

## SHEET 330- FUNGUS GNATS

### Fungus Gnats (*Bradysia* species)

Fungus gnats can be pests in greenhouse crops, seedling nurseries and interior plantscapes.

#### Damage

Fungus gnat larvae damage plants by feeding on fine roots and can also spread root rot diseases, such as *Pythium*, *Phytophthora* and *Fusarium*. Adult gnats are a nuisance to greenhouse workers and the public.

#### Description

Fungus gnats are small flies in the Family Sciaridae.

- Adults are 2-5 mm (1/5 inch) long, with long, bead-like antennae, long legs and clear wings with a prominent Y-shaped vein.
- Larvae are legless, white or translucent maggots with a dark head capsule.

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 coloured and triangular in profile.

<b>Fungus gnats</b>	<b>Shore Flies</b>
Adults:	Adults:
- antennae long, bead-like	- antennae short, bristle-like
- legs long	- legs short
- wings clear with a Y-shaped vein	- wings smoky gray with 5 clear spots
- poor flyers	- good flyers
Larvae:	Larvae:
- dark head capsule	- no dark head capsule

#### Life Cycle

A complete life cycle takes about 5 weeks at 20°C (68°F). 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 2-3 weeks, 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 4-6 days.

#### Monitoring Tips

- Use yellow sticky traps, placed 25 cm (12 inches) 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 500 m<sup>2</sup> (about 5,000 ft<sup>2</sup>) to monitor for fungus gnats.
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### Controls

Combining biological controls with preventative and cultural controls gives the best results. Chemical controls are also available.

### Biological Controls

There are three biological controls for fungus gnats available in Canada. 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 *Hypoaspis* at the low (preventative) rate.
- If trap counts are over 20 gnats/trap/week, or are increasing, apply nematodes or *Bacillus thuringiensis israelensis* (BTI).

**'Hypoaspis':** This soil-dwelling predatory mite feeds on fungus gnat larvae. The best way to use *Hypoaspis* 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. For more information, see Sheet 230.

Supplement *Hypoaspis* with other biocontrols (below) if fungus gnat populations are high.

**Insect Parasitic Nematodes:** *Steinernema carpocapsae*, *S. feltiae*, and *Heterorhabditis* spp. are beneficial nematodes that control fungus gnats and other insects (for more information, see Sheet 280). They can be applied to the soil through conventional sprayers or through the irrigation system. Nematodes are effective against high populations of fungus gnats but, unlike *Hypoaspis*, 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.

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

### Chemicals

- 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 (0.18 kg lime/L water ; 1.5 lb./gal) as a slurry, applied to the soil surface.

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- 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 25 cm (1 foot) above the soil or media surface or using yellow traps placed above the crop
- Cover floors or treat under benches with a floor spray of hydrated lime.
- Release *Hypoaspis* 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.