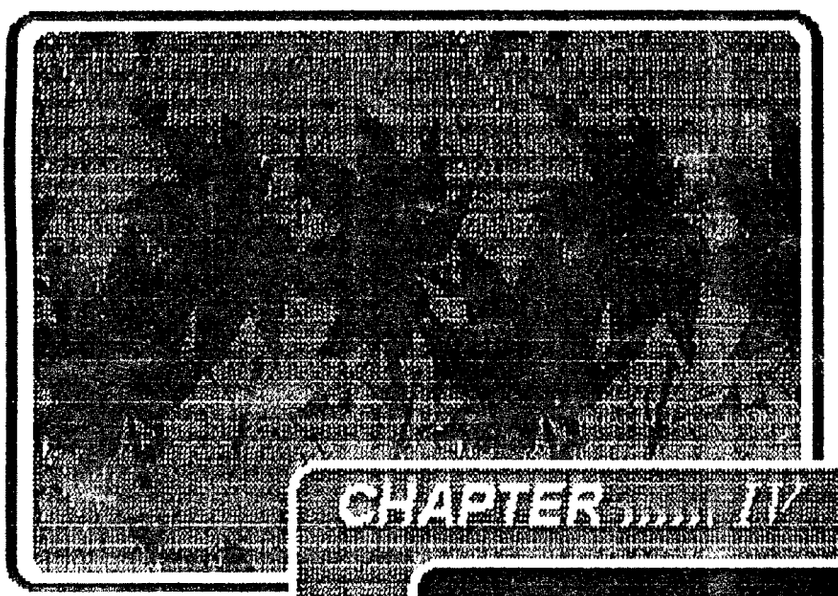

CHAPTER ... IV

Summary and Conclusions.

Several leguminous halophytes such as Caesalpinia bonduc, C.crista, Derris scandens, D.trifoliata, Pongamia pinnata, Erythrina varigata etc. form an important component of the coastal ecosystem. Caesalpinia crista is a perennial climber growing in the area on and around number of mangroves and mangrove associates like Rhizophora mucronata, Avicennia alba, Acanthus ilicifolius, Excoecaria agallocha, Lumnitzera racemosa , Clerodendron inerme, Pongamia pinnata etc. It is one of the important plant recognised in the estuarine ecosystem in many countries such as India, Australia, Malaysia, China, Java, Burma, Philippines, Polynesia, N.America, Bangla Desh etc. Medicinally it is also important. The roots of C.crista are said to be diuretic, tonic and useful in the treatment of stones in the bladder. It is also reported to be a fish poison. Hence an attempt was made to investigate some physiological aspects of this halophytic legume. The significant findings of the present investigation can be briefly summarized as follows.

1. The soil and water in the vicinity of the plant was slightly alkaline. Salinity of the soil as well as water was least in monsoon and highest in summer.

2. Density of pods of Caesalpinia crista is less than unity, hence they float on sea water. The buoyancy test indicated that about 89% pods remained floating on sea water upto two months. Sixty percent seeds remained viable even after two months floating of the pods on sea water. There is no dormancy period for C.crista seeds but temporary dormancy gets imposed when pods are kept floating on sea water and this can be considered to be an important ecological adaptation.

3. Two morphological categories of seeds large and small were recognized in C.crista. Germination pattern of dimorphic seeds is also different. Large seeds show better germination and vigorous seedling growth than the small seeds.

4. Seeds of C.crista can tolerate salinity upto 1% NaCl during germination but the germination was relatively quick and the germination percentage was highest in Ø.25% NaCl salinity. As the salinity of the medium increased the germination percentage decreased and time required for germination increased. It indicates that the seeds of C.crista are sensitive to salinity of the growing medium. This behavior is similar to the germination behavior of various perennial halophytic species.

5. The analysis of inorganic constituents during different seasons revealed that though the plant is growing in saline habitat there in no tendency of sodium accumulation. Only during summer months sodium gets accumulated in the root region to some extent but still it is not transported to leaves via stem. Accumulation of sodium in the root tissue during summer months is the effect of high NaCl salinity of the surrounding medium.

6. Chloride accumulation is also comparatively lower than the records of other halophytes accompanying C.crista. Only root tissue showed chloride accumulation during summer months. These results clearly indicate that C.crista belongs to the category of salt evading type of halophyte in classification system of Waisel (1972) where Prosopis farcata is included.

7. K: Na ratio is more than unity in different plant parts which clearly indicates the preferential uptake of potassium as a monovalent cation since the K: Na ratio of the medium is very low.

8. Appreciable calcium accumulation rather than Na, K and Cl was observed and this may be one of the possible mechanisms of salt tolerance in this leguminous halophyte.

9. Appreciable levels of magnesium in the leaf tissue of C.crista was noticed during all the three seasons.

10. Marked seasonal variation of phosphorus content from all the plant parts was observed. During winter a peak of phosphorus content was observed in all the plant parts and minimum was recorded during summer.

11. As compared to other halophytes where iron nutrition has been investigated, C.crista was found to have higher values of iron in different plant parts during all the three seasons.

12. There is no much variation in zinc, copper and manganese contents during different seasons. Our findings agree with the results recorded by other workers for different halophytes in this respects.

13. Comparative inorganic analysis of senescent and green leaves revealed that during senescence there is clear translocation of toxic elements like Na and Cl towards the senescent leaves while useful elements like K and P are translocated towards green leaves.

14. Leaf moisture content varied seasonally. It is highest during monsoon and least during summer though the salinity of habitat is too high. C.crista evades salt, hence the development of leaf succulence, typical of some halophytes is not noticeable.

15. Very high TAN value in the leaf tissue indicate that heavy accumulation of organic acids, might be playing an osmoregulatory role.

16. Analysis of the carbohydrates reveal that starch is a major carbohydrate fraction in all the plant parts. The reducing sugars are prominent than the nonreducing sugars.

17. Total nitrogen in leaf tissue is more than total nitrogen from other plant parts. As C.crista does not possess root nodules, total nitrogen in root tissue is also less than the leaf tissue nitrogen.

18. Appreciable free proline accumulation was seen only in leaf tissue and not in stem, root and rachis. As leaf is the major metabolic center, the compounds necessary for biosynthesis of proline are best provided during photosynthetic process.

19. Amount of total polyphenols from leaf tissue is quite high. Thus similar to other mangroves salinity appears to stimulate the secondary metabolism in the leaves of C. crsta.

2Ø. The seed analysis revealed that the seed tissue contain moderate levels of carbohydrates and proteins and lower amount of total polyphenols. The lipids were found to be present in appreciable amount which indicate possible economic importance of this halophytic legume.

21. Mineral contents of seeds of C.crista showed the similar pattern of minerals in other plants parts. Heavy accumulation of Ca is observed followed by potassium,

chloride, phosphorus, magnesium. Sodium was present in least amount. As regards micronutrients are concerned iron is the dominant element followed by zinc, manganese and copper.

It is evident from the foregoing account that legume C.crista shows several interesting features. It is well adopted as a halophytic plant from the germination stage onwards. C.crista is a salt evading type of halophyte. Entry of salt is prohibited or in check at root level and in extreme salinities roots absorb and accumulate salt but do not translocate it to the aerial parts. The plant also shows some economic promise as the leaves are rich in polyphenols while seeds are rich in oil.