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Zinc deficiency in Rice

Factsheets for Rice Production, East Africa

Importance

- Zinc (Zn) is important for early vigour and grain formation
- Zinc deficiency is associated with Sulphur deficiency
- It is the most widespread micronutrient disorder in rice
- Symptoms vary with soil, variety and growth stage
- Soils high in acidity (pH>7) predispose plants to zinc deficiency

Prevalence

- Zinc is deficient in areas with low zinc parent material and high salt concentration
- In areas where zinc has formed complexes with high organic matter due to large applications of organic manures and crop residues
- In soils with high pH (>7) and with high evapotranspiration rates such as Bura and Hola irrigation schemes and in Kwale county
- Soils with high available P and Si status
- Peat soils and cold wet conditions

Symptoms

- The midrib at the base of the youngest leaf of zinc-deficient rice becomes chlorotic (dies) 2 - 4 weeks after sowing or transplanting
- Brown spots appear as scattered light yellow spots in older leaves, later turn deep brown
- Entire leaf turns rusty and dusty brown and dry within a month
- White lines may appear sometimes along the leaf mid-rib starting from the 2nd or 3rd fully matured leaves
- Stunted with reduced tillering compared to normal plants
- Spikelet sterility and delayed maturity under severe cases



Fig 1. Reduced tillering (a), Rice discolouration (b)
Source: Dobermann and Fairhurst, (2000);
(Yara.com.gh/crop-nutrition/rice)

Management Strategies

- Carry out soil test and apply its recommendations
- Grow recommended Zn-efficient varieties.
- Contact your local agriculture office for an up-to-date list of available varieties.
- Use fertilizers that generate acidity in the soil (lower pH (e.g. Ammonium sulfate)
- Apply organic manure before seeding or transplanting or applied to the nursery seedbed a few days before transplanting
- Allow permanently flooded fields, especially where three crops per year are grown, to drain and dry out periodically
- Broadcast ZnSO₄ in nursery seedbed
- Dip seedlings or presoak seeds in a 2-4% ZnO suspension such as 20-40 g ZnO L⁻¹
- Apply 0.5-1.5 kg/ha of ZnSO₄ as foliar spray in 2-3 repeated applications at intervals of 10-14 days
- Regularly monitor irrigation water quality