

What it does

Iron (Fe) toxicity causes leaf bronzing and reduced root oxidation power.

Why and where it occurs

Fe toxicity occurs on a wide range of soils, but generally in lowland rice soils with permanent flooding during crop growth.

It can happen throughout the growth cycle of the crop.

How to identify

Check plants for the following symptoms:

- Tiny brown spots on lower leaves starting from tip and spread toward the leaf base or whole leaf colored orange-yellow to brown
- Spots combine on leaf interveins and leaves turn orange-brown and die
- Leaves narrow but often remain green
- In some varieties, leaf tips become orange-yellow and dry up
- Leaves appear purple-brown if Fe toxicity is severe
- Stunted growth, extremely limited tillering
- Coarse, sparse, damaged root system with a dark brown to black coating on the root surface and many dead roots
- Freshly uprooted rice hills often have poor root systems with many black roots

To confirm iron toxicity, send soil and plant sample to lab for Fe toxicity test.

How to manage

To prevent Iron (Fe) toxicity:

- Plant Fe tolerant varieties. Contact your local agriculture office for an up-to-date list of available varieties.
- In temperate climates where direct seeding is practiced, coat seeds with oxidants.
- Use intermittent irrigation and avoid continuous flooding on poorly drained soils containing a large concentration of Fe and organic matter.
- Carry out dry tillage after the rice harvest to enhance Fe oxidation during the fallow period, but this will require machinery (tractor).



Leaf bronzing (orange-yellow to brown leaves) can be observed in plants



Iron toxicity in the field



Tiny brown spots are visible on leaf tips and leaf bases of plants affected by iron toxicity



Iron toxic soil

To control:

- Balance the use of fertilizers (NPK or NPK+ lime)
- Apply sufficient Potassium (K) fertilizer.
- Apply lime on acid soils, do not apply excessive amounts of organic matter (manure, straw) on soils containing large amounts of Fe and organic matter and where drainage is poor.
- Use urea (less acidifying) instead of ammonium sulfate (more acidifying).