GROWERTALKS

Pest Management

8/31/2017

Fighting Fungus Gnats

Steve Frank

Propagation is tough, and from a pest management perspective, quite unfair. By necessity, you keep things wet—sometimes very wet—most of the time. This breaks the rules typically espoused for integrated pest management in greenhouses. Moisture leads to pests and diseases. In wet conditions, you're guaranteed to have fungus gnats. Identification of these pests is fairly easy, but management—especially in propagation—can be hard.

Pictured: Dark-winged fungus gnat adult.

Fungus gnats are small delicate flies that superficially look like small mosquitos. They're 3-mm long with slender bodies, long legs and long antennae. Sort of like a mosquito, right? (At least much more like a mosquito than the other common fly in a wet greenhouse: shore flies. They look like small house flies with heavy rounded bodies, short legs and short antennae.) The difference is important because, although they both fly around driving you nuts, fungus gnat larvae actually feed on plant roots. Shore fly larvae do not.

Fungus gnats lay eggs on moist soil in pots, under benches or in other moist areas of greenhouses. Each female can lay 100 or more eggs, so the population can blow up quickly.

Fungus gnat larvae have shiny black heads and white bodies. The young larvae begin feeding on fine root hairs in the top centimeter of soil. As they grow larger, the larvae burrow deeper and feed on larger roots. Mature larvae are about 6-mm long and can burrow into plant stems and roots, causing even more damage.

Since larvae feed on roots, they can reduce plant water uptake and growth. A few larvae don't eat much. Like most pests, there are probably a few around all the time. However, it's easy to end up with dozens, or hundreds, of larvae per pot or tray—especially in consistently moist conditions like propagation houses.

At this density, the larvae eat a lot. More than just nibbling root hairs; they eat larger roots also. Severe root

damage will cause plants to wilt, especially at high temperatures. In some cases, plants have so little roots left they can be pulled easily from pots or tip over. In a final death-blow, larvae will invade the succulent plant stem below the soil.

All this can happen to standard vigorous plants under standard growing conditions. In propagation, plants have no roots or very few roots and are holding on for dear life under the best circumstances. The goal in propagation is to take a cutting with no roots and make it grow roots. So you can image with a ton of fungus gnat larvae that every time a little root grows, it's eaten. Thus, it takes longer than necessary to produce fewer plants because many of them won't make it.

The other problem with fungus gnat larvae is disease. It never helps plants to have damaged stems and roots no matter what the cause. So larvae chewing away on roots opens them up to a variety of diseases present in the soil, such as Pythium and Fusarium. In open propagation trays, larvae can easily move through the soil from one plant to another, which could increase spread of diseases as well.

Almost no plants are safe from these insidious underground root munchers. Fungus gnats of one species or another are present throughout the U.S. They feed on the roots, bulbs and corms of most plant species. Whether you're rooting herbs, poinsettias, mums or most anything else, fungus gnats are a pest to watch for.

Adult fungus gnats are a nuisance and, of course, the progenitors of larvae, but are otherwise not directly damaging to plants. Fungus gnats are weak fliers for a fly, but easily get around the greenhouse. They often run on the soil surface instead of flying and often sit motionless. The pesky aspect of the adults is that, of course, no one wants to buy plants with flies on them.

If larvae and pupae are in the soil, adults will keep emerging and hovering around the plants even if they look clean when they leave your care. It will irritate wholesale customers who buy your plugs or rooted cuttings if the next day they're covered in flies. Retail customers also are deterred from buying finished plants with flies. Flies also poop, so plant foliage can have fly specks that indicate fly infestations to commercial buyers and are just ugly to retail customers.

Fungus gnat management, like integrated pest management for most pests, begins with scouting and monitoring their abundance. You can monitor fungus gnat abundance with yellow sticky cards hung at canopy height or even lower. Again, these flies spend a lot of their time running on the soil or making short flights when disturbed, so hanging a sticky card high above the crop will not catch many of them—or other pests either. There are no universal thresholds for when to apply insecticides. However, monitoring with sticky cards and recording how many you catch will tell you if the population is increasing prior to management or decreasing afterward.

Management should target larvae. Since every adult makes 100 larvae, you'll never kill enough adults to make a difference. The first way to target larvae is to deprive them of the wet soil they live in. Under standard growing conditions, fungus gnat infestations indicate either the crop is being watered too much, water is accumulating in non-crop areas like under benches—which allows larvae to grow—or both. In propagation, the soil will obviously need to be wetter than when finishing plants. However, sanitation is still an important component of fungus gnat management. Look for those areas that don't drain well or accumulate water and dry them.

Flies shouldn’t come out when you open a bag of potting mix. Bags of potting mix can be infested with flies, eggs, larvae or pupae. The life cycle of fungus gnats is about two weeks, so if you go from no flies to millions within a day or two of setting up new pots or trays of soil, they could have come in the bag. Inspect soil with a hand lens for larvae or small pupae.

There are a few biological control agents available to control fungus gnat larvae, including predatory mites and Steinernema spp. nematodes. Insecticide treatment requires drenching infested pots or trays to kill larvae in the soil. Active ingredients available for this use include some pyrethroids, insect growth regulators, neonicotinoids, azadirachtin and others. Check with local extension personnel or other resources to see what’s available for your system. **GT**

Steve Frank is Associate Professor and Extension Specialist at North Carolina State University. He conducts extension and research related to greenhouse, nursery and landscape pest management. You can reach him at sdfrank@ncsu.edu, @OrnaPests on Twitter, or visit his website http://ecoipm.org.