

Sulfur (S)

What is the Role of Sulfur (S) in Plants?

Sulfur is an essential plant nutrient required for chlorophyll production. It is needed to produce essential amino acids (cysteine, methionine, and cystine) in plants that are related to human nutrition. S is quite mobile in the plant (though less so than N) but only partially mobile in the soil.

Why Apply Sulfur Fertilizer to Rice?

Sulfur limits plant growth when the soil supply of S is low or adverse soil conditions prevent plant uptake of S. In such cases S needs to be applied as required. Other nutrients need to be applied in balanced amounts to ensure a good crop response to fertilizer S application and to achieve a healthy and productive crop.

How to Manage Sulfur?

- **S deficiency symptoms.** Pale green plants; pronounced pale yellowing of young leaves (in contrast to yellowing and progressive death of older leaves for N deficiency). Soil and/or plant analysis is often needed to confirm S deficiency.
- **Occurrence of S deficiency.** S deficiencies are not very common. S may be needed in leached sandy soils; low organic matter soils; and, highly weathered soils rich in iron oxides.
- **How much S to apply?** Apply 10 kg S ha⁻¹ at moderate S deficiency and 20-40 kg S ha⁻¹ at severe deficiency. The crop requires around 2 kg S ha⁻¹ (both straw and grain) per t of grain yield.
- **When to apply S?** When required, apply any S fertilizer just before the last puddling along with P and K. The effect of applied S can last 2 crop seasons.

What are the Sources of S?

The commonly used S fertilizers are ammonium sulfate (24% S), single super phosphate (12% S), and gypsum (17% S).



Yellowing of youngest leaves in S-deficient plants. Photos: Dobermann & Fairhurst 2000.



Leaf canopy in S-deficient plot appears yellow.

Further reading

Dobermann A, Fairhurst T. 2000. Rice: Nutrient disorders and nutrient management. Singapore and Los Baños: Potash & Phosphate Institute (PPI), Potash & Phosphate Institute of Canada (PPIC), and International Rice Research Institute (IRRI). p 1-191.

For more information:

Visit <http://www.knowledgebank.irri.org/>.

For information related to site-specific nutrient management, visit <http://www.knowledgebank.irri.org/ssnm>.

To diagnose problems in the field, visit <http://www.knowledgebank.irri.org/ricedoctor>.

Developed with inputs from V Balasubramanian, RJ Buresh and M Bell.