THE MOVEMENT AND FIXATION OF PHOSPHATES IN RELATION TO PERMANENT PASTURE FERTILIZATION

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Fertilizers on grasslands are usually applied as top dressings. The essential elements of these materials must move into the region of the feeding roots before they can be utilized. Because of these facts and also because of the fact that phosphates apparently move rather slowly in soils, it seemed desirable to study in detail the movement and fixation of phosphates, particularly with reference to pasture fertilization. The experiments reported here include a study of crop response from applications of superphosphate to the surface and at various soil depths, together with chemical analyses to determine the rate and extent of phosphate movement and fixation in soils.

Way (15), as early as 1850, expressed certain ideas in regard to absorption of fertilizing materials. Weidemann (16) showed that both acid and basic muck soils fix phosphates. Schreimer and Failyer (11) concluded that the addition of large amounts of soluble phosphates did not materially increase the amount found in the soil solution.

Petit (10), working with soils containing large quantities of organic matter, found that they did not fix phosphates very readily, but when the organic matter was removed none of the phosphate remained soluble. He concluded that the fixation was due to the inorganic materials, such as calcium, aluminium, and iron compounds.

Harrison and Das (7), in India, applied soluble phosphates to soils and found that on the calcareous soils most of the phosphate is retained in the surface layers, while on the non-calcareous soils considerable penetration of phosphate takes place. They also found a very rapid reversion of the monocalcium phosphate to the tri-calcium phosphate on the calcareous soils.

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Reference by number is to "Literature Cited," p. 798.