GROWERTALKS

Features

3/31/2016

Shoo, Fly, Don’t Bother Me

Dave Smitley

I’ve visited many greenhouses where the edges of plastic flats are covered with tiny black spots. Usually a few small (4 to 5 mm long) flies can also be found sitting on flats, and if the grower is using yellow sticky cards, each card may have 50 or more adult shore flies on it. In the worst cases, workers are brushing shore flies off their hands or faces. This article summarizes what we know and don’t know about the biology and management of shore flies in greenhouses.

Shore fly is a common name used for members of an entire family of small flies—the *Ephydridae*. The name comes from the fact that some species are abundant along seashores, and along the shores of lakes and ponds (Figure 1). About 2,000 species of shore flies have been identified world-wide. They’re a diverse group, with the larvae living in a wide assortment of wet habitats, including inside leaves, in algae and in all types of wet soil.

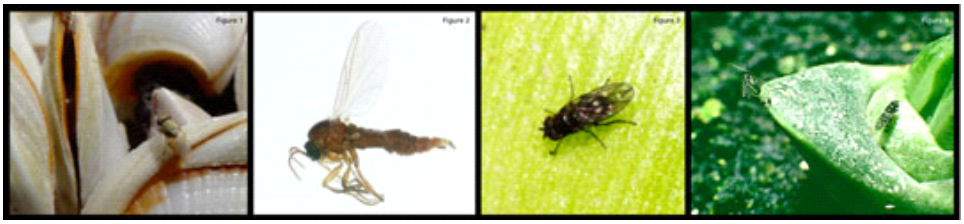

Figure 1. Another type of shore fly (Ephydridae sp.) from the seashore. Photo: John Tann
Figure 2. Adult fungus gnat (Bradysia sp.). Photo: Gary Steck
Figure 3. Adult shore fly (Scatella obscura). Photo: Phil Nixon
Figure 4. Fungus gnat adult on the left and an adult shore fly (Scatella tenuicosta) on the right. Photo: Dave Shetlar

---

One species, the petroleum fly or oil fly, is found in crude petroleum in tar pits. Very little research has been done on shore flies found in greenhouses. In fact, only one species has been studied in any detail: *Scatella tenuicosta*. (Prior to 2005, this species was confused with *Scatella stagnalis*.) This is a dark-bodied shore fly that may become a nuisance when algae is present in the greenhouse (Figure 6). This is most likely in propagation houses or in newly seeded flats where overhead misting is on a frequent cycle. But algae can grow in any situation where there’s continuous moisture, nutrients and light.

Identification of shore flies

Shore flies and fungus gnats are among the most common insects found on yellow sticky cards. They're both small flies, 4 to 6 mm long, but shore flies have a stout body, more like the shape of a house fly, while fungus gnats have a long, narrow body (Figures 2 and 5). They can be easily distinguished on yellow sticky cards because fungus gnats have long, bead-like antennae and long legs, while shore flies have very short, stubby antennae and much shorter legs (Figures 3 and 6).

Biology of shore flies

Most of what is known about the biology of shore flies in greenhouses comes from two research papers on Scatella tenuicosta (Vanninen and Koskula 1996, Ugine et al. 2007). The larvae of this species feeds on algae for five days, pupates for three days, then emerges as an adult fly for a total life cycle of about eight days at 78F (26C). Ugine et al. (2007) found that development takes longer under cooler conditions, so that at 68F (20C), the life cycle is about 14 days. Adult females require three days to mate and mature before they can begin laying eggs and each female can produce 315 eggs. This means that under warm conditions they can reproduce rapidly, building-up to a nuisance level quickly.

The other species of shore fly reported from greenhouses so far is *Scatella obscura* (Figure 3). The larvae of this species probably also feed on algae, but so far hasn't been studied in the greenhouse.

Shore fly larvae haven't been reported to feed on the roots or stems of cuttings or on seedlings. More research is needed to determine if any other species of shore flies are found in greenhouses, and what the larvae and adults feed on.

Management of shore flies

Shore fly larvae require wet conditions and algae to develop, so they usually become a problem in propagation houses where flats are misted throughout the day, or in greenhouses with wet soil that doesn't dry between irrigation runs. Any cultural practice that allows the growing medium and benches and floors to dry will greatly reduce shore fly problems. However, this isn't possible in the early stages of propagation.

But it is possible to use good sanitation to limit the amount of algae present. Start with sterilized or sanitized flats, pots and benches, and treat under benches or other places where algae can grow. Eliminating algae will also control shore flies because the larvae cannot develop without it.

Figure 5. Fungus gnat adult on a yellow sticky card. Photo: Lance Osborne
Figure 6. Shore fly adult (Scatella tenuicosta) on a yellow sticky card. Photo: University of Florida

Spraying an insecticide to control the adult shore flies will help, but may not eliminate the problem because adult females can begin laying eggs within three days of emerging. This means an insecticide would need to be sprayed or fogged every three to four days to completely eliminate them. Otherwise, adults could emerge and lay eggs between treatments.

Under drier conditions, insecticide residue on flats and plants provides some contact activity for several days to a week after it's applied, but not in propagation houses with overhead misting. Under these conditions, insecticides applied as a soil and surface drench once per week or once every two weeks will be the most effective strategy. Make sure all of the surfaces with algae are treated.

Monitor shore fly populations with yellow sticky cards. Change the cards once per week and record the number of shore flies found. Insecticides that work well for fungus gnats usually work for shore flies as well. Imidacloprid, dinotefuran or thiamethoxam can be applied as a soil drench according to label directions. In propagation houses, make one application immediately after the cuttings are stuck and repeat once every two weeks or as needed. Always treat a few flats first to make sure that the types of cuttings that you're propagating or seeds you're germinating aren't sensitive to the insecticide that you plan to use.

Because those three insecticides are neonicotinoids, you may need some alternatives. In that case, pyriproxyfen, cyromazine or diflubenzuron (all insect growth regulators) can be used as a soil drench. Diflubenzuron isn't recommended for use on poinsettias. Azadarachtin products are also labeled as a soil drench for fungus gnat control.

For biological control houses, the soil predator mite Hypoaspis will eat fungus gnat and shore fly larvae, but their effectiveness under propagation conditions with wet soil hasn't been investigated. Insect parasitic nematodes may be the best choice for biological control because the moist soil conditions are ideal for the nematodes and some research tests look promising. More research is needed to determine which nematode species are best for shore fly control and how effective they are.

The predatory staphylinid beetle, Atheta coriaria, is also good for biological control because Atheta larvae live in the soil and will consume shore fly larvae. However, purchasing enough Atheta for rapid biological control isn't practical because of the cost and Atheta has also not been tested in wet soils. **GT**

Acknowledgements:

Thanks to Dr. A.G. Irwin of Norwich, United Kingdom, for a tentative identification of the shore flies in the photographs. And Dr. John Sanderson, Cornell University, who provided several suggestions for improving this article.

Dave Smitley is a Professor of Entomology and Michigan State University Extension Specialist.

References:

Castrillo, L.A., Ugine, T.A., Filotas, M.J., Sanderson, J.P., Vanenberg, J.D. and S.P. Wraight. 2007. Molecular characterization and comparative virulence of Beauveria bassiana isolates (Ascomycota: Hypocreales) associated with the greenhouse shore fly, Scagtella tenuicosta (Diptera; Ephydridae). Biological Control: 154 – 162.

Kadavy, D.; Myatt, J., Plantz, B., Kokjohn, T., Shaw and K. Nickerson. 1999. Microbiology of the Oil Fly, Helaeomyia petrolei. Appl. Environ. Microbiology 65: 1477 – 82.

Malais, M.H. and W.J. Ravensberg. 2000. Knowing and recognizing: the biology of glasshouse pests and their natural enemies. Koppert B.V. The Netherlands.

285 pp.

Mathis, W.N. & Zatwarnicki, T. (1990), A revision of the western Palaearctic species of Athyroglossa (Diptera: Ephydridae). Trans. Amer. Entomol. Soc. 116: 103–133.

Rice-Mahr, S., Cloyd, R. and D. Mahr. 2001. Biological control of insects and other pests of greenhouse crops. North Central Regional Publication 581.

Sanderson, J.P. Shore fly biology and control. www.greenhouse.cornell.edu/pests/pdfs/insects/SF.pdf

Ugine, T.A., Sanderson, J.P. and S.P. Wraight. 2007. Development times and life tables for shore flies, Scatella tenuicosta (Diptera: Ephydridae), at three temperatures. Environ. Entomol. 36: 989 – 997.

Vanninen, I. 2001. Biology of the shore by Scatella stagnalis in rockwool under greenhouse conditions. Entomol. Exp. Appl. 98: 317Ð328.

Vanninen, I., and H. Koskula. 2003. Biological control of the shore fly Scatella tenuicosta with Steinernematid nematodes and Bacillus thuringiensis var. thuringiensis in peat and rockwool. Biocontrol Sci. Technol. 13: 47Ð63.