

# Wheat leafminer does not like oats

Dr Goddy Prinsloo

ARC-SMALL GRAIN, BETHLEHEM

**Worldwide, many species of leafminers are known to mine oat leaves. A test was conducted locally in a glasshouse using wheat, barley and oats to establish host plant preferences. Farmers with severe infestations annually in wheat are advised to plant oats for one season and break the lifecycle of the miner.**

**LEAFMINER IS NOW KNOWN** in almost all wheat producing areas of the country. This fly, *Agromyza ocularis*, (**Figure 1**) first appeared as wheat pest in 2000 in irrigated wheat fields in the Prieska and Douglas areas. Since then it spread slowly to Vaalharts, Lichtenburg and Brits, and during 2016 to dryland production in the Western Cape. The female fly lays eggs inside host plant leaves and the larva mines through the leaf, causing dead leaf tissue (**Figure 2a, b**). Visible leaf damage can sometimes be serious, but yield loss, however, seems to be small, which render it difficult to establish control measures.

Originally, this species was described in the early 1960s from specimens collected with a sweep net from grasses in the Ceres (Western Cape) and Drakensberg (KwaZulu-Natal) areas. Unfortunately, no host plants were recorded at that time, which makes it difficult to determine natural sites where they could survive. During recent years, four alternate host plant species were recorded, namely canary seed grass, rye grass, wild oats and *Bromus* sp. grass (Adendorff, 2010).

## Clean oat plants

Observations during 2015 – 2017 on oats, planted under irrigation in the Vaalharts area, showed no signs of infestation, while wheat plants nearby were infested. Worldwide, more than eight species of leaf miners are known to mine oat leaves (Ridland, 2009) and therefore it was decided to test oats as host plant in the glasshouse.

A small host preference test using wheat (cultivars Kariega and Duzi), barley (Puma) and oats (Maluti) was conducted in the glasshouse. Three plants, all containing six tillers each of each of the four cultivars, were arranged randomly in cages and flies were released into the cages. The number of mined leaves per tiller of each plant and the number of pupae per plant were determined. Only a few oat leaves contained small mines compared to the wheat and barley (**Figure 3**). The oat plants did not yield any pupae, while many pupae were harvested from barley and wheat (**Figure 4**).

It is clear that the leafminer does not prefer oats as a host. There could be several reasons for that. Firstly, the presence of repelling volatile chemicals, or the absence of attractive host plant volatiles. These volatiles, together with plant colour, are the major signals used to identify a host plant.

However, seeing that the few mines found on oats did not yield any pupae, could be an indication of an antifeedant or toxicity factor, that may be present in the plant itself.



Figure 1: Adult leaf miner fly.



Figure 2a: Leaf miner larvae inside leaf.



Figure 2b: Damage signs.

TO PAGE 11

# Wheat leafminer does not like oats

FROM PAGE 9

All these factors should be studied to determine how the plant and leafminer are interacting. Some of these factors could probably be used in future to build resistance into plants or to be used as a direct control measure on wheat and barley crops.

## Can farmers use it?

In the meantime, the author recommends to farmers with fields where severe problems occur annually, to plant oats for one season and break the lifecycle of the miner.

Leafminers are able to survive for several months in the soil. When oats are planted after maize, the hatching leafminers would probably look for a field of wheat and with no pupae produced in the soil, the problem could be reduced or eradicated.

For further information on the problem, please contact Goddy Prinsloo at [prinsloogj@arc.agric.za](mailto:prinsloogj@arc.agric.za) or 058 307 3435.

## References

- ADENDORFF, J. 2010. The bio-ekology of the grass leaf miner, *Agromyza ocularis* (Diptera: Agromyzidae), on wheat and barley in the Northern Cape Province, South Africa. MSc. thesis University of the Free State.
- RIDLAND, P. 2009. Industry Biosecurity Plan for the Grains Industry – Threat Specific Contingency Plan: *Cereal Leafminers Agromyza ambigua, Agromyza megalopsis, Cerodontha denticornis, Chromatomyia fuscula, Chromatomyia nigra*. Plant Health Australia. 🇺🇦

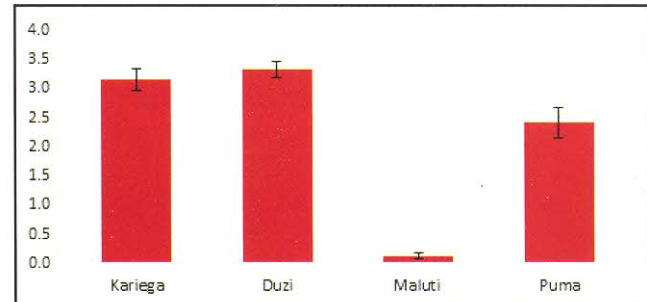


Figure 3: Mean number of leaves mined per tiller on wheat (Kariega, Duzi), barley (Puma) and oats (Maluti).

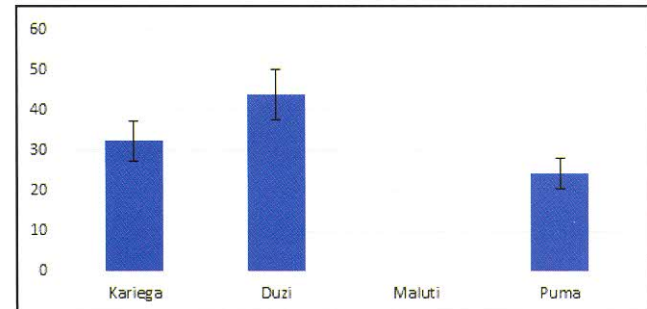


Figure 4: Mean number of pupae per plant harvested from wheat (Kariega, Duzi), barley (Puma) and oats (Maluti).