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Plant Nutrition TODAY
Better Crops, Better Environment...through Science

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DROUGHT: FERTILIZING FOR THE NEXT CROP

Drought. The impact on crop production has been sobering, but more than yield has been affected. The cycle of every nutrient has also been impacted. This year, taking measurements is more important than ever in 4R Nutrient Stewardship programs.

Compared to seasons with normal rainfall, residual soil nitrate can be higher after a drought where N was applied to a cereal crop. Higher levels arise from decreased downward movement of soil water and from reduced fertilizer N uptake by the drought-stressed plant.

Whether or not residual N will be available for next season's crop depends greatly on the precipitation that occurs after harvest. In the Midwest, precipitation occurring early in the following season is associated with higher losses of nitrate in tile drainage. Soil nitrate tests are the best tool for assessing the quantity of residual soil N available to the next crop. Additionally, cover crops can be planted after harvest to take up some of the residual nitrate and protect it from environmental losses.

In many areas, crops originally intended for grain harvest were cut instead for forage. The change from harvesting grain to harvesting most of the aboveground portion of the plant changes how much of each nutrient is removed. If grain was harvested as planned, grain nutrient concentrations of drought-stressed crops may or may not differ from unstressed plants, depending on the crop as well as the timing and severity of water deficits. Tissue testing of harvested crop portions is essential this year to determine changes from planned nutrient removal. This is especially important for P and K.

Very little data exist on how N credits are affected for cereals grown after legumes under drought conditions. If drought occurred during the growth of the legumes, it is hypothesized that more residual nitrate will exist in the soil, since legumes often scavenge soil nitrate under normal growth. How drought affects the amount of readily mineralizable N from root exudates is not well quantified. However, legumes are regularly used in arid areas to provide N to cereal crops, so it seems reasonable to take some to all of the N credit used normally.

Soil tests after a drought may contain some unexpected variance when compared with tests from more normal years. The immobile nutrient most sensitive to environmental conditions during sampling is K. Lack of rainfall reduces the leaching of K from plant tissues prior to sampling, which can reduce soil test results. Additionally, soil mineralogy can either increase or decrease the amount of available K under drought conditions. Taking soil samples in a drought year and looking at the changes can provide valuable data for improved interpretation in future years when dry conditions strike again.

The impacts of drought on crop nutrition are profound. Soil testing and plant analysis remain our best tools to quantify these impacts to adjust nutrient management for the next crop. Discussing analytical results with a trusted and knowledgeable agronomist ensures informed strategies can be created to meet local conditions.

For more information from IPNI on nutrient management following a drought, visit http://www.ipni.net.

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Abbreviations: N = nitrogen; P = phosphorus; K = potassium.