

INTRODUCTION

Soil salinity is becoming a very serious problem in agriculture. The saline soils of arid and semiarid regions of the world constitute a big area of such a problem soil. Area of saline soil is increasing day by day. Some of the productive soils are also being converted into the problem soils as a result of over-irrigation and over fertilization due to unwise agricultural management. It is estimated that more than 25% of the land all over the world is too saline to produce adequate yield of crops. In India more than 7.6 million hectares of soil has been reported to be saline. It is very serious problem in the states like Uttar Pradesh, Gujarat, West Bengal, Rajasthan, Punjab and Maharashtra. The solution to make use of such soils for crop production is soil reclamation by engineering approach, which is very costly and can not be practiced in developing country like India. Another approach, to solve this problem, is a selection of/or breeding for salt tolerant crop varieties, which is being tackled by number of scientists all over the world. Large number of crops have been screened for their salt tolerance.

From the brief review on Vinca rosea L. and physiology of salinity tolerance by plants, it can be seen that there is very little work on medicinal plants. So it is highly essential to test some important medicinal plants for their salinity tolerance so that, such plants can be tried for their growth in such problem soils which have become rather useless for most of the crops. Catharanthus roseus G.Don is one of the common but highly

promising medicinal plant and has several medicinal properties embodied in it. The medicinal principle is isolated from each and every part of the plant. Presently it is a highly demanded plant species in the world of medicine. It is important to understand the mechanism/s by which salt tolerant plants withstand and overcome the salinity hazards, so as to attempt to introduce such important medicinal plants. Keeping this view in mind, an attempt has been made to study the physiology of salt tolerance of this plant along with some cytological aspects in the view of its medicinal importance. Botany Department of Shivaji University, Kolhapur (India) has been actively engaged in the work on salt tolerance for last 26 years, under the dynamic leadership of late Prof.G.V.Joshi. During this period the different traditional crops and succulents are studied to investigate their salt tolerance mechanisms. Thus, the present study 'Physiological and Cytogenetic Studies in Catharanthus roseus G.Don' is well in connection with the research programme of this department.

The experimental part of the present investigation includes the effect of NaCl salinity at different levels of salt (00, 25, 50, 100 and 200 mM) on growth through various parameters like shoot and root length, biomass production, number of leaves, leaf area, number of buds, flowers and pods per plant. Organic constituents like moisture content, titratable acid number (TAN), carbohydrates, total nitrogen, proline and secondary metabolites

like polyphenols and total alkaloids of different parts of plants have also been taken into consideration. Photosynthetic studies include, chlorophylls, stomatal index and stomatal behaviour. Mineral contents of different parts of a plant have also been studied. These studies are supported by meiotic study. The methodology used includes pot soil culture technique, double beam spectrophotometer, thin layer chromatography, autoporometry, flamephotometry, atomic absorption spectrophotometry and microphotography.

For the convenience and presentation, the thesis has been divided into four different parts. The Chapter-I, 'Review of Literature' of the thesis deals with a brief review of literature on the Vinca rosea cultivation of Vinca rosea, alkaloids of Vinca rosea, and their economic importance. This Chapter also includes the literature on physiology of salt tolerance in plants, cytological studies like meiosis and scope of present investigation. The methodology used in present investigation is given in detail in Chapter-II 'Material and Methods'. The important findings of the investigation have been critically discussed in the light of relevant and most recent literature available, in Chapter-III, 'Results and Discussion'. The significant findings of the present studies have been summarised briefly in the last Chapter of the thesis, Chapter-IV, 'Summary and Conclusions'. The literature referred to in the form of research papers, research articles, reviews, monographs and books has been listed alphabetically and chronologically in the last part of the thesis, 'Bibliography'.