

B Boron applications for increased yields of high-yield field corn and sweet corn

- Boron is essential for all plant growth. It aids in the transfer of sugars and nutrients from leaves to reproductive organs, and increases pollination and seed development.
- Corn requires a supply of available boron, especially during tasseling and silking. Where needed, a preplant application of *Granubor*[®] 2 or a foliar spray of *Solubor*[®] prior to these stages of growth generally will ensure an adequate supply of boron.
- Only certain varieties of field corn under high-yield conditions – and some sweet corn varieties – may respond to applied boron, especially on sandy soils in high rainfall regions, or with adverse weather conditions during the critical stages of tasseling and silking.
- Corn is sensitive to over-applications of boron, and boron toxicity can result if the recommended boron application rates and methods are not carefully followed.

Corn requires a high fertility soil for optimum production. Well-drained soils with a good supply of organic matter which have been well fertilized and limed over several years will generally produce the highest grain yields.

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Cell wall strength, cell division, seed development and sugar transport are plant functions of B. While B requirements for optimum plant nutrition are low as compared with those of the primary nutrients, the need for B is especially significant during tasseling and silking stages.

Deficiency symptoms

Boron-deficiency symptoms are rare in most corn varieties. The most common B-deficiency symptom is small, misshapen cobs with missing kernels, resulting in significantly decreased yields. Under cases of extreme B deficiency, the leaves also may have small white dead spots and be brittle.

Soil tests and plant analyses

Boron deficiencies may occur on coarse-textured soils where organic matter content is low, on soils with a pH above 6.0, and on recently limed soils.

Soil testing and plant analyses are both helpful in assessing the potential B-supplying capacity of the soil and the current B status of the growing plant.

The critical level of hot-water-soluble B for corn in most soils ranges from 0.2 to 0.5 ppm, depending on the soil pH, organic matter content and texture. Corn grown on soils that are lower than the critical level may respond to applied B, depending on the variety and the weather conditions during the critical stages of reproduction.

The critical level of B in the upper mature corn leaves is about 5 ppm, but the usual leaf-B range is 10-20 ppm. Corn plants with leaf B contents below the critical level should be sprayed with *Solubor*[®] before tasseling and silking.

Boron recommendations for corn	
<p>Marginal soil test B and/or leaf analyses, or dry weather during critical stages:</p> <p>One foliar spray at a rate of 1.25 lbs. of <i>Solubor</i>[®]/acre (0.25 lbs. of B/acre) before tasseling. <i>Solubor</i>[®] can be foliar applied alone or with insecticides to plants.</p>	<p>Low soil test B and a prior history of B response:</p> <p>A soil application of 7 lbs. of <i>Granubor</i>[®] 2/acre (1 lb. of B/acre) surface broadcast and incorporated prior to planting. If boron is banded with fertilizer at planting, 0.5 lbs. of B/acre is suggested. Boron may also be applied in sidedressed nitrogen fertilizer at the rate of 1.0 lb. of B/acre. A foliar spray at 1.25 lbs. of <i>Solubor</i>[®]/acre (0.25 lbs./acre) also may be applied before tasseling.</p>

Recommendations for corn

Yield responses to applied B are inconsistent and seasonal, probably due to environmental effects on crop growth. However, yields of some varieties of high-yield field corn and sweet corn may be improved with B fertilization, especially on sandy soils in high rainfall regions, or with over-irrigation because soluble B can be easily leached from the root zone. Adverse weather conditions also can decrease the supply of available B in soil and/or B uptake by the plant during the critical stages of tasseling and silking. Response to applied B generally is greatest when there are adequate supplies of other nutrients.

Data below show increased corn yields with a sidedressed application of B with high potassium fertilization on a sandy soil. Other studies have reported corn yield increases with foliar sprays of 1.25 lbs. of *Solubor*[®]/acre prior to tasseling.

Response of corn to sidedressed Granubor (Three-Year Averages)		
B applied, lbs./acre	Ear leaf B, ppm	Yield, bu./acre
0	3.6	151
2	18.7	167
LSD (0.10)	2.7	11

Woodruff, J. R., F. W. Moore and H. L. Musen. *Agronomy Journal* 79:520-524, 1987.

For more information

- Call US Borax at 1 (800) 699 9005
- Visit our website at www.borax.com/agriculture