AVAILABLE NUTRIENTS IN FERTILIZED SOILS AT VARIOUS PERIODS OF THE YEAR

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The soils on which vegetable crops and strawberries are grown in southeastern Louisiana are liberally fertilized annually. These applications are considerably in excess of the amounts removed by the harvested part of the crop. Recently, attempts have been made to find a satisfactory chemical method for determining the fertilizer requirements of these soils. Particular interest exists in the testing of soils used for growing strawberries, a crop which often occupies the land for a period of 7 months from the time of setting out the plants to the last picking of berries.

In connection with the use of various testing methods, several questions have arisen, namely, Should all soils be resampled annually and new recommendations made from the most recent analyses? If so, at what time of year should the sample be taken for analysis? What is the state of availability of the nutrients from the time of application until the picking of berries 7 months later? Since the soils are being liberally fertilized, even though the analyses often show comparatively high levels of certain nutrients, would an absorption method be better than an extraction method as a means of estimating fertilizer requirements?

Comparatively little information is available regarding nutrient variation with season. Bell and Thornton (1) studied the effect of season and fertilization on the available phosphorus and potassium as determined by rapid chemical tests. They found that supplies of both of these nutrients showed a tendency to decrease as the season advanced. Their determinations included a period of only 3½ months, however, and were conducted during an abnormally hot and dry summer.

In this study determinations have been made of the level of “available” nutrients at various periods through the year in nine soils on which strawberries are being grown continuously. In the past some of these soils have been fertilized much more heavily than others. This year they all received a fairly liberal application of fertilizers.

**PROCEDURE**

Determinations were made of the pH, available phosphorus by the Truog method (10), water-soluble phosphorus and 0.05N HCl soluble potassium, calcium, and magnesium. The water-soluble phosphorus involved shaking for 1 hour of 1 part soil with 100 parts of water, filtration, and determination of phosphorus colorimetrically in the filtrate. More procedures used for potassium, calcium, and magnesium have been described elsewhere (8). The soils were also tested by the rapid test methods of Spurway (9), Hester, Heil, and Morgan (5). In addition, potassium and phosphorus requirements were estimated by the absorption method proposed by Purvis and Blume (7).

In order to find out whether these constituents accumulating in the available state in the B horizon were taken of the B horizon to a depth of 1 foot beginning and at the end of the year. The above determinations were made also on these samples.

**RESULTS**

Results are presented here for variations in available phosphorus, water-soluble phosphorus, 0.05N HCl-soluble potassium, and potassium phosphorus adsorption for the nine soils. The variations throughout the year in pH and exchangeable calcium and magnesium were significant. Results from the rapid test methods showed the same trend as those of the more detailed laboratory methods. The difficulty involved in reading rapid tests, particularly phosphorus, with a degree of accuracy makes their use in this questionable value. The purpose of using rapid tests was to test several different extractants for phosphorus and potassium.

In Table 1 are given the results of available phosphorus throughout the season as determined by the Truog method. These results are depicted graphically in Fig. 1. Some of these soils have been fertilized for several years and the available phosphorus has been built up to an extremely high level. Accumulations of available phosphorus have previously been reported as being considerable in excess of the amounts removed by the harvested part of the crop.