

## ENUMERATION OF LICHENS FROM THE DOBOKA RESERVE FOREST, HOJAI, ASSAM, INDIA

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### ABSTRACT

The main objective of this present study is to discuss about lichen diversity from the “**Doboka Reserve Forest, Hojai, Assam, India**”. A total of 46 species distributed in 23 genera and 13 families were numerated during the study. The two most dominated families were Graphidaceae & Pyrenulaceae, which together comprised of more than 50% of populations. Pyrenula & Graphis were the genera, which together constituted for about 22% of the total identified lichen species. Many of the identified species were reported for the first time from the particular location of Assam. The rich lichen diversity in a small forested area suggests the need to explore the area further.

**Keywords:** Diversity, Location, Symbiotic Organism, Biomonitoring, Lichen Flora.

### I. INTRODUCTION

Among the different Lichenological regions in India, ‘Eastern Himalaya & North-East India’ records the maximum no. of lichens represented by 1253 taxa, followed by western Ghats with 1209, & Western Himalaya with 972 taxa [24]. It serves as a geographical gateway for much of India’s flora and fauna & is also part of the Indo-Burma Hot spot (Myers et al. 2000). The probable reason for such significant species enrichment is due to its difficult terrain & long years of isolation. India is home to an estimated 89,450 described species of all living organisms, accounting for about 7.3 percent of the global diversity [20]. It is being estimated that there are about 2040 species of lichens present in India (Awasthi,2000). In India, the first attempt on lichen study was made by Dr. Kalipada Biswas, the Superintendent of erstwhile Royal Botanic Garden Calcutta and now reorganised as Botanical Survey of India. Dr. Biswas made his publication entitled ‘The Lichen Flora of India’ in 1947 [6]. It has been observed that lichen diversify themselves with the diverse and structurally complex vegetation, enlightening new possibility for a more comprehensive strategy for lichen conservation. An undoubted role of lichens is their use as pollution indicator. Lichens are interesting in their actual status as they have a unique combination of traits, being primarily fungal but also algal or cyanobacterial. The present study aimed to gather information about the lichens of “**Doboka Reserve Forest**”. However, information on lichen diversity in this region is far from comprehensive and there may still be many unknown species. Growing deforestation is a major environmental problem that can result in the extinction of any lichen species without being studied.

The North-East region is exceedingly rich in lichens, mosses & liverworts (Ramakanta et al. 2003). The humid climate and plenty of annual rainfall in the region offers more lichen growth. The topography, altitude and moisture-laden monsoon winds blowing across the Bay of Bengal offers the abundant growth of lichens. Although it is home to a rich variety of lichens, the north-eastern region of India is largely underexplored.

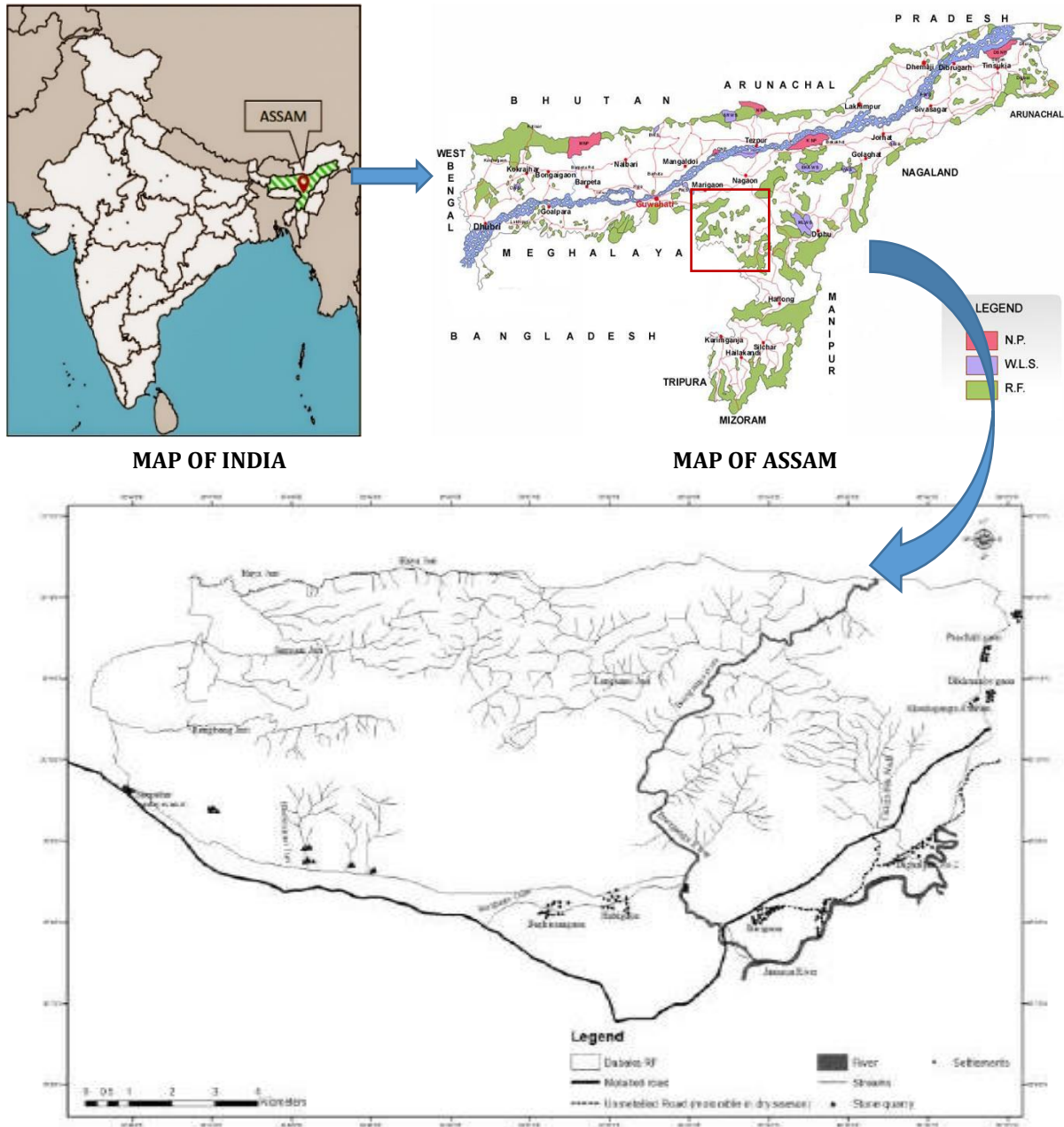
Another work on lichen diversity have also been performed earlier in the southern Reserve Forest of Assam, where different variety of lichens along with some newly reported and endemic species were identified [20].

### II. MATERIALS AND METHODS

#### Study Area:

This particular study is performed in the **Doboka Reserve Forest, Hojai, Assam, India**. The total land covered area is about 12,251.23 ha. It is situated at an altitude of 106 m and is located between 92 ° 46'0'' - 92 ° 57'0'' E longitude and 26 ° 6'0'' - 26 ° 13'0'' N latitude. The present study was performed during the winter of 2021 in a selected forest patch of about 3.5 km<sup>2</sup> square on NH 29, about 18 Km from Hojai Town (Fig.1). Some of the important host tree species include Dillenia pentagyna, Shorea robusta, Bauhinia variegata, Terminalia belerica, Careya arborea, Lagerstroemia flosreginae, Chromolaena odorata, Sterculia colorata etc. The most predominant plant of this forest is Shorea robusta.

The area is surrounded by local Hindu, Muslim and Tribal communities. The locals are dependent on the forest for collection of fuel wood & other plant products. The region is also enriched with other important flora and fauna.



**Fig 1: Map of Doboka Reserve Forest**

**Climate:**

The region falls under subtropical with warm and humid climatic conditions. The three seasonal variations that distinctly observed are summer, monsoon and winter. The summer starts from April and extends up to September or mid of October. While the monsoon coincides with summer and starts from early May extending up to August. The winter season is for shorter among all and starts from December to February. The period between last of December and up to mid of January withstand extensive cold. There is severe storm with strong winds, thunder and hail between the months of March and April. The annual average humidity is 80% during morning and 70% during evening. It can be seen that the state gets highest rainfall (28.7%) of southwest monsoon rainfall in July followed by 28.6% in June. August and September receive 23.8% and 18.9% of south

west monsoon rainfall. The average annual rainfall of the region during the period 1989-2018 was 2134.6 mm (Climate Research and Services, India Meteorological Department, Ministry of Earth Sciences Pune, 2020).

**Methods of sample collection:**

The study was carried out during the month of January and February 2021, during which the average maximum and minimum temperature was 29°C and 12°C respectively and the average humidity was between 59% to 68%. Throughout the survey, lichen samples were collected across a variety of habitats from the area. The samples were collected from different trees (up to a height of 2.5 m), from dried twigs and stems from the floor of the forest with well-colonized lichens.

All specimens were collected in paper bags and taken to the laboratory for identification using standard keys (Awasthi 1988, 1991, 2000 a, b) and also through chemical tests following Walker and James (1980). Specimens are preserved in the department of Botany, Rabindranath Tagore University, Hojai, Assam for the benefit of students.

**III. RESULTS AND DISCUSSION**

The study revealed **46 species** belonging to **13 families** and **23 genera (Table-1)** from **Doboka Reserve Forest, Hojai, Assam**. The forest is dominated by the Graphidaceae family with 19 species (41 %), followed by Pyrenulaceae with 6 species (13%); the two families account for more than 50 % of the lichen flora in the area. The families Arthoniaceae, Opegraphaceae and Pertusariaceae had three species each, and together constituted 21 % of lichens, followed by Coccocarpiaceae, Parmeliaceae, Thelotremaaceae and Trypetheliaceae with two species each. One species from each of the families Biatoraceae, Brigantiaceae, Catillariaceae, Collemataceae were found. The genus Pyrenula was dominant with 6 species (13%) followed by Graphis with 4 species each (8%). The genera Arthothelium, Opegrapha and Pertusaria each had three species.

**Table 1.** List showing 46 species of lichens with their genus and family, found in Doboka Reserve Forest in Assam.

Family	Genus	Species
Arthoniaceae	Arthothelium	1. abnorme
		2. chiodectoides
		3. subruanum
Biatoraceae	Phyllopsora	4. buettneri
Brigantiaceae	Brigantiaea	5. leucoxantha
Catillariaceae	Catillaria	6. pulvereae
Coccocarpiaceae	Coccocarpia	7. palmicola
		8. pellita
Collemataceae	Leptogium	9. cyanescens
Graphidaceae	Graphis	10. Intermediella
		11. nakanishiana
		12. proserpens
		13. subserpentina
	Sarcographa	14. cinchonarum
	Sarcographina	15. subtricosa
	Phaeographis	16. subtorquescens
		17. albolabiata
	Fissurina	18. dendritica
		19. columbina
		20. comparilis

		21. humilis
	Platygramme	22. muelleri 23. pudica
	Acanthothecis	24. leucoxantha 25. albescens
	Hemithecium	26. chrysenteron
	Dyplolabia	27. afzelii
	Carbacanthographis	28. marcescens
Opegraphaceae	Opegrapha	29. prosodea 30. subvulgata 31. vulgate
Parmeliaecea	Parmotrema	32. tinctorum
	Relicinopsis	33. malaccensis
Pertusariaceae	Pertusaria	34. amara 35. coccodes 36. quasiae
Pyrenulaceae	Pyrenula	37. anomala 38. brunnea 39. coactella 40. costaricensis 41. introducta 42. leucotrypa
Thelotremataceae	Myriotrema	43. albocinctum 44. anamalaiense
Trypetheliaceae	Trypethelium	45. eluteriae 46. tropicum

#### IV. CONCLUSION

Lichen communities provide valuable insights into anthropocentric changes in microclimates. Lichens have also been used to address environmental issues associated with natural resource management, such as the effects of habitat fragmentation and alteration. Lichens contribute to the structure and management of forest stands, to the ecological continuity over time and space of natural or semi-natural forests, to the impact of development on biodiversity. They bring advantages to the efficiency of conservation practices for rare or threatened species and to the protection of genetic resources. The significant correlations between stand age and lichen species richness in several forests confirm the importance of old or dead trees, and associated factors, as habitat for lichens. Over the past few years, they have been used as a means of monitoring gaseous pollutants and extracting HIV antigen from plants. So, we can conclude that there is a vast treasure trove of medicines hidden in this small group of plants and an appropriate study may give rise to a vast pool of new information.

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