Trial 6. Nutrition for Hyper Yielding Barley (FAR TAS B22-06-2)

Objectives:

To assess the value of higher nutrition input for barley

Key points:

- There was no significant yield difference in response to nitrogen or added nutrients (through fertiliser or manure).
- The high yields achieved despite varying N rates suggest that the N supply coming from the soil is very important for achieving higher grain yields.
- Despite only 10 kg N/ha from MAP at sowing being applied to the "0N" treatment, a yield of 11.91 t/ha was still achieved.
- There was a statistically significant trend for protein to increase with higher N rates.
- Screenings also rose with N rate with 0N having 0.9% versus 250N at 1.7%.

Table 1. Detailed treatment list, grain yield (t/ha) & % site Mean.

Trt.	Nitrogen rate	Phosphorus rate	Potassium rate	Sulphur rate	Yield	Mean
	kg N/ha	kg P/ha	kg P/ha	kg S/ha	t/ha	%
1	0+0	22	42	19	11.91 -	103.6
2	25+25	22	42	19	11.45 -	99.6
3	50+50	22	42	19	11.26 -	97.9
4	75+75	22	42	19	11.48 -	99.9
5	100+100	22	42	19	11.45 -	99.6
6	125+125	22	42	19	11.21 -	97.5
7	75+75+50	22	42	19	11.70 -	101.8
8	75+75+5 t/ha Manure	22	42	19	11.31 -	98.4
9	75+75+PKS	65	83	37	11.38 -	99.0
10	5 t/ha Manure	22	42	19	11.79 -	102.6
				Mean	11.49	100.0
				LSD (P=0.05)	ns	ns
				P-Value	0.232	0.226

Note: All treatments received 100kg/ha MAP (10N: 22P) which is included in the treatment details.
**Manure applied at a rate of 5 t/ha, see nutrient breakdown in table 4.*

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

Trt	Nitrogen rate	Phosphorus rate	Potassium rate	Sulphur rate	Protein	Test weight	Retentions	Screenings
	kg N/ha	kg P/ha	kg P/ha	kg S/ha	%	kg/hL	%	%
1	0	22	42	19	10.8 e	72.0 -	94.5 -	0.9 c
2	50	22	42	19	11.2 d	70.3 -	94.4 -	1.0 bc
3	100	22	42	19	11.6 c	69.5 -	95.8 -	1.3 bc
4	150	22	42	19	12.1 b	70.6 -	95.8 -	1.1 bc
5	200	22	42	19	12.4 ab	70.3 -	94.8 -	1.4 ab
6	250	22	42	19	12.8 a	70.0 -	94.4 -	1.7 a
7	210 Split	22	42	19	12.3 b	70.5 -	94.9 -	1.3 ab
8	150+M	22	42	19	12.1 b	70.5 -	95.2 -	1.3 ab
9	150+PKS	65	83	37	12.3 b	70.2 -	95.3 -	1.3 ab
10	M	22	42	19	10.7 e	70.5 -	96.1 -	1.0 bc
				Mean	11.7	60.6	95.1	77.9
				LSD (P=0.05)	0.8	ns	2.4	ns
				P-Value	<0.001	0.438	0.821	0.111

Table 3. Site soil test details

Soil Tests	Level Found
EC	0.17 dS/m
Organic Carbon W&B	3.02 %
pH 1:5 water	7.05
Total Mineral N*	164.7 kg soil mineral N/ha
Colwell Phosphorus	311 ppm
Colwell Potassium	588 ppm
KCl Sulfur	5.60 ppm

*Mineral N 0-60cm, all other results 0-10cm depth sampled 21/5/2022

Table 4. Trial input and management details.

Sowing date:		**7 September**			
Harvest date:		**6 February**			
Plant population:		300 seeds/m^2			
Basal fertiliser:	28 April	100kg MAP (10 N)			
	5 tonnes manure:	N	P	K	S
	Kg/ha	5.5	50	90	26
Nitrogen:		As per treatment list			

All inputs of insecticides, fungicides, and herbicides were standard across the trial