

## Impact of initial fallow herbicide treatments on the efficacy of unregistered 1<sup>1</sup> herbicide + paraquat when applied as a double knock to control Windmill grass (*Chloris truncata*)

**Trial Code:** GOWE04616-3  
**Season/Year:** Summer 2015/16  
**Location:** 'Glenlossie', Kickabil (20 km South of Collie)  
**Collaborators:** Ben Shanks

### Keywords

GOWE04616-3, Windmill grass, Double knock, Tank mixes, Herbicide resistance, Paraquat, *Chloris truncata*, Collie

### Take home message

Use of a combination of an unregistered herbicide (UnReg 1) plus paraquat (PQ) as a double knock (DK) to control windmill grass (WMG) resulted in a failure. This mix has been previously shown to be effective on WMG.

It is unclear whether the first knock herbicides interfered with the efficacy of the Unreg1 + PQ as the DK, or whether it was due to moisture/plant stress resulting from the very hot dry conditions following the first treatment.

Until more is understood around the interaction of any previous herbicide applications and the efficacy of UnReg1+PQ it is not advisable to use this mix as a DK. Or in close succession to the use of other fallow herbicides.

The trial confirmed that Targa followed by a double knock of paraquat can be effective in controlling WMG.

### Background

Previous trials by GOA have found that the combination of UnReg1+PQ can provide very effective knockdown control for WMG when used as a single pass, standalone treatment. However, the relative narrow weed control spectrum of UnReg1+PQ highlights a possible shortcoming, the control of the broader range of weeds often present in fallow situations alongside WMG.

One possible way to address is to tank mix UnReg1+PQ with herbicides targeting other weeds applied as a single pass.

Another alternative is to use the UnReg1+PQ as a double knock treatment following more conventional weed control herbicides, noting that paraquat is already well accepted as a common product of choice for double knocks. The concern with this approach is whether the herbicides applied

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<sup>1</sup>Unregistered herbicide (UnReg1) is a Group H herbicide registered for use in fallows but not registered for use on Windmill Grass (however is registered for Feathertop Rhodes Grass another *Chloris* species and Fleabane)

in the first pass will affect the efficacy of UnReg1+PQ. This trial has been designed to investigate this question.

## DISCLAIMER

Following is a report on a scientific experiment. It may contain some herbicide treatments that are not registered for the situation, manner or rate at which they are used in this trial. This document or anything else resulting from, construed or taken from this or by GOA or its representatives should not be taken as a suggestion, recommendation or endorsement of any unregistered herbicide uses.

## Aim

Determine if the effectiveness of control of WMG by the UnReg1+PQ, herbicide mix, is reduced when used as a DK following the application of a range of common fallow herbicide mixes applied in the first knock.

## Method

A small plot trial was established in the summer of 2015/16. At this site, there was a reasonably uniform (but not dense) population of WMG.

The herbicide treatments listed in **Table 1** were applied to the trial site on the 10<sup>th</sup> of February 2016 to actively growing WMG. It was estimated by nearby rain gauges that the site received around 85mm of rainfall between the 23<sup>rd</sup> and the 29<sup>th</sup> of January, around 11 days prior to application.

On the 17<sup>th</sup> of February, 7 days after the initial applications, a DK treatment containing UnReg1+PQ was applied over the whole trial site, except for the untreated plots at the first application timing. No rainfall fell between the initial application and the DK treatment and the WMG plants had matured quickly in this time.

No rainfall was received at the trial site until very late April/early May. Assessments were made as to the level of brownout at 29 days after the initial application (DAA) achieved within this period with a final assessment of percentage regrowth made 96 DAA on the 16<sup>th</sup> May following ~58 mm of rainfall.

All treatments were applied in a total volume of 100 L/ha through AIXR110015 (coarse) nozzles at 3 bar.

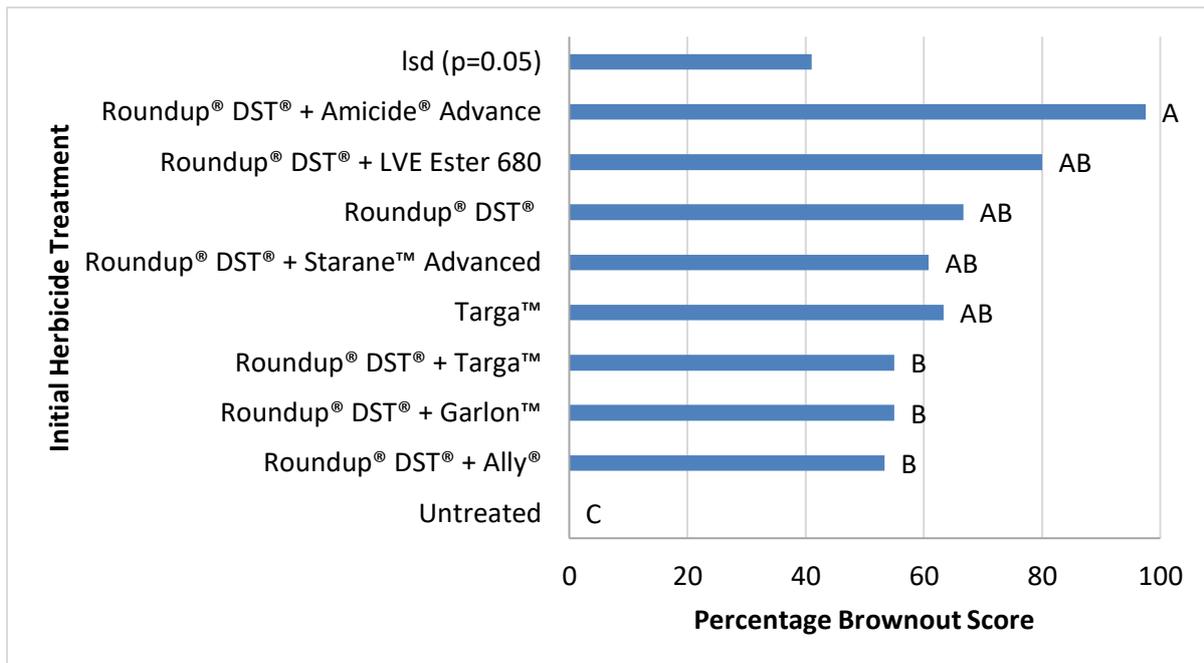
Results were analysed using ANOVA for the analysis of variance and results compared by using a least significant difference (LSD) method with a 95% confidence interval. Any references to differences between treatments should be assumed to be statistically different unless otherwise stated.

**Table 1.** Herbicides and rates applied in the first application

Initial Treatment	Rate (mL or g/ha)
Untreated Control (UTC)	
Roundup® DST® + LVE Ester 680	2000 + 800
Roundup® DST® + Starane™ Advanced	2000 + 900
Roundup® DST®	2000
Targa™	Very high rate <sup>2</sup>
Roundup® DST® + Amicide® Advance	2000 + 1600
Roundup® DST® + Targa™	2000 + 500
Roundup® DST® + Ally®	2000 + 7
Roundup® DST® + Garlon™	2000 + 160

## Results

Brownout assessments were conducted 29 DAA where most treatments were assessed to have at least a 50% reduction in green leaf area while the untreated plots showed no brownout (Figure 1).



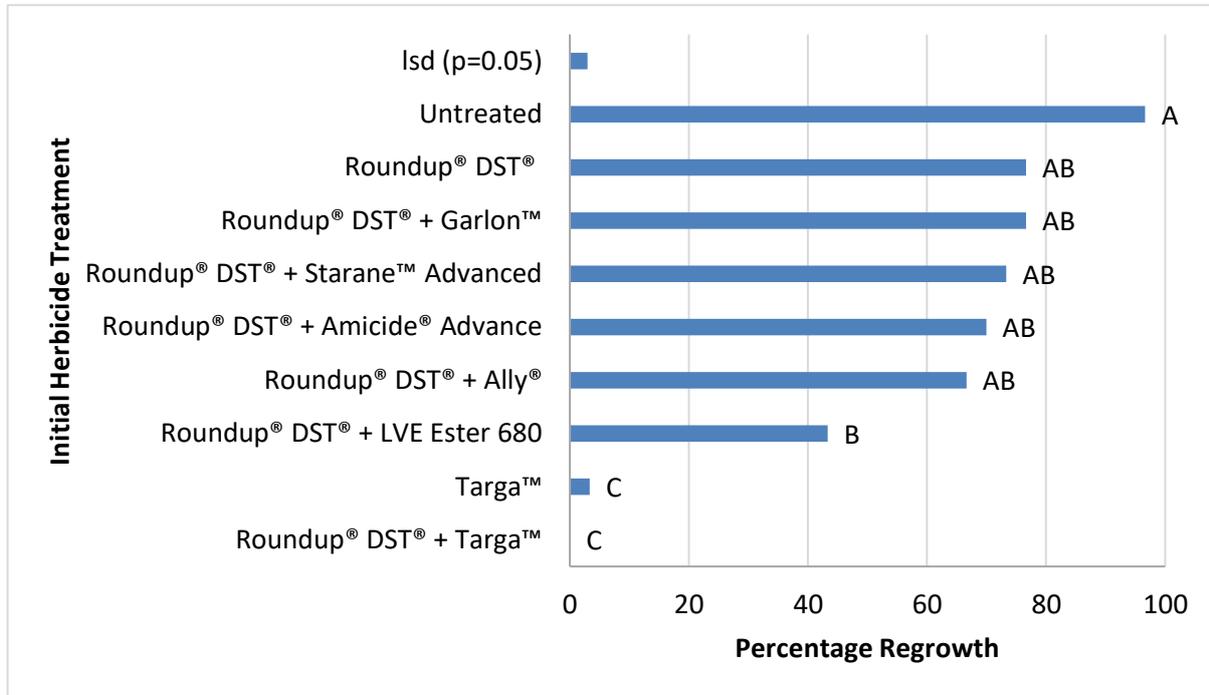
**Figure 1.** Percentage brown out scores, 29 DAA following various initial herbicide treatments followed by a double knocked of UnReg1+PQ

Windmill grass regrowth was assessed at 96 DAA, as detailed in

**Figure 2** below. There was significant regrowth in nearly all treatments with most, not different to the untreated. Three treatments had significantly less than 45% of plants showing regrowth; Roundup®

<sup>2</sup> The rate applied in this trial was in excess of the rate allowed by the minor use permit of 500ml/ha Targa (99g/L a.i.)

DST® + LVE Ester 680, Targa™ and Targa™ + Roundup® DST®. Treatments containing Targa however were clearly the best performing treatments with less than 3% of plants regrowing.



**Figure 2.** Percentage of plants assessed as showing regrowth 96 DAA following various initial herbicide treatments followed by a double knocked of UnReg1+PQ

## Discussion

Firstly, it should be highlighted that very hot and dry conditions followed the establishment of this trial that could have potentially contributed to decreased performance of any herbicides applied to control WMG.

Early brownout scores showed that most herbicide treatments had some impact on the WMG. However, it is plausible to suggest that this could be largely attributed to the paraquat component of the DK treatment.

Ninety-six days after the initial applications, the windmill grass had recovered with ~70% of plants regrowing. The exceptions were treatments that contained Targa or the Round up DST + LV Ester. The later, however, still had 43% of plants regrowing which would be commercially unacceptable control.

Both Targa treatments performed well with little regrowth after 96 days. However, both treatments contain a sequence of Targa followed by paraquat, albeit mixed with UnReg 1. Targa followed by a double knock of paraquat has been shown by previous trial work, to be effective in controlling WMG and this use pattern has a minor use permit granted in NSW<sup>3</sup>. It cannot be determined in this trial whether the high levels of control by these two treatments could be attributed to the addition of

<sup>3</sup> Permit number - PER13460

UnReg 1 to the paraquat or simply a demonstration of the already established, effectiveness of Targa followed by a DK of paraquat.

Unfortunately, there was not a treatment of UnReg1+PQ applied by itself at either the initial application timing or the DK. If there were, this would have allowed the determination of whether the failure was due to the initial herbicide applications effecting efficacy, or whether developing moisture stress was the cause. For example, it is plausible that the WMG may have begun to suffer moisture stress due to the deteriorating weather conditions between the initial application timing and the DK timing contributing the failure in control.

In support of this theory in an adjacent co-located trial the application of UnReg1+PQ at the initial herbicide application timing rather than the second timing achieved much higher levels of control of WMG<sup>4</sup>.

## Conclusion

This trial has been inconclusive as to whether a range of common herbicide mixes applied before the application of UnReg1+PQ as a DK has affected its efficacy on windmill grass.

The results of this trial has also shown that using UnReg1+PQ as a DK has not offered acceptable levels of control except where it has followed the application of Targa in the initial application. This trial has therefore reinforced that the currently permitted use pattern of applying Targa followed by a double knock of paraquat can be effective in controlling WMG. However, it is also unclear if the addition of the UnReg 1 herbicide contributed anything further to the high levels of control achieved.

Until further evidence is available, it may be safest to assume that there is potential negative impact to the final control achieved by using the UnReg1+PQ as a DK. This could be due to either interference by the various initial treatments or simply the function of the delay in application of the effective herbicide combination of UnReg1+PQ. Further work is required to investigate this question.

## Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the authors would like to thank them for their continued support. Special thanks goes out to Ben Shanks of Dubbo who hosted this trial.

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<sup>4</sup> Controlling windmill grass- tank mixes with paraquat and a group H herbicide- Kickabil 2016  
<http://www.grainorana.com.au/documents?download=61>