

Blueberry gall midge

Dasineura oxycoccana

PLANT PEST FACTSHEET



Figure 1. Damage to blueberry leaves caused by *Dasineura oxycoccana*

Background

In June 2008, the Plant Health Service in England and Wales was contacted by a private crop consultant concerned about a cecidomyiid infestation in a blueberry crop (*Vaccinium corymbosum*) at a nursery in Herefordshire. Anecdotal evidence suggested that the midge had previously been present at the nursery for at least a year. Infested plants with live larvae were collected from the site and sent to the laboratory for examination. Adult flies were reared from these samples and these were identified as a North American species, *Dasineura oxycoccana* (Johnson).

In June 2009, the Plant Health and Seed Inspectorate carried out a survey of blueberry crops in England and Wales, looking for *D. oxycoccana*. The pest was found to be present at a number of additional nurseries and production sites across England, in all cases on *V. corymbosum*: one site in Hampshire, two sites in Kent, two sites in Norfolk, and two sites in Lancashire. Damage symptoms (Figs 1 and 2) were also consistent with those seen at the original site the year before.

Given that the midge appears to already have a wide distribution within England, it has been proposed that the plant health authorities will take no statutory control action.

Geographical Distribution

Dasineura oxycoccana is native to North America (found from Canada to the Gulf Coast). The midge was first recorded in Europe in Italy in 1996, and has subsequently been reported from Latvia and Slovenia, although there are no details available concerning any subsequent establishment.



Figure 2. Close up view of damage to blueberry leaves

Figure 3. Final instar larva

Figure 4. Adult female

Host plants

In North America, *Dasineura oxycoccana* is a damaging pest of cultivated *Vaccinium* species, including *V. corymbosum* (highbush blueberry), *V. ashei* (rabbiteye blueberry) and *V. macrocarpon* (cranberry). In the USA, when associated with blueberry it is often referred to as blueberry gall midge; however, where the midge occurs on cranberry, it is known as cranberry tipworm.

Identification

The appearance of *Dasineura oxycoccana* larvae varies as they develop, from translucent-white, through yellow, to an orange hue (Fig. 3). They are about 1-2 mm long and 0.3 mm wide.

The adult *D. oxycoccana* is a relatively small species of midge with a wing-length of 1.0-1.5 mm (Fig. 4). Morphological differences between the 260 or so species of *Dasineura* recorded from Europe are slight and even specialists find them difficult to separate. Practical identification of adults and larvae is therefore usually based on host plant associations and symptoms. *Dasineura oxycoccana* is the main pest species on blueberry in North America; other species are known to be associated with *Vaccinium* in both Europe and North America, but little is known about most of these. However, *Prodidiplosis vaccinii* (Felt) another North American species that attacks blueberries has been recently found in Spain. But to date, *P. vaccinii* has not been found in the UK. The two species are usually easily separated by specialists.

Biology, damage and detection

The life history of the midge under British conditions has yet to be investigated. However, the following has been observed of the midge in North America. The adult females oviposit between the developing floral or vegetative bud scales. The larvae then develop, protected by the unopened leaves or flower buds. In North America, in cranberry there can be a number of successive generations in a single year; the larvae spin a silken cocoon within which they pupate. This occurs within the damaged tip except for the final generation each year, which pupates in the soil where they over-winter. Adults emerge in the spring to mate and lay eggs.

The midge is present in both northern and southern states in the USA, and there appears to be a climatic demarcation between populations that attack leaf buds only and populations that attack both flower and leaf buds. This is probably related to timing of the emergence of adults from over-wintering pupae. Thus, in south-eastern Georgia adult midge populations are usually low through the period when the flower buds are most susceptible to damage, whereas in southern Florida, where the adults are able to emerge earlier, the flower buds are attacked causing severe economic losses.

At the English sites, damage symptoms have been consistent. In each case, the larvae have attacked the young vegetative shoots of the blueberries, causing leaf distortion, blackening and death of the young buds (Figs 1 and 2). There have been no reports of damage to flower buds; this was also the case in Italy.

The two methods that, in the USA, have proved effective for the early detection of *D. oxycoccana* are: i) collecting young buds and placing them into a bag at room temperature- if the buds are infested, young larvae will begin to emerge after 2-4 days; ii) collecting buds and dissecting them under a 10x dissecting microscope. Once feeding damage is apparent, the associated larvae can be detected with the naked eye.

Pest management

The degree of damage being caused by *D. oxycoccana* and the most appropriate control methods have not been established for the UK. Therefore, the pest levels at which treatments are advisable is yet to be determined. In Washington State, USA, it has been noted that low pest densities can lead to an increase in yield in cranberry crops, because the larval feeding causes ancillary branching and additional floral development. However, in Florida heavy infestations of *D. oxycoccana* have killed 20% to 80% of the floral buds on susceptible bushes of rabbiteye blueberry. Most of the information that is available on pest control comes from the USA, but only some of this is applicable to the UK due to the differences in insecticide registration, production systems and climate.

Two methods of cultural control have been suggested in the USA, although they are not yet proven techniques and may not be appropriate to UK production systems. Firstly shallow disking beneath blueberries, in late autumn or early winter to kill diapausing pupae. Secondly using a disk to spread a thin layer of sand under blueberry bushes to inhibit adult emergence. There are no commercially available biological control techniques that are known to be effective.

Adult *D. oxycoccana* are believed to be susceptible to insecticides, but the eggs and feeding larval stages are less easily killed since these stages are partially protected by the surrounding plant tissue. In the UK, there are Specific Off Label Approvals for the use of thiacloprid (Calypso) on protected and outdoor blueberry crops; however, it is unclear how effective this product is against this midge. Products containing spinosad have provided some control of this pest in the USA. However, spinosad (as Tracer) is only suitable for propagation crops, because any fruit harvested within 12 months must be destroyed. Spinosad should not be applied to flowering crops when pollinating insects are active. When using any pesticide, always read and follow the conditions on the manufacturers label and Specific Off Label Approvals.

Authors

D. Collins and D. Eyre

The Food and Environment Research Agency (Fera). July 2010

© Crown copyright 2010