

Wheat Agronomy at Parndana

Background

Agriculture Kangaroo Island and the Kangaroo Island Grain Growers' Association have been working with SARDI for several years to identify key ingredients of agronomic packages which deliver high yielding wheat crops with good quality in the Parndana environment. In 2006, this trial shifted to the Vivonne Bay environment on the property of the Pontifex family.

Since there are now a huge number of options for managing wheat including canopy management concepts, the trial in 2006 concentrated on treatments which have claimed to be important in other wheat growing areas but are of uncertain value for Kangaroo Island. These included growth regulants, delayed applications of nitrogen, fungicides, potassium (K) and boron (B) fertilisers. The fungicide treatments were particularly topical given the threats of both stripe and stem rust epidemics.

The approach taken in this trial was that we devised a management package, which we thought would be pretty good for wheat at this site (listed as the standard in the table of results below). All the other options we tested were compared against this standard, ie was there anything extra we could do which would improve performance over and above the standard? In addition, some of the treatments left out components of the standard package to see how important they were to overall performance.

What was done?

The trial was set up on the property of the Pontifex family in a paddock which had been intensively cropped and had been in canola in 2005; the site normally gets extremely wet in winter and early spring. The site was direct drilled with Clearfield JNZ @ 100 kg/ha on 23 June. For treatments, which required extra N or K at seeding, this was applied as broadcast urea or muriate of potash, respectively, prior to seeding.

Mid season treatments were applied on 31 August at jointing (growth stage 31) and late treatments were applied on 5 October (flowering, GS61).

Results

Growth and performance in this trial was very good most of the year with excellent establishment and no major weed or pest problems obvious. Towards the end of the season lack of rain put substantial stress on the crop and yields were very low compared to those normally experienced in this district. However, grain quality was good which suggests that the crop reduced its yield potential early and was thus able to fill the reduced number of grains set, despite the very dry finish.

Table 1 shows that grain yield and quality of Clearfield JNZ wheat were almost entirely unaffected by treatments. Providing extra nutrients above the standard package of 120 kg N/ha and 22 kg P/ha, nor leaving out N or P, did not improve or reduce yield or quality. This is not surprising for the fertiliser treatments given that the site had reasonable reserves of P (approx 34 mg/kg Colwell P), K (approx 280 mg/g Colwell K) and N (more than 150 kg mineral N/ha in the top 60 cm) and that the yields were so low due to the poor spring. At least high rates of N at seeding did not appear to have caused any further yield or quality reductions.

Similarly, the threatened rust epidemics did not eventuate due to the hot dry spring, so fungicide treatments (Amistar Xtra, Tilt, Opus, Apron, Jockey and Dividend) had no impact either. The pesticide treatments (Gaucho or Fastac) had no impact.

Table 1. Grain yield and quality of wheat at Vivonne Bay in the agronomy trial, 2006.

Treatment	Treatment Description	Grain yield (t/ha)	Grain protein (%)	Screenings (% < 2 mm)	Grain wt (g/1000)
Standard	NPN	1.73	12.3	5.6	35.6
Seeding N	120N + P	1.36	12.7	6.3	35.7
Canopy man N	NPNN	1.55	12.3	6.9	35.7
Low N	NPN1/2	1.69	12.3	5.7	36.2
No N	P	1.63	12.3	5.8	35.0
No P	NoP	1.47	11.6	5.9	35.4
Extra K	NPN+K	1.67	12.2	5.9	35.9
Extra B	NPN+B at GS31	1.69	12.4	6.6	35.2
Growth Regulant	NPN+Growth Regulant at GS31	1.58	12.2	5.7	35.5
Amistar Xtra	NPN+Amistar Xtra at GS59	1.72	12.3	7.6	35.8
Tilt	NPN+Tilt at GS59	1.56	12.7	5.9	36.1
Opus	NPN+Opus at GS59	1.70	12.1	5.2	35.9
Fastac	NPN+Fastac at G31	1.80	11.9	5.6	35.3
Apron	NPN+Apron	1.52	12.9	5.8	36.7
Jockey	NPN+Jockey	1.70	11.7	5.8	35.8
Gaucha	NPN+Gaucha	1.98	12.2	5.5	36.9
Dividend	NPN+Dividend	1.70	12.4	6.7	35.7
Everything	NPN+205ml Fastac early +Growth Regulant +K+B(GS31) +Dividend+CU@GS59	1.72	12.5	6.2	35.6
Tilt at flag	NPN+200ml/Ha Tilt at GS59	1.28	12.4	5.6	36.5
Copper	NPN+Copper at GS59	1.63	12.1	6.5	35.9
LSD ($P=0.05$)		ns	ns	ns	0.9

Key for Treatment Description	
P	22P @ Seeding
NP	20N + 22P at seeding
NPN	20N + 22P at seeding + 100N Jointing
NPNN	20N + 22P at seeding + 50N Jointing (GS31) + 50N Booting (GS59)
NPN1/2	20N + 22P at seeding + 50N Jointing (GS31)
NoP	20 N at seeding + 100 N Jointing

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Take Home Message:

- This trial showed that under the extremely dry conditions of 2006, wheat yield at this site was largely determined by water supply because major diseases were absent and the soil had abundant nutrients in reserve for the small demands of such a low yielding crop.