# GENERAL INTRODUCTION

On surface of this planet only one-fifth is the land mass and rest is covered by water and yet by and large the water is saline or salty with approximately 3 % sodium chloride. Although life is said to have origined in water, it is a matter of contemplation and food to the thought whether life has origined in salt brine! Coming back to the point of discussion there are relatively very few green plants that grow in sea water or saline water indicating thereby that the situation is adverse. The plants have to constantly struggle to maintain their osmotic balance. Nevertheless, certain plants that grows under saline conditions without any problem of metabolism although neither Na nor Cl elements have any significant role to play in the plant metabolism, itself, is indicative that the conditions are odd. Plants adapted to such conditions are called halophytes (Waisel, 1972) In support of the above statement are the evidences that the plants such as Avicinia and Rhizophora are able to grow in garden without much problem! Hence the mechanism of salt tolerance in plants has been extensively investigated throughout the world.

It is a well known fact that in the body of the earth NaCl salt is most abundantly found and hence its presence or problem created by its presence has added one more dimension to the investigation of inland salinity. Therefore, salinity problem has been broadly classified as coastal salinity which differs from inland salinity. In the coastal salinity only NaCl is a dominant factor found while in inland salinity several salts are found. Depending upon the abundance of particular element and the nature of the

soil the pH also changes and hence inland salinity is mainly classified on the basis of its impact on soil, as saline soil and sodic soil. The latter has high pH of the soil and highly alkaline in nature while the former is not. Therefore, the term salinity is a generic term used to cover different types. The plants growing or adapted to different regions are also different. It is interesting to note that inland salinity is also closely associated with water logging, which in turn is dependent upon the nature of soil. Those soils which have high proportion of clay particle in them are poor drained soils where waterlogging occurs. For instance, the soils in the arid region in the northern part of India such as Rajasthan, Hariyana and Punjab are sodic yet waterlogging takes place whereas, in Maharashtra and Karnatak wherever, soil is of volcanic in origin, such as black cotton soil in the Krishna and Godavari basin the soil is saline. It also has poor drainage because of heavy clay and hence waterlogging occurs. In India several million hectares of soils have gone alkaline or saline because of poor drainage. Under such circumstances the plants have to face square problems one of salinity or alkalinity and the other waterlogged conditions. These two conditions exert different types of metabolic stresses which most plants cannot face and they succumb. This has resulted into shrinking of tillable land. Today the problem of wet land is as serious as that of saline and probelm of saline land is as serious as that of drought prone. To takle the problem extensive research has been going on all over the world. The nature of research is mainly confined by and large to the investigation of tolerance mechanism in crop, but then there are many constraints in cultivating desired crop. For example sugarcane cannot be made to adopt to saline condition because

of its intrinsic metabolic reactions. At the same time it cannot be replaced by other crop.

In the recent years tremendous progress has been made in genetic engineering and biotechnology. We have reached a stage where transgenic technique is available to modify the very genetic nature of a plant beyond the genetic barrier bypassing the conventional breeding methods. If it is so we must be able to identify plants which have got wide range of adoptation to such extreme environmental conditions. Lippia nodiflora the present name Phyla nofiflora is one of such plants which is able to grow in saline soil, under waterlogged condition as well as sustain drought condition. Investigation of its physiological mechanism may eventually help in isolating the genes and transfer to the useful crop. And hence the present work tries to make a humble effort to study some of the mechanisms such as salt gland and salt exudation, the mechanism to sustain water logged condition and so on.