

Nitrogen Deficiency in Rice Production

Importance

- Nitrogen (N) enhances plant growth, grain yield and grain quality
- Nitrogen is the most limiting element in almost all soils
- Proper application of N fertilizers is vital in improving crop growth and grain yields

Prevalence

Nitrogen deficiency is common in most agricultural soils in East Africa. In Kenya, it is particularly deficient in;

- Coarse textured soils with low organic matter content (less than 0.5% organic C) in Kirinyaga, Embu, Kisumu, Busia, siaya and in parts of Teso in Busia county
- Calcareous and alkaline soils with low soil organic matter and high potential for ammonia volatilization prevalent in Kwale, Kilifi, Tana River, Taita Taveta and Lamu counties
- Soils with particular constraints to inherent N supply for example acid sulfate soils, saline soils, P-deficient soils and poorly drained wetland soils

Deficiency Symptoms

- Discoloured leaves and stunted plants
- Older leaves or the whole plant turn yellowish green
- Older leaves are chlorotic at the tips moving towards the midrib in a V-shape
- Reduced tillering and reduced grain number

N/B. These indicators are sometime confused for Sulphur, Iron and Nitrogen visual deficiency. Sulphur deficiency first appears on young leaves, Iron deficiency first appears on emerging leaves while Nitrogen deficiency first appears on older leaves.

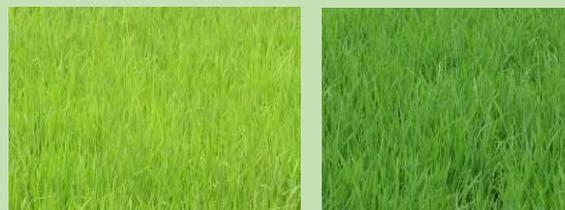


Fig 1. Deficient Pale green (L) , Healthy dark green (R)
(Wasilwa LA, KALRO)

- Plants adversely infected by diseases such as bacterial leaf blight, sheath blight, blast and insects attack are particularly prone to this deficiency
- Presence of patchy patterns arising from uneven nitrogen application

Management Strategies

- Analyze soils (at least in every three years) and plant tissue (whenever symptoms are noticed) to establish the N level in soils
- Apply recommended N fertilizer efficiently, in splits and at right timings, based on the soil test report
- Apply farm yard manure, crop residue and compost on low soil organic matter soils particularly in lowland rainfed rice areas.
- Carryout dry shallow tillage within 2 weeks of harvesting to enhance soil oxidation and crop residue decomposition in irrigated rice
- Keep fields flooded to prevent N losses through denitrification and runoff immediately after fertilizer application.

Contributors: Wandera F (Fredrick.Wandera@kalro.org); Wasike, V; Otipa, M; Kimani, J; Kega, V; Ochieng, V; Kirigua, V., Wasilwa L.,Kundu C. A.; Esilaba A.O., Mutiga S; KBeCA ILRI); Mugambi, C; Ngari, B; Zhou, B (IRRI); Mitchell T. (OSU); Wang, G. L (OSU); Were, V (TSL); Ouedraogo, I (INERA); Rotich, F (UoEm); Correll, J. C. (UARK) and Talbot, N. J. (TSL). *E-Guide for Rice Production in East Africa (2019)*