ABSTRACT

Lichens the most successful symbiotic organisms on earth constitute the dominant life form over as much as 8 per cent of the earth's surface. They are amongst the most significant bioindicators, besides having many economic applications. While there have been systematic studies of the nearly 700 species rich macrolichen flora of India contributing to 10 per cent of the world total, there have been hardly any investigations of their community ecology and there is little understanding patters of diversity and distribution at local level. Hence, the present investigation focused on the diversity, distribution pattern and ecology of macrolichens in the local landscapes along the Western Ghats of Karnataka. A total of 15 families with 33 genera and 106 species constitute macrolichen community in the Shimoga, Chikmagalur and Hassan occurring in 2379 individuals sampled over 45000 square meters. Forests of Shimoga supports about 95 species of lichens belong to 31 genera and 14 families, Chikmagalur supports about 84 species of lichens belong to 25 genera and 12 families and Hassan supports about 72 species of lichens belong to 24 genera and 11 families among total 106 species.

Corticolous macolichens ranked highest in terms of mean composition representing 71, 61 and 53 species in Shimoga, Chikmagalur and Hassan districts respectively. Foliose species ranked higher in terms of composition represents 75 per cent and fruticose represent 23 per cent remaining are squamulose forms. Association of the algal partner in the distribution of lichen is *Trebouxia* (61%) is the dominant algal partner followed by *Nostoc* (19%) and *Trentepholia* (8%). *Parmotrema cristiferum*, *P. tinctorum* and *Heterodermia dendritica* is having high importance value (IVI). Physciaceae is the largest family which supported 32 species followed by Parmeliaceae (29 species) and Usneaceae (10 species). The *Heterodermia* (16 species) is the largest genera followed by *Parmotrema* (11 species) *Usnea* (10 species) in three districts. The species, genus and family level turn over between the transects increase with altitudinal differences. Altitude does not significantly influence on the diversity of macrolichens but the nature of substrate seems to govern their distribution. Shimoga having species richness Shannon diversity index is H'= 4.412 and Simpson value D= 0.987. Chikmagalur and Hassan had

Shannon diversity index is H'= 4.309 and 4.153, Simpson value D= 0.985 and 0.982. Detrended Correspondence Analysis (DCA) indicated there is no co-relation with site, forest type and host but there is a distinct correlation with substrates. DCA analysis indicate that, there are several groups that concentrate species of certain genera and they largely correlate with the different forest types, but not perfectly. The indicator species analysis with respect to forest types indicates that several species were strongly co-relate with a particular forest types. DCA analysis indicated microhabitats and macrohabitats rich at one taxonomic level may not necessarily possess same richness rank at other level of taxonomic hierarchy.

Our results indicated that host-tree species and canopy height influence lichen species richness and growth forms. The foliose growth form had the greatest species richness in comparison with the other growth forms. There is no correlation with bark texture, bark peeling and site and forest type, but separately they have co relate with environmental factors and few species had significant co-relationship with a particular host species.

The lichens have been household items of Indians since ancient times. Etnobotanical survey in the study sites reveals that 70 per cent people used *Parmotrema* species for medicine and 20 per cent people used *Usnea* for medicinal use and only 10 per cent people used *Ramalina* and *Heterodermia* species for medicine. The nutrient composition of lichens varied widely between different species of lichens but they are generally high in carbohydrates and low in most other nutrients. Based on ethnobotanical survey we selected six macrolichen species like *Parmotrema tinctorum, Ramalina pacifica, R. taitensis, Roccella montagnei, Usnea galbinifera and Heterodermia diademata* were used in antimicrobial studies. The results of antibacterial activity of various solvent extracts showed positive activity. The results showed that higher inhibitory potential of the methanol extract. *Parmotrema tinctorum* and *Ramalina pacifica* showed good results against all tested bacteria. Gram positive bacteria were more susceptible when compared with Gram negative bacteria to lichen extracts.