



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

SF 129

Rhubarb: Evaluation of herbicides for problem weeds

Final 2011

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Project Number:	SF 129
Project Title:	Rhubarb: Evaluation of herbicides for problem weeds
Project Leader:	Chris Creed
Contractor:	ADAS UK Ltd
Industry Representative:	Tim Place, Place UK
Report:	Final Report, 2011
Publication Date:	12/06/2012
Previous report/(s):	None
Start Date:	01 January 2011
End Date:	30 November 2011
Project Cost:	£ 12,500

Headline

Of a number of candidate herbicides assessed in rhubarb, Chikara (flazasulfuron) showed best overall weed control, with good control of Himalayan balsam and cleavers.

Background and expected deliverables

Efficient and cost effective weed control is important in rhubarb as with other crops to prevent yield loss as a result of competition for water and nutrients and to enable efficient harvesting without impedance by weed growth.

The industry has relied heavily on simazine and dichlobenil for weed control in the past, but these have been withdrawn under the on-going EU review of pesticides. The majority of rhubarb herbicide programmes are currently based on pendimethalin and propyzamide, although these herbicides have gaps in their weed control spectrum. The introduction of the Sustainable Water framework directive and the new Regulation (EC) No.1107/2009 on Pesticide registration is likely to place residual herbicides under threat. The future availability of pendimethalin and propyzamide is therefore at best uncertain.

Rhubarb is currently enjoying a revival, partly due to supermarket promotion resulting from the "Delia" effect in May 2010 when the crop outsold production. Multiples therefore have an increasing interest in this crop with a potential 10 month season. Effective weed management in rhubarb is set to become more important to allow supply to keep up with demand.

Consultation with rhubarb growers in the north, midlands and south of England has confirmed the need for work to identify alternative herbicides from currently available products - or those likely to become so - which provide a good spectrum of weed control. There is a high priority for 'problem weeds' such as Himalayan balsam (*Impatiens glandulifera*), docks (*Rumex obtusifolius*) and perennial thistles (*Cirsium arvense*). It is also essential to identify potential replacements for those products being lost.

Although there is an Extension of Authorisation for Minor Uses (EAMU) for glyphosate, the short dormant season of the crop provides a very narrow window for treatment, and since the loss of dichlobenil, perennial weed infestations are increasing.

This project aimed to improve weed control in the rhubarb crop by investigating additional herbicide options (as the future of some existing materials looks doubtful) and identifying

controls for more 'difficult' weeds. Three principal areas were addressed, with the objective of providing information for growers on candidate herbicides which:

- Offer control of commonly-occurring annual weeds using residual herbicides;
- Control perennial weeds, often a long-term problem in rhubarb, with spot treatments of contact acting herbicides;
- Offer control of some more exotic weeds now troubling producers, such as Himalayan balsam;
- Provide information on any adverse effects on the crop.

Currently only three residual herbicides are recommended for use in rhubarb, Kerb Flo (propyzamide), Stomp (pendimethalin) and metamitron: Continual use of these herbicides could result in resistant weeds dominating the crop.

EAMUs will be needed to allow the use of some of the candidate materials on this crop. Growers will benefit from this work by having a wider choice of herbicides to maintain effective weed control in plantations, which would otherwise be difficult as a result of increasing restrictions on or loss of current herbicides.

Summary of the project and main conclusions

A replicated experiment (main trial) and a small spot treatment experiment were done in 2011 in a commercial crop of rhubarb (Timperly Early) in Rothwell, Leeds. The selected field was known to have a significant Himalayan Balsam problem.

Main trial

A range of four residual herbicides considered to have a suitable weed control spectrum but not currently approved for use on rhubarb and one (Gamit 36 CS) with an EAMUEAMU, were chosen for assessment. The industry standards pendimethalin/ propyzamide (Stomp/Kerb Flo) were included for comparison (see Table 1). They were applied to a one year old crop of Timperly Early on 9th February 2011 at 400 L of water /ha. Weed control was assessed four and eight weeks after treatment.

Table 1. Herbicide treatments applied to the rhubarb crop February 2011

Treatment	Product	Active ingredient and concentration	Product rate	Timing	Approval for use on rhubarb
1	Untreated control				
2	Calisto	mesotrione 100g /L	1.5 L/ha	February	Not approved
3	Chikara	flazasulfuron 25%w/w	150 g/ha	February	Not approved
4	Gamit 36 CS	clomazone 360 g/L	0.25 L/ha	February	EAMU 3168/10
5	Stomp 400 SC /Kerb Flo	pendimethalin 400 g/L propyzamide 400 g/L	3.3 L/ha 4.25 L/ha	February	EAMU 1430/07 Full approval
6	Metribuzin SC 600	metribuzin 600 g/L	1 L/ha	February	Not approved
7	Venzar Flowable	lenacil 440 g/L	5 L/ha	February	Not approved

At the first assessment (16th March), one month after the treatments were applied, there was good germination of Himalayan balsam (*Impatiens glandulifera*), knotgrass (*polygonum aviculare*), small nettle (*Urtica urens*), cleavers (*Galium aparine*), pineapple weed (*Matricaria disiodes*) and groundsel (*Senecio vulgaris*), with the untreated plots showing up to 15% weed coverage.

None of the treatments caused any lasting crop damage; however there was some transient foliar scorch observed four weeks after treatment caused by Chikara (flazasulfuron), Calisto (mesotrione) and Gamit 36 CS (clomazone).

Figure 1 shows the results of the weed assessments four and eight weeks after treatment. Chikara clearly showed the best overall weed control including good control of the Himalayan balsam suppressing almost all germination at four weeks after treatment and stunting the growth of later germinating balsam. Chikara also showed good control of most other weeds germinating particularly cleavers (*Gallium aparine*) and groundsel (*Senecio vulgaris*) (Figure 2).

Other promising treatments included Metribuzin SC 600 which showed good results against cleavers, knotgrass and Himalayan balsam (*Impatiens glandulifera*), reducing the amount of germination of the latter species but not providing complete control. The other treatments, Venzar (lenacil), Calisto and to a lesser extent Gamit 36 CS, also showed comparable if not better weed control than the industry standards Stomp and Kerb Flo, on weeds such as groundsel, cleavers and knotgrass, although none of these showed consistent activity against Himalayan balsam.

By 12 weeks after treatment Chikara was still by far the most effective treatment with Metribuzin SC 600 and to a lesser extent Venzar Flowable, also maintaining good residual weed control. The other treatment plots by this stage had become encroached by Himalayan balsam, groundsel and nettle.

If they were to be approved for use on rhubarb, all of the active ingredients tested are likely to improve weed control in rhubarb if used in conjunction with one or more of the standard programmes, reducing risks of resistance developing and increasing the number of active ingredients available to rhubarb growers.

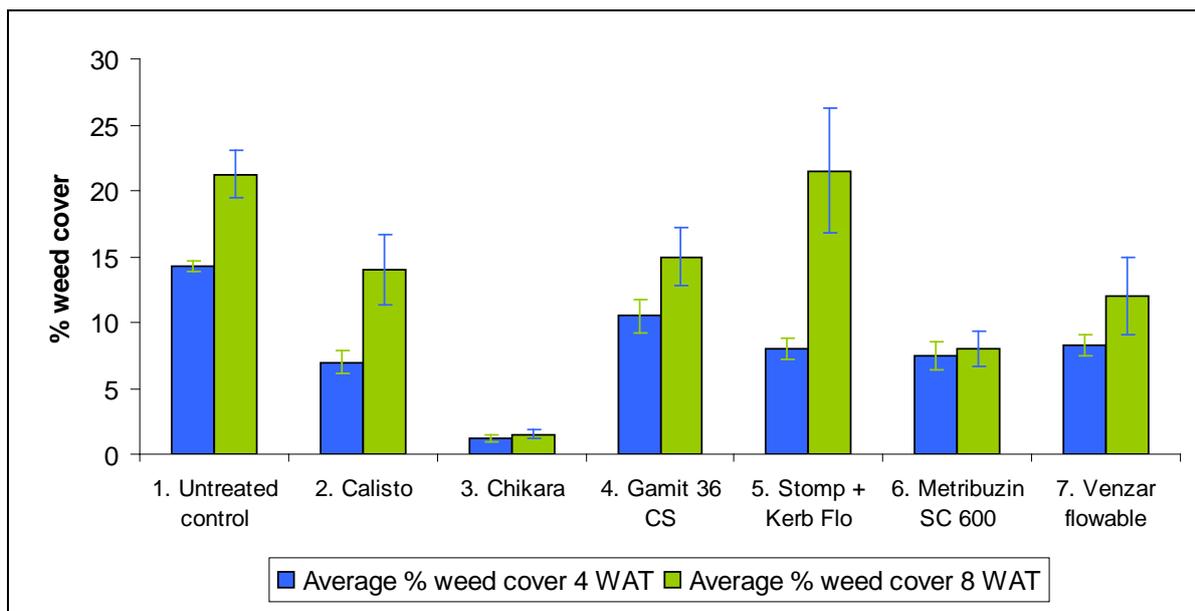


Figure 1. Percent weed cover after 4 and 8 weeks after treatment (WAT). Assessments carried out on the 16th March and 4th May.



Figure 2. Weed germination at 4 weeks after treatment - 16th March 2011.

Spot treatments

At the same trial site, three contact herbicides (Table 2) were tested for crop safety and as spot treatments for the control of perennial weeds. These were applied over the top of the rhubarb in three un-replicated plots and on the headland in strips, on 4th May 2011 again at 400 L water/ha. A part of the field with a high level of perennial weeds was chosen. Treatments were assessed for phytotoxicity and perennial weed control after 3 weeks.

Table 2. Herbicides applied as spot treatment to crop and headland plots - May 2011

Treatment	Product	Active ingredient	Product rate	Timing	Approval for use on rhubarb
1	Dow shield	clopyralid 200 g/L	1 L/ha	May	Not approved
2	Rosate 36	glyphosate 360 g/L	25 ml/L	May	EAMU 1478/07
3	Timbrel	triclopyr 480 g/L	25 ml/L	May	Not approved

Timbrel (triclopyr) showed the best control of Burdock (*Articum lappa*), *Artemesia* spp., Himalayan balsam (*Impatiens glandulifera*) and creeping thistle (*Cirsium arvense*). However the Timbrel was the most damaging to the rhubarb causing severe scorch and collapse of the plants. The Dow shield (clopyralid) and Rosate 36 (glyphosate) showed only minor crinkling to the rhubarb leaves. However due to the size of the rhubarb leaves, many of the weeds were shielded, so little can be drawn on their perennial weed control efficacy within the crop. On the headland plots, the Rosate 36 showed best control across all the perennial weed species present.

Financial benefits

Modern rhubarb production depends on good weed control. Hand weeding and hoeing can cost up to £1,500 per ha*, has no lasting effect, and typically a crop may require up to 3 weeding sessions per year. The total cost could amount to £4,500/ha so the approval of some of the more promising treatments from this trial would reduce these costs significantly.

If EAMUs can be obtained for the promising actives highlighted by this trial (i.e. Chikara and Metribuzin SC 600) it is likely that bespoke weed programmes can be produced to fit a farm's problem weeds. Lack of herbicides that are effective on the rhubarb crop are likely to reduce potential production of this valuable which is much in demand.

*Source Organic Farm management Handbook 2011 cost of bed weeding

Action points for growers

- It is recommended that HDC (on behalf of growers) investigate the possibility of securing EAMU's to permit use of one or more of Chikara, Metribuzin SC 600, Venzar Flowable and Calisto on rhubarb during the dormant season.
- It is also recommended that further trials are carried out looking at the safety of using contact herbicides such as glyphosate on the growing crop.