Midwest Laboratories®

NITRATE NITROGEN LEVELS IN CORN STALKS

End of Season Evaluations of Nitrogen Management in Corn

The end-of-season cornstalk test is a tool for evaluating nitrogen (N) management practices used in any corn field in any year. The test is most valuable when used on fields that show no visual signs of N deficiency.

The test is based on the fact that corn plants suffering from inadequate N remove nitrate from the lower cornstalks during the grainfilling period, while corn plants that have extra N accumulate nitrate in their lower stalks during this period. Stalk nitrate-N concentrations can be divided into three categories: low, optimal, and excess.

INTERPRETATIONS - The low category (less than 700 ppm N or 0.07%) indicates high probability that greater availability of N would have resulted in higher yields. Concentrations in this range, however, give little indication of the magnitude of yield increase that might be expected from more available N. Visual signs of N deficiency usually are present when nitrate concentrations are in this range.

The optimal category (700 to 2000 ppm N or 0.07% - 0.20%) indicates high probability that N availability was within the range needed to maximize profits for the producer.

The excess category (greater than 2000 ppm N or 0.20%) indicates high probability that N availability was greater than when fertilizer N was applied at rates that maximize profits for producers.

The concentration of nitrate in the stalk at the end of the season reflects all factors that influenced N availability and N needs during the growing season. Because many factors influence N availability after fertilizers are applied, it is unrealistic to expect any producer to attain optimal concentrations in all fields in all years. Indeed, experience has shown that the optimal range is difficult to attain consistently with existing management practices.

When interpreting the results of the test, consider weather conditions that occurred during the growing season. Rates of fertilization that are most profitable over many years will result in low concentrations in some years and in excess concentrations in other years. Expect lower-than-desired concentrations in years having unusually large amounts of in-season rainfall that results in unusually large losses of N and/or high yield potential. Expect higher-than-desired concentrations in years when unusually low rainfall limits N losses and/or yield potential.

After appropriately considering weather conditions, increase fertilization rates for areas that usually test in the low range and decrease rates for areas that usually test in the excess range.

Concentrations in the excess range indicate that use of the late-spring soil test to guide N fertilization will probably increase profits for the producer.

SAMPLING - Sample between 1 and 3 weeks after black layers have formed on about 80 percent of the kernels of most ears. Sample the 8-inch segment of stalk found between 6 and 14 inches above the soil. Remove leaf sheaths from the segments. Do not use stalks that are severely damaged by disease or insects.

Collect fifteen 8-inch segments at random within an area not larger than 10 acres to form a single sample to send for analysis. Sample areas differing in soil types or management histories separately. Collecting one composite sample from each of several small areas (less than an acre) that seem to be representative of larger areas within a field is an effective strategy.

Send samples to a laboratory for analysis within 24 hours of collection. This analysis can experience a lot of variability if the sample is collected and it sits around for days.