

Awnless barnyard grass management: Flame application parameters

Background

In early 2007, the first population of glyphosate resistant awnless barnyard grass (*Echinochloa colona*) was confirmed in northern NSW. The paddock had a long history of winter cropping together with a heavy reliance on glyphosate in the summer fallow. This commercial experience, together with recent QPIF modeling outcomes, highlights that we are approaching a very dangerous situation due to the overuse of glyphosate.

Barnyard grass is typified by multiple germinations during the spring/summer. This characteristic frequently results in the need for multiple fallow sprays. An effective residual herbicide could allow a reduction in fallow sprays and consequently reduce the selection pressure on glyphosate. Flame[®] (imazapic 240 g/L) was chosen for this study as it can provide very effective residual control of a range of grasses and broadleaf weeds, however variability in performance has often been an issue.

Project aims

1. To investigate the impact of application volume and droplet size on Flame efficacy and reliability
2. To examine whether application timing just prior to rainfall has any impact on Flame reliability

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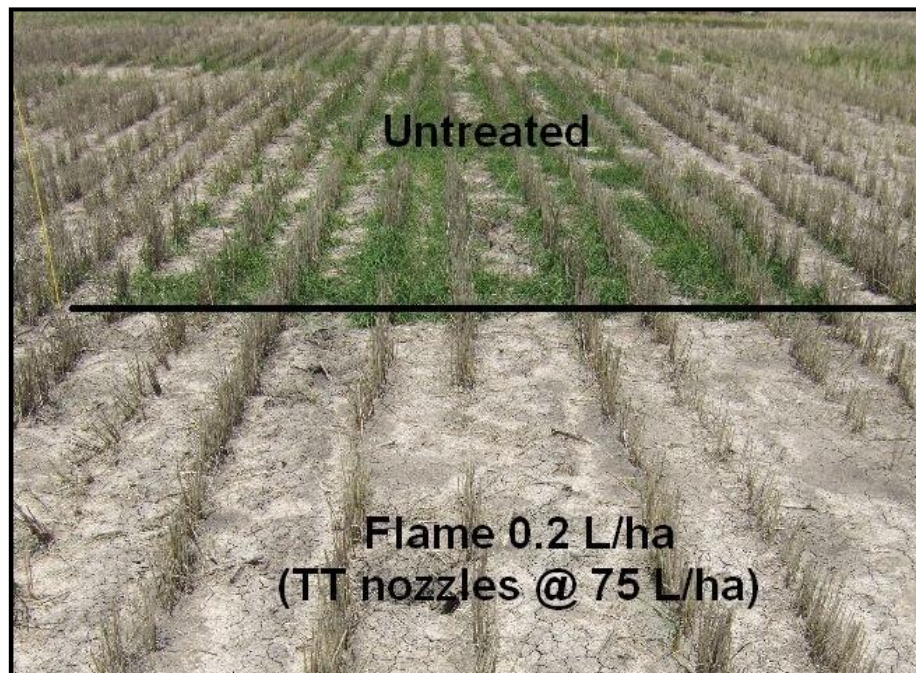
Results in a nutshell

Barnyard grass control:

- *High levels of initial control were obtained across 3 of the 4 trials*
- *Poor initial control levels where Flame applied 10-14 days after 25 mm rain event*
- *Good levels of control at 57-84 days after application in all trials*
- *Nozzle type (droplet size) had little impact on level of control*
- *Varying application volume from 50-100 L/ha had little impact on control*
- *No benefit observed by delaying application to shortly prior to a rain event*

Overall:

- ***Application PRIOR to weed germination appeared more important than application parameters***
- ***Useful tool in high barnyard grass situations but no silver bullet***
- ***Also consider in early spring between summer crop harvest and long fallow winter cereal crop***



Bullarah 1, 3 Jan 2008, 41 days after application

Trial design

NGA established four small plot trials in November 2007 to investigate basic application parameters and better understand their impact on level of barnyard grass control. All trials were established at sites that had 'commercially concerning' populations of barnyard grass in the summer of 2006/07. Treatments were applied either shortly after a fallow knockdown spray (Bellata site, double knocks of paraquat 1.2 L/ha applied 7 and 2 days pre Flame) or onto a bare soil fallow situation (other 3 sites). There were three replicates in all trials.

Flame at 200 mL/ha was applied at three total application volumes (50, 75 and 100 L/ha) and at four droplet sizes (fine, medium, coarse and extremely coarse). This was achieved using XR, TT, AM and TTi 110015 nozzles respectively. All combinations of volume and droplet size were evaluated. Treatments were applied at a constant pressure of 230 kPa with speed of travel adjusted to generate the specified application volumes.

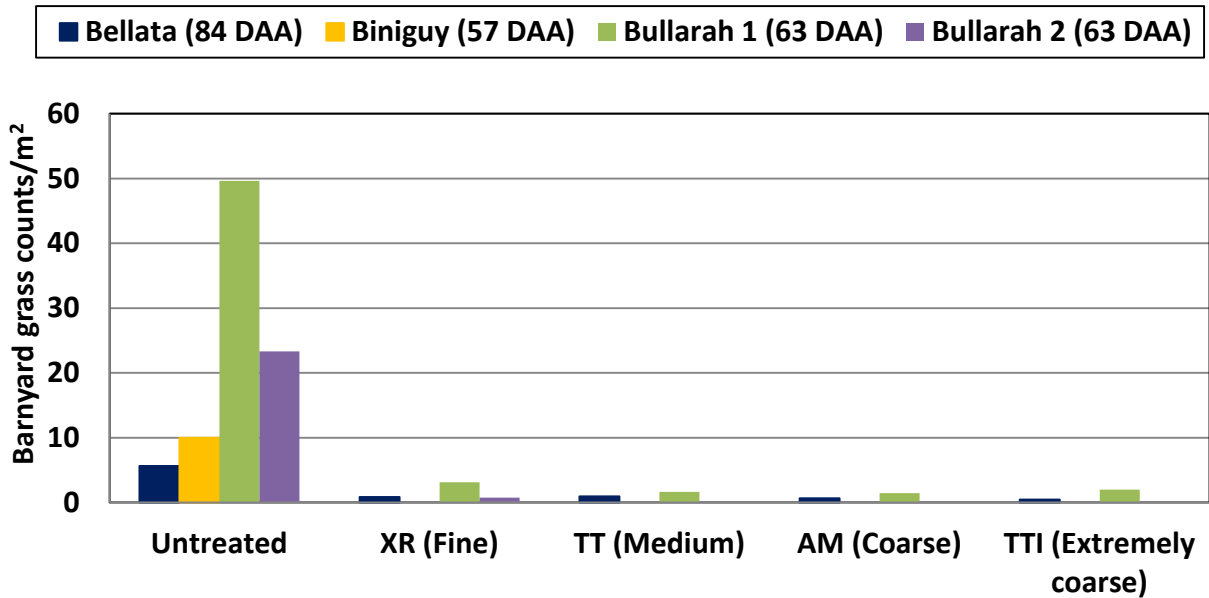
Assessment

1. **Barnyard grass control:** visual biomass reduction with final weed counts 8-12 weeks after application

Multi-trial summary

Droplet size impact

Barnyard grass control by nozzle (droplet size)



DAA=days after application

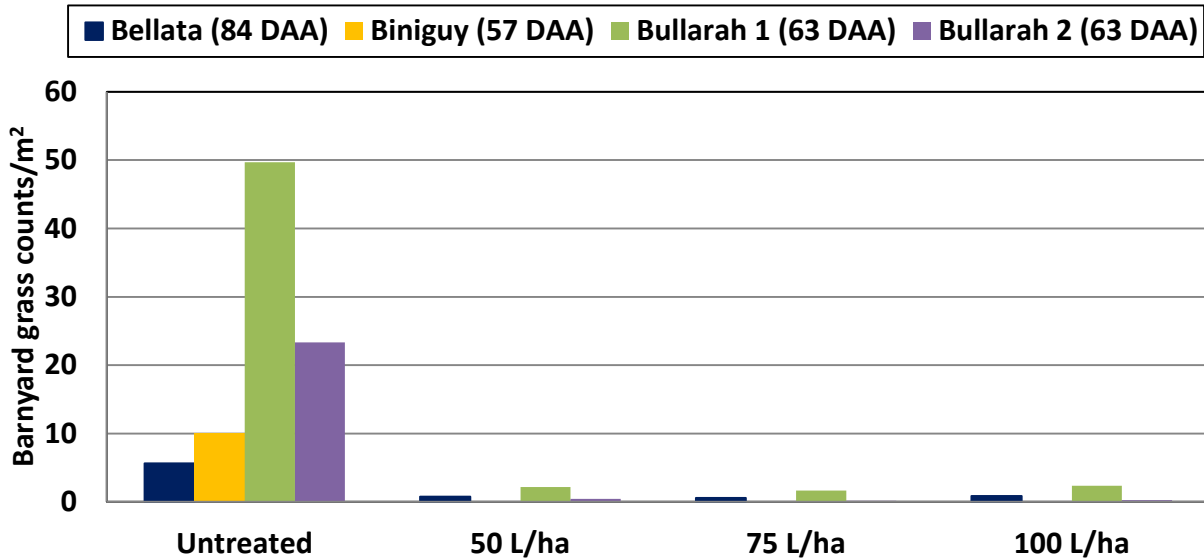
No significant difference in control between any droplet size in any trial or overall

Key messages – droplet size

- Droplet size had negligible impact on level of weed control in any trial
- Certainly no improvement by using a Fine droplet size

Application volume impact

Barnyard grass control by application volume



DAA=days after application

No significant difference in control between any application volume in any trial or overall

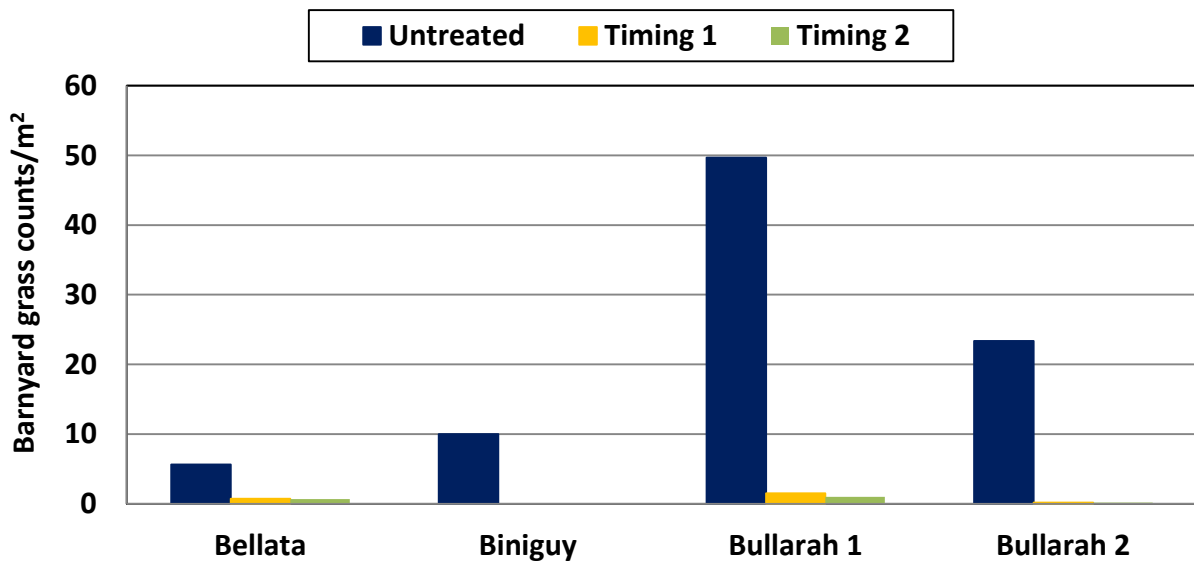
Key messages – application volume

- Varying application volume from 50-100 L/ha had negligible impact on level of weed control in any trial
- Greater than 95% weed control was still obtained 8-12 weeks after application at 3 of 4 sites with ~87% mean control only achieved at Bellata

Timing of application impact

Two applications were made in each trial. Timing 1 was the main trial timing. Timing 2 was a delayed spray attempting to apply shortly prior to a rain event. The interval between Timing 1 and 2 varied from 3-10 days with rain events of >2.5 mm occurring at all sites within 1 day of Timing 2. Flame at 200 mL/ha was applied in 50 L/ha volume at Timing 2 through both TT and AM nozzles.

Barnyard grass control by application timing



No significant difference in control between any timing in any trial
Results are means of TT and AM results at 50 L/ha for Timing 1 and 2

Key messages – application timing

- No clear benefit obtained by timing shortly pre rainfall
- Timing prior to weed germination appeared more important than timing prior to rainfall

Individual trial results 2007/08

Trial number: NGA0724

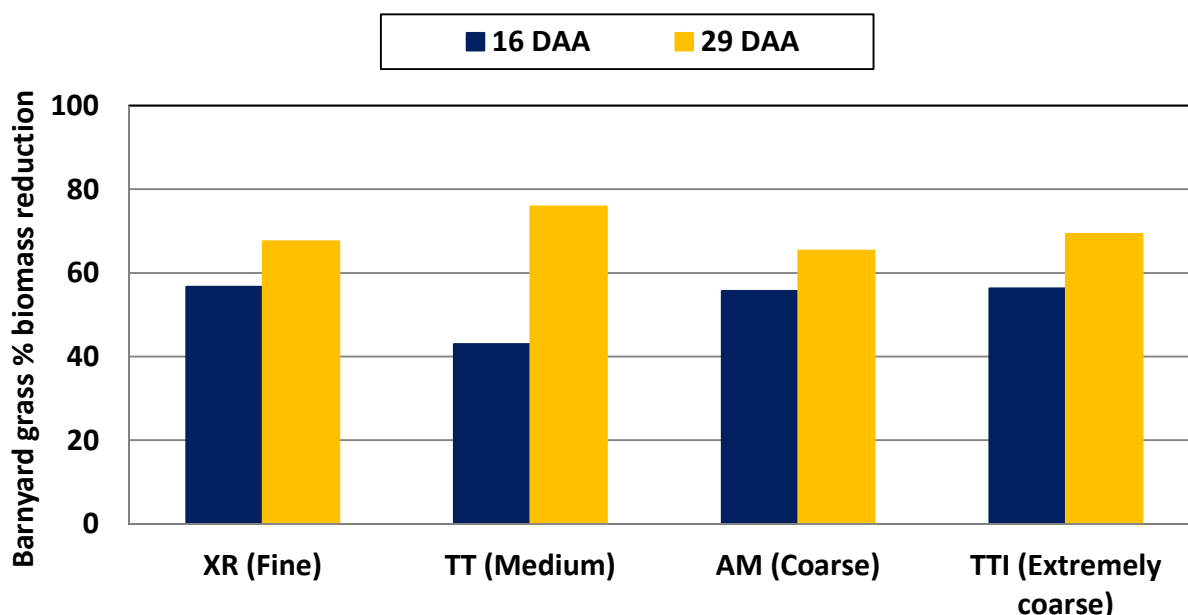
Site: Bellata district

Timing 1: 19/11/2007

Timing 2: 22/11/2007

Next rain event: 4.5 mm (23/11/07 – 25/11/07)

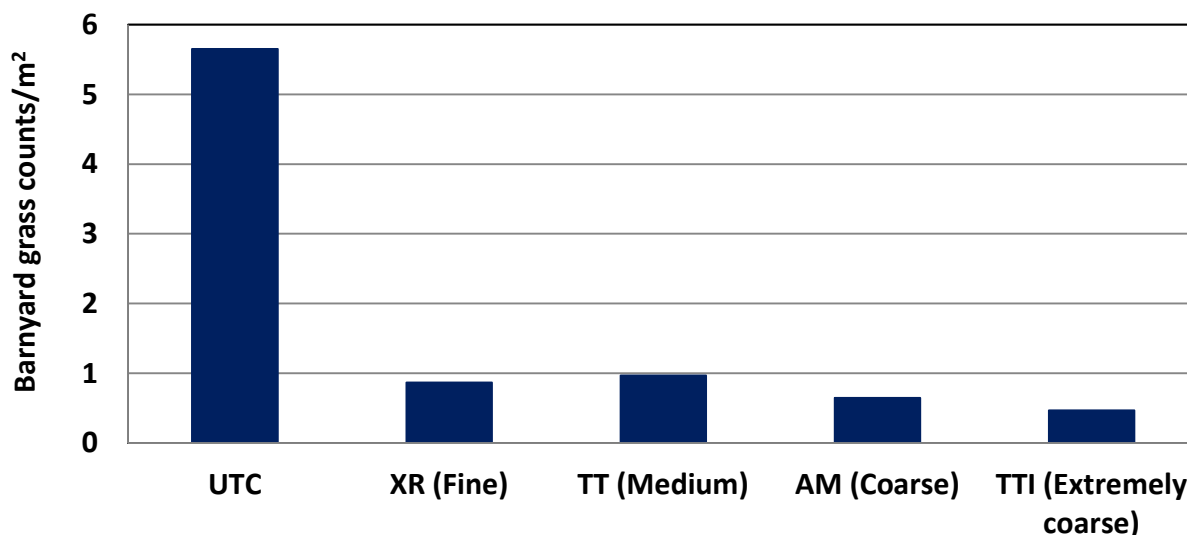
Barnyard grass visual biomass reduction by nozzle (16 and 29 DAA)



No significant difference in control between any droplet size
DAA = days after application Timing 1

- Moderate barnyard grass pressure situation in 2007 wheat stubble
- Site received ~25 mm rain, 10-12 days before Timing 1
- Double knock of paraquat 1.5 L/ha applied 7 and 2 days before Timing 1
- Complete control achieved by double knock with no survivors present at Timing 1
- Visual assessment at 16 DAA already showed poor and variable levels of suppression of new germinations
- Trial successfully sprayed out with Roundup CT 3L/ha at 35 DAA
- Trial monitored for another 7 weeks to examine impact on subsequent emergence flushes

Barnyard grass control by nozzle (84 DAA)



No significant difference in control between any droplet size
DAA = days after application Timing 1

- ~87% mean control of barnyard grass emerging between 35-84 DAA
- Improved efficacy compared to early assessments
- Subsequent seed testing by I&I NSW showed staggered barnyard grass germination over 2-3 weeks even when soil was kept at high moisture levels
- Results suggest that poor levels of initial control may have been due to barnyard grass already germinated but not emerged at time of trial establishment

Key messages

- Poorest level of control in trial series
- No indication of benefit from delayed application but interval was only 3 days
- No impact on efficacy from varying droplet size or application volume (data not presented)

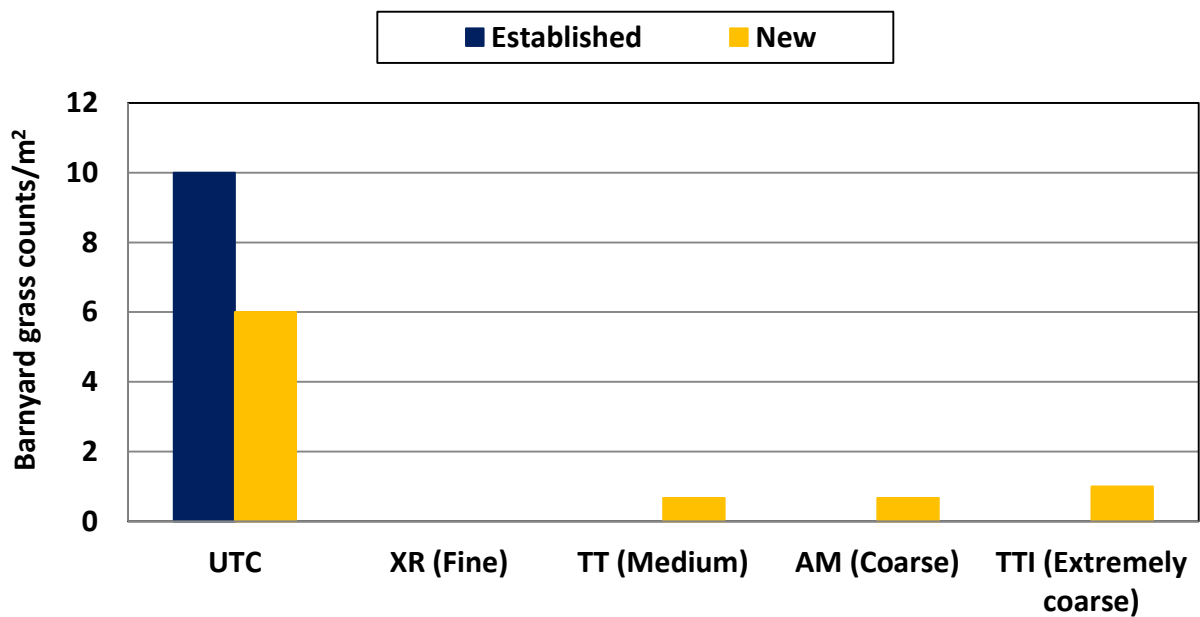


ABYG: Flame Application Parameters 2007/08 Complete Summary

Trial number: NGA0725
Site: Biniguy district

Timing 1: 28/11/2007
Timing 2: 7/12/2007
Next rain event: 8-10/12/2007

Barnyard grass control by nozzle (57 DAA)



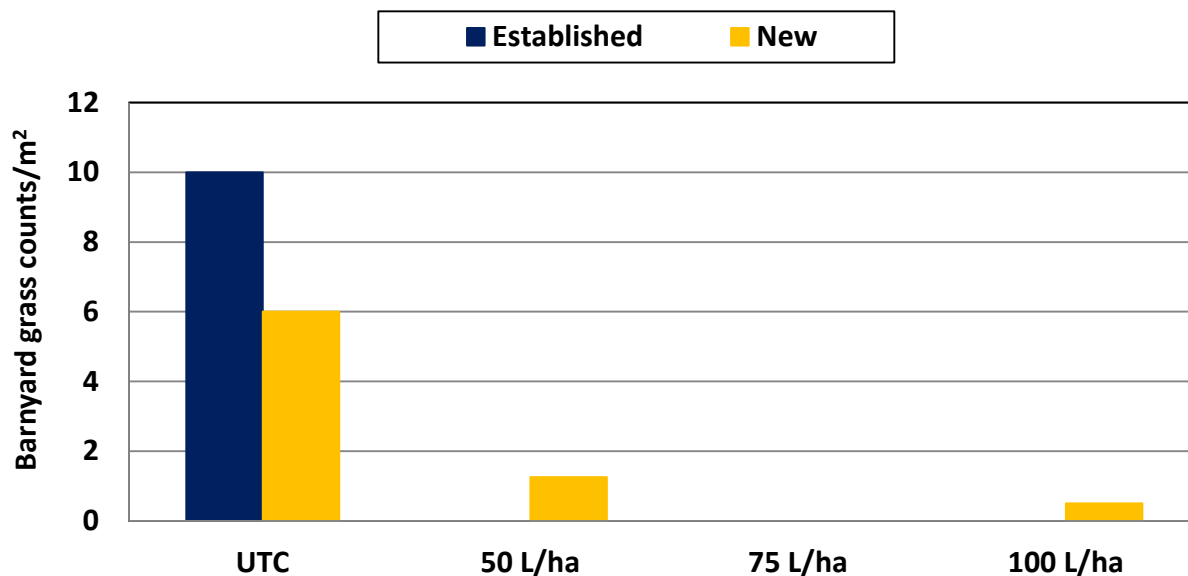
No significant difference in control between any droplet size

DAA = days after application Timing 1

'Established' counts were original germination, 'new' counts were plants emerging between 35-57 DAA

- Relatively low barnyard grass pressure situation in 2007 wheat stubble
- Double knock of Roundup CT 1.2 L/ha applied 16 and 9 days before Timing 1
- Complete control of original germination by all treatments at 35 and 57 DAA
- ~90% mean control of new germination between 35-57 DAA
- No significant impact on efficacy from varying droplet size

Barnyard grass control by application volume (57 DAA)



No significant difference in control between any application volume

DAA = days after application Timing 1

'Established' counts were original germination, 'new' counts were plants emerging between 35-57 DAA

- No significant impact on efficacy from varying application volume

Key messages

- Excellent level of control of a low population of barnyard grass immediately post wheat harvest
- No impact on efficacy from varying droplet size or application volume
- No indication of benefit from delayed application (data not presented)

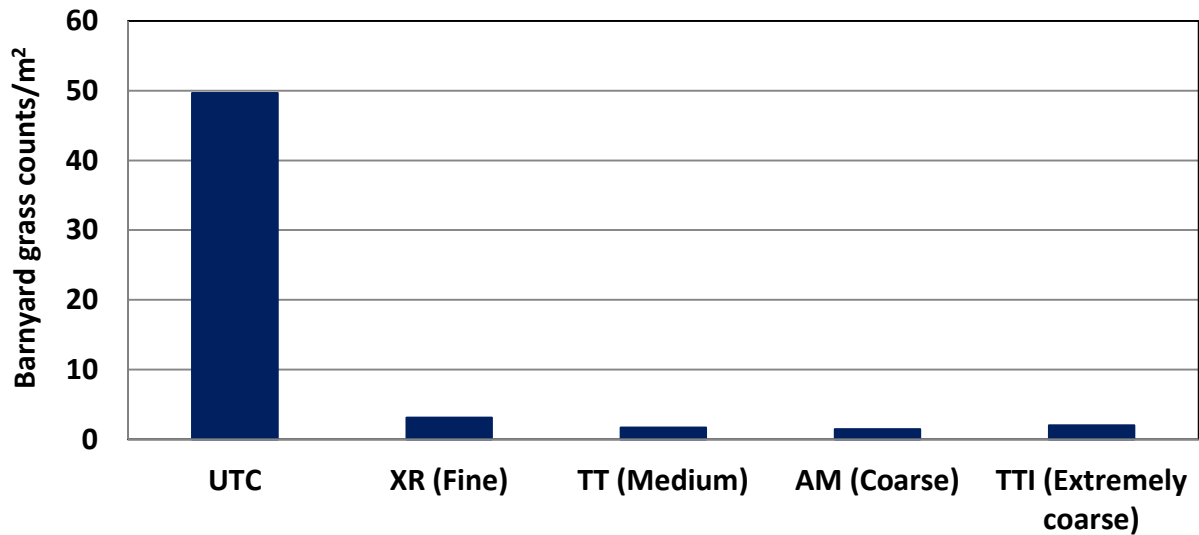


ABYG: Flame Application Parameters 2007/08 Complete Summary

Trial number: NGA0726
Site: Bullarah district

Timing 1: 23/11/2007
Timing 2: 3/12/2007
Next rain event: 4/12/2007

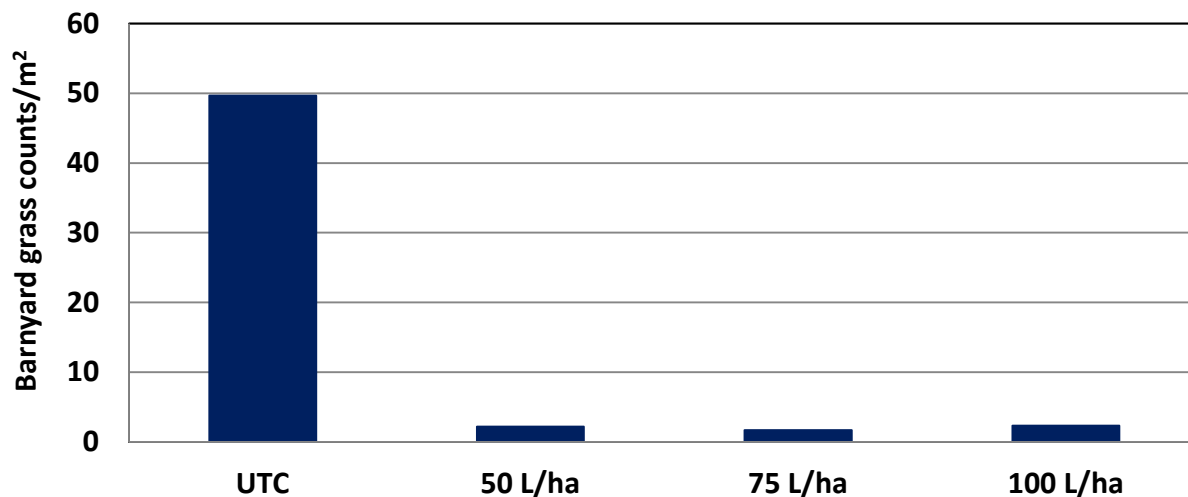
Barnyard grass control by nozzle (63 DAA)



No significant difference in control between any droplet size
DAA = days after application Timing 1

- Heavy barnyard grass pressure situation in 2007 wheat stubble
- Applied on dry fallow
- ~96% mean control of barnyard grass germinations post application
- No significant impact on efficacy from varying droplet size

Barnyard grass control by application volume (63 DAA)



No significant difference in control between any application volume
DAA = days after application Timing 1

- No significant impact on efficacy from varying application volume

Key messages

- Good level of control of a high population of barnyard grass
- No impact on efficacy from varying droplet size or application volume
- No indication of benefit from delayed application (data not presented)

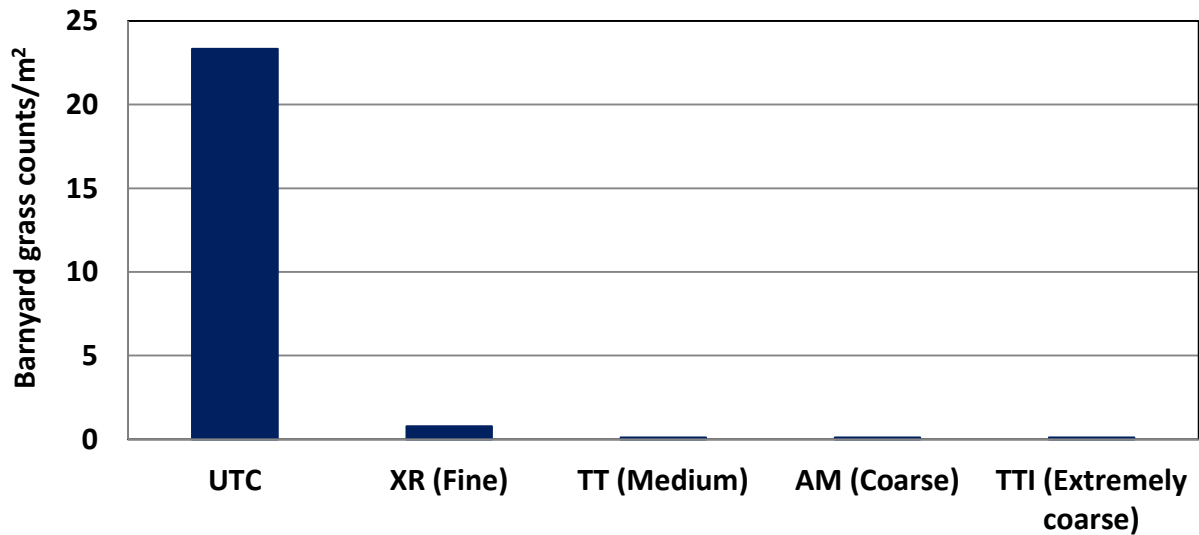


ABYG: Flame Application Parameters 2007/08 Complete Summary

Trial number: NGA0727
Site: Bullarah district

Timing 1: 23/11/2007
Timing 2: 3/12/2007
Next rain event: 4/12/2007

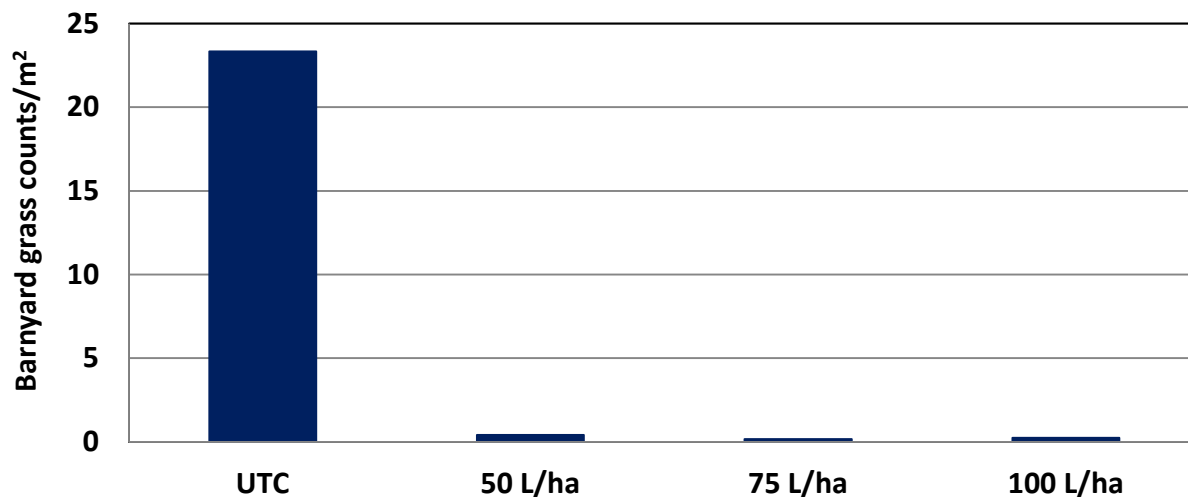
Barnyard grass control by nozzle (63 DAA)



No significant difference in control between any droplet size
DAA = days after application Timing 1

- Moderate barnyard grass pressure situation in 2006/07 sorghum stubble
- Paddock cultivated in July and September 2007
- ~99% mean control of barnyard grass germinations post application
- No significant impact on efficacy from varying droplet size

Barnyard grass control by application volume (63 DAA)



No significant difference in control between any application volume
DAA = days after application Timing 1

- No significant impact on efficacy from varying application volume

Key messages

- Good level of control of a moderate population of barnyard grass
- No impact on efficacy from varying droplet size or application volume
- No indication of benefit from delayed application (data not presented)