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# Phosphorus nutrition

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Department of Agriculture

Western Australia

SUMMARY OF RESULTS FOR 1984 SEASON

Phosphorus nutrition

M.D.A. Bolland

M.J. Baker

Trial No.: 84 E 31  
 Location: Esperance Downs Research Station  
 Soil type: Sandy gravel  
 Vegetation: Blue mallee  
 History: New land  
 Results: Fertilizer: TSP = triple superphosphate; NCRP = North Carolina rock phosphate; DRP = Duchess rock phosphate  
Cultivation: UC = fertilizer applied to the soil surface and left there; C = fertilizer cultivated into the top 10 cm of soil with a rotary hoe after application to the soil surface.

BARLEY (cv. Stirling) - DATA MEAN OF THREE REPLICATIONS

Fertilizer	Cultivation	kg P/ha applied	1984 yield (kg/ha)			
			Whole tops			Grain
			Aug. 5	Sept. 19	Dec. 5	Dec. 5
Nil		0	0	67	250	0
TSP	UC	60	99	1775	4680	1111
		120	200	2261	5540	1321
		240	249	2648	5885	1447
		480	312	3040	6653	1660
		960	198	2143	5244	1555
TSP	C	60	132	1831	5109	1099
		120	239	2064	5360	1327
		240	279	2550	5615	1568
		480	396	3413	7162	1760
		960	455	3819	7183	2219
NCRP	C	315	167	1640	4175	1210
		608	196	1913	5270	1376
		1215	222	2184	5248	1386
		2430	250	2492	5410	1410
		4860	275	3319	5676	1452
DRP	C	236	143	1862	4261	691
		460	226	2131	4551	1210
		1150	230	2724	5076	1318
		2300	291	3139	5566	1346
		4600	345	3516	6168	1543

Comments: 1. A depression in yield for highest TSP (UC) treatment was observed because of phosphorus toxicity.

2. North Carolina rock phosphate; a reactive (or highly carbonate substituted apatite rock phosphate) is not an effective fertilizer in south-western Australia. This contrasts with results from America, South-East Asia and New Zealand. The surface horizons of soils in south-western Australia dry out periodically in the winter growing season, and this may markedly reduce the effectiveness of phosphorus from rock phosphate fertilizers. Also soils in south-western Australia contain much sand, and this may limit the extent of reaction between soil and rock phosphate due to lower content of water and of reactive adsorbing soil minerals.

Trial No.: 84 M 63  
 Location: South Bodallin (Merredin Research Station)  
 Soil type: Uniform yellow sandplain with some ironstone gravel  
 Vegetation: Wodgil  
 History: New land  
 Results: TSP = triple superphosphate; NCRP = North Carolina rock phosphate; DRP = Duchess rock phosphate. UC = fertilizer applied to the soil surface and left there; C = fertilizer mixed in to the top 10 cm of soil with a rotary hoe after application to the soil surface.

TRITICALE (cv. Tyalla) - DATA MEAN OF THREE REPLICATIONS

Fertilizer	Cultivation	kg P/ha applied	1984 yield (kg/ha)			Grains/m <sup>2</sup> Dec. 6
			Whole tops		Grain	
			Oct. 12	Dec. 6	Dec. 17	
Nil		0	157	205	0	59
TSP	UC	60	4920	6767	1728	169
		120	5767	7507	2160	187
		240	5707	7429	2346	191
		480	6562	8186	2531	204
		960	5333	7319	2284	177
TSP	C	60	5560	6698	2253	155
		120	5705	7150	2284	192
		240	5971	7507	2469	189
		480	6062	7758	2592	194
		960	6493	7938	2623	197
NCRP	C	315	3503	3998	1389	111
		608	4731	5703	1602	138
		1215	4226	6491	1790	157
		2430	5393	6367	1883	170
		4360	4529	6400	1914	162
DRP	C	230	3267	4116	1142	131
		460	4514	5433	1574	134
		1150	6010	7126	2068	169
		2300	6055	8405	2253	217
		4600	6205	8091	2407	215

Comments: As for 84 E 31.

Trial No.: 84 NO 69  
 Location: West Dale  
 Soil type: Gravel sandy loam  
 Vegetation: Wandoo, red gum  
 History: New land  
 Results: TSP = triple superphosphate; NCRP = North Carolina rock phosphate; DRP = Dutchess rock phosphate; Cal = Calciphos; UC = fertilizer applied to the soil surface and left there; C = fertilizer cultivated into the top 10 cm with a rotary hoe after application to the soil surface.

SUBTERRANEAN CLOVER (cv. Seaton Park) - DATA MEAN OF THREE REPLICATIONS

Fertilizer	Cultivation	kg P/ha applied	1984 herbage yield (kg/ha)	
			Aug. 21	Oct. 5
Nil		0	77	1395
TSP	UC	60	1267	4684
		120	1297	5044
		240	1667	5900
		480	1725	5880
		960	1813	6391
TSP	C	60	1307	4140
		120	1405	4739
		240	1647	5305
		480	1955	6057
		960	2129	6418
NCRP	C	300	589	2772
		600	1324	3676
		1200	1317	4362
		2400	1564	5081
		4444	1683	5326
DRP	C	230	459	2561
		460	905	3458
		920	1491	4651
		1840	1695	5529
		3041	1895	5527
Calciphos	C	222	385	2467
		444	761	2924
		889	1530	4231
		1778	1520	4822
		2667	1683	5005

Comments: As for 84 E 31.