Does water quality antagonise glyphosate for control of milk thistle?

Trial location: Spring Ridge

Weed target: Advanced fleabane and sowthistle at application

60L/ha Rain & bore water 110015 AIXR @ 2 Bar 10km/hr 3 Reps

100L/ha Rain & bore water 110015 AIXR @ 2 Bar 6km/hr 3 Reps

	Date	Weed size	Time	Temp	RH%	Delta T
Timing 1	17/09/2025	Flowering	10am	20°C	65%	4.7

Trial objectives

- Evaluate reduced performance of glyphosate in hard water
- Evaluate the performance of water conditioners and alternative additives

Most glyphosate label do not support a claim for control of fleabane for good reason. Additionally, weed size at application was well outside of optimal timing for glyphosate. This was designed to create a sub-lethal result so that differences between treatments can be observed. Readers should concentrate on the relativity between herbicide treatments and not expect these treatments to deliver full control of fleabane of this size and maturity if at all.

All treatments except the untreated had Glyphosate 450 CT @ 1.5 L/ha			
Mix partner	**Rate**	**Water**	**Spray volume**
Untreated			
Nil		Rain water	60 L/ha
Buddy (417 g/L ammonium sulphate)	2% v/v	Rain water	60 L/ha
Li700	0.5% v/v	Rain water	60 L/ha
Nil		Bore water	60 L/ha
Buddy (417 g/L AMS)	2% v/v	Bore water	60 L/ha
Li700	0.5% v/v	Bore water	60 L/ha
Nil		Rain water	100 L/ha
Buddy (417 g/L AMS)	2% v/v	Rain water	100 L/ha
Li700	0.5% v/v	Rain water	100 L/ha
Nil		Bore water	100 L/ha
Buddy (417 g/L AMS)	2% v/v	Bore water	100 L/ha
Li700	0.5% v/v	Bore water	100 L/ha
Supa Link (water conditioning & compatibility agent)	0.3% v/v	Bore water	100 L/ha
Outright 770 (multipurpose adjuvant)	1% v/v	Bore water	100 L/ha
Steadfast (acidifying surfactant)	0.06% v/v	Bore water	100 L/ha
Amps PlantPro Allround Zinc (7.4% Zn as EDTA complex)	1 L/ha	Rain water	60 L/ha
Sett Enhanced (8% calcium + 0.5% boron)	1.5 L/ha	Rain water	60 L/ha

Bore water quality used in the trial

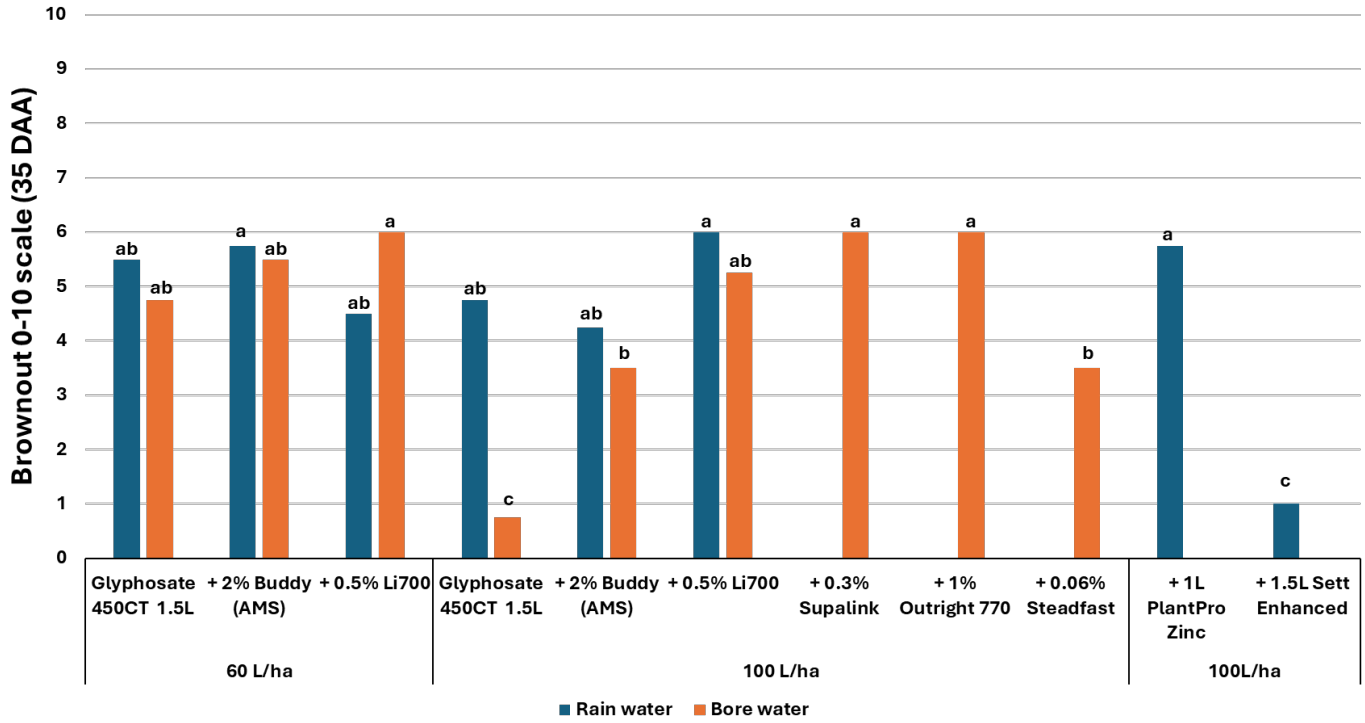
			CLIENT SAMPLE ID		Sample 1	
			SOURCE		Bore	
Test Parameter	**Method Description**	**Method Reference**	**Units**	**LOR**	**250200-1**	
Total Dissolved Salts	Calc	PMW-03	mg/L	na	758	
Electrical Conductivity	Electrode	PMW-03	dS/m	0.01	1.57	
pH	Electrode	PMW-04	units	na	7.40	
Carbonate	Titration	PMW-07	mg/L	1	<1.00	
Bicarbonate	Titration	PMW-07	mg/L	1	372	
Hydroxide	Titration	PMW-07	mg/L	1	<1.00	
Total Alkalinity	Titration	PMW-07	mg/L	10	372	
Chlorides	DA	DAP-07	mg/L	10	363	
Nitrate-N Soluble	DA	DAP-04	mg/L	0.5	3.45	
Phosphorus Soluble	ICP-OES	ICP-09	mg/L	0.5	<0.50	
Copper Soluble	ICP-OES	ICP-09	mg/L	0.05	<0.05	
Zinc Soluble	ICP-OES	ICP-09	mg/L	0.05	<0.05	
Manganese Soluble	ICP-OES	ICP-09	mg/L	0.05	<0.05	
Iron Soluble	ICP-OES	ICP-09	mg/L	0.05	<0.05	
Boron Soluble	ICP-OES	ICP-09	mg/L	0.05	0.05	
Potassium Soluble	ICP-OES	ICP-09	mg/L	0.5	4.13	
Calcium Soluble	ICP-OES	ICP-09	mg/L	0.5	171	
Magnesium Soluble	ICP-OES	ICP-09	mg/L	0.5	85.7	
Sodium Soluble	ICP-OES	ICP-09	mg/L	0.5	80.1	
Sodium Adsorption Ratio	Calc	SAR	na	na	1.2	
Total Hardness	Calculation	APHA2340B	mg/L	na	779	
Sulphate Soluble	ICP-OES	ICP-09	mg/L	0.5	70.1	

Results and discussion

In this trial there was no significant difference between glyphosate +/- ammonium sulphate or Li700 in bore or rainwater when applied at 60 L/ha spray volume.

When applied at 100 L/ha spray volume, glyphosate +/- ammonium sulphate or Li700 also delivered equivalent performance when rainwater was used. When bore water was used at 100 L/ha spray volume, there was a major reduction in performance of glyphosate alone, however performance was largely able to be restored by pre-treating the bore water with the range of water conditioning surfactants tested.

Additional treatments were included to understand the impact of zinc (as PlantPro Allround Zinc) and calcium (as Sett Enhance) on the performance of glyphosate in rainwater and 100L/ha. As can be seen in the graph, the addition of zinc did not impact the performance of glyphosate. However, the addition of calcium significantly reduced the performance of glyphosate (which reflects a similar outcome to many bore water sources, which are also high in calcium).



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