Sciarid flies

Many growers have been experiencing problems with growing media this year, and one of the most common problems reported has been with sciarid flies. Some other problems, particularly with cucurbit germination, may also be sciarid fly related.

Adult sciarid fly - Bradysia

Sciarid flies, or fungus gnats, can be a problem in the damp conditions of propagating houses as they feed on wild and cultivated fungi and decaying plant material. Often sciarid fly larvae are secondary to disease problems, but they can also cause plant damage. The species that cause most problems are *Bradsysia spp...* Damage occurs when the fly larvae, which live in the seed or potting compost, feed on roots and stems. Seedlings, cuttings and younger plants are most susceptible, and these may collapse and die. Mature plants may not be so badly affected; but if severely infested they will grow poorly, wilt and even die. An additional problem is that fungal diseases can gain entry to plants through wounds caused by the fly larvae. Adult sciarid flies can also carry spores of pathogenic fungi from plant to plant, spreading diseases such as *Pythium* and *Phytophthora*. Some composts and amendments can encourage sciarids and they have become more of a problem with widespread use of seed and potting mixtures based on coir and other types of organic matter.

Sciarid larvae feeding on root - Bradysia

Photos: David Cappaert, Michigan State University, Bugwood.org

What can you do?

- Ensure that you are not importing growing media onto the holding that is contaminated with sciarid flies. Routinely check growing media bags, immediately on opening, for signs of adult flies and larvae. Report any problems to your supplier (and also tell the OGA) and ask for compensation or replacement.
- Use yellow sticky traps to monitor adults. These need to be changed regularly, every couple of weeks or so. Traps are unlikely to contribute to control unless used in high densities; and they need to be used with caution because they also trap predators and parasites. Check plants, growing media, propagating benches and around for both adults and larvae.
- Good nursery hygiene is important – don't leave growing media bags open or piles of substrate on propagating benches, and dispose of diseased or unwanted plants promptly.
- Avoid over-watering to minimise breeding areas. Sciarid larvae thrive in moist conditions so reduce watering to a minimum when infestations are high. This is especially important in winter when lower temperatures and light levels reduce plant growth.
- Cover module trays until germination with corrugated plastic sheeting, which also conserves moisture and prevents the trays being over-watered. Susceptible crops can be covered with fleece until established. This will reduce fly egg-laying on growing media surface.
- Covering the surface of pot plants with horticultural sand or grit with a layer about a centimetre thick will prevent adults from laying eggs – but this is not practical for most vegetable transplants!
- There are four biological control agents available for sciarid fly: *Hypoaspis* and *Macrocheles* mites; *Atheta coriaria* beetles; and *Steinernema feltiae*, a nematode. *Hypoaspis* mites are supplied in a mixture of moist peat and vermiculite that are sprinkled over the surface after potting. The mites search actively for their prey and can survive for at least six weeks without food, and so can be a useful preventive treatment. The nematodes are watered onto the pots or trays as a preventative or control. They invade and breed inside the larvae, releasing bacteria, which kill them. When the larvae decompose, a new generation of nematodes is released. Both the biological controls will also attack other soil-dwelling creatures – including beneficial ones.
- You could consider using the predatory beetle *Atheta coriaria*. *Atheta* can be expensive for direct release as high rates are needed; but work by ADAS/HDC has developed a DIY system for rearing Atheta on nurseries for low-cost control (see opposite).

Adult Atheta beetle

Grow your own biological control

The native ground-dwelling predatory beetle *Atheta coriaria* feeds on various insect eggs, larvae and pupae, particularly those of flies and beetles. It will eat the ground-dwelling life stages of sciarid fly, shore fly, western flower thrips, cabbage root fly and carrot fly. ADAS's HDC-funded work showed that the rates of release of *Atheta*, recommended by commercial suppliers (up to 10 per m^2) were often too low to be beneficial, and much higher rates were needed (up to 500 per m^2) to give effective control of high densities of sciarid flies. This would be prohibitively expensive to buy, so a system for rearing and maintaining populations of *Atheta* on nurseries was developed.

Materials

- Fresh pack of *Atheta* from a commercial supplier
- Three litre plastic box with snap-on lid
- Insect-proof mesh or net curtain
- PVA glue or sticky tape
- Growing media such as 1:1 coir : vermiculite
- Turkey grower pellets

Method

- Make sure the containers are clean (new plastic containers can be toxic to insects).
- Make two ventilation holes (2.5 cm diameter) in the lids, cover with insect-proof mesh and secure with glue or tape.
- Add 1.5 l of growing media, dampened to achieve 75% moisture content (add approx. 150 ml of water).
- Add approximately 60 adults to each box.
- Add 5 g of ground up turkey pellets to each box in week one, and 15 g per week thereafter. Sprinkle on to the top of the growing media and rotate the box to mix it in.
- Keep the substrate damp but not too wet, using a plant mister.
- Keep boxes at a constant 25^0C, or at least within 15-32^0C
- After four weeks (longer at lower temperatures), the adults should have completed a generation and multiplied by a factor of 40. They can then be released into the glasshouse together with the substrate. Boxes or part-boxes can be retained to set up fresh rearing boxes.
- Boxes can be kept for up to six more weeks, but then will become over-crowded. Store at a lower temperature (15-20^0C)
- Rearing-release units: boxes can be taken into the glasshouse and the insect screening removed from the boxes. Boxes should be shaded with foil with holes in the foil to allow the beetles to disperse. The substrate should be kept damp so that *Atheta* remaining in the boxes keep breeding and dispersing. The beetles shouldn't be fed in the week before their release. Feed them 5g of turkey feed one week after introducing them and then weekly.
- No firm recommendations can be given for numbers of rearing-release units required, as this depends on density of pest, numbers of *Atheta* in each box, temperature and level of control required. In a trial, a rate of one box (860 *Atheta*) per 5 m^2 was used in a crop of potted parsley, heavily infested with sciarid flies. After four weeks sciarid levels were 59% lower than the control using *Steinernema feltiae* and *Hypoaspis miles*.
- Note that *Atheta* is not compatible with *Hypoaspis* mites, as the *Hypoaspis* will eat the *Atheta* larvae and the *Atheta* adults will eat *Hypoaspis* eggs and young nymphs!

Atheta rearing box with screened ventilation holes in lid

Turkey pellets before grinding

Grinding pellets in food processor

Rearing-release box in greenhouse

Photos: Phil Sumption

More information:

HDC Factsheet 06/10 Grower system for rearing the predatory beetle Atheta coriaria. With thanks to Jude Bennison (ADAS) and Grace Choto (HDC) for permission to use the factsheet in this article. HDC is a division of the Agriculture and Horticulture Development Board.

Garden Organic Factsheet PC22 – Sciarid Fly

Bulrush Grower Notes: Sciarid flies or fungus gnats. www.bulrush.co.uk/downloads/grower-notes/22...sciarid/download.html

Phil Sumption