RESEARCH LABORATORY TECHNICAL REPORT

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Horse chestnut leaf miner

Dr Glynn Percival & Dr Luke Hailey

Identification, Biology & Management

The horse chestnut leaf miner (*Cameraria ohridella*) is a moth of the lepidopteran family Gracillariidae. Its larvae are leaf miners on the common horse chestnut (*Aesculus hippocastanum*), causing significant aesthetic damage to the tree. Its spread began from the Balkan region (also the origin of its host) around 1984, moving through most of Europe. It reached the UK in 2002 and Ireland in 2013.

Symptoms

Larvae of *C. ohridella* feed within the leaves of horse chestnut and cause white to brown blotches, often limited by leaf veins (Figure 1). Concentric rings of feeding may be apparent on close inspection. The initial mines appear as a small white blister later enlarging and turning brown.

The fungus *Guignardia aesculi* can cause similar looking damage but doesn't separate the layers of leaf tissue and its blotches are less regular in size and shape.

Confirm leaf miner infection by holding the leaf up to the light: you should be able to see the larva or chrysalis and frass (excrement) inside. Larvae may be feeding at the edges of the mines.

Mines may cover most of the leaf surface, especially later in the season. Up to 700 mines have been recorded on just one leaf. Heavily damaged leaves shrivel and brown, falling early. The lower leaves of the tree are impacted first. Damage spreads up the canopy over the growing season, often reaching the top of smaller trees. This leads to an untimely autumnal appearance during the growing season.

Concerns

The spread and establishment of *C. ohridella* is of particular concern because once established, the moth appears always to maintain exceptionally high rates of infestation. In European towns and cities there has been no decrease in the leaf miner population even after many years, and severe damage to horse chestnuts has occurred on an annual basis, greatly impairing the visual appearance of the trees (Figure 2). Over time repeated infestation can kill young trees and/or show a progressive decline in health as a direct consequence of attack. Climate and/or interactions with other pests and diseases can influence the impact of *C. ohridella* on trees.

Figure 1: Symptoms of horse chestnut leaf miner

Causal Agent

The moth can survive temperatures as low as -23C, although it thrives in warmer climates, where it can achieve as many as five generations a year. If moisture is adequate, the warmer the climate the quicker the lifecycle and consequently a higher number of generations.

From April onwards, adult moths emerge from pupae, initially those overwintered in last year's leaf litter. They do so in the early morning and fly to the tree trunks where they mate. From May until August the females lay their eggs along or near the lateral (sideways) veins of the leaves on the upper leaf surface. A female can produce on average 20-40 eggs which hatch after 2-3 weeks. Larval development takes up to 4 weeks to complete. During this time larvae feed on the inside of the leaves but leave the upper and lower leaf surfaces intact. Pupae develop in a silken cocoon for 2 weeks before they are fully developed however, the over-wintering generation can remain at this stage for 6 or 7 months.

Figure 2: Disfigured tree caused by severe infestation

Control

Over consecutive years, damage can be reduced by removing fallen leaves during the autumn and winter. Leaves can be composted thoroughly, to destroy the over-wintering pupae, or collected into heaps and covered with a layer of soil or other plant material to prevent adult emergence the following spring. Burning of infected leaves is also recommended.

Pheromone traps are available for monitoring when the adults have emerged, and treatments can be applied. Our research so far has indicated pheromone traps cannot significantly reduce the visual damage by the leaf miner. No specialist parasitoid has been found for use as a biological control. Generalist parasitoid wasps, crickets, and birds have been observed to feed on the larvae with little apparent impact on the vast numbers of larvae.

Application of appropriate plant protection products can manage this pest. Application early in the growing season, when the adult moths emerge, is recommended.