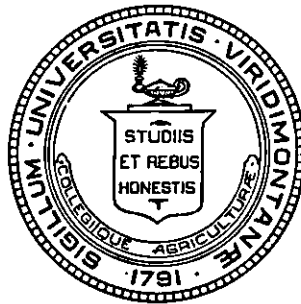


Fixation and Penetration of Phosphates in Vermont Soil

University of Vermont and State Agricultural College
Vermont Agricultural Experiment Station
BURLINGTON, VERMONT

FIXATION AND PENETRATION OF PHOSPHATES IN VERMONT SOILS

By V. L. WEISER



Studies were made of the penetration and fixation of phosphates in Vermont soils. Field plots were established and greenhouse and laboratory studies made of sundry phosphatic fertilizers. Plant and chemical studies of phosphate fixation were included and methods of overcoming such fixation were considered.

Field studies with super-, ammonium and sodium phosphates indicate that phosphate penetration is a problem of minor importance under field conditions in Vermont. However, laboratory results seem to show that superphosphate penetrates slowly into many Vermont soils.

Penetration of superphosphate may be enhanced by certain materials, such as certain sulphate and nitrate salts. Sodium, ammonium, and certain organic phosphates penetrate more quickly in soils than does superphosphate. Exposure of a phosphate to relatively large amounts of soil results in enhanced fixation.

Vermont soils are comparatively high fixers of phosphorus, being sometimes as potent in this respect as are lateritic soils. This may be explained by the presence of much of the B horizon in the surface soil, due to the loss of a considerable portion of the A horizon through cultivation and erosion. It is well understood that the B horizon of podzolized soils can fix large amounts of phosphorus, usually, it is thought, because of their iron and aluminum contents.

Certain hydrated oxides and precipitated salts of iron and aluminum fix large amounts of phosphorus. Certain silicates and minerals, as well as some sorts of organic matter, when applied to soils reduce their fixing power.

Liming increases the ability of a crop to recover phosphorus. However, chemical studies indicate that liming may sometimes increase fixation.

The influence of frequency of application on phosphate recovery was found to vary with the form of phosphatic fertilizer used. Recovery from sodium phosphate was greater when small and frequent applications were made, but recovery from superphosphate and Ammophos was greater when large and less frequent applications were made.

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