13 Adequacy of Current Fertilizer Recommendations for Site-Specific Management


Variable rate fertilizer application (VRA) and site specific management (SSM) provide one of the greatest challenges and opportunities for improving fertilizer use efficiency since the wide scale adoption of soil testing in the 1950s and 1960s. The assumption of VRA is that it will more closely match productivity, input efficiency and profitability compared with uniform application (Sawyer, 1994). The concept assumes that within-field variability exists, that it does influence crop yields, that the variation can be identified, measured, and mapped, that precise crop response models are available to determine inputs, and that data processing and application equipment are available that can effectively manage and apply the inputs. Site-specific management and VRA, however, raise many questions about current fertilizer recommendations. Are they adequate for this new technology?

New methodology suggests that we reevaluate past research and assumptions. As the acreage of land under SSM increases, there is a need (i) to review past soil test correlation and calibration work and the resulting fertilizer recommendations and (ii) to determine what, if any, changes are required.

HISTORICAL OVERVIEW

Soil testing has been available for many years (Bray, 1929; Morgan, 1932; Truog, 1930) and is generally understood to include chemical or physical measurements made on a soil. For plant nutrients, it has come to mean rapid chemical analyses that assess a soil's plant-available nutrient status in addition to a program that includes interpretation, evaluations, and fertilizer recommendations (Peck & Soltanpour, 1990).

Since the late 1940s soil testing has been used to identify soils that may require lime and fertilizer inputs for optimizing crop production. With the increasing awareness of fertilizer effects on environmental and soil quality, soil tests have been instrumental in determining where excess nutrient levels occur. It is now as important to determine where fertilizers or manure should not be applied as where to apply them.

The science behind soil testing, soil test correlation, and fertilizer response work is solid. Our libraries and book shelves are replete with articles, symposia, and