

Screening of Multipurpose Trees for Saline Vertisols and their Bio-ameliorative Effects

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Abstract : Performance of 23 multipurpose trees was evaluated under saline and high water table conditions in a field trial initiated in 1989. Based upon survival, height and collar diameter observations, *Casuarina equisetifolia*, *Acacia auriculiformis*, *Dalbergia sissoo*, *Syzygium cumini*, *Pongamea pinnata* and *Glyricidia maculata* performed better under saline and high water table conditions. Moderately tolerant species identified were *Albizia amara* and *Pongamea pinnata*. All tree species enriched the soil nutrient pool (N, P and K), organic carbon and decreased dispersibility of clays.

Key words : Forest and fruit trees, salinity, high water table, growth performance, bio-amelioration.

An alternate land use strategy of saline waste lands lies in the identification of suitable salt-tolerant tree and fruit species. Trees, in general are known to be more tolerant to adverse soil conditions than most agricultural crops. Evidence from literature reveals that *Acacia nilotica* is more tolerant to soil salinity and sodicity (Singh *et al.*, 1991, 1992) conditions and species such as *C. equisetifolia*, *A. articulata* and *P. juliflora* are more tolerant to soil salinity and shallow water table conditions (Tomar and Gupta, 1985). Nath and Banerjee (1992) observed decreased pH, EC, exch. cations, water soluble cations and anions and increased organic carbon and available N in the soil within 7 years of planting of *C. equisetifolia*. Arunprasad *et al.* (1991) and Murthy *et al.* (1990) also reported ameliorative effects of trees/leaves on soils. Similarly, certain fruit species are also known to exhibit salt-tolerance. Pathak and Pandey (1986) reported adaptability of aonla to sodic (30 ESP) and saline (10 EC) soils. In view of such possibilities, the present study was

undertaken on saline vertisol of Thungabhadra project area to screen some MPTs for their adaptability and their possible role in bio-amelioration of salt affected soils.

Materials and Methods

Twenty three six-month-old saplings of multi-purpose tree (MPT) species (Table 1) were planted in furrows (base width of 30 cm) during August 1989 following a randomized block design with two replications. Each replication had 25 plants of respective species, in a 10 x 10 m plot with a spacing of 2 x 2 m. Observations were recorded from nine plants located in the centre. The soil had 26.2% sand, 17.6% silt and 44.8% clay with a B.D. of 1.33 Mg/m³. Soil reaction ranged from 8.1 to 8.5 with the salinity ranging from 10 to 12 dS m⁻¹. Soil was medium in depth varying from 0.75 to 1.0 m with calcic layer underneath. The average depth of water table was within 0.5 m during monsoon and 0.8 m during summer season.

both were associated together. Species such as *S. cumini*, *F. limonea*, *E. officinalis*, *E. hybrid* and *P. pinnata* were found next better species in terms of their adaptability and bio-ameliorative effects. Results of this study are in agreement with those of Boyko and Boyko (1968), Yadav (1981) and Tomar and Gupta (1985).

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