Salinity stress damage in rice

Causes of salinity
- Rock weathering is primary source of salts
- Water table fluctuation can lead to salinity
- Use of saline irrigating water
- Low rainfall to leach salts accumulated due to high evaporation rate
- Inundation/waves of sea water into inland
- The problem is severe in Hola – Bura region, Tana River, but there are isolated area in Kilifi (Malindi) county
- With climate change and rise in sea water level, flooding of agricultural land by salty water is expected to bring more area under salinity.
- Semi-arid areas where heavy irrigation and evaporation occur

Symptoms
- Morphological symptoms include: plant death, low tillering, reduced spikelets per panicle, leaf scorching, spikelet sterility and low 1000 grain weight
- The plants may be affected uniformly under sodicity and salinity but not in all cases
- White leaf tip resulting in tip burning like is the major sign of salinity stress
- Stunted growth
- Transplanting old seedlings help avoid seedling stage damage but not at flowering stage
- Plants tends to mature early to complete life cycle

Economic loss
- Loss of Chlorophyll and photosynthetic area leads to reduced grain and biomass yields (A, B)
- Sterility can result into up to 100% grain loss and panicle death (B, C, & D)
- Incase of seedling damage this can result into complete crop loss or partial loss depending on salinity distribution.

Predisposing factors
- Saline soils dominated by sodium cations with electrical conductivity (EC) more than 4 dSm⁻¹, but the dominant anions are usually soluble chloride and sulphate
- Exchangeable Sodium Percentage (ESP < 15) and pH values of these soils are much lower than in sodic soils

Management Strategies
Use of tolerant varieties such as:
- Changing the growing saline environment to make it normal and suitable for the normal growth of crops
- Combined use of tolerant varieties and changing the saline production environment (this involves less resource use)
- Early seedling vigour is key to lowering stress effect at this sensitive stage

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