



CHEM RIGHT LABORATORIES, INC.

117 N. MAIN ST. • MAQUOKETA, IOWA 52060
(563) 652-4226 • FAX (563) 652-6137

Sampling for Cornstalk Testing to Evaluate Nitrogen Management

Recent studies have shown that the nitrogen (N) status of a corn crop can be assessed by measuring nitrate concentrations in the lower portion of cornstalks at the end of the growing season.

Basis for the test

Corn plants suffering from inadequate nitrogen availability remove nitrogen from the lower cornstalks and leaves during the grain-filling period. Corn plants that have more nitrogen than needed to attain maximum yields, however, accumulate nitrate in their lower stalks at the end of the season.

Interpretation of stalk nitrate concentrations

Stalk nitrate concentrations can be divided into four categories: **low** (less than 250 ppm N), **marginal** (250 to 700 ppm N), **optimal** (700 to 2000 ppm N), and **excess** (greater than 2000 ppm N).

The **low** category indicates high probability that greater availability of nitrogen would have resulted in higher yields. It should be noted that concentrations in this range give little indication of the magnitude of yield increase that might be expected from more available nitrogen. Visual signs of nitrogen deficiency usually are clear when nitrate concentrations are in this range.

The **marginal** category indicates that nitrogen availability was very close to the minimal amounts needed. Although producers should not be concerned when samples test in the range, this range is too close to economic penalties to be the target for good nitrogen management under most conditions.

The **optimal** category indicates high probability that nitrogen availability was within the range needed to maximize profits for the producer. The higher end of this range is more appropriate when fertilizer N is relatively cheap and grain prices are relatively high (compared with prices in Iowa during the past decade). The lower end of the range is most appropriate when fertilizer nitrogen is relatively expensive and grain prices are relatively low. Visual signs of nitrogen deficiency often are observed in this range.

The **excess** category indicates high probability that nitrogen availability was greater than if fertilizer nitrogen had been applied at rates that maximize profits for producers.

Why the test is needed

Recent surveys using the late-spring soil test and the end-of-season cornstalk test indicate that a high percentage of Iowa cornfields receive substantially more fertilizer nitrogen than is economically optimal. This means that many corn producers can increase their profits by identifying these fields and reducing rates of nitrogen fertilization accordingly.

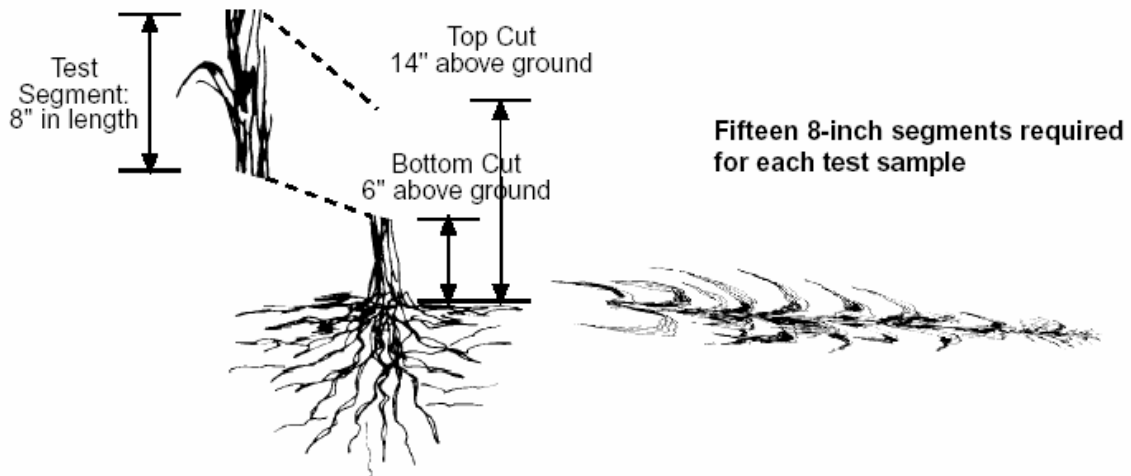
The underlying reason for over-fertilization is that corn plants show no visual symptoms that enable producers to recognize when above-optimal rates nitrogen N have been applied. This means that producers can apply too much nitrogen year after year and never suspect a problem with their nitrogen management. The end-of-season cornstalk test makes it possible for producers to avoid this pitfall.

How the test is done

The time for sampling is between one and three weeks after black layers have formed on about 80 percent of the kernels of most ears.

The portion of each plant sampled is the 8-inch segment of stalk found between 6 and 14 inches above the soil. Leaf sheaths should be removed from the segments. Stalks severely damaged by disease or insects should not be used.

Fifteen 8-inch segments should be collected to form a single sample to be sent for analysis. Areas differing in soil types or management histories should be sampled 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.



Samples should be sent to CRL for analysis as soon as possible after collection. Samples should be placed in paper (not plastic) bags to enable some drying and minimize growth of mold. Samples should be refrigerated (but not frozen) if stored for more than a day before mailing.

CRL will dry the samples as soon as they are received. The samples will be ground and analyzed for nitrate concentrations. Concentrations are expressed as PPM (parts nitrate-N per million parts of dry stover).

CRL's price is \$15.00. Volume discounts are available.

Source: Iowa State University, University Extension
<http://www.extension.iastate.edu/Publications/PM1584.pdf>