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DEPARTMENT OF AGRICULTURE

STUDIES ON THE EFFECTS OF NUTRITION AND TILLAGE SYSTEMS
ON CEREAL ROOT DISEASES

EXPERIMENTAL RESULTS 1985

R.F. Brennan
Research Officer
Plant Research Division
Esperance

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1. MICRONUTRIENTS (Cu, Zn) AND TAKE-ALL

83ES39

AIM: To study the nutritional and fungicidal effects of copper and zinc on take-all in wheat.

SOIL: Grey sand, Neridup, W. Mincherton

SOWN: 13/6/85 Cranbrook at 60 kg/ha

BASALS: P = 20.0 kg/ha
N = 18.0 kg/ha at seeding
N = 25 kg/ha, 4 weeks after seeding (urea)

HARVEST: 3/12/85

Table 1 Plant per metre of row at 2 1/2 leaf stage (12.7.85)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	24.4	23.6			
(kg/ha)	5	24.2	24.5	26.0	24.8	25.2
drilled	10		20.4			
	15		25.2			
	20		26.2			

Table 2 Dry matter production (kg/ha) at Anthesis (Zadoks 62) 10.10.85

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	706	597			
(kg/ha)	5	802	1019	975	986	1043
drilled	10		1043			
	15		993			
	20		1137			

Table 3 Grain weights (g/1000 seeds)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	23.11	24.91			
(kg/ha)	5	25.40	25.39	26.12	26.56	26.15
drilled	10		26.63			
	15		26.90			
	20		26.36			

Table 4 Grain Yield (kg/ha)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	441	373			
(kg/ha)	5	501	636	611	616	651
drilled	10		651			
	15		620			
	20		710			

N.B. Trace elements applied in 1983.

2. MICRONUTRIENTS (Cu, Zn) AND TAKE-ALL

83ES40

AIM: To study the nutritional and fungicidal effects of copper and zinc on take-all in wheat.

SOIL: Brown loamy sand, G. Tyrell, Mt Ridley

SOWN: 14/6/85, Cranbrook at 60 kg/ha

BASALS: P = 23 kg/ha
Mo = 75 g/ha
N = 21.6 kg/ha
24.0 kg/ha T.D.

HARVEST: 17/12/85

Table 5 Plants per metre of Row at 4 1/2 leaf stage (24.7.85)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	21.0	18.6			
(kg/ha)	5	20.6	19.0	20.2	19.8	18.4
drilled	10		20.2			
	15		19.2			
	20		18.8			

Table 6 Dry matter production (t/ha) at Anthesis (Z67) 15.10.85

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	3.38	3.38			
(kg/ha)	5	3.44	3.38	3.52	3.41	3.32
drilled	10		3.31			
	15		3.37			
	20		3.36			

Table 7 Grain Weight (grams/1000 seeds)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	37.99	38.20			
(kg/ha)	5	38.83	38.67	38.76	39.20	38.32
drilled	10		38.61			
	15		37.95			
	20		37.95			

Table 8 Grain yield (t/ha)

		ZnO (kg/ha) drilled				
		0	2	4	8	16
CuSo ₄	0	1.51	1.52			
(kg/ha)	5	1.52	1.53	1.50	1.52	1.51
drilled	10		1.53			
	15		1.55			
	20		1.53			

AIM: To determine the effects of rates of nitrogen and phosphorus on the build up of take-all in a virgin soil.

SOIL: Grey sand/gravel, High school block

SOWN: 14/6/85, Cranbrook at 60 kg/ha

BASALS: CuSO₄ (6.0 kg/ha))
 ZnO (2 kg/ha)) Basal 1983
 Mo (80 g/ha))

HARVEST: 18/12/85

Table 9 Plants per metre of row at 2nd leaf stage (Mean 10 m counts)
 10.7.85

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	20.6	25.2	25.2	26.0
50	25.0	21.6	24.8	24.8
100	25.8	24.0	27.0	25.4
150	25.6	24.8	24.8	24.2
200	23.6	21.0	24.6	24.8

Table 10 Dry matter production at Anthesis (kg/ha) (Z71 - 17.10.85)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	205	257	341	384
50	432	624	749	889
100	410	651	897	1162
150	465	870	1072	1276
200	508	1031	1276	1458

Table 11 Grain Weights (grams/1000 seeds)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	-	-	-	-
50	20.94	22.74	22.72	24.66
100	21.93	23.19	24.49	25.70
150	21.40	23.49	23.22	24.93
200	26.12	23.88	23.68	26.32

Table 12 Grain Yield (kg/ha)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	NH	NH	NH	NH
50	170	340	400	480
100	360	460	540	600
150	440	574	620	740
200	520	620	693	827

Nitrogen T.D. 8/7/85

NH Not harvested

- NB:
1. Root samples at anthesis for take-all assessment have not been completed.
 2. Plants sampled for nutrient status during the growing season.
 3. Plants sampled for nutrient uptake. Chemical analysis of plant samples are as yet not complete.
 4. Soil sampled, site and specific treatments. No data as yet is available.
 5. All data the means of 3 replicates.

4. NITROGEN AND PHOSPHORUS RATES AND TAKE-ALL

83ES42

AIM: To determine the effects of rates of nitrogen and phosphorus on the build up of take-all in a virgin soil.

SOIL: Grey sand/gravel/clay, J. Lay

SOWN: 14/6/85, Cranbrook at 60 kg/ha

BASALS: CuSO₄ at 6.0 kg/ha)
 ZnO (2 kg/ha)) Basal 1983
 Mo (80 g/ha))

HARVEST: 18/12/85

Table 13 Plant per metre of row at 1 1/2 leaf stage (12/7/85)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	21.6	22.8	22.4	21.8
50	21.8	22.4	21.6	22.6
100	22.0	22.0	21.6	22.0
150	23.2	22.8	23.2	22.2
200	23.4	23.0	23.4	23.0

Table 14 Dry matter yield (kg/ha) at Anthesis (Z69; 18/10/85)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	230	270	310	300
50	880	1180	1240	1520
100	920	1400	1710	1910
150	940	1420	1880	2100
200	950	1430	1770	2200

Table 15 Grain Weights (grams/1000 seeds)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	-	-	-	-
50	32.07	30.52	31.43	32.32
100	33.23	31.67	30.60	32.13
150	34.90	32.80	30.64	32.38
200	33.01	32.85	31.57	33.89

Table 16 Grain yield (kg/ha)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	-	-	-	-
50	190	369	411	484
100	187	388	488	720
150	190	388	530	811
200	210	442	552	823

Nitrogen T.D. 8/7/85 at 1 1/2 leaf stage

AIM: To determine the effects of rates of nitrogen and phosphorus on the build up of take-all in a virgin soil.

SOIL: Brown loamy sand, G. Tyrell, Mt Ridley

SOWN: 14/6/85, Cranbrook at 60 kg/ha

BASALS: CuSO₄ at 6.0 kg/ha)
 ZnO (2 kg/ha)) Basal in 1983
 Mo (80 g/ha))

HARVEST: 17/12/85

Table 17 Plants per metre of row at 4th leaf stage (24/7/85)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	20.2	19.8	22.2	22.2
50	21.6	20.6	20.4	22.6
100	20.0	20.6	22.4	20.6
150	21.8	21.4	20.4	21.2
200	20.2	21.2	20.2	22.2

Table 18 Dry matter production (kg/ha) at Anthesis (Z65; 15/10/85)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	550	670	720	950
50	1460	2110	2830	3180
100	1640	2470	3450	4000
150	1660	2810	3840	4490
200	1790	2940	4020	4720

Table 19 Grain weights (grams/1000 seeds)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	-	-	-	-
50	36.09	34.97	36.65	36.15
100	36.32	36.29	36.78	36.86
150	38.74	37.66	36.85	36.93
200	36.39	36.98	39.19	38.24

Table 20 Grain yield (kg/ha)

Super drilled (kg/ha)	Rates of urea T.D. (kg/ha)			
	0	20	40	80
0	*NH	NH	NH	NH
50	629	720	846	994
100	720	834	1029	1211
150	777	926	1086	1280
200	786	949	1120	1314

*NH Not harvested

N.B. Nitrogen topdressed at seeding.

6. SPLIT APPLICATIONS OF NITROGEN AND TAKE-ALL

84N1

AIM: To determine whether a split application of nitrogen applied four weeks after sowing can improve the effectiveness of take-all control by ammonium nitrogen.

SOIL: Yellow brown gravelly sand, Newdegate Research Station

SOWN: 22/6/85, Wheat at 50 kg/ha

BASALS: P = 28 kg/ha drilled
N = at seeding (25 kg/ha) TRS 4-15

HARVEST: 6/12/85

Table 21 Plants per metre of row at 3 leaf stage (8/8/85)

Fertilizer drilled	Nil	Nitrogen TD (kg/ha)	
		Urea (33)	Am. Sulphate* (71)
Super	18.2	16.6	17.0
18:5	17.6	17.0	18.0
D.A.P.	18.0	17.0	18.8
Agras No. 1	18.8	17.0	18.0
Am. sulphate	18.6	17.4	17.0

Table 22 Dry matter production (t/ha) at Anthesis (Z67; 24/10/85)

Fertilizer drilled	Nil	Nitrogen TD (kg/ha)	
		Urea (33)	Am. Sulphate* (71)
Super	2.28	2.45	2.79
18:5	3.02	2.87	3.17
D.A.P.	2.89	2.97	3.47
Agras No. 1	3.01	2.99	3.55
Am. sulphate	3.24	3.46	3.40

Table 23 Grain yield (grams/1000 seeds)

Fertilizer drilled	Nil	Nitrogen TD (kg/ha)	
		Urea (33)	Am. Sulphate* (71)
Super	39.14	37.67	38.97
18:5	39.05	39.08	36.58
D.A.P.	38.84	39.86	35.88
Agras No. 1	39.10	34.58	37.18
Am. sulphate	36.44	37.64	36.53

Table 24 Grain yield (kg/ha)

Fertilizer drilled	Nitrogen TD (kg/ha)		
	Nil	Urea (33)	Am. Sulphate* (71)
Super	1124	1339	1257
18:5	1201	1292	1311
D.A.P.	1395	1302	1358
Agras No. 1	1292	1227	1332
Am. sulphate	1152	1227	1245

* Ammonium Sulphate granulated
Nitrogen topdressed four weeks after sowing

- NB:
1. Roots sampled at anthesis for take-all assessment have not been completed.
 2. Nutrient status and uptakes unavailable at this time as are soil analyses.
 3. All data the mean of 3 replicates.

7. TAKE-ALL AND MANGANESE/AMMONIUM INTERACTION

84E1

AIM: To test the hypothesis that the control of take-all by NH_4^+ form of N is actually an effect on plant health stimulated by the removal of marginal manganese deficiency rather than any direct effect on take-all per se.

SOIL: Grey sand/gravel, EDRS

SOWN: 25/6/85, Wheat at 45 kg/ha

BASALS: P = 30 kg/ha TD

HARVESTED: 20/12/85

Table 25 Plants per metre of row at 2 leaf stage (16/8/85)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	19.6	19.0	17.4	17.8	20.2
Sodium Nitrate T.D.	18.6	18.8	18.2	18.4	18.6
Am. Sulphate T.D.	17.4	18.4	17.6	17.0	20.0
Am. Sulphate drilled	17.2	18.6	18.4	17.2	19.4
Am. Chloride drilled	18.2	19.6	18.6	19.6	18.8

Table 26 Dry matter production at Anthesis (t/ha) (Z69; 13/11/85)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	3.28	4.03	3.79	4.24	3.91
Sodium Nitrate T.D.	5.31	5.49	5.47	5.44	5.44
Am. Sulphate T.D.	5.69	5.34	5.64	5.76	6.03
Am. Sulphate drilled	5.74	5.90	5.91	5.99	6.11
Am. Chloride drilled	5.48	6.19	6.71	6.53	5.96

Table 27 Grain weights (grams/1000 seeds)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	43.06	42.16	40.91	44.93	42.86
Sodium Nitrate T.D.	37.58	42.07	39.05	40.55	38.02
Am. Sulphate T.D.	40.96	39.18	39.88	40.79	42.24
Am. Sulphate drilled	39.21	37.44	39.55	39.73	38.59
Am. Chloride drilled	39.50	39.94	40.80	38.65	38.07

Table 28 Grain yields (kg/ha)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	1375	1696	1625	1875	1727
Sodium Nitrate T.D.	2184	2173	2202	2179	2268
Am. Sulphate T.D.	2316	2398	2530	2459	2720
Am. Sulphate drilled	2577	2548	2750	2834	2857
Am. Chloride drilled	2434	2813	2702	2518	2571

AIM: To determine whether a split application of nitrogen applied four weeks after sowing can improve the effectiveness of take-all control by ammonium nitrogen.

SOIL: Grey sand/gravel, EDRS

SOWN: 20/6/85, Wheat at 50 kg/ha

BASALS: P = at 28 kg/ha drilled
N = at seeding (25 kg/ha) TRS 4-15

HARVEST: 20/12/85

Table 29 Plant per metre of row at 1 1/2 leaf stage (16/8/85)

Fertilizer drilled	Nitrogen TD (kg/ha)		
	Nil	Urea (33)	Am. sulphate* (71)
Super	18.2	19.8	18.2
18:5	18.6	19.2	19.0
D.A.P.	19.0	18.4	17.2
Agras No. 1	19.0	22.0	19.6
Am. Sulphate	17.4	18.4	19.4

Table 30 Dry matter production (kg/ha) at Anthesis (Z69)

Fertilizer drilled	Nitrogen TD (kg/ha)		
	Nil	Urea (33)	Am. sulphate* (71)
Super	2541	3523	3578
18:5	3844	4322	4588
D.A.P.	4261	4868	5240
Agras No. 1	4456	4205	4435
Am. Sulphate	4117	4596	4596

Table 31 Grain yield (grams/1000 seeds)

Fertilizer drilled	Nitrogen TD (kg/ha)		
	Nil	Urea (33)	Am. sulphate* (71)
Super	41.50	40.10	38.98
18:5	39.50	38.48	39.66
D.A.P.	34.36	37.68	39.45
Agras No. 1	38.90	38.04	38.05
Am. Sulphate	38.86	38.95	39.57

Table 32 Grain Yield (kg/ha)

Fertilizer drilled	Nitrogen TD (kg/ha)		
	Nil	Urea (33)	Am. sulphate* (71)
Super	929	1244	1208
18:5	1643	1857	2006
D.A.P.	1464	1833	1707
Agras No. 1	1732	1935	1930
Am. Sulphate	1774	1856	1982

* Ammonium Sulphate granulated
Nitrogen topdressed four weeks after sowing

- NB:
1. Roots sampled at anthesis for take-all assessment have not been completed.
 2. Nutrient status and uptakes unavailable at this time as are soil analyses.
 3. All data the mean of 3 replicates.

9. Cu RESIDUAL ON WHEAT AND TAKE-ALL

67E9

AIM: To determine the residual effectiveness of previously applied copper and to measure the effect of copper applications on the build up of take-all.

SOIL: Grey sand/gravel, EDRS

SOWN: 20/7/85, Aroona 50 kg/ha

BASALS: P = 16 kg/ha
N = 40 kg/ha

HARVEST: 20/12/85

Table 33

Treatment	Plant/ MROW (16/8/85)	Dry matter (t/ha) (8/11/85)	1000 grain wt (grams)	Grain yield (kg/ha)
1 Nil Cu	19.6	4.40	33.01	819
2 CuSO ₄ (4.4 kg/ha in 1976)	19.0	4.80	39.64	1438
3 " (1.1 kg/ha in 1967)	19.6	5.20	37.17	1081
4 " (2.2 " ")	19.0	5.30	39.36	1362
5 " (4.4 " ")	19.8	4.95	38.72	1243
6 " (8.8 " ")	19.0	5.05	36.95	1343
7 " (4.4 " ")	18.0	5.58	38.16	1476
8 " (4.4 " ")	19.4	4.94	40.29	1400

NB: TR7 had extra CuSO₄ in 1968, 69, 70 at a rate of 275 g/ha
TR8 had extra CuSO₄ in 1968, 69, 71 at a rate of 550 g/ha

Comments:

1. Areas of Rhizoctonia patch damage in the trial. Grain yields corrected for areas completely wiped out by this root disease.
2. Nutrient status and uptake unavailable.

10. Cu RESIDUAL ON WHEAT AND TAKE-ALL

67E8

AIM: To determine the residual effectiveness of previously applied copper and to measure the effect of copper applications on the build up of take-all.

SOIL: Caitup gravelly sand, EDRS

SOWN: 20/7/85, Aroona at 50 kg/ha

BASALS: P = 16 kg/ha
N = 40 kg/ha

HARVEST: 20/12/85

Table 34

Treatment	Plant/ MROW 2 leaf	Dry matter (t/ha) (Z71, 7/11/85)	1000 grain wt (grams)	Grain yield (kg/ha)
1 Nil Cu	19.5	4.30	37.09	1297
2 CuSO ₄ (2.2 kg/ha)	20.0	4.69	39.25	1898
3 " (4.4 ")	18.4	4.49	38.65	2067
4 Nil Cu	18.6	3.89	38.16	1206
5 CuSO ₄ (1.1 ")	19.0	4.32	37.46	1579
6 " (2.2 ")	20.2	4.54	36.72	1795
7 " (4.4 ")	19.2	4.58	37.73	1989
8 " (8.8 ")	18.6	4.46	38.43	2167
9 ¹ " (2.2 ")	18.4	4.48	38.39	2014
10 ¹ " (4.4 ")	18.2	4.51	37.41	1873
11 ² " (2.2 ")	19.6	4.69	36.34	1957
12 ² " (4.4 ")	22.4	4.56	37.62	1983
13 ³ " (2.2 ")	19.6	4.58	37.76	2076
14 ³ " (4.4 ")	22.6	4.54	36.22	2035

NB: 1 Extra CuSO₄ (2.2), and CuSO₄ (4.4) in 1976
2 Extra CuSO₄ (130 g/ha) in 68, 69
3 Extra CuSO₄ (260 g/ha) in 68, 69

Comments:

1. Nutrient status and uptake unavailable.

AIM: To test the hypothesis that the control of take-all NH_4^+ form of N is actually an effect on plant health stimulated by the removal of marginal manganese deficiency rather than any direct effect on take-all per se.

SOIL: Yellow gravelly sandy loam, G. Cugley; S.W. Newdegate

SOWN: 26/6/85, Gutha at 40 kg/ha

BASALS: P = 30 kg/ha TD

HARVESTED: 9/12/85

Table 35 Plants/metre of row at 4 leaf stage (9/8/85)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	20.2	20.6	20.4	21.0	20.8
Sodium Nitrate T.D.	19.8	19.2	19.6	20.2	19.8
Am. Sulphate T.D.	19.6	20.6	19.6	21.0	20.0
Am. Sulphate drilled	20.1	19.8	20.0	19.0	20.6
Am. Chloride drilled	20.6	19.6	20.8	21.2	21.2

Table 36 Dry matter production (kg/ha) at Anthesis (Z66, 24/10/85)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	1295	1415	1418	1468	1542
Sodium Nitrate T.D.	1527	2041	2216	2287	2150
Am. Sulphate T.D.	2074	2222	2406	2406	2416
Am. Sulphate drilled	2425	2552	2586	2498	2503
Am. Chloride drilled	2304	2467	2311	2333	2656

Table 37 Grain weights (g/1000 seeds)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	33.81	36.65	36.82	36.51	36.40
Sodium Nitrate T.D.	32.38	34.30	34.78	35.00	35.35
Am. Sulphate T.D.	34.69	34.18	34.84	35.32	37.01
Am. Sulphate drilled	36.13	35.34	35.85	35.60	36.01
Am. Chloride drilled	34.41	34.28	35.00	35.01	36.27

Table 38 Grain Yields (kg/ha)

N Sources	Manganese sulphate (kg/ha)				
	0	25	50	100	200
Nil	691	735	747	759	778
Sodium Nitrate T.D.	784	944	1099	1084	1232
Am. Sulphate T.D.	988	1068	1195	1210	1241
Am. Sulphate drilled	1043	1210	1210	1129	1234
Am. Chloride drilled	1080	1185	1160	1241	1286

12. CULTIVATION DEPTHS AND TIMING EFFECT ON RHIZOCTONIA

84E24

AIM: To obtain information and recommendations on the minimum amount and timing of cultivation to control Rhizoctonia patch in the short and long term.

SOIL: Deep sand (25-50 cm) over gravel. Esperance Downs Research Station

SOWN: 24/6/85, Stirling at 45 kg/ha

BASALS: P = at 12 kg/ha drilled
N = at 27 kg/ha
N = at 27 kg/ha T.D. 4 weeks after seeding

HARVESTED: 18/12/85

Table 39 Effect of Cultivations and Timing on the plants per metre of row and the grain weights per 1000 grains

1984 TR	1985	Germination Plant/MROW)	Grain weights (g/1000 seeds)
1 DD/TDD	DD/TDD	15.7	36.03
2 DD/Comb	Agrow 20 cm	16.7	38.32
3 DD/Comb	DDC	16.7	38.17
4 DD/Mod Comb 3 cm 2 1/2 pts	DDC	15.3	38.10
5 DD/Mod Comb 3 cm 6 pt	DDC	17.2	36.25
6 DD/Mod Comb 10 cm 2 1/2 pts	DDC	16.8	35.75
7 DD/Mod Comb 10 cm t pt	DDC	16.5	37.59
8 Scarify 10 cm + Harrows 2WBS	Agrow 30 cm	16.7	39.35
9 TR8 + WB 5 cm IBS	DDC	16.7	36.40
10 Scarify 10 cm + HI WBS	Scarify + Harrows	15.9	35.90
11 Scarify 10 cm + HI IBS	DD/Mod/C 3/2 1/2"	16.5	37.60
12 Disc plough 2 WBS + HIBS	DD/Mod/C 3/6"	17.9	37.63
13 Agrowplow 10 cm 2 WBS	DDC	17.2	38.90
14 Agrowplow 20 cm 2 WBS	DDC	16.0	39.11
15 Agrowplow 30 cm 2 WBS	DDC	16.2	39.27
16 Agrowplow 30 cm 2 WBS	DDC	16.0	39.20
17 Agrowplow 30 cm 2 WBS + Scarify 10 cm	DDC	16.7	39.27

BS Before seeding

IBS Immediately before seeding

H Harrows

Table 40 Effect of cultivations and timing on the area affected by Rhizoctonia (m²/plot) and grain yield. Data is the mean of 5 replications

1984 TRS	1985	Rhizoctonia Patch (m ² /plot)	Grain Yield (kg/ha)
1 DD/TDD	DD/TDD	28.2	1736
2 DD/Comb	DDC	24.6	1795
3 DD/Comb	Agrow 30 cm	8.7	2746
4 DD/Mod Comb 3 cm 2 1/2 pts	DDC	22.9	1898
5 DD/Mod Comb 3 cm 6 pt	DDC	23.7	1622
6 DD/Mod Comb 10 cm 2 1/2 pts	DDC	21.2	2225
7 DD/Mod Comb 10 cm 6 pt	DDC	15.7	2236
8 Scarify 10 cm + Harrows 2WBS	Agrow 30	8.5	2591
9 IR8 + WB 5 cm IBS	DDC	23.8	1695
10 Scarify 10 cm + HI WBS	Scarify + Harrows	19.7	1771
11 Scarify 10 cm + HI IBS	DD/Mod/C 3/2 1/2"	17.6	2073
12 Disc plough 2 WBS + HIBS	DD/Mod/C 3/6"	12.9	1896
13 Agrowplow 10 cm 2 WBS	DDC	18.9	2260
14 Agrowplow 20 cm 2 WBS	DDC	16.7	2184
15 Agrowplow 30 cm 2 WBS	DDC	13.0	2289
16 Agrowplow 30 cm 2 WBS	DDC	14.2	2377
17 Agrowplow 30 cm + 2 WBS + Scarify 10 cm + HIBS	DDC	9.3	2452

BS Before seeding
 IBS Immediately before seeding
 H Harrows

Table 41

			Plant/M,row (Z22; 16/8/85)	Grain Yield kg/ha	Grain weights (g/1000)	
1	Sprayseed	5 weeks	before seeding	20.2	3336	41.38
2	"	4	"	20.8	3254	40.57
3	"	3	"	20.2	3511	39.55
4	"	2	"	21.4	3409	40.29
5	"	1	"	20.2	3578	39.75
6	Sprayseed	immediately before seeding		19.4	3369	40.58
7	Scarify	5 weeks	before seeding	19.0	3070	39.89
8	"	3	"	19.4	3441	42.15
9	"	1	"	19.0	3486	40.38

Table 42

				Dry matter production (kg/ha)	
				(Z22, 16/8/85)	(Z65, 8/10/85)
1	Sprayseed	5 weeks	BS	400	7079
2	"	4	"	428	7009
3	"	3	"	412	7140
4	"	2	"	449	6486
5	"	1	"	367	6729
6	"	IBS		304	7169
7	Scarify	5 weeks	BS	429	7792
8	"	3	"	412	7190
9	"	1	"	399	6927

BS Before seeding

IBS Immediately before seeding

14. EFFECT OF CULTIVATION DEPTHS AND MACHINES ON RHIZOCTONIA AND YIELD

AIM: To obtain information and recommendations on the minimum amount of cultivation to control Rhizoctonia

SOIL: Deep sand (50 cm) over gravel, Esperance Downs Research Station

HARVESTED: 18/12/85

Table 43

Treatments	Grain Yield (kg/ha)
1 DD Standard Combine	3118
2 DD Mod C-3 cm cult/seed - 2 1/2" points	3210
3 DD Mod C-3 cm cult/seed - 6" points	3420
4 DD Mod C-10 cm cult/seed - 2 1/2" points	3910
5 DD Mod C-10 cm cult/seed - 6" points	3547
6 Scarify IBS	3515
7 Agrowplow sweeps 10 cm	3752
8 Agrowplow 10 cm	3510
9 Agrowplow 20 cm	3822
10 Agrowplow 30 cm	4173
11 Agrowplow 30 cm + Scarify 10 cm IBS	3841

N.B. Little rhizoctonia in trial site. Only Rep 1 had the disease to a minor extent.