



Information Sheet

7.8 Boron management



Sugarcane requirements for Boron (B) range between 20 and 40 grams per ton of cane harvested (a typical 100 t/ha sugarcane crop removes about 0.2 to 0.4 kg B/ha). Boron is essential for new cell growth and elongation through involvement with cell wall development. New roots and shoot development is strongly influenced by adequate B supply. It is also involved in translocating sugars in the plant and production of proteins. Boron is mainly available in solution as the borate ion (BO_3^{3-}). It is highly mobile in most soils and easily leached, though this is worse in acid and sandy soils. Alkaline soil can also reduce plant availability. Plant requirements are in a very narrow range thus over supply can easily lead to toxicity.

Deficiencies symptoms

- Generally appears on younger leaves first.
- Young new leaves may exhibit a “crinkled” appearance and develop serrated edges and tear.
- Leaf tips show burning or tip dieback and leaves become brittle.
- Translucent lesions or water sacs develop on leaf blades.



▲ Boron deficiency characterised by crinkled, torn and brittle leaves.



Impact of excess boron

Due to a narrow plant requirement it is easy to induce toxicity by applying excessive amount of B fertiliser. If B-rich irrigation water is applied there is a risk of inducing toxicity.

Factors affecting boron availability

The amount of B in the soil is strongly controlled by the parent material. Soils formed on marine sediments may show elevated amounts of B as sea water contains substantial amounts. The main drivers of B availability in the soil are pH and organic matter content. It is prone to leaching in sandy and acid soils, while high pH reduces availability. Much of the available B is due to organic matter turnover in soils.

Boron application guidelines

Soil tests for B have not proven useful to guide requirements and leaf testing is advised. SASRI currently advises a sufficiency range of 10-20 ppm. Where in doubt it is advisable to apply B in a test strip to evaluate likely responses.

Soil treatments

- Top dress or furrow apply 1 kg B/ha.
- Do not over-apply and ensure even application to avoid localised toxicity.

Foliar spray

Due to potential toxicity, leaf testing should be used to confirm deficiency (<10 ppm) before treatment. The following is advised:

- Spray a soluble B source at 0.2 to 0.4 kg/ha, using a knapsack spray rate of 300-400 L/ha.



Notes and precautions

- Excess B can be toxic – caution not to over supply is important.
- Where excess has been soil applied, liming can be used to decrease availability.

Available boron fertiliser formulations

| Source/product | B% | Solubility | Notes |
|-------------------------------|-------|------------|-----------------------------|
| Borax | 11 | Moderate | Better for soil application |
| Solubor | 20 | High | Soil or foliar application |
| Sodium borate/ tetraborate | 14-20 | High | Soil or foliar application |
| Boric acid | 17 | High | Soil or foliar application |
| Coemanite | 10 | Low | Soil application |
| Mineral B | 2-6 | Low | Soil application |
| B frits/pellets | 2-6 | Low | Soil application |

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