



## Trouble-shooting Deficient Crops

**This season's growing conditions could be leading to a lack of nutrients, making crops look less than healthy.**

Extra rain can flood crops, depleting the soil of oxygen and increasing the amount of carbon dioxide. This leads to limited root growth in the plants.

If your crops aren't looking as spritely this season as you expected them to, your first instinct may be to get a soil test to find out what nutrients your soil is lacking. However, if you're doing things right, it's likely your soil test shows healthy soil, meaning the weather and other growing season conditions are to blame for your deficient crop.

"Environmental conditions play an important role in nutrient availability," says Fabián Fernández, University of Illinois Extension specialist in soil fertility and plant nutrition. "Plants obtain most of their nutrients and water from the soil through their root system. Any factor that re-stricts root growth and activity has the potential to restrict nutrient availability."

### Causes of Crop Nutrient Deficiency

Four factors may be causing this season's observed crop deficiencies, Fernández says.

#### 1. Extra Rain

Excess water in the soil depletes oxygen and builds up carbon-dioxide levels. While oxygen is needed by the roots to grow and take up nutrients, high carbon-dioxide levels are toxic and limit root growth and activity.

#### 2. Cooler Weather

Temperature influences how soil nutrients are absorbed by plants. Under cool soil temperatures, chemical reactions and root activity decrease, rendering nutrients less available to the crop. Plant nutrients are taken up as roots extract soil water to replenish water lost through the leaves. Cool air temperatures can lower evapotranspiration and reduce the convective flow of water and nutrients from the soil to the plant root.

#### 3. Cloudy Skies

Light intensity affects nutrient availability. Many days in this growing season have been characterized by low light intensity due to cloudiness. Low light intensity reduces photosynthetic rates and nutrient uptake by the crop.

#### 4. Crop Residue

Immobilization of nitrogen occurs when plant-available nitrogen becomes temporarily unavailable as microorganisms breakdown crop residue. This has been observed in corn fields planted on previous corn fields. As crop residue and soil organic matter starts to mineralize, nitrogen will become available to the plant. If the full amount of nitrogen has not been applied yet, a sidedress application of urea ammonium nitrate (UAN) can help provide the nitrogen the plant needs at this time.

"As growing conditions improve, most nutrient deficiency symptoms will disappear without additional fertilization," Fernández says.

In Illinois, there are instances in which calcium, magnesium, sulfur and a few micronutrients may be deficient in crops, but these crop deficiencies are not widely seen.

"The use of micronutrient fertilizers should be limited to areas of known deficiency, and only the deficient nutrient should be applied," he says. "Exceptions to this are situations in which producers already in the highest yield bracket try micronutrients experimentally in fields that are yielding less than would be expected under good manage-ment, which includes an adequate N, P and K fertility program and a favorable pH."

### Testing for Crop Nutrient Deficiency

If you suspect a nutrient deficiency in your crop, Fernández encourages you to collect plant samples and send them to a laboratory for nutrient analysis.

When diagnosing a crop fertility problem through plant analysis, select paired samples of compa-rable plant parts representing the abnormal and normal plants. After collecting the samples, deliver them immediately to the laboratory. Samples should be air-dried if they cannot be delivered immediately or if they are going to be shipped.

Soil factors (fertility status, temperature and moisture) and plant factors (cultivar and development stage) may complicate



the interpretation of plant analysis data. The more information provided concerning a particular field, the more reliable the interpretation will be.

“Because growing season conditions accentuate problems that might not be as evident in other years, this is a good time to learn about field conditions or management practices that should be adjusted to prevent or lessen problems in the future,” Fernández says.