

SURVEY OF NEW ZEALAND FLAX SOILS.

In co-operation with Dr. Yeates, of Massey College, and Mr. N. H. Taylor, of the Soil Survey Division, an inspection was made by Dr. Dixon of several typical flax soils in the North Island. Flax appeared to grow most luxuriantly on well-drained alluvial soils. It was noticed that soils with impeded drainage and peaty soils were associated with poorer stands of flax. Chemical analyses of a selected number of soils suggested that poor flax-growth was connected in certain cases with a low phosphate status of the soil. In view of the great importance of phosphatic manures for flax on the pakihi soils of Westport, which are very deficient in phosphate, it seems probable that phosphatic top-dressings would prove profitable on a number of the flax plantations of the North Island.

POTASH RESPONSES IN TARANAKI.

In the annual report for 1934-35 attention was drawn to the low potash status of a large number of soil samples collected in North Taranaki. With few exceptions soil samples obtained from the area lying north of a line drawn between Stratford and Cape Egmont and extending to Ohairo in the north gave available potash figures of less than 0.020 per cent. for the 0-3 in. depth of soil. The figures for the southern sector of Taranaki were generally much higher, particularly in the Patea locality. Some samples, however, were found with figures for potash below 0.020 per cent., making any generalization concerning the value of potassic manures in the southern sector very difficult. As a result of the analytical data obtained for Taranaki soils it was suggested that a response to potassic manures for pasture treatment was probable throughout the whole of the northern sector of Taranaki. In view of this suggestion, based on the chemical results, it is interesting to note that the field trials with potassic manures conducted by the Department of Agriculture have shown, with few exceptions, marked potash response for pastures in North Taranaki, enabling a general recommendation to be made to farmers concerning the value of potassic manures.

COMPOUND SOIL PARTICLES.

During the past few years attention has been drawn by the pedologists to a discrepancy between the observed free drainage qualities of soils classed as brown and red-brown loams, and the laboratory classification based on the usual methods of mechanical analysis. It was suggested that the unexpected free drainage qualities of these soils resulted from the formation of compound soil particles.

Laboratory studies have therefore been made with a view to determining percentages of water-stable soil aggregates in selected soils. The wet sieving method of Bouyoucos was tested and was found satisfactory for routine analysis. The results of texture analysis by this method gave a much better correlation between the laboratory classification and the field properties of the soils.

The brown and red-brown loams with high iron clays contained comparatively high percentages of water-stable compound particles, thereby accounting for their good drainage qualities.

Studies of soil aggregates are being extended to other types of soils with a view to determining their influence, if any, on soil-erosion.

INFLUENCE OF FOREST LITTER ON SOIL TYPE.

It has long been known that the plant covering of land profoundly affects soil formation and that different types of plant cover are associated with distinct types of soil—*e.g.*, typical podsoils are developed under a forest cover, while black earths are developed under a grass cover.

It is of great interest, therefore, to determine the relationship between different species of New Zealand trees and the soils with which they are associated. With a view to securing information on these relationships, forest litters have been examined in the chemical laboratory. The chemical results show that there is a considerable difference in ash composition of litters associated with the puriri, taraire, rimu, totara, kauri, and nikau. The alkalinity of the ash of the litters correlated well with field observations concerning the fertility of the soils associated with these trees.

GENERAL.

Considerable time has been spent in comparing different methods of extracting plant-food from soils. The use of 1-per-cent. citric acid for the extraction of available phosphoric acid has been compared with buffered acetic and sulphuric acids at strengths giving pH values of 2, 3, and 5 respectively.

The phosphoric-acid estimations on the solutions obtained with the different extracting liquids showed a fairly good correlation in the case of citric acid and sulphuric acid (pH 2), but the correlation with the other strengths was not satisfactory.

As noted by other investigators, replacable potash estimations gave a very satisfactory correlation with available potash figures obtained with 1-per-cent. citric acid. In a comparison of hydrochloric-acid and citric-acid extraction, the potash figures did not show a satisfactory correlation.

Dr. J. K. Dixon has remained in charge of the Soil Laboratory during the past year and has been responsible for the conduct of a great deal of the work. He has been ably assisted by Mr. A. C. Harris, M.Sc.; Mr. L. Hodgson; and Mr. J. T. Corder. Miss E. B. Kidson, M.Sc., was granted a year's leave of absence for study overseas. Since her return to New Zealand she has been seconded to cobalt investigations relating to stock ailment in Southland and in Ashburton County, Canterbury.