Anthonomus spilotus – a new pest of pears in the spring

Introduction

Anthonomus spilotus is a new pest of pears in the UK. The weevil is normally found in warmer climates but is suspected to have been in the UK since at least 2015 when larvae were first identified in young leaf shoots. The weevil has also been found in other northern countries in recent years including Belgium. It is recorded in N. Africa, France, Spain, Portugal, Italy and Greece. It has established as far north as Sweden and as far east as Russia. Several factors have probably combined to give A. spilotus the opportunity to build up in UK orchards. The weevil could have been introduced in the compost of potted plants, as the pupae drop to ground level. Pear growers increasingly avoid spraying broad spectrum products in pear orchards to preserve natural predators for pear sucker control. In addition, a warming climate may be aiding survival in new regions.

A. spilotus should not be confused with either Anthonomus pyri (pear bud weevil) or Anthonomus pomorum (apple blossom weevil). A. pyri, primarily damages overwintering flower buds in pear while A. pomorum, a related species to A. spilotus, is found in apple but is reported to occasionally cause damage to pear and quince blossom.

Action points

- Monitor pear orchards weekly from February by tap sampling tree branches to check for the presence of adult pear bud weevils
- Check for feeding holes in flower and leaf buds
- Continue to monitor until May
- Make a careful decision over the need to use control measures and the choice of product
- Continue to monitor for the pest after control methods have been used
Identification

*Anthonomus spilotus* is 3-3.5 mm in length (Figure 3) with an ash coloured transverse band across the wing cases (elytra). This band has whitish coloured hairs (pubescence) and is perpendicular to the midline join of the wing cases. The body of the adult weevil also has ginger hairs, which are only visible under a microscope. The transverse band is more horizontal than that of *A. pomorum* which is more V-shaped and widens to the outer edges of the wing case. All three species (*A. spilotus*, *A. pyri* and *A. pomorum*) have strongly bowed front legs (tibiae) with a wide, conspicuous, tooth. This characteristic should therefore not be relied upon to differentiate between the three species. The extremities of the leg segments (femur, tibia) and anterior border of the prothorax are a light iron colour.

![Figure 3. Anthonomus spilotus from pear trees in Kent, 2017; (a) Male (b) Female (c) Median lobe of male genitalia. Specimens in Natural History Museum, London. Photograph by Harry Taylor](image)

Male and female *A. spilotus* are very similar but the male ‘nose’ (rostrum) is dull, with deep to rugose punctuation and very slightly shorter than the female (1.2× as long as the head and pronotum compared to 1.3× of the female). The female rostrum is shiny with fewer and less deep punctures. However, it should be noted that species differentiation is quite difficult. Specimens should be sent to an expert for confirmation. When trying to determine which species is present in your orchard, it is probably better to rely on lifecycle information and damage characteristics.

The eggs (Figure 4), which are laid inside the expanding buds, are yellowish-white in colour and elliptical in shape. The larva is a characteristic C-shape, is yellowish-white and has a brown head capsule (Figure 5). The pupal case is brown in colour and barrel shaped (Figure 6).

![Figure 4. Eggs are yellowish-white and elliptical in shape](image)

![Figure 5. Larva are a characteristic C shape with a brown head](image)

![Figure 6. The pupal case showing pupa inside](image)

**Life-cycle of the pest**

Like apple blossom weevil, *A. spilotus* has one generation per year. It overwinters until early March and then begins to feed on developing flower and leaf buds of pear and less frequently on medlar (*Mespilus*), or hawthorn (*Crataegus*).

Mating also occurs at this time of year. Data collected by NIAB EMR in 2016 suggests that the weevil may be more active at night.

The female weevil inserts her rostrum into the buds, which creates holes. Some of these holes seem to be caused simply through feeding action, especially earlier in the season.

However, later on, from mid-March (Figure 7), it is thought that egg laying begins to take place in these holes (Figure 8) although more information is needed to confirm this. When laid in flower buds the eggs are laid quite close to the anthers (Figure 9). Eggs are also found in the leaf buds. Normally one egg per bud is inserted, but sometimes two can be found. Egg laying continues until mid-April. Larvae develop inside the buds (Figures 9 and 10) into May at which point the adult numbers and feeding damage are much reduced. The aborted leaf and flower buds often drop to the ground, where the pupa (Figure 11) is thought to develop during May. Adults emerge in mid-June (Figure 12) and diapause until the following spring. *A. spilotus* never lays eggs in the autumn.
Damage caused

The feeding damage caused by the adults results in small holes through the bracts of the growing leaf buds (Figures 2 – front page, 13 and 14). Holes in flower buds are also found with blackened edges (Figures 14 and 15 – overleaf) which sometimes have liquid oozing from the hole. The puncturing causes necrosis of the plant tissues.

Later the leaf or flower buds bend and develop irregularity. Flower buds are consumed by the larvae and the fruits fail to develop. On the leaves, the larvae feed on parenchyma cells causing subsequent irregular growth. The emerging young leaflets become twisted and bent and fail to unfurl or grow properly. The leaf eventually dries up and becomes black. This should not be confused with pear leaf midge damage which is characterised by the leaf sides rolling inwards and eventually becoming black. The damage is significant as abnormal bud growth continues until May.
Monitoring

From the end of February onwards, pear orchards should be tap-sampled at least every week, to look for adult weevils. Forty trees per orchard should be assessed using a stick and white collecting tray (Figures 16 and 17) ensuring good coverage of the orchard and returning to a different area the following week. In addition unopened leaf and flower buds should be visually inspected with a hand lens for the appearance of small black holes (Figures 14 and 15), possibly with liquid oozing out of them. These holes are easy to see without a hand lens once experience is gained. Ensure that a representative area of the orchard is sampled. Guidance on how to achieve this is available in the Apple Best Practice Guide on the AHDB Horticulture website. It is important to check every pear orchard as the pest does not seem to be present in every orchard on a farm. Monitoring should continue after spray applications to check that the treatment has been effective.

Control

Although parasitoids of *A. spilotus* have been documented, populations appear to be insufficient to gain complete control of the pest.

At present, there are no cultural or biological control methods available to pear growers, so it will be necessary to use traditional crop protection products. However, to date, no spray threshold has been developed, so it is important that growers only spray when absolutely necessary as effective products may disrupt natural enemies conserved to control pear sucker.

The optimum spray timing is likely to be required either pre- or post- petal fall, although as this is a new pest of pear in the UK, further experience of its control will need to be developed to confirm this. At this time of the season, fewer pear sucker natural enemies will be present in the orchard, which may permit the use of products which might not be used later in the season as populations of these natural enemies build up.

Growers should also consider whether the size of population present in the orchard is likely to cause economical damage. More experience and data is needed, but if the larvae are found to be consuming only small numbers of flowers within a truss, this could potentially have a thinning effect as each truss produces far more flowers than the tree can hold.

Extensive damage to leaf buds, however, could, over the long term, damage the new growth and vigour of the trees and reduce yields. Because *A. spilotus* only has one generation, it may be that one single spray in one year could reduce numbers over several years.

The final choice of control product should also be considered carefully. Most sprays will be targeted to control egg laying adults as the juvenile stages of the pest are hidden inside the leaf and flower buds. Data from AHDB Projects TF 223 and TF 220 have shown Calypso (thiacloprid) to be effective at controlling adult *A. spilotus* in the spring. In laboratory studies on sprayed *A. spilotus* adults from UK pear orchards, Calypso and Spruzit (pyrethrins) gave almost 90% kill while Hallmark (lambda-cyhalothrin), Gazelle (acetamiprid) and Exirel (cyantraniliprole) offered around 50% control of adults. It should be noted that cyantraniliprole is not currently approved for use on pear. Steward (indoxacarb) and Coragen (chlorantraniliprole), applied to the adult insects topically, were ineffective.

Ideally plant protection products should not be applied during the blossom period when pollination by bees and other insects is taking place and as a result, some products have restrictions on use during blossom. Growers should consider the persistence of agrochemicals in the crop and the harm they may cause to natural enemies which become active around this time of year, including anthocorids and earwigs.

Table 1 (see insert in back cover) lists those products currently approved for use on UK pears for controlling a range of pests. Some are known to offer full or partial control of *Anthonomus spilotus* while the efficacy of the others listed is unknown. Growers should be guided by experienced pear agronomists who are BASIS qualified before making a final choice.

![Figure 15. Damage to flower bud – note the small hole beneath the sepals](image)

![Figure 16. Orchards should be tap-sampled at least weekly from February onwards using a stick and white collecting tray](image)

![Figure 17. Side view of *A. spilotus* adult knocked onto a tray](image)
Table 1. Products currently approved for use on pear which are either known to control *Anthonomus spilotus*, provide partial control or whose activity has not yet been tested.

<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Typical product</th>
<th>Approval type</th>
<th>Activity against</th>
<th>Harvest interval</th>
<th>Max. number of applications</th>
<th>Maximum rate</th>
<th>Risk to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tested and effective against <em>Anthonomus spilotus</em></strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>thiacloprid</td>
<td>Calypso/ Agrovista Reggae</td>
<td>EAMU</td>
<td>Broad range of pests</td>
<td>14 days</td>
<td>2</td>
<td>0.375 l/ha</td>
<td>Environment</td>
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<tr>
<td>pyrethrins</td>
<td>Spruzit</td>
<td>Full</td>
<td>Broad range of pests</td>
<td>None listed</td>
<td>4</td>
<td>2 litres per 100 litres of water</td>
<td>Environment</td>
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<tr>
<td><strong>Tested and partially effective against <em>Anthonomus spilotus</em></strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>acetamiprid</td>
<td>Gazelle</td>
<td>Full</td>
<td>Aphids, weevils</td>
<td>14 days</td>
<td>2</td>
<td>0.375 kg/ha</td>
<td>-</td>
</tr>
<tr>
<td>lambda-cyhalothrin</td>
<td>Hallmark with zeon technology</td>
<td>Full</td>
<td>Broad range of pests</td>
<td>7 days</td>
<td>4</td>
<td>0.09 l/ha</td>
<td>Environment</td>
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<tr>
<td><strong>Tested using topical application in the laboratory and ineffective against <em>Anthonomus spilotus</em></strong></td>
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<td>chlorantraniliprole</td>
<td>Coragen</td>
<td>Full</td>
<td>Caterpillars</td>
<td>14 days</td>
<td>2</td>
<td>0.175 l/ha</td>
<td>Environment</td>
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<td>indoxacarb</td>
<td>Steward</td>
<td>Full</td>
<td>Caterpillars</td>
<td>7 days</td>
<td>3</td>
<td>0.25 kg/ha</td>
<td>Environment</td>
</tr>
<tr>
<td><strong>Products approved on pear but whose activity has not yet been tested</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>deltamethrin</td>
<td>Decis/Bandu</td>
<td>Full</td>
<td>Broad range of pests</td>
<td>7 days</td>
<td>None listed</td>
<td>0.35 l/ha</td>
<td>Environment</td>
</tr>
<tr>
<td>diflubenzuron</td>
<td>Diflox Flow/ Dimilin Flo</td>
<td>Full</td>
<td>Caterpillars</td>
<td>14 days</td>
<td>2</td>
<td>0.3 l/ha</td>
<td>Environment</td>
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<td>fenoxycarb</td>
<td>Insegar WG</td>
<td>Full</td>
<td>Caterpillars</td>
<td>42 days</td>
<td>None listed</td>
<td>0.6 kg/ha</td>
<td>Bees and environment</td>
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<td>flonicamid</td>
<td>Mainman</td>
<td>Full</td>
<td>Aphids</td>
<td>21 days</td>
<td>3</td>
<td>0.14 kg/ha</td>
<td>Environment</td>
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<td>methoxyfenozide</td>
<td>Runner</td>
<td>Full</td>
<td>Caterpillars</td>
<td>14 days</td>
<td>3</td>
<td>0.6 l/ha</td>
<td>Bees and environment</td>
</tr>
<tr>
<td>thiamethoxam</td>
<td>Centric</td>
<td>Full</td>
<td>Broad range of pests</td>
<td>14 days</td>
<td>2</td>
<td>0.4 kg/ha</td>
<td>Bees and environment</td>
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<tr>
<td>spirodiclofen</td>
<td>Envidor</td>
<td>Full</td>
<td>Mites and suckers</td>
<td>14 days</td>
<td>1</td>
<td>0.6 l/ha</td>
<td>Bees and environment</td>
</tr>
<tr>
<td>spinosad</td>
<td>Tracer</td>
<td>Full</td>
<td>Broad range of pests</td>
<td>7 days</td>
<td>4</td>
<td>0.25 l/ha</td>
<td>Environment</td>
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Further information

Two published papers are available with further information on *Anthonomus spilotus*:


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Figure 3 – Natural History Museum (Harry Taylor)