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DIVISION OF SOILS

THE PHOSPHATE CONTENT OF
AUSTRALIAN SOILS:
TABULATED DATA

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This report is a summary of the analyses for total phosphate that have been done by State organizations and by C.S.I.R.O. as part of the routine laboratory examination of samples from soil surveys. Although some analyses were done as early as 1898, soil surveying and the accompanying laboratory work have been carried out only since the late nineteen twenties. Only these later analyses are included in the summary. They are given in tabulated form using each survey area as an entity but in a few cases contiguous areas have been combined.

For each area are given the number and mean depth of samples, and the median, arithmetic mean, and standard deviation of the percentages of phosphate. The median is given because the distribution of values round the mean is skew. The standard deviation is given as a measure of the spread of the values, and as a basis for assessing statistically the significance of the difference between any two areas. Statistics are given for the surface soil and, where data is available, for the next underlying horizon.

The map which is given at the end of the report shows the mean phosphate value for each area in one of three classes.

The analyses have been collected together in order to provide a basis for comparing Australian soil phosphate values with those from other countries, and to examine the pedological causes of the values. The report, which is to be published in Australian Journal of Agricultural Research, shows that parent material, drainage conditions, leaching, and plant growth, are the factors which influence the phosphate content.

Notes

(1) With only one exception the analyses have been done on a constant-boiling HCl extract of the fine earth usually by some variation of the molybdenum - blue method. The exception is the Whittlesea Shire survey (82) for which the samples were analysed by the tri-acid method.

The HCl method gave an average of 68% of the total with 22 samples of soils on granite, shale and basalt (Beatty, J.H., private communication), the total being determined after HF-HNO₃ digestion.

(2) Where the area of the survey has not been reported an estimate has been made from a map.

Reconnaissance samples, and samples from specially selected soils such as those formed on basalt, are described as "spot".

On the map spot samples and areas smaller than about 200 square miles are represented by circles of a fixed size.

(3) The reference numbers which are given in column 1 are the same as are given on the attached map and on map 1 in the paper in Australian J. Agric. Res.

(4) Some of the data included in these tables has been kindly supplied by several people from unpublished sources. In each case the source is given in the list of references.

Western Australia

Ref.	Place or district	Samples		% P ₂ O ₅ statistics			Area (sq.miles)
		Depth (in.)	No.	Median	Mean	S.D.	
1	Ord-Victoria	0-4	52	0.028	0.033	0.018	83,000
		10-24	38	0.019	0.027	0.014	
2	Fitzroy River	0-7	7	0.030	0.030	0.016	spot
		7-17	3	...	0.014	-	
3	Meekathara	0-2	5	0.046	0.045	0.022	spot
4	Gingin-Bindoon	0-10	48	0.021	0.045	0.398	26
		12-37	45	0.016	0.124	0.362	
5	Merredin	0-2	5	0.030	0.030	0.010	90
		4-10	5	0.018	0.023	0.003	
6	York	0-4	13	0.028	0.022	0.013	25
		6-14	13	0.014	0.012	0.007	
7	Coastal Plain and Low Plateau	0-4	61	0.031	0.014	0.050	1,508
		12-23	52	0.018	0.034	0.055	
8	Lakes District	0-5	23	0.013	0.015	0.012	357
		21-36	21	0.009	0.012	0.010	
9	Denmark-Kojonup	0-3	73	0.003	0.014	0.012	910
		7-15	71	0.006	0.007	0.008	
10	Gibson's Desert	0-11	7	0.024	0.025	0.012	7,500 (calc.)

Northern Territory

Ref.	Place or District	Samples		% P ₂ O ₅ median	statistics		Area (sq. ml.)
		Depth (in.)	Nos.		mean	S.D.	
11	Arnhem Land	0-20	21	0.021	0.033	0.028	18,000 (calc.)
12	Katherine-Darwin	0-6	53	0.023	0.027	0.021	27,000
		7-16	17	0.018	0.021	0.010	
13	Barkly Tablelands	0-3	35	0.030	0.033	0.013	120,000
		2-7	19	0.026	0.028	0.011	
14	McDonnell Ranges - The Granites	0-24	11	0.021	0.029	0.018	50,000 (calc.)
15	MacDonald Downs	Surface	1	-	0.033	-	Spot
16	Ayer's Rock	Surface	1	-	0.023	-	Spot
17	North Simpson Desert	1-16	1	-	0.016	-	Spot
18	Centre Simpson Desert	0-9	3	-	0.017	-	Spot
		5-32	2	-	0.018	-	

South Australia

Ref.	Place or district	Samples		% P ₂ O ₅ statistics			Area (sq.mls)
		depth (in.)	no.	median	mean	S.D.	
19	Mann Ranges	0-6	3	-	0.036	-	Spot
20	Ernabella	0-12	1	-	0.196	-	Spot
21	Marree-Lake Eyre	0-9	2	-	0.051	-	Spot
22	North-west of State	0-2	7	0.040	0.048	0.026	51,000
		1-6	1	-	0.054	-	
23	Lambina	0-2	1	-	0.060	-	Spot
		2-14	1	-	0.053	-	
24	Yudnapinna	0-4	19	0.037	0.036	0.012	25
		5-15	19	0.033	0.037	0.018	
25	Southern Flinders	0-3	23	0.060	0.073	0.041	2,300
		4-12	14	0.060	0.074	0.043	
26	North-east Pastoral District	0-10	9	0.065	0.059	0.022	4,000 (calc.)
27	Red-brown Earths of S. Australia	0-5	37	0.052	0.062	0.032	3,000 "
		5-13	36	0.046	0.051	0.026	
28	Mallee	0-9	31	0.021	0.028	0.018	13,000 "
		7-16	19	0.017	0.019	0.009	
29	Barossa Valley	0-4	8	0.028	0.038	0.025	30
		10-15	38	0.023	0.026	0.014	
30	Mount Lofty Ranges	0-2	21	0.019	0.038	0.036	117
		13-19	20	0.020	0.030	0.024	
31	Lower Murray Swamps	0-12	7	0.125	0.136	0.027	20
		12-31	3	-	0.067	-	
32	Kangaroo Island	0-4	24	0.012	0.019	0.023	202
		4-10	23	0.010	0.015	0.018	
33	Coonapllyn Downs	0-3	57	0.006	0.009	0.007	1211
		8-14	55	0.009	0.010	0.007	
34	Kingston Avenue	0-2	6	0.030	0.044	0.039	230
		5-8	6	0.021	0.030	0.019	
35	County Grey	0-6	22	0.015	0.052	0.088	480 (calc.)
		9-22	17	0.009	0.029	0.045	
36	Mt. Gambier	0-9	7	0.32	0.336	0.110	Spot
		11-20	3	—	0.213	—	

Queensland

Ref.	Place or district	Samples depth no. (in.)		% P ₂ O ₅ statistics			Area (sq.mls)
				median	mean	S.D.	
37	Leichhardt- Gilbert	0-4	44	0.039	0.065	0.079	125,000
		8-17	38	0.030	0.052	0.069	
38	Cairns-Gardwell	0-5	27	0.202	0.209	0.166	1,600(calc.)
39	Charters Towers	0-7	6	0.019	0.040	0.045	spot
		8-19	4		0.031		
40	Lower Burdekin	0-4	37	0.030	0.052	0.078	6,400
		3-9	9	0.036	0.103	0.125	
41	L. Galilee area	0-6	2	-	0.065	-	spot
42	Longreach	0-3	1	-	0.051	-	spot
43	Emerald	0-3	3	-	0.037	-	spot
44	Rockhampton	0-5	3	-	0.170	-	spot
45	Rolleston	0-6	3	-	0.074	-	spot
46	E. Simpson Desert	0-19	2	-	0.013	-	spot
		16-27	1	-	0.017	-	spot
47	Thylungra	0-8	2	-	0.054	-	spot
48	Theodore	0-9	3	-	0.107	-	spot
		9-28	3	-	0.081	-	
49	Bundaberg	0-9	2	-	0.245	-	spot
		9-18	2	-	0.240	-	
50a	Toolara Forest*	0-4	525	-	0.009	-	2 (calc.)
50b	Tuan Creek Forest*	0-4	414	-	0.005	-	2 "
51	Bollen	0-5	12	0.041	0.043	0.018	20,000
		17-31	10	0.030	0.032	0.011	
52	Beerburrun*	S ³ face	44	-	0.019	-	5
53	Darling Downs	0-4	22	0.251	0.270	0.164	53
		9-20	13	0.205	0.218	0.138	
54	Brisbane	0-4	9	0.014	0.047	0.074	spot
		9-16	5	0.006	0.013	0.016	
55	Burleigh Heads	0-9	2	-	0.225	-	spot
		9-18	2	-	0.145	-	

* No individual analyses available

New South Wales

Ref.	Place or district	Samples		median	mean	S.D.	Area (sq.mls)
		depth (ins.)	no.				
56	Lismore	0-4	27	0.240	0.281	0.173	360
		5-12	26	0.180	0.253	0.173	
757	New England	3-5	10	0.044	0.093	0.105	6,600(calc)
58	Macquarie	0-4	55	0.062	0.116	0.125	24,000
59	Upper Hunter Valley	0-3	33	0.147	0.215	0.210	188
		3-7	23	0.113	0.160	0.123	
60	Bathurst	0-11	10	0.104	0.127	0.058	spot
		11-27	10	0.111	0.112	0.029	
61	Coomealla	0-6	20	0.034	0.037	0.019	31
		5-8	4	0.031	0.047	0.019	
62	Griffith-Yenda	0-9	18	0.040	0.041	0.007	31
		9-21	17	0.040	0.036	0.007	
63	Wagga	0-5	1	-	0.056	-	spot
		5-7	1	-	0.052	-	
64	Tumut	0-14	7	0.152	0.163	0.029	spot
65	Australian Capital Territory	0-3	11	0.051	0.054	0.012	910
66	Wakool	0-4	10	0.050	0.049	0.014	835
		4-15	10	0.049	0.079	0.076	
67	Deniboota	0-3	51	0.064	0.067	0.019	474
		2-7	2	-	0.068	-	
68	Falkiner Station	0-2	14	0.046	0.052	0.015	2
		4-9	19	0.044	0.045	0.011	
69	Jenargo	0-2	8	0.051	0.054	0.007	196
		3-7	14	0.048	0.049	0.007	

Victoria

Ref.	Place or district	Samples		% P ₂ O ₅ median	statistics		Area (sq.mls)
		depth (in.)	no.		mean	S.D.	
70	Mildura	0-8	38	0.090	0.109	0.057	58
71	Robinvale	0-6	6	0.037	0.043	0.013	23
72	Swan Hill	0-9	25	0.050	0.055	0.023	18
		10-26	14	0.040	0.039	0.015	
73	Kerang	0-4	12	0.090	0.087	0.013	84
74	Boort	0-4	18	0.048	0.047	0.016	273
		3-12	5	0.048	0.053	0.023	
75	Rochester	0-6	9	0.051	0.047	0.015	1
76	County Moira	0-5	29	0.061	0.068	0.027	309
		5-14	17	0.048	0.059	0.026	
77	Shepparton	0-7	8	0.071	0.084	0.033	28
		8-26	7	0.029	0.030	0.007	
78	Dookie	0-4	18	0.045	0.053	0.023	650
		11-20	15	0.037	0.039	0.017	
79	Myrtleford	0-8	9	0.023	0.228	0.062	spot
		6-15	6	0.19	0.147	0.090	
80	Kowreeshire	0-3	19	0.014	0.016	0.009	2114
		12-16	18	0.016	0.017	0.006	
81	Western District	0-4	24	0.067	0.105	0.093	5500 (calc.)
82	Mt. Gellibrand	0-7	20	0.035	0.053	0.045	19
		9-22	2	-	0.022	-	
83	Whittlesea Shire*	0-5	23	0.087	0.103	0.059	215
		6-14	22	0.055	0.066	0.050	
84	Gippsland	0-6	54	0.054	0.065	0.043	1800 (calc.)
		11-22	8	0.025	0.038	0.041	
85	Bairnsdale	0-8	2	-	0.267	-	spot
		8-25	2	-	0.122	-	
86	Orbost	0-9	2	-	0.162	-	spot
		9-24	2	-	0.092	-	

* P determined by the tri-acid method

Tasmania

Ref.	Place or district	Samples		% P ₂ O ₅ statistics			Area (sq.mls.)
		depth (in.)	no.	median	mean	S.D.	
87	King Island	0-10	56	0.080	0.104	0.097	425
		10-36	44	0.030	0.063	0.076	
88	Flinders Island	0-3	41	0.009	0.037	0.051	513
		10-15	32	0.005	0.023	0.034	
89	Montagu Swamp	0-7	20	0.041	0.060	0.040	56
		10-21	18	0.026	0.036	0.027	
90	Burnie	0-6	56	0.170	0.203	0.111	480
		6-14	41	0.160	0.169	0.108	
91	Waterhouse Estate	0-7	16	0.015	0.032	0.038	78
		9-21	4	0.011	0.011	0.003	
92	Launceston Basin	0-4	58	0.040	0.064	0.061	900
		7-13	31	0.028	0.059	0.061	
93	Ouse	0-5	32	0.042	0.057	0.042	78
		6-13	11	0.038	0.057	0.049	
94	Sorrell	0-3	13	0.110	0.293	0.318	205
		4-7	12	0.154	0.262	0.268	
95	Huonville	0-7	25	0.029	0.031	0.016	7
		6-15	10	0.016	0.019	0.009	

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New South Wales

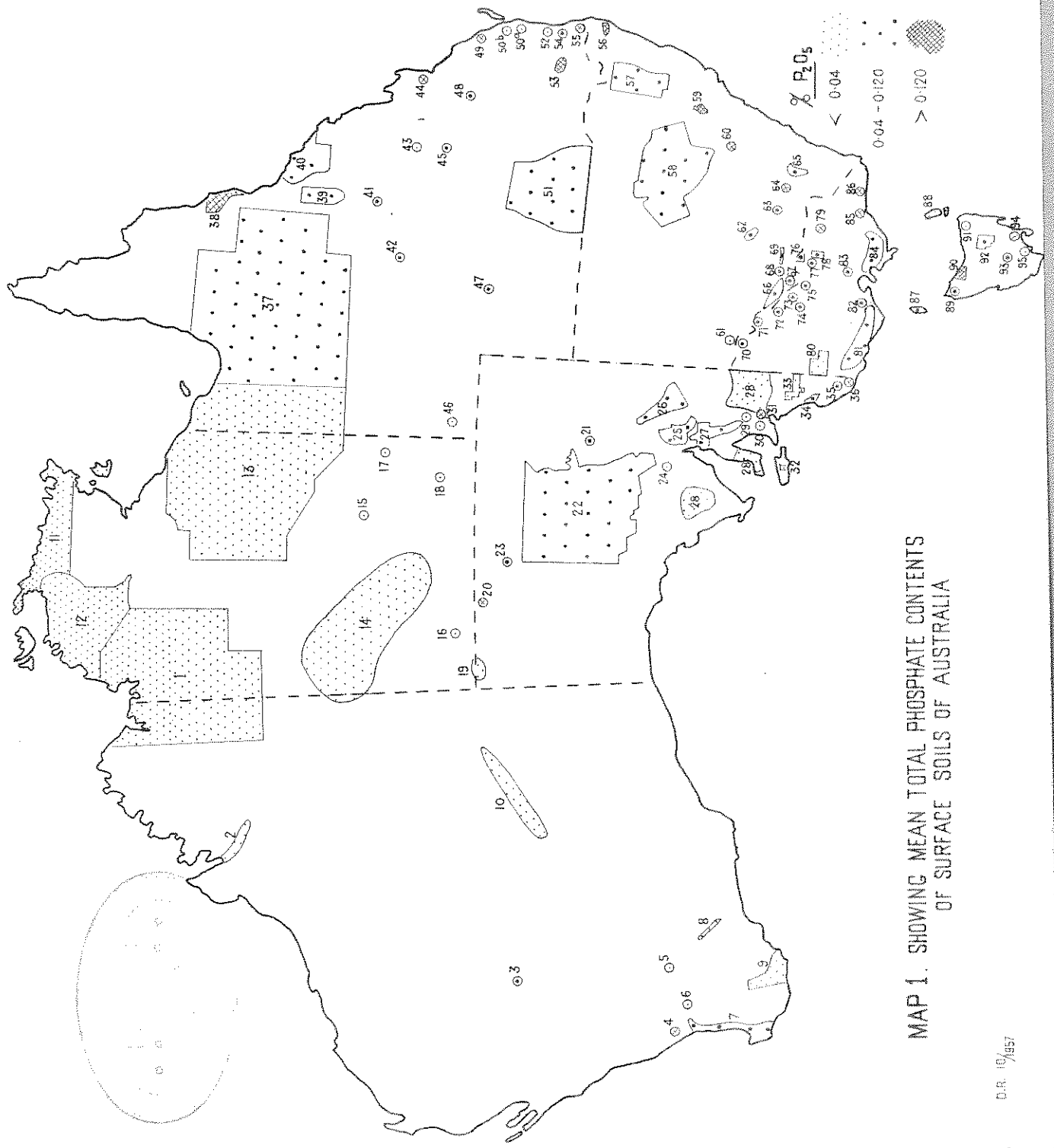
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MAP 1. SHOWING MEAN TOTAL PHOSPHATE CONTENTS OF SURFACE SOILS OF AUSTRALIA