AHDB HORTICULTURE

Grower Summary

CP 171

The use of highly attractive yeast strains for controlling *Drosophila suzukii* (spotted wing drosophila)

Annual 2018

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Project title:	**The use of highly attractive yeast strains for controlling *Drosophila suzukii* (spotted wing drosophila).**
Project number:	CP 171
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Report:	Annual report, September 2018
Previous report:	N/A
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Date project commenced:	02 10 2017
Date project completed (or expected completion date):	

GROWER SUMMARY

Headline

- A number of yeasts have proved to be attractive to *D. suzukii* (SWD) in laboratory choice tests.

Background and expected deliverables

Since being identified in the UK in 2012 *Drosophila suzukii* – spotted wing drosophila (SWD) has started to cause commercial damage in soft and stone fruit plantations, resulting in yield losses and increasing expenditure on control methods. *D. suzukii* is currently controlled by plant protection products, crop hygiene measures and insect exclusion mesh. With more stringent measures being imposed on the use of plant protection products, often resulting in the withdrawal of particular products, combined with the threat of insecticide resistance from a limited number of active ingredients, new control methods need to be developed and optimised.

Complex interactions take place between fruit, microbial organisms and *Drosophila* species and understanding these is important in developing strategies for the control of *D. suzukii*. Yeasts are an essential source of nutrients for *Drosophila*. They are not only important for oviposition but also larval development. Some yeast species, most notably *Hanseniaspora uvarum,* are attractive to *D. suzukii* and have the potential to produce highly attractive and selective baits. Potentially, yeasts can be deployed in two distinct ways for controlling *D. suzukii*.

The first is precision monitoring, which traps numerous adult *D. suzukii* and is widely available and easily implemented, but is labour-intensive. To date this method has not been demonstrated to reduce crop damage. Trapping is recommended for the monitoring and detection of *D. suzukii* and lure-and-kill strategies and it could be used in integrated pest management of *D. suzukii*. However, more attractive and selective baits are needed to reduce the capture rates of non-target species. This would also make detecting *D. suzukii* females easier as they can be mistakenly identified for other *Drosophila* species without the aid of a microscope.

The second is the attract-and-kill technique, which combines yeasts with plant protection products to attract flies to the control agent. This technique offers potential within IPM programmes. This system may achieve a reduction of the volume of synthetic plant protection products applied whilst simultaneously increasing the targeted exposure of *D. suzukii.* It could also reduce the exposure to non-target species to plant protection products and reduce residues in fruit. A study of the literature and results from AHDB project SF 145 have demonstrated that combining plant protection products with the yeast species *H. uvarum,* increases mortality and reduces egg laying compared to plant protection products alone.

Yeast has been widely used as an attractant in SWD monitoring traps. Dried baker's yeast has been typically used in fermentation-based baits. Since 2012, there has been a focus on the potential use of the yeast species *H. uvarum* in control strategies for SWD. Although, *H. uvarum* is known to be attractive to *D. suzukii*, not many other yeast species have been tested for attractiveness. This project will not only test the attractiveness of yeast species from an existing culture collection but also yeasts that will be isolated from ripening fruit (strawberries, raspberries, blueberries and cherries). Unlike the majority of *Drosophila* species *D. suzukii* oviposit in ripening fruit, so yeast from ripening fruit may not only be attractive but selectively attractive to *D. suzukii.* In nature microbes on the surface of fruit are complex and, currently, only single yeasts have been tested for attractiveness. This project will also test the attractiveness of combinations of yeasts.

The main aim of this project is to identify highly attractive yeast species alone and in combination and then utilise these in the control of *D. suzukii.* Additionally, this project will

characterise microbial communities on ripening fruit and investigate identified yeast for attraction to *D. suzukii* as well as its potential use in control strategies.

Summary of the project and main conclusions

Three candidate yeast species that are attractive to *D. suzukii* have been identified; *Hanseniaspora uvarum*, yeast coded 218 and 190*. Drosophila simulans* was shown to be indifferent to all three of the yeasts while *D. melanogaster* was indifferent to two of the three. Both are common non-target species often captured in *D. suzukii* monitoring traps. Additionally, multiple strains of *H. uvarum* are also attractive to *D. suzukii*, a yeast species that in the context of *D. suzukii* has received a lot of attention in the literature and is known to be attractive to *D. suzukii*. This highlights the potential for yeast to produce attractive and selective baits for *D. suzukii.* This work will continue for a further two years.

Financial benefits

Drosophila suzukii is an economically damaging pest that causes yield losses in both soft and stone fruit crops. This project has the potential to improve *D. suzukii* control. The attractive yeast species and strains identified by this project could potentially be exploited in the monitoring and control of *D. suzukii* in IPM strategies to more effectively combat this pest.

Action points for growers

- At this early stage of this three-year project, there are currently no action points for growers.