Soil Testing Is Useful Not Only For Nitrogen But Other Nutrients

URBANA, ILL.

Soil testing to determine the nitrogen fertilizer needs for corn in Illinois has not been as useful as testing to determine the needs for limestone, phosphorus, and potassium. Two tests that measure the soil nitrate nitrogen fraction may be appropriate in certain situations and are explained in Chapter 9 of the Illinois Agronomy Handbook.

The early spring nitrate nitrogen test has been used for many years in the drier regions of the Corn Belt with reasonable success. This test requires collecting soil samples in one-foot increments to a two- to three-foot depth in early spring. The procedure measures mostly nitrogen carried over from the previous crop.

The greatest potential for success of this test is where corn follows corn, especially in fields where adverse growing conditions limited yields the previous year and where dry weather has reduced the loss of nitrogen from the soil. Heavy rainfall in late spring or early summer will reduce the usefulness of this test since much of the nitrogen detected earlier in the spring may be leached or denitrified before the corn plants have the opportunity to take it up from the soil.

University research in Wisconsin and Michigan has shown this procedure to work well, but Iowa researchers have indicated that the test did not accurately predict nitrogen needs.

The pre-sidedress nitrate test (PSNT) is typically more accurate in high-yielding environments and in fields that have received manure or other organic fertilizers in the recent past or that have had legume crops with high nitrogen content, such as alfalfa. By sampling later in the growing season, this test provides a measure of the amount of nitrogen mineralized (released) from organic nitrogen plus the amount of carryover nitrogen still present in the soil. Research in several states has shown this test to be useful.

The test requires soil sampling to a one-foot depth when corn is 6 to 12 inches tall (V4 to V6 developmental stage), or in late May to early June when planting is delayed. The reliability of this procedure depends upon proper sample collection, handling, and processing.

PSNT works best if no nitrogen or only a starter amount (20 to 30 pounds of nitrogen per acre) has been applied prior to sampling. One of the limitations of this test is that it is useful only for fields that will receive sidedress nitrogen application, thus the risk of a relatively short application period.

The general consensus is that no additional nitrogen is needed if the PSNT test levels are above 25 parts per million (ppm), and a full rate of nitrogen should be applied if test levels are less than 10 ppm. When levels fall between 10 and 25 ppm, nitrogen rates should be adjusted proportionally.

Further information is available in the Illinois Agronomy Handbook, 24th Edition, which can be ordered online at https://pubsplus.uiuc.edu/C1394.html University of Illinois Extension offices can assist individuals obtaining a copy. In Ogle County call (815) 732-2191 or visit www.extension.uiuc.edu/ogle . Δ