NSW GOVERNMENT Department of Primary Industries

FACTSHEET

Exotic Pest Alert: Apple leaf curling midge

Plant Biosecurity Orange

Apple leaf curling midge (*Dasineura mali*) is an exotic plant pest

This insect is a serious threat to Australia's apple industry

If found it must be reported promptly to the Exotic Plant Pest Hotline **1800 084 881**

Symptoms

Symptoms of damage caused by apple leaf curling midge are distorted, rolled and discoloured leaves (Figure 1). Rolled leaf edges prevent young leaves from unfolding and the roll becomes tighter as leaf growth continues.

Damage is caused by the larval stage of the insect. Apple leaf curling midge maggots feeding on apple leaves make them curl tightly upwards and the leaf edges are rolled together into distorted tubes (Figure 2). Leaf tissues thicken and become brittle. Leaves turn red brown.

Damage can be confused with aphid infestations.

Figure 1 Damage caused by apple leaf curling midge

Figure 2 New growth on an apple tree affected by apple leaf curling midge

What is apple leaf curling midge

The adult apple leaf curling midge is a small fly. The insect has four life stages: eggs, larvae, pupae and adult.

Eggs

Leaves are the preferred site for egg laying. Eggs are laid irregularly in groups on the margin or upper side of unfolding leaves.

In early spring prior to leaf emergence eggs are laid on the bracts of leaf buds and in developing flowers.

Eggs are transparent pink to pale red in colour and cigar-shaped. They take from 2-10 days to hatch depending on temperature conditions.

Larvae

Larvae (maggots) are initially white but become a bright orange-red colour at the final instar (Figure 3).

Immature larvae spend most of their life within a rolled leaf. They die if exposed to bright sunshine.

Larvae take 20 days to reach maturity.

When mature the larvae exit the leaf roll and fall to the ground to pupate. Prolonged dry conditions may prevent or delay mature larvae from exiting leaf rolls. Thorough wetting of the leaves assists the larvae to escape to find pupation sites.

Pupae

Pupation takes place just below the soil surface in a tough white silken cocoon.

Pre-pupae have the same orange colour as mature larvae and are clearly visible inside the cocoon. Mature pupae are brown.

During warmer months pupation takes 8-13 days.

Apple leaf curling midge can survive cold winters by remaining as pupae inside the cocoon until favourable conditions return.

Figure 3 Apple leaf curling midge larvae

Figure 4 Adult apple leaf curling midge

Adults

Adult flies have a dark brown body, about 1.5-3 mm long and resemble a mosquito (Figure 4).

Female apple leaf curling midges produce a sex pheromone to assist males to find them for mating.

The number of generations per year is related to temperature.

Host

Apple trees (*Malus spp*.) are the only host of the apple leaf curling midge.

The severity of apple leaf curling midge infestations can differ between apple cultivars, although the susceptibility can vary through the season depending on the availability of shoots suitable for egg laying.

No apple cultivar is known to be resistant to infestation if the pest is present.

Damage

Feeding larvae of apple leaf curling midge can affect apple leaves, flowers and fruit.

Flower and fruit damage occurs when high populations of apple leaf curling midge are present during flowering. Eggs laid on flowers can affect the developing fruitlets resulting in distorted bumpy fruit.

Terminal shoots may be stunted and growth of grafted scions may be retarded or killed.

Larvae feeding on leaves prevents the leaves from fully expanding. Leaves may drop prematurely. Leaf and shoot damage affects crop yield.

World distribution

Apple leaf curling midge is of European origin and has spread to North America and New Zealand.

International experience

Apple leaf curling midge was accidently introduced into New Zealand in 1950. By the mid 1980's apple leaf curling midge populations and damage had greatly increased.

Soil treatments can be used to reduce adult emergence.

Insecticide control of the larval stage is difficult because larvae are protected inside the rolled leaves.

Actions to minimise risks

Put in place sound crop hygiene including:

- on-farm biosecurity to prevent entry, establishment and spread of pests and diseases
- ensure all staff and visitors are instructed in and adhere to on-farm hygiene practices
- regularly monitor your crop
- keep records

Reporting

If you suspect apple leaf curling midge:

Call the Exotic Plant Pest Hotline on

1800 084 881

Take photos not samples to minimise the risk of spreading the pest

Contact your local district horticulturalist

Visit the Plant Biosecurity website for further information

www.dpi.nsw.gov.au/biosecurity/plant

An **exotic plant pest** is a disease causing organism or invertebrate not present in Australia and which threatens agricultural production, forestry or native and amenity plants.

Resources

British Columbia Ministry of Agriculture - Factsheet '*Apple leaf curling midge*'

HortFACT '*Apple leaf-curling midge life cycle'*

Washington State University – Orchard pest management online, '*Apple leafcurling midge'*

Figure 1 courtesy of Washington State University

Figures 2 and 4 courtesy of Jerry Cross, East Malling Research

Figure 3 courtesy of AgrEvo

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