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## PLANT NUTRIENT ANALYSES IDENTIFIES YIELD-ROBBING SHORTAGES

**In the under-developed and developing countries, we might not be too surprised to frequently observe nutrient deficiency symptoms in major field crops.** In North America, there is a perception among many urban dwellers, and even many in agricultural communities, that observance of nutrient deficiencies in leading field crops like corn, sorghum, soybean, wheat, cotton, and rice is relatively rare. Yet it is important to recognize, by the time plant nutrient deficiency symptoms are visually observed, significant crop yield has been lost and soil productivity has been compromised.

**Summaries of more than 2.7 million soil samples in North America by the International Plant Nutrition Institute (IPNI) showed that soil test phosphorus (P) levels had declined an average of 6 parts per million (ppm) from 2005 to 2010; mainly in the Corn Belt and the Central Great Plains.** Those declines in soil test P could largely be explained by the cumulative crop harvest P removal exceeding P inputs. Similarly, median soil test potassium (K) levels declined an average of 4 ppm between 2005 and 2010; indicating 50% or more of the sampled areas likely needed K application to avoid crop yield losses, especially east of the Mississippi River and in the provinces of eastern Canada. When P and K are below agronomic optimum levels, poor crop growth and inefficient nitrogen (N) use can result. Inadequate secondary and micronutrient nutrition can also limit crop performance and N use efficiency.

**Other factors like soil compaction, inadequate or excessive soil moisture, root injury by insects and pathogens and foliar diseases can also affect crop nutrition, and sometimes lead to inaccurate visual diagnoses.** More farmers are using on-the-go crop greenness sensors or other aerial imagery - primarily in corn and wheat systems - to identify crop greenness as an indicator of the N nutrition status. Those greenness-sensing technologies work best when all other nutrients are at or above agronomic optimum levels. To be sure that crops have adequate nutrition in-season, and to avoid potential visual misdiagnoses, more growers and crop advisers should consider collecting representative plant tissue samples and performing plant tissue nutrient analyses. Plant tissue analysis can be used to accurately identify shortages and imbalances that short-change crop yield and quality, and which may leave plants more susceptible to attack by insects and diseases.

**Make sure that crops in your fields are not experiencing “hidden hunger.” Collect representative plant tissue samples, and submit them to a reliable laboratory for nutrient analyses.** Be sure to sample the right plant parts; and if you are uncertain which parts to sample, consult your laboratory, crop adviser, extension agent, or a reputable plant nutrition website for guidance.

**Soil testing and plant analyses are like tandem axles under vehicles and trailers.** You may be able to manage getting by with one for a short time, but to avoid the risk of damage and lost performance, it is best to rely on both. Consider plant tissue sampling “healthier” versus “unhealthy,” or better-performing” versus “under-performing” areas in your fields to learn if differences may be caused by inadequate plant nutrition. Don’t let “hidden hunger” act like a cancer, eating away your crop productivity and economic viability until it is too late. Use both soil testing and plant tissue analyses to evaluate and fine-tune your crop nutrition management.

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