Iron Toxicity in Rice

Factsheets for Rice Production, East Africa

Fig 1. Iron toxicity in rice (Knowledgebank..irri.org)

Fig 2. Iron toxicity in rice field (a.ismail@irri.org)

Fig 3. Iron toxicity (knowledgebank.irri)

Importance

- Iron toxicity is a syndrome of disorder associated with large concentrations of reduced iron (Fe2+) in the soil solution
- Iron toxicity is common in permanently flooded lowland rice production systems
- It is also induced by deficiency of phosphorus, potassium and zinc in low fertility soils
- Iron toxicity results in stunted plants, reduced tillering

Prevalence

- Iron toxicity is prevalent in soils with high organic matter content especially black cotton soils found in Mwea, Ahero and Bura irrigation schemes
- It is also common in upland and lowland acid sandy soils in Busia, Siaya, Embu, Teso counties

Toxicity Symptoms

Toxicity symptoms are manifested by :

- Bronzing of rice leaves.
- Tiny brown spots appear on lower leaves starting from tip spreading toward the leaf base
- Leaves turn orange-brown and die
- Leaves become narrow with leaf tips turning brown-yellow and eventually dry up
- In severe iron toxicity, leaves appear purple-brown
- There is stunted growth and reduced tillering
- Freshly uprooted rice hills often exhibit poor root showing black appearance
- **Crop Loss**
- In severe cases, yield losses of 15% to 30% are recorded

Fig 4. Iron toxicity (fftc.agnet.org)

Management Strategies

- Test soils and plant tissue for Iron toxicity
- Apply additional Phosphorus and Magnesium fertilizers to soils
- Incorporate lime in the topsoil to raise pH in strongly acid soils
- Incorporate100−200 kg MnO_2 per hectare in the topsoil to decrease free iron in soil (Fe^{3+} reduction)

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