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ZINC FERTILITY FOR CORN

Corn, like all crops, requires 17 essential nutrients in varying amounts and any one of the 17 can limit yield if not present in a sufficient amount. For example, only 0.3 lb Zn/A is needed to produce a 180 bu corn crop, but corn is relatively sensitive to Zn deficiency and yield losses can occur even if all other nutrients are present in adequate amounts.

The 2010 IPNI Soil Test Summary indicated that less than 20% of the samples submitted from the southeast US were below a critical level of 1 ppm DTPA equivalent Zn. However, more and more Zn deficiency is being observed in cornfields throughout the region, often in fields that test adequate for Zn prior to planting. In many of these cases, the deficiency symptoms are not uniform across the field, which would explain why a composite soil test would not detect a Zn problem.

There are many factors affecting Zn availability across a landscape including soil temperature, pH, texture, organic matter, and previous crop. Many early season Zn deficiencies are due to cool growing conditions and the plants will grow out of the deficiency as the soil warms and yield losses are not likely. Approximately 70% of the Zn requirement for a corn crop is taken up via diffusion (driven by a concentration gradient at the root surface) and root interception (roots physically contacting Zn on soil particles as they grow). Thus, any factor that affects root growth (compaction, disease or insect damage) can also affect Zn uptake.

Zn fertilizer rate recommendations throughout the south vary some, but in general, broadcasting 10 lb Zn/A will raise soil Zn levels to an adequate amount. The broadcast recommendation (typically applied as zinc sulfate) is expected to be effective for 3 to 5 years, depending on cropping system, but soil tests should be used to determine when additional fertilization is needed. Some states recommend a lower rate if the Zn is to be band-applied. However, these reduced rates are usually anticipated to be annual applications as part of a starter blend.

Foliar Zn applications have been shown to be as effective as an in-season fertilization strategy. However, this approach is best utilized as a rescue treatment or as a compliment to a sound soil-based fertility program.

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Abbreviations: Zn = zinc; DTPA = Diethyl Triamine Penta-Acetic.