

B

Boron applications for increased soybean yields

- 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.
- Soybeans require an adequate supply of available boron, especially during flowering and seed development. Multiple foliar sprays of *Solubor*[®] will ensure an adequate supply of boron during this stage of growth.
- Foliar sprays of *Solubor*[®] can be combined with other field treatments, such as insecticides, to reduce costs.
- Preplant soil application of *Granubor*[®] 2 plus foliar sprays of *Solubor*[®] during the season are recommended for soils testing low in available boron.

Soybeans require 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 soybean yields.

Cell wall strength, cell division, fruit and seed development and sugar transport are plant functions related to boron (B). While B requirements for optimum plant nutrition are low compared with those of the primary nutrients, the need for B is especially significant in flowering and seed development.

Deficiency symptoms

Because B is vital to flower formation and seed production, a decrease in B supply during this critical stage can result in decreased yields. Boron deficiency results in interveinal chlorosis of the plant foliage with brittle leaves in the youngest growth. Stunted roots with few or no flowers also may be evident. Floral buds may wither before opening.

Soil tests and plant analyses

Boron deficiencies may be suspected 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 soybeans in most soils ranges from 0.2 to 0.5 ppm, depending on the soil pH, organic matter content and texture. Soybeans which are grown on soils that are less than the critical level generally will respond to applied B.

The critical level of B in the top mature soybean leaves is about 20 ppm, but the ideal level is about 30 ppm. Soybean plants with leaf B contents below the critical level should be sprayed one or more times with *Solubor*[®] after flower initiation and during seed development.

Recommendations for soybeans

Yield responses to applied B are inconsistent and seasonal, probably due to environmental effects on soybean growth. However, both yield and quality of soybeans may be improved with B fertilization because available B levels are low in some soils.

Boron should be applied for soybeans especially on sandy soils in high rainfall regions or with over-irrigation because soluble B can be easily leached from the root zone. Soybean response to applied B generally is greatest when there are adequate supplies of the other nutrients.

Boron recommendations for soybeans	
<p>Marginal soil test B and/or leaf analyses, or dry weather during critical stages:</p> <p>Multiple foliar sprays at rates of 0.5 lbs. (0.1 lbs. of B/acre) weekly for 3 - 5 times before flower initiation and development. <i>Solubor</i>® can be applied to vines alone, or with insecticides.</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.</p>

Data below show increased soybean yields with foliar applications of B, nitrogen (N) and/or magnesium (Mg) which were made during the R3 to R5 stages of growth in Georgia. Four foliar applications of various combinations of *Solubor*®, urea or UAN solution, and MgSO₄ resulted in 5-20% increases in yields. Highest yield increases were with B + N or B + Mg foliar sprays applied at 25 gal./acre. Other studies have reported soybean yield increases with one or two foliar sprays of 1.25 lbs. of *Solubor*®/acre applied alone or in combination with the insecticide, Dimilin®.

Response of soybeans to late-season foliar sprays of one or more nutrients				
Nutrient applied, lbs./acre			Yield, bu./acre	
B	N	Mg	Bonifay Sand	Greenville Sandy Loam
—	—	—	37.8	38.3
—	40	—	44.3	40.7
0.4	—	—	38.9	43.6
0.4	40	—	46.0	42.2
—	—	0.25	40.2	40.9
—	40	0.25	39.4	43.5
0.4	40	0.25	47.2	41.3
0.4	40	0.25	42.0	42.5

G. J. Gascho, Fluid Journal 1(2): 15-16, 1993.

For more information

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