CT IPM
Integrated Pest Management Program
Department of Plant Science and Landscape Architecture
UConn Extension

Managing Fungus Gnats on Vegetable Transplants

Adult fungus gnats are small (1/8-inch-long), mosquito-like insects, with long legs and antennae. Their two delicate, clear wings have a Y-shaped vein in the wing pattern. Fungus gnat adults are weak flyers and tend to fly in a zig-zag pattern. One may also see them moving across the lowermost leaves close to the media surface. Adult females are attracted to fungi so one may see them near plants with *Botrytis* sporulation. Females lay their eggs near these areas, so the developing, black headed larvae have access to a fungal food source.

Fungus Gnat Damage

Fungus gnat larvae are small, (approximately ¼ of an inch long when mature), translucent to white with a distinctive black head capsule. Fungus gnat larvae feed on fungi and decaying organic matter, but also feed upon tender young plant roots. They are most damaging to young seedlings grown in plugs. In laboratory studies, adult fungus gnats carried spores of *Botrytis*, *Verticillium*, *Fusarium* and *Thielaviopsi*s as they moved from plant to plant. Spores have also been found in their droppings. It is unclear how important this disease transmission is in commercial greenhouses.

Biology and Life Cycle

Fungus gnats develop from egg to adult in 21 to 28 days (depending on temperature). Eggs are laid in cracks and crevices in the growing media and hatch in about four to six days. Fungus gnat larvae feed for about two weeks at 72^{o} F and then pupate in the growing media. After four to five days, fungus gnat adults emerge. Overlapping and continuous generations make control difficult.

Scouting

Yellow sticky cards are best placed horizontally at the soil surface to detect fungus gnat adults. Check and change the cards weekly. Growers develop their own action threshold levels based upon their tolerance levels.

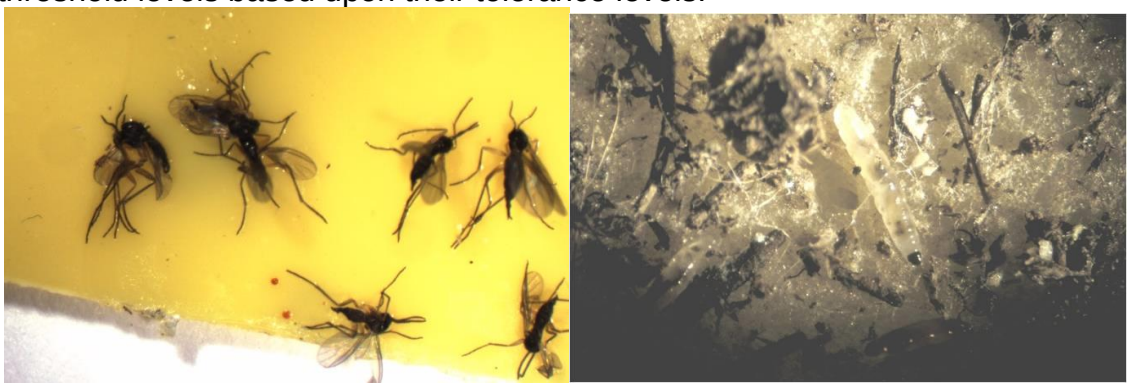

Figure 1 & 2: Adult fungus gnats on sticky card (on left) and black-headed fungus gnat larvae on potato slices (on right). Photos by L. Pundt

Cultural Controls for Fungus Gnats
Dry, level, well-drained greenhouse floors help eliminate area where fungus gnats breed.

- Eliminate areas with excess moisture and puddles beneath greenhouse benches.
- Clean up any spilled media on the floor.
- Inspect incoming plugs for fungus gnat larvae or their feeding damage.
- Avoid overwatering and keep plants as dry as possible during production.
- Remove plant debris and low growing weeds from inside and outside the greenhouse.
- Keep cull piles away from the greenhouse.
- Store the growing media so that it stays dry without tears or openings where native fungus gnats may enter the media bags.

No potting mix is immune to fungus gnat infestations. Adults are especially attracted to microbially active media containing composts, vermicompost, blood meal or kelp. Two to five times as many adults may emerge from microbially active media.

Management of Fungus Gnats
Insect growth regulators and biopesticides can be applied to the growing media to manage fungus gnat larvae. Repeated applications are needed, as most products do not affect the eggs or pupae. Due to the development of insecticide resistance, there are few insecticides that work effectively against fungus gnat adults.

The biopesticide, *Bacillus thuringiensis* var. *israelensis*, (Gnatrol WDG), is most effective against first instar fungus gnat larvae. This bacteria must be ingested by the larvae, after which a toxic protein crystal is released into the insect's gut. Larvae stop feeding and die. Gnatrol is only toxic to larvae for two days. Repeated applications, i.e. two or three applications at high rates, may be needed to provide effective management.

Insect growth regulators containing azadirachtin (i.e. Aza-Direct, AzaGuard, Azatin O, Molt X) may be applied to the growing media to manage fungus gnat larvae. Repeat applications may be needed.

Biological Controls for Fungus Gnats
Commercially available biological control agents (BCAs) include generalist predatory mites, *Stratiolaelaps scimitus*, entomopathogenic (insect-killing) nematodes, *Steinernema feltiae*, and rove beetles, *Dalotia coriaria.* All these BCAs should be used preventively and applied to moist growing media. They are mutually compatible.

Steinernema feltiae are applied as a drench treatment against fungus gnat larvae during cloudy, overcast weather. Repeated applications every two weeks are needed. *Stratiolaelaps scimitus* feed on fungus gnat larvae, thrips pupae and shore fly larvae. These predatory mites are best used when fungus gnat populations are low. The rove

beetle, *Dalotia coriaria*, is a generalist predator that feeds upon fungus gnat and shore fly larvae in the growing media. The slender, dark brown or black adults are nocturnal, so are best released in the evening. Both adults and larvae tend to hide in cracks and crevices of the growing media.

By Leanne Pundt, UConn Extension, 2024.

References

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