Keeping summer weed control cost effective

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Take Home Messages

- Summer weed control is not a luxury item and should be considered an essential expense.
- The financial reward of timely summer weed control far outweighs the outlay and this was again proven in 2006.
- Expenditure on summer weed control can be minimised if weeds are sprayed early.
- The level of control achieved can be maximised by spraying in conditions that ensure droplet survival and penetration of the target.
- LV Ester 600 or Estercide Xtra 680 are the closest substitutes for 2,4-D Ester 800 as a spike in glyphosate mixes.
- High rates of glyphosate alone are effective for controlling heliotrope.

Introduction

Summer weed control has been proven to significantly increase the bottom line in previous BCG trials, the SARDI GRDC funded summer weeds project and in the field. In 2006, those who received summer rain and controlled summer weeds produced significant yield differences to those that failed to control summer weeds. One example resulted in a 0.8 t/ha yield difference in barley resulting in a return of $10 for every $1 spent.

There is also an increased understanding of the conditions required to optimise spraying results. Furthermore advances in guidance technology are increasing summer spraying opportunities.

Despite this, the perception remains that controlling summer weeds is still difficult, expensive and occurs at a time of year when most would prefer to be doing something else. This article provides some tips for effective results whilst minimising expenditure and outlines some recent research looking at cost effective summer weed control.

"A job worth doing is worth doing well"

Given that one application of herbicide over summer can be an outlay of $10-$25/ha depending on the weed spectrum and in wet summers where often more than one application is required, it pays to ensure maximum return on every dollar spent. Below are a few hints to ensure that is the case:

1) Product selection, rates and timing

- Product selection will be influenced by weed spectrum, weed size and the degree of stress that the plants are under. **Spraying within 2 to 4 weeks after germination is the key to achieving good results**. This allows spraying of new weeds while they are small and also targets any regrowth while it is fresh. Timely spraying minimises soil moisture and nutrient loss. Spraying early also seems to result in less wheel tracking problems. Spraying later requires higher rates of herbicide which increases the cost of the operation, results are often variable and the damage has been done in terms of seed set, soil water and nitrogen use.

- Legal requirements regarding the use of 2,4-D products have changed dramatically in the last 12 months. 2,4-D Ester 800 can no longer be used between Sept 1 and April 30 (LV Estercide 600 or Estercide Xtra) is a close substitute and is permitted for use except in Chemical Control Area's). All 2,4-D products including Amicide 625 and Surpass 300 must be applied using "Coarse to Very Coarse" droplets and wind speeds must be between 3-15 km/hr.
- Keep glyphosate rates robust to counteract tank mixing antagonism and less than ideal conditions. Skimping on rates in summer weed spraying can be counter productive.
- Always add ammonium sulphate and a penetrant regardless of water quality. JSA research has found 0.2% LI700 to be equally effective as 1% Hasten on heliotrope. Oil based adjuvants may be required to maintain droplet size and on particularly woody weeds but using oil with AI nozzles can actually reduce droplet size.
- When considering cost of products also cost out adjuvants. The convenience of one size fits all adjuvants can come at considerable cost when spraying large areas. Some times the cheapest adjuvant is more herbicide!
- Ensure water quality is adequate or that appropriate adjuvants are used. (*See water quality article by Gerard Bardell in this manual).*
- Use residual products in the mix where appropriate. This may save additional applications if follow up rains occur. Crop type and plant back restrictions must be considered especially if residual issues already exist from in-crop applications in 2006.

2) Spray set up and operation

- Ensure good coverage. Higher water rates (70L/ha +) are preferred for summer weed spraying however, as water is a limiting factor this season, some compromise may be required. Fortunately most summer weeds are relatively flat and with a large leaf area enabling reasonable coverage of small plants with moderate water volumes (40-50L/ha). Glyphosate also works well at moderate water volumes as a higher concentration of glyphosate in the droplet improves efficacy. However, high pressure AI nozzles can have variable results with water rates below 60 L/ ha. Changing to low pressure AI nozzle or a coarse pre-orifice nozzle (e.g TT 110-03) would enable safer use of lower water rates. Note that the suggested minimum water rate for Sprayseed or Gramoxone is 80 L/ha and fine droplet. Consider the impact of orifice size and travel speed and the resultant issues that may arise with dust if you travel too quickly.
- Spray in conditions that will optimise the weed kill, that is; Delta T 2-10, temperature less than 28ºC and wind speed 3-15 km/hr. This is most likely to occur early morning. If conditions become unsuitable it is better to stop rather than waste time and money. Delta T for several locations can be accessed at
  http://www.bom.gov.au/products/IDV60800.shtml
- Less haste and less speed! Generally, keeping travel speeds less than 15 km/hr should reduce problems with weeds surviving in wheel tracks due to dust, however the threshold speed will vary with the amount of ground cover .Other solutions to overcoming dust in wheel tracks include using a high output nozzle or twin cap nozzle in line with the tractor wheels. This increases output at the area of concern with minimum effect on total output of herbicide or carrier.
- Enlist help if required. Based on the scenario above (ie the yield improvement of 0.8 t/ha), paying $5-8/ha for contract services would be a better outcome than missing the opportunity of spraying the weeds at all or at a later stage. A four week delay could

result in the need to use an additional $5-8/ha of herbicide and the result may be more variable at night.

Cost effective Phenoxy alternatives

JSA with the support of a GRDC Southern Agribusiness Network Initiative has been investigating low cost options to 2,4-D Ester 800. A replicated trial was conducted in February 2006 targeting a high population of stressed, flowering heliotrope (4-10cm). The results are summarised below. High rates of glyphosate were the most cost effective treatments when targeting heliotrope. It is worth noting that the Sprayseed treatment which would commonly be used on stressed heliotrope was one of the most expensive treatments and was less effective than robust rates of glyphosate. The mixes will be further tested this summer on a range of mixed populations for typical summer weeds (eg melons, caltrop).

Table 1: Summary of the treatments achieving commercial acceptability in order of cost effectiveness (all mixes were sprayed with 2% liquid ammonium sulphate and 0.2% Li700 which is included in the costing)

Herbicide mix	**EWRC weed control score 35 DAT**	**Estimated weed control (%)**	**Cost $/ha**
1.5L/ha glyphosate 450	**2.0**	**98-99.9**	**10.50**
300mL/ha Ester 800 + 1.2L/ha glyphosate 450 (control)	4.0	90-95	11.55
80mL/ha Garlon 600 + 1.2L/ha glyphosate 450	**4.0**	**90-95**	**12.12**
450mL/ha Ester 800+ 1.2L/ha glyphosate 450	4.5	85-90	12.83
2L/ha glyphosate 450	**1.8**	**98-99.9**	**13.00**
120mL/ha Garlon 600+ 1.2L/ha glyphosate 450	3.5	90-95	13.68
600mL/ha LV Estercide 600+ 1.2L/ha glyphosate 450	4.5	85-90	14.10
600mL/ha LVE MCPA + 1.2L/ha glyphosate 450	4.5	85-90	14.40
1.5L/ha Sprayseed 250	3.5	90-95	18.00
4L/ha glyphosate 450	1.0	100	23.00
Lsd (P <0.05)	1.4		

Table 2 summarises some options to replace 2,4- D Ester in summer spraying mixes.

LVEster600 was the closest substitute and the preferred product where an ester type product is desired, however there has been a formulation change and a new product EstercideXtra 680. has been released which is equally suitable. MCPA LVE can also be used at twice the Ester 800 rate but this can be costly over large areas. While 2,4- D Amicide 625 appears cost effective, there can be some antagonism with glyphosate and the rate of uptake is slower than

ester formulations which can mean less efficacy under stressed conditions. Spray rigs using direction injection should be able to use amine and glyphosate provided they are applied from separate tanks. Results using amine as a spike, even with Credit and Bonus (more compatible with amine) as the glyphosate component have been variable. Surpass is a glyphosate compatible amine formulation. Cost and rate of uptake are the negatives with Surpass although results should be better than with Amicide 625 in a tank mix with glyphosate. It should be noted that Amicide 625 and Surpass are not very effective on heliotrope.

Table 2: 2,4- D substitutes for Estercide 800 as spikes added to glyphosate.

Product	Rate to achieve similar killing power to 300ml/ha 24D Ester 800	Cost ($/ha)	Comments
LVEster 600	400 ml/Ha	$3.40	Best bet substitute. Multiply Ester 800 rate by 1.33.
EstercideXtra 680	355 ml/Ha	$3.30	New formulation low volatile ester from Nufarm. Multiply Ester 800 rate by 1.18.
MCPALVE	600 ml/Ha	$5.00	Can be used but needs 2 X Ester 800 rate so becomes expensive.
Surpass	1 L/Ha	$4.95	Amine formulation so slower uptake. Weak on heliotrope
Amicide Antagonism with glyphosate can reduce activity	500 ml/Ha	$2.85	Best mixed with Credit and Bonus ($7.70/ha for 0.83L/ha compared to $6/ha for glyphosate + AS+ LI700). Weak on heliotrope.

Conclusion

In a year when maximising opportunities is vital, summer weed control will be extremely important. Acting early on summer weeds and following the guide lines above will reap the largest financial rewards.

- Choose a herbicide mix appropriate to the weed spectrum (consult your agronomist).
- Cost out adjuvants as well as herbicides.
- Ensure spray set up and spray conditions are suitable for the task at hand.

There are effective alternatives to 2, 4-D Ester 800 and in some cases high rates of glyphosate may suffice.