

CHLORIDE ACCUMULATION CAUSING LEAF INJURY IN MANGO ORCHARDS
IRRIGATED WITH SALINE WATER

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ABSTRACT

Foliar symptoms of salt injury resembling potassium (K) deficiency in mango orchards, irrigated with underground water, are very common along Batinah Coast of Oman. Twenty four soil, water and plant leaf samples collected from different orchards of the area were analyzed for different parameters important from salinity and plant nutrition point of view to identify the cause of injury. All the soils were calcareous having 8.4 to 27.3 % CaCO₃, marginal salinity, alkaline reaction and a light to medium texture. Electrical conductivity (EC) of the various water samples ranged from 0.8 to 7.0 dS m⁻¹. All the mango plant leaf samples had adequate concentration of N, P and K except those 8 % which were found deficient in K. However, chloride was more than its critical range of 0.2-0.9 g kg⁻¹ in 92 % of the plant leaf samples. Significantly positive relationship of chloride content (Y) in the plant leaf samples with EC of irrigation water (X) was explained by the power regression equation : $Y = 0.026 X^{0.63}$ ($r = 0.76$, $p < 0.001$, $n = 24$). Chloride accumulation at an excessive level with increasing salinity of irrigation water was also found associated with high Na:K ratio and K deficiency in the mango plant leaves.

INTRODUCTION

Mango (*Mangifera indica* L.) is an evergreen tree grown on alluvial soil. It is a tropical fruit tree and is widely cultivated in the tropics and subtropics. It is a dioecious tree and requires cross-pollination. It is a long-lived tree and can produce fruit for 20-30 years. It is a hardy tree and can tolerate a wide range of soil conditions. It is a deep-rooted tree and can tolerate saline soils. It is a salt-tolerant tree and can tolerate high salinity in the soil. It is a salt-tolerant tree and can tolerate high salinity in the soil. It is a salt-tolerant tree and can tolerate high salinity in the soil.

resembles K deficiency symptoms (Bergmann, 1992). The present study was, therefore, designed to investigate nutritional problems of mangoes in Batinah area and to define quantitative relationship of salinity of irrigation water with specific ions responsible for salt injury in the mango leaves.

MATERIALS AND METHODS

For the present investigation we collected soil, water and plant leaf samples from 24 mango orchards along the Batinah Coast. Mango trees in the sampled orchards were 5 to 7 years old and are irrigated through bubblers with underground water. Most farmers annually fertilize their orchards with 550 g N tree⁻¹, 190 g P tree⁻¹ and 490 g K tree⁻¹. Urea, triple superphosphate and potassium sulphate are the marketed fertilizers for major nutrients in Oman. In addition to this 10-15 kg tree⁻¹ of organic manure is also applied every year. (M.A.F., 1993).

Soil

Soil samples at 0-30, 30-60 and 60-90 cm depth were collected from basin under the shade of each tree, but the data are reported for surface 0-30 cm only. Three holes were bored under each tree to collect a composite soil sample. The soil samples were air dried and ground to pass through a 2 mm sieve. Soil pH was estimated in 1:5 soil suspension with a combination calomel-glass electrode. Soil salinity was also estimated in 1:5