Do application conditions affect control of feathertop Rhodes grass and barnyard grass in fallow?

Trial location: Mallowa, NSW

Weed target: Feathertop Rhodes grass (*Chloris virgata*) (FTR), Barnyard grass (*Echinochloa spp*) (BYG)

Crop: Fallow

Application: 100L/ha Rainwater 110015 AIXR @ 2 Bar 6km/hr 4 Reps

Application timing at this location

	Date	Weed size at Timing 1	Time	Wind	Temp	RH%	Delta T
Timing 1 (T1)	22/12/2025	2 cohorts 'Tillering' and 'Advanced'	8am	10kph S	30.5°C	83%	3.8
Timing 2 (T2)	23/12/2025		9am	6kph WSW	25°C	98%	0.4
Timing 3 (T3)	29/12/2025		8am	13kph SW	20°C	59%	5
Timing 4 (T4)	29/12/2025		3pm	4kph SSW	32°C	26%	14
Timing 5 (T5)	19/01/2026		9am	4kph W	27°C	50%	7.5

For the trial reported here, first applications were applied at Timing 1, 2, 3 or 4.

Site background

Summer grass weeds such as feathertop Rhodes and barnyard grasses become more difficult to control as weed size increases and as application conditions deteriorate.

Both feathertop Rhodes grass and barnyard grass were present at this site. Barnyard grass was believed to be predominantly *Echinochloa colona* (awnless barnyard grass) but some *Echinochloa crus-galli* (common barnyard grass) may also be present. For this publication we have referred to the population collectively as barnyard grass (*Echinochloa spp*.). There were two cohorts of each weed. Plots were scored individually for each species and assessments separated into 'tillering' (1-3 tiller) and 'advanced' (3 tiller to commencement of flowering) weed sizes at application.

All plots were crossed sprayed with 2.4 L/ha of paraquat (250 gai/L) to create a double knock for those trials and treatments where this was required. Two paraquat cross spray strips were applied, one at 7 days after the main application timing and the other at 28 days after the first application timing. This created a matrix of no double knock; and double knocks applied at either 7 or 28 days between treatments.

Soil moisture was adequate at the first application timing (local BOM sites report ~50mm 10 days prior to the first application timing). There was a 4-6mm rainfall event the night of the first application timing.

Treatments were assessed for initial brownout 16 days after the first application and scored for biomass reduction at 40 days after the initial application.

No formal resistance testing was conducted on this population, but it is expected that there will be some level of glyphosate resistance present in the feathertop Rhodes grass and 'probably' also in the barnyard grass.

Conditions at application – how do they affect hydrophilic herbicides?

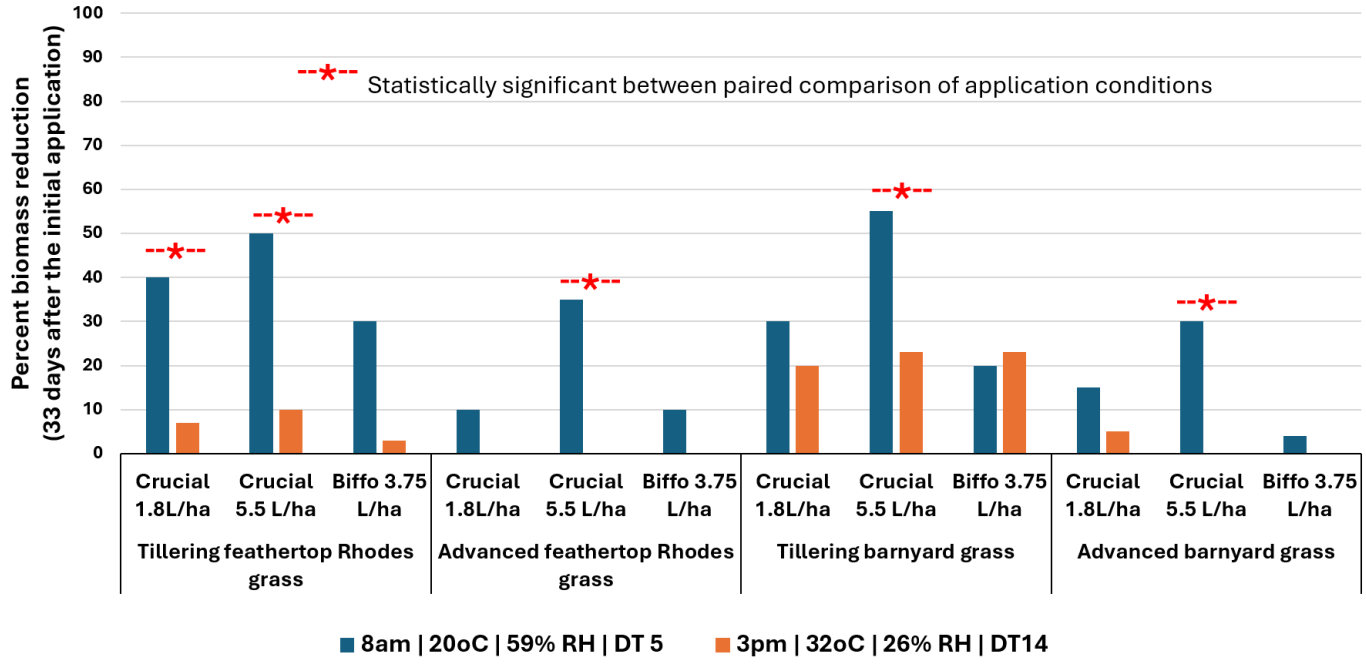
Across this field site, herbicides applications were made on different days and at different times of day. This allows some comparison of the performance of glyphosate and glufosinate (both hydrophilic herbicides) over a range of different application conditions at application.

Direct comparison of glyphosate and glufosinate under different application conditions (Timing 3 & 4)

Space was left in Trial 1 to include additional treatments for a 'conditions at application' comparison. These plots were sprayed 7 days later than the main applications in this trial, on a day where it was predicted to have acceptable application conditions in the morning (as per the Biffo® label), followed by hot and low humidity conditions later in the day.

Crucial® (600 g/L glyphosate) at both 1.8 L/ha and 5.5 L/ha and Biffo® (200 g/L glufosinate) at 3.75 L/ha were applied in the morning (8am | (20°C | 59% RH | Delta T 5) and compared to a second afternoon application of the same herbicides, at the same rates and on the same day (3pm | 32°C | 26% RH | Delta T 14).

As can be seen from the graph, performance generally declined when either herbicide was applied under the harsher application conditions (DT14). For each weed cohort, the paired comparison of application timings was statistically significant for Crucial® at 5.5 L/ha, while there was also a significant effect for Crucial at 1.8 L/ha on the 'Tillering' feathertop Rhodes grass. Application conditions did not provide statistically different results for glufosinate in this situation, but there was a trend for better performance under the milder application conditions.



Temperature and relative humidity conditions are stressed on the glufosinate label. This data reinforces that the same principles of temperature and humidity at application also apply for glyphosate (which is also a highly hydrophilic herbicide).

While no treatments provided commercially acceptable control for weeds of this size, there is a strong indication that performance of these herbicides is likely to be reduced if they are applied in the middle of the day during summer.

Cross trial comparison

Across the field site there were multiple trials with different objectives and applied at different application timings. Glufosinate (as Biffo® at 3.75 L/ha) was the only common treatment across all trials and application timings. (Note that for some of these trials, sub-lethal control was sought to separate treatment differences, so the weed sizes reported here were larger than label recommendations for this application rate).

While comparing treatments from different trials applied on different days is not statistically valid, it is worth noting the performance of glufosinate against the same weed population but applied under different application conditions.

Biffo (glufosinate) @ 3.75 L/ha			% biomass reduction at final assessment (40, 39 or 33 days after application)			
			Tillering FTR	Advanced FTR	Tillering BYG	Advanced BYG
Day 1	Trial 1	30.5°C | 83% RH | DT 3.8	20%	10%	33%	5%
Day 1	Trial 2 (several different nozzles)	30.5°C | 83% RH | DT 3.8	20% 10% 15% 10%	0% 0% 0% 5%	33% 28% 38% 25%	0% 0% 0% 5%
Day 2	Trial 3	25°C | 98% RH | DT 0.4	85%	17%	90%	18%
Day 7	Trial 1	20°C | 59% RH | DT 5	30%	10%	20%	4%
Day 7	Trial 1	32°C | 26% RH | DT 14	3%	0%	23%	0%

Note: There was a small rainfall event (4-6mm) overnight between day 1 and day 2, resulting in very high humidity the morning of day 2 applications.

Apart from the afternoon Day 7 timing (DT14), all other application timings were within stated label parameters for optimal glufosinate performance (temperature < 33°c, RH > 50%). Where the adverse application conditions were experienced (DT14), performance was very poor on the 'Tillering' barnyard grass and also resulted in almost zero effect on the 'Tillering' feathertop Rhodes grass or the 'Advanced' weed growth stages of either species.

Several applications were made across different protocols at DT 3.8 or DT 5 on different days, with performance approximately similar across the two species at comparable weed sizes under these relatively similar environmental conditions. Overall, performance was poor, despite these conditions being within label rate recommendations for temperature and humidity.

Performance of glufosinate on the same weed population was considerably different for the Day 2 application timing (DT 0.4) where conditions were mild and extremely humid, due to overnight rainfall. In this case, glufosinate performed well as a stand-alone application against the 'Tillering' weed size of both species.

The data suggests that even when application summer conditions are within label direction for temperature and humidity, glufosinate leaf uptake may still be compromised. Where the rate applied is inadequate for the weed size, this may result in sub-optimal performance.

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Disclaimer: This document is based on the results from individual trials. Variability in product performance is expected across trials and environments. Different outcomes are possible under different trial situations; brand of herbicide applied; environmental conditions before, at and following application; sprayer setup; adjuvant choice; water quality and spray volume; weed size and weed stress; and herbicide resistance status of the population. Trials seek to build on current knowledge – therefore this summary may contain experimental use patterns that are currently not specifically labelled for all of the weed(s) targeted in the trial, or treatments applied at a weed growth stage or application timing that may differ to the product label. In some circumstances, inclusion of a particular treatment is included to demonstrate why this product should not be used in that particular situation. Any research with unregistered agricultural chemicals or of unregistered products, rates or use patterns reported in this document does not constitute a recommendation for that particular use by the authors or the authors' organisations. All agricultural chemical applications must accord with the currently registered label for that particular agricultural chemical, crop and region.

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