

Trial 2. Nutrition for Hyper Yielding Wheat (FAR WAA W23-05)

Key points:

- *Additional N over the 120kg N/ha farm standard (10N basal MAP + 110N in crop) applied at GS32 was associated with higher grain protein and higher screenings, however yield differences were not statistically significant.*
- *The only visual differences were observed in response to the horticulture mix (NPKS (13-2-8-14) which delivered only 2kg P/ha.*
- *Lower rates of phosphate (2kg P/ha) were inferior giving significantly lower dry matters when assessed at 50% head emergence, with lower yields compared to higher rates of phosphate.*
- *There were no benefits demonstrated to applying higher rates of P than 5 kg/ha P, but variable yields in the trial resulted in no significant differences in yield.*
- *The lower phosphate rate resulted in lower crop canopy reflectance (crop canopy greenness measured as NDVI) and lower head numbers.*
- *Manure did not have any significant effect on crop dry matter, head number or yields in 2023 with no significant NDVI effects, unlike results generated in 2022.*

Treatments:

Mowhawk winter wheat sown 30 April after canola was managed with five different levels of basal nutrition and manure application at sowing. These treatments were followed by the farm standard post emergence application of N 110kg N/ha applied in three applications at tillering GS22 (55N applied as Urea:MOP 75/25% mixture), and the start of stem elongation GS30 and GS31 when urea was used to apply 32 kg N/ha and 23 kg N/ha. The influence of additional N input was assessed with 4 treatments that applied between 11 – 46 kg N at second node stage to crops that had all received the same input of basal fertiliser (139kg/ha - MAP: MOP: MnSO₄ mix (66.8/28.6/4.6)).

The pig manure applied at 5t/ha had the following % composition:

P	K	N
0.573	0.904	1.28

This delivered the following levels of macro nutrients 28.7 kg P/ha, 45.2 kg K/ha and 64.0kg N/ha.

Table 1. Treatment list and timings – Rates of macro nutrients N, P, K & S applied as kg/ha.

Trt.	Treatment Name	Sowing Fertiliser	Basal nutrients applied at sowing			
			kg N/ha	kg P/ha	kg K/ha	kg S/ha
1	Standard MAP	MAP 100kg/ha	10	22	0	2
2	50% increase of Farm Standard	208.5kg/ha Farm Std Mix*	14	30.5	36	2
3	Horticulture Mixture	Hort Mix** 100kg/ha	13	2	8	14
4	50% Standard MAP	MAP 50kg	5.5	11	0	1
5	Farm Standard + Manure	139kg/ha Farm Std Mix* + 5t/ha Manure	9.3 64	20.3 28.7	24 45.2	1.3 na
			GS22 Urea:MOP***	GS30 Urea	GS31 Urea	GS32 Urea
			kg N/ha/kg K/ha	kg N/ha	kg N/ha	kg N/ha
6	Farm Standard MAP	139kg/ha Farm Std Mix*	55/18	32	23	0
7	Farm Standard + 25kg Urea	139kg/ha Farm Std Mix*	55/18	32	23	11.5
8	Farm Standard + 50kg Urea	139kg/ha Farm Std Mix*	55/18	32	23	23.0
9	Farm Standard + 75kg Urea	139kg/ha Farm Std Mix*	55/18	32	23	34.5
10	Farm Standard + 100kg Urea	139kg/ha Farm Std Mix*	55/18	32	23	46.0

Trt 1 – 5 received the standard N top dressing applications outlined in treatment 6.

*MAP: MOP: MnSO₄ mix (66.8/28.6/4.6)

Horticulture mixture **NPKS (13-2-8-14) 13N, 2P, 8K and 14 S kg/ha

***Urea:MOP (75/25)

Table 2. Influence of nitrogen rate on grain yield and grain quality, protein (%), test weight (kg/hL) and screenings (%).

Trt.	Treatment Name	Yield t/ha	Protein (%)	Test weight (kg/hL)	Screenings (%)
1	Standard MAP	4.57	11.6	71.6	6.0
2	50% increase of Farm Standard	4.98	10.8	74.4	4.2
3	Hort Mix	3.99	10.5	75.6	3.9
4	50% Standard MAP	4.46	10.7	75.1	3.5
5	Farm Standard + Manure	4.73	11.2	71.1	5.1
6	Farm Standard	3.68	10.7	75.2	3.7
7	Farm Standard + 25kg Urea	4.71	11.8	71.5	5.0
8	Farm Standard + 50kg Urea	4.73	12.2	73.1	5.0
9	Farm Standard + 75kg Urea	4.48	13.5	68.5	7.0
10	Farm Standard + 100kg Urea	3.51	13.4	68.4	6.5
Mean		4.38	11.6	72.4	5.0
LSD P=0.05		ns	0.8	4.4	1.7
P Value		0.683	<0.001	0.012	0.002

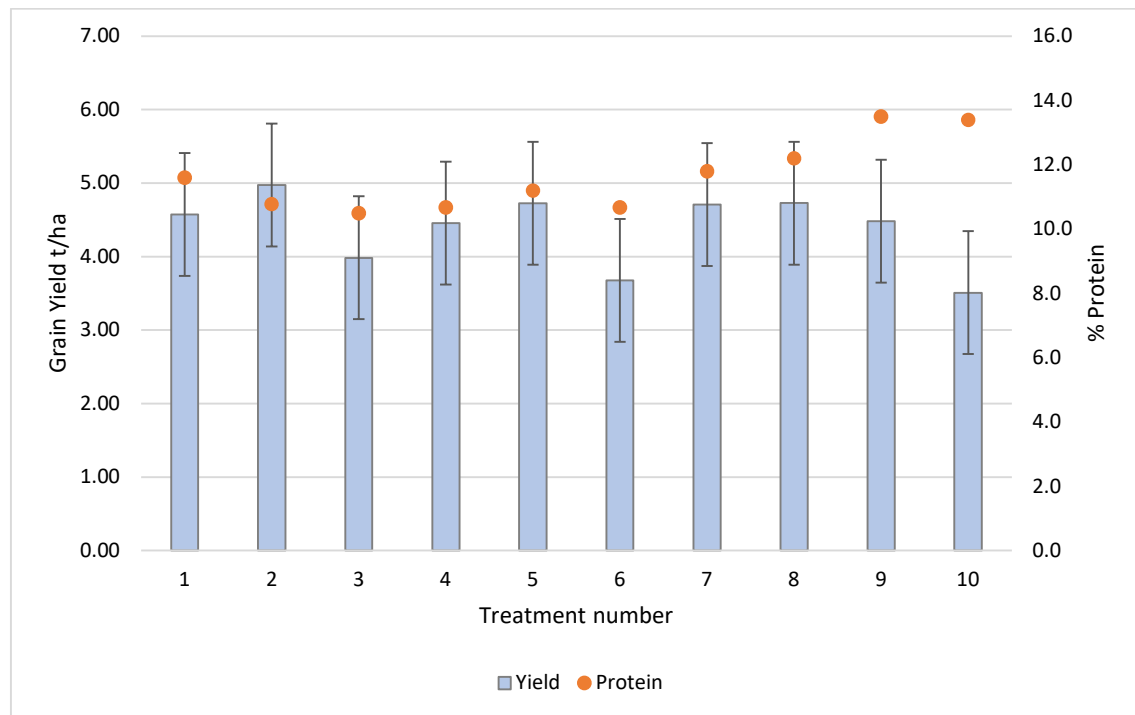


Figure 1. Relationship between yield and protein (refer to table 2 for P values).

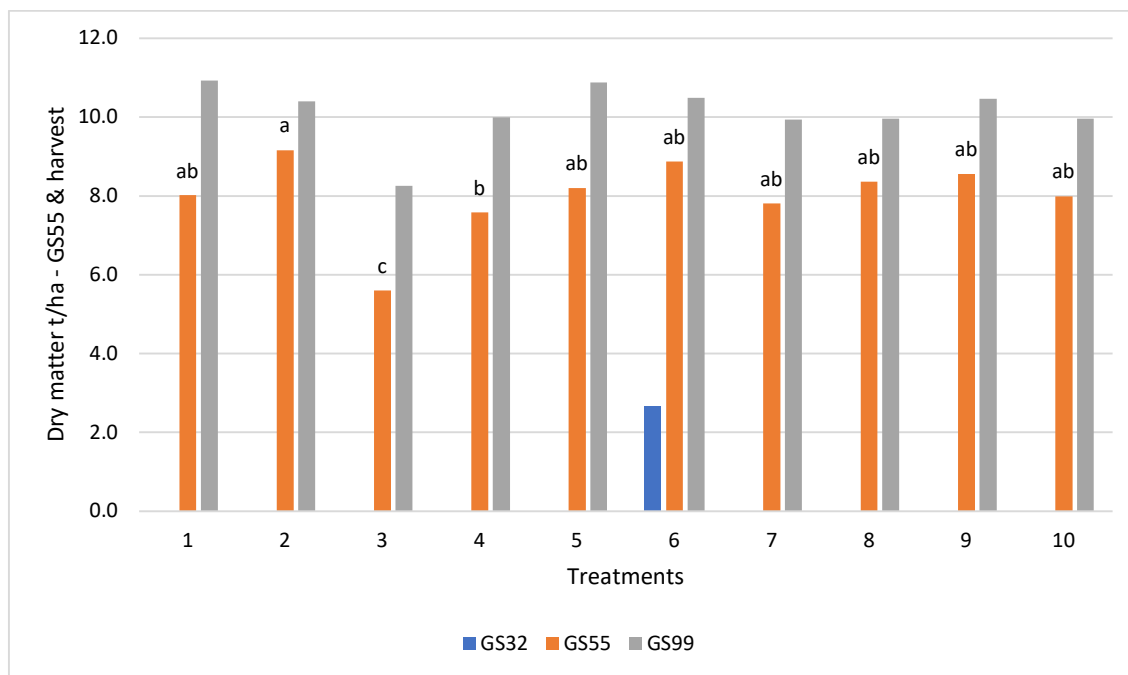


Figure 2. Treatment Dry Matter (t/ha) by growth stage. GS99 series is non-significantly different. GS55 series: P value=0.003, LSD (P=0.05)= 1.4).

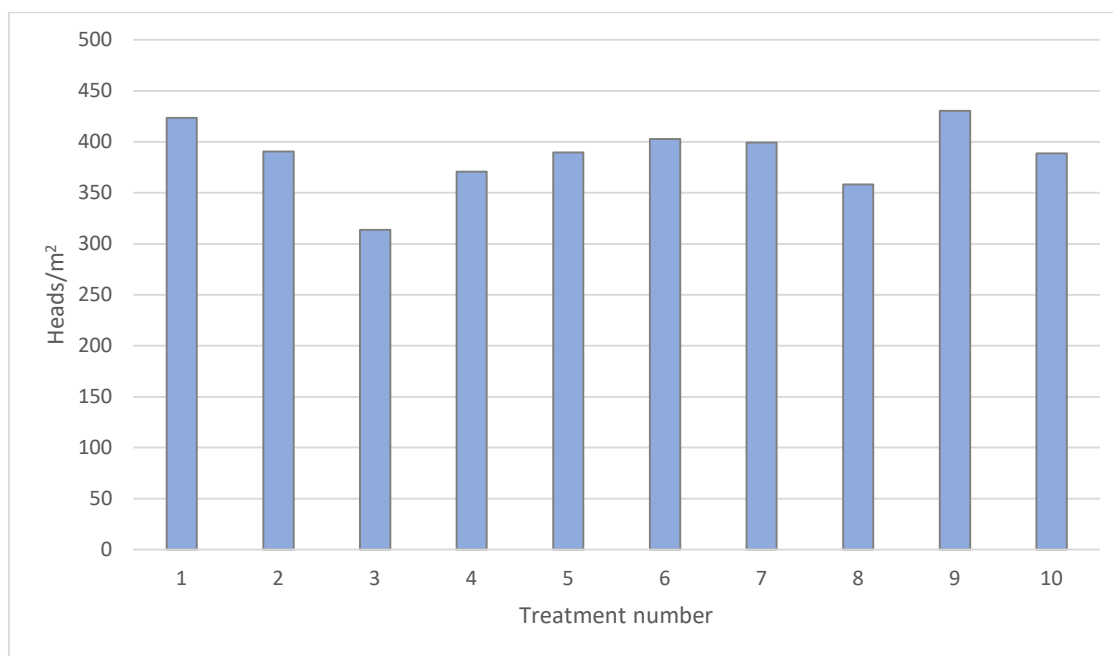


Figure 3. Influence of treatment on head number (Heads/m²). Differences are not significant.

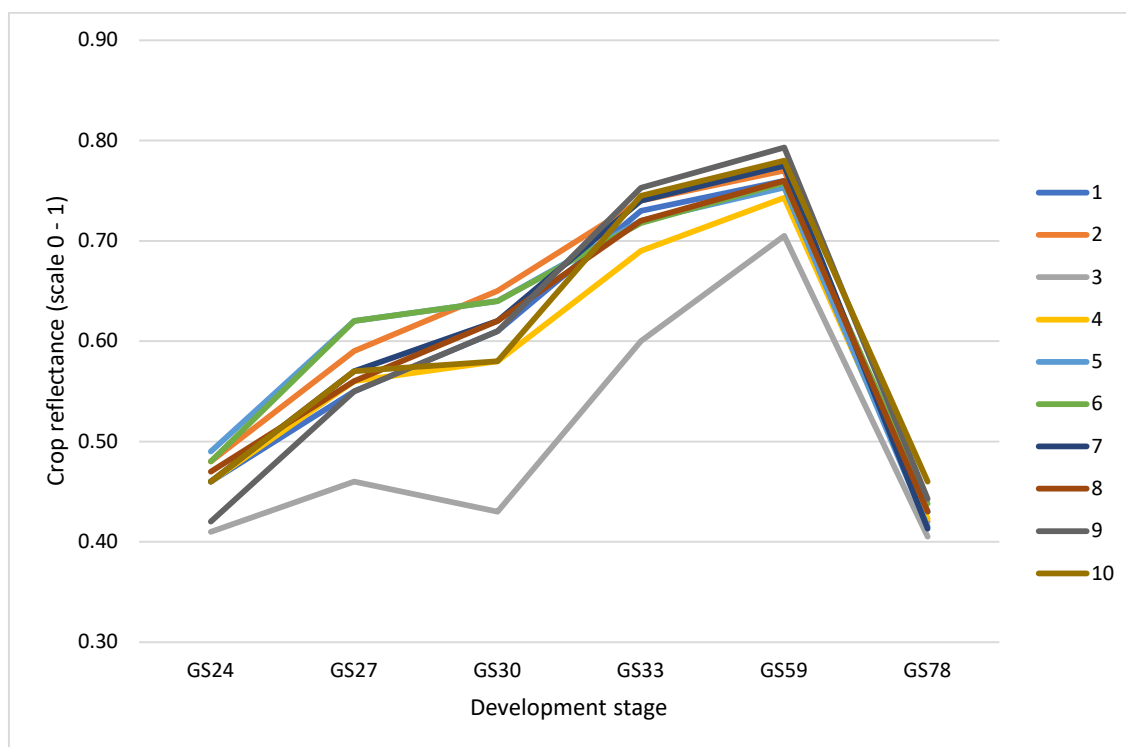


Figure 4. Influence of treatment (treatment number) on crop canopy reflectance measured as NDVI – (GS24 tillering – GS78 grain fill).

Table 3. Trial input and management details.

Variety:	Mowhawk	
Sowing date:	30 April 2023	
Harvest date:	13 December 2023	
Seed rate:	180 seeds/m ²	
Basal fertiliser:	29 Apr	169kg MAP/MOP/MnSO ₄ (66%/29%/5% blend)
Nitrogen:	12 Jun	55 kg N/ha
	13 Jul	32kg N/ha
	2 Aug	23kg N/ha
Fungicide:	GS31	Prosaro 0.30 L/ha
	GS39	Radial 0.84 L/ha
	GS61-71	Opus 0.50 L/ha

Table 4. Active ingredients and chemical loading (g/L) for products used.

Name	Active 1		Active 2		Type
Fungicide					
Opus	Epoxiconazole	125 g/L	---	---	SC
Prosaro	Prothioconazole	210 g/L	Tebuconazole	210 g/L	SC
Radial	Azoxystrobin	75 g/L	Epoxiconazole	75 g/L	EC