Developing a sustainable IPM system for high value *Rubus* crops (raspberry, blackberry) for Europe

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Background

SCRI research has targeted key pests of *Rubus* which affect fruit quality and are increasingly difficult to control with standard methods.

The aim is to maximise fruit quality while minimising pesticide usage for high value soft fruit crops.

Key pests targeted are raspberry beetle (*Byturus tomentosus*), affecting quality even at low density, large raspberry aphid (*Amphorophora idaei),* affecting quality and plantation life via transmission of 4 viruses, and raspberry cane midge (*Ressliella theobaldi),* affecting yield.

Raspberry beetle

Most important pest in *Rubus* production

IPM component 1 - Monitoring using white sticky traps (Swiss Rebel[®] bianco, Agrisense Vertical sticky trap)

IPM component 2 - Spray thresholds: Based on trials in 3 countries under EU RACER project > 5 beetles / trap → spray fresh production crops

IPM component 3 - Enhanced trapping / non-insecticidal pest reduction

- Identified bouquet of flower volatiles using GC-MS
- Identified biologically active volatile components using EAG
- Behavioural responses to flower compounds characterised in lab and field (several sites, crops, years)
- Optimising attractant release rates and trap design with commercial partner

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Possible non-insecticidal management of this pest for organic and conventional growers

SCRI studies indicate +ve interactions between some plant R genes and key natural enemies

Large raspberry aphid

Varieties with aphid resistance (R genes) have been bred and used successfully for > 40 years in the UK

Strong selection pressure on aphid populations has resulted in resistant breaking biotypes

The A_1 resistance gene is now fully overcome in the UK, over 30 years

The A_{10} resistance gene was fully effective against all biotypes but is **now breaking down** in parts of the UK, in less than 15 years of commercial use

Partial resistence (multigenic) **is more durable but** less effective in reducing aphid numbers

New sources of resistance and IPM strategies to protect existing R genes urgently needed

Raspberry cane midge

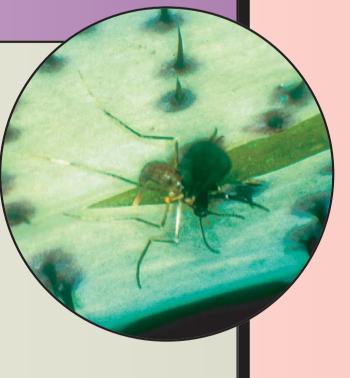- Important pest in UK and Europe as part of 'Midge Blight' disease
- Control requires accurate timing of sprays against first generation midges
- SCRI and ADAS have developed computer-based prediction model (accurate to +/- 3-days) and is available throughout UK
- EU-funded RACER project has transferred technology to Switzerland and Italy
- Poor up-take in Scotland to date

Tested monitoring system available for raspberry IPM

Summary

Key pests have been identified which affect fruit quality and plantation longevity

Pesticides are likely to be less available (EU legislation)

Consumers and supermarkets demand high fruit quality but low pesticide inputs

SCRI has developed several key components for IPM in *Rubus*

These IPM components need to be put together into grower-friendly packages and tested in different UK soft fruit production areas and types (field, protected, conventional, organic).

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