CHAPTER - VIII

SUMMARY AND CONCLUSIONS

The present investigation deals with the "Studies on the liverworts of Panhala". Collection of the material has been done from various habitats and localities. To decide their microenvironment, a special emphasis was given on their habitat preferences and substrate characteristics. Considerable attention is also focused on their monographic studies such as taxonomy, morphology and anatomy.

Subject matter of this dissertation has been divided into IX-chapters.

Chapter-I is a general introduction in which necessity of the present work, in the light of recent studies made in various countries regarding the bryophytes.

Chapter-II deals with the review of previous work in bryophytes. It gives information about the floristic as well as ecological work, done by different workers.

Chapter-III gives the information regarding the history, topography and physical features of the area under study.

Chapter - IV describes the material and the methods used in the present work.

Chapter-V is descriptive; which gives key for the identification upto species level. It also gives a detailed account of the liverworts collected from Panhala. Investigation also includes morphology and anatomy of six genera and ten species.

Chapter-VI deals with detailed investigation into the relationships between the liverworts and their various environmental factors acting upon them.

Chapter-VII, is a discussion about the investigation carried out, into two parts - A and B. Part-A deals with a discussion based on characteristic features of liverworts collected from Panhala. Part-B is discussed with the ecological parameters related to their micro-environment.

Chapter-VIII includes summary and conclusions.

Chapter-IX is a bibliography which includes the references cited to the literature.

On the basis of above summarised work, following conclusions are drawn into following lines.

In different habitats, different types of liverworts are observed with their specific micro-environment. This may be due to the difference in

ecological parameters such as moisture content, light intensity, pH and organic matter of the substrates. Thus, microclimate plays a vital role in distribution of growth of liverworts.

Liverworts therefore, occur most abundantly in restricted sites where they do not have to compete with other plants. Amongst such sites are rock walls and their crevices, moist soil, mud banks and road cuts. all the liverworts studied are found to be basiphilous. Majority of them are epilithic and restricted to their habitats, such as *Plagiochasma, Asterella, Targionia and Fossombronia.*

Out of three *Riccia* spp. studied, *R. crystallina* and *R. frostii* are strictly terrestrial while *R. fluitans* is 'amphibious'. As it was found in floating condition on water at vegetative stage and becomes terrestrial one at sporophytic stage.

Panhala is found to be less favourable for the growth of folliose and epiphytic forms while it is found to be more favourable for the thallose forms. This may be due to absence of abundant rains, high humidity and altitude.

All the localities have average altitude ranging from 850 to 965 meters, where xeric forms such as *Riccia frostii, Targionia hypophylla, Plagiochasma spp.* and *Asterella angusta* occur invariably. They show

various ecological and morphological adaptations against drought conditions which have been discussed earlier.

As far as area occupied by each liverwort is concerned, it is found that *Asterella angusta* occupies the largest area among them, possibly because of most favourable ecological conditions in that locality.

Fossombronia himalayensis, a well known endemic leafy liverwort distributed in Western Himalayas and South India only, is also observed in Panhala. It is receiving a threat to it's survival owing to the marked changes in the natural as well as man-made environments. This fragile plant is very susceptible to periodic drought following rainy season (September-October) resulting in premature damage of sporophyte. The increasing urbanization, removal of shady habitats and niches, changed topography have all posed a threat to it's survival.

The fast increasing urbanization with it's monstrosities and recreation on the Panhala hill station is putting extreme pressure on bryoflora to the limits of their patience Exploration, collection and conservation are one of the urgent needs of the day.

The extraordinary varied and rich bryoflora of our vast country is not thoroughly explored. Besides Western Ghats, South-Western Maharashtra region abounding in moss or liverwort-covered valleys and

hillsides, ridges and slopes still awaits exploration. A great deal of interesting information is shrouded in darkness. Moreover it has been an urgent call to bryologists and floristic researchers of these areas that unexplored regions deserves first priority for exploration. The need for more and more bryo-exploration in the still very inadequately known parts of the South-Western Maharashtra is absolutely essential otherwise many a species would perish and would disappear before being documented from these unexplored areas.

The present work by us could form a "starting point" and foundation in our region on which more comprehensive qualitative and quantitative studies could rest in future with the response of bryophytes to mineral elements and their sources of supply and the factors influencing availability and uptake.