CHAPTER 5

CONCLUSION

The exploration of lichen diversity from Dhubri district of Assam revealed 196 lichen species of which 15 are new record to India, 28 new record to Assam, and 15 are endemic to Indian region. Of the total species, 88% were crustose, 11% foliose and 1% were leprose. Although the diversity of crustose lichens were more in the district however species of foliose lichen, *Dirinaria* and *Pyxine* were the most frequently encountered species in the study area. This is because these lichen species are tolerant to air pollution and is the reason for their application in many biomonitoring studies.

Graphidaceous lichen of Graphidaceae are the most dominant followed by Arthoniaceae. Among the genera, *Graphis* was the most dominant with 60 species followed by *Pyrenula* with 43 species.

It is noteworthy that tree species viz. *Albizia* sp., *Aquilaria agallocha, Areca catechu, Artocarpus heterophyllus, Averrhoa* sp., *Azadirachta* sp., *Azadirachta indica, Bombax ceiba, Camellia sinensis, Citrus* sp., *Cocos nucifera, Delonix regia, Elaeocarpus* sp., *Eucalyptus* sp., *Ficus* sp., *Gmelina arborea, Holarrhena* sp., *Jatropha* sp., *Lannea* sp., *Laurus* sp., *Litchi chinensis, Mallotus nudiflora, Mallotus* sp., *Mangifera indica, Mesua ferrea, Michelia champaca, Moringa* sp., *Neolamarckia cadamba, Polyalthia longifolia, Pongamia pinnata, Ricinus* sp., *Shorea robusta, Spondias* sp., *Syzygium* sp. and *Tectona grandis* holds good number of lichen species indicating their suitability for lichen growth.

All the villages had almost the same number of lichen species with similar lichen diversity as revealed by beta diversity.

Dirinaria applanata, D. consimilis, D. picta, Lecanora helva and *Pyxine cocoes* were the most frequently found species. *Pyxine cocoes* (10.85) was highly abundant followed by *P. reticulata* (5.00), *Lecanora helva* (4.85), *Parmotrema saccatilobum* (4.00) and *Dirinaria applanata* (4.00).

These studies provide a comprehensive account on the lichen diversity of Dhubri district. It also enriches the present status of lichen biota of the state, Assam.

Phytochemical screening of methanolic and hexane extracts of *D. applanata, D. consimilis, D. papillulifera, D. picta, Parmotrema saccatilobum, Pyxine cocces, P. reticulata* showed presence of alkaloids, flavonoids, phenol, tannin, and triterpenoids. Thin layer chromatography of the selected lichen species for antimicrobial activity showed the presence of lichen compounds such as atranorin, divaricatic acids, sekikaic acids, protocetraric acids and triterpenes which are known to have potential antimicrobial property.

Study of antimicrobial activity of the lichen extracts revealed potential antimicrobial activity of methanolic extract of *D. picta* having considerable amount of phenol and flavonoid content against *P. oryzae* and *C. gloeosporioides*. Besides this, all the lichen species were also found to be more effective against the pathogens, *P. oryzae* and *C. gloeosporioides* as revealed in disc diffusion as well as by MIC assay. In future, further research on secondary metabolites of *D. picta* could lead to the use of it as a potent biological control measure as fungicide.

Future scope:

1. Data extracted from the study will be a baseline and definitely be helpful for future lichen biodiversity and biomonitoring research in the area as well as lichen- centric conservation strategy.

2. In future, further research may be carried out focusing on the identification of compounds in *D. picta* and its use as a potent biological agent to control the tested pathogens which will be beneficial for the human society. In addition to this, all the tested lichen species may also be targeted for its use against the pathogens, *P. oryzae* and *C. gloeosporioides*.