

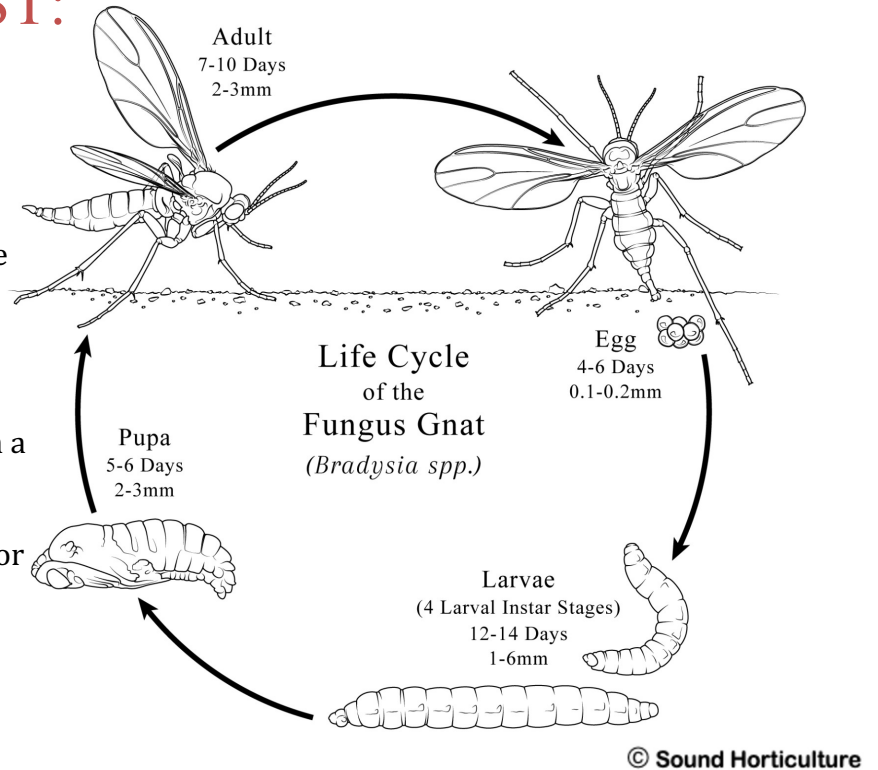


CROP PEST:

Fungus Gnat *Bradysia spp.*

DESCRIPTION:

Fungus gnats can be pests in greenhouse crops, seedling nurseries and interior plantscapes. They are small flies in the family Sciaridae. Adults are 1/5 inch (2-5mm) in length, with long bead-like antennae, long legs and clear wings with a prominent Y-shaped vein. Larvae are legless and white or translucent with a dark head capsule (Fig 1). Adults are poor flyers and tend to run along the soil surface when disturbed. Before using biological control, it is important to correctly identify fungus gnats because they can be mistaken for shore flies (see table below) or moth flies, which are gray colored and triangular in profile.



Fungus gnats

Adults:

- Antennae long, bead-like
- Legs long
- Wings clear with a Y-shaped vein
- Poor flyers

Larvae

- Dark head capsule

Shore Flies

Adults:

- Antennae short, bristle-like
- Legs short
- Wings smoky gray with a 5 clear spots
- Good flyers

Larvae

- No dark head capsule

LIFE CYCLE:

A complete life cycle takes about 5 weeks at 68°F (20°C). There are usually continuous overlapping generations in greenhouses.

- Females lay eggs near the soil surface. They lay 100-200 eggs over their lifetime. The eggs hatch in 4-6 days.
- Larvae feed for 12-14 days, mostly on decaying plant material, algae, and soil fungi as well as on fine root hairs and tender lower stems.
- The larvae pupate in the soil and adults emerge after 5-6 days.

MONITORING TIPS:

- Use yellow sticky traps, placed 12 inches (25 cm) above the soil surface.
- Count the number of fungus gnats on traps weekly.
- Replace traps every 3-4 weeks, particularly in warm weather.
- Traps are usually used at a rate of one trap per about 5,000 ft² (500 m²) to monitor for fungus gnats.



Figure 1: Fungus gnat larvae in turnips.

BIOLOGICAL CONTROLS:

There are three biological controls for fungus gnats available. They are compatible with each other and may be used together if required.

- In new plantings and where sticky trap counts are below 20 gnats/trap/week, introduce *Stratiolaelaps* (formerly called *Hypoaspis miles*) at the low (preventative) rate. Approximately 10 per square foot.

- If trap counts are over 20 gnats/trap/week, or are increasing, apply 1 million nematodes per 1000 square feet or *Bacillus thuringiensis israelensis* (BTI).

'*Stratiolaelaps*' (formerly called *Hypoaspis miles*): This soil-dwelling predatory mite feeds on fungus gnat larvae. The best way to use *Stratiolaelaps* is to establish it in the greenhouse before fungus gnats appear. Apply to seedlings in flats or cubes at the start of the growing season, and then again when planting out. Supplement *Stratiolaelaps* with other biocontrols (below) if fungus gnat populations are high.

Entomopathogenic nematodes: *Steinernema carpocapsae*, *S. feltiae*, and *Heterorhabditis* spp. are beneficial nematodes that control fungus gnats and other insects. They can be applied to the soil through conventional sprayers or through irrigation systems. Nematodes are effective against high populations of fungus gnats but unlike *Stratiolaelaps*, will not reproduce or remain in the growing media and must be reapplied regularly.

- Apply nematodes when yellow sticky traps average over 50-75 fungus gnat adults per trap, weekly, or while fungus gnat populations appear to be increasing.
- If root diseases are a problem in the crop, apply nematodes sooner to reduce the risk of disease transmission by fungus gnat larvae.
- Three applications, 7-10 days apart, are usually required. Nematode products vary, so always follow product recommendations for rates and timing. Calculate application on the actual growing area, not greenhouse area.



Figure 1: Fungus gnat adult (left) next to rove beetle (right) on a yellow sticky card.

***Bacillus thuringiensis* var. *israeliensis* (BTI):** A strain of this bacteria that infects fungus gnat larvae is available (Gnatrol). It is applied in water to the soil or growing media after fungus gnats are established. Always follow instructions on the product label.

CHEMICAL CONTROL:

Use an algaecide to control algal slime and make the soil surface less attractive to fungus gnats.

OTHER MEASURES:

- Treat soil under benches with hydrated lime (1.5 lb./gal water (0.18 kg lime/L) as a slurry, applied to the soil surface.
- Cover floors with ground-cover fabric (i.e., spunbonded poly) to eliminate breeding sites.
- Improve drainage and modify watering schedules to eliminate wet spots that produce algae and become breeding sites.
- Where possible, pasteurize soil media to destroy fungus gnat eggs (this does not necessarily control the pupae as they are resistant to adverse conditions).
- Increase the density of yellow sticky traps in propagation areas to trap out adult fungus gnats.

SUMMARY OF IPM FOR FUNGUS GNATS:

- Eliminate wet spots that produce algae and become breeding sites.
- Monitor with yellow sticky traps 1 foot (25 cm) above the soil or media surface or use yellow traps placed above the crop.
- Cover floors or treat under benches with a floor spray of hydrated lime.
- Release *Stratiolaelaps* (formerly called *Hypoaspis miles*) on seedlings and as soon as transplants are set out to establish it in the greenhouse before fungus gnats appear.
- Apply insect parasitic nematodes and/or BTI to reduce high fungus gnat populations.

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