Fungus Gnats and Shoreflies

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Fungus gnats (Bradyssia sp.) are becoming of increasing concern to greenhouse growers. Larval fungus gnats damage plant roots as they feed and help spread fungal root rots. 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
Farmers Ask the IRS

The answers to many farmer's tax questions are in Internal Revenue Service Publication 225, Farmer's Tax Guide. Farmer employers can learn more about their responsibilities in publication 51 (Circular A), Agricultural Employer's Tax Guide. Both are available free from the IRS by calling 1-800-829-3676.

The following are common questions and answers prepared to help farmers with federal income tax laws.

Q. Did the mileage rate for business travel go up again?
A. The rate for the 1993 tax year remains at 28 cents per mile; the same as for 1992.

Q. I heard that I may be able to deduct part of the cost of my family's health insurance as a business expense on my 1993 tax return. I remember doing that on earlier returns, but what's the latest news?
A. The deduction of up to 25 percent of health insurance expenses paid by self-employed individuals has been reinstated, retroactive to July 1, 1992. The deduction terminates again at the end of 1993. The deduction is not available if you are eligible to participate in a subsidized health plan maintained by your employer or your spouse's employer. If you qualify for an additional deduction for 1992, file a Form 1040X to claim a refund.

Q. A flood damaged my farm this year, and I understand our part of the country is a disaster area. What does this mean?
A. If your area qualified for federal disaster assistance, you may be able to elect to deduct your loss on your federal income tax return for the immediately preceding tax year. If the election is made, the loss would be considered as having occurred in the preceding tax year. Generally, crop insurance proceeds and disaster payments are includable in income and affect the deductible loss.

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

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Once you have decided that it is time to upgrade your operation with some new equipment, take time to evaluate the many alternatives that are available. Visit other growers, attend trade shows, talk with equipment vendors and read articles on what others have done that can be applied to your own business.
Lower Production Costs

Letting machinery replace some of your labor force can result in a lower cost per plant. A piece of machinery can work for long periods of time without stopping for a coffee break. An analysis of the time that will be saved and the per unit cost needs to be made. Good records on the time required to do certain tasks is helpful in determining which jobs should be mechanized. Care should also be taken to see that bottlenecks will not be created.

Improved Quality

Equipment can often be used to improve the quality of the plants that are produced. A precision seeder for plug trays can accurately place one or more seeds per cell at a constant depth. This will result in uniform seedlings that are ready for transplanting at one time. A well-engineered irrigation system with fertilizer injector will uniformly feed all the plants on a bench or in a greenhouse better than can be done with hand watering. Look for tasks in your greenhouse where decision making can be better done by a control device.

Increased Production

There are many pieces of equipment available that will increase your production without requiring additional help. For example, at the request of a local grower a device was developed to size ivy cuttings before sticking into a propagation flat. Prior to development of the machine, eight people were employed with shears to make the cuttings needed to keep the planting crew busy. The machine accomplished the same job with one operator. The machine cost about $1,500. In your own operation, try to mechanize the jobs that use the largest amount of labor.

Reasonable Payback Period

The payback period is the time required for the savings to recover the initial capital investment. It is obtained by dividing the total capital investment including installation cost by the annual cost savings. A payback period of less than three years is excellent; three to five years is good. The cost savings can be estimated from the projected labor reduction less the equipment operating costs.

References


