Monitoring raspberry beetle (Byturus tomentosus) with white sticky traps: the experience from three geographically distinct European areas

J A T Woodford, S C Gordon, H Höhn, K Schmid and T Tuovinen, I Lindqvist

1 Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA, UK
2 Swiss Federal Research Station for Fruit-Growing, Viticulture and Horticulture, CH-8820 Wädenswil, Switzerland
3 Agricultural Research Centre of Finland, FIN-31600 Jokioinen, Finland

Introduction

1 Raspberry (Rubus idaeus) is a high value crop, grown in many European countries for the fresh market and processing.

2 Raspberry beetle (Byturus tomentosus) damages flower buds, flowers and, especially, fruits. Adults emerge from the soil in spring and feed on young foliage until flower buds develop. They feed, mate and lay eggs in flowers.

3 Larvae cause the greatest damage. Infestations or contamination can make fruit unsaleable.

4 Most growers routinely apply one or two insecticide sprays before harvest.

5 A 2-year EU project, ‘Reduced Application of Chemicals in European Raspberry Production’ (see ‘RACER’ panel) developed methods to decrease dependence on routine ‘insurance’ sprays of pesticides to control raspberry beetle and other pests and diseases without affecting fruit quality.

Methods

Monitoring adult raspberry beetle flight activity

Raspberry beetles were trapped on white, sticky plates (Rebell® bianco), suspended from supporting wires 50-70cm above ground in spaces between canes, and facing the alleys between rows. Four traps were placed at least 20m apart in insecticide-free areas in 5-11 plantations/country in late-April or early-May, and changed at weekly intervals for 6-10 weeks.

Trials were made in 1998 and 1999 in:
- Switzerland several cultivars; IPM and organic plantations; 409 - 1060m elevation.
- Scotland 2 cultivars (Glen Clova, Glen Ample); large plantations; main raspberry-growing area.
- Finland cvs Orarava, Muskoka and Perusen; widely separated central, eastern and southern areas.

Assessing larval feeding damage to ripe fruit

250 fruits or freshly exposed husks (receptacles)/replicate from 10m lengths of the trap row and two adjacent rows were examined shortly after harvests. Husks were inspected in the field, or collected and examined in the laboratory to check the accuracy of field assessments.

Results

Raspberry beetle flight activity

In Switzerland, raspberry beetles were first trapped in late April; in Scotland, about 1-4wk later; in Finland, they were not caught until mid-May or early-June.

In Scotland and Finland, most were trapped before flowers opened.

Large numbers were caught during the flowering period in Switzerland and Scotland (>45% of the total number of trapped beetles, cf. <5% in Finland).

Damage assessments

Larvae were found far more often in husks than in the detached raspberries. There was a close relationship between damage to the husks and damaged fruits ($\tau = 0.928$).

Relationships between numbers of adult raspberry beetles and larval damage

Relationships for sites, years and countries were too variable to use damage assessments or percentage of damaged fruits to rank sites. The relationship between percentage of damaged fruits and percentage of damaged husks at sites in Switzerland (CH), Scotland (GB) and Finland (FI) is shown in the following diagram.

Conclusions

Damage assessments

- Inspecting damaged husks is an efficient indirect method to assess fruit damage.

Relationships between numbers of adult raspberry beetles and larval damage

- Trapping efficiency declines during flowering, when raspberry beetles are attracted to flowers, and white traps become obscured by dense foliage.

- In Finland, most raspberry beetles are trapped before flowering.

- In Scotland and Switzerland, large numbers are often trapped during flowering.

- Fruit damage is usually positively related to numbers of trapped adult raspberry beetles in Scotland and Switzerland, but not in Finland.

Control thresholds

Insecticide control is unnecessary for fresh market raspberries in Switzerland and Scotland at sites where fewer than 5 raspberry beetles/trap are caught before flowering.

Higher threshold (5-20 raspberry beetles/trap) for processed raspberries.

Acknowledgements

We thank the SME’s and growers who provided sites for these studies, and Ms J W McNicol (Biometrics and Statistics Scotland) for statistical advice. The RACER project was funded by the European Commission (FABR BI.98-52-2757/9538) and Bundesamt für Bildung und Wissenschaft in Switzerland.

J A T Woodford, S C Gordon, Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA, UK
H Höhn, K Schmid Swiss Federal Research Station for Fruit-Growing, Viticulture and Horticulture, CH-8820 Wädenswil, Switzerland
T Tuovinen, I Lindqvist Agricultural Research Centre of Finland, FIN-31600 Jokioinen, Finland