Grower Summary

SF 140

Control of potato aphid (*Macrosiphum euphorbiae*), on strawberry in spring,

Final 2016

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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:	Control of potato aphid (*Macrosiphum euphorbiae*), in spring, on strawberry
Project number:	SF 140
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Report:	Year 3 final report, 2015
Previous report:	Year 1 and 2 reports, 2013, 2014
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Date project commenced:	1 April 2013

GROWER SUMMARY

Headline

- The reduction in dose of effective aphid control products by 50% in admixture with Silwett achieved the same control of potato aphid on strawberry as the full rate applied alone.

Background and expected deliverables

A range of aphids are pests of strawberry, including the strawberry aphid (*Chaetosiphon fragaefolii*), the shallot aphid (*Myzus ascalonicus*), the melon and cotton aphid (*Aphis gossypii*), the glasshouse aphid (*Aulacorthum solani*) and the potato aphid (*Macrosiphum euphorbiae*). They cause direct damage to the plant; including distortion, and strawberry aphid and some other species may transmit viruses. The potato aphid has become a more common pest of strawberry in recent years. It produces copious amounts of honey dew which contaminates the fruit. Many of the insecticides applied to strawberry through the season are targeted to control potato aphid.

AHDB Horticulture project SF 094 (*Minimising pesticide residues in strawberry through integrated pest, disease and environmental crop management*, Defra HortLINK HL0191) - demonstrated that autumn sprays of thiacloprid reduced spring infestations of aphids on strawberry. However, autumn applications need to be well timed and are subject to the weather and ground conditions in October. Hence, some plantations may not receive sprays, leading to problems with aphids early the following spring. There is a need to identify which products would be more effective in spring. There are reports by agronomists that some populations of *Macrosiphum euphorbiae* may be less susceptible than others to certain insecticides, but this currently appears to have no impact on the levels of control that can be achieved with approved insecticides in brassicas and potato (IRAG 2008; 2012).

Another possible cause for failure in control may be that temperatures are not high enough in the spring for uptake of plant protection products into the plant.

Summary of the project and main conclusions

The aim of the project was to improve the control of potato aphid (*M. euphorbiae*) in the spring on strawberry. In the first year (2013) we screened nine insecticides; acetamiprid (Gazelle), a coded product, chlorpyrifos (Equity), flonicamid (Teppeki), lambda-cyhalothrin (Hallmark), pirimicarb (Aphox), pymetrozine (Chess), pyrethrins (pyrethrum) and thiacloprid (Calypso) in a randomised block experiment on potted strawberry plants. These were compared to an

untreated control. The trial was done in typical spring temperatures (average 10.4ºC). Numbers of aphids on the untreated control plots continued to increase over the trial period. All the tested strawberry approved and non-approved insecticides reduced numbers of aphids on the strawberry plants by at least 80%. By the end of the trial (10 May) no aphids were found on plants that had been treated with Gazelle, the coded product, Hallmark, Pirimicarb or Pyrethrins.

Because all the products tested in the 2013 trial were successful at controlling *M. euphorbiae*, the aim of the study in 2014 was to test the survival of *M. euphorbiae* in commercial strawberry plantations.

Two *M. euphorbiae* infested commercial strawberry plantations in Kent were used for the replicated trials and included an untreated control. The treatments were; chlorpyrifos (Equity), lambda-cyhalothrin (Hallmark with Zeon technology), pirimicarb (Aphox), pymetrozine (Chess), pyrethrins (Pyrethrum 5EC) and thiacloprid (Calypso), all at the recommended field rate. An air assisted knapsack sprayer was used to apply the sprays in 1,000 l/ha. Water sensitive papers were stapled on the underside of the; outer, middle and inner leaves before spraying, for evidence of spray coverage. A pre-assessment of the numbers of aphids on leaves was done. Counts of aphids were done 1 and 2 weeks after the insecticide applications. Samples of aphids from one site were sent for resistance testing to Rothamsted Research.

Adequate spray coverage of the insecticide treated strawberry plants was achieved. Numbers of *M. euphorbiae* on the untreated control plots declined at both sites over the trial period. All of the tested insecticides reduced the numbers of *M. euphorbiae* for at least one week. *M. euphorbiae* numbers increased by the second assessment (2 weeks later) on plants treated with chlorpyrifos and pymetrozine in both spray trials. Only lambda-cyhalothrin gave consistent, long-term, (over 2 weeks) control of *M. euphorbiae*. At one site there was no overall significant difference between the numbers of *M. euphorbiae* on the untreated plants and the plants treated with pymetrozine after a single application. It is possible that some individual *M. euphorbiae* were able to tolerate sprays of pymetrozine but so far no evidence for resistance has been found.

Because in 2014 all of the applied insecticides reduced the numbers of *M. euphorbiae* on strawberry leaves a week after the insecticides were applied, the aim of the study in 2015 was to test if control could be improved with the addition of adjuvants.

A purpose planted strawberry plantation at East Malling Research was used for the replicated trial and included an untreated control. The treatments were lambda-cyhalothrin (Hallmark with Zeon technology), pirimicarb (Aphox), pymetrozine (Chess), pyrethrins (Pyrethrum 5EC)

and Silwet L-77. All products were used at the recommended field rates and were also tested with Silwet L-77 at a 50% reduced rate. All treatments were applied twice at a 12-day interval with an air assisted knapsack sprayer (in 1,000 l/ha). A pre-assessment of the numbers of aphids on leaves was done. Counts of aphids were done 5 days and 11 days after the first application and 1 and 7 days after the second application.

Numbers of *M. euphorbiae* on the untreated control plots declined over the trial period. Single applications of lambda-cyhalothrin, pirimicarb or pyrethrum, or the same products at half the dose in admixture with Silwet L-77 significantly reduced the numbers of *M. euphorbiae* on the strawberry plants for at least one week. *M. euphorbiae* numbers on the treated plots had increased by the second assessment (11 days post application) but had decreased on the untreated control plots to the point where the differences between them were no longer statistically significant.

In all three years of the project the numbers of aphids on the untreated control plots declined naturally after 2 weeks from the pre-assessment. This could be because of natural levels of predation, disease or parasitism.

Financial benefits

Potentially, if not controlled, aphid infestations can lead to complete crop loss. No quantitative data on industry average losses resulting from aphid infestation is available but conservatively assuming that 1% of the crop is lost, this is equivalent to 507 tonnes of strawberries, worth £2.1 million p.a. Improved control as a result of this work would reduce the scale of these losses considerably. The results of this study may also be transferable to other affected crops such as raspberry, loganberry and hops.

Action points for growers

- Growers should ensure good spray coverage of the underside of strawberry leaves and into the crown of the plant. Water sensitive papers attached to the leaves during spraying will help to give a reasonable indication of whether this is being achieved.
- Insecticide resistance management must be incorporated into spray programmes by following the recommendations on the product label and rotating modes of actions of pesticides.
- Many aphicides are more effective at warmer temperatures, when they have a better fumigant action (chlorpyrifos, pirimicarb) and/or are more rapidly taken up into the plant for ingestion by aphids.

- Growers should monitor the effects of insecticide sprays to ensure control is being achieved.
- Consider autumn applications (post-harvest) for aphid control, as these have been shown to greatly reduce spring populations of aphids the following year.
- Growers should also monitor natural predator and parasitoid levels to determine whether intervention with a plant protection product is necessary.