

PREFACE

Mangroves - the threatened coastal intertidal halophytic flora play very dominant and important role in the estuarine mouths, sea-land interphase areas or deltaic ecosystems of both the tropical and subtropical zones, especially in the highly populated Southeast Asian Countries, several Pacific islands and Australian coasts.

The mangrove vegetation is common in muddy places, where the water is calm. If the muddy swamps are extensive, the mangroves form a low forest. The trees are mostly low with countless arched aerial roots. As the mud in which these plants are growing is soft, fixation is a difficult matter. So, all mangrove trees and shrubs develop crooked and arched prop roots (knee roots). The soil is always water logged and poor in oxygen, making respiration difficult. Special respiratory roots called pneumatophores are also developed in some species. They are erect, about 30cms or more in height and stand in radiating rows all around the trees.

Mangrove ecosystems are open systems, which exchange matter and energy with the adjacent marine and terrestrial ecosystems. The chemical factors, especially with respect to salinity, influence the development of the mangrove. The daily variation and annual average of the salinity affect the mangrove growth and distribution. Each species of mangrove has a different tolerance range of salinity. The mangroves towards the sea due to high salinity show the dwarfism and away from the sea but in constant supply of fresh water show gigantism. The optimum salinity therefore varies from species to species.

Mangrove ecosystem is always associated with estuaries and as such many estuarine animals are part and parcel of mangrove fauna. These animals either inhabit or visit the mangrove biotope for various needs of life.

The mangrove ecosystem can be used as a coastal stabiliser and of protective green belt to disperse the energy of cyclones, tidal bores, winds and storms in general. In such cases, the mangrove green belt does not require any special management, except for repairing damages caused by natural calamities.

Mangrove swamps have a key role to play in the nutrient cycle and ecology of the coastal waters. The ecological studies on mangroves have concentrated around various flora. With the common general features, it is easy to place these plants in the Cochin backwaters in distinct natural group-halophytes. However, these plants belong to different families which show no inter relationship are grouped together.

The available literature bring to the notice that very little work has been done in the past few years on the histochemical, biochemical and palynological aspects in the mangroves of Cochin backwaters.

Sampling were done in two fixed mangrove areas *viz.* station 1 - Pudevypu and station 2 - Vallaradam. A control station was taken into consideration for the comparison of hydrological parameters with that of mangrove stations.

The thesis is presented in five chapters. Chapter I - Introduction to the topic of study, extensive literature on the subject is summarised and correlated with particular reference to the importance of mangroves, to bring an awareness of the present status of our knowledge in the subject and the review also clearly states that much work has not been done in the mangrove ecosystem related to histochemistry and biochemistry.

Chapter II is on Material and Methods, the description of the mangrove environment *ie.* Cochin backwater and the study areas, methodology in the collection of water samples, laboratory experiments, the study of some important hydrological parameters and all the available mangrove leaves were analysed both qualitatively and quantitatively for the different biochemical constituents.

In chapter III, the observations of the investigations are presented under four parts on various aspects such as foliar epidermal features, foliar histochemistry, qualitative and quantitative analysis of leaves for chlorophyll *a*, chlorophyll *b*, total chlorophyll, carotenoid, carbohydrate, protein, tannin, moisture, ash, nitrogen, sodium, potassium and hydrographic parameters such as temperature, pH, salinity, dissolved oxygen, gross primary productivity and net primary productivity are described under separate heads.

Chapter IV discussed the results of the observations. All the data collected and the results of the work done on the above aspects are given either in the form of graphic intensity charts or tables of effective presentation of the results. Correlation and multiple regression analysis of the results and their tables are also given as the last part of this chapter.

Salient features and findings of the present investigation are given as Summary and Conclusions in chapter V and the relevant literatures cited in these respects are included in a detailed list of References.