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Introduction

India is fortunate to have a coast-line which embraces both tropical and subtropical vegetation. Mangrove swamps are prominent component of coastal vegetation, which occupy the flood plains, margins of bays and tidal rivers in addition to shores. The role of the mangrove forests in stabilising the shoreline or coastal board is well known. They prevent soil erosion and encroachment by the sea to the interior.

Odum (1970 and 1972) and Odum and Heald (1972) have studied estuarine environment in South Florida and shown that there is a belt of mangroves which supports large populations of birds, game-fishes and invertebrate species of commercial importance. Mangroves also provide a habitat and a nursery ground for a variety of organisms (Macnae,1974; Idyll et.al.,1967). There has been an increasing awareness among the scientific community that the mangroves are a critical component of tropical marine ecosystems. They contain a highly specialized community of plant species and associated fauna not capable of flourishing under other situations.

The scientific account of Indian mangroves was firstly given by Rheede (1678), Schimper (1891) gave detailed information on the littoral flora of the Indo-Malayan coast in Die Indo-Malayische strand flora. The mangrove vegetation of the Gangetic Sunderbans was studied by Prain (1903). The mangrove flora of the erstwhile Bombay Presidency are contributed by Cooke (1908) and Blatter (1905).

The total mangrove area along the Indian coast has been estimated tentatively to be 700,000 ha.(Sidhu 1963). The Indian

coastline of about 5,700 Km. long can be divided into the east and west coasts and island chains (Untawale,1985). Several attempts have been made earlier to survey the mangrove areas along the Indian coasts (Mathauda,1957; Qureshi,1957; Khan,1957; Sidhu,1963; Blasco,1977). The extent of the mangroves along the east coast of India is larger than that in the west coast.The total mangrove area along the west coast is about 12%, while it is 33% of east coast of the total Indian mangroves. Some of the species found on the east coast like Heritiera, Nypa etc. are not found on the west coast. Untawale (1984), suggested that the succession of mangrove is dependent on the available seeds or propagules, their size or length and the tidal fluctuation. Seeds of grass, sedge or Excoecaria agallocha L. which are minute in size, will always establish themselves at the uppermost limit of the intertidal region.

Mandal and Nandi (1989) reported that E, agallocha occur at the places with high salinity and low elevation. It also appears to tolerate long periods of flooding by fresh water. In Australian mangrove within the survey area, the species was found at sites inundated by waters of salinity upto 85 parts per thousand (Clough,1979). It is abundant species in arid zone areas especially in back mangrove areas in Shrilanka (Kanakaratne,1984). In West Bengal in the mixed zone of sea and fresh water originating from rivers resulting in conditions. According to them, salt tolerant fresh water plants are included (called Prohyline) Bruguiera, Excoecaria,

Acrostichum, Sonneratia, Heritiera, Lumnitzera, Clerodendron and Dalbergia. E. agallocha, common on mangrove forest along channels and river banks, tolerates variable salinity i.e. 30% in the month of May and July, while 5% in the month of October and December. Hemsley (1894) reported that in both island groups (i.e. Fiji and Tonga) the less saline mangrove areas were occupied by Heritiera littoralis, Excoecaria agallocha, Clerodendrum inerme. De Hann (1931) has reported E. agallocha, C. inerme are other brakish water indicators.

E. agallocha is locally known as Gengwa in West Bengal, Kharphuti in Maharashtra and Thillai at Pitchaviram.It belongs to the family Euphorbiaceae. This species is found in West New Guinea, Bismark, Soloman Islands, Malaysia, Australia, Burma, Ceylon and India. It is usually small, glabrous, bushy tree. This tree is often called in English, as the poison mangrove because of the acrid latex. E. agallocha exudes acrid latex which is injurious to the human eyes and hence called 'blinding tree of India' (Kathireson and Thangam,1987; Padmakumar and Ayyakkannu, 1985). Besides these, it has also some medicinal importances. Latex of E. agallocha is poisonous but it is medicinally used (Maiden,1889; Cribb and Cribb, 1981). There are no reports concerning its impact on the organism associated with this plant in the marine environment (Kathireson and Thangam,1987).

The various parts of this plant have been reported to be useful for the treatment of ulcers, leprosy and also as an

aphrodisiacal tonic (Kirtikar and Basu, 1945; Seeman 1865-1873). Leaves and latex are used to cure epilepsy and rashes on skin, in indigenous medicine (Amarasinghe, 1988). The extract of this plant has also been used for the treatment of rheumatism, paralysis, cutaneous infections, purgative and as abortifacient (Anonymous, 1952). The chemical composition of the latex has been studied by Puntambekar and Krishna (1943). However, attention has not been focused so far on the antibiotic activity of the plant. Padmakumar and Ayyakkannu (1985) concluded that the antimicrobial compound. By the local people at Terekhol the juice is used for removing many aliments (Joshi and Shinde, 1978).

About 39 % of honey is produced from Gnewa (Mandal and Nandi, 1989; Ghosh, Majumdar s. et al.,1983). It is rarely used as it gives off an unpleasant smoke. Plants are used in Malaya for obtaining charcoal. Wood has been used for manufacturing of matches, packing cases and boxes. It produces good quality of pulp which is used for news prints.

As a result of human activities the mangrove resources have been depleted. Threat to this ecosystem comes from different human activities. Mangrove ecosystems are being damaged more and more day by day. It has become a necessity to preserve natural resources.

Scope of Present Investigation :

The present study is restricted to the regeneration of E. agallocha L. It is now a common knowledge that mangrove species have developed over the years. The mangrove ecosystem is dynamic; the plant species inhabiting it to adapt these frequent changes and having adaptability which enables them to withstand a variety of environmental stresses, particularly the salinity stress ranging from high salinity at one extreme to a complete lack of it or near fresh water conditions at the other.

India is loosing mangrove vegetation very fast in spite of its ecological and economic values. The mangrove ecosystem is under threat since the last decade due to lot of human pressure. As a remedy to stop this deterioration, steps are being taken to afforest the barren mangrove areas. It is an urgent need of today to have artificial regeneration of mangrove land.

In disturbed forests regeneration may come from seeds or some from vegetative regrowth (U.Tin.Hla.,1985), usually in the form of stump sprouts i.e. coppicing. E.agallocha L. has well coppicing ability (Saenger,1979). According to Raddi (1984) E.agallocha coppice well and as well as Avicennia has good regenerative ability. It is a useful species which can also support apiculture along with Excoecaria. Blasco (1977) suggests that Avicennia and Excoecaria in Western India have persisted in the face of over exploitation because they coppice. The germination per cent of seeds of E. agallocha L. is very low.

The main reason for failure in seed germination in this species is that the plant suffers by heavy attack of pests on fruits, therefore majority of seeds are destroyed (Bhosale,1990). Mandal and Nandi (1989) reported that many of the birds feed on the fruits or seeds of E. agallocha.

In recent days, artificial regeneration has the attention.The most important problem is the lack of data and knowledge regarding the afforestration and regeneration of mangroves. It is well known that mangroves need fresh water conditions for establishment of seedlings (Bhosale 1978). It is also reported that many mangroves can grow with fresh water irrigation and germination of seeds is best under fresh water conditions (Andrini, 1958).

In present work, E. agallocha L. has been tried to cultivate vegetatively under laboratory condition as well as under changed climatic conditions i.e. at high altitude from sea level, changed rainfall and also under different conditions other than coastal areas. Nevertheless large scale plantations are to be carried out directly. Therefore, nursery techniques in various species are to be established. It is seen that there is wide scope to conserve and propogate the mangrove plantation on varying climatic and soil conditions. It has an utility potential to the mankind. Keeping in view the importance significance and utility of mangroves.An attempt has been made to bring E. agallocha L. cuttings and seedlings to the laboratory and study the growth performance and parameters under fresh water conditions.