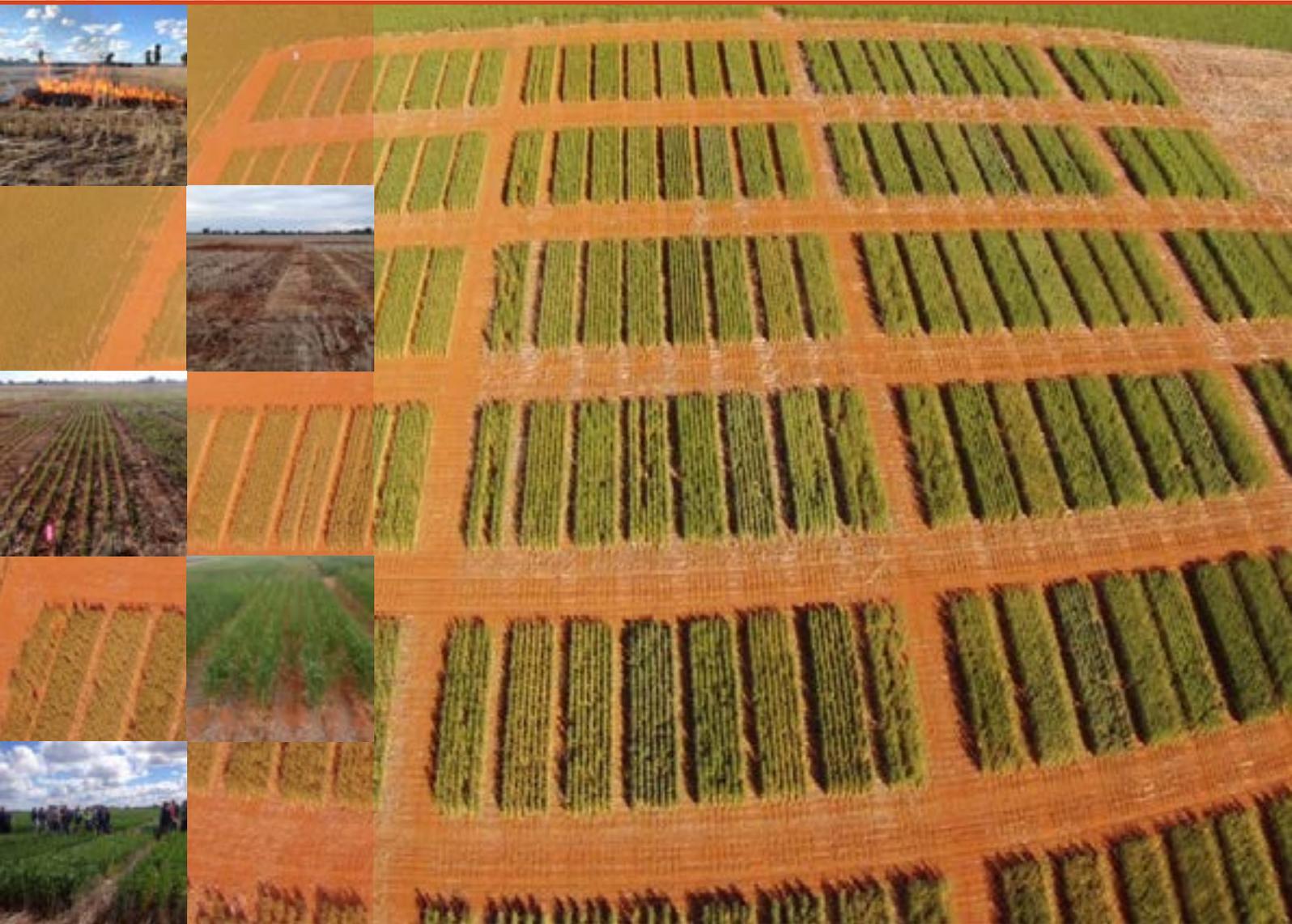




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TO BURN OR NOT TO BURN
Barellan Farmers Tackling Stubble
CLG-1206248-847

INDEPENDENT AGRONOMY ADVICE + CUTTING EDGE RESEARCH

To Burn or Not to Burn

KEY POINTS

- * Burning, mulching or leaving the stubble standing had no impact on varietal performance in this trial, with no significant differences in plant establishment, grain yield or protein recorded.
- * There was however significant differences in yield and grain protein between varieties, with EGA Gregory and Suntop top performing varieties.
- * Burning or mulching stubble did lower ryegrass numbers in this trial.
- * Stubble treatments had a large effect on how some pre-emergent herbicides performed in this trial. This result is expected and highlights the importance of understanding how individual herbicide properties vary when they are used in stubble situations.

BACKGROUND

The farmers in the Borellan area of southern New South Wales are well aware of the benefits of conservation farming and stubble retention to their farming systems.

Farming systems that overcome some of the issues associated with stubble including herbicide management, variety choice and whether to burn, retain or cultivate stubble still raise questions in their cropping programs.

In the past the Borellan farmers have had little experience with locally managed trials, particularly in relation to stubble management. As a result a project was developed in conjunction with FarmLink. The aim of this project was to educate these farmers on how to plan their farming systems to overcome the issues associated with stubble.

TRIAL DETAILS

Two trials, a wheat variety x stubble management (sown 9th May) and a pre-emergent herbicide x stubble management (Gregory wheat sown 15th May) trial, were established in Borellan in May 2014, at Jeff Savage's 'Mayfield' property.

The trials were designed to measure and monitor the impact that various stubble management techniques have on;

- 1) Varietal performance
- 2) Pre-emergent herbicide efficacy

Trial 1: Impact of varietal choice and stubble management (stubble retention vs burnt stubble vs mulched) on grain yield and quality.

This trial consisted of 3 stubble treatments (stubble retained, stubble burnt and stubble mulched) by 12 varieties including Bolac, Crusader, Dart, Gregory, Lancer, Livingston, Merinda, Spitfire, Suntop, Sunvale, Ventura and Wedgetail. It was replicated 3 times and had plot sizes of 12m by 1.75m

Trial 2: Impact of pre emergent herbicides on grain yield and quality.

This trial consisted of 3 stubble treatments (stubble retained, stubble burnt and stubble mulched) by 6 pre-emergent herbicide treatments including nil, 2L TriflurX®, 118g Sakura®, 2.5L Boxer Gold®, 2L TriflurX® + 2L Avadex® Xtra and 2.5L Boxer Gold® (applied at 2 leaf ryegrass). It was non replicated.

Figures 1 and 2 show the trial plans and treatments for these trials.



Figure 1: Trial plan for the variety x stubble management trial

Row	Range					
	1	2	3	4	5	6
1	Wedgetail	Bolac	Spitfire	Gregory	Sunvale	Crusader
2	Spitfire	Ventura	Crusader	Sunvale	Ventura	Wedgetail
3	Livingston	Suntop	Livingston	Wedgetail	Spitfire	Suntop
4	Dart	Crusader	Suntop	Dart	Merinda	Dart
5	Sunvale	Lancer	Ventura	Lancer	Bolac	Gregory
6	Merinda	Gregory	Bolac	Merinda	Lancer	Livingston
7	Ventura	Dart	Livingston	Crusader	Sunvale	Livingston
8	Lancer	Spitfire	Lancer	Merinda	Suntop	Gregory
9	Merinda	Wedgetail	Spitfire	Sunvale	Spitfire	Dart
10	Gregory	Sunvale	Gregory	Bolac	Bolac	Ventura
11	Suntop	Livingston	Wedgetail	Suntop	Wedgetail	Merinda
12	Crusader	Bolac	Ventura	Dart	Lancer	Crusader
13	Dart	Crusader	Bolac	Spitfire	Spitfire	Merinda
14	Livingston	Wedgetail	Dart	Crusader	Bolac	Livingston
15	Merinda	Suntop	Lancer	Gregory	Crusader	Ventura
16	Spitfire	Lancer	Suntop	Ventura	Wedgetail	Sunvale
17	Sunvale	Bolac	Sunvale	Merinda	Dart	Gregory
18	Ventura	Gregory	Wedgetail	Livingston	Lancer	Suntop

retained 1 burnt 2 mulched 3

Figure 2: Trial plan for the herbicide x stubble management trial

Row	Range					
	1	2	3	4	5	6
1	Nil		Nil		Nil	
2	2L TriflurX		2L TriflurX		2L TriflurX	
3	118g Sakura 1		118g Sakura 2		118g Sakura	
4	2.5L Boxer Gold		2.5L Boxer Gold		2.5L Boxer Gol 3	
5	2L TriflurX + 2L Avadex Xtra		2L TriflurX + 2L Avadex Xtra		2L TriflurX + 2L Avadex Xtra	
6	2.5L Boxer Gold @ 2Lf Rye		2.5L Boxer Gold @ 2Lf Rye		2.5L Boxer Gold @ 2Lf Rye	

retained 1 burnt 2 mulched 3

RESULTS AND DISCUSSION

Statistical analysis was carried out on the variety by stubble management trial for grain yield and protein. Varieties differed in yield and protein in this trial, however no significant interaction between varieties and stubble treatment was recorded.

No statistical analysis was carried out on the herbicide by stubble management as it was not replicated.

Variety x Stubble Management

Establishment scores, along with disease and weed scores, were taken on 5th June. Establishment

was scored on a scale of 0 to 9, with 0 indicating very poor /uneven establishment and 9 very even establishment. The average establishment scores for each treatment is shown in figure 3, with scores ranging from 8 to 9. This trial mostly established well in all treatments.

No diseases were evident in the trial early post-emergence. The trial was sprayed for stripe rust on 9th September with Amistar Xtra® @ 750ml.

Weeds, mainly ryegrass, were sprayed on 22nd June with 300ml Axial® + 0.5% adigor + 1L Precept® 150. There was no recorded difference between weeds present and stubble treatment.

There was no impact of stubble treatment (standing, vs burnt vs mulched) on variety yield performance. Figure 4 shows the differences in yield of all the varieties across all stubble treatments. There was a significant difference between varieties. Yields ranged from 2.61 t/ha for Sunvale and Wedgetail up to 3.22 t/ha for Gregory. The average yield for the trial was 2.82 t/ha.

Varietal performance may have been linked to acid soil tolerance, as this site had a pH of 4.3 CaCl₂.

There were also no significant differences between the interaction of stubble treatment and variety for grain protein. There was a significant difference

between varieties for grain protein.

Figure 5 shows the average grain protein of each variety across all stubble treatments. The average grain protein for the trial was 11.59%, ranging from 10.87% for Gregory up to 12.29% for Spitfire.

There was a significant difference in grain nitrogen yield between each of the varieties, figure 6. The average grain N yield was 324.65. Suntop had the highest grain N yield with 351.7 and Merinda had the lowest grain N yield with 299.8.

Figure 3: Variety by Stubble Management Establishment scores, taken 5.6.2014

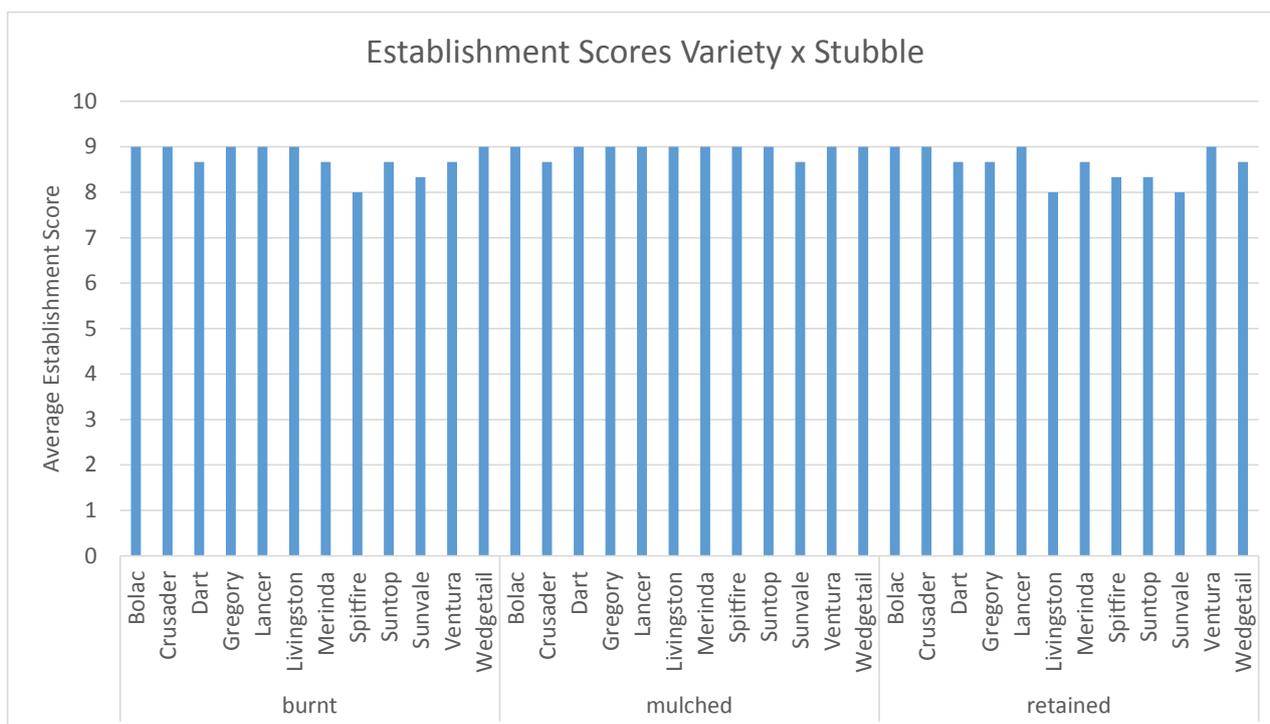


Figure 4: Average grain yield for each variety across all stubble treatments

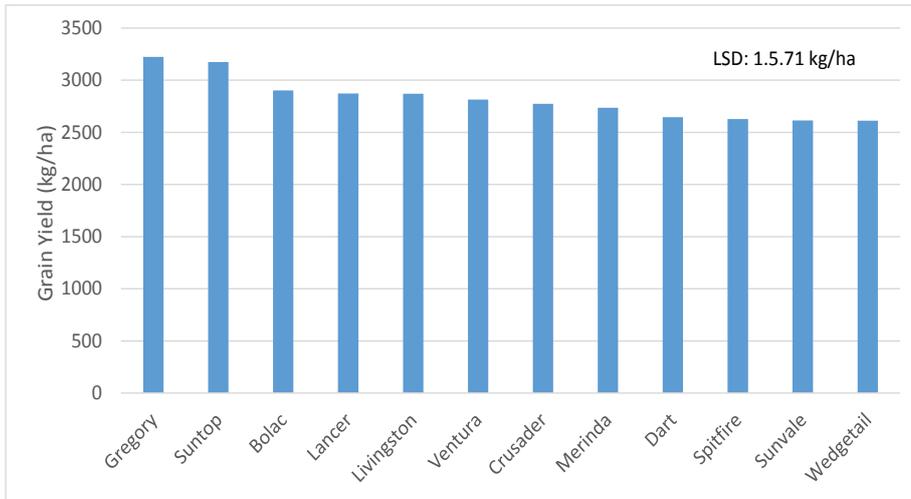


Figure 5: Average grain protein for each variety across all stubble treatments.

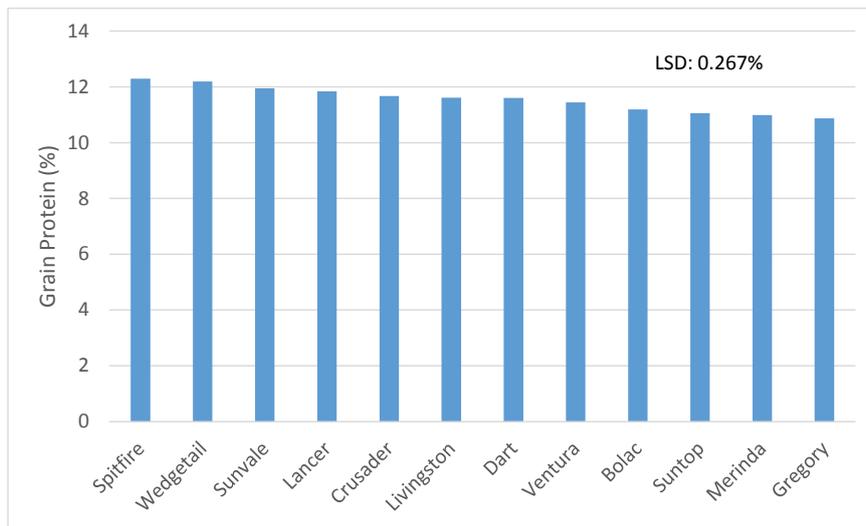
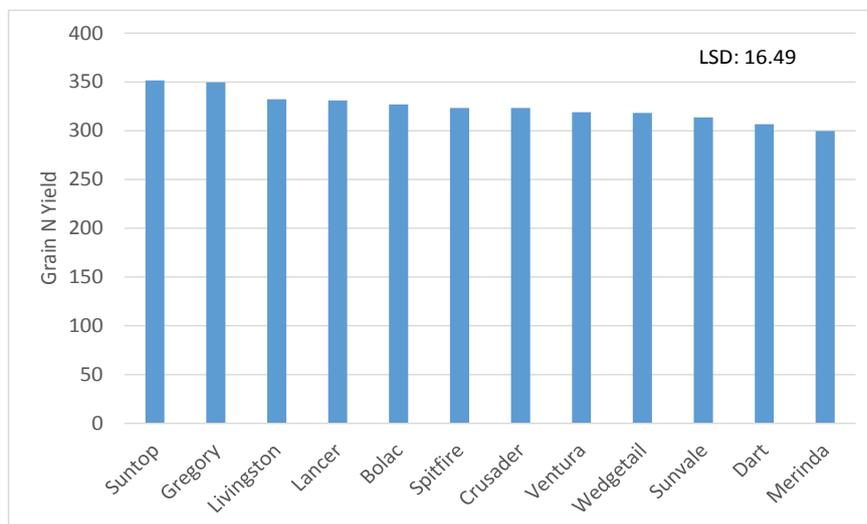


Figure 6: Average grain N yield for each variety across all stubble treatments.



Herbicide x Stubble Management

Establishment, disease and weed scores, were taken on 5th June when the crop was at the two leaf stage.

Establishment was scored using the same scale as the variety x stubble management trial. There were no differences between any treatment, as all treatments established perfectly. There was also no diseases observed in this trial to report on.

The density of weeds was scored on a scale of 0 to 10, with the lower the score the less weeds. All treatments were scored in comparison to the nil retained stubble treatment, which had the highest density of weeds. Ryegrass was mostly at the 2 leaf stage when weeds were scored.

All herbicide treatments, with the exception of treatment 6 (2.5L Boxer Gold® - applied at 2 leaf ryegrass) were applied pre-emergence and incorporated by sowing (IBS). Treatment 6 was applied on 29th May when the crop and weeds were at the two leaf stage, known as early post emergent (EPE).

This demonstration trial did show the effect of either burning or mulching stubble on the following weed burden (figure 7).

This was demonstrated most noticeably in the nil herbicide treatment, where burning or mulching alone decreased weed presence by about 50%, probably as a result of seed destruction. The level of weeds remaining however was still unacceptable, and for commercially acceptable weed control a pre-emergent herbicide was warranted.

This demonstration also showed how some pre-emergent herbicides reacted to various stubble treatments.

Triflur X® worked better when stubble was burnt, and better again when mulched. The opposite trend occurred with Boxer Gold® when applied prior to sowing. Sakura® seemed unaffected by the stubble treatment.

This highlights the way that stubble can react with various pre emergent herbicides in turn affecting the outcome in weed control.

It would be unwise to draw any conclusions from just one trial, however this trial reinforces that Triflur X® works better if there is less stubble that intercepts the herbicide from reaching the soil.

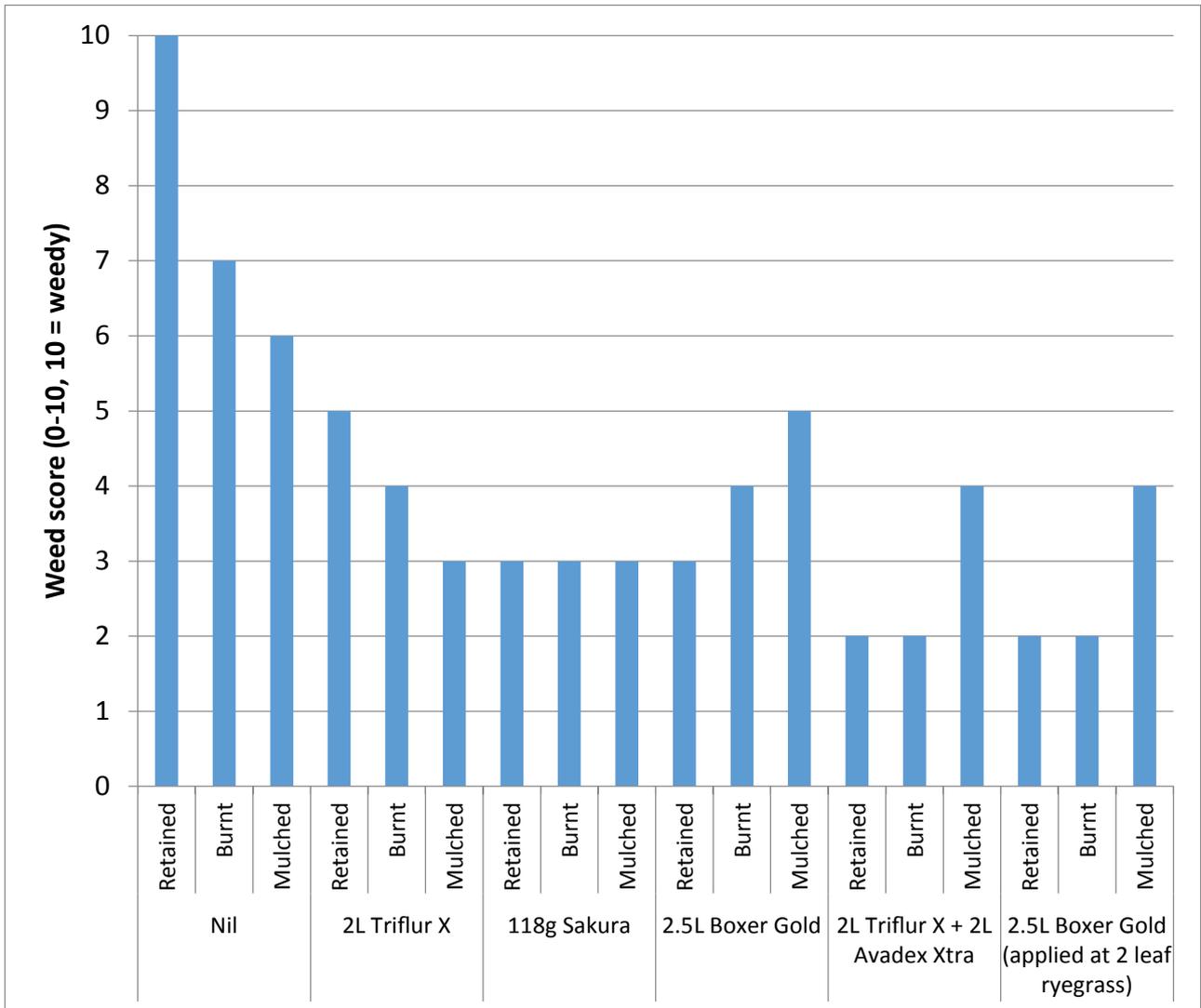
This is also the case (to a lesser extent) with Boxer Gold®, however with this product we observed a reduction in efficacy compared to the burnt treatment when the stubble was mulched. This was most likely resulting from the layer of mulched soil limiting the herbicide and soil contact.

Sakura® performed consistently across all stubble treatments in this trial.

Triflur X® and Avadex® Xtra gave the highest level of weed control along with Boxer Gold EPE. The issue with the Boxer Gold® EPE was that it affected crop vigour quite noticeably, whereas no other herbicide had this effect on the crop.

In both cases weed control reduced when stubble was mulched.

Figure 7: Weed scores of the herbicide by stubble treatment demonstration



Note: Weeds were scored as a comparison to the nil retained treatment.

Figure 8: Burning the stubble treatments in April.



ACKNOWLEDGEMENTS

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