



# “End of Season” Cornstalk Test

Research conducted at Purdue University and Iowa State University (ISU) show 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. Surveys indicate that a high percentage of corn fields receive substantially more N fertilizer than is needed.

## WHY TEST

End of season stalk testing was developed to evaluate how well nitrogen fertilizer was utilized by the corn plant. This allows the producer to distinguish between over fertilization and fertilizing to maximize profits.

## BASIS FOR TEST

A relationship between stalk nitrate concentrations and relative yields was developed from trials having rates of N fertilizer applied ranging from 0 to 300 lb. N/acre.

Corn plants with inadequate available nitrogen remove N from lower cornstalks and leaves during the grain filling period.

Corn plants with excess N for maximum yields accumulate nitrate in their lower stalks at the end of the season.

This relationship indicates that stalk N concentration can be divided into four categories for interpretation.

### NITRATE CONCENTRATION CATEGORIES

- Low:** Less than 450 ppm nitrate-N (Purdue), less than 250 ppm (ISU)  
Indicates high probability that greater availability of N would have resulted in higher yields. Visual signs of N deficiency are usually observed in this range.
- Marginal:** 250 - 700 ppm nitrate-N (ISU)  
Producers should not be concerned when samples test in this range. N availability was close to the minimum amount needed for maximum yields but should not be the target for good nitrogen management.
- Optimal:** 450-2000 ppm nitrate-N (Purdue), 700-2000 ppm nitrate-N (ISU)  
Indicates that N supplies were sufficient for maximum yields.  
*Note: The high end of this category is appropriate when N costs are low and corn prices are high. The low end of this category is appropriate when N costs are high and corn prices are low.*
- Excess:** Greater than 2000 ppm nitrate-N  
Indicates that N supplies were above levels needed to maximize profits.

FACT SHEET

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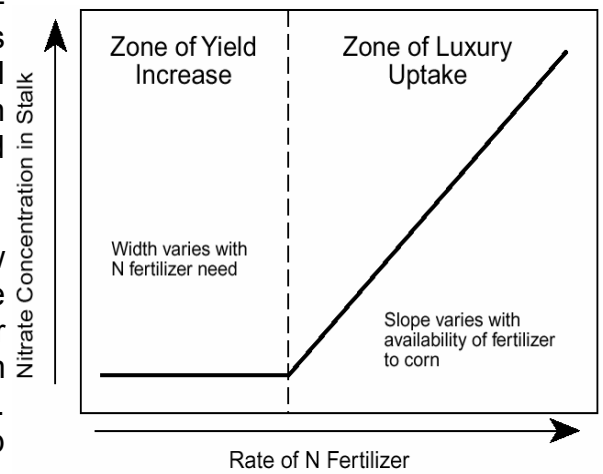
## INTERPRETING RESULTS

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. High rainfall seasons will likely result in lower concentrations, while low rainfall seasons will likely result in higher concentrations.

After consideration is given for weather conditions, fertilization rates should be increased for areas that usually test in the low range and decreased on areas that usually test in the excess range. When you have concentrations consistently in the excess category, most producers profit by using the late spring nitrate soil test to guide N fertilizer needs.

The "End of Season" corn stalk test does not directly indicate how much N rates should be increased or decreased but continued use for several years enables producers to fine tune their N management. The underlying reason for over-fertilization is that corn plants show no visual symptoms that enable producers to recognize when above-optimal rates of N have been applied. The end-of-season cornstalk test makes it possible for producers to avoid the "zone of luxury uptake".

Producers who grow corn on manured soils, who grow corn after alfalfa, and those comparing alternative management practices such as fertilizer materials or methods of application will benefit greatly from observing cornstalk nitrate levels on a yearly basis. Thoughtful use of the test for a few years will help producers optimize rates for their fields.



## HOW TO SAMPLE

**Time:** 1 - 3 weeks after black layers have formed on 80% of the kernels of most ears.

**Where:** 8 inch segment of stalk found between 6 and 14 inches above the soil. Avoid damaged stalks and remove sheaths.

**Amount:** Within an area not larger than 10 acres, fifteen 8 inch segments should be collected at random to form one composite sample to be evaluated. Areas of differing soil types or management should be sampled separately.

**Shipping:** Place in a paper bag (not plastic). Refrigerate if delay in shipping is one or more days. Do not freeze.

