

UF/IFAS Nutrient Management Series: UF/IFAS Standardized Nutrient Recommendation Development Process¹

Rao S. Mylavarapu²

Interpretation of soil test results based on research and best collective scientific judgment is the primary and sole educational objective of offering soil testing service through UF/IFAS Extension Soil Testing Laboratory (ESTL) in Gainesville. Fertilization recommendations, if any, are included in soil test reports along with the soil test results and are based on such interpretations.

Soil Testing

The Extension soil testing program is a three-step process involving soil testing, interpretation, and nutrient application (i.e., fertilization) recommendations (Mylavarapu, 2010). First, soil testing establishes the levels of nutrients in the soil. The next step, the interpretation of these soil test results, is the most crucial component of the program. The amounts of nutrients that the soil can supply for a specific crop are ranked by adequacy: Very Low, Low, Medium, High and Very High. Each rank is categorized by a range of nutrient concentrations determined in parts per million (ppm) (Table 1) (Mylavarapu et al., 2013, 2014). These ranges determine the amount, if any, of a particular nutrient that should be applied for successful crop production based on the Crop Nutrient Requirement (CNR). Crop requirements for various nutrients have been determined based on lab and field research on crop response (Hochmuth

et al., 2014). The critical soil test level of a nutrient is the maximum amount of nutrient that, when applied to the soil, would produce an optimum yield or quality increase. Nutrient additions above this maximum amount will not produce a yield increase. The third step, recommendation, is based on the rank of nutrient adequacy for specific crops. For example, a High or a Very High category does not require any nutrient additions and therefore application of that nutrient is not recommended.

Soil testing involves collecting a representative soil sample(s) from a uniform field up to 40 acres that will be managed similarly. The soil sample is analyzed at the ESTL using specific standard soil test procedures. First the sample is subjected to an extraction procedure using an appropriate solution. In Florida, different extractants have been adopted based on the type of soil. For acidic soils the extractant used is Mehlich-3 (Mylavarapu et al., 2014) and for all calcareous soils in the state with a pH of ≥ 7.4 , the extractant adopted is Ammonium Bicarbonate-DTPA (AB-DTPA) (Mylavarapu et al., 2014a). For organic soils, either water extraction or ammonium acetate extraction procedure is used depending on the nutrient in question. The suitabilities of these extractant solutions for specific soils have been determined based on multi-year field calibration studies (Hochmuth et al., 2014a). The extraction procedure is expected to mimic

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2. Rao S. Mylavarapu, professor, Nutrient Management Specialist and Director of UF/IFAS ARL/ESTL, Department of Soil and Water Sciences; UF/IFAS Extension, Gainesville, FL 32611.

release of nutrients from the soil and therefore provide an *estimate* of the amount of nutrients that the soil can supply. Lime requirement is also determined using Adams Evans buffer solution (pH 8.0) for a particular crops target pH for optimum crop response.

Standardized Nutrient Recommendations

Researcher(s) and/or specialist(s), through the Unit administration, must approach the UF/IFAS Plant Nutrient Oversight Committee (PNOC) with proposals and documentation for new recommendations and revisions to existing ones. The PNOC meets quarterly and is presided over by the Dean for Extension. The Dean for Research and several Unit Heads comprise the active membership of the Committee. The Committee will approve or disapprove each recommendation after a review of the materials and once all the questions/comments are addressed by the researchers and/or specialists to its satisfaction. Any revisions and updates to the existing recommendations go through the same procedure as described above. Once approved, the recommendations are forwarded to the ESTL for incorporation into the soil test reports for the clients. Causes to approach the PNOC with proposals for new or modified recommendations may include new crops, new varieties, and new or modified soil extractants and analytical procedures.

State and local agencies have identified UF/IFAS standardized soil testing procedures and nutrient recommendations for various commodities as the basis for developing and implementing Best Management Practices (BMPs), which are designed to sustain and improve the economic profitability of crop production while minimizing the deleterious environmental impacts from cropping practices. This is becoming more important in nutrient-sensitive regions of the state, like the Everglades, Lake Okeechobee, the Suwannee, St. Johns River, and so on. BMPs add a relatively new dimension to the already-complex process of soil testing and nutrient recommendation, hence the need for fine-tuning.

Any UF/IFAS researcher/specialist who needs to approach the PNOC for reviewing a nutrient recommendation—including both fertilization recommendations and BMPs—should submit a proposal, along with any documentation and other supporting material, as an agenda item for the meetings. Proposals should be submitted to the Office of the Dean for Extension and Chair of the Plant Nutrient Oversight Committee, UF/IFAS, PO Box 110210,

Gainesville, FL 32611-0210, Tel: 352-392-1761, FAX 352-392-3583, email extadm@ifas.ufl.edu.

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Table 1. Revised Soil Test Interpretation for Mehlich-3 Extraction Method for Agronomic and Horticultural Crops and Landscapes

Nutrient	Mehlich-3, mg kg ⁻¹		
	LOW	MEDIUM	HIGH
P	≤25	26–45	>45
K	≤35	36–60	>60
Mg	≤20	21–40	>40

Source: Mylavarapu, Obreza, Morgan, Hochmuth, Nair, and Wright (2014)