

Colorado Insect Disease of Interest

Fly Fungus

Scientific Name: *Entomophthora muscae*
(=*Entomophthora schizophorae*)

Subphylum: Entomophthoromycotina

Class: Zygomycetes

Order: Entomophthorales

Family: Entomophthoraceae

Identification and Descriptive Features: The fly fungus, *Entomophthora muscae*, is a parasite of several different kinds of flies. Infected insects typically die stuck to plants, sticks and other surfaces above ground. The abdomen of the killed fly typically becomes somewhat distended and the wings and legs stick out. A fine covering of whitish spores may cover much of the body. Outbreaks tend to occur in spring following wet weather.

Distribution in Colorado: Statewide

Life History and Habits: Infections begin when a conidia land on a susceptible fly and germinate. The germ tube can penetrate through the cuticle and the fungus grows rapidly within the body cavity, consuming the hemolymph. Within 5-7 days after infection, the now critically ill insect migrates up vertical surfaces. Ultimately they often are found near the top of plants, the upper edge of walls, or at other elevated locations where they die.

Conidiophores emerge through the segmented membranes of the body a few hours after death. A single spore is produced on each and the spore is forcibly ejected. When flies die on a glass surface a small halo of spores from the “conidial shower” can be observed. The habit of having the dying fly migrate to high points facilitates the dispersal of the conidia to other flies.

Infections of the fly fungus are dependent of optimal conditions of temperature; humidity can also be important. Outbreaks of the fly fungus tend to occur most commonly following a period accompanied by rainfall events. High temperatures present in summer inhibit survival of the fungus but infections may resume with the return of cool weather in fall.



Figure 1. Anthomyiid fly killed by the fly fungus and stuck to a leaf.



Figure 2 Pair of flies, killed by the fly fungus and stuck to the tip of an onion leaf.

In Colorado infections are most commonly observed among the “root maggot” flies of the genus *Delia* (Diptera: Anthomyiidae), which somewhat resemble small house flies. The fungus has also been reported from flies in the families Muscidae, Calliphoridae, Sarcophagidae, Tachinidae, Drosophilidae, Scatophagidae, Culicidae and Syrphidae and was originally described attacking the house fly (*Musca domestica*).

Similar Species: Several other fungi can parasitize insects. Most closely related is the grasshopper fungus, *Entomophthora grylli*, which similarly causes dying insects to migrate to the top of plants where they die clinging to the plant. Outbreaks of this fungus are capable of producing massive grasshopper epizootics if conditions for infection are optimal; attempts by humans to manipulate the fungus have had little success.



Figure 3. Grasshopper killed by the fungus *Entomophthora grylli*, stuck to the top of a mullein plant.