



Grower Summary

SF/TF 170
CTP_FCR_2017_1

Developing a 'push-pull'
strategy for the
management of *Drosophila*
suzukii

Annual 2018

Disclaimer

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

©Agriculture and Horticulture Development Board 2019. No part of this publication may be reproduced in any material form (including by photocopy or storage in any medium by electronic mean) or any copy or adaptation stored, published or distributed (by physical, electronic or other means) without prior permission in writing of the Agriculture and Horticulture Development Board, other than by reproduction in an unmodified form for the sole purpose of use as an information resource when the Agriculture and Horticulture Development Board or AHDB Horticulture is clearly acknowledged as the source, or in accordance with the provisions of the Copyright, Designs and Patents Act 1988. All rights reserved.

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.

AHDB Horticulture,
AHDB
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel – 0247 669 2051

AHDB Horticulture is a Division of the Agriculture and Horticulture Development Board.

Project title: Developing a 'push-pull' strategy for the management of *Drosophila suzukii*

Project number: SF/TF 170
CTP_FCR_2017_1

Project leader: Daniel Bray, University of Greenwich., Charles Whitfield, NIAB-EMR., Michelle Fountain, NIAB-EMR. and David Hall, University of Greenwich, NRI.

Report: Annual report, October 2018

Previous report: None

Key staff: Christina Faulder

Location of project: Greenwich University, Medway Campus and NIAB-EMR

Industry Representative: N/A

Date project commenced: October 2017

Date project completed (or expected completion date):

GROWER SUMMARY

Headline

- We are developing a “push-pull” strategy, which combines insect attractants and repellents, to provide year-round crop protection against the spotted wing drosophila (*Drosophila suzukii*).

Background and expected deliverables

Drosophila suzukii, also known as spotted wing drosophila (SWD), is a major insect pest of soft and stone fruit crops. This invasive fruit fly was first found in the UK in 2012 and has quickly spread (Harris and Shaw, 2014). *Drosophila suzukii*, lay their eggs in ripening fruit (Goodhue et al., 2011). The eggs hatch and the larvae cause the fruit to collapse through feeding. Secondary damage is caused by pathogens which enter the fruit through female penetration of the skin (Calabria et al., 2012). There are currently no effective strategies for control of this pest.

There are two distinct forms of *D. suzukii*: a summer morph, which feeds on fruit, and an overwintering winter morph. The summer morph transitions into the winter morph in response to lower temperatures and reduced exposure to light (Toxopeus et al., 2016). Most research has focused on control of the summer morph, but the winter morph may be equally important: reducing overwintering populations may limit invasion of crops by the summer morph in early spring.

In this research project, we are developing a push-pull strategy for year-round control of *D. suzukii*. Push-pull employs repellents to ‘push’ pest insects from the crop and attractants to ‘pull’ them into a trap or onto a non-target plant (Cook et al., 2007). In Year 1, we have conducted electrophysiological assays to identify chemicals which can be detected by the antenna of *D. suzukii*. As the summer morphs and winter morphs have different behaviours ecologies, and may respond differently to chemical stimuli, (Kirkpatrick et al., 2018) we have tested our chemicals against both morphs.

Summary of the project and main conclusions

In the first year of this PhD project, we have shown that the summer and winter morph could detect all fourteen of the putative repellents tested, as measured by electrical changes in the antenna. Three of the chemicals tested (129/04, 129/05, 129/06) elicited a different magnitude of response in summer and winter morph. This may equate to a difference in antennal sensitivity between the two morphs, which could translate into differences in behaviour relevant to development of control programmes. Bioassays are now being conducted to identify which of these chemicals can repel both the summer and winter morph away from fruit.

Financial benefits

The soft and stone fruit industries are currently heavily dependent upon traditional crop protection products to control SWD. Without them, serious crop losses of up to 90% could occur in cherry crops with at least 50% of losses in other susceptible soft and stone fruit crops. There is increasing pressure to reduce reliance on crop protection products, so this project is attempting to develop alternative management strategies.

Action points for growers

- There are no grower action points at this early stage of the project.

