

## What it does

Manganese (Mn) toxicity affects the plant metabolic processes such as enzyme activities and organic compounds. This can lead to sterility in plants.

## Why and where it occurs

Mn toxicity is relatively rare especially in irrigated rice systems and rarely occurs in lowland rice. It can occur in the following soils:

- Acidic soils in upland areas (pH <5.5); Mn toxicity often occurs with Aluminum (Al) toxicity
- Lowland soils containing large amounts of easily reducible Mn
- Acid sulfate soils
- Areas affected by Mn mining

## How to identify

Check the plants for the following symptoms:

- Yellowish brown spots between leaf veins, extending to the whole interveinal area
- Brown spots on veins of lower leaf blades and leaf sheaths
- Leaf tips dry out eight weeks after planting
- Chlorosis of younger (upper) leaves
- Stunted plants
- Reduced tillering

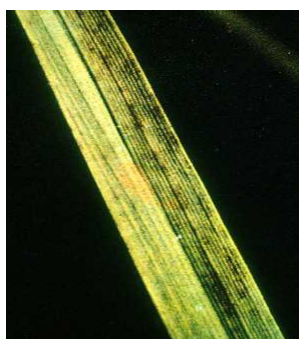
Sterility results in reduced grain yield.

The chlorosis of younger or upper leaves is similar to those of Iron (Fe) chlorosis. To confirm cause of problem, bring soil and plant sample to the laboratory for testing.

## How to manage

Where possible, the general management options for Mn toxicity are:

- In a temperate climate, coat seeds with oxidants (e.g., Calcium (Ca) peroxide) to improve germination and seedling emergence by increasing the supply of oxygen.
- Manage water efficiently.
- Balance the use of fertilizers (NPK or NPK+ lime) to avoid nutrient stress as a source of Mn toxicity.
- Recycle straw or ash to replenish Silicon (Si) and Potassium (K) removed from the field.



Yellowish brown spots on the interveins of lower leaves and sheaths