

SOILS OF THE WAIPA COUNTY.

During the past five years many chemical analyses of Waipa soils have been made, and a report covering the field classification and the chemical data of the soils is now in the press. The Waipa County is noteworthy in that soils of naturally low fertility have been so improved by top-dressing that the carrying-capacity has been raised at least sixfold. Phosphatic fertilizers, mainly superphosphate, have been responsible to a great extent for pasture-improvement and the accompanying increase in carrying-capacity. As a general rule, 3 cwt. to 4 cwt. of superphosphate per acre has been the amount of the annual top-dressing, but on some farms the rate of application has exceeded these amounts for several years in succession. The following figures illustrate the improvement in plant nutrients which has resulted from the top-dressing of two typical soils:—

Soil Type.	Available Phosphoric Acid.	
	Unmanured.	Manured.
	Per Cent.	Per Cent.
Hamilton clay loam	0·001	0·019
Te Kowhai loam	0·005	} 0·050
	0·004	

Some of the Waipa soils resemble some of the red-brown loams of North Auckland in that a high percentage of ferric oxide in the soil tends to lower the efficiency of the superphosphate top-dressing as a result of a reaction between the iron compounds of the soil and soluble phosphates. On such soils basic phosphates and the more liberal use of lime deserve special consideration.

So far, potassic manures have not been extensively used in the Waipa County. There is, however, increasing evidence to show that as a result of depending on phosphatic top-dressings the reserves of potash are being depleted. This is particularly true of pastures which are frequently cut for hay or ensilage. The Horotiu and the Te Kowhai soil types now show rather low figures for available potash. For instance, two soils receiving a yearly application of 2 cwt. to 3 cwt. of superphosphate now contain only 0·012 and 0·016 per cent. available potash, as compared with 0·034 per cent. on an adjoining unmanured field.

Waipa soils, in general, are of medium acidity, with pH values ranging between 5 and 6. This, combined with a rather low percentage of base saturation, suggests that more attention should be paid to lime treatment of the pastures. Base-saturation figures show that, of the different soils, Hamilton clay loam is least in need of lime. This soil type is followed by the Waikato, Whatawhata, Ohaupo, Te Kowhai, and Horotiu series, with the Rotokauri and Te Rapa series most in need of lime supplements.

WESTPORT SOILS.

Further studies have been made of the podsolization process which is so characteristic of highly leached soils on the West Coast. In a previous report data have been presented illustrating podsolization in pakihi soils near Westport. The leached condition of the topsoil and the presence of an iron-humus pan at a depth of 12 in. to 20 in. are typical features of all pakihi soils at Westport.

During the past season a study has been made of podsolization which is even now taking place on the recent sands adjacent to the sea-beach at Sergeant's Hill and at other localities on the West Coast. Samples of sand from the sea-beach have been compared in the chemical laboratory with samples of older sands which have been subjected to leaching for considerable periods. For the sake of comparison a typical pakihi soil of the same textural type has been included in the studies. The results of the chemical examinations are shown in Tables I and II.

TABLE I.—PODSOLIZATION STUDIES ON WEST COAST SANDS.

Laboratory No.	Depth of Sampling	Horizon.	Available.		pH Values.	Base Ex-changeable Capacity.	Total Ex-changeable Bases.	Base Saturation.	Remarks.
			Potash.	Phos-phoric Acid.					
	In.		Per Cent.	Per Cent.		m.e.	m.e.	Per Cent.	
2224	0·015	0·082	6·2	Medium sand from sea-beach.
2225	..	0-6	0·007	0·010	4·4	12·8	1·1	8·6	} Consolidated sand-dunes close to beach.
2226A	..	10-20	0·002	0·007	4·6	9·0	0·2	2·2	
2055	..	2-6	0·005	0·005	4·6	10·2	0·4	4·4	} Sandy flats, Utopia Road, with high water-table, and pan at 18 in.
2056A	..	6-15	0·006	0·004	4·4	9·2	0·3	3·8	
2056B	..	15-27	0·003	0·072	5·0	6·6	Nil	Nil	
2056C	..	27+	0·004	0·069	4·9	3·1	0·1	3·2	} Typical pakihi terrace with pan at 18 in.
2211A	..	0-3	0·010	0·003	4·2	18·6	1·2	6·5	
2211B	..	3-9	0·006	0·002	4·4	14·4	0·6	4·2	

In Table I data are presented for sea-sand from the beach, for samples of sand from consolidated sand-dunes adjacent to the beach, and for older sandy flats which before drainage had a water-table at a depth of 18 in. Samples 2211A and B are taken from a pakihi terrace behind the sandy flats. This terrace represents an earlier sea-beach of this locality. The sea-sand (sample 2224) shows a high content of available phosphoric acid, a moderate supply of available potash, and a pH value of 6·2. Samples