

# NE10\_07 Cereal nutrition trial in wheat, Tullooona, NSW.



## Aim:

To evaluate various nutrition programs in Wheat for improved grain quality and yield.

## Background:

Many claims are made by suppliers of fertiliser inputs which need to be quantified. This trial will compare nutritional seed treatments, granular fertiliser and foliar fertiliser treatments and a gross margin analysis will be generated for each treatment in order to see if the treatments in the trial are economically viable.

## Details:

Location:	“Kildare”, Tullooona, NSW.
Researcher:	Tom McGuire and Landmark Moree.
Co-operators:	Darryl Bartelen, Landmark Moree.
Sowing Date:	9/6/2010.
GSR:	470mm
Soil:	Self mulching cracking clay
Trial Details:	9/6/10 – Lang wheat was planted at 51kg/ha. A disc seeder was used for sowing with press wheels on 250mm spacing. The trial had 4 replicates. 17/8/10 - Applications of the treatments 5 through to 9 were made when the crop was between late tillering to the start of jointing in a total volume of 124.8L/ha. The grower applied Axial + MCPA LVE + Ally for post emergent weed control and a foliar fungicide to control Stripe Rust. 9/9/10 – 2 <sup>nd</sup> applications of treatments 7 and 8 were applied just prior to flag leaf emergence in a total volume of 124.8L/ha. 12/12/10 – trial was harvested.

**Table 1. Summary of treatments.**

Trt. No.	Treatments
T1	Untreated Control – zero fertilizer
T2	Granulock Supreme Z @ 40kg/ha to mirror district average rate
T3	Advanced plant nutrients Maxsil @ 20kg/ha with a full rate of Granulock Supreme Z @ 40kg/ha
T4	Advanced plant nutrients Maxsil @ 20kg/ha with a half rate of Granulock Supreme Z @ 20kg/ha
T5	Agro K Super Symcoat applied to seed @ 4L/T ,Granulock Supreme Z @ 40kg/ha , fb System-Ready as a foliar @ 1L/ha
T6	Agro K Super Symcoat applied to seed @ 4L/T, Granulock Supreme Z @ 40kg/ha, fb System-Zn as a foliar @ 1L/ha
T7	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Vigour-Lig Plus @ 5L/ha x 2 applications
T8	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Lig-Nitros @ 5L/ha x 2 applications
T9	Microsoil Nitrogen @ 12L/ha , Phosphorus @ 3.5L/ha & Calcium @ 3.5L/ha applied to stubble, Granulock Supreme Z @ 40kg/ha, fb in crop application of the same treatments above + Trace Elements @ 1L/ha

**Results:**

**Table 2. Summary of yield.**

Rating Data Type		Lang wheat	Vigour Score	Yield
Rating Unit		Plants/m <sup>2</sup>	(1-9)	T/ha
Rating Date		17/8/10	17/8/10	12/12/10
Trt No	Treatment			
1	Untreated Control – zero fertilizer	108 abc	6.5 a	4.74 a
2	Granulock Supreme Z @ 40kg/ha to mirror district average rate	116 a	6.8 a	4.66 a
3	Advanced plant nutrients Maxsil @ 20kg/ha with a full rate of Granulock Supreme Z @ 40kg/ha	108 abc	6.8 a	4.76 a
4	Advanced plant nutrients Maxsil @ 20kg/ha with a half rate of Granulock Supreme Z @ 20kg/ha	98 c	6.5 a	4.72 a
5	Agro K Super Symcoat applied to seed @ 4L/T ,Granulock Supreme Z @ 40kg/ha , fb Sysstem-Ready as a foliar @ 1L/ha	100 bc	6.8 a	4.79 a
6	Agro K Super Symcoat applied to seed @ 4L/T, Granulock Supreme Z @ 40kg/ha, fb Sysstem-Zn as a foliar @ 1L/ha	106 abc	6.3 a	4.71 a
7	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Vigour-Lig Plus @ 5L/ha x 2 applications	112 ab	6.5 a	4.67 a
8	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Lig-Nitros x 2 applications	106 abc	6.8 a	4.77 a
9	Microsoil Nitrogen @ 12L/ha , Phosphorus @ 3.5L/ha & Calcium @ 3.5L/ha applied to stubble, Granulock Supreme Z @ 40kg/ha, fb in crop application of the same treatments above + Trace Elements @ 1L/ha	110 abc	6.8 a	4.77 a
<b>LSD(P=.05)</b>		12.05	0.69	0.46
<b>CV</b>		7.76	7.2	6.72

**Note:** Means followed by the same letter do not significantly differ.

**Table 3. Summary of grain quality data.**

Grain Quality Data								
Trt No	Treatment	Protein	Screenings	Wgt	Bin Grade	T/Ha	Trt Cost \$/Ha excl GST	\$/Ha excl GST
1	Untreated Control – zero fertilizer	11.6	3.6	74.2	H2	4.74	0	\$1,318.20
2	Granulock Supreme Z @ 40kg/ha to mirror district average rate	11.9	3.6	74.8	H2	4.66	\$28.35	\$1,267.60
3	Advanced plant nutrients Maxsil @ 20kg/ha with a full rate of Granulock Supreme Z @ 40kg/ha	11.9	3.6	75.5	H2	4.76	\$25.00 + \$28.35	\$1,270.40
4	Advanced plant nutrients Maxsil @ 20kg/ha with a half rate of Granulock Supreme Z @ 20kg/ha	11.9	4.5	74.2	H2	4.72	\$25.00 + \$14.20	\$1,273.45
5	Agro K Super Symcoat applied to seed @ 4L/T , Granulock Supreme Z @ 40kg/ha , fb System-Ready as a foliar @ 1L/ha	11.7	3.6	74.2	H2	4.79	\$14.05 + \$28.35	\$1,289.70
6	Agro K Super Symcoat applied to seed @ 4L/T, Granulock Supreme Z @ 40kg/ha, fb System-Zn as a foliar @ 1L/ha	11.7	3.6	72.3	AUH2	4.71	\$14.05 + \$28.35	\$1,173.25
7	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Vigour-Lig Plus @ 5L/ha x 2 applications	11.9	3.8	74.2	H2	4.67	\$35.85 + \$28.35	\$1,234.55
8	SJB Kickstart P applied to seed @ 8L/T, Granulock Supreme Z @ 40kg/ha, fb Lig-Nitros @ 5L/ha x 2 applications	11.9	4.1	73.0	AUH2	4.77	\$32.85 + \$28.35	\$1,169.95
9	Microsoil Nitrogen @ 12L/ha , Phosphorus @ 3.5L/ha & Calcium @ 3.5L/ha applied to stubble, Granulock Supreme Z @ 40kg/ha, fb in crop application of the same treatments above + Trace Elements @ 1L/ha	11.9	4.7	74.2	H2	4.77	\$45.00 + \$28.35	\$1,253.20

**Note:** - AWB pricing on 2/3/11 for H2 was \$278.10/T excl GST and AUH2 was \$258.10/T excl GST.

## **Discussion:**

This trial was planted at “Kildare”, which is located at Tulloona in Northern NSW on the 9/6/10. The growing season for the trial was uncharacteristically wet with in crop rainfall totalling 470mm. The crop was not moisture stressed at anytime during the growing season. Granulock Supreme Z @ 40kg/ha was selected as a suitable starter fertiliser for nitrogen, phosphorus, sulphur and zinc and mirrors district average practice. The addition of nitrogen in the form of urea at planting was not added because the trial was located in a paddock which had Faba Beans in it the previous winter. The area the trial was sown into was free from weeds at planting with good moisture present at the time of sowing. The trial was sprayed by the grower post emergent for grasses, broadleaf weeds and stripe rust.

The variety of wheat used was Lang and the planting rate for all of the treatments in the trial was 51kg/ha, targeting an established population of 100plants/m<sup>2</sup>. All of the treatments in the trial achieved plant establishments ranging from 98 –116 plants/m<sup>2</sup>. Treatment 2 achieved the best plant establishment at 116 plants/m<sup>2</sup> and it was statistically different to treatments 4 and 5. Vigour scores for the treatments were also conducted with scores ranging from 6.3 - 6.8 however there was no statistical difference between any of the treatments.

There were effectively three timings for the treatments in this trial. 1). the at planting treatment which in four treatments required the addition of a nutritional seed treatment for the Agro-K and SJB programs. Other treatments at planting required the addition of fertiliser with the seed, apart from the untreated treatment which had zero fertiliser inputs. The Microsoil program required the products be applied to the stubble prior to planting. The same Microsoil combination with 1L/ha of trace elements was applied again then in crop at late tillering – jointing. 2). Treatments 5 through to 9 were made when the crop was between late tillering to the start of jointing in a total volume of 124.8L/ha. 3). The second foliar application for treatments 7 and 8 were applied just prior to flag leaf emergence in a total volume of 124.8L/ha.

When comparing the results for yield from the trial, there was no statistical difference between any of the treatments. The highest yielding treatment in the trial was treatment 5 @ 4.79T/ha (Agro K Super Symcoat applied to seed @ 4L/T, Granulock Supreme Z @ 40kg/ha, fb Sysstem-Ready as a foliar @ 1L/ha). When gross a margin analysis was conducted for the different treatments in the trial, treatment 1 (untreated control - zero fertiliser) gave the highest economic return at \$1,318.20/ha excl GST. Treatment 5 delivered the next highest gross margin in the trial with a return of \$1,289.70/ha excl GST. Treatment 3, (Advanced plant nutrients Maxsil @ 20kg/ha with a full rate of Granulock Supreme Z @ 40kg/ha) produced the highest test weight @ 75.5 out of all of the treatments in the trial. Interestingly enough though, treatment 4 (Advanced plant nutrients Maxsil @ 20kg/ha with a half rate of Granulock Supreme Z @ 20kg/ha) returned an extra \$3.05/ha compared to treatment 3, with less Granulock Supreme Z. The results for treatments 3 and 4 support the manufacturers claim that Maxsil, a calcium silicate product, assists the plant to more efficiently utilise Nitrogen, Phosphorus and Potassium which improves quality characteristics of the end product, which in this case was the grain.

As this trial was conducted in isolation it is difficult to drawn conclusions from the results without repeating the trial again for another 1 - 2 seasons to see if there are any trends presenting themselves. Never the less, the key finding from this trial is that in a wet year, following a faba bean rotation, when growing wheat there is a yield benefit from using solid and foliar fertilisers. Surprisingly in this trial though there appears to be limited economic benefit in doing so. The problem with not using any fertiliser is that it creates a scenario where nutrition is mined which in the long term is unsustainable. Using fertiliser where it is warranted more often than not will pay for itself. Trial work in a drier season which is more typical of the winters experienced in Northern NSW is warranted to quantify the benefits of the alternative nutrition programs in this trial.

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<b>B</b>	3	8	1	9	6	7	2	5	4	<b>B</b>
<b>B</b>	2	9	5	1	4	3	8	7	6	<b>B</b>
<b>B</b>	7	5	9	2	8	4	3	6	1	<b>B</b>
<b>B</b>	1	2	3	4	5	6	7	8	9	<b>B</b>

Trt. No.	TREATMENT	PRODUCT RATE (L/Kg/ha)	Experimental Details
T1	Untreated Control – zero fertilizer	0	<b>Location:</b> “Kildare,” Tullooona. <b>PD Agronomist:</b> Tom McGuire <b>Co-operators:</b> Darryl Bartelen and Landmark Moree. <b>Plot Size:</b> 1.5m x 12m <b>Replicates:</b> 4 <b>Sowing date:</b> 9/6/10 <b>Spray Date:</b> 17/8/10 & 9/9/10 <b>Growth stage:</b> Z26 & Z36-39 <b>Soil Moisture &amp; Type:</b> Good moisture, self mulching clay <b>General Comments:</b> Sown into good moisture with previous crop being Faba Beans so no nitrogen has been applied to the trial other than what is in the Granulock Supreme Z and the products tested. Lang wheat used as variety sown at 51kg/ha targeting 100 plant m2.
T2	Granulock Supreme Z	40kg/ha	
T3	Advanced Plant Nutrients Maxsil sown with a full rate of Granulock Supreme Z	20kg/ha + 40kg/ha	
T4	Advanced plant nutrients Maxsil sown with a half rate of Granulock Supreme Z	20kg/ha + 20kg/ha	
T5	Agro K Super Symcoat applied to seed, sown with Granulock Supreme Z, fb Sysstem-Ready as a foliar, Z26	4L/T + 40kg/ha, fb 1L/ha	
T6	Agro K Super Symcoat applied to seed, sown with Granulock Supreme Z, fb Sysstem-Zn as a foliar, Z26	4L/T + 40kg/ha, fb 1L/ha	
T7	SJB Kickstart P applied to seed, sown with Granulock Supreme Z, fb Vigour-Lig Plus as a foliar @ Z26 & Z32	8L/T + 40kg/ha, fb 5L/ha x 2	
T8	SJB Kickstart P applied to seed, sown with Granulock Supreme Z, fb Lig-Nitros as a foliar @ Z26 & Z32	8L/T + 40kg/ha, fb 5L/ha x 2	
T9	Microsoil Nitrogen, Phosphorus & Calcium applied to stubble, sown with Granulock Supreme Z @ 40kg/ha, fb in crop foliar application of the same treatment	Nit = 12L/ha + Phos = 3.5L/ha + Cal = 3.5L/ha + 40kg/ha, fb Nit = 12Lha + Phos = 3.5L/ha + Cal = 3.5L/ha + 1L/ha Trace Elements	

<b>Date:</b>	17/8/10	<b>Nozzle Make &amp; Type:</b>	MD 110015
<b>Time:</b>	4pm	<b>Pressure (Bar):</b>	2
<b>Experimenter:</b>	Tom McGuire	<b>Output volume (L/ha):</b>	124. 8L/ha,
<b>Method:</b>	Handheld boom,	<b>Application speed (kph):</b>	5km/h
<b>Equipment:</b>	Boom with LPG pressurisation	<b>Swath (m):</b>	2
<b><u>Weather Details</u></b>		<b><u>Crop Details</u></b>	
<b>Temperature (°C):</b>	20	<b>Crop Stage:</b>	Z26
<b>RH (%):</b>	54	<b>Leaf condition:</b>	Dry
<b>Cloud cover(%):</b>	5%		
<b>Wind direction:</b>	SSE	<b><u>Soil Conditions</u></b>	
<b>Wind speed (km/h):</b>	7	<b>At the surface (0-10cm):</b>	Adequate
<b>Before spraying:</b>	7	<b>Below the surface:</b>	Good
<b>During spraying:</b>	7		
<b>1 week after spraying:</b>	N/A	<b><u>Target</u></b>	Fertiliser Efficiency

<b>Date:</b>	9/9/10	<b>Nozzle Make &amp; Type:</b>	MD 110015
<b>Time:</b>	1pm	<b>Pressure (Bar):</b>	2
<b>Experimenter:</b>	Tom McGuire	<b>Output volume (L/ha):</b>	124. 8L/ha,
<b>Method:</b>	Handheld boom,	<b>Application speed (kph):</b>	5km/h
<b>Equipment:</b>	Boom with LPG pressurisation	<b>Swath (m):</b>	2
<b><u>Weather Details</u></b>		<b><u>Crop Details</u></b>	
<b>Temperature (°C):</b>	23	<b>Crop Stage(Zadok's):</b>	Z36-39
<b>RH (%):</b>	63	<b>Leaf condition:</b>	Dry
<b>Cloud cover(%):</b>	5		
<b>Wind direction:</b>	NW	<b><u>Soil Conditions</u></b>	
<b>Wind speed (km/h):</b>	10	<b>At the surface (0-10cm):</b>	Adequate
<b>Before spraying:</b>	10	<b>Below the surface:</b>	Good
<b>During spraying:</b>	10		
<b>1 week after spraying:</b>	N/A	<b><u>Target</u></b>	Fertiliser Efficiency