




1989

New block Badgingarra RS late time of seeding.

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Trial 89BA33. New block Badgingarra RS late time of seeding

No	Treatments Name	At seeding 5/7/89			After seeding kg fert./ha (date)	Total kg N/ha	Adjusted cost \$/ha
		Fertilizer kg/ha	N	P			
1	CSBP Strategic	138 Agras 1	24	10	50u (3/8)	47	70
2	CSBP Tactics	115 Super 38 Urea	17	10	-	17	31
3	NPD Strategic	57 Super	-	5	120 Agron (3/8)	41	63
4	NPD Tactics	29 DAP	5	6	60u (3/8)	33	36
5	Traditional	57 Super	-	5	50u (3/8)	23	29
6	Farmer	95 Super 25 Urea	11	9	75u (3/8)	45	56
7	Nil/Nil	-	-	-	-	-	-
8	Adviser	115 Super 57 Urea	26	10	50u (3/8)	49	61
7+	Nil/+N	70 Urea	32	-	75u (3/8)	66	62

NPD Rationalization

- (3) Based on a 1.5 t/ha potential yield, the strategic treatment was planned to be 120 kg urea/ha 4WAS. However, the crop was poorly established and so NH_4NO_3 was used in the hope of getting better tillering than would be possible with the slower release urea source. Gambling on equal dollars to urea for 2/3 N, but believe that twice as effective.
- (4) DAP was used to place nitrogen with the seed in case there was no rain of significance after seeding. This nitrogen (only 5 kg/ha) was probably lost with the rains of 20-28/7/89 (50 mm). Urea (60 kg/ha) was applied at 4WAS with the option to apply more later if the yield potential warranted it.

Trial 89BA33. Yield components (from hand harvests)

1st time of planting No	Treatment Description	BY t/ha	GY t/ha	Heads per m ²	TGW gm	HI %	Grains /head	Grains per m ²
1	CSBP soil test	2.36	1.05	128	39	45	21	2,670
2	CSBP tactics	2.34	1.00	131	38	43	20	2,600
3	NPD strategic	2.62	1.21	163	38	46	19	3,151
4	NPD tactics	2.53	1.12	137	39	45	18	2,900
5	Traditional	1.93	0.86	122	41	45	17	2,100
6	Farmer	2.20	1.01	125	39	46	21	2,600
7	Control	0.71	0.27	83	38	42	9	700
8	Adviser	2.33	1.02	126	39	44	21	2,640
7+	Control + N	2.46	1.07	139	38	43	20	2,780

Economic analysis (from machine harvest)

1st time of planting No	Treatment Description	Total kg/ha N P		Adj. cost \$/ha	Yield t/ha	Net return \$/ha	Mean \$ return %
1	CSBP soil test	58	15	69	1.09	106	104
2	CSBP tactics	48	11	72	0.99	86	72
3	NPD strategic	83	8	81	1.05	86	64
4	NPD tactics	72	8	81	1.17	106	89
5	Traditional	46	8	54	0.96	100	122
6	Farmer	46	9	66	0.95	86	79
7	Control	Nil	Nil	Nil	0.21	34	-
8	Adviser	49	10	61	0.99	98	105
7+	Control + N	103	Nil	96	0.97	60	27
	LSD (P < 0.05)				0.15	22	

Adj. cost is cost of fertilizer adjusted for the future value of phosphate but no account is taken of interest on the investment.

Net return is gross return (with wheat at \$150/tonne) minus adjusted costs.

Mean dollar return is the return to fertilizer dollars as a per cent of the adjusted cost $(\text{net return}_i - \text{net return}_7) / (\text{adj. cost}_i)$.

Trial 89BA33. Yield components (from hand harvests)

2nd time of planting No	Treatment Description	BY t/ha	GY t/ha	Heads per m ²	TGW gm	HI %	Grains /head	Grains per m ²
1	CSBP Soil test	1.69	0.75	93	38	44	22	2,000
2	CSBP Tactics	1.23	0.55	101	38	45	14	1,430
3	NPD Strategic	1.52	0.70	118	33	46	18	2,110
4	NPD Tactics	1.38	0.65	106	38	47	16	1,710
5	Traditional	1.30	0.61	125	36	47	14	1,710
6	Farmer	1.41	0.69	93	38	49	20	1,820
7	Control	0.55	0.17	53	36	31	9	470
8	Adviser	1.64	0.81	104	39	49	20	2,100
7+	Control + N	1.60	0.76	119	38	48	17	2,010

Economic analysis (from machine harvest)

2nd time of planting No	Treatment Description	Total kg/ha N P		Adj. cost \$/ha	Yield t/ha	Net return \$/ha	Mean \$ return %
1	CSBP Soil test	47	10	70	0.69	41	21
2	CSBP Tactics	17	10	31	0.41	35	29
3	NPD Strategic	41	5	63	0.43	6	-
4	NPD Tactics	33	6	36	0.50	44	50
5	Traditional	23	5	29	0.42	38	41
6	Farmer	45	9	56	0.71	58	57
7	Control	Nil	Nil	Nil	0.16	26	-
8	Adviser	49	10	61	0.70	51	41
7+	Control + N	66	Nil	62	0.65	42	26
	LSD (P < 0.05)				0.17	25	

Adj. cost is cost of fertilizer adjusted for the future value of phosphate but no account is taken of interest on the investment.

Net return is gross return (with wheat at \$150/tonne) minus adjusted costs.

Mean dollar return is the return to fertilizer dollars as a per cent of the adjusted cost $(\text{net return}_i - \text{net return}_7) / (\text{Adj. cost}_i)$.

Location: 89BA32 1st TOP
Hand Harvest: 7/12/89

No	Treatment kg N/ha			Source	kg N/ha Total	Adj. cost \$/ha	Yield t/ha	Net return \$/ha	Mean \$ return %
	7/6 AS	5/7 4WAS	3/8 8WAS						
1	0	0	0		0	23	0.37	32	-35
2	32	0	0	Urea	32	53	0.86	76	68
3	64	0	0	Urea	64	79	1.15	93	67
4	128	0	0	Urea	128	131	1.37	74	26
5	256	0	0	Urea	256	243	1.10	-78	-49
6	0	32	0	Urea	32	53	1.13	16	-45
7	0	64	0	Urea	64	79	1.24	107	85
8	0	128	0	Urea	128	131	1.28	61	16
9	0	256	0	Urea	256	243	1.13	-74	-47
10	0	0	32	Urea	32	53	0.75	59	36
11	0	0	64	Urea	64	79	0.94	62	23
12	0	0	128	Urea	128	131	0.99	17	-18
13	0	0	256	Urea	256	243	0.77	-128	-69
14	64	32	0	Urea	96	109	1.32	89	45
15	64	64	0	Urea	128	135	1.33	64	18
16	64	128	0	Urea	192	187	1.42	26	7
17	64	256	0	Urea	320	291	1.24	-105	-50
18	64	0	32	Urea	96	109	1.22	74	31
19	64	0	64	Urea	128	135	1.27	55	11
20	64	0	128	Urea	192	187	1.45	30	-5
21	64	0	256	Urea	320	291	1.27	-101	-48
22	64	0	0	NO ₃	64	193*	1.35	9	-16
23	0	64	0	NO ₃	64	193	1.36	11	-15
24	0	0	64	NO ₃	64	193	0.94	-52	-48
25	64	0	0	NH ₄	64	107	1.22	67	25

Basal 18.2 kg P/ha as super. Full price of Agran 34:0 but 17% N as NO₃

Tactics trial

7	Nil P	Nil N		Nil	Nil	0.27	40	-
7+	Nil P	Nil N		103	96	1.07	64	25
1	Top net return			58	69	1.05	88	70
4	2nd net return			72	81	1.12	87	53

Trial No: 89BA33 2nd TOP
 Hand Harvest: 7/12/89

Treatment kg N/ha (as urea)							
No	AS 5/7	4WAS 3/8	Tot.N kg/ha	Adj. cost \$/ha	Yield t/ha	Net return \$/ha	Mean \$ return %
26	0	0	0	23	0.33	26	0
27	32	0	32	53	0.76	61	66
28	64	0	64	79	1.03	76	63
29	128	0	128	131	0.98	16	-8
30	256	0	256	243	0.84	-117	-59
31	0	32	32	53	0.76	61	66
32	0	64	64	79	0.83	45	24
33	0	128	128	131	0.83	-7	-25
34	0	256	256	243	0.81	-121	-60
35	64	32	96	109	0.90	26	0
36	64	64	128	135	1.07	25	-1
37	64	128	192	187	1.02	-34	-32
38	64	256	320	291	0.88	-159	-64

Basal 18.2 kg P/ha as super

Tactical trial

7	Nil P	Nil N	0	0	0.17	26	-
7+	Nil P	+ N	66	62	0.76	52	42
6	Manager		45	56	0.69	48	39
8	Adviser		49	61	0.81	60	59

Trial No: 89BA33 1st TOP
1989 results - hand harvest yield components

No	Treatment kg N/ha			Source	BY t/ha	GY t/ha	Heads per m ²	TGW gm	HI %	Grains /head	Grains /m ²
	26/5 AS	20/6 4WAS	19/7 8WAS								
1	0	0	0		0.80	0.37	99	43	46	9	860
2	32	0	0	Urea	1.90	0.86	130	44	46	15	1,990
3	64	0	0	Urea	2.64	1.15	140	41	44	20	2,800
4	128	0	0	Urea	3.02	1.37	163	39	46	22	3,520
5	256	0	0	Urea	2.56	1.10	135	41	42	20	2,660
6	0	32	0	Urea	2.52	1.13	147	42	45	18	2,680
7	0	64	0	Urea	2.77	1.24	161	41	45	19	3,030
8	0	128	0	Urea	2.89	1.28	170	39	44	19	3,280
9	0	256	0	Urea	2.62	1.13	156	39	43	19	2,880
10	0	0	32	Urea	1.84	0.75	150	44	41	11	1,700
11	0	0	64	Urea	2.31	0.94	205	45	41	10	2,100
12	0	0	128	Urea	2.54	0.99	202	42	39	12	2,340
13	0	0	256	Urea	1.99	0.77	156	42	39	12	1,850
14	64	32	0	Urea	3.04	1.32	156	38	43	22	3,490
15	64	64	0	Urea	3.10	1.33	174	37	43	21	3,630
16	64	128	0	Urea	3.20	1.42	178	35	44	23	4,000
17	64	256	0	Urea	2.75	1.24	167	34	45	22	3,720
18	64	0	32	Urea	2.76	1.22	140	39	44	23	3,160
19	64	0	64	Urea	2.98	1.27	154	39	42	21	3,240
20	64	0	128	Urea	3.39	1.45	170	38	43	23	3,830
21	64	0	256	Urea	2.96	1.27	149	37	43	23	3,440
22	64	0	0	NO ₃	3.04	1.35	159	41	45	21	3,350
23	0	64	0	NO ₃	3.05	1.36	187	41	44	18	3,320
24	0	0	64	NO ₃	2.42	0.94	223	41	39	10	2,330
25	64	0	0	NH ₄	2.65	1.22	146	37	46	23	3,290

Basal 18.2 kg P/ha as super

7	Nil P	Nil N		0.71	0.27	83	38	42	9	700
7+	Nil P	+ N		2.46	1.07	139	38	43	20	2,780
1	Top net return			2.36	1.05	128	39	45	21	2,670
4	2nd net return			2.53	1.12	137	39	45	18	2,900

Trial 89BA33 2nd TOP. Yield components hand harvest 7/12/89

Treatment kg N/ha (as urea)									
No	AS 5/7	4WAS 3/8	BY t/ha	GY t/ha	Heads /m ²	TGW gm	HI %	Grains /hd	Grains /m ²
26	0	0	0.80	0.33	94	39	47	9	850
27	32	0	1.21	0.76	86	42	46	21	1,820
28	64	0	2.31	1.03	115	40	47	23	2,600
29	128	0	2.32	0.98	129	36	45	21	2,770
30	256	0	1.74	0.84	114	33	44	23	2,540
31	0	32	1.42	0.76	129	37	46	16	2,110
32	0	64	1.98	0.83	120	33	45	21	2,560
33	0	128	1.98	0.83	142	35	44	18	2,410
34	0	256	1.62	0.81	139	33	47	18	2,460
35	64	32	2.01	0.90	110	36	44	23	2,480
36	64	64	1.98	1.07	159	37	48	18	2,900
37	64	128	1.95	1.02	135	36	44	21	2,820
38	64	256	1.94	0.88	151	35	45	17	2,500

Tactics trial

7	Nil P	Nil P	0.55	0.17	53	36	31	9	470
7+	Nil P	+ N	1.60	0.76	119	38	48	17	2,010
6	Manager		1.41	0.69	93	38	49	20	1,820
8	Adviser		1.64	0.81	104	39	49	20	2,100

Badgingarra sown 7/6/89 Aroona Wheat, 1st time of sowing

	Plants m ²	Rating 5/7	Rating 3/8	Tiller/pLt 3/8	Mgm/pLt 3/8	Rating 29/8	Tiller 29/8	T/ha DM 29/8	T/ha 28/9
<hr/>									
89BA33									
1	127	35	57	2.2	260	53	-	-	1.8
2	115	23	65	2.7	272	56	-	-	1.7
3	114	16	27	2.2	136	53	-	-	1.8
4	129	36	52	2.0	211	52	-	-	1.7
5	124	19	20	1.4	104	33	-	-	1.6
6	127	28	47	2.2	222	43	-	-	1.8
7	112	24	4	0.6	56	5	-	-	0.4
8	124	33	63	2.3	255	48	-	-	1.6
7+	112	-	55	1.6	178	59	-	-	1.9
<hr/>									
89BA32									
1	121	21	6	0.3	62	9	0.3	0.2	0.4
2	103	35	40	1.9	252	47	-	0.7	1.6
3	141	35	57	2.8	285	52	2.7	1.2	2.1
4	103	30	59	3.6	321	66	3.2	1.4	2.0
5	86	17	29	2.6	239	61	-	0.9	1.9
6	89	21	25	2.2	147	49	-	0.9	1.8
7	103	21	21	2.3	135	57	3.2	0.9	1.8
8	103	21	31	2.5	151	62	3.1	0.9	2.0
9	94	21	12	2.3	114	57	-	0.9	1.5
10	129	21	4	-	-	16	-	0.2	0.9
11	80	21	6	-	-	23	3.2	0.2	1.2
12	110	21	8	-	-	31	3.7	0.3	1.2
13	84	21	7	-	-	36	-	0.4	1.0
14	97	-	63	3.1	323	67	0	0.4	1.0
15	107	-	62	3.0	299	61	3.2	1.4	2.1
16	107	-	66	2.6	292	69	-	1.3	2.6
17	97	-	42	2.5	289	63	-	1.2	1.8
18	117	-	57	-	-	60	-	1.2	2.0
19	100	-	61	-	-	62	3.3	1.2	2.1
20	103	-	58	-	-	66	-	1.3	1.9
21	106	-	51	-	-	60	-	1.3	2.0
22	144	49	75	3.0	325	62	2.4	1.3	2.1
23	100	21	33	2.9	155	56	4.0	1.0	2.0
24	104	21	7	-	-	18	4.1	0.3	1.2
25	117	28	53	2.9	290	54	2.4	1.2	2.2

89BA33 1st TOP Diagnostic N and P

Treatment	3/8 N%	3/8 NO ₃ ppm	3/8 p%	3/8 kg N/ha	3/8 kg P/ha	28/9 kg N/ha	28/9 kg P/ha
1	4.45	486	0.45	14.7	1.49	21	2.9
2	4.81	408	0.52	15.0	1.63	18	2.6
3	5.97	1386	0.46	9.3	0.71	24	2.6
4	4.51	569	0.44	12.3	1.19	18	2.4
5	4.87	602	0.48	6.3	0.62	17	2.4
6	5.03	583	0.44	14.2	1.25	19	2.6
7	3.37	416	0.45	2.1	0.28	4	1.1
8	4.92	675	0.44	15.6	1.40	16	2.4
7+	5.26	1187	0.38	10.5	0.76	23	2.5

2nd time planting Badgingarra (Canna Wheat (5/7/89))

	Plants/m ² 3/8/89	Rating 3/8	Rating 29/8	Tiller 29/8	Mgm/plant 29/8	t/ha 28/9
89BA3						
1	99	12	23	1.2	284	1.0
2	108	19	17	0.7	257	0.8
3	94	8	9	1.3	109	0.8
4	86	17	12	0.7	171	0.8
5	117	9	8	0.7	86	0.5
6	103	15	17	1.1	196	0.9
7	118	9	4	0.3	76	0.2
8	98	17	24	1.2	321	1.0
7+	108	20	25	1.1	261	1.0
89BA32						
26	102	8	4	0.1	84	0.2
27	70	16	20	1.4	355	1.1
28	110	20	27	1.6	396	1.3
29	84	8	24	2.4	444	1.3
30	79	4	18	2.4	426	1.1
31	109	10	8	1.7	119	0.7
32	77	7	8	2.1	140	0.9
33	92	8	9	2.2	135	1.0
34	76	8	9	2.0	216	0.9
35	78	9	19	2.3	436	1.0
36	102	17	27	2.2	404	1.2
37	95	17	26	2.5	458	1.3
38	116	19	29	2.0	404	1.2

89BA33 2nd TOP Diagnostic N and P

Treatment	29/8 N%	29/8 NO ³ ppm	29/8 P%	29/8 kg N/ha	29/8 kg P/ha	28/9 kg N/ha	28/9 kg P/ha
1	4.40	520	0.45	12.4	1.27	16	1.83
2	2.87	291	0.34	8.0	0.94	8	1.30
3	5.22	1366	0.45	5.3	0.46	14	1.44
4	3.93	548	0.48	5.8	0.71	11	1.44
5	4.41	1079	0.49	4.4	0.43	8	1.00
6	4.21	596	0.43	8.5	0.87	14	1.62
7	2.78	408	0.38	2.5	0.34	3	0.59
8	3.85	433	0.37	12.1	1.16	15	1.70
7+	4.44	1049	0.32	12.5	0.90	16	1.55

89BA32. Crop nitrogen parameters

	Nitrogen %			Grain	Nitrogen uptake k N/ha			Grain	NHI
	3/8	29/8	28/9		3/8	29/8	28/9		
1	3.43	1.98	0.94		2	3	3		
2	4.20	1.31	0.69		11	9	11		
3	5.10	1.84	1.00		20	22	21		
4	6.09	2.61	1.38		20	36	28		
5	6.57	3.55	1.79		14	32	34		
6	5.82	2.11	0.99		11	18	17		
7	6.27	2.83	1.23		9	24	22		
8	6.80	3.56	1.68		10	33	33		
9	6.72	4.52	2.10		7	41	32		
10	-	3.87	1.28		-	9	11		
11	-	4.69	1.63		-	11	20		
12	-	5.44	2.13		-	17	26		
13	-	5.22	2.20		-	18	23		
14	5.95	2.35	1.23		18	32	28		
15	6.19	2.96	1.35		20	42	28		
16	6.35	3.30	1.79		21	42	46		
17	6.57	4.07	2.08		19	50	37		
18	-	2.35	1.13		-	28	23		
19	-	3.10	1.41		-	37	29		
20	-	3.37	1.76		-	43	34		
21	-	3.55	1.96		-	45	40		
22	4.64	1.52	1.02		22	19	21		
23	6.09	2.00	1.15		10	20	23		
24	-	4.88	1.87		-	14	23		
25	5.56	2.29	0.98		19	27	22		

89BA32. Crop nitrogen parameters

	N%		Grain	N uptake		Grain	NHI
	29/8	28/9		29/8	28/9		
26	3.09	1.33		3	3		
27	3.88	1.17		15	13		
28	4.8	1.58		20	20		
29	5.69	2.06		27	26		
30	6.01	2.48		27	28		
31	5.36	1.60		7	12		
32	6.04	2.01		9	17		
33	6.37	2.47		9	25		
34	6.31	2.66		14	25		
35	5.53	1.99		27	21		
36	5.64	1.97		24	24		
37	5.87	2.31		30	29		
38	5.66	2.52		24	30		

89BA32 Tiller Analysis

About 20 plants per replicate for each of four replicates were described. The results are expressed per hundred plants. There were on average, about one hundred plants per metre squared.

Treatment kg N/ha					% Occurrence 8WAS						% Occurrence 12 WAS						Head
AS	4WAS	8WAS	Source		T ₁	T ₂	T ₃	T ₄	HO	SUM	T ₁	T ₂	T ₃	T ₄	HO	SUM	M ₂
1	0	0	0	Urea	11	15	9	0	0	35	2	15	12	0	4	33	99
3	64	0	0	Urea	69	91	70	14	37	281	68	77	64	12	52	274	140
4	128	0	0	Urea	71	88	76	33	87	355	57	88	75	41	50	316	163
7	0	64	0	Urea	36	86	78	10	19	229	45	96	84	44	52	323	161
8	0	128	0	Urea	38	91	82	20	18	249	37	85	90	54	45	308	170
11	0	0	64	Urea	-	-	-	-	-	-	20	48	75	151	22	318	205
12	0	0	128	Urea	-	-	-	-	-	-	29	65	92	132	29	374	202
15	64	64	0	Urea	72	91	79	15	53	310	66	91	73	34	63	325	174
19	64	0	64	Urea	-	-	-	-	-	-	62	84	89	33	44	326	154
22	64	0	0	NO ₃	84	89	59	10	53	295	74	86	74	2	23	242	159
23	0	64	0	NO ₃	66	98	74	11	44	293	66	94	96	50	97	404	187
24	0	0	64	NO ₃	-	-	-	-	-	-	22	78	96	167	44	406	223
25	64	0	0	NH ₄	67	91	70	15	47	290	71	79	61	12	22	245	146

Late time of sowing - Canna Wheat

26	0	0	0		5	6	1	0	0	12	0	0	0	0	0	0	94
29	128	0	0	Urea	79	88	58	2	14	241	63	86	57	9	24	239	129
33	0	128	0	Urea	81	90	41	1	5	218	84	90	67	4	9	254	142
36	64	64	0	Urea	80	91	32	0	14	217	70	63	24	3	2	162	159

- Notes 1. Urea c.f. nitrate: (a) At seeding, nitrate allowed more early tillers (1,2 and 3) but higher order tillers either did not occur or disappeared at the later sampling due to N deficiency as NO₃ was lost. (b) Better T₄ numbers with nitrate allowed great HO tillers with 4WAS applications (HO = Higher Order). (c) Better T₂ and T₃ numbers with nitrate at 8WAS allowed the development of higher order tillers.
2. Urea at seeding and ammonium at seeding gave very similar results.
3. Final head numbers suggest HO tillers survived. However grains/hd were low in such treatments.

Tiller survival prediction*(12WAS)							
T	> ½ms	½-¼	< ¼	SUM	Mature tillers/M ₂	Heads/M ₂	Grain/head

Early time of planting (sampled 29/8/89)

1	3	3	23	29	0	99	9
3	44	41	158	243	0	140	20
4	35	81	190	306	60	163	22
7	102	60	154	316	58	161	19
8	42	78	164	284	67	170	19
11	6	32	244	282	125	205	10
12	3	3	328	334	92	202	12
15	51	80	205	336	-	174	21
19	86	86	111	283	-	154	21
22	36	72	115	223	15	159	21
23	66	56	234	356	87	187	18
24	24	19	302	445	119	223	10
25	63	51	107	227	29	146	23

Late time of planting - (sampled 29/9/89)

26	0	0	0	0	0	94	9
29	20	54	166	240	45	129	21
33	20	52	180	252	50	142	18
36	11	18	132	161	57	159	18

* Tillers/100 plants scored in three size categories relative to the main stem.
 Mature tillers/M² is given by (heads/M²-plants/M²) at maturity.