

PHORID FLIES

Insect Family Phoridae

The Mushroom Phorid, Megaselia halterata

The “mushroom phorid,” *Megaselia halterata*, belongs to the Phoridae, a very large family (group) of flies comprising more than 3,500 species. The species in the Phoridae have highly diverse life history traits and geographical distributions that are considered to be unmatched in the entire insect order encompassing all flies (Diptera). *Megaselia halterata* is found worldwide, and populations of this fly are especially prominent wherever edible mushrooms are cultivated. This species is an obligate fungal feeder; that is, it cannot feed or survive on anything other than fungal mycelium (mycelium is the thread-like vegetative part of fungi). It is not known to be a health hazard to humans: neither the adults nor the larvae have been found to carry any human or animal disease-causing organisms.

The life cycle of this fly begins when the female lays eggs where there is actively growing mushroom mycelium, either in the wild or in commercial mushroom houses. Days later, the larvae hatch from the eggs and begin to feed on mycelium. In fact, the larval stage of the mushroom phorid is the only life stage that is known to feed, although adults of other phorid fly species are known to feed on nectar and water. Although the duration of the larval stage is highly dependent on temperature, development at 70°F usually takes 15–20 days. After this period of active feeding, the larvae pupate. The pupae remain inactive, undergoing physiological changes (metamorphosis), and eventually emerge as the adult flies. The entire life cycle from egg to adult at 70°F takes between 25 and 30 days.



Figure 1. *M. halterata* female (left), male (right)
 (Photo by Stefanos Andreadis)



Figure 2. *M. halterata* egg on mycelia (Photo by Stefanos Andreadis)

Little is known about the longevity and behavior of adult mushroom phorids in the wild; however, it is established that the adults form swarms over turf areas as part of their mating behavior. This behavior aids in mate finding and enhances reproductive success. After mating, the females search once again for actively growing mycelia to lay eggs in and the life cycle repeats. When mushroom phorid populations in the environment are very high, the swarming flies have been known to cluster in large numbers in and around houses, especially in neighborhoods close to mushroom farming operations. These large clusters of flies cause concern and aggravation to homeowners. The flies themselves, although an extreme nuisance in many cases, are not a known health threat; and to date, there is no evidence that they are able to breed in homes or in turf in lawns around homes.

A different species of *Megaselia*, the scuttle fly, *Megaselia scalaris*, can breed in many types of decaying plant and animal matter and is commonly found in a variety of environmental habitats. Despite its anecdotal reputation as a disease carrier, there is no known record of it transmitting human disease-causing organisms. There are some records of it contributing to human myiasis; that is, its larvae can develop in wounds and thus potentially contribute to infection of the wound by microorganisms. Because the larvae of *M. scalaris* feed on carrion and decaying vegetation, it has been a useful species in forensic entomology for homicide investigators to estimate time of death. There are also records of *M. scalaris* breeding on corpses and then devel-



Figure 3. *M. halterata* pupa (Photo by Stefanos Andreadis)

oping through its entire life cycle within coffins, thereby acquiring another common name, the “coffin fly.” There is no evidence supporting conjectures that the adult flies of *M. scalaris* burrow 6 feet down to enter coffins. It is more likely that their eggs or larvae were already on the corpse before burial.

Other species of phorid flies from other genera have a wide variety of life histories and habits. A species in the genus *Pseudacteon* parasitizes a severe pest ant species, the red imported fire ant (*Solenopsis invicta*), by laying its eggs on the heads of these ants. This phorid species is being intensively researched as a possible biological control agent for this pest ant. (<http://web.biosci.utexas.edu/fireant/FAQ%20Answers.html>) Females of another phorid fly species, *Ormia ochracea* (<http://www.npr.org/sections/health-shots/2014/07/22/333755517/how-a-tiny-fly-ears-could-help-you-hear-better>), find their cricket hosts from several meters away by using incredibly sensitive tympanic organs (ears). The female then deposits several larvae (not eggs) onto the cricket; these larvae then burrow into the cricket body and feed and develop into adult flies within the cricket.

The phorid *Apocephalus borealis* (http://entnemdept.ufl.edu/creatures/MISC/BEES/Apocephalus_borealis.htm) has been shown to parasitize honey bees in their hives and to also parasitizes bumblebees and paper wasps.



Figure 4. *M. halterata* larva (Photo by Stefanos Andreadis)

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