Chapter 16

Conventional Soil and Tissue Tests for Assessing the Phosphorus Status of Soils

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I. INTRODUCTION

The analysis of soils and plants to determine their content of nutrients essential for plant growth had its beginnings in the nineteenth century. Early attempts to characterize the supply of nutrients available for plant growth were based on a total analysis of the soil. This approach was not of much use for accurately determining on which soils plants would respond to fertilization. Daubeny in 1845 introduced a significant concept when he suggested that nutrients existed in “active” and “dormant” forms. He proposed that carbonic acid be used to extract the active forms. This provided the conceptual framework for the development of soil test extractants to measure that portion of the soil P which was available to plants.

The idea of analyzing plant tissue for the purpose of soil nutrient status evaluation probably dates back to the middle of the 19th century (Weinhold, in Smith, 1962). It was then used essentially as a biological testing approach for soil fertility evaluation. This was based on the idea that the plant itself would be the best indicator of the nutrient status of the medium in which it was growing. With the finding that application of superphosphate increased crop yields in certain soils, interest was stimulated in the use of soil tests and plant analysis to identify those soils deficient in phosphate (P).

During the past 50 years soil scientists and agronomists have conducted hundreds of experiments to evaluate the P status of soils. It is not our intent to present a comprehensive review of all the research dealing with soil tests and plant analysis for P. Instead we will try to indicate some of the important principles which need to be taken into account when evaluating and interpreting results of soil tests and plant analysis for the purpose of assessing the P status of soils.

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The Role of Phosphorus in Agriculture.

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