



BUG BIZ

Pest Management and Insect Identification Series



Galleria mellonella, Greater Wax Moth (Lepidoptera: Pyralidae)

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Description

The greater wax moth is one of the two primary wax moth species that are considered major pests of western honeybee (*Apis mellifera*). Adult greater wax moths are 1/2 to 4/5 of an inch (12 to 20 mm) in length, with a maximum total wingspan of slightly more than 1 1/2 inch (40 mm). Adults are slender and pale brown to gray in body and wing color, with reddish-brown mottling along the trailing edges of the forewings. Wings are held at an angle over the body (rooflike). Female adults are typically larger than males. In addition, adult males are lighter in color than females and possess distinctively concave margins of their forewings. Adult greater wax moths possess reduced mouthparts and do not consume food or water. Greater wax moth eggs are spherical and tiny, measuring approximately 2/100 of an inch (0.5 mm) in diameter, and are creamy white to pinkish. Larvae are caterpillars that are creamy white in color. Mature caterpillars are gray to dark gray and reach a maximum length of slightly over 1 inch (28 mm). Pupae are 1/2 to 4/5 of an inch (12 to 20 mm) in length and yellowish brown in color. Pupae are usually bare but may be covered with excrement and other debris.

The other primary wax moth species that is less prevalent and destructive is the lesser wax moth (*Achroia grisella*), which is treated in a separate article. Its life history and many of its physical traits are similar to that of the greater wax moth. Mature larvae and adult lesser wax moths are smaller than their greater wax moth counterparts. Other differences include the surface texture of the eggs and head shape. For positive identification, consulting a professional apiculturist or entomology diagnostician may be necessary.

Life Cycle

Once mated, female greater wax moths lay eggs in batches in crevices and cracks of combs. Each female may lay up to 1,800 eggs during her lifetime, with 300 to 600 being the typical range. Total adult lifespan ranges from three



Adult greater wax moth (Pest and Diseases Image Library, Bugwood.org, CC BY-NC 3.0 US).



Comb and frame damage caused by greater wax moth larvae (Juan Campá, MGAP, Bugwood.org, CC BY-NC 3.0 US). Entomology, CC BY 4.0).

to 30 days, depending on temperature, with longer lifespans during cool weather. Warmer temperatures are more favorable for faster development across all life stages. Larvae typically hatch in three to five days at temperatures of 84 F to 95 F (29 C to 35 C). Larvae immediately begin tunneling through wax combs and lining the inside walls with silken webbing and feces (frass). These tunnels weaken combs and restrict movement of bees. Larvae are generalist feeders on wax, honey, pollen and other debris. In favorable conditions, larvae can double in weight daily for the first ten days and beginning to pupate as early as day 18 or 19. Crowded greater wax moth larvae become cannibalistic, with larger larvae devouring smaller larvae. Larval development may be retarded by up to five months under suboptimal conditions. Mature larvae are capable of boring into the soft wood of hive bodies or frames in managed colonies. Larvae prepare a cocoon of paperlike silk that is stronger and coarser than tunnel silk. These are cemented mainly to the frame or hive wood structure, especially if the wood is damaged. They may also be concentrated within combs or in loose debris at the bottom of hives. Maturation of pupae requires up to 14 days at higher temperatures to as long as two months in cooler temperatures. After emerging from cocoons (eclosion), adult moths disperse to nearby trees and shrubbery. Mating occurs inside the honey hives after males attract females using ultrasonic signals.

Ecological Significance and Pest Status

The greater wax moth was described initially by Johan Christian Fabricius in 1798 during early stages of what scientists recognize as formal taxonomic description. Greater wax moth is found throughout the world wherever honeybees are kept commercially or by hobbyists. In the U.S., damage caused by the greater wax moth is most severe in southern states, including Louisiana, where the climate is ideal for rapid population buildups. As with many hive pests, greater wax moths are secondary, opportunistic pests and do not pose a threat to strong, healthy colonies. Wax moths thrive in weak colonies and destroy unused or inadequately protected combs, with all damage performed by the larvae. A clear sign of wax moth infestation is the presence of bald brood with uncapped brood cells in a straight line or small patch. This is the result of the activity of nurse bees uncapping brood cells to pursue tunneling larvae. Silk produced by larval tunneling can bind the legs of honeybee pupae and prevent them from molting properly, resulting in death before emergence.

Control

In managed hives, the most effective way to control greater wax moth is through prevention by maintaining strong, healthy colonies. Such colonies have a high bee-

to-comb ratio and a good population of young, healthy bees to defend combs against pests. Regular cleanings and inspections to prevent the buildup of wax debris, cocoons and other materials that the greater wax moth larvae feed on are also good prophylactic measures. Replacing weak or dead colonies and old combs every three to five years can also help prevent infestations.

Proper storage of equipment such as empty hive boxes, combs, and supers is essential for eliminating wax moths and limiting their damage. Ensuring that all combs and other materials are clean and free from wax debris is important. In addition, empty hive boxes and newer combs should be in well-lit, well ventilated areas to reduce wax moth populations. All stages of active infestations can be killed by heating or freezing combs. Combs stored at 115 F (46 C) for up to three hours is effective, but combs become structurally unsound at 120 F to 122 F (49 C to 50 C) and melt at 144 F to 147 F (62 C to 64 C). Alternatively, combs can be stored in a freezer at 19.4 F (-7 C) for 24 to 48 hours. Freeze treated combs can then be transferred to plastic containers to prevent infestations. Storing equipment at 94 F (39 C) severely limits wax moth activity and damage.

References

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