INTRODUCTION

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Increasing population on this planet is exerting a constant pressure on the availability of natural resources. There must be increase in global food production and it is nearly by 57% by 2050 (Wild, 2003). But at the same time the great extent of agricultural and useful land is getting converted into 'wasteland' due to human folly. Development of salt affected soils throughout the world in recent years is one such alarming problem before the human race. At the global level 952 million hectare of land are affected by salt problem (Szabolcs, 1979). Szabolcs (1989) described the global distribution of salt affected soils among different continents as follows

Continent	Area (Million hectare)		
	Saline	Sodic	Total
North America	6.2	9.6	15.8
Central America	2.0	-	2.0
South America	69.4	59.6	129.0
Africa	53.5	27.0	80.5
South Asia	83.3	1.8	85.1
North and Central Asia	91.6	120.1	211.7
South east Asia	20.0	-	20.0
Europe	7.8	22.9	30.7
Australia	17.4	340.0	357.4
Total	351.5	581.0	932.2

According to recent estimates there are about 8.11 million ha of salt affected soil in India (Singh, 1992). Dagar and Tomar,(2002) reported that in India about 5.50 million ha land is saline (including coastal sandy areas), 3.88 million ha alkali, and 8.53 million ha waterlogged. Utilization of poor quality water being utilized in different states especially in Rajsthan (84 %), Hariyana (62%), Punjab(41%), Karnataka(38%), Andhra Pradesh (32%) and Gujrat(30%). In such areas where groundwater is poor and fresh water is not available for agriculture, the use of poor quality water for irrigation is inevitable.

The soils in India are moderately saline which can be successfully reconomically reclaimed (Poljakoff Mayber and Gale, 1975). Agronomically most of suitable land has been cultivated and it is impossible the expansion into new areas for the increase of food production therefore it is important to increase yield per unit area.

All soil contain some water soluble salts but when these salt occur in amount that are harmful to germination of seed and plant growth they are called saline. Ions most commonly associated with soil salinity include the anions Chloride (Cl^-), Sulphate (SO_4^-), Carbonate (HCO_3^-) and sometimes Nitrates (NO_3^-) and the cations are Sodium (Na +), Calcium (Ca ++), Magnesium (Mg++) and sometimes Potassium (K+) (Lamond and Whitney,1992). Saline soil and sodic soil can significantly reduce the value and productivity of affected land. Soil salinity generally occurs in arid and semiarid climate where rain fall is insufficient to leach soluble salt from the soil or internal soil drainage is restricted. Salinity problem

can also occur on irrigated land, particularly when irrigation water quality is marginal.

Salt affected soils are classified into group of alkaline and saline soil. In alkaline following factors inhibit the growth,

1) Problem of nutrient availability is due to high pH.
2) Poor water transmission or leaching reduces aeration of roots.
3) Hard $CaCO_3$ layer present at the depth of one meter acts as physical barrier for vertical penetration of roots.

According to Singh (1996) in saline soil following factors inhibit plant growth

1) High osmotic pressure of soil water due to salinity.
2) Due to competitive uptake of ions there are nutritional disorders.
3) Saline soil shows waterlogging and high water table.
4) Presence of poor quality ground water in saline soil and there is scarcity of fresh water.

Most of the crops are highly sensitive to soil salinity and crop yields significantly affected (Mass and Hoffman, 1971). Thus it is rather impractical to grow any crop on large on such soils if salinity levels are high. According to CSSRI, the salt affected soil can be judiciously utilized for raising forestry, agriculture and horticulture crop and non-conventional crop of high economic value using bad quality water for irrigation selecting suitable salt tolerant species.

People of many developing countries in Asia are exposed to daunting challenge of managing their ever increasing human and cattle population, to meet the requirement of food, fuel, wood feed, medicine, timber and shelter. Marginal and salt affected lands can be brought under cultivation through an agroforestry practices selecting suitable salt tolerant species using bad quality water for irrigation. Thus the unproductive land will increase the economic condition of the farmer and also help in improving the ecological environment. Afforestation programme for saline waterlogged soils require the proper selection of tree species and planting technique. As the main problem of these soils are high water table, high salinity of soil and underground water, impeded drainage and less soil aeration for tree growth, tree species should be those which can tolerate these multiple stresses. Researchers at the Central Soil Salinity Research Institute at Karnal have found that tree of genus *Prosopis* can be used for Afforestation of salt land in the country (Singh and Singh, 1993). *Prosopis juliflora* has been considered as most promising plant which can be grown satisfactorily on waterlogged saline soil with EC > 25 ds/m in their active root zone. *Prosopis juliflora* silvipasture practice has been found most promising for fire wood and forage production and soil amelioration. *Prosopis juliflora* could produce 160 ton/ ha air dried fire wood in six years when planted at 2m X 2m spacing (Singh and singh, 1993) which leads in improving the soil to greater extent after six months. Besides this the species has also several other economic benefits.

Although it well known that *Prosopis juliflora* is a stress resistant plant species. The mechanism of salinity tolerance in this plant are not investigated in detail. Hence in the present investigation, an attempt has been made to study some aspects of physiology of salinity tolerance in this species. These studies encompass the effect of sodium chloride salinity on germination, mineral nutrition, lipids and activities of some important enzymes.

The dissertation is divided into three chapters. The 'Review of literature' on different aspects of Prosopis juliflora is presented in Chapter I of the dissertation. The methodology followed for the investigation has been described in Chapter II of the dissertation. The significant findings of the investigation are presented and discussed in the light of relevant literature. This forms the substance for Chapter III. In the last chapter 'Summary and Conclusions' the significant findings of present investigation have been briefly summarized. The literature cited in the dissertation is systematically mentioned in the 'Bibliography' part of the dissertation.