

Copper deficiency



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What it does

Copper (Cu) deficiency affects the metabolic processes of rice plants, specifically photosynthesis and respiration. It can lead to reduced pollen viability and increase in spikelet sterility, thus developing many unfilled grains.

Why and where it occurs

Cu deficiency is relatively rare in Assam especially in irrigated rice systems. It is caused by the following:

- Small amount of available Cu in soil
- Strong absorption of Cu on humic and fulvic acids (peat soils)
- Small amounts of Cu in parent materials (sandy soils derived from quartz)
- High NPK rates, causing rapid plant growth rate and exhaustion of Cu in soil solution
- Over liming of acid soils, causing increased amount of Cu complexed by organic matter or adsorbed and occluded by hydroxides and oxides
- Excessive Zn in the soil, inhibiting Cu uptake

Cu deficiency occurs on the following soils:

- Soils with high organic matter status (Histosols)
- Lateritic, highly weathered soils (Ultisols, Oxisols)
- Soils derived from marine sediments (limestone)
- Sandy textured soils
- Calcareous soils

How to identify

Check the leaves for the following symptoms:

- Chlorotic streaks on either side of the midrib
- Dark brown necrotic lesions on leaf tips
- Bluish green and chlorotic near the leaf tip
- Rolling of new leaves

New leaves do not unroll and the upper portion of leaves have a needlelike appearance, while the lower portion of the leaf appears normal

Plants also have reduced tillering.

When affected, pollen viability is reduced; this means, spikelets become sterile and develop unfilled grains.

To confirm Cu deficiency, bring soil and plant sample to a laboratory for testing.

Why is it important

Although rare in irrigated rice systems, the damage caused by Cu deficiency is important throughout the growth stage of the crop.

How to manage

- Dip seedling roots in 1% CuSO₄ (copper sulphate) suspensions for 1 h before transplanting
- Avoid over liming of acid soils because it may reduce Cu uptake
- On Cu-deficient soils, apply CuO or CuSO₄ (5-10 kg Cu/ha at 5-year intervals) for long-term maintenance of available soil Cu (broadcast and incorporate in soil)



Cu deficiency (source:RKMP)



Cu deficiency (Source: Yara)