



Information Sheet

7.12 Zinc management

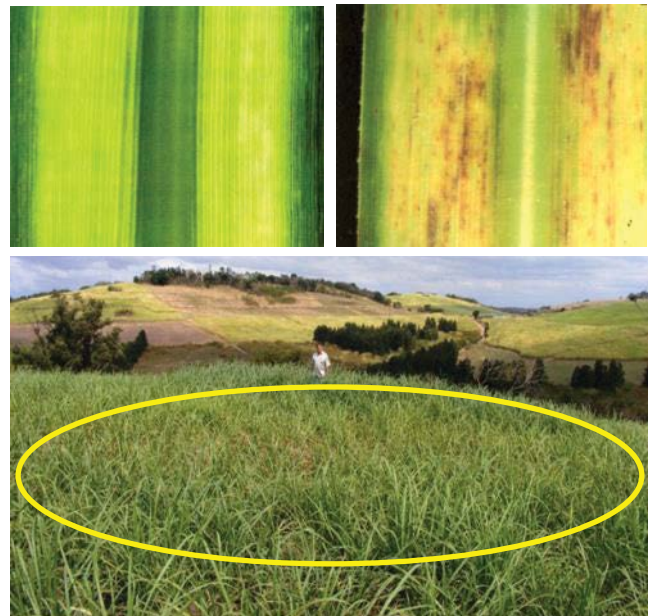


Sugarcane requirements for zinc (Zn) are low with the crop removing only about 4 to 5 grams per ton of cane harvested (a typical 100 t/ha sugarcane crop removes about 0.4 to 0.5 kg Zn/ha). Zinc is important for the production of chlorophyll and is necessary in the regulation of the plant's growth rate and development. It is essential for phosphorus chemistry in the plant and is also implicated in the efficient use of water. Deficiencies are often linked to the well-weathered acidic clay and loam soils with high organic matter, as well very sandy soil types. Alkaline soils are also prone to deficiencies.

Deficiencies symptoms

- Generally appears in the third and older leaves.
- Can appear as a band of yellowing that normally occurs in the margins of the leaf.
- In young leaves, veinal yellowing (chlorosis) is a distinguishing feature (Zn is the only element to show this symptom while other nutrients present interveinal chlorosis).
- Reduced tillering, shorter internodes and thinner stalks.
- Red lesions associated with fungus (*Curvularia brachyspora*) that tends to proliferate on the Zn deficient leaves.

Zinc deficiency symptoms in leaves (top) and in the field (bottom). ▶



Impact of excess zinc

Zinc toxicity has **not** been reported in South African sugarcane and is not a commonly encountered problem.

Factors affecting zinc availability

The main drivers of concern affecting Zn availability in the soil are pH, clay and organic matter content. High pH soils (alkaline) tend to have reduced Zn availability, while acidic soils are often deficient due to losses over time. **Excessive liming** (to above pH 6) can also lead to Zn deficiency. Soils with high amounts of stable organic matter (humic soils) generally have low amounts of Zn. Excess amounts of P can lead to Zn forming plant unavailable compounds. Soils that have lost their topsoil or that have been inverted and waterlogged soils are also often susceptible to deficient Zn supply.

Zinc application guidelines

Plant cane

- In plant cane, a soil test is usually undertaken to assess sufficiency levels.
- When the soil test zinc level is below 1.5 mg/L, 10 kg of Zn /ha, should be applied in the planting furrow. This is usually adequate for several cycles.
- Leaf sampling is advised to confirm adequate supply and uptake by the crop.
- Most commonly, zinc sulphate (heptahydrate, 23% Zn) or a suitable zincated fertiliser mixture (e.g. 2:3:4(30) + 0.5% zinc) is advised.
- Zinc oxide (ZnO) can be considered for acidic soils (low solubility in alkaline soils). Zn-chelates are costly, but perform well over a range of soil conditions. In general, they are better suited to situations where Zn lock-up may be a problem (alkaline soils, high P and organic matter levels).



Ratoon cane

Growers are advised to apply zinc fertiliser to fields where soil tests indicate potential deficiency ($< 1.5 \text{ mg/L}$), or preferably, if the zinc content in the **third leaf is 13 ppm** or below. The following strategies are advised:

- Young cane, up to six months old, should receive a **foliar application of 1% zinc sulphate** (or chelate equivalent) and a suitable wetter, using a knapsack spray rate of 250 L/ha. Application should preferably be carried out between November and March **during active growth**.
- The effect of a spray application of zinc is usually visible within three weeks, though it will only be beneficial within that growing season.
- Cane older than six months should be treated after harvest by applying **10 kg Zn/ha** as zinc sulphate or zinc fertiliser material over the cane row. This treatment will provide sufficient Zn for several ratoon crops.

Notes and precautions

- In alkaline soils with adequate Zn content but low supply, the use of acidifying N fertiliser (e.g. Ammonium sulphate/nitrate) in the furrow or banded can assist in releasing Zn from alkaline complexes.
- Avoid using brass and galvanised iron spray containers as they may become corroded.
- Zinc sulphate has poor compatibility with MAP and DAP and should not be blended in fertigation systems.
- Micronutrient elements, including zinc, should not be added to herbicide sprays unless permitted by the herbicide product label.

Available zinc fertiliser formulations

Source/product	Zn%	Solubility	Notes
Zinc sulphate heptahydrate	23	High	Soil or foliar application
Zinc sulphate monohydrate	35	High	Soil or foliar application
Zinc chloride	30	High	Soil or foliar application
Zinc oxide	50-80	Low	Better in acidic soil
Zinc chelate	9-14	High	Soil or foliar application
Zincated fertilisers	Variable	High	Soil, applied as part of other fertilisers

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