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PREVENT ROOT PRUNING WITH PROPER NITROGEN PLACEMENT AT SIDE-DRESSING

As corn growers prepare to supplement their pre-plant programs with side-dressed N, an understanding of several important points may help improve the efficiency of crop response and N uptake.

- Prior to the 6th or 7th leaf (~25 to 30 days after emergence, or V6-V7), corn roots tend to grow nearly parallel to the soil surface, and in well-drained soils, more than 70% of the roots may be present in the top 10 in. Nitrogen shortage at this time can reduce the number of kernel rows on the ear.
- By 7 to 8 weeks after emergence (after V12), roots extend completely to the row middle and 4 ft. below the base of the corn stalk.
- Research on sandy, irrigated soils has shown consistently higher corn yields with side-dress applications than with N applied before planting.
- About 40 to 50% of the total N uptake usually occurs after tasseling (VT), but uptake accelerates rapidly between V8 and V10 (~30 to 40 days after emergence). Any limitation of root activity and nutrient uptake during this critical period can seriously short-change growth (e.g. leaf area expansion) and cause yield losses (especially the number of kernels along the length of the ear).
- In many systems, applying N to alternating row middles has proven as efficient as application to each row middle – provided that soil compaction, leaching, and water-logging are not limiting effective N use in the application row middle.
- Placing urea-containing products (e.g. urea, urea-ammonium nitrate solutions) into the soil, beneath surface residues, helps minimize the gaseous loss (volatilization) of ammonia from urea-containing N fertilizers. Yield benefits of 8% or more compared to broadcast or surface dribble applications have been measured in research.

Many farmers strive to place side-dressed N near the actively-feeding roots of young plants, especially where plants have not achieved much top growth. Where plants may be 14 to 16 in. tall (i.e. after V6-V7), placement of N mid-way between rows should be adequate. All too often, in an effort to stimulate greater root uptake, application rigs get within 6 to 8 in. of the corn stalks. This “too-close-to-the-row” application may be injuring roots and taking a toll on plant vigor...and yield. When making side-dress N applications, unnecessary root injury can be avoided by spacing application knives or coulters closer to the centers between rows.

With increased N costs, reports of some regional supply/distribution challenges affecting access to N sources, early-season crop stresses...and the current opportunities to capture desirable corn market prices ...can one risk impairing nutrient and water uptake by allowing unnecessary root injury and root pruning by N application equipment? Growers should adjust the spacing of coulters and knives on N applicators before side-dressing this season to improve N use efficiency and effectiveness.

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Abbreviations in this article: N = nitrogen.