



## **Certified Best Practices for Sustainably Sourcing and Managing Orchard Bees**

### **Pest Management**

#### **Overview**

After the larva cocoons, or most commonly, after the adult forms within the cocoon just prior to or during the first few months of wintering, the nests can be cleaned of pests. This aids in keeping the population clean. If done after wintering temperatures have started, keep the cocoons cool during this process. Below are images of common pests and suggestions on how to control them. If not controlled, they generally overwhelm the host population within about 3 years due to the artificial concentration.

#### **General Guidelines**

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One good early approach is removal of the nesting materials from the environment shortly after bloom ends (late spring to early summer), prior to pest infestation, predation, human intervention, or vandalism. Once nests are under your control, check periodically for small wasp parasites flitting about the nests, as they can repeatedly parasitize your population by having multiple generations in one summer. Also, soon after collecting the nests, if you consistently have problems with mites and access to a controlled temperature environment, you can also follow the suggestions in Appendix 2 for mite control. After the larva cocoons, or most commonly, after the adult forms in the cocoon just prior to or during the first few months of wintering, the nests can be dissected to clean out the cells with pests and other miscellaneous pests that eat debris or pollen. This is the best method in keeping the population clean. If nest cleaning is performed after wintering temperatures have started, it is best to keep the cocoons cool during this process (i.e., don't bring them into a warm facility for your comfort).

#### **Examples of Pests**

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##### **Predatory beetles**

**The checkered flower beetle** (*Trichodes ornatus*). The beetle larvae have a

somewhat worm-like appearance and a red color and can penetrate partitions, consuming multiple individuals. Remove them from the nest and kill them. Either freezing or putting in a container with alcohol is an efficient way.



*Trichodes ornatus* adult



*Trichodes ornatus* larva

**Blister beetles** (*Tricrania stansburyi*). Only one blister beetle develops in one bee cell. Again, remove and dispose of them.



*Tricrania* adult



*Tricrania* wintering as adults in pupal skin

**Flour beetles** (*Tribolium spp.*). Cleaning nesting material with Clorox or heat works well.



Flour beetle adult

**Carpet beetles** (Dermestidae). Again, clean nest blocks with Clorox or heat.



Carpet beetle larva

### Parasitic wasps

***Leucospis* spp.** (Leucospidae). These can be separated after the host bees have become adults in the fall since *Leucospis* remain as prepupae. Remove and dispose of them.



*Leucospis* adult



Wintering *Leucospis* prepupa inside host cocoon

***Monodontomerus* spp.** (Torymidae). Infested cells can be identified by a large number of very small larvae in a cocoon, rather than the typical single large larva of the blue orchard bee. Remove and destroy.



*Monodontomerus* adult



*Monodontomerus* larvae in host

Cocoons parasitized by *Monodontomerus* are not easily detected, but the wasps will emerge after the bees in the spring, so shortly after the bees have fully emerged. Remove and destroy any remaining cocoons.

### Cleptoparasites

***Chrysura* spp.** (Chrysididae). A cleptoparasitic wasp. Remove any of their cocoons and dispose of them.

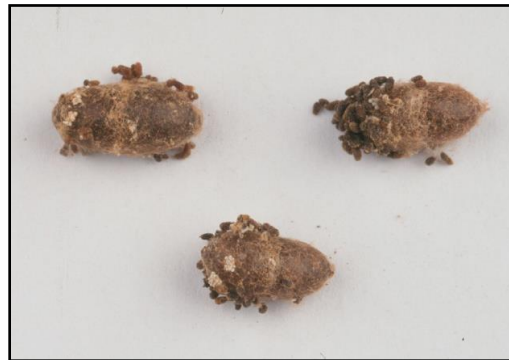


*Chrysura* adult

***Sapyga* spp.** (Sapygidae). A common cleptoparasitic wasp of the blue orchard bee. Remove and dispose of cocoons.



*Sapyga* adult



*Sapyga* cocoons

***Stelis* spp.** (Megachilidae). A cleptoparasitic bee. Larval fecal pellets are long and curly, allowing one to identify it in the nest. Remove and dispose of cocoons.



*Stelis* adult



*Stelis* cocoons

**Houdini fly** (*Cacoxenus indegator*). Newly introduced to the US from Europe. It is important to remove and destroy these larvae when cleaning in the fall. If you see the adults at nest entrances when bees are flying, you can swat them or use an aspirator to collect them for some control at propagation sites. Yellow sticky cards have been used with limited success. If you failed to clean them from your nests in the fall, a fallback measure is to cover the nests with emerging bees and flies with a net. Release the bees from the net and squish the flies.



*Cacoxenus* larvae



*Cacoxenus* adult

## Pollen mites

Hairy fingered mites (*Chaetodactylus krombeini*), also known as pollen mites.



*Chaetodactylus* in *O. lignaria* cell

If pollen mites are present, they can be treated with heat and dehydration during the larval stage (see Appendix 2). If mites are discovered after cocooning, they will need to be dealt with during cocoon harvest.

## Chalkbrood fungus

The most common disease, and consequently the one we know most about, is chalkbrood, caused by several species in the fungal genus *Ascosphaera*. Any spores are hazardous, so if any at all have formed, carefully remove the larva (it can be dropped into a jar of bleach) and then sterilize the area. A solution of 1 part water

and 1 part bleach can be sprayed on the work surface and any equipment the cadaver may have contaminated. Other sterilization techniques may work, but whatever you use, it is important to eliminate and not spread this disease in your populations.

This disease can rapidly destroy populations within only a few generations and spread to surrounding populations if not controlled.



Typical chalkbrood with spores



Chalkbrood with only hyphae

### **Rodents and other vertebrates**

If mouse damage is found, you can put out traps. Larger rodents, as well as birds, can be kept out if you have your nests recessed in a box with  $\frac{1}{4}$ " chicken wire in front. Bears tend to like nesting sites, so check with honey bee people to see if they are a problem in the area and if so, see what they do to keep them at bay.



For a more detailed description of pests and mechanism of control as well as more on management, see "[How to Manage the Blue Orchard Bee as an Orchard Pollinator](https://www.ars.usda.gov/ARUserFiles/20800500/Bosch2001.pdf)" by Jordi Bosch and William Kemp.

<https://www.ars.usda.gov/ARUserFiles/20800500/Bosch2001.pdf>

Also:

Kronic, M., Stanisavljevic, L., Pinzauti, M., Felicioli, A. 2005 The accompanying fauna of *Osmia cornuta* and *Osmia rufa* and effective measures of protection. Bull. Insect.58,141-152.

Houdini Fly - A new invasive pest threatens Mason Bees.

[https://www.youtube.com/watch?v=CEmqw1sCX\\_U](https://www.youtube.com/watch?v=CEmqw1sCX_U). Available in internet. 03-02-2020.

Pollinating Orchards Successfully

ORCHARDBEE.ORG