Factsheet 11/10

Field Vegetables

Project FV 317

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Turnip sawfly: biology and control

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A major outbreak of turnip sawfly in 2006 resulted in damage to turnips and oilseed rape and led to economic losses in watercress and brassicas grown as baby-leaf salads. This factsheet will help growers identify turnip sawfly as it details its anatomy and biology in Britain. Guidelines on chemical and cultural control are also given.

Background

Turnip sawfly (*Athalia rosae*) was a major pest in the 18th and 19th centuries, at a time when turnip was an important crop nationally. There are contemporary reports of mass immigrations 'like flights of bees' and 'in clouds as to darken the sky', and in 1782 turnip sawflies were washed up on East coast beaches to a depth of 5 cm. However, during the early 20th century the insect was all but eradicated, and it was not until the 1940's that it began to re-appear. Sporadic, minor outbreaks only were recorded until, in 2006, a major outbreak occurred, resulting in damage to oilseed rape and turnip as well as economic losses in watercress and brassicas grown as baby-leaf salads. Losses in the latter were due to leaf feeding by larvae and contamination of harvested produce by larvae and adults (Figure 1). There is concern that the widespread cultivation of low-glucosinolate oilseed rape and a rise in mean temperature due to climate change will together allow the insect to establish itself once again as a regular problem for British growers.

1 Larvae of turnip sawfly on watercress; severe leaf damage and potential contamination risk

Description

Adult

The adult is about 6-8 mm long. It is predominantly orange, with a black head (Figure 2). Its thorax is mainly orange, but has two black 'shoulder pads.' The abdomen is entirely orange. Its wings are translucent pale orange with the leading edge black. Legs are mainly orange, but with the tip of each tarsal segment black, which gives the legs the appearance of being black-banded. The pest is recognisable in the field by the presence of the orange colouration on the upper surface of the thorax (other, similar, sawflies have the upper surface of the thorax entirely black) and by the orange legs with black 'hoops'.

Larva

The caterpillar-like larva (Figure 3), is 16-18 mm long when fully grown. Mature larvae can be black, very dark green or dark slate grey, with paler grey sides along the side above the legs and on the underside. The head is round, black and shiny. Larvae have three pairs of true legs and 8 pairs of prolegs. They can be distinguished from moth and butterfly caterpillars by the number of prolegs (there is a maximum of 5 pairs in moths and butterflies) and from other sawflies by their colouration and host plant selection.

2 Adult turnip sawfly feeding on pollen. Note the yellow/black pattern of the thorax and black rings around the legs

3 Larvae of turnip sawfly feeding on tatsoi leaves

Biology

Development

First generation adults emerge from pupae in the soil in May or June. They mate immediately with oviposition beginning shortly after. Up to 300 eggs are laid, each one into a small pouch slit into the margin of a host plant's leaf. The eggs hatch in 6-8 days. Young larvae feed inside the leaf at first, then externally on the underside. They eventually leave a leaf skeleton. Development takes 10-13 days at temperatures above 20°C, after which the larvae drop to the soil and pupate in a cocoon 1-5 cm below the surface. Pupation takes 10-13 days, followed by emergence of the next generation of adults.

Generations

There are normally three generations a year in southern Britain. Second generation adults appear in July and early August and the third generation in August and September. Recent experience has shown the third generation to be the most numerous.

Immigration

Turnip sawfly is a common and widespread insect on mainland Europe. Suitable temperatures for flight and favourable winds may result in mass immigrations. The most recent case was in 2006, when large numbers crossed the south coast on southerly winds from France, but there have been other more localised immigrations, for instance near Clacton, Essex in June 2007; near Lowestoft, Suffolk in 2008 and 2009 and; north of Norwich in autumn 2009.

Host plants

Turnip sawflies are attracted to plants of the Cruciferae family by the isothiocyanates and glucosinolates that they contain. Turnip, tatsoi and mizuna (the latter two being Japanese greens grown as baby-leaves) are particularly favoured, but other Cruciferae such as oilseed rape, mustards, watercress and even weeds such as charlock can also be hosts.

4 Adult turnip sawfly on a sticky trap. Yellow/black thorax and black rings just visible on specimen at centre

Management

Monitoring

The simplest form of monitoring is direct observation. Adult sawflies feed on pollen or nectar, so flowering hedgerow plants can be used as monitoring sites, with the presence of turnip sawflies giving an early warning of imminent attack. Yellow sticky traps set up near potential host crops are also useful if checked frequently (Figure 4). Monitoring should begin in May and continue until September. Cruciferous host plants can be used as larval monitoring sites, but by the time the larvae are seen damage is likely to be well advanced. The purpose of monitoring should be to detect sudden increases in adult activity, which might indicate that a mass immigration has occurred.

Cultural control

Wherever possible spring-sown crops should be sited away from known overwintering sites, such as oilseed rape infested during the previous autumn. Crop covers can be used to keep adults out of sensitive crops (such as Japanese greens grown as baby-leaf salads). Trials have shown that insect-proof mesh may be superior to horticultural fleece for this purpose.

Chemical control

Seed dressings may be used on oilseed rape and/or mustard. Those containing neonicotinoid components such as Cruiser OSR (thiamethoxam) or Modesto (clothianidin) are likely to give 6-8 weeks of protection from drilling against sawfly larvae. Treatment of autumn-sown oilseed rape may reduce the risk of TSF damage in nearby watercress or salads the following spring.

There is a wider range of topically-applied pesticides that should control turnip sawfly. Some are available as on-label treatments, others as Specific Off-Label Approvals (SOLA). Labels or SOLA documents should be checked to see what is available on specific Cruciferous crops. Nothing is available for use on watercress, but there are options for baby-leaf salads, rocket etc. As a guide pyrethroid insecticides such as lambda-cyhalothrin (e.g. Hallmark with Zeon Technology) and deltamethrin (e.g. Decis) have been shown in trials to be effective.

Contact materials such as fatty acids (Savona) and plant extracts (Majestik) gave some control but were less effective.

Neonicotinoid insecticides such as acetamiprid (Gazelle SG) or thiacloprid (Biscaya) have not been specifically tested but should give good control of sawfly larvae by ingestion.

Spinosad (Tracer) can be used on vegetable brassicas and should also give control by ingestion.

It should be noted that products based on Bacillus thuringiensis (B.t.), i.e. Dipel DF will control the caterpillars of butterflies and moths but NOT the physically-similar sawfly larvae.

Additional information:

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