EXOTIC PEST - FOR SUSPECT DETECTIONS CALL THE HOTLINE ON 1800 084 881

Grain stem gall midges (*Mayetiola sp.*)

EXOTIC PEST DETECTION & SAMPLING GUIDE

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Background

Grain stem gall midges are three related species of tiny flies. Their adult stages are short-lived but the larval stages of these midges are serious pests of grain crops. While no grain stem gall midge species are currently found in Australia, they have a major impact on grain production overseas – particularly in Europe and North America. Each of the main pest species of this group are quite specialized to feed on either wheat (Hessian fly, Mayetiola destructor), barley (Barley stem gall midge, Mayetiola hordei) or oats (Oat midge, Mayetiola avenae) respectively. Chemical control of these midges is generally ineffective because the larvae migrate to and feed within the stem base of host plants.

How would I identify grain stem gall midge?

Identification by morphology

These three midge species are extremely similar to each other in appearance. Expert knowledge and laboratory diagnostics may be needed to accurately distinguish between them. In each case the adults are tiny, fragile, mosquito-like, and about 3mm long. Their eggs are dull red-orange in colour, less than 0.5 mm long, and laid in grooves on the upper side of host plant leaves, often in quite large numbers.

After hatching, the immature forms resemble translucent white, legless larvae. These tiny larvae work their way down the grooves of leaves to the base of the plant, rasp on the stem and suck up sap that oozes from the wound. The larvae will remain feeding at the base of the plant and grow to up to 6 mm long. After about two to three weeks of feeding the larvae will then pupate. At this point their outer skin becomes hard, brown, and shiny to form a protective case (Figure 1). This is known as the 'flaxseed' stage due to their close resemblance to flaxseeds (or linseeds).

Identification by damage

Gall stem midge infestations can have a significant impact on cereal crop yield. Growing plants may be stunted and tillers may be weakened causing plants to lodge. There may also be evidence of leaf discolouration, with infested plants ranging from a darker to a more bluish green.

How do I scout for grain stem gall midge?

For each of these three midge pests the flaxseed stage is the most distinctive and the most likely to be observed by growers examining infested host plants.

To check for the presence of grain stem gall midge a few test plants should be uprooted and the outer leaves around the leaf sheath peeled back to look for the 'flaxseed' stage.

Hessian flies have a high preference for wheat host plants but also feed on quite well on rye and can survive on oats or barley. Oat midges and Barley stem gall midges tend to only feed on their specific host plant. Infestation of the latter species causes barley host plants to form stem galls at the plant base, but this does not generally occur for host plants attacked by either of the other two grain stem gall midge species.

Could it be confused with an endemic species?

There are no other small flies or midges present in Australia that attack cereal crops above the ground, so any small native flies are unlikely to be confused with grain gall stem midge species. Any small white larvae that appear to be feeding on cereal crop plants are likely to be exotic pests and should be reported immediately.

Figure 1. Flaxseed-like pupae at base of wheat plant

Cover image: Hessian fly *(Mayetiola destructor)*, Scott Bauer, USDA Agricultural Research Service, Bugwood.org
Image: John C. French Sr., Retired, Universities:Auburn, GA, Clemson and U of MO, Bugwood.org

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What should I do if I suspect grain stem gall midge?

Grain stem gall midge species are priority plant pests, exotic to Australia. If you find 'flaxseeds' and/or translucent white larvae within the leaf sheath at the base of cereal crop plants, call the **Exotic Plant Pest hotline on 1800 084 881**. The hotline will divert you to the appropriate state biosecurity agency, which will investigate the suspect detection further. To support an investigation you should take note of:

- The detection location (take a GPS coordinate using your phone);
- The host plant on which the suspect detection has been made;
- Damage symptoms (e.g. leaf discolouration, lodged tillers); and
- A photo of all life stages observed (taking close-up photos of the same specimen from multiple angles is most useful for identification).

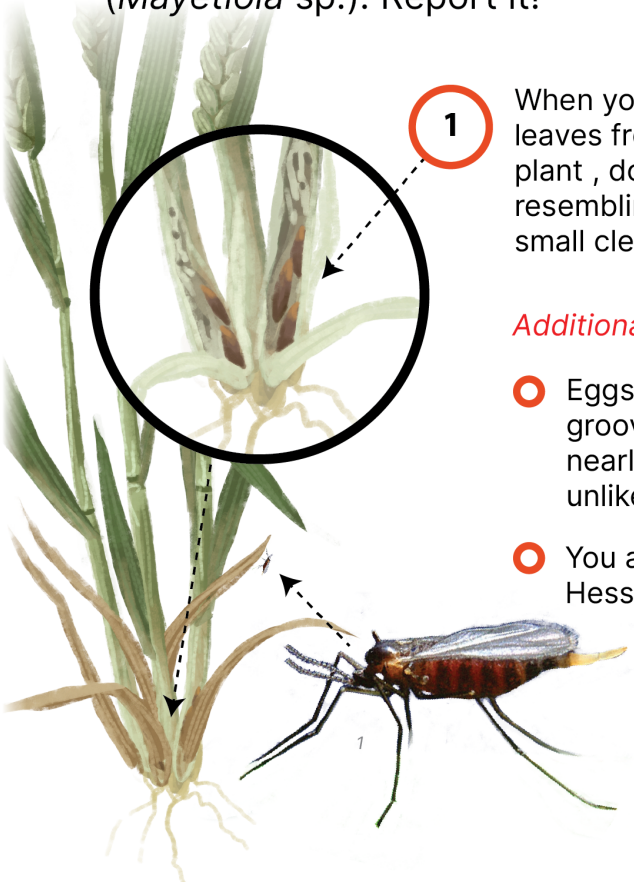
Taking a sample

Taking a sample will also assist in a biosecurity investigation. Collect infested plants in a ziplock bag – double bagging of specimens is ideal. Label the bag with the date and collection location and keep in the fridge in case a larval sample is needed by the biosecurity agency.

Figure 2. Reporting decision making Grain stem gall midge (*Mayetiola sp.*)

You have detected unexplained yield reduction in your cereal crop. **Should you report it?**

If you answer yes to the following question, it could be one of the exotic **grain stem gall midges** (*Mayetiola* sp.). Report it!



1 When you peel back outer leaves from the base of the plant , do you find pupae resembling flax seeds, or small clear grubs?

Yes

Additional possible signs

- Eggs are laid along the grooves of leaves, but are nearly microscopic and unlikely to be noticed.
- You also may see adult Hessian flies resting on stems

Australia has many flying insects that may look outwardly similar as adults, but none are known to attack cereal crops. Any sign of pupae or grubs inside plant bases should be reported!

[1] *Scott Bauer, USDA Agricultural Research Service, Bugwood.org, CC BY 3.0*

Figure design and illustrated components: Elia Pirtle, eliapirtle.com

More information

Hessian Fly (Texas Invasive Species Institute), Farms.com