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Phosphorus in Finnish soils in the 1900s with particular reference to the acid ammonium acetate soil test

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Abstract

Comprehensive research into phosphorus (P) in soils and crops began in Finland in the early 1900s. The average amount of total ploughed topsoil layer of mineral soils was about two tonnes per hectare in the 1930s, before the abundant use of fertilisers. chemical fractions of P in mineral soils were organic matter, primary apatite and secondary complexes of the hydrous oxides of the smaller amounts of P in light peat soils, as much as 80% was present in stable organic compounds. Field experiments showed P reserves of Finnish soils are poorly available to plants, and that P fertilisers are inefficiently utilised because of the slow supply of applied phosphate in soils. In evaluations before the late 1950s, all simple chemical tests appeared to be rather unreliable in estimating the supply of P from soils to plants, but later research has shown that the results were impaired by errors implicit in the reagents and materials. Some soil test P values (STP) obtained from old samples stored for more than ten years evidently were too high, particularly in organic soils, and many of the soils studied were strongly acidic and therefore biologically less fertile than the chemical P test results. The acid ammonium acetate method (pH 4.65) was introduced in the early 1950s and has since been used in routine soil testing in Finland not only for P but for all macronutrients except N. In later evaluations of different methods used for estimating the requirement for fertilisation, the acid ammonium acetate method has proven equal or superior to any other simple chemical method.

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