1989

Interaction of season with wheat response to nitrogen fertilizer.

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INTERACTION OF SEASON WITH WHEAT RESPONSE TO NITROGEN FERTILIZER

Trial: 89M3.

Location: Paddock T7 Merredin Research Station.

Soil Type: Yellow loamy sand over mottled clay and gravel at varying depth.

	0-15 cm	15-30 cm	30-45 cm
pH ($CaCl_2$)	4.2	3.9	3.9
Clay %	13.5	18.5	20.5
Organic C %	0.77	0.35	0.18
Total N %	0.046	0.023	0.016
NH_4 N ppm	3	1	1
NO_3 N ppm	6	2	1

History: 1988 pasture.

Seasonal: Sown on 30/5/89. Gutha Wheat at 50 kg/ha Madiera Serradella at 15 kg/ha. Basal superphosphate at 200 kg/ha plus Molybdenum drilled with the seed and 100 kg/ha Muriate of Potash topdressed. At seeding (A.S) nitrogen treatments topdressed by hand on 1/6/89 and 4 weeks after (4WAS) treatments applied on 29/6/89. Supplementary water applied:

Date	28/6	13/7	27/7	9/8	24/8	7/9	20/9	4/10	19/10	2/11
Water (mm)	16	19	18	18	20	20	20	20	20	20

i.e. TR. OO - nil water applied
O+ - 100 mm water applied
+O - 91 mm water applied
++ - 191 mm water applied

Rainfall: date/mm

January		February		March		April		May		June	
6	1.2	15	0.6	31	1.6	7	3.4	1	11.0	7	2.4
12	17.0	23	0.2			10	1.0	16	6.5	8	1.2
25	1.2	25	5.0			14	0.6	17	2.8	12	4.2
		26	8.8			19	1.2	20	8.4	13	2.2
						20	1.0	23	7.0	14	44.8
						24	28.2	24	12.4	15	1.2
								26	7.6	16	0.6
								28	2.0	29	3.4
								31	3.8	30	3.2

July		August		September		October		November	
1	0.9	3	3.0	7	0.9	2	2.2	14	Trace
2	1.6	18	5.5	8	0.3	7	0.8		
8	1.6	30	7.8	15	0.8	18	2.4		
14	14.0			18	2.3	22	0.6		
20	2.2			21	0.8	25	1.4		
21	4.2			23	1.0				
23	3.2								
25	1.8								
27	0.4								
28	7.6								

89M3. Early observations

	Treatment Kg N/ha	Source	Time	27/7/89 Rating	Per plant Tillers	Wt mgm	N%	N uptake	25/8/89 Kg/ha	N%	N uptake
	Nil			10	1.0	128	4.70	8	709	2.21	16
	35	Urea	AS	24	1.6	213	5.02	14	1,268	1.95	24
00	69	Urea	AS	31	1.9	302	5.25	21	1,639	1.79	29
	138	Urea	AS	40	2.1	343	5.62	26	1,774	2.04	36
	35	Urea	4WAS	23	1.8	195	5.26	14	1,221	1.96	24
	33	NO_3	AS	25	2.0	260	5.16	18	1,404	2.17	31
	33	NO_3	4WAS	24	2.0	240	5.55	18	1,379	2.05	28
	Nil			12	1.1	143	4.75	9	751	1.84	14
	35	Urea	AS	28	1.7	253	4.90	17	1,337	1.86	25
+0	69	Urea	AS	38	1.9	293	5.18	20	1,667	1.94	32
	138	Urea	AS	44	2.2	358	5.35	26	1,900	2.15	40
	35	Urea	4WAS	25	1.7	203	5.40	15	1,201	2.00	24
	33	NO_3	AS	23	1.6	220	3.97	12	1,250	2.06	26
	33	NO_3	4WAS	29	2.0	223	5.43	16	1,201	2.19	31

89M3. Anthesis results 20/9/89

Treatments			BY t/ha				N%				N uptake kg/ha			
kgN /ha	Source	Time	00	0+	+0	++	00	0+	+0	++	00	0+	+0	++
Nil	Urea	AS	2.1	2.1	2.3	2.5	0.98	0.97	0.93	0.95	20	20	20	24
12	Urea	AS	2.2	2.7	2.8	2.3	0.92	0.87	0.88	0.99	20	24	25	23
23	Urea	AS	2.8	2.8	3.2	2.8	0.89	0.88	0.94	0.91	25	25	30	26
35	Urea	AS	3.0	3.2	3.4	3.4	0.88	0.92	0.88	0.92	27	29	30	33
46	Urea	AS	2.8	3.4	4.1	4.5	0.96	0.97	0.91	1.02	27	33	38	47
69	Urea	AS	3.5	3.2	4.5	4.6	0.93	0.92	1.03	0.98	32	29	47	45
138	Urea	4WAS	3.5	3.3	4.8	4.9	0.95	1.03	0.93	1.02	33	34	45	50
23	Urea	4WAS	2.5	2.7	3.7	2.7	0.91	1.00	0.90	0.92	23	27	33	25
35	Urea	4WAS	2.8	2.8	3.9	3.3	0.89	0.93	0.93	0.96	25	26	36	32
23	Urea	½AS ½4WAS	3.1	2.8	4.2	2.7	0.89	0.99	0.86	0.92	27	28	36	25
33	NO_3	AS	3.3	3.8	4.5	3.1	0.89	1.02	1.02	0.99	29	39	45	30
33	NO_3	4WAS	2.8	3.1	4.1	3.7	0.87	1.02	0.92	1.10	25	31	38	41

89M3. Results - final harvest

Kg N/ha	Source	Time	TGW 00	TGW 0+	TGW +0	TGW ++	GPH 00	GPH 0+	GPH +0	GPH ++
Nil			37	43	39	43	25	28	27	26
12	Urea	AS	38	43	39	43	27	27	30	27
23	Urea	AS	37	44	39	42	25	27	29	30
35	Urea	AS	36	44	38	43	28	29	32	31
46	Urea	AS	37	44	38	43	29	30	31	31
69	Urea	AS	38	44	37	43	27	29	31	33
138	Urea	AS	38	44	36	43	26	30	31	32
23	Urea	4WAS	37	45	38	43	26	29	33	29
35	Urea	4WAS	37	44	38	44	29	28	37	30
23	½ AS	½ 4WAS	35	43	38	43	29	27	31	26
33	NO_3	AS	37	44	37	44	28	29	32	27
33	NO_3	4WAS	37	43	38	44	29	30	31	32

Kg N/ha	Source	Time	Heads/m^2 00	Heads/m^2 0+	Heads/m^2 +0	Heads/m^2 ++	Grains/m^2 00	Grains/m^2 0+	Grains/m^2 +0	Grains/m^2 ++
NIL			146	160	169	180	3,601	4,321	4,589	4,690
12	Urea	AS	149	155	179	178	4,014	4,148	5,407	4,807
23	Urea	AS	183	152	195	179	4,491	4,075	5,745	5,347
35	Urea	AS	170	164	176	174	4,754	4,698	5,585	5,486
46	Urea	AS	141	183	200	175	4,107	5,461	6,270	5,459
69	Urea	AS	174	172	212	208	4,744	4,967	6,536	6,867
138	Urea	AS	177	188	209	243	4,600	5,713	6,443	7,811
23	Urea	4WAS	149	179	172	175	3,895	5,174	5,655	5,052
35	Urea		157	170	210	190	4,543	4,715	6,573	5,677
23	Urea ½AS	½ 4WAS	184	168	198	170	5,272	4,590	6,094	4,467
33	NO_3	AS	185	179	199	198	5,226	5,186	6,478	5,424
33	NO_3	4WAS	139	171	206	192	4,065	5,080	6,438	6,216

89M3. Results - final harvest

Kg N/ha	Source	Time	BY t/ha				GY t/ha				HI%			
			00	0+	+0	++	00	0+	+0	++	00	0+	+0	++
Nil	Urea	AS	2.9	4.0	4.1	4.3	1.3	1.9	1.8	2.0	47	46	43	46
12	Urea	AS	3.4	3.9	4.9	4.4	1.5	1.8	2.1	2.1	45	46	43	47
23	Urea	AS	4.0	4.0	5.3	5.1	1.7	1.8	2.2	2.3	42	45	42	44
35	Urea	AS	3.9	4.5	5.0	5.4	1.7	2.0	2.1	2.4	43	45	43	44
46	Urea	AS	3.5	5.3	5.7	5.6	1.5	2.4	2.3	2.3	43	45	41	42
69	Urea	AS	4.2	4.8	6.0	7.0	1.8	2.0	2.4	3.0	42	45	40	42
138	Urea	AS	4.1	5.6	5.7	7.7	1.8	2.5	2.3	3.4	43	45	40	43
23	Urea	4WAS	3.4	5.0	5.2	4.9	1.4	2.3	2.2	2.2	43	46	42	45
35	Urea	4WAS	3.9	4.5	5.9	5.6	1.7	1.9	2.5	2.5	44	46	42	44
23	Urea ½AS	½ 4WAS	4.4	4.4	5.6	4.2	1.8	2.0	2.3	1.9	42	45	41	45
33	NO_3	AS	4.6	5.4	5.7	5.2	1.9	2.3	2.4	2.4	42	43	42	46
33	NO_3	4WAS	3.5	5.1	5.9	6.3	1.5	2.2	2.4	2.7	42	43	41	43

Kg N/ha			Grain N%				Grain N uptake			
			00	0+	+0	++	00	0+	+0	++
Nil	Urea	AS								
12	Urea	AS								
23	Urea	AS								
35	Urea	AS								
46	Urea	AS								
69	Urea	AS								
138	Urea	AS								
23	Urea	4WAS								
35	Urea	4WAS								
23	Urea ½ AS	½ 4WAS								
33	NO_3	AS								
33	NO_3	4WAS								

Results - Serradella

		Kg/ha			
		00	0+	+0	++
19/10	TDM	1,328	2,437	1,744	3,108
3/11	TDM	1,119	2,085	1,489	3,264
20/11	POD WT	904	1,552	1,069	1,987

PASTURE DETERIORATION TRIAL

Trial no.: 89NA61

Location: A. Cleland, West Dale

Soil: Gravelly sandy loam. Red gum, white gum, bicarbonate phosphorus 50 ppm

History: Long term pasture dominated by non-productive "suffocating clover"

Seasonal: Initial problems with the drill meant that the original trial was abandoned, selected plots were sprayed with spray seed (to remove prolific capeweed) and resown with Karridale and Woogenellup sub.clover. Cross strps were reapplied. Only the sprayed and resown main plots were assess on September 14, 1989. The sown clover did not contribute signficantly because the existing pasture legumes survived the spray seed and dominated the sward. It looked as though the suffocating clover dominated the unresponsive treatments while the background sub.clover (Dwalganup) seemed to respond to Nemacur, Super+trace elements and super+manganese. The site was grazed once (by mistake) early but then left to go to seed. Total pasture growth probably never exceeded (2 t/ha) in a regime and season when it should have produced at least 4 t/ha.

The nemacur response was interesting. No evidence of nematodes was found. Perhaps nemacur acted as an insecticide and killed red legged earth mite. (The RLEM treatment was not applied). The response to super was remarkable at the high levels of soil phosphorus. Perhaps we were getting a response to the zinc contamination of the super. Nemacur contains phosphorus which was applied at about 5 kg P/ha. It also contains about the same percentage sulphur. The domance of the tiny suffocating clover plants in the grazed sward and where capeweed was removed suggests that they better survive grazing pressure and are then able to dominate the sward late in the year but produce very little dry matter of value as dry summer feed. The above is all speculation as this trial was poorly run by us.

A new trial will be run in 1990 repeating the responsive treatments and trying to get a phosphate response curve.

Results of ratings (2 observers x 12 replicates) take on:

Treatment	Level	Dry matter t/ha
1. Rotary hoe	-	1.19 abc
2. Topdressed lime	2 t/ha	1.10 c
3. Drilled lime	2 t/ha	1.15 bc
4. Gypsum	200 kg/ha	1.04 c
5. Nemacur	44 kg/ha	1.38 ab
6. Ammonium nitrate	150 kg/ha	1.13 c
7. Super Cu, Zn, Mo	500 kg/ha	1.41 a
8. Nil		1.10 c
9. Super manganese		1.38 ab
LSD (P < 0.05)		0.25

Note: Treatment with same letter are not signficantly different from each other.

1989 SUMMARY OF RESULTS
EFFECT OF CLOVER GROWTH ON NITROGEN FOR FOLLOWING CEREALS

Trial: 88NA88

Location: Walton, Yealering

Soil type: Sheoak and wandoo

0.35 cm gritty grey loamy sand.
30-35 cm gravelly grey, loamy sand.
Beyond 35 cm, orange/grey mottled laterite sandy gravel loam.

History: Clover dominant pasture 1986.
Cereal 1987 (soil K 30 ppm pH 5.1).
Super x KCl on pasture trial in 1988 (see 1988 results summary).

Seasonal: Sown to oats and rates of N as ? on ?

Yield of oats t/ha

1989 kg N/ha	1988 treatment of clover Nil	Super 150	Super 150 KCl 50	Super 300 KCl 100
Nil	2.46	2.54	2.67	2.74
20	3.02	2.95	3.00	3.22
40	3.23	3.47	3.14	3.25
60	3.29	3.16	3.45	3.57
120	3.49	3.57	3.39	3.51

LSD ($P < 0.05$) = 0.383 t/ha.

There is some correlation in yields at zero nitrogen with the 1988 pasture yields.

(t/ha)

1988	Nil	Super 150	Super 140 KCl 50	Super 300 KCl 100
Pasture total	3.6	3.7	5.1	5.3
Residue	3.0	3.0	3.9	3.9