J. Sci. Fd Agric. 1973, 24, 991–994

Symposium on Soil Phosphorus and Crop Growth

The following are summaries of papers presented at a symposium held by the Agriculture Group (S.C.I.) and the Fertiliser Society on 20 February 1973. The reports so published are entirely the responsibility of the authors and in no way reflect the views of the Editorial Board of the Journal of the Science of Food and Agriculture.

An Attempt to Evaluate Plant available Soil Phosphate on a Rational Basis

H. A. Sissingh

Institute for Soil Fertility, 92 Oosterweg, Haren-Gr., Netherlands

The fact that so many diverse methods are used for the determination of plant-available soil phosphate raised the question whether an exact and—at the same time—practically useful criterion might be formulated for the correctness, in principle, of a method.

One such criterion may be that the treatment of the soil sample, as incorporated in the method, will not make labile more phosphate than there is involved in the soil phosphate supply to the plant.

To find whether this condition is realised or not, labile-phosphate values, determined with the aid of ^{32}P as the L-value on the one hand, and as E-values in laboratory experiments using water or diverse solutions on the other hand, should be compared. If L- and E-values are essentially equal, the required condition is satisfied.

Most of the common crops (potatoes, cereals, beets, etc.) only take up soil phosphate from the labile pool (L), developing no phosphate-unlocking activities. In the case of oats equality of E- and L-values has been found, using water as the contact solution for the E-determination. This finding formed the rational basis for selecting water as the most promising extractant for the plant-available soil phosphate. Favourable indications from field experiments have supported this choice.

The next—empirical—step in the development of a P-water method is the creation of extracting conditions, which will result in the removal from the solid-bound labile pool of an amount of phosphate which correlates closely with the amount withdrawn by plants.

This has been achieved stepwise, arriving at a water : soil ratio of 60 : 1 (v/v).

The so-called P_w-value method has been used successfully for fertiliser recommendations for arable soils since August 1968. Agricultural evaluation of P_w-values has been shown to be essentially equal for all soil types in the Netherlands.

Simulation of Phosphorus Response

M. A. Scaife

National Vegetable Research Station, Wellesbourne, Warwicks, England

A dynamic model of P uptake and response is described, written in the computer simulation language CSMP, which attempts to predict the changes in P response and plant P status throughout growth by assuming the following.