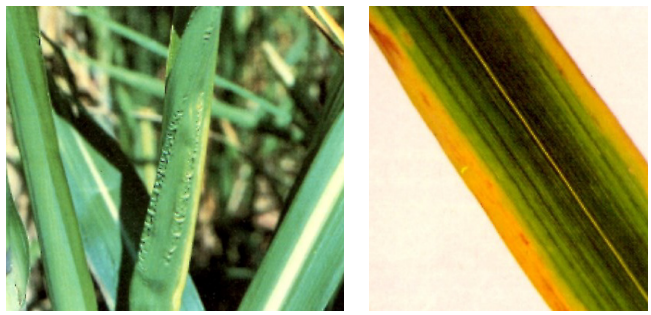
Information Sheet

7.8 Boron management

Sugarcane requirements for Boron (B) range between 2 - 4 grams per ton of cane harvested (a typical 100 t/ha sugarcane 0.2 – 0.4 kg/100tc). 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.

Defciencies 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 suficiency range of 10-20 ppm, though a lower limit of 4-5 ppm is used in some countries. 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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