The impact of grass control pre-emergent herbicides on lentil in the following season

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Location – Hart Field Site

Key Messages

- Rainfall between herbicide applications and seeding did not meet the rainfall requirements for some herbicides in the 2025 season.
- Overwatch followed by Mateno Complete applied to a June 13 sowing in 2024 had a negative impact on lentil NDVI in the following season.
- Individual applications of either Overwatch or Mateno Complete, or Overwatch with a lesser residual herbicide and Post emergent Mateno Complete with a lesser residual herbicide did not cause any negative effects to lentil.

Why do the trial?

Pre emergent herbicides for annual ryegrass control in wheat are residual soil applied herbicides that can have significant plant back requirements for some crops.

Due to the improved adaptability and recent high prices of lentil, a wheat - lentil rotation has become common in some cropping areas. This rotation puts pressure on Group 1 post emergent grass herbicides in the lentil season leading to increasing resistance and this intern, puts more pressure on pre-emergent chemistry being used in wheat. As a result of this increased pressure, pre-emergent herbicide use in wheat has increased. Further increasing the use of pre- emergent herbicides in wheat, is the recent release of Mateno Complete as a post emergent option and a price reduction in generic pyroxasulfone. Pyroxasulfone is also registered for use in Lentil meaning it can be used in the wheat crop and in the lentil further increasing its use. With Mateno Complete being applied later in the season and pyroxasulfone being applied in combination with other products such as Overwatch it is possible that in low rainfall season these pre-emergent herbicides maybe having an impact on following crops.

The registration for pyroxasulfone in lentil is slightly unusual, despite being registered in lentil as a knife point press-wheel application, a 9 month and 250mm rainfall requirement for plant back remains for pyroxasulfone that has been incorporated into the seed bed through cultivation of rainfall. The crop safety in lentil requires physical separation of the seed and the herbicide. Where the herbicide is already incorporated into the soil through cultivation or rainfall in the prior season physical separation is more difficult to achieve and crop effect can occur if the plant back requirements are not met.

This trial takes advantage of an existing site at Hart that was established in 2024. The previous trial investigated pre-emergent herbicides for ryegrass control in wheat and the impact of time of sowing. This provided two application timings of herbicides in 2024 that could be used to look for impacts on lentil in the following season (2025). This was particularly interesting due to the low rainfall that was received in 2024 at Hart.

How was it done?

Rainfall from herbicide applicaions to seeding	**Pre emergent 2024** TOS 1 228mm (24th April 2024) TOS 2 203mm (13th June 2024)	**Post emergent 2024** TOS 1 213mm TOS 2 188mm	
2025 Sowing date:	8th May 2025	**Fertiliser:**	Granulock Zn 56 kg/ha
Variety:	Thunder lentil @ 45 kg/ha	**2025 IBS Herbicides:**	Reflex 700 ml/ha Ultro 1.5 kg/ha Brodal 120 mL/ha
Row spacing:	250 mm		

In 2024 the treatments shown in Table 1 were established at seeding in 2024. TOS 1 treatments were applied at seeding April 24th and TOS 2 treatments were applied June 13th. The post emergent Mateno Complete and Boxer Gold treatments were applied EPE post the pre-emergent treatments at the three-leaf stage, for TOS 1 and TOS 2 respectively.

The trial was sown to Thunder Lentil in 2025 and measurements throughout the season included a vigour score 10th July, GreenSeeker NDVI (18th August and 9th September) and the trial was harvested for grain yield on the 6th of November.

Trial analysis was conducted using AsReml in R using mixed linear models.

Table 1. *Treatments applied in 2024 and over sown with lentil in 2025 at the Hart Field Site, herbicides have been classified into four catagories, low residual (nil and herbicides with no rainfall plant back requirement), pyroxasulfone, Overwatch and pyroxasulfone + Overwatch.*

Treatment	Product	Herbicide classification	Rate (s)
1	Control	Low residual	Nil
2	pyroxasulfone	Pyroxasulfone	118 g/ha
3	Trifluralin	Low residual	2.0 L/ha
4	Boxer gold	Low residual	2.5 L/ha
5	Overwatch	Overwatch	1.25 L/ha
6	Luximax	Low residual	0.5 L/ha
7	Mateno Complete	Pyroxasulfone	1.0 L/ha
8	Sakura + Avadex	Pyroxasulfone	118 g/ha + 2.0 L/ha
9	Trifluralin + Avadex	Low residual	2.0 L/ha + 2.0 L/ha
10	Overwatch + Avadex	Overwatch	1.25 L/ha + 2.0 L/ha
11	Luximax + Avadex	Low residual	0.5 L/ha + 2.0 L/ha
12	Overwatch + Trifliralin	Overwatch	1.25 L/ha + 2.0 L/ha
13	Overwatch *fb* Mateno Complete	Overwatch + Pyroxasulfone	1.25 L/ha *fb* 1.0 L/ha

14	Trifluralin + Avadex *fb* Mateno Complete	Pyroxasulfone	2.0 L/ha + 2.0 L/ha *Fb* 1.0L/ha
15	Sakura *fb* Boxergold	Pyroxasulfone	118 g/ha *fb* 2.5 L/ha

Results and Discussion

Rainfall

Rainfall requirements for lentil following herbicides containing pyroxasulfone, including Mateno Complete and Overwatch herbicides is 250mm. This rainfall requirement was not met in any situation in this trial. The most rainfall that occurred was in TOS1 pre-emergent treatments. With the later applications of pyroxasulfone in Mateno Complete only receiving 188mm before the lentils were sown in 2025. Therefore, it was expected to see some level of damage, particularly in these later application timing treatments.

GreenSeeker NDVI and grain yield

The TOS 1 applications did not have any impact on lentil NDVI recorded September 9th, with all treatments averaging 0.68. However, the TOS 2 applications showed some treatment effects. The Overwatch + Pyroxasulfone treatment had the lowest NDVI of the trial of 0.59. This indicates that crop biomass was reduced under this treatment compared to the low residual treatments in the TOS 2 plots. Given the low rainfall that was received between application and lentil sowing this result is not surprising given the label requirements of these two products.

2025 was a rainfall and low production year at the Hart Field Site. Lentil grain yields across the site were low, averaging only 1.12 t/ha. The site was variable and no treatment differences were detectable at harvest due to treatment specifically. This is despite the reductions in NDVI that were recorded earlier in the season. However there was a strong relationship between NDVI and Grain yield, indicating that the treatment affects that were reducing NDVI were likely having an impact on grain yield as well.

Table 2. *GreenSeeker NDVI, September 9th and lentil grain yield for treatment group at Hart in 2025.*

TOS	Treatment	NDVI 9th September		Lentil Grain yield 2025 (t/ha)	
1	Low residual	0.67	ab	1.13	a
	Overwatch	0.68	ab	1.13	a
	Overwatch + Pyroxasulfone	0.72	b	1.28	a
	Pyroxasulfone	0.67	ab	1.09	a
2	Low residual	0.65	b	1.08	a
	Overwatch	0.63	ab	1.12	a
	Overwatch + Pyroxasulfone	0.59	a	1.05	a
	Pyroxasulfone	0.63	ab	1.09	a
1	Average	0.68		1.16	
2	Average	0.62		1.09	
Pr(>F)	*TOS*	*0.233*		*0.129*	
	Herbicide	*0.713*		*0.503*	
	TOS * Herbicide	<0.001		0.126	

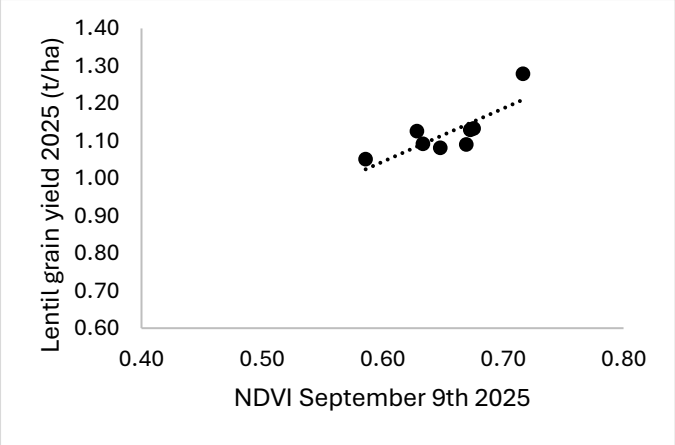


Figure 1. *Green seeker NDVI recorded 9th September and lentil grain yield in 2025 (y = 1.4221x + 0.1908, R^2 = 0.6534) .*

Conclusion

Lentil is sensitive crop to many herbicides and some have long plant back periods and rainfall requirements. A reduction in mid season NDVI indicated a sensitivity to the Overwatch fb Manteno Complete herbicide treatment. This was despite there being no impacts from either of those products being applied individually. Although it did not translate into a reduction in grain yield it should be a reminder to obey plant back requirements particularly if the herbicide mixture contains more than one product with a longer residual period .

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