



ASSESSMENT OF WMF NPK CROP PLUS AND WMF MICROBES ON WHEAT YIELD AND QUALITY

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AIM

To evaluate wheat yield and quality when growing wheat with conventional granular fertilisers or Western Mineral's granular mineral fertiliser. To compare the effects of different methods of "extra" nitrogen application.

BACKGROUND

Western Mineral Fertilisers (WMF) Mineral and Microbe cropping programs have basically performed well on relatively low applications of Nitrogen and Phosphorus. This current trial is part of on-going research being conducted to examine mineral fertiliser/microbe programs and the *value* of adding various forms of extra or top up N. As Nitrogen fertilisation is a significant cost in cereal production, the development of a symbiosis between diazotrophic (N_2 fixing) bacteria and cereal would be of enormous economic value.

The objective of this trial is to evaluate different types of Nitrogen (solid, liquid or Microbial) applied: 1) at seeding, 2) post seeding or 3) as a N_2 fixing microbial seed treatment (PSN microbes). The parameters being tested include vigour, nutrient status (plant tissue analysis), yield and quality.

TRIAL DETAILS

Property	McIlroy family, Pithara
Plot size & replication	15m x 1.25m x 3 replicates RCB
Soil type	Sandy Loam
Sowing date	05/06/09
Seeding rate	70 kg/ha Westonia
Fertiliser (kg/ha)	See Treatment List (over page)
Paddock rotation	2008 = Oats, 2007 = Pasture
Herbicides	05/06/09: 2.5l/ha Trifluralin, 2L/ha Roundup, 30g/ha Logran 08/07/09: 25g/ha Monza, 2%v/v DC Trate 29/07/09: 380g/ha Achieve, 1.2l/ha Bromicide MA, 0.75%v/v Supercharge
Growing Season Rainfall	201mm

RESULTS

Table 1. Assessment results for WMF trial at Liebe Group Main trial site.

Trt.	Treatment	Vigour 03/08/09	Vigour 25/08/09	Vigour 03/09/09	Yield (t/ha)	Protein %	Hectolitre weight	Screenings %
1	Untreated Check NO Fertiliser	3.7d	3.7e	3.7d	1.14d	7.63d	75.46a	2.29d
2	70 kg/ha NPK Crop Plus 750 g/t Ag Microbes on seed No nitrogen	5.0c	6.3bcd	5.3c	1.22cd	7.73cd	73.89abc	2.64cd
3	70 kg/ha NPK Crop Plus 750 g/t Ag Microbes on seed 10.5 Units Liquid N inject	7.0a	7.7ab	8.0a	1.44ab	8.67b	71.51bcd	3.82abc
4	70 kg/ha NPK Crop Plus 750 g/t Ag Microbes on seed 10.5 Units Gran Urea 4W.A.S	6.7ab	8.0ab	8.3a	1.40abc	8.87ab	70.67d	3.87abc
5	70 kg/ha NPK Crop Plus PSN Microbes on seed NO Nitrogen	5.3c	5.0de	6.3bc	1.28bcd	7.97cd	73.85abc	3.03bcd
Trt.	Treatment	Vigour 03/08/09	Vigour 25/08/09	Vigour 03/09/09	Yield (t/ha)	Protein %	Hectolitre weight	Screenings %

6	70 kg/Ha NPK Crop Plus PSN Microbes on seed 10.5 Units Liquid N inject	7.0a	7.0abc	7.3ab	1.49a	8.13c	73.51a-d	2.89cd
7	70 kg/Ha NPK Crop Plus PSN Microbes on seed 10.5 Units Gran Urea 4W.A.S	5.7a	8.3a	8.5a	1.40ab	9.20a	70.64d	4.54a
8	70 kg/ha Macro Pro Extra 400 ml/ha Impact in Furrow NO Nitrogen	7.7bc	5.7cd	6.3bc	1.36abc	7.77cd	75.35a	2.60cd
9	70 kg/ha Macro Pro Extra 400 ml/ha Impact in Furrow 10.5 Units Liquid N inject	7.3a	8.7a	8.0a	1.47ab	9.17a	71.28cd	4.34a-d
10	70 kg/ha Macro Pro Extra 400 ml/ha Impact in Furrow 10.5 Units Gran Urea 4W.A.S	3.7a	8.7a	8.5a	1.46ab	8.53b	72.90a-d	3.21ab
LSD (P=.05)		1.22	1.57	1.357	0.1656	0.397	2.6299	1.2721
Standard Deviation		0.72	0.92	0.797	0.0972	0.233	1.5441	0.7469
CV		11.58	13.5	11.58	7.13	2.8	2.11	22.87
Bartlett's X2		3.431	4.59	6.294	8.276	9.38	12.25	12.389
P(Bartlett's X2)		0.945	0.868	0.79	0.602	0.496	0.269	0.26

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 2. Plant tissue analysis (03/08/09) for all treatments.

Treatment.	N %	P %	K %	S %	Na %	Ca %	Mg %	Cl %	Cu mg/kg	Zn mg/kg	Mn mg/kg	Fe mg/kg	NO ₃ mg/kg	B mg/kg
1	3.5	0.4	4.1	0.3	0.1	0.4	0.2	1.7	6.4	34.3	272.1	150.5	40	4.3
2	3.3	0.5	4.3	0.3	0.1	0.3	0.2	1.8	5.7	32.9	267.6	174.2	38	4.3
3	3.7	0.4	3.7	0.3	0.1	0.3	0.2	1.8	5.0	28.5	168.8	142.4	71	4.5
4	3.7	0.5	4.0	0.4	0.1	0.3	0.2	1.7	5.5	30.1	179.8	164.9	30	4.2
5	3.5	0.5	3.9	0.3	0.1	0.3	0.2	1.8	5.7	30.8	231.4	147.0	40	4.2
6	3.7	0.5	4.1	0.4	0.1	0.4	0.2	1.7	5.9	34.2	192.5	165.8	38	4.7
7	3.9	0.5	4.3	0.4	0.1	0.4	0.2	2.1	5.8	33.0	205.1	162.9	58	4.1
8	3.8	0.5	4.2	0.4	0.1	0.3	0.2	1.8	6.2	33.2	207.8	149.2	42	4.5
9	3.8	0.4	3.9	0.4	0.1	0.4	0.2	1.7	5.5	32.1	177.5	154.4	42	3.9
10	3.9	0.5	4.5	0.4	0.1	0.4	0.2	1.7	6.1	33.6	188.0	176.5	100	4.6

COMMENTS

- Yields and protein were generally low across the trial.
- Addition of granular starter fertiliser had a significant effect on yield vs the untreated for all treatments except treatment 2 and 5.
- Throughout the season there was a consistent response of increased plant vigour with the addition of starter fertiliser and additional nitrogen.
- There was no statistically significant difference in yield when comparing PSN Microbes to Ag Microbes.
- For the W.M.F. microbe treated plots, the addition of nitrogen (regardless of form) gave a statistically significant yield increase over microbe treated plots which did not receive Nitrogen. Nitrogen form (inject vs granular) did not have a significant yield difference. NPK Crop Plus with PSN microbes with nitrogen applied at seeding (in liquid form) showed the highest yield (1.49 t/ha), and NPK Crop Plus with PSN microbes with nitrogen applied as granular urea showed the highest Protein (9.2%) levels.
- There was no statistically significant difference in yield between comparable NPK Crop Plus treatments and Macro Pro Extra treatments.
- Addition of N to the Macro Pro plots did not give a statistically significantly yield increase.
- Those plots which did not receive post emergent N were generally significantly lower in protein.
- A later application of nitrogen (urea form) generally resulted in higher protein levels compared to same amount of nitrogen applied at seeding (in liquid form)
- Hectolitre weights were generally higher for those treatments which did not receive any extra nitrogen.
- Screenings results were varied, but were generally lower in treatments that received NO extra nitrogen.

- Plant tissue analysis generally showed little difference between treatments across all elements when assessed on 03/08/09.

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