National Journal of Life Sciences, **Vol. 16(1&2) 2019 : 25-28** ISSN : 0972-995X (Print), 2321-7960 (Online)

LOCATION AND MAPPING OF CHIPPALERU ESTUARY, LAKSHMIPURAM VILLAGE, THUMMALAPENTA

ASHOK KUMAR B. and V. SAILAJA*

Vikrama Simhapuri University P. G. Centre, Kavali (A.P.)

ABSTRACT : The mangrove ecosystem has been identified as very unique but fragile, dynamic and most productive as any other ecosystem. Increasing human pressure on the limited mangrove resources due to increase in population. Increasing awareness regarding environmental and economic use of mangroves has highlighted the need for mangrove conservation and management. In India, mangroves occur on the West Coast, on the East Coast and on Andaman and Nicobar Islands, but in many places they are highly degraded. According to the Government of India (1987), India lost 40% of its mangrove area in the last century. The National Remote Sensing Agency (NRSA) recorded a decline of 7 000 ha of mangroves in India within the six-year period from 1975-1981. Increasing human population in coastal areas is resulting in increased pressure on mangrove ecosystems in many countries, with the growing demand for timber, fuel wood, fodder and other non-wood forest products.

Key words : *Mangroove, Topography, India, Biodiversity, Conservation, Chippaleru.*

INTRODUCTION

Mangroves are shrubs or small trees that grow in coastal saline or brackish water. The term is also used for tropical coastal vegetation consisting of such species. Mangroves occur worldwide in the tropics and subtropics, mainly between latitudes 25°N and 25°S. In the year 2000, the area of mangroves was 53,190 square miles (137,760 km^2), spanning 118 countries and territories (Giri *et al.*,2011). Mangroves are salt tolerant trees, also called halophytes, and are adapted to life in harsh coastal conditions. They contain a complex salt filtration system and complex root system to cope with salt water immersion and wave action. They are adapted to the low oxygen (anoxic) conditions of water logged mud. The mangrove biome, or mangal, is a distinct saline wood land or shrub land habitat characterized by depositional coastal environments, where fine sediments (often with high organic content) collect in areas protected from high-energy wave action. The saline conditions tolerated by various mangrove species range from brackish water, through pure seawater (30-40 ppt), to water concentrated by evaporation to over twice the salinity of ocean seawater (up to 90 ppt).

Need for mangrove conservation and management : Increasing human population in coastal areas is resulting in increased pressure on mangrove ecosystems in many countries, with the growing demand for timber, fuel wood, fodder and other non-wood forest products (NWFPs) (Saenger, Hegerl and Davie,1983). Management can also open new avenues for self-employment such as ecotourism, fishing, beekeeping and cottage industries based on mangrove forest products, helping to improve the socio-economic conditions of the local communities.

Economic significance of mangrove ecosystem : The mangrove ecosystem has been identified as very unique but fragile, dynamic and most productive than any other ecosystem (Naskar and Ghosh,1989). Mangrove wood is well known for its high calorific value, therefore, preferred as fuel wood since time immemorial. The trees and shrubs, which can be used for this purpose, include Rhizophora, Avicennia, Excoecaria, Ceriops, Bruguiera and Sonneratia. Mangroves grow within the saline environment in the inter-tidal region; therefore, it's wood is normally resistant to termite and other insects. It can withstand water logging and direct sunshine. Cattle, goats and buffaloes are the domestic animals known to graze on mangrove foliage leaves of some mangrove species like *Avicennia marina* and *Bruguiera parviflora* are used as fodder for mulching animals.

Hamilton and Snedaker (1984) found that *A.marina* was most nutritive. Barks of mangrove trees and shrubs are rich source of vegetable tannins. Tannins have been studied for their seasonal changes in 14 mangrove species and the tannins ranged from 2.41-21.42 mg/g dry weight (Katheresan and Veera Ravi,1990). Mangrove forests have substantial potential for production of wax and honey. Honey collected from *Cynometra ramiflora* and *Aegialitis rotundifolia* has a good market value and is in demand. However, honey from other species like *Ceriops* and *Excoecaria agallocha*, although common, is not highly valued (Blasco,1975).

Mangrove plants possess medicinal properties and are used by tribals in Andaman and Nicobar as medicine for treatment of several diseases (Dagar & Dagar,1986 and Dagar, 1989). Medicinal properties of mangroves have also been reported elsewhere (Chapman,1976; Chopra *et al.*,1956 and Anonymous,1948-1976). Some of the reported medicinal uses on mangroves are as follows : *Acanthus ilicifolius* - leaves reported to be used for treating rheumatism and neuralgia. *Acrostichum aureurn* In Malaya and Borneo, the pounded rhizome is applied to wounds and boils. *Ceriops tagal* - Decoction of shoots used as substitute for quinine. *Heritiera littoralis* - Decoction of seeds is used in diarrhea and dysentery. *Xylocarpus granatum* and *X moluecensis* - Bark is used as febrifuge and in dysentery by the Nicobarese. *Excoecaria agallochais* the principal pulping species used in the news-

*Corresponding author (email : sailajab@yahoo.com) Received 28.04.2019 Accepted 22.05.2019

print mill in Bangladesh. *Sonneratia caseolaris*, *Excoecaria agallocha* and *Avicennia marina* produce strong Sulphate pulps. The African species of *Rhizophora racemosa* is reported as suitable for making dissolved pulp although some problem exist due to the inorganic crystals present in the wood (Sugden and von Cube,1978).

Some mangrove species like *Rhizophora mucronata* possess satisfactory properties for making writing and printing paper. Importance of the mangrove ecosystems in fisheries has been established (Purushan,1991; Agate,1991 and Jeyaseelan *et al.*,1991). With a high rate of primary production, they are able to sustain populations of fish, shellfish and wildlife. Shellfish includes molluscs (Gastro A total of about one million jobs worldwide are dependent on mangrove-associated fisheries pods and Bivalves) and crustaceans (crabs and shrimps). Mangroves help in multiplication of fishes and prawns. As mangrove forests are inhabited by variety of animals and birds, they can be converted into wildlife sanctuaries. Eco-tourism can be introduced in such areas for educational and recreational purposes. Bark of *Derris heterophylla* and milky latex of *Excoecaria agallocha* are used as fish poison (Dagar,1982,1987). Mangroves are rich in polyphenolic compounds (Kathiresan,1995 and Kathiresan & Pandian,1991,1993) and As potential sources of mosquitocides (SubramoniaThangam,1991 and Thangam & Kathiresan,1992,1997,1993,1994). (Subramonia Thangam, 1991; Premanathan,1991; Moorthy,1995; Palaniselvam, 1998; Moorthy & Kathiresan,1995 and Kathiresan,1995). The conservation of mangroves as well as the rich fauna habituating them is an immediate necessity of the hour.

Environmental and ecological significance of mangrove ecosystem : Mangroves maintain atmospheric equilibrium in coastal areas and check the soil erosion and help in stabilization of coastlines. Mangroves acts as life supporting system. Thus, mangroves support life in marine environment (Dagar,1982,1987). Mangrove detritus and the subsequent mineralized nutrients are exported out of the mangrove ecosystem through tidal flashing. These are found in the food base for marine micro-organisms and these in turn support the valuable estuarine and near shore fishery (Naskar & Mandal, 1999). Mangroves are really the builders and guardian of the land (Sahani,1957). They grow seaward, sending their spreading roots into the shallow water. Mangroves acts as Wind breaker, Habitat for Wild life Scenic beauty and High Biodiversity and Nature's Gene Bank .Presence of mangroves along the sea coast and estuaries add scenic beauty to the area.

Many research papers concerned with Indian mangroves have been published over a period of 30 years. Fauna, flora, ecology and microbiology aspects have been well- studied as evident by the publications of over 60% of total research papers. However, some key aspects of mangrove conservation and management like regeneration, area and distribution etc have received poor attention. Through the present study an effort has been made to collect information on these key aspects.

It is utmost important to involve local people residing close to mangrove belts in mangrove management programme by educating them and fulfilling their genuine demand of minor forest produce from the mangrove forests. For this purpose, we must have the information on the actual extent of mangrove areas and its growing stock to plan sustainable resource utilization. This information has also been collected through the present study.

MATERIAL AND METHODS

The study will be carried out in State of Andhra Pradesh at Chippaleru estuary. During the study lot of information, directly or indirectly related to conservation and management of mangroves. The present study signifies the importance of mangroves in the conservation of Biodiversity. As part of my study on mangroves of Nellore district, I happened to visit Lakshmipuram of Annagaripalem in Kavali mandal. Coordinates : 14°49'25.94"N, 80°04'37.34" E. The swamps of the above location are about 1 km to the east of Lakshmipuram, a fishermen hamlet in Annagaripalem Panchayat of Kavali mandal. In order to reach these swamps one has to cross the Buckingham canal. The entire area to the east of Buckingham canal is heavily invaded with *Prosopis*

Fig. 1 Showing the mangroove area.

Fig. 2 Showing the diagrammatic representation of mangroves located in Lakshmipuram.

Figs. 3-4 Shows the photographs of the study area.

chilensis, which has extended farther into the salt marshes. There salt marshes are adjacent to Chippaleru, a brackish water creek which flows from west to east and merges with Bay of Bengal after branching off into a few smaller creeks. As part of my study on mangroves of Nellore district, I happened to visit Lakshmipuram of Annagaripalem in Kavali mandal. Lakshmipuram mangrove swamps are dominated by A.marina with dense growth. The extent of the mangrove swamp is about 18000 sq. meters (Figs.1&2).

RESULTS AND DISCUSSION

Mapping and location : As part of my study on mangroves of Nellore district, I happened to visit Lakshmipuram of Annagaripalem in Kavali mandal. Coordinates: $14^{0}49^{1}25.94^{11}$N, $80^{0}04^{1}37.34^{11}$E. The swamps of the above location are about 1 km to the east of Lakshmipuram, a fishermen hamlet in Annagaripalem panchayat of Kavali mandal. In order to reach these swamps one has to cross the Buckingham canal. The entire area to the east of Buckingham canal is heavily invaded with *Prosopis chilensis* , which has extended farther into the salt marshes (Figs.3&4).

There salt marshes are adjacent to *Chippaleru*, a brackish water creek which flows from west to east and merges with Bay of Bengal after branching off into a few smaller creeks. As part of my study on mangroves of Nellore district, I happened to visit Lakshmipuram of Annagaripalem in Kavali mandal. Lakshmipuram mangrove swamps are dominated by *A.marina* with dense growth. The extent of the mangrove swamp is about 18000 sq. meters. It is here we find the tallest trees of *Rhizophora mucronata* which are extended over a large area. *Artrhocnemum indicum* and *Sesuvium portulacastrum* are two mangrove associates which have spread over a large area in these swamps.

True mangroves :

a. *Avicennia marina* : about 6-7 ft tall, very dense, in full bloom, there are fruits here and there.

b. *Rhizophora mucronata* : in flowering. In entire Nellore district, it is here we find the tallest and most robust *R.mucranata* trees. About 5 such trees have come together giving the appearance of a single tree. They occupy an area of about 150 ft x 2 ft and a height of 15-18 ft. They are at the fringe of a creek, full of water round the year. Besides, there are 21 smaller trees *R.mucranata* ranging from 6-10 ft in height.

There is a Mandal Parishad School with student strength of 30 and two full-fledged teachers. After completing the field visit the school was visited and the students and teachers were addressed about mangroves, their significance and the need for their conservation. Live plant specimens collected were shown and explained with the help of poster. Pamphlets on the need for conservation of mangroves were distributed to the teachers for disseminating the information contained therein to the local stake holders and others concerned.

Mangrove associates :

1. *Acanthus ilicifolius* : Sparse in number, in flowering.

2. *Sesuvium portulacastrum* : Dense growth, no flowers.

3. *Artrhocnemum indicum* : Dense growth, no flowers.

These two mangrove associates have spread in a mixed pattern occupying an area of about 2 hectares.

4. *Suaeda nudiflora* : flowering.

Lakshmipuram is predominantly a fishermen hamlet. Most of the dwellers are engaged in fishing in the creeks and in the sea, about 1 km away. Some of them are engaged as laborers in the prawn culture ponds which are hardly a km away from the hamlet.

Our mangrove education and restoration program aims to increase environmental awareness and restore mangrove forests. We have partnered with local educational institutions to teach students and teachers about the ecological importance of their mangrove forests and help them get involved in mangrove restoration efforts.

The main aim of the present study is to educate the students, teachers, and community members about mangrove forests and to create a hands-on, collaborative project for students and teachers that will help to restore and monitor the mangrove ecosystem.

From my point of view, the alternative way for saving the mangrove is by involving local people. This management practice are used in conserving the Chippaleru Mangrove forests which i think a successful one. By giving awareness to the local communities, automatically they will feel the important of this halo-phytic plant to them.

REFERENCES

Agate, A. D.; Subramnian, C. V. and Vannucci, M. (1991). *Mangrove Microbiology.* Agate AD, pp. 11-13.

Blasco, F. (1975). mangroves de l'Inde= The mangroves of India.

Chapman, V. J. (1976). Mangrove vegetation. Vaduz. J. Cramer, p. 581.

Chopra, R. N.; Nayar, S. L. and Chopra, I. C. (1956). *Glossary of Indian medicinal plants.* Council of Scientific and Industrial Research, New Delhi, **1** : 105.

Dagar, H. S. (1989). Plant folk medicines among Nicobarese tribals of Car Nicobar Island, India. Economic Botany, **43(2)** : 215-224.

Dagar, J. C. (1982). Some ecological aspects of mangrove vegetation of the Andaman and Nicobar Islands in India. *Sylvatrop (Philippines).*

Dagar, J. C. (1987). Species composition and plant biomass of an ungrazed and a grazed grassland at Ujjain. *Trop. Ecol.*, **28(2)** : 208-215.

Dagar, J. C. and Dagar, H. S. (1986). Mangroves and some coastal plants in ethnobotany of the tribals of Andaman and Nicobar Islands. *J. Andaman Sci. Assoc.*, **2(2)** : 33-36.

Giri, C.; Ochieng, E.; Tieszen, L. L.; Zhu, Z.; Singh, A.; Loveland, T. and Duke, N. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*, **20(1)** : 154-159.

Hamilton, L. S. and Snedaker, S. C. (1984). *Handbook for mangrove area management.* Honolulu : East-West Environment and Policy Institute.

Jeyaseelan, M. J. P.; Sundararaj, V. and Devaraj, M. (1991). Significance of mangroves in fisheries. *Maharastra Assoc. Cultiv. Sci. Res. Inst. Pune*, pp. 14-23.

Kathiresan, K. (1995). Studies on tea from mangrove leaves. *Environment and Ecology, Kalyani*, **13(2)** : 321-323.

Kathiresan, K. and Pandian, M. (1991). Effect of UV on quality of black tea from *Ceriops decandra*. *Science and Culture*, **57(3-4)** : 93-95.

Kathiresan, K. and Pandian, M. (1993). Effect of UV on black tea constituents of mangrove leaves. *Science and Culture*, **59(7-10)** : 61-63.

Kathiresan, K. and Ravi, A. V. (1990). Seasonal changes in tannin content of mangrove leaves. *Indian Forester*, **116(5)** : 390-392.

Moorthy, P. (1995). Effects of UV-B radiation on mangrove environment: Physiological responses of *Rhizophora apiculata* Blume. *Ph.D. Thesis*, Annamalai University, India.

Naskar, K. and Ghosh, A. (1989). Mangrove Forest of the Sunderbans : Its Impact on Estuarine Fisheries. *Proc. Coast Zone Management of West Bengal*, pp. 47-59.

Naskar, K. and Mandal, R. (1999). *Ecology and biodiversity of Indian mangroves.* Daya Books.

Palaniselvam, V. (1998). Epiphytic cyanobacteria of mangrove: Ecological, physiological and biochemical studies and their utility as biofertilizer and shrimp feed. *Ph.D. Thesis*, Annamalai University, India.

Premanathan, M. (1991). Studies on antiviral activity of marine plants. *Ph.D. Thesis*, Submitted to The Annamalai University, India.

Purushan, K. S. (1991). Prospects of fish production from mangrove ecosystems. *Fish Chimes.*, **11** : 24-26.

Saenger, P.; Hegerl, E. J. and Davie, J. D. (1983). *Global Status of Mangrove Ecosystems* : Vol. 3. International Union for Conservation of Nature and Natural Resources.

Sahani, K.C. (1957). Mangrove Forests in Andaman and Nicobar- Islands. In : *Proc. Mangrove Symposium*. Calcutta, pp. 114-123.

SubramoniaThangam, T. and Kathiresan, K. (1992). Mosquito larvicidal activity of mangrove plant extracts against *Aedes aegypti*. *International Pest Control*, 34(4).

SubramoniaThangam, T. and Kathiresan, K. (1997). Mosquito larvicidal activity of mangrove plant extracts and synergistic activity of *Rhizophora apiculata* with pyrethrum against *Culex quinquefasciatus*. *International Journal of Pharmacognosy*, **35(1)** : 69-71.

Sugden, E. A. N. and Von Cube, H. G. (1978). Industrial uses of mangrove (*Rhizophora racemosa*). In : *World Forestry Congress.* Jakarta (Indonesia).

Thangam, T. S. and Kathiresan, K. (1991). Mosquito larvicidal activity of marine plant extracts with synthetic insecticides. *Botanica Marina*, **34(6)** : 537-540.

Thangam, T. S. and Kathiresan, K. (1993). Note : Repellency of marine plant extracts against the mosquito *Aedes aegypti*. *International Journal of Pharmacognosy*, **31(4)** : 321-323.

Thangam, T. S. and Kathiresan, K. (1994). Studies on mosquito larvicidal activity of *Rhizophora apiculata*. *International Journal of pharmacognosy : A Journal of Crude Drug Research.*