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CROP DEFICIENCY SYMPTOMS – CAN YOU READ THE SIGNS?

Are you able to identify nutrient deficiencies from plant symptoms in the field? If not, it's time to go out and gather some information. Your soil and plant analysis lab agronomist will help you interpret some of the symptoms observed. A good knowledge of nutrient deficiency symptoms is required as much as an understanding of the effects of water, temperature, salinity, and pest stresses.

Plants in the field integrate all the environmental, soil, cultivar, and management factors that interact to affect crop growth and development. Plant tissue samples collected during the season can be used to diagnose nutrient imbalances. While for some nutrients this diagnosis may not be in time to take corrective action, it provides information for future nutrient management.

Nutrients differ in the plant parts where their deficiency is expressed. Nutrients that are mobile in the plant can generally move from old to young tissue when insufficient soil supplies exist. As a result, it is the older leaves that show the deficiency first. Examples of mobile nutrients include phosphorus, potassium, and magnesium. Nutrients which are not mobile in the plant result in the young or new tissue showing the deficiency first. Examples of non-mobile nutrients include sulfur, calcium, and the micronutrients...manganese, iron, boron, zinc, copper, and molybdenum. Nitrogen deficiency often causes the entire plant to be pale or yellowish green.

Visual symptoms are not always a clear indicator of which nutrient is deficient. Chlorosis, or yellowing, is a common deficiency response to many nutrients. With the exception of phosphorus, all of the macronutrients and most of the micronutrients show some form of leaf chlorosis. Phosphorus deficiencies show up as purplish patches on the lower leaves and general stunting of the plant. Potassium differs from the other nutrients in that the chlorosis on leaves occurs first around the leaf margin, with the areas eventually dying (necrosis) and drying up. Manganese and iron deficiencies appear as interveinal chlorosis...that is, yellowing between the veins in the leaves. Deficiencies of several nutrients (boron, zinc, copper, calcium, and molybdenum) lead to deformation in the plant leaves.

Proper interpretation of plant tissue analyses depends on appropriate and representative sample collection. Most laboratories can provide specific sampling guidelines for different crops. In addition to giving instructions on how to take the samples, they usually stress these points: 1) samples should be free of soil contamination; 2) samples must be placed in paper bags (not plastic); 3) samples should be quickly dried to stop enzymatic reactions and to prevent spoilage in shipment; and 4) samples must be shipped as rapidly as possible after drying.

The results of plant analysis alone should not be used to make fertilizer recommendations. Most crop advisers prefer to consider plant tissue analysis along with soil test results, a record of nutrient applications (including any manure), cropping history and recent pesticide applications. Consider using a laboratory that can demonstrate proficiency in analytical testing and provide a reasonable turn-around on the results, with clear interpretation.

Field records of where deficiencies were observed should be kept from year to year, with location coordinates noted as accurately as possible. Areas of the field that have recurring problems, or problems that appear to be spreading from one year to the next, should be more carefully sampled for both plant and soil analysis and evaluated for special management needs.

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