

Matching Nitrogen to Variety

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Aim

To evaluate yield and quality response of existing wheat varieties when treated at different nitrogen rates. Aiming to maximise nitrogen use efficiency by matching inputs to variety.

Trial Details

Property	Wenballa Farm, east of Dalwallinu
Plot size & replication	12m x 2.5m x 3 replications
Soil type	Red loam
Soil pH (CaCl ₂)	5.6
EC	0.038 dS/m
Paddock rotation	2009 wheat, 2010 wheat, 2011 wheat
Variety	As per protocol
Seeding date	7/6/12
Seeding rate	75 kg/ha
Fertiliser	7/6/12: 75 kg/ha MAPSZC banded, 100 kg/ha SOP spread IBS
Herbicides	7/6/12: 1.5 L/ha Roundup, 2.5 L/ha Boxer Gold, 1.0 L/ha Trifluralin, 1 L/ha Chlorpyrifos 11/7/12: 25 g/ha Monza, 2% v/v DC Trate
Growing Season Rainfall	133mm

Trial Design

Table 1: Treatment list showing 3 variety x 4 nitrogen rates. 4WAE = 4 weeks after emergence.

Treatment	Treatment	N rate	N top up rate 4WAE	N top up rate 9 WAE
1	Mace	0 kg/ha		
2	Mace	25 kg/ha	UAN	30 L/ha
3	Mace	50 kg/ha	UAN	60 L/ha
4	Mace	75 kg/ha	UAN	90 L/ha
5	Wyalkatchem	0 kg/ha		
6	Wyalkatchem	25 kg/ha	UAN	30 L/ha
7	Wyalkatchem	50 kg/ha	UAN	60 L/ha
8	Wyalkatchem	75 kg/ha	UAN	90 L/ha
9	Magenta	0 kg/ha		
10	Magenta	25 kg/ha	UAN	30 L/ha
11	Magenta	50 kg/ha	UAN	60 L/ha
12	Magenta	75 kg/ha	UAN	90 L/ha

Dalwallinu Rainfall 2012

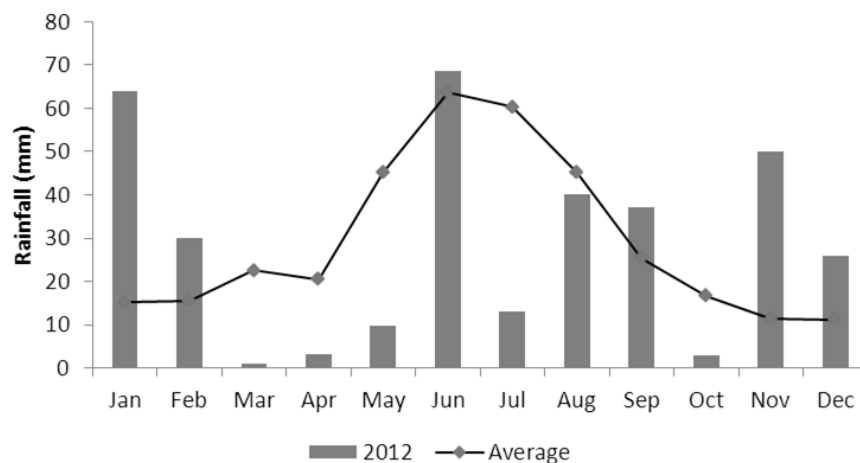


Figure 1: Dalwallinu rainfall calendar year 2012 compared to average.

Results

Table 2: Biomass, head counts and final grain yield for varieties. Different letters indicate a significant result.

Treatment No.	Treatment	Crop Biomass 16/8/12	Head Count (/m ²) 19/9/12	Grain Yield (t/ha)
1	Mace 0N	80 d	102 abc	1.354 a
3	Mace 50N	85 cd	101 abc	1.316 ab
4	Mace 75N	92 ab	113 ab	1.307 abc
5	Wyalkatchem 0N	80 d	91 c	1.013 a-d
6	Wyalkatchem 25N	82c d	96 bc	0.985 bcd
7	Wyalkatchem 50N	83 cd	90 c	0.739 d
8	Wyalkatchem 75N	85 cd	89 c	0.767 d
9	Magenta 0N	82 cd	112 ab	0.928 d
10	Magenta 25N	87 bc	118 a	0.966 cd
11	Magenta 50N	87 bc	115 ab	0.966 cd
12	Magenta 75N	93 a	121 a	1.032 a-d
LSD (P=0.05)		5.8	20.7	0.3
CV		4.0	11.8	19.8

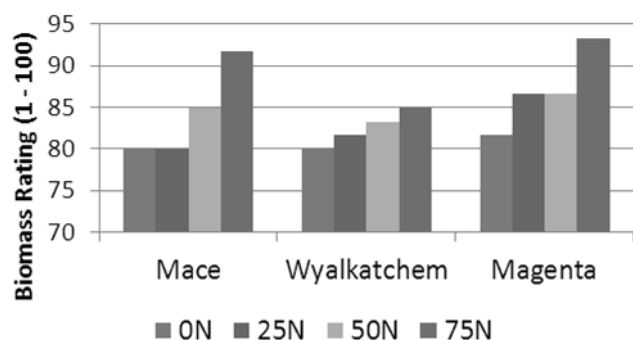


Figure 2: Wheat variety response in biomass to N application, observations as at 16th August 2012.

Table 3: Quality data for the treatments, bold indicates a higher pay grade, italics lower (std APW2).

Treatment	Protein	Specific Weight (kg/hL)	Screenings (%)
1 M0N	11.6 f	74.4 a	3.3 c
2 M25	13.1 e	74.5 a	4.5 abc
3 M50N	13.3 de	74.7 a	3.9 bc
4 <i>M75N</i>	<i>13.9 bcd</i>	<i>73.7 a</i>	<i>5.0 abc</i>
5 <i>W0N</i>	<i>12.0 f</i>	<i>73.4 a</i>	<i>3.5 c</i>
6 <i>W25N</i>	<i>13.3 de</i>	<i>71.1 b</i>	<i>6.1 ab</i>
7 <i>W50N</i>	<i>13.8 b-e</i>	<i>70.9 b</i>	<i>6.2 ab</i>
8 <i>W75N</i>	<i>14.4 ab</i>	<i>71.4 b</i>	<i>6.4 a</i>
9 <i>MAG0N</i>	<i>12.2 f</i>	<i>73.9 a</i>	<i>3.9 bc</i>
10 MAG25N	13.5 cde	74.3 a	3.2 c
11 <i>MAG50N</i>	<i>14.1 abc</i>	<i>73.3 a</i>	<i>5.3 abc</i>
12 <i>MAG75N</i>	<i>14.6 a</i>	<i>73.7 a</i>	<i>4.6 abc</i>

The analysis of crop biomass was done on the 16th August and shows a significant jump in biomass for Mace and Magenta to the top rate of N. Wyalkatchem trends upward but is not significant. This did not reflect through to head count or yield. The yield numbers had a very high CV% (lots of variability) as frost was recorded by Kalyx throughout the plots therefore unfortunately not much can be taken from the yield.

Grain quality was as expected in a tough finish at the site. All varieties showed an increase in protein with applied nitrogen. Wyalkatchem grain quality deteriorated significantly with applied nitrogen as screenings increased and hectolitre weight dropped compared to the control.

Economic Analysis

Table 4: Gross Margins using base variable costs of \$207/ha and Gross Revenue APW \$300/t, with grade spreads as at 15/1/13. Sulphate of Potash NOT included @ \$80/ha (not typical farmer practice).UAN @ \$1.35/kg.

Treatment No.	Treatment & Bin Grade	N rate	Gross margin/ha
1	Mace (H2)	0 kg/ha	\$207.32
2	Mace (H1)	25 kg/ha	\$86.11
3	Mace (H1)	50 kg/ha	\$134.78
4	Mace (AUH2)	75 kg/ha	\$83.85
5	Wyalkatchem (AGP1)	0 kg/ha	\$66.51
6	Wyalkatchem (AGP1)	25 kg/ha	\$25.20
7	Wyalkatchem (AGP1)	50 kg/ha	-\$75.00
8	Wyalkatchem (AGP1)	75 kg/ha	-\$101.16
9	Magenta (AGP1)	0 kg/ha	\$43.56
10	Magenta (H1)	25 kg/ha	\$59.68
11	Magenta (AGP1)	50 kg/ha	-\$13.68
12	Magenta (AGP1)	75 kg/ha	-\$29.61

Comments

Mace was the highest yielder with the best grain quality and being a hard variety gave the best gross margin. All other varieties didn't make their base grade of APW2 with the exception of one Magenta treatment. Adding nitrogen had a negative impact on yields and therefore gross margins with the exception of Magenta 25N, which was able to scrape into a higher bin grade. This trial was impacted by drought stress and frost which increased variability (CV 19.8%) which does limit the conclusions we can take from this trial. The biomass trends do give us a picture of what potentially might have happened given a better finish to the season therefore further trial work is needed. All three varieties do appear to react differently to nitrogen inputs however we weren't able to show this through to yield.

Acknowledgements

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