



# Information Sheet

## 7. NUTRITION

### 7.6 Recommendations for Sulphur (S)

#### Sulphur availability in soils

- Sulphur is an important secondary nutrient. The amount taken up by each sugarcane crop varies between 20 and 30 kg S/ha.
- As with phosphorus, sulphur is usually found in relatively small amounts in soils. Like nitrogen, much of the soil S is in the organic form and, through biological processes, is mineralised to the sulphate form.
- Sulphur is taken up in the sulphate form and is used in the formation of amino acids and proteins.
- S deficiencies are therefore more likely to occur in light sandy soils (e.g. NGS (Ordinary), granite, Recent Sands) which have a low organic matter content and cover an area of over 200 000 hectares in the sugar industry.

- Responses to sulphur (20-25 kg S/ha applied as ammonium sulphate) were obtained in a number of glasshouse trials, and in seven ratoon cane trials conducted on sandy soils. In the field trials, responses of up to 25 tons cane/ha were obtained, with an average response of 7 tons cane/ha.
- For advisory purposes, as with nitrogen, soils have been classified into four categories (low, medium, high and very high) according to their potential to mineralise S from organic matter. This may be estimated by using various soil properties or a knowledge of soil form, as shown in the table overleaf.

#### Recommendations

Periodic testing of cane growing on Category 1 soils is advisable. Where the soil S level is below 15 ppm and leaf S is below 0.12%, the following options may be considered:

#### Deficiency symptoms

- Sulphur deficiency may be mistaken for nitrogen deficiency. The foliage is yellowish-green, especially in the younger leaves, and plants are stunted with thin stalks.
- With severe S deficiency, leaves may develop a purplish tinge.
- Both leaf and soil tests have proved useful in diagnosing potential S deficiency in cane, using threshold values of 0.12% and 15 ppm for leaf and soil respectively.
- A ratio of N:S in the leaf of above 17 is also an indication that sulphur may be required.



*The leaf on the right is sulphur deficient, as compared to a healthy leaf on the left.*

Picture reproduced from Sugarcane Nutrition, Anderson DL and Bowen JE (1990)

### Plant cane

A potential deficiency can easily be rectified at planting by applying sufficient S in the furrow to meet the requirements of the plant crop and four succeeding ratoons.

- If no P is required, or there is a low P requirement (0-20 kg P), apply 600 kg gypsum/ha in furrow.
- If there is a moderate to high P requirement, use either single or ammoniated supers in the furrow, or use 600 kg/ha gypsum in the furrow.

### Ratoon cane

- On acid soils, use 300 kg/ha gypsum as a top-dressing in every other ratoon, applied on the row.
- On neutral/alkaline soils, use ammonium sulphate or ASN as top-dressing in every other ratoon.

## Soil properties and S mineralisation potential

Soil criteria	S mineralisation potential			
	Category I Low	Category II Moderate	Category III High	Category IV Very high
Description	Highly leached sandy soils and those with impeded drainage	Sandy loams to clays	Mainly blocky clays, melanic to vertic	Humic sandy clay loams to clays
Organic matter %	<2	2 to 4	2 to 4	>4
Mineralisation potential (kg/ha)	<20	21 to 40	41 to 80	>81
Clay % range	<15	15 to 35	>35	>25
Parent material	NGS (Ordinary Granite (light) Dwyka tillite (light) Recent Sands Alluvium (light)	Granite Middle Ecca sediments Alluvium	Lower Ecca Shale Amphibolite Dolerite/Basalt Tugela Schist Swazi Basic Rocks	NGS (Mistbelt) Peat
Soil form	Cartref Kroonstad Longlands Katspruit Dundee Fernwood Hutton (light) Mispah	Swartland Glenrosa Hutton Oakleaf Valsrivier	Mayo Milkwood Arcadia Shortlands Bonheim Rensburg	Inanda Kranskop Magwa Hutton Clovelly Griffin
S requirement	Likely to be most beneficial	Only where soil S levels are below 15 ppm	Very unlikely, except where leaf S values are low	Not required

### Common sulphur carriers

Product	S% (approximately)
Ammonium sulphate	22 - 24
Supers (10.5%)	10
Ammoniated supers	10
ASN (27%)	12
Gypsum	15 - 18

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