



FEJ

MATERIAL

AND

METHODS

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The main aspect of present investigation is mineral elements. The study aims at knowing distribution of sodium, potassium, calcium, magnesium, iron and chlorides in the seedlings of different mangroves.

#### I) SELECTION OF PLANTS

Mangroves are classified in three groups, namely, salt excluding, salt excreting and salt accumulating. The seedlings of plants are selected from all the three groups. Each group is represented by two sample species, however, salt excreting group is represented by three, Aegiceras and Avicennia possess cryptovivipary whereas Acanthus has no vivipary.

- Salt excreting - Avicennia officinalis L.  
Aegiceras corniculatum (L.) Blanco.  
Acanthus ilicifolius L.
- Salt accumulating - Sonneratia alba J. Smith.  
Lumnitzera racemosa Willd.
- Salt excluding - Ceriops tagal C.B. Robinson.  
Rhizophora mucronata Lamk.

Plate - 1

First season seedlings of

- a. A. officinalis
- b. A. corniculatum
- c. A. ilicifolius
- d. L. racemosa
- e. S. alba

## II) MATERIAL

The seedlings of first season (i.e. first year growth which has received only one rainy season) were collected in October 1991 from Ratanagiri area and brought to the laboratory ; washed for surface dirt, rinsed with distilled water and sampled into four groups as young leaves (first pair of leaf from top), mature leaves, stem and roots. In case of R. mucronata there is viviparous mode of reproduction. Therefore, the seedlings have original hypocotyl region and newly developed stem region. Hence this plant was sampled in five groups.

The material was subjected to analysis of fresh weight, dry matter, moisture content, leaf anatomy and mineral elements.

## III) METHODS OF ANALYSIS

A) Leaf anatomy - The hand cut sections were observed under light microscope for presence of oil globules. the sections were photographed on 35 m.m. microphotographic camera (Olympus).

B) Fresh weight and Dry matter - Cleaned material made into pieces was weighed accurately to its fresh weight. It is to be noted that the minimum material required for any group of sample was 4-5 g. To obtain this, the number of seedlings excised varied greatly. In case of Rhizophora and Cerriops 10-15 seedlings were enough whereas in case of Sonneratia and Lumnitzera seedlings were very tiny and needed a large number as 70-100. The number of other seedlings needed was between 30 and 80. The weighed material was

Plate-2

a. R. mucronata seedlings under mother plant.

b. C. tagal }  
                 } First season seedlings.  
      R. mucronata }

transferred to oven at 60 C and dried till constant weight was obtained. This represented the dry matter. From the difference between fresh weight and dry weight, percentage of moisture was calculated.

C) Mineral elements -The oven dried material was subjected to wet digestion (Toth et al., 1948). From this digest major elements Na,K,Ca,Mg and Fe were determined. Na and K were found out on Digital Flame Photometer (Elico CL 22 D). Calcium, Magnesium and Iron were estimated using Atomic Absorption Spectrophotometer (Perkin Elmer 3030). Iron was also found out from ash. For estimation of chlorides Volhard's (1956) method was used. However, CaO was not used for ashing. Instead, 0.5 g oven dried plant material was ashed at 500 C till constant weight was obtained. Ash after recording weights was dissolved in few drops of 1 + 4 HNO<sub>3</sub>. Further the ash was extracted with hot water and filtered through Whatmann No.44 filter paper. An aliquot (10ml) was removed for estimation of mineral elements and remaining filtrate was used for chloride determination. From the weight of the ash percentage was calculated.

The mineral elements were measured on Flame photometer (Systronics FPM ) and Atomic Absorption Spectrophotometer (AAS). The values are used for comparison.

IV) ECOLOGICAL MODEL - An ecological model can be verbal, mathematical or geometrical. In the present study a verbal model has been suggested to assess the behaviour of different mangrove seedlings with respect to their endogenous salt

levels. The model is tested with mathematical numbers which gives a kind of index value indicative of plant's nature. The proposed model is :

Behaviour of the species = Life form  
 + Category in classification  
 + Reproduction mode  
 + Range of ionic distribution  
 as percentage difference  
 ( between highest and lowest  
 values for the element)

To prove this model mathematical expressions are given to each of the category which are called units.

Life form

Units

Tree - 1

Shrub - 3

Herb - 5

(All are arbitrary numbers in increasing order)

Category

Units

Salt excreting - 6

Salt accumulating - 8

Salt excluding - 7

( These numbers are based on average values of an element for the entire seedling of that category)

**Reproduction**

	<b>Units</b>
<b>Typical vivipary</b>	<b>- 30</b>
<b>Crypto vivipary</b>	<b>- 20</b>
<b>No vivipary</b>	<b>- 10</b>

**( Arbitrary numbers in decreasing order )**

**Percentage difference**

**Difference of 10 % equivalent to 1 unit, e.g.**

**70 % = 7 units.**

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