

B

The role of boron in flowering and fruit, nut and seed formation

- Boron is actively involved in pollen germination and fruit, nut and seed formation.
- The boron requirement for flowering and seed set may be higher than that needed for vegetative growth.
- Boron can become limiting at critical periods during seed set due to drought periods which may reduce root activity, or when heavy rainfall has leached available boron from the root zone in soil.
- One or more foliar sprays of *Solubor*[®] just prior to, or at flowering and seed set can ensure that there is a sufficient supply of boron during this critical period of reproductive growth.

Boron (B) has a significant effect in pollen germination and pollen tube growth. The viability of pollen grains also decreases when B is deficient. Production of fruit, nut and seed crops is adversely affected much more than vegetative growth with a low supply of available B in soil.

Boron deficiency increases the drop of buds and flowers, resulting in significant reductions in seed and fruit set and also in the quality of developing fruit, nuts and seed.

Cereals and grasses are less sensitive than legumes and some vegetable crops to low levels of available B. Differences in B requirements among species may be related to differences in cell wall composition. Boron deficiencies occur more frequently in some legumes than in grasses. The critical deficiency concentration of B is 3 to 4 times greater for younger than older leaves in dicots such as alfalfa and soybean, an indication of immobility of B in these species.

Environmental conditions affecting available boron in soils

Environmental conditions can lead to low availability of soil B. Leaching of available B from the root zone due to high rainfall is a major problem, especially if heavy rainfall occurs on coarse-textured soils just before the rapid growth of leaves and development of flowers. Another adverse environmental condition is when a drought period occurs just prior to, or during, flowering and seed set. Plant root activity is decreased in dry soils; consequently, B uptake may be reduced at the time of maximum B utilization in plants.

Correction of B deficiencies with Solubor foliar sprays

Soil conditions are highly variable. Therefore, it is important to determine the available B supply when fruit, nut and seed crops are grown. Both soil and plant tissue analyses are strongly recommended to assess the available B status for fruit and nut crops, and also for agronomic or forage crops that are grown for seed production. A combination of soil applications and foliar sprays, depending on the plant species, may be needed when results of soil and/or plant analyses indicate a low supply of available B for the current crop.

There is increasing evidence that correcting foliar symptoms of B deficiency in various fruit and nut crops may not be sufficient to result in full production in some regions. Results of research have shown that fruit and nut yields have been increased by foliar sprays of *Solubor*[®] to plants which do not have visual symptoms of B deficiency. This suggests that flowering and fruit set may have a greater demand for B than does vegetative growth.

Foliar sprays of *Solubor*[®] at the pre-bloom or bloom stages of fruit and nut crops supplies available B at the critical periods of pollen formation, germination and fertilization just prior to seed and fruit set. Foliar-applied B is rapidly absorbed by the leaves and flower buds.

This application will help ensure that flower buds have enough B to carry them through flowering, fertilization and fruit or nut set. However, such sprays may not be sufficient to supply the plant's vegetative requirements on soils which may be low in available B.

For plant species in which B is mobile in the phloem tissue, foliar sprays containing 1 - 2 lbs. of *Solubor*[®]/100 gallons of water appear to provide sufficient available B for subsequent flower development. Leaf B concentrations also are increased by these foliar sprays. In deciduous fruit and nut trees, the B supply for flowers is derived from stored B, because flowering precedes root uptake of B in the spring. This may result in a temporary B deficiency unless dormant sprays have been applied.

Species in which B is immobile in the phloem tissue need a constant supply of available B, so soil applications may be more appropriate. Timing and rates of foliar *Solubor*[®] applications should be determined by referring to recommendations for specific crops growing in your region. More than one foliar spray may be needed for correction of severe B deficiencies in some crops.

Summary

One of the important functions of B in plant nutrition is its role in fostering pollen growth and development, which is important in seed set and the resulting fruit, nut and grain production. Therefore, it is important to know the available B status for specific crops and the environmental conditions which may reduce B availability prior to, and during the critical period just before and during seed set.

One or more foliar sprays of a B source such as *Solubor*[®], depending on the specific crop, can help ensure that there is sufficient available B at this critical period.

For more information

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