

## What it does

Sulfide toxicity reduces nutrient uptake of plants by reducing root respiration. It has an adverse effect on metabolism, particularly when an excessive amount is taken up by the rice plant.

## Why and where it occurs

Sulfide toxicity is not very common in rice. It is, however, associated with low-Fe soils. It can occur in well-drained sandy soils, degraded paddy soils, poorly drained organic soils, and acid sulfate soils.

## How to identify

Check the field for the following symptoms:

- Interveinal chlorosis of emerging leaves coarse, sparse, dark brown to black root system.
- Freshly uprooted rice hills often have poorly developed root systems with many black roots (stains of Fe sulfide) unlike healthy roots, which are covered with a uniform and smooth orange-brown coating of Fe<sup>3+</sup> oxides and hydroxides.
- Sulfide toxicity can also cause increased occurrence of diseases, such as brown spot. Leaf symptoms of sulfide toxicity are similar to those of chlorosis caused by Iron (Fe) deficiency. Other diagnostic criteria are similar to those of Fe toxicity, but has different visual leaf symptoms.

## How to manage

- Sulfide tolerant plant varieties.
- Avoid continuous flooding and use intermittent irrigation in soils that contain large concentrations of S, have high organic matter status, and are poorly drained
- Carry out dry tillage after the rice harvest to enhance Fe oxidation during the fallow period, but this will require machinery (tractor)
- Balance the use of fertilizer nutrients (NPK or NPK+ lime) to avoid nutrient stress and improve root oxidation power
- Apply sufficient K fertilizer
- Avoid using excessive amounts of organic residues (manure, straw) in soils containing large amounts of Fe and organic matter, and in poorly drained soils

Where possible,

In temperate climates, coat seeds with oxidants (e.g.. Calcium (Ca) peroxide) to increase the O<sub>2</sub> supply and improve seed germination

- Apply K, P, and Mg fertilizers, apply Fe (salts, oxides) on low-Fe soils to increase immobilization of H<sub>2</sub>S as FeS

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Sulfide toxicity causes roots to be coarse and sparse