

Corn Starter Fertilizer with Zinc

Getting corn off to the best possible start is on the mind of growers each spring. Starter fertilizer is one way to help ensure nutrient availability to the crop early in the season. While zinc (Zn) is needed in much smaller quantities than nitrogen (N), phosphorus (P), and potassium (K), it is important to acknowledge its contribution to corn development. Including Zn with starter fertilizer is being examined as a way to improve yield potential.

Role of Zinc

Because Zn is required by corn in very small amounts, it is termed a micronutrient. Zinc is an important component of multiple enzymes that drive metabolic reactions in all crops.

Zinc Deficiency Symptoms

Plants fail to develop normally when Zn is deficient. A Zn deficient corn plant exhibits interveinal chlorosis on the upper leaves. The veins, midrib, and leaf margin remain green. As the deficiency intensifies, bands (or "stripes") develop on either side of the midrib and the leaves may turn almost white (Figure 1). Additionally, a Zn deficient corn plant may be stunted, *i.e.* shortened internodes on the stalk (Figure 2).



Figure 1. A young corn plant showing typical zinc deficiency symptoms. Note the broad white stripes on both sides of the leaf midrib. Photo courtesy: University of Minnesota Extension, *Zinc for Crop Production*. www.extension.umn.edu

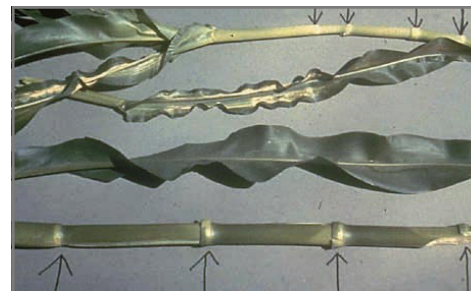


Figure 2. A normal plant (*bottom*) is shown in contrast to the zinc-deficient plant, which has shortened internodes. Photo courtesy: University of Minnesota Extension, *Zinc for Crop Production*. www.extension.umn.edu

Tissue testing can confirm deficiencies. Foliar fertilizers to correct deficiencies may be an option, or, starter fertilizer with Zn may be a proactive approach to preventing Zn deficiency.

Zinc Management

Several situations exist where including Zn may be beneficial in a fertilizer program¹:

- Soil pH above 7.4; Zn availability may be reduced in soils with high soil pH values.
- Cool/wet soils, when mineralization is slowed
- Sandy soils or soils with low organic matter
- Topsoil removed, or eroded soils
- High phosphorus (P) levels; a P-induced Zn deficiency is a concern and may occur if very high rates of phosphate fertilizer (more than 100 lb P₂O₅/acre) are used and the soil test for Zn is in the low and very low range.

A soil test can be used to determine Zn levels. A 200 bu/acre corn crop requires approximately 0.4 lbs/acre of Zn². The

addition of Zn in small quantities can produce significant increases in crop production, where soil test Zn levels are low¹. For example, a University of Nebraska study found that when applied in a band near the seed at planting, a rate of 0.1 lb. Zn/acre nearly doubled the yield of irrigated corn. This is an extremely rare occurrence, and it should be noted that the Zn soil test was low. University of Nebraska recommends Zn be included in starter when the Zn soil value is marginally adequate³.

Zinc sulfate is the most common source of Zn. It can be applied in a band application with dry starter fertilizer at planting.

In summary, corn is sensitive to low soil Zn levels. If soil tests, previous field history, or plant analyses indicate a Zn deficiency, then adding Zn to a starter fertilizer will likely show a positive yield response.

References. ¹Rehm, G. and M. Schmitt. 1997. *Zinc for crop production*. University of Minnesota Extension publication FO-00720-GO.

²Mengel, D.B. *Role of Micronutrients in Efficient Crop Production*. Purdue University AY-239.

³Hergert, G.W. and C.S. Wortmann. *Using starter fertilizers for corn, grain sorghum, and soybeans*. University of Nebraska. NebGuide G361. Revised June 2006.