Grower Summary

SF 145

Managing Spotted Wing Drosophila (SWD) in the UK: Determining its distribution and seasonal population dynamics

Annual 2014

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

Read the label before use: use pesticides safely.

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Further information

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GROWER SUMMARY

Headline

- Monitoring for adult and larval spotted wing drosophila (SWD) has been optimised and contributions have been made to understanding the biology of the pest in UK habitats, and in managing fruit waste and pest control.

Background and expected deliverables

Spotted wing drosophila (*Drosophila suzukii*, SWD) is a new invasive pest to the UK, but has caused considerable losses in fruit crops in Europe and the USA. The overall aim of the project is to monitor the spread of SWD within the UK, and to develop measures for its control. To this end five objectives have been set for the project;

Objective 1. To determine the distribution and seasonal population dynamics of all life stages of SWD in different cropping situations and especially polytunnel crops on fruit farms in the UK.

Objective 2. To develop economically and environmentally sustainable treatment and disposal strategies for soft and stone fruit waste to eliminate it as a source of SWD infestation and attraction on fruit farms.

Objective 3 To develop and evaluate sampling and extraction methods for quantifying SWD infestations in different soft and stone fruits.

Objective 4. To develop a synthetic lure and attract and kill technology for SWD for incorporation into IPM programmes.

Objective 5. To obtain evidence for the effectiveness of different plant protection products including biopesticides and for developing an insecticide resistance management strategy for SWD.

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Summary of the project and main conclusions

Objective 1 – Population dynamics

This was subdivided into two tasks. The first involved establishing a monitoring network across the UK, with fourteen sites; five in Kent (including East Malling Research), one in Surrey, two in the west Midlands, two in eastern England and four in Scotland (including the James Hutton Institute). This network has been successfully established, with 130 traps operating, and plans to add another site in the West Midlands in 2014. In addition, the design of trap and bait used, has been optimised to produce a considerable advance in efficiency and ease of use since the start of the project.

The first record of SWD in 2013 was made at East Malling Research in August. Since then, SWD has been captured in crops at each of the six national monitoring sites in Southern England, though at very low numbers. In East Anglia, the first SWD was recorded in December 2013. No SWD were found in the national monitoring traps in West Midlands or Scotland, though SWD is known to occur in the West Midlands on other farms. The numbers caught in crops have generally been very low and those caught were at the end of the year, so crop damage has been minimal. This is probably due to the exceptionally cold winter and spring in early 2013.

The second task was to study the distribution of SWD on farms in more detail. Therefore two farms (including EMR) were sampled with over 50 traps each, in a range of crops and in neighbouring wild areas and woodlands. SWD were detected throughout these farms, but were especially associated with particular woodlands and hedgerows. November and December saw a fall in catches in crops, but there was a steep increase in catches in wild areas during these months. This presumably reflected pest migration to more sheltered areas for the winter. SWD can remain active throughout the winter if the weather is mild.

To determine if SWD can utilise native plant species as hosts, fruit were collected from a range of species. SWD was found in berries collected from Elder and Blackberry, and it is known that they are also capable of using Dogwood, Sloe, Snowberry, Red Bryony and Nightshade.

Additional research is tracking the development of the ovaries in the female SWD flies. This work will allow scientists to predict when egg laying will start in wild hosts in the spring.

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Objective 2 – Waste disposal

One conclusion from research in SWD infested countries is that crop hygiene is an important component of SWD control. However, consultations with UK soft fruit growers indicated that about 20% of the strawberry crop and 10-15% of the raspberry crop is currently waste, mainly disposed of in a 'compost heap' which rots down over several months. Cherry and plum waste is not usually collected from under the trees. Quantities of fruit waste produced by individual companies can range from <1 tonne to >100 tonnes per week during peak season.

As there is no published information on the conditions needed to kill SWD in fruit waste, this was investigated. It was found that fruit fermentation in bins was effective, but only in sealed containers which become anaerobic for up to 13 days. Further research will reveal if shorter containment periods are also successful at killing Drosophila larvae. Another consideration is that this fermented waste, although devoid of SWD, is highly attractive to SWD when opened to the environment. Therefore it cannot be simply spread on land, but has to be ploughed into the soil.

Objective 3 – Sampling and extraction methods

It is very difficult to discern SWD larvae in fruit by simple visual examination of the fruit and so various methods used around the world were assessed to quantify larval SWD infestation in blueberries, cherries and raspberries. All methods rely on stresses to induce the larvae to leave the fruit, sometimes encouraged by gently crushing the fruit.

Immersion of fruit in either a salt or sugar solution was trialled with some success, though 100% recovery was not achieved, even though the experiment was timed to assess the largest, 3rd, instars. Freezing overnight was found to generally produce lower counts, as well as taking longer to assess.

Preliminary trials on strawberries (not presented here) suggested that a different method may be required for this fruit.

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Objective 4 – Lures/attract and kill technology

A wide variety of traps and baits have been developed around the world for SWD recording. Work at EMR compared the most promising of these traps for efficiency and ease of use. In collaboration with NRI a new synthetic attractant bait combination was developed and was shown to be attractive to SWD and more importantly more selective for this species. This new synthetic attractant is not yet commercially available to growers as it is still in trial.

Objective 5 – Crop protection

Insufficient SWD were present in the UK to undertake field trials in 2013. However, strawberry fruit with field doses of insecticide residues were assessed using a laboratory culture to determine the effectiveness of seven insecticides, including spinosad (Tracer), chlorpyrifos (Equity), lambda-cyhalothrin (Hallmark) chlorantraniliprole (Coragen), deltamethrin (Decis) pyrethrins (Spruzit) and a coded product. These were compared to an untreated control. Harvest interval was up to two weeks post insecticide application, to determine any effect of residue decay.

Spinosad, the coded product and chlorpyrifos gave control of SWD for up to two weeks after spraying (no adult SWD emerged from fruits exposed to SWD post spraying). Lamda-cyhalothrin and pyrethrins gave very short and variable control of SWD – up to two days. None of the other products were effective at reducing SWD in this strawberry trial. This trial will be repeated in 2014 on raspberry fruits. SWD develops insecticide resistance easily, and good crop hygiene and other non-chemical controls should be combined with rotations of modes of action of insecticides to prevent insecticide resistance.

Financial benefits

SWD poses a clear threat to the fruit industry, particularly soft fruit and cherries. Experience in other countries indicates that it has the capacity to spread rapidly, cause devastating damage to the industry and have an impact on the wider environment. There are clear, significant differences between the UK and other regions of the world where the pest has been found, in terms of climate, crops, varieties, growing systems and approved pesticides. However, damage has caused significant financial losses to many of the fruit growing countries and individual growers.

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Action points for growers

- Growers should monitor susceptible crops and wild areas around crops so that they can predict the onset of egg laying by SWD.
- Growers should use the modified Biobest trap with the Dros-attract bait to monitor for SWD during the 2014 season.
- Growers should consult their BASIS qualified advisors before making a final choice of crop protection product.
- Crop hygiene needs to be maintained and waste fruit should be treated by containing in sealed vessels and then disposed of in a way which renders the waste unattractive to further SWD egg laying.
- Immersion of fruit in sugar or salt solution is recommended for detection of larval infestation in the crop.

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