

In the ammonium acetate method, a soil to extractant ratio of 1 to 5 was used, and samples were shaken for 30 minutes. Total phosphorus as described by Bray and Kurtz (4) was determined in nitric-perchloric acid digests of soil samples. Detailed procedures for the extractable phosphorus methods are described in the appendix.

Results

The relationship between soil phosphorus as determined by four chemical methods and responses to phosphate fertilization in five field experiments is shown in Table 16. The amount of phosphorus by the four different methods varied widely. The acid ammonium acetate extracted much less phosphorus than the extractants containing NH_4F . However, this is not of very great importance. By all methods phosphorus was lowest in soil from the young tree experiments which were conducted on previously unfertilized soil. Experiments 1, 2 and 3 in bearing Valencia groves indicated no response to added phosphate until the fourth year of the experiment. It can be concluded, therefore, that the soil was sufficiently supplied with phosphorus to meet the phosphorus requirement of the trees at the time the experiments were initiated.

The soil test values for phosphorus indicate the level of available phosphorus above which a response to phosphate fertilization would not be expected in any grove. These data are not sufficient to indicate which soil test most accurately reflects the amount of phosphorus available to the trees. However, it can be said with a reasonable degree of assurance that phosphorus test values above the levels reported in Table 16 for Experiments 1, 2 and 3 would be adequate for optimum production of citrus.

The data indicate that soil test values above 22 pounds phosphorus per acre (50 pounds P_2O_5) by acid ammonium acetate, 80 pounds phosphorus (185 pounds P_2O_5) by the Bray P_1 test, and 130 pounds phosphorus (300 pounds P_2O_5) per acre by the Bray P_2 test would be adequate levels, and soils containing these amounts would not be expected to respond to phosphate additions. Soil test values below these levels would not necessarily indicate that a response will always be obtained from phosphate fertilizers applied to such soils, and these critical levels may result in a few groves' being unnecessarily fertilized with phosphate. However, this is more desirable than risking a deficiency of phosphorus. When making fertilizer recommendations for