially, cut just the cardboard tube to the depth only to open the tube -- not to slice it in half! The cutting is best performed with a sharp, thin razorblade.

Once tubes are opened (and we had to work at physically opening them because they do not just fall open), remove healthy cocoons. Healthy cocoons are small (less than 1/4"), brownish gray, and have small pellets on them. Although they do not look like much, these cocoons house live adult HFB. After cocoons are removed, leave behind any masses of yellow pollen mixed with mites. The mites use the pollen as a food source and do not directly parasitize HFB -- they compete with the bee larvae for the pollen while the larvae are developing. If there is a pile or mess of pollen, the larva did not survive as the mites consumed the pollen and left behind the pollen remains. Hence, messy pollen is a bad sign and brown cocoons are a good sign. If you are working for a long time, store loose cocoons in the refrigerator until ready to rinse.

After all cocoons (or as many are to be completed within a day) are removed from the tubes, place the cocoons into a colander and rinse well with cool water to remove any frass, pollen or mites. We used the spray nozzle on the sink and rinsed them and gently moved them around for 30 seconds. After rinsing, dip cocoons into a 5% bleach/water solution for approximately 30 seconds. All the rinsing and dipping can be performed with the cocoons in a colander.

After the bleach solution, rinse again with cool water and lay in a single layer on top of paper towel to dry completely. Once dry, HFB cocoons are ready for storage until spring. They can be stored in plastic deli containers with holes punched into the lid for air circulation. It would be wise to check periodically for moisture – no mold should be allowed to form.

In the spring, place 100 to 150 cocoons inside a small, dark emergence box with a 5/16" hole cut into one side. Attach or tape the emergence box inside a bucket filled with clean, empty tubes. Place the buckets into the orchard at the appropriate timing to coordinate with bloom.