

# Manganese deficiency



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## What it does

Manganese deficiency affects photosynthesis and protein synthesis. Mn-deficient plants are often deficient in Phosphorus.

## Why and where it occurs

Manganese deficiency is relatively rare in Assam especially in irrigated rice systems.

Mn deficiency occurs frequently in upland rice, but is not common in rainfed or lowland rice because the solubility of Mn increases under submerged conditions.

Soils particularly prone to Mn deficiency include the following types:

- Acidic upland soils (Ultisols, Oxisols)
- Alkaline and calcareous soils with low organic matter status and small amounts of reducible Mn
- Degraded paddy soils containing large amounts of active Fe
- Leached sandy soils containing small amounts of Mn
- Leached, old acid sulfate soils with low base content
- Alkaline and calcareous organic soils (Histosols)
- Highly weathered soils with low total Mn content



Mn deficiency symptoms

## How to identify

Check the plant for the following symptoms:

- Pale grayish green interveinal chlorosis spreads from the tip to the leaf base
- Necrotic brown spots develop later and leaf becomes dark brown
- Newly emerging leaves are short, narrow, and light green

Manganese deficient plants are shorter, with fewer leaves, less weight, and have smaller root system at tillering. Plants are usually stunted but tillering is not affected.

Affected plants are more susceptible to brown spot (caused by *Helminthosporium oryzae*) and Mn-deficient rice plants often deficient in Phosphorus.

In soils where both Mn deficiency and Fe toxicity occur, Mn-deficient rice plants accumulate a large concentration of Fe, and may also show symptoms of bronzing.

## Why is it important

Mn deficiency is not very common in irrigated or rainfed rice, but can be a common problem in Upland systems. Its damage is also important throughout the growth stage of the crop.

## How to manage

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

- Apply farmyard manure or straw (incorporated or burned) to balance Mn removal and enhance Mn(IV) reduction in soils containing small amounts of Mn and low organic matter status.
- Use acid-forming fertilizers, e.g., ammonia sulfate instead of urea.
- To confirm Mn deficiency, bring soil and plant sample to a laboratory for testing.

## Sources of Manganese

Manganese requirement is very less in the plants, but in sandy soils with low organic matter content, its deficiency can be replenished with the spray of manganese sulphate (30% Mn, 1-5kg Mn/ha in about 200 litre water) or by adding MnSO<sub>4</sub> @ 5-20kg/ha in the soils. Manganese chloride is the other source of Mn.