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INTERPRETING SOIL TEST RESULTS… A CRITICAL STAGE WHEN DEVELOPING FERTILIZER RECOMMENDATIONS

It is one thing to take soil samples and another to effectively interpret the results. Soil sample analysis results are usually reported in parts per million (ppm). That means micrograms of the nutrient per gram of soil tested (µg/g). Or, in some instances results are reported as pounds of nutrient per acre of topsoil (lb/A).

The levels of the nutrient are usually rated into categories of availability based on field calibration research results for the local area or region. For example, common categories are very low, low, adequate, high, and excess. The amount of fertilizer nutrient to be added is based on the level of nutrient availability and the probability of obtaining a crop growth and yield response. A very low test result would mean a relatively high rate of fertilizer could be added and this rate decreases in amount when the test result increases until no fertilizer is recommended when an excess test result is observed. A misinterpretation of the availability of a specific nutrient may mean that insufficient or excess amounts of a nutrient may be recommended.

Sometimes the results received from the lab are quite different than what has been observed in the past or what was expected. It is important to understand why the results are different. The advantage of taking and reviewing the results of soil testing on a specific field on a regular basis, ideally each year, is that it allows comparison of this year's results with past year's results. If the level of a specific nutrient is unusually lower or higher than observed, it is important to try to understand why the level is different. For example, if the level of NO_3-N in a soil after a wheat crop is usually between 7.5 and 15.0 ppm and if the level is very low at 3 ppm (or contrastingly very high at 40 ppm) the two unusual results might be due to the extremes in weather experienced during the growing season. An unusually low soil test result such as the 3 ppm above may be due to a very good growing season with ample precipitation and excellent crop growth that removed more N from the soil than normal. The unusually high soil test result (i.e. 40 ppm) may be due to a very dry growing season where crop growth was so limited by the lack of moisture that much of the plant available N in the soil wasn't used and remains in the soil.

What factors can cause soil test results to be different than normal? The most common factor is extremes in weather, either unusually moist or unusually dry as noted above. Other factors causing an excess nutrient level may be a crop failure resulting from early frost, a planting problem, severe insect or fungal disease infestation, or severe hail damage. Sometimes a low soil test results from a mistake in soil sample collection when a deeper sample than planned and reported was taken. Possibly a 0 to 12-in. sample was collected when a 0 to 6-in. sample was wanted. This can make a difference, especially for soils with shallow topsoils. Sometimes a higher than normal soil test result can be due to taking a soil sample in an area uncharacteristic of the field. For example, if one of the 20 subsamples that were mixed together to make up the field sample is taken near the edge of a low-lying saline depression, the S soil test result for the field sample may test very high in SO_4-S (e.g. 85 lb S/A), while the average soil test level of S for the majority of the field may actually be low (e.g. 5 lb S/A). In this example, a zero S fertilizer recommendation would result and much of the subsequent crop could be S-deficient.

It can be useful to contact the laboratory. If you have difficulty in determining why a soil test is unusually lower or higher than expected and you can't figure out why, it can be helpful to contact the soil test laboratory agronomist.

If the soil test results are difficult to explain, it may be best to re-sample. In some instances, an unusual soil test result can't be explained and it is best to resample the field. Often, the second soil test will be more normal.

—TLJ—

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Abbreviations in this article: N = nitrogen; NO_3^- = nitrate; S = sulfur; SO_4 = sulfate; ppm = parts per million.

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