

3.4.8 Revenue wheat nitrogen trial - Inverleigh, Vic

Location:

Inverleigh Research Site.

Funding:

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Background/Aim:

Revenue is a dual purpose winter wheat that has proven to be very high yielding in southern environments. There has been limited work done in relation to the response of Revenue to nitrogen manipulation in terms of both grain yield and quality. It is known that Revenue because of its high yield potential, can benefit from high levels of nitrogen.

It is also thought that Revenue could be responsive to higher levels of "up front" nitrogen in order to develop more tillers and final grain heads at harvest.

The trial was set up to investigate the best approach to applying a set amount of nitrogen (100 kg/ha) in order to achieve the greatest grain yield and to maximize quality.

Take home messages:

- Very high yields were achieved in Revenue which indicates the benefit of an early sowing (23rd April). To achieve high yields in Revenue sowing should be undertaken as early as possible. This variety has a strong vernalisation requirement which means that flowering will occur at approximately the same time of year irrespective of sowing date, thereby not increasing the frost risk.
- A greater emphasis of nitrogen "up front" tended to increase grain yields in Revenue. The best combination was 25 kg/ha nitrogen at sowing as Urea (plus 100 kg/ha MAP), along with 75 kg/ha nitrogen at GS30 (end of tillering/floral initiation).
- Very acceptable grain protein, test weight and screenings were achieved in all nitrogen treatments apart from the control. There were no significant differences between any of the nitrogen treatments (apart from the control) for these grain quality parameters. Once again an early sowing has impacted favourably on these grain quality traits.

Trial Design and Inputs

The wheat trial was sown using the variety Revenue, on the 23rd April with a sowing rate calculated to achieve 175 plants/m². A sowing fertilizer application of 100 kg/ha MAP was used.

There were 6 treatments established in a fully replicated (4 rep) trial. These treatments consisted of applying 100 kg/ha nitrogen at different timings, namely:

Trt	Description
1	Untreated Control (no nitrogen)
2	25kg/ha N at sowing GS00, 75 kg/ha N at GS30 (floral initiation)
3	25kg/ha N at sowing GS00, 50kg/ha N at GS21(1 st tiller), 25kg/ha N at GS30
4	25kg/ha N at sowing, 25kg/ha N at GS21, 50 kg/ha N at GS30
5	50 kg/ha N at GS21, 50 kg/ha N at GS30
6	25 kg/ha N at GS21, 75 kg/ha N at 37 (just prior to flag)

The dates of the N application were GS21 (17/7/09), GS30 (17/8/09) and GS37 (2/9/09)

Fertiliser:

The nitrogen was applied as Urea in treatments 2 – 6 above. The nitrogen applied at sowing was run out over the top of the sown rows using the cone seeder at sowing time.

Fungicides:

No foliar fungicides were applied to the trial as there was no obvious diseases present.

Grain Yield:

Calculated from plots 1.45 metres in width and 12 metres in length

Protein:

Calculated as a percentage of grain contents

Grain Test Weight:

Test weight of grain expressed as kg/hl (kilograms per hectolitre)

Grain Screenings:

The % of grain and husk that falls below a 2.0 mm sieve

Table 1: Grain Yield and Quality

Trt	Description	Yield T/Ha	Protein %	Test Wt kg/HI	Screenings %
1	Untreated Control	7.250 c	9.70 b	71.18 a	7.5 a
2	25% GS00, 75% GS30	7.650 a	11.08 a	72.75 a	4.8 a
3	25% GS00, 50% GS21, 25% GS30	7.505 ab	10.38 ab	72.75 a	6.0 a
4	25% GS00, 25% GS21, 50% GS30	7.478 ab	10.60 a	72.38 a	5.3 a
6	25% GS21, 75% GS37	7.415 bc	10.70 a	72.15 a	5.7 a
5	50% GS21, 50% GS30	7.413 bc	10.45 ab	72.23 a	4.0 a
LSD (P=.05)		0.2079	0.767	1.158	3.17
Standard Deviation		0.1336	0.509	0.768	2.09
CV		1.79	4.85	1.06	37.75
Grand Mean		7.45	10.48	72.24	5.53
Replicate F		1.118	0.133	1.916	0.312
Replicate Prob(F)		0.3837	0.9389	0.1703	0.8167
Treatment F		3.877	3.206	2.277	1.312
Treatment Prob(F)		0.0285	0.0363	0.0996	0.3144

Results and Discussion:

This was an excellent trial which produced some very good results with very low CV's. The yield and Test Weight CVs are possibly the lowest I have seen. The CV for screenings was quite high, so these results should be treated with caution.

Growing conditions were good up until the end of September, at which point rainfall became severely limiting for grain fill. There were also several days of above 35 degrees celcius during November which would have impacted on yield. Despite these conditions, yields in excess of 7 T/Ha were achieved (Table 1), which was extremely good. This once again highlights the incredibly high yield potential of Revenue given an early sowing (23/4/09).

The highest yielding treatment was where 25 kg/ha nitrogen was applied "up front" and 75 kg/ha at GS30 (floral initiation). This was however not significantly higher than treatments 3 and 4, however was significantly higher than for treatments 6, 5 and 1.

The data would therefore suggest that an increased emphasis on early nitrogen did give a positive yield response. The lowest yielding treatment was where no nitrogen was applied – refer Table 1.

There was no significant difference between all nitrogen treatments, apart from the control, for grain protein. The reasonably high grain protein figure of 9.70% where no nitrogen was applied in the control, suggests that the site was already quite high in available nitrogen.

There was no difference in grain test weight between the treatments, with very acceptable readings being achieved. This again points to the benefits of an early sowing. The lowest treatment for grain test weight was in fact the control, however the difference was not significant.

There were no significant differences between treatments for screenings.