



Grower Summary

CP 122

Viral pathogens suitable for the control of
Drosophila suzukii in the UK

Annual 2015

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The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

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 AHDB Horticulture office (hort.info.@ahdb.org.uk), quoting your AHDB Horticulture number, alternatively contact AHDB Horticulture at the address below.

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Project title: Viral pathogens suitable for the control of *Drosophila suzukii* in the UK

Project number: CP 122

Project leader: Dr Darren Obbard (University of Edinburgh)

Report: Annual report, December 2015

Previous report: N/A

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Location of project: University of Edinburgh, Edinburgh and East Malling Research, Kent

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Date project commenced: September 2014

Date project completed (or expected completion date): September 2017

GROWER SUMMARY

Headline

- New viruses discovered in *Drosophila* pest: the first steps on the road to a novel biopesticide.

Background and expected deliverables

Drosophila suzukii (Matsumura), also known as the spotted wing drosophila (SWD) is an invasive fly pest of soft fruits. Its recent invasion of the fruit growing regions of North America and Europe and the damage it has caused there have driven interest in finding new control solutions. Conventional chemical control methods have many drawbacks and are difficult to implement within integrated pest management (IPM) programmes, consequently the development of an alternative IPM compatible biopesticide would be beneficial for growers, consumers and pest management professionals alike. This study seeks to characterise the viral diversity of SWD with the aim of identifying a pathogen suitable for the control of this pest in UK fruit crops. A combination of approaches, both cutting edge genetic techniques and traditional lab based investigation, will be used to identify the viruses infecting SWD from large samples of wild flies, before viruses are isolated and investigated for their interactions with their *Drosophila* host or hosts in the laboratory and field.

Summary of the project and main conclusions

The viruses of *Drosophila suzukii* (spotted wing drosophila or SWD) offer good potential candidates for the development of a microbe based bioinsecticide. However, to date, the viruses of *D. suzukii* remain almost completely unstudied. Cutting edge genetic techniques have been used to sequence the genetic material of all pathogens infecting this fly. Through the lab's expertise in the study of *Drosophila* viruses we have identified a selection of viruses present in wild *D. suzukii*. Some viruses discovered appear to be very closely related to the viruses found in *D. melanogaster*. Others however, seem to be unique to *D. suzukii* and new to science. Through a technique called serial passage we have confirmed that an extract containing only the viruses of a large pool of wild flies has a lethal effect on *D. suzukii* in the lab. We are currently in the process of identifying which viruses cause these lethal effects and isolating pure viral isolates for further experimentation. Further sequencing is now underway for another large sample of flies caught in 2015.

Financial benefits

The impact of this pest on the European horticultural industry has already been substantial, with *D. suzukii* having caused losses of over €8 million in fruit crops in Northern Italy in 2010 and 2011 and more than €1.5 million for French strawberries in 2011 (FERA, 2015). The European and Mediterranean Plant Protection Organisation (EPPO) in a recent 'Pest Risk Analysis' deemed this organism to be a potential threat to crops in its region. Potential damage is described as "massive" and the regions ability to control it as "with much difficulty" (EPPO, 2010). In the Pacific fruit growing regions of the USA, the estimated damage due to *D. suzukii* has been calculated at over €400 million/year (Bolda et al., 2010). With damage estimates for the UK slow to emerge, it is hard to quantify the exact financial damage that this pest has done since its establishment here.

A key consideration for the damage caused by this pest is the effect of disrupting already established IPM programmes to gain control. Changes in management techniques, necessitated by the presence of this pest, often include the use of crop protection products not compatible with residue or resistance management practices. Without IPM compatible products, damage is not limited to that done by the pest itself but also extends to secondary pest damage caused by the use of broader spectrum or longer persistence products. Additionally these 'emergency use products' are often required close to harvest, endangering the low residue standards enforced by retailers.

Action points for growers

- It is too early in the life of this project to identify any action points for growers.