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General comments and comparative yields

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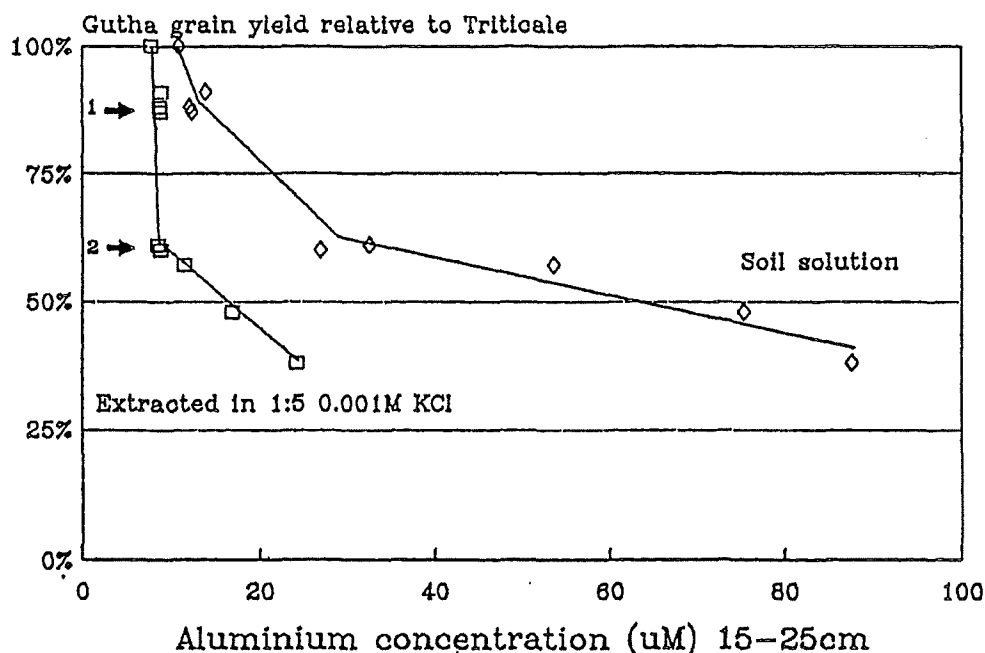
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Figure 1. Two measures of subsoil aluminium as indicators of the severity of subsoil acidity (gauged by comparing the yield of acid sensitive Gutha wheat to the tolerant Tyalla triticale).



Soil Solution Al vs 0.001M KCl Extractable Al

Measuring aluminium in surface soil samples can result in a number of problems, due mainly to the presence of organic matter which readily complexes with the aluminium present in the soil. Methods used are unable to distinguish between these Al complexes and as a consequence Al values are often extremely elevated and totally inaccurate.

The relationship between soil solution Al and 0.001M KCl extractable Al throughout the whole soil profile is rather poor. If however, the top 15 cm (0 - 5, 5 - 10, and 10 - 15 cm samples, where essentially all the organic matter is in these soil profiles) is excluded an extremely good relationship is observed (Figure 2). The equation of the plotted line is:

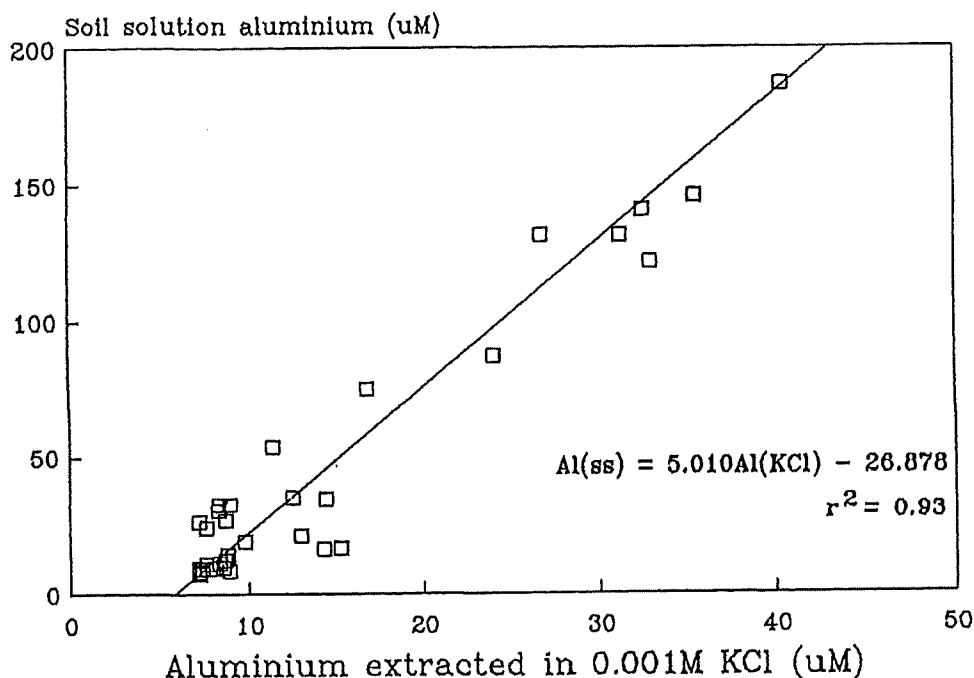
$$Al_{ss} = -26.878 + 5.010 Al_{KCl} \dots\dots\dots (r^2 = 0.934)$$

General Comments

87ME77 - One of the better sites in terms of productivity. This site was sown at two times, initially 4 reps were sown but as it was very dry the remaining 8 reps were sown after additional rain. This split seeding did not seem to adversely affect the trial

87ME78 - A poor site, towards the middle of the range of the ten sites sown. The very high basal N and P fertilizer applied

Figure 2. Relationship between soil solution aluminium and aluminium extracted in 1:5 0.001M KCl.



resulted in an extremely dense healthy crop of ryegrass that was difficult to control chemically. In addition to the soil factors responsible for the low productivity at this site, weed competition did little to help the cause of this crop.

87ME79 - One of the very poorest sites. An extremely acid subsoil incapable of producing an economic return. A large proportion of self sown triticale across the site has put some doubt on the yields observed. Kangaroos also did substantial damage to this site and therefore these results have been excluded from the analysis.

87ME80 and 87ME81 - Two trials located only 400m apart in the same paddock. 87ME80 was supposed to be on the poorer soil (as described by the farmer). Grain yields were very similar however the vegetative yield at anthesis at the good site (87ME81) was considerably greater than the poor site.

87ME82 - Sheep caused considerable damage early on hence the trial was not sampled for early vegetative yield. This problem was rectified and an anthesis yield was obtained, unfortunately sheep again damaged the trial prior to harvest and consequently grain yields were not obtained. Anthesis yields may be doubtful due to the early grazing.

87ME83 - A poor site that was plagued by wild oats and ryegrass. Recommended rates and chemicals failed to control these weeds at this site and this fact may have influenced the yields obtained.

87ME84 - One of the poorest soils. This site has an extremely acid subsoil and very high levels of aluminium in all depths studied. Previous work on this site have indicated economic

returns are unlikely.

87ME85 - An extremely good sandplain soil. No subsoil acidity problems consequently very little aluminium was detected in this soil. Crop yields here were quite good considering the late seeding of this site and the rainfall during the year.

87ME86 - A relatively new land site (2 - 3 years), in the middle of the range of sites studied this year. Unfortunately anthesis yield data has been lost.

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME77
 Location: Jim Lamberts, S. Burracoppin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 14/7/87 Brominil M 1 l/ha
 Seeding Date: 2/6/87 Reps 1,2,7 & 8, too dry
 8/6/87 Reps 3-6 & 9-12

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	7/7/87	5/8/87	22/9/87	
Millewa	80	105 (62)	2435 (97)	1289 (90)
Aroona	74	110 (65)	2317 (92)	1305 (91)
Gutha	66	123 (73)	2766 (110)	1428 (100)
Bodallin	70	82 (54)	2358 (84)	1317 (92)
1W-610	60	92 (54)	1946 (78)	1158 (81)
Murray	72	202 (120)	3060 (122)	1303 (91)
Tyalla	82	189 (100)	2511 (100)	1428 (100)
S.A.Comm	90	200 (119)	3528 (141)	1356 (95)
LSD(p<0.05)	9.2		502	236

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.8	4.3	4.2	4.2	4.3	4.2	4.2
pH KCl	5.5	4.9	4.7	4.6	4.6	4.6	4.6
pH w	5.8	5.2	5.1	4.8	4.7	4.5	4.4

Cations in
Soil Soln. (All units are uM)

Al	34	26	20	11	9	8	8
Ca	1614	1061	644	341	144	198	263
Mg	1337	642	299	124	62	80	209
Na	5587	3549	2292	1685	970	753	753

(ss - soil solution, KCl - 1:5 0.001M KCl, w - 1:5 water)
 NS - not sampled

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME78
 Location: Jim Lamberts, S. Burracoppin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 1/7/87 Glean at 20g/ha
 Seeding Date: 8/6/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	15/7/87	5/8/87	22/9/87	
Millewa	65	290 (108)	1186 (70)	787 (83)
Aroona	60	247 (92)	1157 (68)	557 (59)
Gutha	60	252 (94)	1260 (74)	577 (61)
Bodallin	62	200 (75)	1253 (74)	581 (92)
1W-610	51	223 (83)	921 (54)	491 (81)
Murray	69	346 (129)	1692 (99)	624 (91)
Tyalla	73	307 (100)	1701 (100)	943 (100)
S.A.Comm	84	385 (151)	1947 (114)	952 (95)
LSD(p<0.05)	6.7		260	156

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.5	4.3	4.2	4.1	4.0	4.1	4.1
pH KCl	4.9	4.8	4.6	4.5	4.4	4.4	4.4
pH w	5.4	5.1	4.8	4.7	4.6	4.5	4.5

Cations in Soil Soln.

Al	17	28	38	32	32	24	26
Ca	4515	3078	1491	884	609	312	545
Mg	3659	2235	1092	757	695	681	949
Na	11955	10091	6918	5790	7134	11383	15936

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME79
 Location: Graham Beek, S. Burracoppin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 14/7/87 Brominil M 1 l/ha
 Seeding Date: 26/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	7/7/87	5/8/87	15/9/87	
Millewa	65	166 (68)	504 (33)	376 (45)
Aroona	57	129 (53)	417 (27)	277 (33)
Gutha	59	137 (56)	486 (32)	314 (38)
Bodallin	63	160 (65)	537 (35)	361 (43)
1W-810	50	111 (45)	459 (30)	267 (32)
Murray	65	256 (104)	1002 (66)	131 (16)
Tyalla	67	245 (100)	1518 (100)	834 (100)
S.A.Comm	80	326 (133)	2207 (145)	915 (110)
LSD(p<0.05)	7.8		286	93

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.4	4.3	4.0	3.8	3.7	3.7	3.6
pH KCl	4.8	4.7	4.4	4.2	4.0	4.0	4.0
pH w	5.2	5.0	4.7	4.4	4.2	4.2	4.1

Cations in Soil Soln.

Al	26	17	38	88	131	146	122
Ca	702	555	472	362	388	305	266
Mg	359	354	274	213	219	177	245
Na	558	558	493	515	536	449	471

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME80
 Location: George Reynolds, S.Bodallin
 Basal Fertilizers: Super Cu Zn Mo Nol at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 1/7/87 Brominil M 1 l/ha
 Seeding Date: 26/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	15/7/87	5/8/87	15/9/87	
Millewa	61	209 (68)	2051 (97)	1672 (88)
Aroona	62	199 (65)	2005 (92)	1282 (68)
Gutha	58	232 (76)	2273 (110)	1665 (88)
Bodallin	54	224 (73)	1988 (94)	1725 (91)
1W-610	45	188 (61)	1841 (78)	1041 (55)
Murray	57	342 (111)	2869 (122)	1847 (98)
Tyalla	56	307 (100)	2738 (100)	1893 (100)
S.A.Comm	69	385 (125)	3393 (141)	1435 (76)
LSD(p<0.05)	13.0		402	178

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	5.8	4.1	4.0	3.9	3.9	4.0	3.8
pH KCl	6.0	5.0	4.7	4.5	4.4	4.3	4.4
pH w	6.5	5.6	5.2	4.9	4.7	4.6	4.7

Cations in Soil Soln.

Al	680	78	19	12	10	11	9
Ca	544	1643	1140	659	304	233	176
Mg	518	1187	617	317	183	294	384
Na	5414	6173	4287	2899	1793	1490	1728

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME81
 Location: George Reynolds, S.Bodallin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 1/7/87 Brominil M 1 l/ha
 Seeding Date: 26/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	15/7/87	5/8/87	15/9/87	
Millewa	53	251 (78)	2650 (84)	1595 (90)
Aroona	59	257 (79)	2465 (78)	1469 (91)
Gutha	48	226 (67)	2910 (93)	1466(100)
Bodallin	51	220 (68)	2426 (77)	1534 (92)
1W-610	41	159 (49)	2156 (69)	1217 (81)
Murray	54	311 (96)	3024 (96)	1577 (93)
Tyalla	59	324(100)	3145(100)	1687(100)
S.A.Comm	51	358(110)	3671(117)	1212 (72)
LSD(p<0.05)	12.1		454	274

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	5.0	4.1	4.0	3.9	3.8	3.8	3.7
pH KCl	5.7	4.9	4.6	4.6	4.6	4.8	4.8
pH w	6.4	5.4	5.1	5.2	5.1	5.2	5.2

Cations in Soil Soln.

Al	405	21	14	12	8	7	7
Ca	548	1227	1294	855	333	305	365
Mg	457	764	640	391	235	344	530
Na	3961	4568	3766	2661	1794	1685	2140

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME82
 Location: Lou Farina , Warralackin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agron at 270 kg/ha
 Herbicides: -
 Seeding Date: 27/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	6/7/87		15/9/87	
Millewa	67	NS	1958 (103)	NS
Aroona	60	NS	1679 (89)	NS
Gutha	58	NS	1668 (88)	NS
Bodallin	66	NS	1932 (102)	NS
1W-610	53	NS	1838 (97)	NS
Murray	67	NS	1617 (85)	NS
Tyalla	81	NS	1893 (100)	NS
S.A.Comm	78	NS	2071 (109)	NS
LSD(p<0.05)	25.7		529	

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	5.2	5.0	4.7	4.3	4.0	4.4	4.2
pH KCl	5.4	5.2	4.7	4.5	4.5	4.6	4.6
pH w	5.9	5.8	5.1	4.7	4.8	5.1	5.2
Cations in Soil Soln.							
Al	54	132	12	30	9	7	8
Ca	136	259	460	793	167	84	164
Mg	84	107	196	519	245	189	538
Na	64	215	404	627	1146	1471	5431

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME83
 Location: Walter Geier, Warralackin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 6/7/87 Brominil M 1 l/ha
 Hoegrass at 2 l/ha
 Seeding Date: 27/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	15/7/87	4/8/87	16/9/87	
Millewa	65	301 (139)	1212 (59)	424 (68)
Aroona	65	272 (126)	1132 (55)	323 (52)
Gutha	57	217 (100)	1193 (58)	351 (57)
Bodallin	55	254 (118)	1217 (59)	349 (56)
1W-610	56	311 (144)	918 (45)	246 (40)
Murray	58	306 (142)	2053(100)	374 (60)
Tyalla	60	216 (100)	2047(100)	619(100)
S.A.Comm	66	318 (148)	2430(119)	545 (88)
LSD(p<0.05)	11.8		221	45

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.5	4.2	3.9	3.9	3.9	3.9	3.8
pH KCl	5.0	4.8	4.6	4.5	4.3	4.3	4.3
pH w	5.3	5.1	4.8	4.6	4.5	4.5	4.4

Cations in Soil Soln.

Al	15	22	37	54	35	16	34
Ca	2038	2499	1330	883	428	139	279
Mg	876	1016	475	355	229	92	266
Na	1947	1946	1276	930	605	302	475

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME84
 Location: Ted Aitken, N.Mukinbudin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: 6/7/87 Brominil M 1 l/ha
 Hoegrass 2 l/ha
 Seeding Date: 28/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	6/7/87	6/8/87	17/9/87	
Millewa	61	427 (55)	2111 (78)	483 (70)
Aroona	60	399 (51)	1662 (61)	349 (51)
Gutha	62	520 (67)	1875 (69)	329 (48)
Bodallin	67	468 (60)	1802 (66)	397 (58)
1W-610	48	312 (40)	1257 (46)	299 (44)
Murray	66	563 (72)	2254 (83)	232 (34)
Tyalla	85	777 (100)	2714 (100)	686 (100)
S.A.Comm	100	795 (102)	2673 (98)	411 (60)
LSD(p<0.05)	14.3		354	60

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.4	4.0	3.9	3.8	3.8	3.7	3.6
pH KCl	4.9	4.5	4.3	4.2	4.1	4.0	3.9
pH w	5.0	4.7	4.5	4.4	4.3	4.1	4.0

Cations in Soil Soln.

Al	33	59	87	75	132	141	187
Ca	1633	1340	1100	849	784	681	516
Mg	560	375	271	208	222	220	291
Na	1405	1297	1362	1297	1426	713	388

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Trial Number: 87ME85
 Location: Neil Breakell, Benoubbin
 Basal Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agran at 270 kg/ha
 Herbicides: -
 Seeding Date: 15/6/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	6/7/87	6/8/87	17/9/87	
Millewa	66	178 (83)	2043 (102)	1084(100)
Aroona	63	142 (66)	1903 (95)	990 (91)
Gutha	66	174 (81)	2211 (110)	985 (91)
Bodallin	59	132 (62)	1963 (98)	1084(100)
1W-610	63	141 (65)	1948 (97)	896 (83)
Murray	77	270(125)	2661 (133)	1120(103)
Tyalla	73	215(100)	2006 (100)	1086(100)
S.A.Comm	80	209 (97)	2335 (116)	751 (69)
LSD(p<0.05)	13.6		266	134

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.8	4.3	3.9	4.2	4.3	4.2	4.0
pH KCl	5.2	4.8	4.8	4.8	4.9	4.9	4.7
pH w	6.0	5.2	5.0	5.2	5.3	5.3	5.2

Cations in Soil Soln.

Al	24	25	36	14	7	7	7
Ca	2790	1957	1400	812	558	300	202
Mg	2247	1303	803	387	251	210	236
Na	6382	4478	3396	2184	1362	864	973

COMPARATIVE YIELDS OF CEREALS ON WODGIL SOILS

Pl Number: 87ME86
 Station: John Butcher, Noongar
 Soil Fertilizers: Super Cu Zn Mo No1 at 363 kg/ha
 Agron at 270 kg/ha
 Herbicides: -
 Seeding Date: 25/5/87

Measurements:

Variety	Plant Densities (no/m ²)	Early Veg. Yield (kg/ha)	Anthesis Veg. Yield (kg/ha)	Grain Yield (kg/ha)
	6/7/87	4/8/87		
Millewa	59	442 (55)	NS	1136 (73)
Aroona	61	443 (55)	NS	844 (55)
Gutha	57	487 (61)	NS	922 (60)
Bodallin	59	397 (49)	NS	997 (64)
1W-610	45	444(109)	NS	759 (49)
Murray	67	873(109)	NS	1231 (80)
Tyalla	64	803(100)	NS	1548(100)
S.A.Comm	84	1016(126)	NS	1037 (67)
LSD(p<0.05)	14.5			119

Soil Measurements:

Sample (cm)	0-5	5-10	10-15	15-25	25-50	50-75	75-100
pH ss	4.8	4.6	4.0	3.9	3.9	3.8	3.8
pH KCl	5.5	4.8	4.7	4.4	4.3	4.0	3.9
pH w	5.8	5.7	5.1	4.7	4.7	4.5	4.4

Cations in Soil Soln.

Al	9	42	17	27	19	21	16
Ca	1323	635	797	562	239	148	89
Mg	735	362	552	505	188	160	119
Na	497	475	713	756	735	756	865