# GOA Trial Report

**Trial name;** Windmill Grass- Pre Emergent/Residual Herbicide Control

**Date;** Summer 2015

**Location;** "Iona", Trangie

**Collaborators;** Kevin and Richard Flinn,

## Background:

Windmill Grass (WMG) is emerging as a major problem in zero till[1] conservation (stubble retention) farming systems. Its growth habits are suited with small seed that readily establishes with minimum soil disturbance, and it has relatively high tolerance to most common herbicides, including emerging instances of glyphosate resistance[2].

A number of trials have been conducted investigating various aspects of knock down control of large mature tussocks of WMG. These have focused on product choice and rates, double knock timing and the effect increasing moisture stress has on final control. Such research, although valuable, has shown that controlling large mature WMG with herbicides varies in its success. Because of knock down herbicide unreliability, many growers have returned to cultivation as a WMG control strategy. Although effective in controlling a large proportion of mature WMG plants, occasional misses and rapid maturation of plants (difficult with cultivation timing to totally prevent weed seed set), together with hard seed carryover can often result in subsequent germinations and rapid reestablishment.

This trial is designed to investigate if pre-emergent or residual herbicides might have a role following cultivation to reduce the likelihood of re-establishment of WMG populations.

## 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.

[1] http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2011/04/Windmill-grass-Chloris-truncata-the-current-state-of-play#sthash.sAZPEnaA.dpuf

[2] http://www.glyphosateresistance.org.au/register_summary.html

# Aim;

- Compare different pre-emergent and residual herbicides for controlling seedling emergences of WMG in crop fallows
- Assess any effects on other weed species present in the trial sites.

# Methods;

- The trial used a Randomized Complete Block design with 3 replications
- Small plots of 3 by 12 m for each treatment.
- The site was selected because it had a high background population of mature windmill grass prior to cultivation (by the farmer cooperator) with offset discs and tined cultivator.
- 41 mm of rain fell on the site between the 23/12/2014 and the 26/12/2014. However, no live weeds, including WMG, were present at herbicide application time 4 days later.
- Herbicides applied on 30/12/2014 (see details below)
- 2L/ha of paraquat was applied to the site on 2/1/2015 to control any weeds that may have germinated before the herbicides were incorporated (i.e. by rain)
- There was a rainfall event on the 5/1/2015, sufficient to incorporate herbicides (approx. 19 mm)
- Trial soil type is a brown silty clay loam. Although not tested it was judged to be neutral pH. Soil condition was loose, moderate level of tilth with some clods up to 75mm in diameter.
- Plant counts were conducted 15, 41 and 50 days after treatment (DAT),
- To prevent existing WMG and other species seeding, a knock down herbicide treatment was applied on 19/2/2015
- The treatments are listed in **Error! Reference source not found.**

**Table 1** Herbicide treatments and rates applied, Trangie 2015

| Treatment | **Product 1** | **Rate mL or g** | **Product 2** | **Rate mL or g** |
|---|---|---|---|---|
| **1** | Untreated control | | | |
| **2** | Targa | 500 | | |
| **3** | Targa | 1000 | | |
| **4** | Terbyne | 1100 | | |
| **5** | Trifluralin | 2000 | | |
| **6** | Stomp 330E | 3000 | | |
| **7** | Flame | 200 | | |
| **8** | Flame | 200 | Diuron 900 WG | 1000 |
| **9** | Dual Gold | 2000 | | |
| **10** | Dual Gold | 2000 | Gesaprim 900 WG | 1000 |
| **11** | Gesaprim 900 | 1000 | | |
| **12** | Balance | 100 | Stomp 330E | 3000 |
| **13** | Balance | 100 | Diuron 900 WG | 1000 |
| **14** | Balance | 100 | Flame | 100 |
| **15** | Sakura | 118 | | |
| **16** | Spinnaker | 140 | | |
| **17** | Chlorsulfuron | 25 | | |
| **18** | Valor | 180 | | |

Site and application details

**Table 2** Daily rainfall mm. Trangie Research Station 2015, 6 km south of the trails site

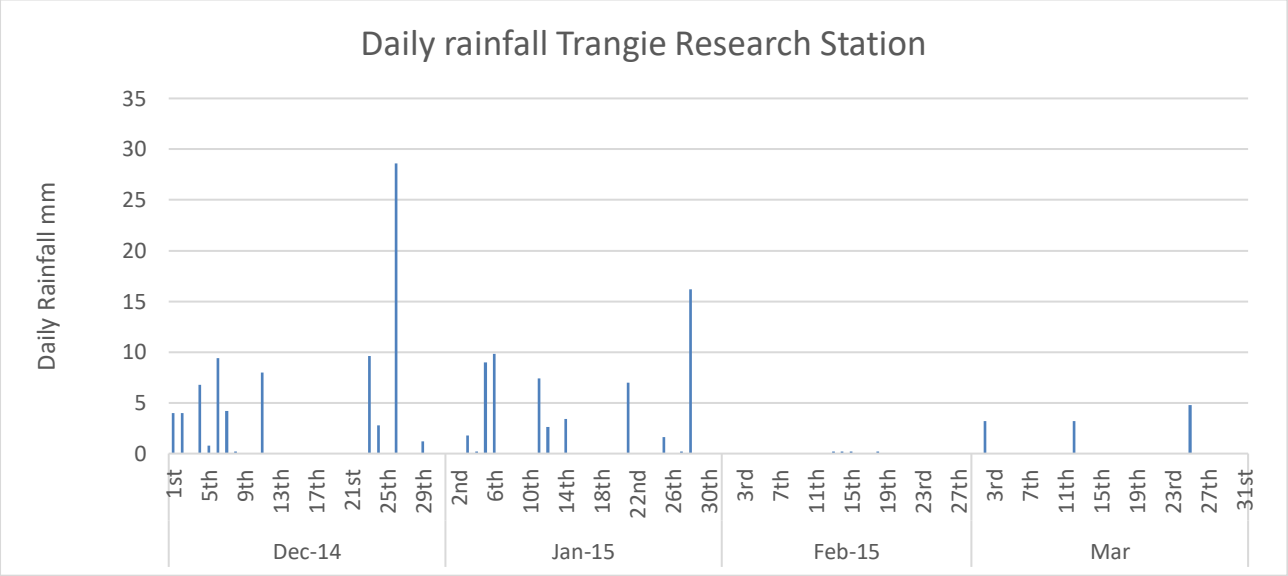


**Table 3** Herbicide application information Trangie, 2015

| | | | | | |
|---|---|---|---|---|---|
| **Date Applied** | 30/12/2014 | **Temp** | **Wind vel.** | **Wind Dir.** | **Humidity** |
| **Start time** | 7.15 sm | 22-24 deg C | 10-15 km/h | E | 32% |
| **Finish Time** | 9.30am | | **Δt** | 10 | |
| **Water rate** | 100L/ha | **Nozzle** | AIXR015 | **Pressure** | 3 Bar |
| **Equipment** | ATV | **Speed** | km/h | | |

Rain was recorded at Trangie research station (approximately 6 km to the south of the site) with 54 mm falling from spraying (30.12.14) to 18th Feb 2015 (virtually all fell in January) with one fall of 28.6 mm recorded on 18th January.

# Results

Fifteen treatments had a significant impact on new WMG populations following application compared with untreated control. Two herbicide treatments, Spinnaker and chlorsulfuron, had no significant impact on subsequent WMG populations. Details regarding individual treatments are detailed in **Table *4*** below.

Awnless barnyard grass (ABG) also germinated at this site. Several herbicide treatments provide a range of control of ABG. Sixteen treatments were significantly different to the UTC as detailed in **Table *4*** below.

**Table 4** Seedling WMG and awnless barnyard grass populations following treatment with various herbicide treatments 48 DAA

| Herbicide treatment | Windmill Grass (WMG) | | | Barnyard Grass (ABG) | | |
|---|---|---|---|---|---|---|
| | pl/m2 | | % Control | pl/m2 | | % Control |
| Targa (1000) | 0.32 | G | 96% | 0.12 | E | 98% |
| Balance/Stomp 330E | 0.36 | G | 96% | 0.40 | DE | 95% |
| Balance/Diuron | 0.52 | G | 94% | 0.91 | CDE | 88% |
| Dual Gold/Gesaprim 900 | 0.67 | FG | 92% | 0.71 | CDE | 90% |
| Stomp 330E | 0.71 | FG | 92% | 2.14 | CDE | 71% |
| Targa (500) | 1.03 | FG | 88% | 1.03 | CDE | 86% |
| Dual Gold | 1.67 | EFG | 81% | 1.63 | CDE | 78% |
| Valor | 1.83 | EFG | 79% | 0.75 | CDE | 90% |
| Trifluralin | 2.34 | DEFG | 73% | 1.23 | CDE | 83% |
| Balance/Flame | 2.58 | DEFG | 70% | 2.98 | BC | 60% |
| Sakura | 3.45 | CDEF | 60% | 2.26 | CDE | 69% |
| Gesaprim 900 | 3.45 | CDEF | 60% | 3.02 | BC | 59% |
| Flame/Diuron | 3.97 | CDE | 54% | 2.10 | CDE | 72% |
| Terbyne | 4.96 | BCD | 43% | 1.51 | CDE | 80% |
| Flame | 5.71 | BC | 34% | 2.86 | BCD | 61% |
| Chlorsulfuron | 5.87 | ABC | 32% | 2.50 | BCDE | 66% |
| Spinnaker | 7.58 | AB | 13% | 4.88 | AB | 34% |
| UTC | 8.69 | A | 0% | 7.38 | A | 0% |
| Lsd | 2.90 | | | 2.55 | | |

Numbers followed by the same letter denotes no significant difference between them

# Discussion

Cultivation of mature WMG plants was not effective in controlling WMG or ABG populations, given the re-establishment of 9 and 7 plants/m2 respectively in the untreated control plots.

Five herbicide treatments resulted in control levels for WMG of over 90% and warrant further investigation as potential control measures in fallow situations (label considerations). Four treatments resulted in above 90% control of ABG (three of which provided greater than 90% control of WMG).

Flame, often considered good for residual grass control, performed poorly achieving around 34% control of WMG and 61% of ABG. The addition of diuron only marginally improved control.

Stomp and Trifluralin both have higher volatility (than other herbicides), and label recommendations typically specify incorporation withing 24 hours. Trifluralin, despite no physical/mechanical incorporation (only rainfall), achieved around 73% control of WMG and 83% of ABG. Similarly Stomp, also resulted in useful control/suppression of WMG and ABG at 92% and 71% respectively. The combination of Balance and Stomp resulted in high levels of control of both species at 95% and 96% of WMG and ABG respectively.

Targa (quizalifop) at 1L/ha, not a registered rate, resulted in lowest WMG population of all treatment, although not significantly different to a number of other products. The lower herbicide rate (500ml/ha) resulted in less control compared to the higher rate (1000ml/ha) (though not statistically different) but a useful level of 88%. The control provided by Targa is interesting as it is considered a knockdown herbicide only and not documented as having any useful residual capacity. This scenario was also reflected in the ABG results with the higher rate achieving the lowest ABG populations with 98% control and the lower rate achieving 86% control. These were not significantly different. These results warrant further investigation.

What was not tested was a zero tilled untreated control, nor was how effective a knock down herbicide might be as an alternative on newly emerging seedlings (it is noted that the farmer had applied a knockdown in the same field, and had subsequently made an additional cultivation).

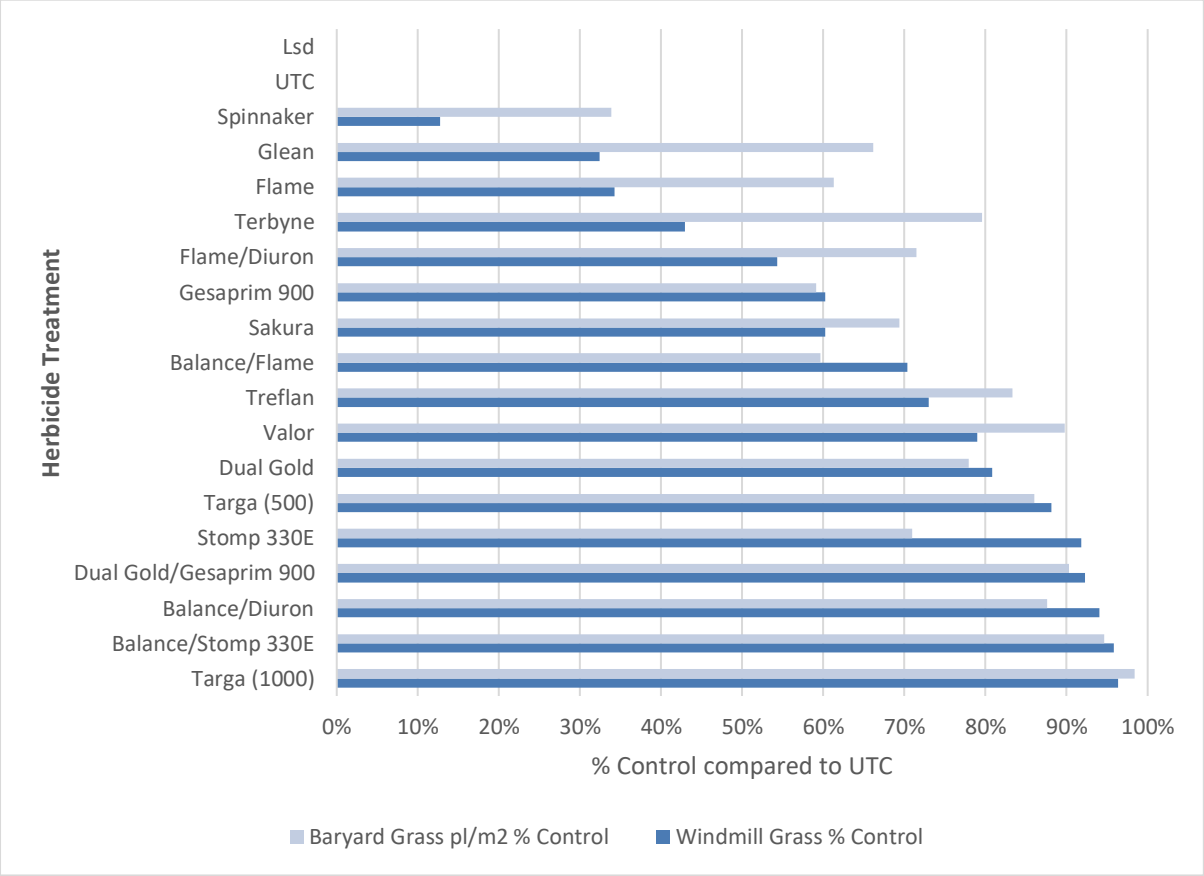


***Figure 1. Percentage control (as compared to the untreated control) of windmill grass and Barnyard grass at Trangie 2015.***

WMG was observed in at least one of these treatments as very unhealthy. While the decision was made to spray out the trial on 19th Feb to prevent seed set, it may have been valuable to assess if rain would have revived the WMG, or whether reactivation of the herbicide would have caused further suppression of these unhealthy plants.

## Conclusion

Cultivation alone (without subsequent passes) did not bury WMG seeds sufficiently enough to suppress germinations. Emerging populations would have rapidly re-infested the field in the absence of further control measures.

A number of treatments investigated in this trial demonstrated very useful levels of control of both WMG and ABG germinations. They warrant further investigations before any implementation. Some of these products may also be restricted from use in these situations due to labelled use patterns A number of products do not have claims for residual control, but appeared to have a useful residual effect.

## Acknowledgements

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