# Grower Summary

## SF 151

Strawberry: Investigating rates and application timing of carfentrazone-ethyl (Shark) as a dormant season herbicide to support extension of use application

Annual 2015

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Before using all pesticides check the approval status and conditions of use.

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## Further information

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| **Project Number:** | SF 151 |
| **Project Title:** | Strawberry: Investigating rates and application timing of carfentrazone-ethyl (Shark) as a dormant season herbicide to support extension of use application |
| **Project Leader:** | Harriet Roberts, ADAS UK Ltd |
| **Contractor:** | ADAS UK Ltd |
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| **Report:** | Annual report 2014 |
| **Publication Date:** | 16 June 2015 |
| **Previous report/(s):** | None |
| **Start Date:** | 1 February 2014 |
| **End Date:** | 31 September 2015 |
| **Project Cost:** | £26.940 |

## *GROWER SUMMARY*

### Headline

- Following the overall application of two rates of Shark (carfentrazone-ethyl) as a dormant season spray to a strawberry crop to control existing weeds, no adverse effects were observed on crop growth or yield.

### Background and expected deliverables

There are currently few options for the post-emergence control of broad leaved weeds in newly planted or established strawberries. Products containing diquat or glufosinate-ammonium are used as spot or directed (shielded) applications to remove weeds growing in the alleyways between crop beds or rows, but only clopyralid (Dow Shield 400) can be applied overall for the control of seedling and established broad leaved weeds in outdoor strawberries. However clopyralid is primarily used to control composite weed species and application (by EAMU) is restricted to the period 1 March to 31 August, meaning there are now no options for the overall post-emergence weed control in the strawberry crop rows outside this period. Because of the restrictions to clopyralid use and its limited range of activity, hand weeding is often the only option for the post emergence control of broad-leaved weeds growing in crop rows. It is estimated that the cost of hand weeding in strawberry plantations per session could be up to £1,200/ha. A typical strawberry crop grown in the soil or in substrate is expected to require several sessions of hand weeding during its life.

Carfentrazone-ethyl (Shark) has previously been appraised both for strawberry runner control and as a dormant season spray over the top of the crop (SF 91 and 91a). In both cases very little lasting damage to strawberry plants occurred. These results indicated that carfentrazone-ethyl could be considered as an overall crop spray in strawberries, thereby extending the range of weed species controlled and the period when overall application of herbicides can be made. To do this, further trials are required to determine the optimum rates and timing of application to demonstrate safety to the crop. Such trials will also assess efficacy of control for problem weeds such as willowherb, cleavers, mallow and polygonum species. The work will include assessments of weed control in planting holes, both as a post-harvest spray and also in the dormant season.

The aim of this project was to increase confidence in the timing and rates of application of carfentrazone-ethyl (Shark) as an overall crop spray to strawberry crops in the dormant season, to control over-wintering weeds in and around strawberry plants. The results could be used to support an EAMU application.

## Summary of the project and main conclusions

This trial was carried out on a commercial farm in a crop of Elegance which was protected by a Spanish style polytunnel. The crop was entering its second (main season) cropping year and was grown in coir substrate bags placed down on raised beds. The plots chosen were known to carry a varied but uniform weed population typical for strawberry. The treatments applied were carfentrazone-ethyl used at 0.33 L/ha or 0.8 L/ha, in 500 L water/ ha compared with a hand weeded and an untreated control.

The trial was set up in a fully randomised block design with four fold replication. Each plot comprised a three metre long run of row of coir filled bags and consisted of approximately 30 plants. The treatments were applied once on 19th February 2014, when the crop was fully dormant, using an air assisted OPS knapsack sprayer and lance.

Weed assessments were made before any treatments were applied. The plots were assessed both for crop damage and weed presence some two, four and eight weeks after treatment and then again at harvest.

All fruit was harvested by farm staff over a three week period, picking class one, class two and waste fruit separately, whilst recording fruit yield and number of berries in each category for each plot.

Despite some initial scorching of overwintered green leaves (**Figure 1**). Using carfentrazone-ethyl (Shark) as an overall dormant season spray, appeared to have no lasting phytotoxic effects on the strawberry plants or on yield or quality of fruit produced by the treated plants at harvest **(Table 1).**

Whilst no statistically significant effects were seen with either rate of Shark in terms of weed control, this was due to a low weed population found in the trial area in this 2014 season. Both rates of Shark did show promising herbicide efficacy against willowherb and chickweed,

with both having some effect on groundsel. No residues were detected on fruit from the first harvest.


**Figure 1.** Scorching to plants treated with Shark (0.8 L/ha) was seen two weeks after treatment

**Table 1.** Results of dormant season applications on crop safety 2 and 8 weeks after application, weed control 2 weeks after application and marketable yield – Cambridge 2014. Phytotoxicity scored on a 0-9 scale where 0 is plant death and 9 in no effect.

| Treatment | Phytotoxicity 2 weeks after treatment | Phytotoxicity 8 weeks after treatment | % weed cover in alleyway 2 weeks after treatment | Average marketable yield g/plant |
|---|---|---|---|---|
| Untreated | 9.0 | 9.0 | 20.0 | 700.31 |
| Hand weeded | 9.0 | 9.0 | 0.5 | 802.03 |
| Shark 0.33 L/ha | 8.0 | 9.0 | 14.5 | 774.96 |
| Shark 0.8 L/ha | 6.5 | 9.0 | 12.5 | 807.84 |
| **P value** | <0.001 | NS | 0.017 | NS |
| **l.s.d. (d.f. 9)** | 0.884 | NS | 10.89 | 164.5 |

In the second part of the trial, the safety of carfentrazone-ethyl (Shark) applied overall immediately post-harvest is being assessed. Application was made in September 2014 to a crop of Elsanta, planted as cold stored runners in coir filled bags in April 2014. Crop safety and effects on yield will be assessed in spring/summer 2015 and the results presented in the final report due in September 2015. In an additional area, Shark has been applied to larger

(20 $m^2$) plots from which residue samples will be taken and analysed according to Good laboratory Practice (GLP) protocols in order to support an EAMU application.

## Financial benefits

It is estimated that removal of weeds by hand could cost up to £1,200/ha per weeding session and typically, an individual plantation (either soil or substrate grown) may require weeding several times during its life. It can be expected that an increase in the options available to commercial strawberry growers for the post emergence control of weeds in the planting holes of overwintered strawberry beds, could lead to savings in excess of £2,000 per hectare.

## Action points for growers

- For growers to benefit from the results of this work, an EAMU would be required for carfentrazone-ethyl (Shark).
- Trials work under this project (SF 151) is continuing into 2015 to assess the safety of a post-harvest application and to provide further residue data for an EAMU application.