SCEPTREPLUS

Final Trial Report

Trial code:	SP 17 Y2 - 2018
Title:	AHDB SCEPTREplus rhubarb late winter herbicide screen
Crop:	Group: field vegetable – Polygonaceae (rhubarb)
Target:	General broadleaf weeds and grasses, 3WEEDT EPPO1/89(3) Weeds in leafy and brassica vegetables
Lead researcher:	Angela Huckle
Organisation:	RSK ADAS
Period:	1st March 2018 – 31st May 2019
Report date:	19th October 2018
Report author:	Angela Huckle Emily Lawrence
ORETO Number: (certificate should be attached)	409

I the undersigned, hereby declare that the work was performed according to the procedures herein described and that this report is an accurate and faithful record of the results obtained

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Date Authors signature

Trial Summary

Introduction

The limited range of herbicides currently available leaves gaps in the weed control spectrum, and rhubarb growers experience problems with a wide range of weeds. Himalayan balsam (*Impatiens glandulifera*), and perennials such as docks (*Rumex* spp.) and thistles (*Cirsium arvense*) are particularly problematic for growers. As well as competing with the crop for nutrients and water, these weeds also hinder pickers, reducing harvest efficiency.

In recent years, rhubarb crown size and yield has decreased in both forced and green pull crops. Growers believe that this is a consequence of increased competition from weeds, amongst other influencing factors.

As a perennial crop, rhubarb presents a challenge for weed control as there is only a short window where the crop is fully dormant where non-selective herbicides can be applied safely. If any leaf is present, even senescent leaf, crop safety of any herbicide applied over the crop needs to be considered. For example, glyphosate is an effective option for weed control over winter, with an EAMU approval for Roundup Biactive in rhubarb, but the short dormant season of the crop provides only a limited window for treatment. The crop must be completely dormant with no leaf, otherwise glyphosate will kill the sets.

The objective of this trial was to identify crop safe and effective herbicides for rhubarb weed control, aiming to expand the options available to growers.

Methods

A trial was sited at a commercial rhubarb grower in Yorkshire. Treatments were applied alone or in combinations, while the crop was dormant (pre-bud break). The rhubarb crop (var. Victoria) was planted in 2016. The treatments were applied on 13 March 2018. The treatments were applied with a 1.5m boom and an Oxford Precision Sprayer knapsack at 400 L/ha water volume, with plots 1.5m wide by 5m long.

A randomised block design was used with four replicates of 18 treatments, including two untreated controls for comparison, totaling 72 plots. Plots were assessed for weed control on four occasions, recording the percentage of weed ground cover. Crop damage was also recorded, at two, four and eight weeks after the first treatment application.

Results and discussion

All treatments were crop safe by eight weeks after application, with the majority showing only minor herbicide damage throughout the assessment period, if any. At the final assessment, there were no significant differences in crop quality between any treatment and the untreated rhubarb.

No treatment showed a decrease in weed cover from the baseline level recorded at the start of the trial, but **AHDB 9996** and **Sencorex Flow** reduced the level of weed by 52% and 41% when compared to the untreated which could still be useful if the product is included within a programme. Both treatments had relatively low final weed cover (15.4% and 18.9%) and showed only a small increase in weed cover during the trial (32.1% at the 8 week assessment).

The grower standard treatment (**Stomp Aqua + Gamit 36 CS**) did not perform especially well in this trial, which emphasises the importance of identifying new actives for more effective weed control in rhubarb. **Sencorex Flow** was approved for use on newly planted crops in 2015, and has become a commercial standard as it showed good efficacy against Himalayan balsam and a range of broad leaved weeds. It has performed reasonably well in this trial showing consistent performance.

Table 1. Summary of crop damage and percentage weed cover from key assessment timing (11th May 2018, 8 weeks post treatment application). **Weed cover data is shown as back transformed means.**

Application A	Crop damage (0-10)	Weed cover (%)
Untreated	10.0	32.06
Stomp Aqua + Gamit 36 CS	10.0	37.99
Kerb Flo	10.0	33.69
AHDB 9952	10.0	20.02
AHDB 9996	10.0	15.35
Sencorex Flow	9.8	18.89
AHDB 9975	10.0	24.00
AHDB 9998	10.0	30.78
Callisto	10.0	21.08
AHDB 9918	10.0	30.65
AHDB 9987	10.0	28.92
AHDB 9998 + Gamit 36 CS	10.0	40.37
AHDB 9998 + Callisto	10.0	47.59
Callisto + Gamit 36 CS	9.8	24.25
Stomp Aqua + Callisto	10.0	24.56
AHDB 9994 + Gamit 36 CS	9.3	53.64
AHDB 9987 + Gamit 36 CS	10.0	30.97
F-prob. value	0.030	0.095
d.f.	52	52
S.E.D.	0.1930	7.07
L.S.D.	0.3873	14.19

Conclusions

- All treatments crop safe.
- **AHDB 9996** performed most effectively in this trial, based on final and overall change in weed cover. **Sencorex Flow** provided a similarly effective level of control.

Take home message

If approved for use in established rhubarb plantations, AHDB 9996 and Sencorex Flow could improve control of Himalayan balsam and other broad leaved weeds when included within current herbicide programmes.

Objectives

1. To evaluate the effectiveness of 16 herbicide treatments, applied in alone or in combinations over the dormant crop, for the control of broadleaved weeds and grasses in rhubarb as measured by crop safety and weed control efficacy.
2. To compare the performance of novel treatments against the commercial standard (Stomp Aqua + Gamit 36 CS).
3. To monitor the treated crop for phytotoxicity.

Trial conduct

UK regulatory guidelines were followed but EPPO guidelines took precedence. The following EPPO guidelines were followed:

Relevant EPPO guideline(s)		Variation from EPPO
EPPO PP1/135(4)	Phytotoxicity assessment	None
EPPO PP1/152(4)	Guideline on design and analysis of efficacy evaluation trials	None
EPPO PP1/225 (2)	Minimum effective dose	None
EPPO PP1/181 (4)	Conduct and reporting of efficacy evaluation trials including good experimental practice	None
EPPO PP 1/214(3)	Principles of acceptable efficacy	None
EPPO PP 1/224(2)	Principles of efficacy evaluation for minor uses	None

There were no deviations from EPPO guidance.

Test site

Item	Details
Location address	Field: Spibey Lane 1 (off Mill Pit Ln.) E Oldroyd and Sons Rothwell, Leeds LS26 0LD Yorkshire Grid reference: SE 33827 29297
Crop	Rhubarb
Cultivar	Victoria
Soil or substrate type	Freely draining lime-rich loamy soils
Agronomic practice	See Appendix A
Prior history of site	See Appendix A

Trial design

Item	Details
Trial design:	Fully randomised block
Number of replicates:	4
Row spacing:	0.75m (2 rows per plot)
Plot size: (w x l)	1.5m x 5m
Plot size: (m^2)	7.5m^2
Number of plants per plot:	Approx. 10
Leaf Wall Area calculations	N/A

Treatment details

AHDB Code	Active substance	Product name/ manufacturer s code	Formulation batch number	Content of active substance in product (g/L)	Formulation type
N/A	pendimethalin	Stomp Aqua	ST10630416	455	Capsule Suspension
N/A	propyzamide	Kerb Flo	3A2888R301	400	Suspension Concentrate
AHDB 9952	N/D	N/D	N/D	N/D	N/D
AHDB 9996	N/D	N/D	N/D	N/D	N/D
N/A	metribuzin	Sencorex Flow	EM4H002443	600	Suspension Concentrate
AHDB 9975	N/D	N/D	N/D	N/D	N/D
AHDB 9998	N/D	N/D	N/D	N/D	N/D
N/A	mesitrione	Callisto	SAVSD15030	100	Suspension Concentrate
AHDB 9918	N/D	N/D	N/D	N/D	N/D
AHDB 9987	N/D	N/D	N/D	N/D	N/D
N/A	clomazone	Gamit 36 CS	160334	360	Capsule Suspension
AHDB 9994	N/D	N/D	N/D	N/D	N/D

Application schedule

Treatment number	Treatment: product name or AHDB code	Rate of active substance (ml a.s./ha)	Rate of product (l/ha)
1	Untreated	-	-
2	Untreated	-	-
3	Stomp Aqua + Gamit 36 CS	1501.5 90	3.30 0.25
4	Kerb Flo	1700	4.25
5	AHDB 9952	3150	7.00
6	AHDB 9996	250	0.50
7	Sencorex Flow	360	0.60
8	AHDB 9975	850 + 1000	4.00
9	AHDB 9998	1344	1.40
10	Callisto	75	0.75
11	AHDB 9918	240	0.48
12	AHDB 9987	1200	2.00
13	AHDB 9998 + Gamit 36 CS	1344 90	1.40 0.25
14	AHDB 9998 + Callisto	1344 75	1.40 0.75
15	Callisto + Gamit 36 CS	75 90	0.75 0.25
16	Stomp Aqua + Callisto	1501.5 75	3.30 0.75
17	AHDB 9994 + Gamit 36 CS	900 90	1.50 0.25
18	AHDB 9987 + Gamit 36 CS	1200 90	2.00 0.25

Application details

	Application A
Application date	13/03/2018
Time of day	11:08 – 12:55
Crop growth stage (Max, min average BBCH)	00
Crop height (cm)	7
Crop coverage (%)	20
Application Method	spray
Application Placement	Soil (over dormant buds)
Application equipment	Oxford Precision Sprayer (knapsack)
Nozzle pressure	2.4 bar
Nozzle type	Flat fan
Nozzle size	02F110
Application water volume/ha	400
Temperature of air - shade (°C)	7.9
Relative humidity (%)	98.9
Wind speed range (mph)	3.2 – 0.6
Dew presence (Y/N)	Y
Temperature of soil - 10 cm (°C)	8.0
Wetness of soil - 2-5 cm	Damp
Cloud cover (%)	100

Note on application issues: AHDB 9987 caused nozzle blockages as it crystallised in the spray tank. In discussion with the manufacturer this could be due to cold temperatures at application.

Untreated levels of pests/pathogens at application and through the assessment period

Common name	**Scientific Name**	**EPPO Code**	**Infection level pre-application/ start of assessment period**	**Infection level mid-assessment period** (2 weeks)	**Infection level mid-assessment period** (4 weeks)	**Infection level at end of assessment period** (8 weeks)
Broad leaved weeds and grasses	*N/A*	3WEEDT	9.5% *(untreated average)*	6.4% *(untreated average)*	26.9% *(untreated average)*	41.9% *(untreated average)*

Assessment details

Evaluation date	**Evaluation Timing (DA)***	**Crop Growth Stage (BBCH)**	**Evaluation type (efficacy, phytotox)**	**What was assessed and how (e.g. dead or live pest; disease incidence and severity; yield, marketable quality)**
13/03/2018	0	00	efficacy	Percentage of weed cover (whole plot score)
27/03/2018	14	13	efficacy, phytotox	Percentage of weed cover (whole plot score)

				Phytotox (scale 0-10, 0 = dead)
10/04/2018	28	19	efficacy, phytotox	Percentage of weed cover (whole plot score) Phytotox (scale 0-10, 0 = dead)
11/05/2018	59	48	efficacy, phytotox	Percentage of weed cover (whole plot score) Phytotox (scale 0-10, 0 = dead)

* DA – days after application A

Statistical analysis

The trial design was a randomised block design, with four replicates of eighteen treatments, including two untreated controls.

As the distribution of weeds was uneven across the trial, which is not unexpected in field situations, there was a need to transform these variables prior to analysis. An angular transformation was used.

All data were analysed by ANOVA using Genstat 18.4 by Chris Dyer at RSK ADAS. For the % efficacy data, calculated by Abbotts formula, an angular transformation was carried out and then the back transformed means are presented from which the Abbotts Formula was used to calculate the % reduction in weeds.

Results

Phytotoxicity

The results of phytotoxicity assessments from three dates are presented in Table 1, and from three dates in Figure 1. These were scored on a scale of 0 to 10, with 0 being 'dead', and 10 being 'no effect'. Those scores at 8 or above were deemed to be commercially acceptable damage. Phytotoxicity was recorded using the following scale:

Crop tolerance score	Equivalent to crop damage (% phytotoxicity)
0	complete crop kill 100%
1	80-95% damage
2	70-80%
3	60-70%
4	50-60%
5	40-50%
6	25-40%
7	15-25%
8*	10-15%
9	5-10%
10	no damage

* 8 = acceptable damage, i.e. damage unlikely to reduce yield, and acceptable to the farmer.

Table 1. Mean phytotoxicity scores (0-10; 0= complete crop death, 10 = no damage) through the trial. Scores ≥8 deemed commercially acceptable damage.

Application A	Mean crop damage scores

	27th Mar	10th Apr	11th May
Untreated	9.96	10.00	10.00
Stomp Aqua + Gamit 36 CS	8.75	9.75	10.00
Kerb Flo	9.52	9.50	10.00
AHDB 9952	9.31	10.00	10.00
AHDB 9996	9.79	10.00	10.00
Sencorex Flow	9.47	10.00	9.75
AHDB 9975	8.91	10.00	10.00
AHDB 9998	9.52	10.00	10.00
Callisto	8.98	9.75	10.00
AHDB 9918	8.23	10.00	10.00
AHDB 9987	10.00	10.00	10.00
AHDB 9998 + Gamit 36 CS	9.64	9.75	10.00
AHDB 9998 + Callisto	8.31	9.97	10.00
Callisto + Gamit 36 CS	9.75	9.75	9.75
Stomp + Callisto	9.31	10.00	10.00
AHDB 9994 + Gamit 36 CS	8.42	9.50	9.25
AHDB 9987 + Gamit 36 CS	9.00	9.75	10.00
F prob. value	0.009	0.741	0.030
d.f.	25	51	52
S.E.D.	0.5164	0.2975	0.1930
L.S.D.	1.0635	0.5973	0.3873

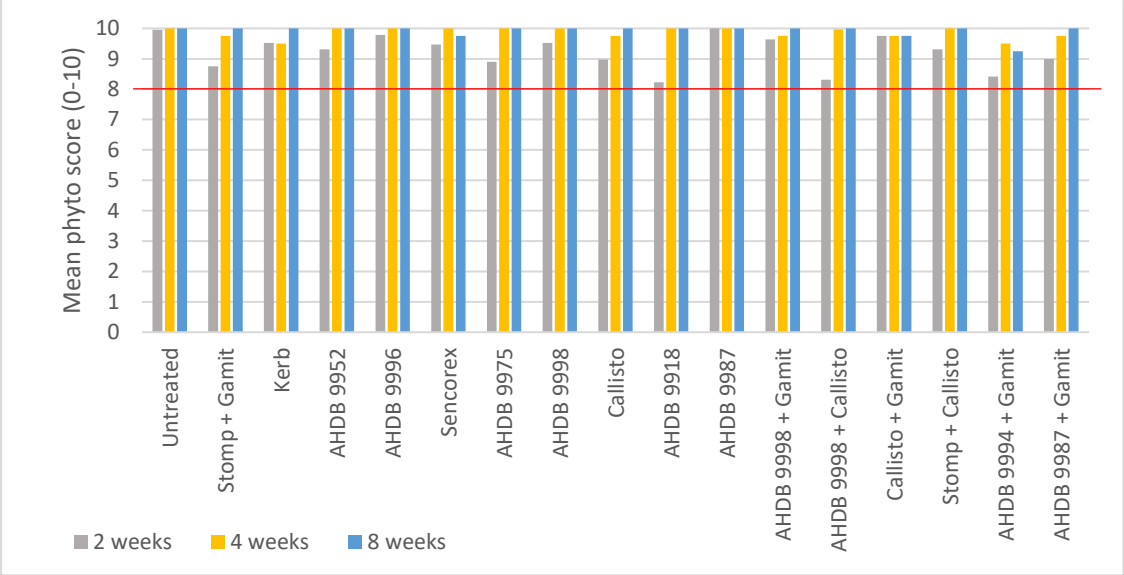

Figure 1. Mean phytotoxicity scores at 2, 4 and 8 weeks after Application A treatment. Scores of 8 or above deemed acceptable damage (as indicated by red line).

Weed control – mean percentage weed cover

The results for the mean percentage weed cover per treatment are presented in Table 2 and Figure 2. The percent reduction in weed cover compared to the untreated control was calculated (using Abbotts formula) from these figures, and results for each treatment are listed in Table 3.

Table 2. Mean percentage weed cover values (transformed).

Trt No.	13th Mar		27th Mar		10th Apr		11th May	
	Ang.	Back-trans	Ang.	Back-trans	Ang.	Back-trans	Ang.	Back-trans
UTC*	16.14	7.73	14.55	6.31	28.10	22.18	34.5	32.06
3	17.51	9.05	17.32	8.87	28.28	22.44	38.1	37.99
4	11.13	3.73	10.71	3.45	27.86	21.83	35.5	33.69
5	16.23	7.81	16.00	7.60	24.62	17.36	26.6	20.02
6	17.87	9.41	14.31	6.11	21.04	12.88	23.1	15.35
7	17.65	9.20	15.58	7.21	27.30	21.03	25.8	18.89
8	9.37	2.65	10.11	3.08	24.68	17.43	29.3	24.00
9	14.83	6.55	13.11	5.14	29.14	23.71	33.7	30.78
10	15.58	7.21	12.37	4.59	24.59	17.32	27.3	21.08
11	12.44	4.64	11.31	3.84	28.14	22.24	33.6	30.65
12	19.47	11.11	13.71	5.62	26.01	19.24	32.5	28.92
13	22.33	14.44	17.98	9.53	26.97	20.57	39.4	40.37
14	23.06	15.35	19.70	11.36	37.66	37.33	43.6	47.59
15	17.09	8.64	15.33	6.99	28.14	22.24	29.5	24.25
16	13.39	5.37	13.53	5.47	26.34	19.68	29.7	24.56
17	14.49	6.26	13.11	5.14	34.27	31.71	47.1	53.64
18	11.38	3.90	10.99	3.64	27.06	20.70	33.8	30.97
F pr value		0.228		0.635		0.099		0.095
d.f.		52		52		52		52
S.E.D.		4.624		4.130		4.169		7.07
L.S.D.		9.279		8.288		8.366		14.19

* Untreated control; treatments 1 and 2

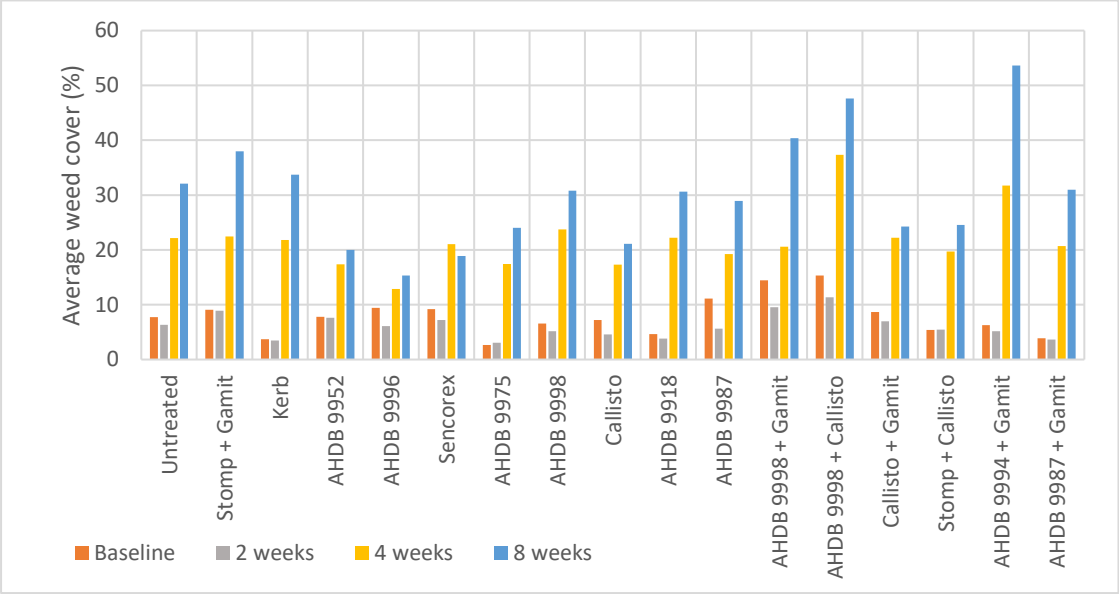

Figure 2. Mean weed cover (%) at time of herbicide application (baseline), and 2, 4 and 8 weeks post-application.

Table 3. Percentage reduction in weed cover (calculated using Abbott formula) – values indicating an increase in weed cover highlighted.

Application A	Weed cover reduction (%)			
	13th Mar*	27th Mar	10th Apr	11th May
Stomp Aqua + Gamit 36 CS	-17.08	-40.45	-1.17	-18.50
Kerb Flo	51.79	45.30	1.58	-5.08
AHDB 9952	-1.05	-20.34	21.73	37.55
AHDB 9996	-21.76	3.22	41.93	52.12
Sencorex Flow	-18.95	-14.19	5.18	41.08
AHDB 9975	65.71	51.20	21.42	25.14
AHDB 9998	15.27	18.53	-6.90	3.99
Callisto	6.73	27.32	21.91	34.25
AHDB 9918	39.94	39.12	-0.27	4.40
AHDB 9987	-43.71	10.98	13.26	9.79
AHDB 9998 + Gamit 36 CS	-86.77	-50.86	7.26	-25.92
AHDB 9998 + Callisto	-98.51	-79.95	-68.30	-48.44
Callisto + Gamit 36 CS	-11.76	-10.72	-0.27	24.36
Stomp + Callisto	30.57	13.37	11.27	23.39
AHDB 9994 + Gamit 36 CS	19.03	18.53	-42.97	-67.31
AHDB 9987 + Gamit 36 CS	49.59	42.40	6.67	3.40

* Baseline assessment

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The initial weed burden in the trial field was low to moderate, with 7.8% the average baseline weed cover across all plots (min. = 2.7%, max. = 15.4%). The change in weed cover from the baseline assessment to the final assessment, 8 weeks after the first treatment application, was assessed. All treatments showed a net increase in weed cover over this period (Figure 3). The weed level in the untreated plots increased over time, but nine treatments were observed to reduce the rate of weed cover increase, with AHDB 9996 and Sencorex Flow treatments performing particularly well.

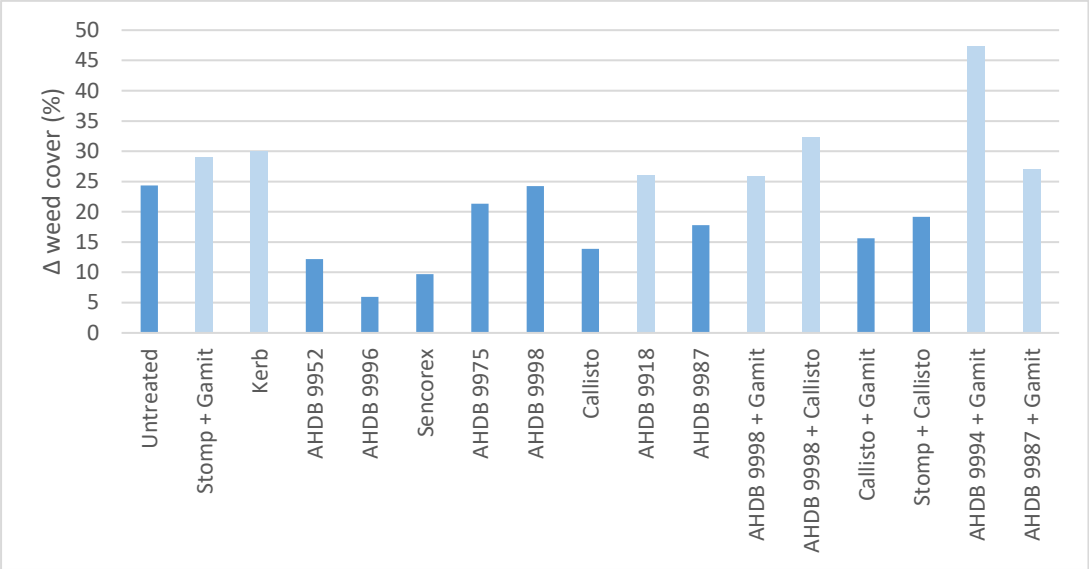

Figure 3. Percentage change in weed cover over 8 week assessment period. Light blue bars indicate treatments where weed cover increase was greater than that of untreated control.

Discussion

All treatments were shown to be crop safe by 8 weeks after application, with the majority showing only minor herbicide damage throughout the assessment period, if any. At the final assessment, there were no significant differences in crop quality between any treatment and the untreated rhubarb.

No treatment showed a decrease in weed cover from the baseline level recorded at the start of the trial, but **AHDB 9996** and **Sencorex Flow** reduced the level of weed by 52% and 41% when compared to the untreated which could still be useful if the product is included within a programme. Both treatments had relatively low final weed cover (15.4% and 18.9%) and showed only a small increase in weed cover during the trial (32.1% at the 8 week assessment).

Eleven of the treatments left plots with a lower weed cover than the untreated at the final assessment but this was not a significant reduction in weed cover. Of these, nine treatments also showed a smaller overall increase in weed cover than the untreated for the whole trial period. These nine treatments were **AHDB 9996**, **Sencorex Flow**, **AHDB 9952**, **Callisto**, **Callisto + Gamit 36 CS**, **Stomp Aqua + Callisto**, **AHDB 9975**, **AHDB 9987**, and **AHDB 9998**.

The grower standard treatment (**Stomp Aqua + Gamit 36 CS**) did not perform especially well in this trial, which emphasises the importance of identifying new actives for more effective weed control in rhubarb.

Conclusions

- All treatments were to be crop safe.
- **AHDB 9996** performed most effectively in this trial, based on final and overall change in weed cover. **Sencorex Flow** provided a similarly effective level of control.

Acknowledgements

AHDB for funding the work, and also the crop protection companies for their financial contributions as well as providing samples for the trials. Thanks should also be given to the growers who provided sites and crops for the trials as well as technical input, particularly Lindsay Hulme, of E. Oldroyd and Sons.

Appendix

a. Crop diary – events related to growing crop

Crop	Cultivar	Sowing date	Row width (m)
Rhubarb	Victoria	13/02/2016	0.75

Previous cropping

Year	Crop
2017	Rhubarb
2016	Rhubarb

Active ingredients(s)/fertiliser(s) applied to trial area

Date	Product	Rate
21/03/2016	Nitram	85
16/07/2016	Nitram	60
03/03/2017	Nitram	80
01/06/2017	Nitram	60
29/03/2018	Nitram	85

Pesticides applied to trial area

Date	Product	Rate (L/ha)
17/02/2016	Gamit	0.25
	Stomp Aqua	3.00
31/10/2016	Roundup Flex	2.00
28/12/2016	Kerb Flo	2.00
19/02/2017	Gamit	0.25
	Stomp Aqua	3.00
21/10/2017	Roundup Flex	2.00
2018	No chemical applied as per request of researcher	

Details of irrigation regime

Date	Type, rate and duration	Amount applied (mm)
N/A	-	-

b. Table showing sequence of events by date – this relates to treatments and assessments

Date	Event
13/03/2018	Trial marked out and Application A treatments applied.
27/03/2018	Weed levels and crop safety assessed.
10/04/2018	Weed levels and crop safety assessed.
11/05/2018	Weed levels are crop safety assessed.

c. Climatological data during study period

Date	Temperature °C (minimum)	Temperature °C (maximum)	Rainfall (mm)
13/03/2018	0.5	9.5	0.2
14/03/2018	-0.5	11.5	0.1
15/03/2018	5.0	6.5	6.1
16/03/2018	1.0	6.0	7.2
17/03/2018	-3.0	2.0	1.2
18/03/2018	-3.0	-1.0	0.2
19/03/2018	-1.0	6.0	1.7
20/03/2018	1.5	8.0	0.1
21/03/2018	0.0	8.0	0.6
22/03/2018	6.0	11.0	0.0
23/03/2018	5.5	9.5	0.3
24/03/2018	4.5	10.5	1.9
25/03/2018	1.0	13.0	0.0
26/03/2018	0.0	14.0	0.1
27/03/2018	5.0	11.0	5.8
28/03/2018	2.5	9.5	0.5
29/03/2018	-1.0	9.5	4.6
30/03/2018	3.5	10.0	4.4
31/03/2018	2.5	4.5	10.6
01/04/2018	2.0	5.5	0.4
02/04/2018	1.0	5.5	34.6
03/04/2018	5.0	15.5	1.0
04/04/2018	3.0	12.0	8.3
05/04/2018	0.5	14.0	0.0
06/04/2018	3.0	13.5	0.1
07/04/2018	7.0	13.5	0.8
08/04/2018	5.5	13.0	0.0
09/04/2018	5.0	13.0	3.6
10/04/2018	6.0	7.0	18.8
11/04/2018	5.0	7.5	0.3
12/04/2018	5.0	6.0	2.9
13/04/2018	5.0	9.5	1.2
14/04/2018	6.0	16.0	0.0
15/04/2018	3.5	13.5	2.8
16/04/2018	8.5	15.5	0.0
17/04/2018	9.5	15.0	0.1
18/04/2018	12.0	24.0	0.0
19/04/2018	10.0	28.5	0.0
20/04/2018	5.5	20.0	0.0
21/04/2018	4.0	21.5	1.2
22/04/2018	9.0	18.5	0.6
23/04/2018	9.0	15.0	0.3
24/04/2018	7.0	14.0	11.2
25/04/2018	6.0	12.5	0.3

Date	Temperature °C (minimum)	Temperature °C (maximum)	Rainfall (mm)
26/04/2018	6.0	11.5	2.5
27/04/2018	3.5	8.5	7.8
28/04/2018	3.5	8.0	0.2
29/04/2018	3.0	10.5	0.0
30/04/2018	3.5	10.0	0.0
01/05/2018	1.5	14.5	0.7
02/05/2018	6.5	12.0	7.2
03/05/2018	4.5	15.0	0.0
04/05/2018	9.5	17.5	0.0
05/05/2018	6.0	20.5	0.0
06/05/2018	9.0	21.0	0.0
07/05/2018	9.5	22.5	0.0
08/05/2018	10.0	20.0	0.2
09/05/2018	7.5	16.0	0.7
10/05/2018	7.0	14.0	0.3
11/05/2018	5.5	14.5	0.0

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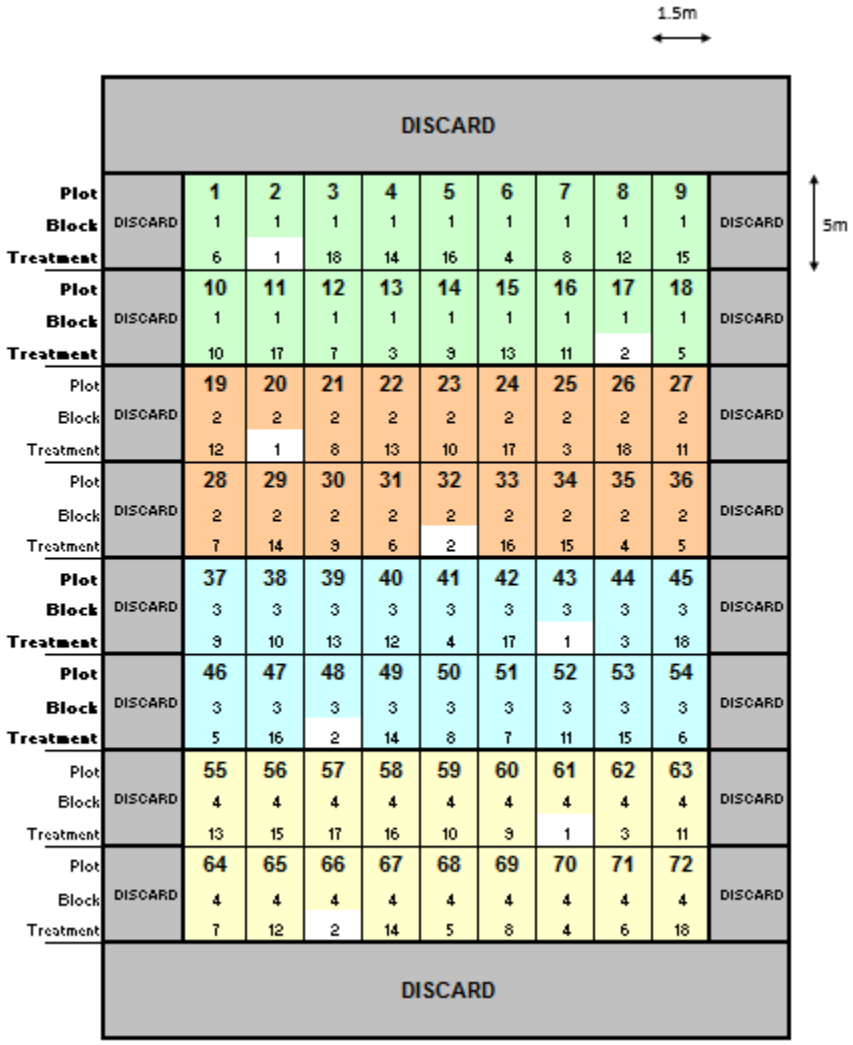
d. Trial design



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e. ORETO certificate

Certificate of

Official Recognition of Efficacy Testing Facilities or Organisations in the United Kingdom

This certifies that

RSK ADAS Ltd

complies with the minimum standards laid down in Regulation (EC) 1107/2009 for efficacy testing.

The above Facility/Organisation has been officially recognised as being competent to carry out efficacy trials/tests in the United Kingdom in the following categories:

Agriculture/Horticulture
Stored Crops
Biologicals and Semiochemicals

Date of issue: 1 June 2018
Effective date: 18 March 2018
Expiry date: 17 March 2023

Signature *Authorised signatory*

Certification Number
ORETO 409

HSE
Chemicals Regulation Division

Department of Agriculture and Rural Development

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