

Trial 5. HYC Wheat Nutrition (FAR RRC W22-05)

cv RGT Accroc

Key Points:

- Following six years of pasture legume 2013-18 inc. (Fescue/Lucerne/Clover) and three years of cropping (canola 2019 (cut for forage), grazing wheat 2020 and canola 2021, there was no yield response to applied nitrogen (80-280kg N/ha).
- With 142kg N/ha in the soil 0 – 60cm on 2 June the zero N treatment (only 12kg N/ha MAP applied) yielded 9.26 t/ha with a protein of 9.5% indicating the presence of 154kg N/ha in grain.
- If 75% of the N is assumed to be in the grain and 25% in the straw residue, then the total N uptake at harvest in zero N plots would be 205kg N/ha indicating approximately 63kg N/ha coming from the soil via 163mineralization.
- If straw residue was returned to the paddock the nitrogen balance would indicate that 142 kg N/ha was available in the soil in the winter (12N from MAP) and 142kg N/ha removed in the grain at harvest.
- All N applications as urea applied as 2 or 3 split applications only served to increase protein but not yield.
- Despite the application of a PGR at GS31 (Moddus/Errex), increasing N served to increase head number and lodging pressure.
- Applying N as a three split at 200kg N/ha applied moderated the lodging pressure slightly but the difference was not significant.
- Applying manure or the equivalent macro nutrients carried in the manure on top of 160kg N/ha gave no yield benefit, and where the equivalent macro nutrients were applied, significantly reduced yield as a result of increased crop lodging.
- There were no significant differences in harvest dry matter as a result of N application.
- The zero N treatment had the highest test weight and lowest screening.

Treatments:

RGT Accroc feed red wheat was subjected to 10 nutrition treatments of varying nitrogen and manure rates. The 5 t/ha manure (chicken manure pellets) treatments were applied on top of 160kg N/ha applied as a two split, 50% at tillering and 50% at GS31. The manure pellets had an analysis of N 3.5%, P 1.8%, K 1.8% and S 0.5%. The available soil N was measured on 2 June with 0-10cm 39kg N/ha, 10-30cm 56kg N/ha and 30-60cm 46kg N/ha. Note this was applied following a 120kg/ha MAP application. The trial site had an organic carbon content of 2.1% in the 0 – 10cm.

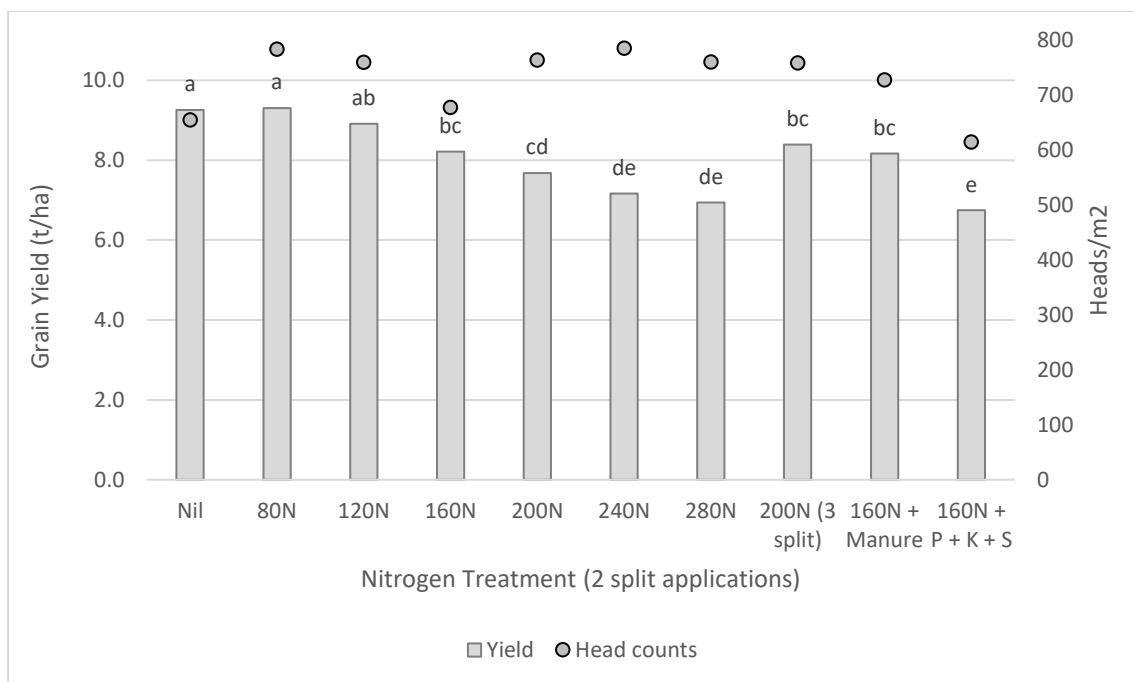


Figure 1. Influence of nutrition strategy on grain yield (t/ha) and final harvest head number (heads/m²).

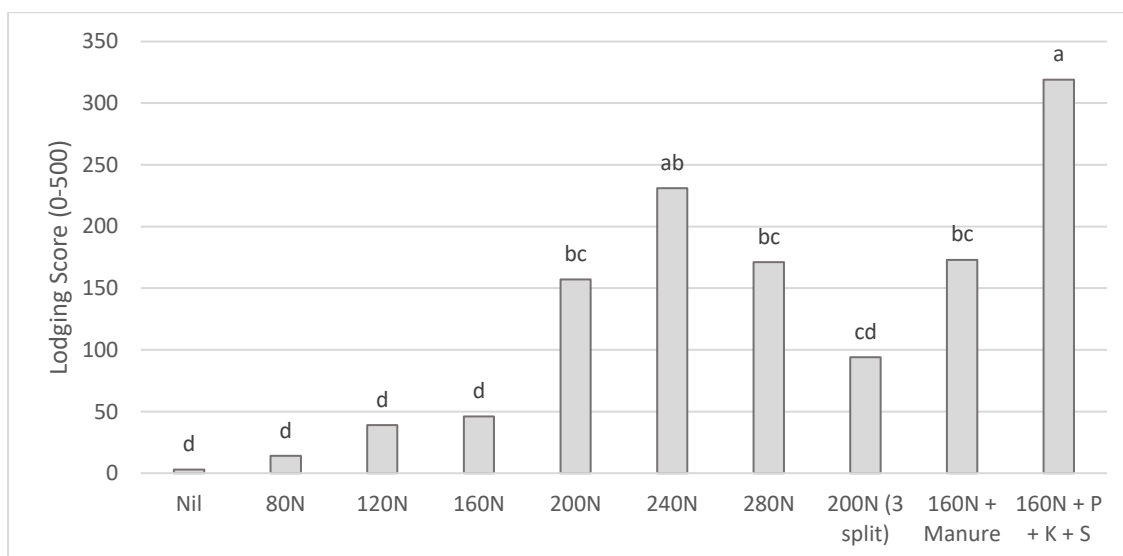


Figure 2. Influence of nutrition strategy on crop lodging (lodging index 0 - 500 scale).

Table 2. Influence of nutrition strategy on crop biomass (dry matter) at GS31, GS71 and harvest.

	GS31	GS71	Harvest
	Biomass (t/ha)	Biomass (t/ha)	Biomass (t/ha)
Nil	3.8 -	17.5 -	20.5 -
80N		16.8 -	21.8 -
120N		18.2 -	19.9 -
160N		18.0 -	20.2 -
200N		18.8 -	19.6 -
240N		18.5 -	20.0 -
280N		19.2 -	19.6 -
200N (3 split)		17.8 -	21.6 -
160N + Manure	4.6 -	17.6 -	20.8 -
160N + P + K + S	4.7 -	19.1 -	17.5 -
Grand Mean	4.3	18.1	20.1
P val	0.076	0.344	0.099
LSD P=0.05	ns	ns	ns

Table 3. Influence of nutrition strategy on grain yield and quality.

Treatment	Grain Yield	Protein	Test Weight	Screenings
kg N/ha	t/ha	%	kg/hL	%
Nil	9.26 a	9.5 e	73.6 a	1.3 f
80N	9.31 a	10.5 d	73.3 a	1.6 ef
120N	8.91 ab	11.1 c	72.2 a	1.9 de
160N	8.22 bc	11.2 bc	70.3 ab	2.2 cde
200N	7.68 cd	11.9 a	70.1 ab	2.4 bcd
240N	7.17 de	12.1 a	68.2 b	2.7 abc
280N	6.94 de	11.8 a	67.8 b	3.2 a
200N (3 split)	8.39 bc	11.8 a	70.4 ab	2.1 de
160N + Manure	8.17 bc	11.7 ab	71.8 a	2 de
160N + P + K + S	6.75 e	12 a	67.6 b	2.8 ab
Grand Mean	8.08	11.4	70.5	2.2
P val	<0.001	<0.001	0.009	<0.001
LSD P=0.05	0.79	0.6	3.5	0.6

Table 4. Sowing details and Crop Inputs.

Sowing date:		21 April 2022
Plant population:		180 seeds/m ²
Basal Fertiliser:		120 kg/ha MAP
Nitrogen:		See Trt list
PGR:	GS31	Moddus Evo 200ml/ha
		Errex 1300ml/ha
Fungicide:	GS31	Prosaro 300ml/ha
	GS39	Aviator Xpro 500ml/ha
	GS61	Epoxiconazole 125 500ml/ha