

# Fungus Gnats and Shoreflies

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**F**ungus gnats (*Bradysia* sp.) are becoming of increasing concern to greenhouse growers. Larval fungus gnats damage plant roots as they feed and help spread fungal root rot pathogens. Adult fungus gnats may become a nuisance to customers at retail greenhouses and in commercial interiorscapes.

## **Identification**

Fungus gnats may be easily confused with shoreflies and moth flies. The dark-winged fungus gnat adults are delicate black insects with long legs and antennae, less than 1/10 of an inch long. Their clear wings have a distinctive Y-shaped wing vein.

Fungus gnats are weak fliers and generally remain hidden under plant leaves close to the soil surface. Males may be seen running over the soil surface in pursuit of the less active females. Fungus gnat larvae are slender, less than 1/4 of an inch long, with a distinctive black head capsule.

Shorefly adults (*Scatella stagnalis*) are "stockier" with shorter legs and antennae than fungus gnat adults. Their wings have five distinctive whitish spots.

Shoreflies primarily feed on algae and may be found in damp environments. Shorefly larvae are yellowish-brown in color without a head capsule.

Moth flies are thickly haired, broad-bodied flies, less than 1/4 of an inch in length that may occasionally be seen in greenhouses. Moth fly larvae breed in moist organic matter and feed on algae.

## **Life cycle of fungus gnats**

Adult females may live for approximately a week, laying from seventy-five to two hundred eggs, which are deposited in soil crevices. Larval development may continue for two to three

weeks. The pupal stage will last for four to six days at 72°F. When in this stage, fungus gnats can survive through adverse temperature extremes or periods of drought.

### **Fungus Gnat Damage**

Fungus gnat larvae will feed primarily on fungal mycelium and spores. When a fungal food source is not readily available, fungus gnats may feed on healthy plant tissue. High populations of fungus gnats can seriously damage young seedlings and cuttings in propagation areas. Feeding damage usually begins at the soil surface as stems, roots or even leaf tissues are fed upon.

Some growers have noticed high populations of fungus gnat adults associated with potting media that are high in microbial activity, such as hardwood bark mixes or mixes with immature composts. However, high fungus gnat populations are not always associated with plant injury. In this situation the larvae were probably feeding on the microbes in the media.

### **Transmission of Root Rot Pathogens**

In a recent study, researchers found that *Pythium* can provide a complete nutritional food source for fungus gnats to develop from egg to adult. Fungus gnat larvae that ingested *Pythium* readily introduced the fungus to young cucumber plants while they were feeding upon the roots. *Pythium* oospores were only transmitted from larval to adult fungus gnats at very low levels. Therefore, larval fungus gnats play a more important role in the transmission of root rot pathogens than adults.

Shorefly larvae, which primarily feed on algae, may also help spread root rot diseases. *Pythium* oospores have been found in their gut with viable spores present in the frass of shore flies.

### **Prevention**

High moisture encourages the development of both fungus gnats and shoreflies. The selection of a potting soil that drains well, in addition to proper watering techniques, will help in preventing fungus gnat problems. Keeping the greenhouse free of debris, spilled potting soil and weeds will help discourage both fungus gnats and shoreflies. Preventing the

development of algae is especially critical to managing shorefly populations because chemical options are so limited. Growers should strive to maintain proper floor grading and drainage to help prevent algae buildup or use algaecides.

### **Monitoring**

Early detection is critical. Yellow sticky cards are more effective in detecting adult fungus gnats when they are placed horizontally just above the soil medium. Some growers use a "working tolerance level" of five fungus gnats per card per week. Monitor incoming plant material for larvae and adults. Fungus gnat larvae are usually found in the top inch of growing medium and may be more visible in soil moisture in the early morning. Potato slices, one inch in diameter and 1/2 inch thick, may be placed on the soil surface to monitor for larvae. The shiny, white larvae may be more easily seen on the soil surface or adhering to the potato slices.

### **Treatment Options**

Materials recommended in the *New England Floricultural Crop Pest Management and Growth Regulation Guide 1993-1994* for fungus gnat larvae include Knox-Out, a microencapsulated formation of diazinon, oxamyl 10G and Enstar 5E or II. Gnatrol is toxic to fungus gnat larvae for only 48 hours, so treatments must be repeated three times at weekly intervals to be most effective. (Gnatrol is not effective against shorefly larvae.)

PT 1100 (pyrethrin) and PT 1200 (resmethrin) are labeled for fungus gnat adults. Applications should be repeated at four- to five-day intervals to be most effective.

There is limited research on how effective these treatments are against shoreflies.

### **Biological Control Options**

Predatory mites including *Hypoaspis* or *Geolaelaps* have been effective against fungus gnat larvae. Lindquist reported excellent results when the mites were introduced at planting with control lasting from six to eight weeks. However, the predatory mites are not compatible with many chemicals.

The most widely used entomopathogenic nematodes are types of *Steinernema carpocapse*- All Strain, (Exhibit, Scanmask or Ecomask). Entomopathogenic nematodes enter the

insect's body through openings in the exoskeleton. The nematodes multiply and then release a bacterium that is toxic to the host insect.

Dr. Lindquist suggests that the first application of nematodes should be made at planting with two or three additional applications at weekly intervals. More effective strains of nematodes may be commercially available in the future.

Detect and treat for fungus gnats early in your production cycle this spring.

## References

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