Problems Encountered in Soil Testing Methods

GRANT W. THOMAS

Estimating soil fertility by laboratory analysis is so far advanced in this country that it is considered heretical to question it. I am willing to assume the role of a heretic because I think that our ability to perform meaningful analyses on soils has not kept pace with our ability to sell this service. Some soil testing enthusiasts have said that any soil test is satisfactory as long as it is calibrated. My association with soil testing research has convinced me that such calibration is difficult to accomplish. Successful calibration of soil tests depends on knowing what we are measuring in the laboratory. It is, of course, possible to get reliable predictions of response with any number of soil tests, provided that we keep our world of soils narrow enough. But, in practice, we do not keep our soil population very narrow.

In this paper, I shall discuss some of the problems associated with the determination of pH, calcium, magnesium, phosphorus, potassium, and nitrogen. Most of the examples are taken from soils in Virginia, North Carolina, and Texas; many of the data were obtained by my students. The provincialism of this paper is excused on the grounds that these are the only areas the author knows and that no one else will discuss them anyway. Nevertheless, most of the principles will apply to some degree in other sections of the country.

In general, three difficulties in soil testing will be considered: the kind of extractant used, the measurement of the element in the extract, and the calibration of results with yield response. These problems often are impossible to separate. Indeed, a combination of problems is more the rule than the exception.

If plants are to have proper nutrition, there must be a continuously adequate supply of nutrients present in the soil

---

1 Contribution from the Texas Agricultural Experiment Station, College Station, Texas.

2 Professor of Soil Chemistry.