Grower Summary

SF 126

Blueberry gall midge: sex pheromone monitoring and control with insecticides

Annual 2013

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Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of the full report, please email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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Project Number:	SF 126
Project Title:	Blueberry gall midge: sex pheromone monitoring and control with insecticides
Project Leader:	Professor Jerry Cross
Contractor:	East Malling Research
Industry Representative:	Laurie Adams
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Previous report/(s):	None
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Project Cost:	£60,871

Headline

The blueberry midge pheromone has been synthesised and is available for evaluation in the UK.

Background

The blueberry gall midge (*Dasineura oxycoccana* (Johnson 1899), syn *Dasineura vaccinii* (Smith, 1890)) is a damaging invasive pest of highbush blueberry (*Vaccinium corymbosum*) in the UK. It is also a serious pest of blueberry in the USA and Canada where it originated and where it is known as the cranberry tipworm, though recent work in Canada has shown that *D. oxycoccana* on cranberry and blueberry produce and respond to different sex pheromones, and are therefore different species. It is abundant and widely distributed in UK blueberry crops, having spread from nurseries on planting material and is most important in newly planted crops and during the first two-three years of establishment.

The midge lays its eggs in the tender growing points of shoots and the larvae live in leaf galls in the shoot tip, causing leaf distortion and blackening of buds, which are killed by the attack. The growth habit of the blueberry occurs in flushes which end with the death of the terminal meristem and the next growth flush starts from the next bud or buds below. Midge attack causes termination more rapidly than it would otherwise occur. Serious attacks can affect the next season's crops because infested bushes develop few bud-bearing shoots. The pest is particularly troublesome on crops grown under protection.

Currently, UK growers attempt to control the midge by applying a spray of thiacloprid (Calypso) when galling damage is first seen in spring. Commercial experience also indicates that a weekly programme of sprays of pyrethrum prevents midge attack. However, on other crops, including blackcurrant, blackberry, apple and pear, thiacloprid (Calypso) has been shown to be at best only partially effective for leaf midge control, and it is likely this is the case with the blueberry midge. Thus effective methods for monitoring the pest and controlling it with insecticides are needed.

EMR and NRI have successfully identified the female sex pheromones of other economically significant midge pests of UK fruit crops including apple leaf midge, pear leaf midge, pear midge, raspberry cane midge, blackcurrant leaf midge and blackberry leaf midge. Monitoring traps for several of these are in use commercially.

Other work by EMR has shown that an EC formulation of spirotetramat is very effective for control of the leaf midge pests and it is likely to be effective against blueberry gall midge. Best control of leaf gall midges on other crops is achieved with a spray of insecticide timed to coincide with the onset of the midge's first flight in spring, as indicated by catches in sex pheromone traps. The traps are highly sensitive and give good quality information and an early warning of the magnitude and timing of attacks. The aim of this project is to identify the female sex pheromone of the blueberry gall midge and establish an effective insecticide to provide the basis for development of a similar strategy against this pest.

Summary of the project and main conclusions

The female sex pheromones of the two sub-species of *Dasineura oxycoccana* found on blueberry and cranberry have been identified and synthesised by Canadian researchers. Lures containing the two pheromones were provided for testing in the UK and the blueberry midge pheromone was shown to be highly attractive to male blueberry midges. No midges were attracted to the cranberry midge lure in the UK.

Analysis of the compounds in the lures suggested these were saturated and mono-unsaturated 2,14-diacetoxyheptadecanes respectively, and this was confirmed in a subsequent publication by the Canadian group. The pheromone of the blueberry midge has now been synthesised at NRI as both the racemic form and *R,R* stereoisomer and these are available for field testing.

A field trapping test showed that significantly more blueberry midges were caught in traps 0.5 m above ground level than in traps at 1.0 m, and few midges were caught in traps at 2.0 m. Further experiments are required to optimise the loading of pheromone in the lure.

It was not possible to carry out a trial of insecticides against the blueberry midge because of the absence of midges in the proposed trial plot, in spite of the fact that the field was heavily infested during 2011. These trials will be carried out during 2013 in a new dedicated experimental plantation at East Malling Research.

Financial benefits

No detailed financial information on the cost to growers of the blueberry midge has been made in the UK. In Latvia, the midge has been shown to reduce growth and yields of large fruited cranberry by 60% (Apenite, 2010). In the USA, the blueberry gall midge causes losses in excess of $20 m per annum to rabbiteye blueberries (*Vaccinium ashei*) where the

pest feeds in the flowers leading to premature floral bud abscission, or aesthetically compromised fruit when mature (Dernisky *et al*., 2005).

Action points

No action points for growers so far.