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Changes in the Forms and Availability
of Applied Phosphate Over a Twelve-
Month Period in Two Soils of the
Manawatu-Rangitikei Sand Country

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INTRODUCTION

A feature of New Zealand agriculture is the requirement for regular applications of phosphate fertilizer to maintain high producing pastures. This is reflected in the large amounts of phosphate fertilizer sold annually, which for the 1971-72 season reached a level of 2,041,000 tonnes.

The soils of the Manawatu-Rangitikei sand country, being naturally deficient in phosphate, are no exception to this requirement for regular applications of phosphate. However, these soils, especially those of the sand plains are potentially fertile. Thus trials conducted by the Department of Agriculture have shown that, on Himatangi sand, pasture production in the range 15,700-16,800 kg D.M./ha can be realized (Blackmore, pers. comm.).

The need for regular, preferably at least annual, application of phosphate to these sand country soils implies a fall in the level of availability of the applied phosphate within the zone of action of the pasture roots due either to:-

- (i) actual loss of phosphate from this zone by leaching a distinct possibility in such light-textured soils; or
- (ii) a change in the soil/soil solution equilibrium distribution of phosphate as a result of changes in the nature of the fixed forms with time; or
- (iii) a combination of these factors.

The object of the present study was to investigate the operation of these factors for two representative sand country soils, the differing moisture regime and pH status of which might be expected to exert some influence on the course of phosphate fixation. At the same time, it was hoped to reach some conclusion as to the relative sensitivity of a

number of commonly used chemical "quick tests" for evaluation of phosphate availability in these soils and to determine whether changes in these values were paralleled by demonstrable changes in the forms of phosphate binding.

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