Boron Facts

By Don MacMillan, *CCA*

Boron is an essential nutrient needed by crops in small amounts. Boron is not very mobile in the soil. Coarse textured sands will experience lower levels of boron due to less adsorption on soil particles and possible leaching losses. Heavier soils will have a greater degree of adsorption and retention of available boron.

Determination of boron requirements can be assessed by hot water soil extraction or the use of in season plant tissue analysis. In the soil, boron availability is affected by many factors some of which are high pH levels, calcium, potassium, nitrogen and organic matter.

High rates of nitrogen encourage more plant growth and place a greater demand on boron supply. High nitrogen and potassium levels may decrease calcium/boron ratios in plants. Soils low in organic matter will have lower boron supply. Liming of soils low in boron may suppress boron availability. The severity of the suppression will be determined by soil moisture, organic matter, crop and elapsed time after application. Liming of acidic, high organic matter soils may encourage more decomposition and increase the boron supply.

Every crop requires boron but some root crops such as beets, turnips, and sugar beets have higher needs. Forages such as alfalfa, and many vegetables (cauliflower, celery, cabbage) all have high requirements. These crops will likely show the greatest response to boron applications when soil boron is limiting.

Early boron deficiency symptoms may include plants with abnormal dark green color, and misshapen plant parts, a rossetted growth habit, shortened internodes, spiral or twisted leaves, malformed leaf tips, or thicker leaves that are slow to expand.

Boron can be either soil or foliar applied. Foliar boron applications may be more effective in some horticultural crops. Several smaller applications may be more efficient.

Placing boron in granular starter fertilizer is challenging since even distribution is difficult to achieve. Spraying a suitable soluble source of boron on the soil before planting will greatly increase uniformity of application. The avoidance of overlaps and poor distribution reduces the risk of hotspots of high carryover that may affect sensitive crops in the rotation.

Role of Boron – What does it do?

Boron is necessary for root hair tip initiation and elongation, and growth of primary and lateral roots. It also assists uptake and translocation of cations such as potassium, calcium and magnesium.

In the plant, boron regulates carbohydrate metabolism and is essential for protein syntheses. It is also necessary for cell wall formation and cell elongation. Boron is not mobile in the plant therefore deficiencies are likely in the most recent developed tissue and growth points of plants.

Boron is involved with the sexual reproduction of the plant including: pollen grain formation, pollen tube formation, seed set, fruit set, pollination, flower set, and seed viability.

Boron deficiency has been implicated in some physiological disorders affecting the quality of root and fruit crops. In perennial crops, boron assists in moving sugars down to crowns and roots. This movement of sugars assists in the onset of dormancy and increases winter survivability.

Boron may only be needed in small amounts, but it is essential to normal plant development.

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