



Zinc is Important for Corn

By Dr. Tarlok Singh Sahota, CCA

Zinc (Zn) is an essential micronutrient, involved in production of auxin, a natural plant growth hormone, and many other important plant functions. Zinc deficiency results in poor root development, stunted growth and small leaves/internodes. In corn, zinc deficiency depicts as a white or yellow band parallel to the mid rib. The most severe symptoms occur on the youngest leaves. Silking and tasseling are delayed and the kernels may be chalky. Zn deficiency symptoms in corn are easy to identify and least confused with other deficiency symptoms.



Figure 1: Zinc deficiency symptoms in corn

The critical soil-test level for available Zn is 1-1.3ppm. The following factors can minimize availability of Zn to corn (and other plants) even if the soil test indicates sufficient quantities of Zn in soils:

- Cool wet soils, as is usually the case in spring season, especially in northwestern Ontario, can cause Zn deficiency by restricting root growth, Zn solubility, Zn uptake and Zn release from soil organic matter; Zn is very sensitive to cold temperatures.
- Acidic soils, sandy soils, soils naturally high in clay content and phosphates.
- Heavy application of phosphorus (P) through

fertilizers or manure. Phosphate binds Zn, rendering it unavailable.

- Higher rates of nitrogen (N) application can promote crop growth to a point where Zn requirement of plants exceeds its availability in the soil.
- Soil compaction.
- Continuous cropping with high yielding varieties without inclusion of Zn in the fertilizer program.

Thus even in soils with adequate tests for Zn, there is no guarantee that corn will not exhibit Zn deficiency. As a

consequence of Zn deficiency, as much as 50% reduction in crop growth can result without the appearance of visual symptoms. Therefore, some Zn in the fertilizer program could be an inexpensive insurance for a high yield corn crop.

Sources of Zn include zinc sulphate (20-36% Zn), zinc oxy-sulphate (38-50% Zn), zinc oxide (50-80% Zn), zinc chloride (50% Zn), zinc EDTA chelate (6-14% Zn) and zinc HEDTA chelate (6-10% Zn). The EDTA sources are more effective than others, but are costlier too. Zinc sulphate is the best alternative. However, zinc oxide is the best to build up soil Zn in the long run, at a lower cost, Corn yielding 150bu/acre is

known to remove 0.25 pounds (0.10lb by grains and 0.15lb by stover) Zn/acre. This equals only about 280 gram Zn/ha. If the stover is left in the field, Zn nutrition would be less of a concern than when stover is removed or if the corn is cultivated for silage in which entire stem is harvested. Often the quantities required for application are more than the crop uptake, because only up to 20% of the applied Zn will be taken up by the crop; the rest is converted into unavailable forms in the soil.

Zn can be applied both to soil and to foliage, though the latter should be resorted to as a temporary measure to correct the deficiency symptoms.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) recommends that Zn, if required, may be applied to the soil mixed in the fertilizer at rates supplying 4-14 kg/ha (3.5-12.5 lb/ac). The higher rate should be sufficient for up to 3 years. Not more than 4 kg/ha should be banded at planting. Zinc may be applied as a foliar spray at rates supplying 60 g/100 L (0.6 lb/100 gal). OMAFRA recommends application of Zn on the basis of a zinc index and advocates that 25-200 zinc index is optimum for corn. This is a wide a range. I have observed Zn deficiency in corn fields that were within this range, though on the lower side. The picture in this note is from one such field.

Although the reports indicate improved yields, such improvements may not be always certain. However, applying zinc may be a relatively low cost insurance for your corn crop in unfavourable soil and climatic conditions.

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Tarlok Singh Sahota Ph.D. is a Certified Crop Adviser employed as the Director of Research and Business, at the Thunder Bay Agricultural Research Station.

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