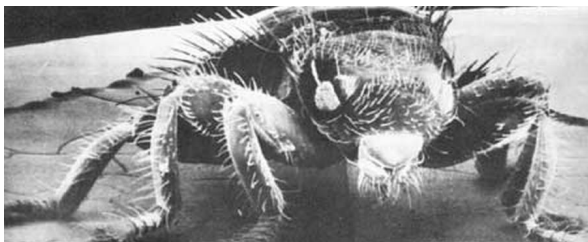


## Bee louse, bee fly, braulid, *Braula coeca* Nitzsch (Insecta: Diptera: Braulidae)<sup>1</sup>

James D. Ellis and C.M. Zettel Nalen<sup>2</sup>

### Introduction

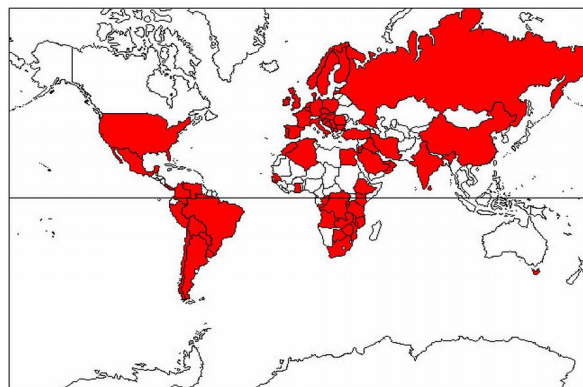
The bee louse, *Braula coeca* Nitzsch, is a wingless fly that lives as a commensalist in western honey bee, *Apis mellifera* Linnaeus, colonies. Biology of the bee louse has been studied irregularly since the 1920s. The fly is presumed to be harmless to its host, though this point is debatable as in some countries bee louse control is recommended. Because no true economic damage can be attributed to the fly, it probably poses a minimal threat to the beekeeping industry.



**Figure 1.** A scanning electron microscope photograph of the anterior of the adult bee louse, *Braula coeca* Nitzsch. Photograph by: W.J. Humphreys, University of Georgia

### Distribution

The bee louse has an extensive global distribution, being documented in Africa, Asia, Europe, Australia (Tasmania), North America, and South America (Smith and Carron 1985). The species probably was brought into the United States on imported honey bee queens, although the exact year is unknown (Philips 1925).



**Figure 2.** The worldwide distribution (red colored areas) of the bee louse, *Braula coeca* Nitzsch. Graphic: Ellis and Munn 2005.

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## Description

Adult bee lice are < 1.5 mm long and covered in spine-like hairs. They do not have the wings or halteres possessed by most flies. Bee lice are reddish-brown in color and regularly are misdiagnosed as varroa mites, *Varroa destructor* Anderson and Trueman, due to their similar appearance. One notable difference useful as a field diagnosis to distinguish between varroa mites (mites) and bee lice (insects) is the presence of six legs on the bee louse, while adult varroa mites have eight legs. Further, the adult bee louse has a rounded appearance while varroa mites are more compressed and oval. Despite these differences, both are very small and difficult to distinguish with the unaided eye.

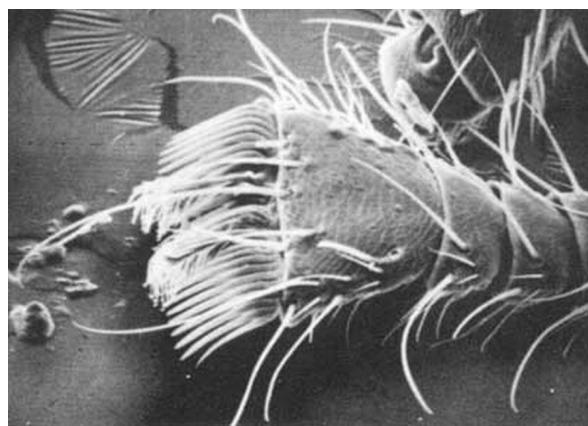


**Figure 3.** Dorsal views of an adult bee louse, *Braula coeca* Nitzsch, (left); and an adult varroa mite, *Varroa destructor* Anderson and Trueman, (right). Varroa mites are more oval in shape, and have eight legs as compared to the bee louse, which has six legs. Photograph by: Bee louse - University of Florida; Varroa mite - Scott Bauer, USDA

**Adults:** The eyes of adult bee lice are located just above the antennae. They appear as pale spots on the surface of the cuticle and are surrounded by pigmented chitinous rings. The terminal joint of a bee louse's 5-segmented tarsus is divided and modified with comb-like teeth, an adaptation that allows the fly to cling to the hairs of honey bees. The thorax is very short, less than half as long as the head, and often is mistaken for an abdominal segment. The scutellum is absent.

**Pupae:** The pupae are white/yellowish and range from 1.4 - 1.7 mm in length and 0.5 - 0.75 mm wide.

**Larvae:** The larvae are maggot-like in appearance, with the posterior end appearing flattened, while the anterior end is pointed. Bee louse



**Figure 4.** A scanning electron microscope photograph of a dorsal view of a tarsus of the bee louse, *Braula coeca* Nitzsch, showing the comb-shaped row of spines, or claw, important in clinging to the branched hairs of the honey bee. Photograph by: W.J. Humphreys, University of Georgia

larvae are very small and difficult to see with the unaided eye. A diagnosis usually is made based on comb damage.

**Eggs:** Bee louse eggs are white, oval shaped, and have two lateral flanges. The flanges are flat and extend parallel to each other toward the long axis of the egg. The eggs range from 0.78 - 0.81 mm in length and 0.28 - 0.33 mm wide excluding the flanges, and average 0.84 x 0.42 mm (l x w) with the flanges.

## Life Cycle and Behavior

Bee louse adults often are found on the heads of honey bee workers, drones, and especially queens. More than 180 bee louse adults have been found on a single queen. While on the head of its host bee, the bee louse will feed on food from the mouth of its host as the host is fed by another bee or is feeding another bee. There is some evidence that bee louse adults can induce regurgitation from bees by stroking the upper edge of a bee's labrum until the bee extends its tongue. The bee louse then feeds on food or other secretions that the bee offers.

Female bee lice can oviposit many places in the hive (empty cells, brood cappings, debris on the floor) but only eggs oviposited on honey cappings will hatch. Egg incubation periods range from 2 to 7.4 days, depending on the season. Upon emergence from their eggs, bee louse larvae construct a tunnel

under the cell cappings. This visible tunnel is the most noticeable hive damage attributed to the bee louse. Although some consider this damage, it is only aesthetic damage and of minor economic importance. Regardless, the intersecting tunnels are a common sign of bee louse infestation. It is believed that bee lice larvae feed on honey and pollen residues encountered while tunneling under the cell cappings.

Larvae of the bee louse undergo three developmental instars. These range from 7.1 to 10.8 days in length. After completing the third instar, the larvae develop into prepupae, a stage that can last from 1 to 2.7 days. During this time, the prepupa has a creamy-white appearance and is enclosed in the larval skin. The life cycle begins again as the adult bee louse emerges.

## **Management**

There is a modicum of control suggestions for the bee louse, largely because it is not considered a major pest. However, many of the synthetic pesticides used against the varroa mite also are presumed effective against the bee louse.

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