

# Enumeration of lichens from Pithoragarh District of Uttarakhand, India

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## ABSTRACT

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The paper enumerates 376 species of lichens belonging to 94 genera and 43 families from the Pithoragarh District of Uttarakhand. The study is based on the collection of lichens during different field trips to the district together with specimens collected earlier and preserved in the herbarium of National Botanical Research Institute, Lucknow (LWG). Of all the localities, Munsiyari to Milam Glacier and Gori-Ganga Catchment area, situated between altitudes of 2000 and 3500 metres, bear the maximum lichen diversity represented by 149 and 142 species respectively. Parmeliaceae (with 20 genera) and Physciaceae (with 10 genera) are the dominant lichen families in the district. *Lecanora* (with 25 species) and *Cladonia* (with 25 species) exhibit their dominance in the area. *Quercus*, particularly *Quercus semecarpifolia*, trees bear luxuriant growth of lichens and exhibit maximum diversity of epiphytic lichens.

**Key-words:** Lichens, Pithoragarh District, Uttarakhand.

## INTRODUCTION

Pithoragarh is the eastern-most district in Uttarakhand state, India. It is naturally landscaped with high Himalayan mountains, snow capped peaks, passes, valleys, alpine meadows, forests, waterfalls, perennial rivers, glaciers and springs. The geographical area of the district is 7100 km<sup>2</sup>, situated between 29.4° and 30.3° north latitudes and 80° and 81° east longitudes, at the border of India sharing boundaries with western Nepal and Tibet. The district has wide altitudinal gradients between 500 to 5000 metres.

The flora and fauna of the district has rich ecological diversity. The flora of the district includes many unique sub-tropical, temperate and alpine plants. The forests of deep river valleys in the lower altitudinal zone of 500 to 1000 metres composed mostly of *Shorea robusta*, while the altitudes between 1500 and 2000 metres has dominance of *Quercus leucotricophora* (Banjh). The

altitudes between 2000 and 3000 metres exhibit luxuriant growth of *Quercus semecarpifolia*, *Quercus dilatata*, *Pinus roxburghii*, *Pinus wallichiana*, *Cedrus deodara*, *Taxus wallichiana*, and *Abies pindrow* together with medicinal plants of *Aconitum heterophyllum*, *Betula utilis*, *Nardostachys grandiflora*, *Picrorhiza kurroa* and *Saussurea obvallata* up to 4000 metres. Different species of lichens, together with bryophytes, form the major portion of cryptogamic vegetation of the forest in most of the zones.

The district has been exhaustively explored for its lichens wealth in the past and more than 50 records of lichen collection from the district are available (Table 1). A total of 15 major localities, explored in the past or recently surveyed for collections of lichens, represent more or less the whole lichen flora of Pithoragarh district (Figure 1).

## MATERIAL AND METHOD

All the lichen specimens collected from the Pithoragarh district, preserved in the lichen herbarium

of National Botanical Research Institute, Lucknow (LWG), were segregated. The unidentified specimens were identified up to species level with the help of recent

**Table 1. Vegetation and altitude of lichen collection localities in Pithoragarh District, Uttarakhand**

Name of collector	Year	Locality	Altitude (in m)	Vegetation
D. D. Awasthi	1947	Askote, Pithoragarh	1400-1500	Q.
D. D. Awasthi	1950	Berinag, Pithoragarh	1800-2000	Q., Coni.
		Johar, Pithoragarh	2000	Q., A.
D. D. Awasthi	1954	Askote Dhanlekh range	1950	Q., A.
D. D. Awasthi	1964	Askote, Pithoragarh	1400-1500	Q.
		Askote Dhanlekh range	1400-1500	Q.
		Askote Singali	1400-1500	Q.
A. Singh	1964	Nagdeo, Pithoragarh	1950	Q.
A. Singh	1972	Dwali and Kafni	2700-3000	Q., B.
		Chandak, Pithoragarh	1500-1600	Q., Ced.
A. Singh	1973	Milam Martoli	3500	A. G.
		Munsiyari	2000-2200	Q.
		Munsiyari to Lilam	1800-2000	Q., A.
		Kalamuni	2500-2700	Q., Ced.
Rana Man Singh		Lilam and Bugdiyar	2500-2700	Q., Ced.
		Milam Glacier Munsiyari	3500-4000	A. G.
		Rilkot to Milam	3300-3500	A. G.
		Bugdiyar to Rilkot	3300-3500	Q., Ced.
		Birju, Pithoragarh	3300-3500	Q., Ced.
		Ticksan Lilam	1800-2000	Q.
		Bugdiyar to Lilam	1800-2700	Q.
		Girgaon	1800	Q.
		Rathapani and Kalamuni	2500-2700	Q., Ced.
D. K. Upreti	1973	Lilam and Bugdiyar Rana Man Singh Top	2500-2700	Q., Ced.
D. K. Upreti	1976	Didihat to Sandev	2000-2500	Q.
N. C. Shah	1976	Munsiyari, Khaliya Top	2000-2700	Q., Ced.
O. P. Arora	1977	Narain Nagar	1500-1800	Q.
		Sehrakot	1500	Q.
D. K. Upreti	1979	Nainipatal forest	1800	Q., Ced.,
		Didihat to Sandev	1800-2500	Q., A.
		Kujauli Village	1450	Py., Pr., C.
D. K. Upreti and G. N. Hariharan	1979	Nainipatal forest	1800	Q., Ced., A.
D. K. Upreti	1980	Thalkedar Temple Forest		
D. D. Awasthi	1981	Narain Nagar	2000-2700	Q., Ced.
D. K. Upreti	1982	Baroli, Pithoragarh	1500-1600	Q.
D. K. Upreti	1983	Kujauli Village, Pithoragarh	1500	Q.
		Narain Nagar	1550	Py., Pr., C.
		Satgarh to Dhawj	1500-1600	Q., A.
		Deochula	2100	Q., Ced.
		Bisar, Dumna	2000	Q., Ced.
D. D. Awasthi	1984	Naret, Askote	1500	Q., Ced.
D. K. Upreti	1985	Pagama forest	1500	Q., Py., Pr.
		Chandak Magnesite Mine	1500	Q., Py., Pr.
N. C. Sah	1986	Milam Glacier	1500	Q., Ced.
D. K. Upreti	1988	Kuchigar <i>Quercus</i> forest	3450	Q.
		Dharchula Sobhla, Opposite Mountain	1500	Q., Py., Pr.
			2000	Q., Ced.

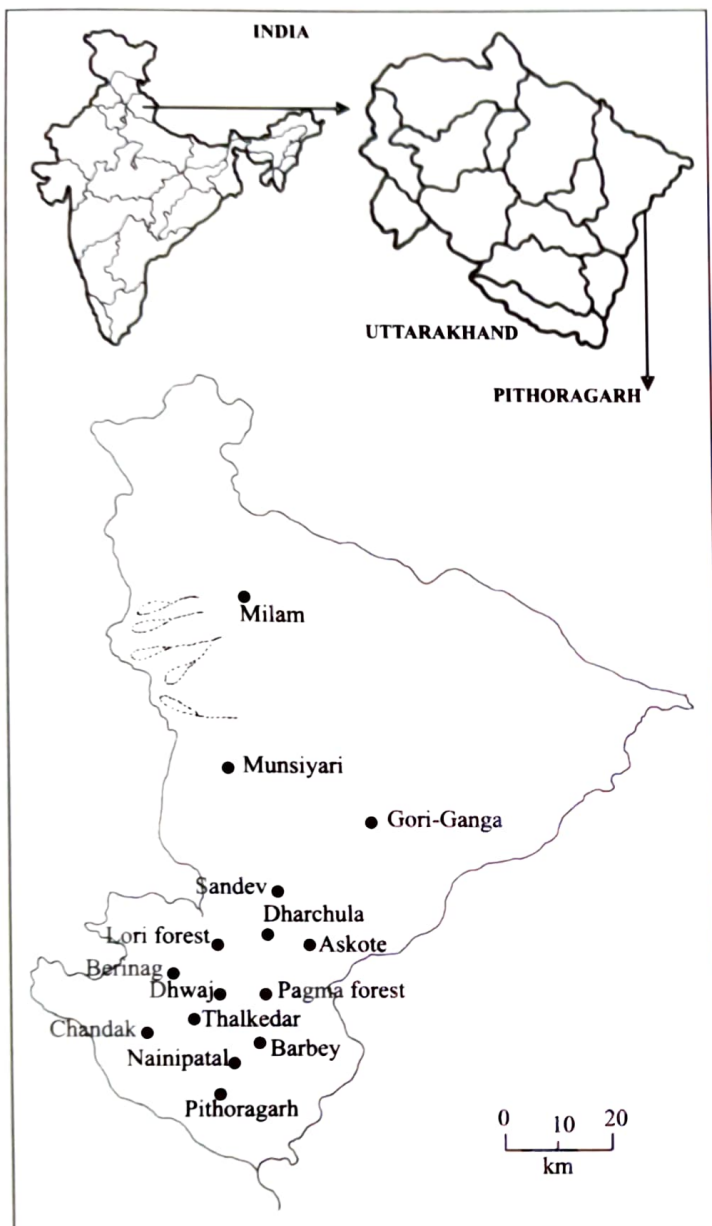


		Vatam	2000	Q., Ced.
		Merithi to Didihat	1625	Q., A.
		Pandegaon, Pithoragarh	1600	Q.
B. S. Kholia	1988	Berinag Chakori	1900	Q., Ced.
		Munsiyari and Kalamuni	3000–3200	Q., Ced.
		Milam Glacier	3500–4500	Q.
D. K. Upreti	1989	Dhawj, Pithoragarh	2000	Q., Ced.
		Barabey	1600	Q.
		Thalkedar Temple Forest	2000–2700	Q., Ced.
		Sandev to Didihat	1900	Q., A.
		Chandak forest, Leprosy Hospital	1500–1600	Q., Ced.
D. K. Upreti and G. N. Hariharan	1990	Dharchula Sobhla, Vatan, Kartu Village	2000	Q., Ced.
		Nainipatal forest	1800	Q., Ced.
		Dharchula Sobhla, Sundang & Homchya	2000	Q., Ced.
		Saurlekh forest near Microwave Station	2700	Q., Ced.
D. K. Upreti	1993	Thalkedar Temple Forest	2000–2700	Q., Ced.
		Munsiyari forest PWD Guest House	2300	Q.
		Munsiyari, Khaliya Top & before Bhujani	2700–2900	Q.
		Munsiyari Virthi Fall	1800	Q.
		Munsiyari, Nain Singh Top	2700	Q.
		Askote Lamgamkant forest	1900	Q.
		Dhawj, Pithoragarh	2000	Q., Ced.
		Munsiyari and Kalamuni	2500–2700	Q., Ced.
D. K. Upreti	1993	Munsiyari, Khaliya Top & before Bhujani	2700–2900	Q.
D. K. Upreti	1996	Munsiyari, Nain Singh Top	2700	Q.
		Barabey forest Latora Temple	1600	Q.
D. K. Upreti	1996	Munsiyari, Nain Singh Top	2700	Q.
		Munsiyari to Lilam Gimighat	2700	Q.
D. K. Upreti and J. Tandon	1996	Barabey in forest and around Latora Temple	1400–1600	Q.
		Munsiyari, Nain Singh Top	2700	Q.
		Munsiyari, Khaliya Top	2700–2900	Q.
		Chandak Pine forest	1500–1600	Q., Ced.
D. K. Upreti	1999	Munsiyari to Lilam Gimighat	2700	Q., A.
S. Chatterjee	1999	Nainipatal forest	1800	A.
		Dhawj, Pithoragarh	2000	Q., Ced.
V. Pant	1999	Askote Churani	1400–1500	Q.
		Askote Jamtri	1400–1500	Q.
		Askote Kuti	1400–1500	Q.
V. Pant	2000	Gori–Ganga catchment	2300	Q.
		Gori–Ganga catchment, Thali	2300	Q.
V. Pant	2002	Gori–Ganga catchment, Thakala forest	1800	Q.
		Gori–Ganga catchment, Thali	2300	Q.
		Gori–Ganga catchment, East Ghandhura	1300–1700	Q.
		Gori–Ganga catchment, Dhaphiyadhura	2200	Q.
		Gori–Ganga catchment, Deochula	1800–2000	Q.
		Gori–Ganga catchment, Kauli	1300–1600	Q.
		Gori–Ganga catchment, Bangpani	1000–1300	Q.

		Gori-Ganga catchment, Salyari	2300	Q.
		Gori-Ganga catchment, Mwani-Dwani	2300	Q.
		Gori-Ganga catchment, Majthan	2300	Q.
		Sandev Botanical Hot Spot, Deochula	2000-2300	Q., A.
		Sandev Botanical Hot Spot	1700-2050	Q., A.
		Sandev Botanical Hot Spot, Lamagarh	1550-1650	Q., A.
		Sandev Botanical Hot Spot, Pantori	1700-2050	Q., A.
		Askote-Sandev, Deochula	1550-1650	Q., A.
		Askote-Sandev, Shantikunj	1550-1650	Q., A.
		Askote-Sandev, Chaurani	1550-1650	Q., A.
		Askote-Sandev Botanical Hot Spot	2000-2300	Q., A.
		Adhichura, Pithoragarh	2000-2300	Q., A.
		Askote-Sandev Botanical Hot Spot	2200	Q., Ced.
		Deochula, Pithoragarh	2200	Q., Ced.
		Chandak Near Magnesite Mine	1500	Q., Ced.
		Chandak, Pithoragarh	1500	Q., Ced.
		Thalkedar forest	2400	Q., Ced.
		Mwani-Dwani	2300	Q., Ced.
		Salayari, Pithoragarh	2300	Q., Ced.
		Shantikunj, Pithoragarh	2300	Q., Ced.
		Gori-Ganga catchment, Thakala forest	1800	Q.
		Gori-Ganga catchment, Deochla	1800-2000	Q.
R. Shrivastava	2003	Chandak near Muthi Manush Temple	1500	Q., Ced.
S. Bhatt	2005	Pithoragarh, Degree Collage Campus	1550	Py., Pr., Cel.
		Chandak Pithoragarh	1500	Q., Ced.
		Pithoragarh, near GIC Mahadev	1550	Py., Pr., Cel.
		Thalkedar	2000-2700	Q., Ced.
D. K. Upreti	2006	Near P. G. College, Pithoragarh	1550	Py., Pr., C.
S. Bhatt	2006	Chandak forest	1500-1600	Q., Ced.
		Bisar forest	1500	Q., Py., Pr.
Y. Joshi and R. Bajpai	2006	Munsiyari, Khaliya Top	2700-3000	Q., Ced.
		Munsiyari to Lilam	2700-3000	Q., A.
S. Joshi	2007	Milam Glacier, Naher Devi to Mapang	2705-3106	A. G.
		Milam Glacier, Naher Devi to Bugdiyar	1800-2450	A. G.
		Milam Glacier, Milam Village	3434	A. G.
		Milam Glacier, Mapang to Railkot	3160-3200	A. G.
		Milam Glacier, Martoli	3390	A. G.
		Milam Glacier, Bejiu	3450	A. G.
		Milam Glacier, Berfu	3450	A. G.
		Rilkot to Milam	3250	A. G.
		Lilam to Bugdiyar	3160-3200	A. G.
		Munsiyari to Lilam	1800-2450	Q., A.

		Gori-Ganga catchment, Salyari	2300	Q.
		Gori-Ganga catchment, Mwani-Dwani	2300	Q.
		Gori-Ganga catchment, Majthan	2300	Q.
		Sandev Botanical Hot Spot, Deochula	2000-2300	Q., A.
		Sandev Botanical Hot Spot	1700-2050	Q., A.
		Sandev Botanical Hot Spot, Lamagarh	1550-1650	Q., A.
		Sandev Botanical Hot Spot, Pantori	1700-2050	Q., A.
		Askote-Sandev, Deochula	1550-1650	Q., A.
		Askote-Sandev, Shantikunj	1550-1650	Q., A.
		Askote-Sandev, Chaurani	1550-1650	Q., A.
		Askote-Sandev Botanical Hot Spot	2000-2300	Q., A.
		Adhichura, Pithoragarh	2000-2300	Q., A.
		Askote-Sandev Botanical Hot Spot	2200	Q., Ced.
		Deochula, Pithoragarh	2200	Q., Ced.
		Chandak Near Magnesite Mine	1500	Q., Ced.
		Chandak, Pithoragarh	1500	Q., Ced.
		Thalkedar forest	2400	Q., Ced.
		Mwani-Dwani	2300	Q., Ced.
		Salayari, Pithoragarh	2300	Q., Ced.
		Shantikunj, Pithoragarh	2300	Q., Ced.
		Gori-Ganga catchment, Thakala forest	1800	Q.
		Gori-Ganga catchment, Deochla	1800-2000	Q.
R. Shrivastava	2003	Chandak near Muthi Manush Temple	1500	Q., Ced.
S. Bhatt	2005	Pithoragarh, Degree Collage Campus	1550	Py., Pr., Cel.
		Chandak Pithoragarh	1500	Q., Ced.
		Pithoragarh, near GIC Mahadev	1550	Py., Pr., Cel.
		Thalkedar	2000-2700	Q., Ced.
D. K. Upreti	2006	Near P. G. College, Pithoragarh	1550	Py., Pr., C.
S. Bhatt	2006	Chandak forest	1500-1600	Q., Ced.
		Bisar forest	1500	Q., Py., Pr.
Y. Joshi and R. Bajpai	2006	Munsiyari, Khaliya Top	2700-3000	Q., Ced.
		Munsiyari to Lilam	2700-3000	Q., A.
S. Joshi	2007	Milam Glacier, Naher Devi to Mapang	2705-3106	A. G.
		Milam Glacier, Naher Devi to Bugdiyar	1800-2450	A. G.
		Milam Glacier, Milam Village	3434	A. G.
		Milam Glacier, Mapang to Railkot	3160-3200	A. G.
		Milam Glacier, Martoli	3390	A. G.
		Milam Glacier, Bejiu	3450	A. G.
		Milam Glacier, Berfu	3450	A. G.
		Rilkot to Milam	3250	A. G.
		Lilam to Bugdiyar	3160-3200	A. G.
		Munsiyari to Lilam	1800-2450	Q., A.





Text-figure 1. Map showing lichen collection sites in the Pithoragarh district of Uttarakhand

distribution, altitude, substratum and growth form type of species were also mentioned together with details of localities, name of the collector and year of collection (Tables 1-2).

### DIVERSITY OF LICHENS IN PITHORAGARH DISTRICT

The localities in and around Pithoragarh District Headquarter, such as Chandak, Nainipatal, Thalkedar, Dhawj, Pagama and Barabey forest are situated more or less between an altitude of 1500 and 2500 meters having *Quercus leucotricophora* as the major forest vegetation. *Quercus leucotricophora* trees exhibit luxuriant growth of most of the parmelioid genera (*Bulbothrix*, *Hypotrachyna*, *Everniastrum* and *Parmotrema*) together with many more crustose taxa. The localities in and around villages showed sparse growth of some members of Physciaceae and Parmeliaceae mostly on the cultivated trees of *Pyrus*, *Prunus*, *Rubina*, *Populus* and *Celtis* trees. The forest about 10 km away from the HQ such as Dhawj, Thalkedar, Nainipatal, Chandak exhibit rich diversity of lichens represented by 184 species.

The Khaliya Top, Lilam and Nain Singh Top localities of Munsiyari area exhibit maximum diversity of lichens in the district represented by 149 species followed by the Askote-Sandev 'Botanical Hot Spot' area of Pithoragarh district with 144 species. The area in and around Milam village and Milam Glacier also bear excellent growth of lichens represented by 101 species. The Vatan and Shobla localities in Dharchula area also exhibit good growth of lichens.

The district exhibits luxuriant growth of bark inhabiting (corticolous) lichens represented by 234 species followed by 129 rock (saxicolous) and 42 soil (terricolous) inhabiting lichens respectively. The alpine and higher temperate localities in Milam Glacier area show dominance of rocks and soil inhabiting lichens while lower to middle temperate areas have dominance of epiphytic lichens.

Among the different phorophyte the *Quercus* trees bear the maximum diversity of lichens. The forest of *Quercus semecarpifolia* in temperate region between altitudes of 2500 and 3000 metres are preferred by a

literature (Awasthi 1988, 1991, 2000). The specimens were identified morphologically, anatomically and chemically. The colour spot tests were performed with reagents as K (5% potassium hydroxide), C (aqueous solution of calcium hypochlorite) and PD (Paraphenylenediamine). Lichen substances were investigated with thin layer chromatography (TLC) in solvent system A (180 toluene: 60 dioxane: 8 acetic acid) using the techniques of Walker and James (1980) and Orange et al. (2001). The species are placed in their correct position by following the modern concept of recent nomenclature and classification of lichens. The

Table 2. Distribution of lichens in various localities of Pithoragarh District along with their availability on various substrates.

Name of species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Substrate	Growth form
<b>Acarosporaceae</b>																	
<i>Acarospora bullata</i> Anzi	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Sq
<i>Acarospora smaragdula</i> (Wahlenb. in. Ach.) Massal.	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	S	Sq
<b>Arthoniaceae</b>																	
<i>Cryptothecia anamaliensis</i> Makh. & Patw.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Cryptothecia dispersa</i> Makh. & Patw.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Cryptothecia lunulata</i> (Zahlbr.) Makh. & Patw.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr
<i>Cryptothecia polymorpha</i> Makh. & Patw.	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr
<i>Cryptothecia subsecta</i> Stirton	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr
<i>Arthothelium albnorme</i> (Ach.) Müll. Arg.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<b>Caliciaceae</b>																	
<i>Buellia betulinoidea</i> Schubert & Klement	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	R	Cr
<i>Dimelaena oreina</i> (Ach.) Norm.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Dirinaria aegialita</i> (Afz. in Ach.) Moore	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	C	F
<i>Dirinaria applanata</i> (Fée) Awasthi	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C	F
<i>Dirinaria consimilis</i> (Striton) Awasthi	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Pyxine berteriana</i> (Fée) imsh.	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	C	F
<i>Pyxine cocoes</i> (Swartz) Nyl.	-	-	+	-	+	-	-	-	-	-	-	-	-	-	+	C,S	F
<i>Pyxine himalayensis</i> Awasthi	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	F
<i>Pyxine meissnerina</i> Nyl.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	C	F
<i>Pyxine minuta</i> Vainio	-	-	+	-	-	-	-	-	-	+	-	-	-	+	-	C,S	F
<i>Pyxine petricola</i> Nyl. in Crombie	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	C	F
<i>Pyxine philippina</i> Vainio	+	-	+	+	-	-	-	-	-	-	-	-	-	+	-	C,S	F
<i>Pyxine reticulata</i> (Vainio) Vainio	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Pyxine soredata</i> (Ach.) Mont	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	C	F
<i>Pyxine subcinerea</i> Stirton	+	+	+	-	-	-	+	-	-	-	-	-	-	+	-	C,S	F
<b>Candelariaceae</b>																	
<i>Candelaria concolor</i> (Dicks.) Stein	+	-	+	-	-	-	+	-	-	-	-	+	-	+	-	C	Cr
<i>Candelariella aurella</i> (Hoffm.) Zahlbr.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Candelariella vitellina</i> (Hoffm.) Müll. Arg.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<b>Catillariaceae</b>																	
<i>Catillaria nilgiriensis</i> Pant & Awasthi	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<b>Chrysothricaceae</b>																	
<i>Chrysothrix candelaris</i> (L.) London	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr



<i>Chrysothrix chlorina</i> (Arch.) London	+	-	+	-	+	+	-	-	+	-	-	-	-	+	-	C	Cr
<b>Cladoniaceae</b>																	
<i>Cladonia awasthiana</i> Ahti & Upreti	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	T	Fr
<i>Cladonia cartilaginea</i> Müll. Arg.	+	+	+	-	-	+	-	-	+	-	-	-	-	+	-	T	Fr
<i>Cladonia chlorophaea</i> (Flörke in sommerf.) Spreng.	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia coccifera</i> (L.) Willd.	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia coniocraea</i> ( Flörke) Sprengel	-	-	+	+	-	-	-	-	+	-	-	+	-	-	-	T	Fr
<i>Cladonia corniculata</i> Ahti & Kashiw	-	+	+	+	-	-	-	+	+	-	-	-	-	+	-	T	Fr
<i>Cladonia corymbescens</i> Nyl.	+	+	-	+	-	-	+	+	+	-	-	+	-	-	-	T	Fr
<i>Cladonia farinacea</i> (Vainio) E. Evans	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	T	Fr
<i>Cladonia fenestralis</i> Nuno	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia fruticulosa</i> Kremphelh	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia furcata</i> (Huds.) Schrad.	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	T	Fr
<i>Cladonia luteoalba</i> Whedon & A. Wilson	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia macilenta</i> Hoffm.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia mangolica</i> Ahti	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	T	Fr
<i>Cladonia ochrochlora</i> Flörke	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia pocillum</i> (Ach.) Grognot	-	+	+	+	-	-	-	-	-	-	-	-	-	+	-	T	Fr
<i>Cladonia pyxidata</i> (L.) Hoffm.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	T,S	Fr
<i>Cladonia ramulosa</i> (With.) J. Laundan	-	+	+	+	-	-	+	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia rangiferina</i> (L.) Weber ex Wigg.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia sinensis</i> Stenroos & Chen	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	T	Fr
<i>Cladonia singhii</i> Ahti & Dixit	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	T	Fr
<i>Cladonia squamosa</i> Hoffm.	-	-	-	+	-	-	+	-	+	-	-	-	-	-	-	T	Fr
<i>Cladonia subradiata</i> (Vain.) Sandst.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	Fr
<i>Cladonia verticillata</i> (Hoffm.) Schaer.	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	T	Fr
<b>Coccocarpiaceae</b>																	
<i>Coccocarpia erythroxyli</i> (Sprengel) Swinsc. & Krog.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Coccocarpia palmicola</i> (Sprengel) Arvidsson & Galloway	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Coccocarpia pellita</i> (Ach.) Müll. Arg. em. Sant	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	C	F
<b>Collemtaceae</b>																	
<i>Collema auriforme</i> (With.) Coppins & Laundan	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	C	F
<i>Collema cristatum</i> (L.) Weber ex Wigg.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	S	F
<i>Collema leptaleum</i> Tuck.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	R	F
<i>Collema polycarpon</i> Hoffm.	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Collema shiroumanum</i> Räsänen.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	R	F
<i>Collema subconveniens</i> Nyl.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	C	F
<i>Collema tenax</i> (Swartz) Ach. em. Degel.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	S	F
<i>Leptogium arisanense</i> Asahina	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Leptogium askotense</i> Awasthi in Awasthi & Akhtar	-	+	+	+	-	-	+	-	+	-	-	-	-	+	-	T,S,C	F



<i>Leptogium austroamericanum</i> (Malme) Dodge	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	C,S	F
<i>Leptogium azureum</i> (Swartz) Mont.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Leptogium burnetiae</i> Dodge	+	+	+	+	-	-	-	-	-	-	-	-	+	-	-	C	F
<i>Leptogium chloromelum</i> (Swartz) Nyl.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	C	F
<i>Leptogium delavayi</i> Hue	-	+	+	-	-	-	+	-	+	-	-	+	-	-	-	C,S	F
<i>Leptogium denticulatum</i> Nyl.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	F
<i>Leptogium furfuraceum</i> (Harm.) Sierk	-	+	-	-	+	-	+	-	-	-	-	-	-	-	-	C,S	F
<i>Leptogium javanicum</i> Mont.	+	-	-	+	-	-	-	-	-	-	-	+	-	-	-	C	F
<i>Leptogium pedicellatum</i> P.Jørg.	+	+	-	+	+	+	+	-	-	-	-	-	-	+	-	C,S	F
<i>Leptogium phyllocarpun</i> (Pers.) Mont.	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	C,S	F
<i>Leptogium pseudopapillosum</i> P.M. Jørg.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Leptogium saturninum</i> (Dickson) Nyl.	+	-	+	+	-	-	+	-	+	-	-	-	+	-	-	R,C	F
<b>Ectolechiaceae</b>																	
<i>Tapellaria saxicola</i> Vezda & Poelt	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	S	Cr
<b>Fuscideaceae</b>																	
<i>Maronea constans</i> (Nyl.) Hepp	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<b>Graphidaceae</b>																	
<i>Diorygma heiroglyphicum</i> (Pers.) Staiger & Kalb	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Diorygma junghunii</i> (Mont. & Bosch) Kalb, Staiger & Elix	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Diorygma megasporum</i> Kaeb Staeyer & Elix	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Graphis anfractuosa</i> (Eschw.) Eschw. in Martius	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Graphis guimaranana</i> Vainio	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Graphis hossei</i> Vainio	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	R	Cr
<i>Graphis lineola</i> Ach.	+	-	-	-	-	-	+	-	-	-	-	-	-	+	-	C	Cr
<i>Graphis longiramea</i> Müll. Arg.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Graphis proserpens</i> Vainio	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	C	Cr
<i>Graphis pyrrocheiloides</i> Zahlbr.	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr
<i>Graphis scripta</i> (L.) Ach.	-	-	+	-	-	-	+	-	-	-	-	+	-	+	-	C	Cr
<i>Pheographina chrysanterodes</i> (Nyl.) Awasthi & Singh.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Pheographina limbata</i> Müll. Arg.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Pheographina nepalensis</i> Awasthi & Singh	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<b>Haematommataceae</b>																	
<i>Haematomma puniceum</i> (Sm. in Ach.) Massal.	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	C	Cr

**Lecanoraceae**

<i>Lecanora achroa</i> Nyl. in Crombie	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora alba</i> Lumbsch	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	R,C	Cr
<i>Lecanora albella</i> (Schreber) Rabenh.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	C	Cr
<i>Lecanora argentea</i> (Ach.) Degel.	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	C	Cr
<i>Lecanora caesiiorubella</i> Ach.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora campestris</i> (Schaerer) Hue	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Lecanora cinereofusa</i> var. <i>himalayensis</i> Upreti	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora concilianda</i> Vainio	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora concilians</i> Nyl.	-	-	-	-	+	-	+	-	-	-	-	-	+	-	+	C	Cr
<i>Lecanora coronulans</i> Nyl.	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C,S	Cr
<i>Lecanora fimbriatula</i> Stirt.	-	-	-	+	-	-	+	-	+	-	-	-	-	+	-	R,S,C	Cr
<i>Lecanora flavidofusa</i> Müll. Arg.	-	-	+	-	-	-	+	-	-	-	-	-	-	+	-	C	Cr
<i>Lecanora formosula</i> Lumbsch	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C,S	Cr
<i>Lecanora helva</i> Stizenb.	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora indica</i> Zahlbr.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Lecanora japonica</i> Müll. Arg.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	S	Cr
<i>Lecanora muralis</i> (Schreb.) Rabenh.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Lecanora perplexa</i> Brodo	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora pseudistera</i> Nyl.	-	-	+	+	-	-	-	-	+	-	-	-	+	-	-	S	Cr
<i>Lecanora queenslandica</i> Knight in Bailey	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Lecanora somervellii</i> Paulson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	S	Cr
<i>Lecanora subimmersa</i> (Fée) Vainio	-	+	+	+	-	-	-	-	-	-	-	+	-	+	-	S	Cr
<i>Lecanora valesiaca</i> (Müll. Arg.) Stizenb.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Lecidella euphorea</i> (Flörke) Hertel	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	C	Cr
<i>Lecidella stigmatea</i> (Ach.) Hertel	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Rhizoplaca chrysoleuca</i> (Smith.) Zopf	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr

**Letrouitiaceae**

<i>Letrouitia transgressa</i> (Malme) Half. Bellem.	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C	Cr
<i>Letrouitia vulpina</i> (Tuck.) Half. Bellem.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Cr

**Lichen Imperfecti**

<i>Leprocaulon arbuscula</i> (Nyl.) Nyl.	-	-	+	+	-	-	-	-	-	-	-	-	+	-	-	C	F
<i>Leprocaulon pseudoarbuscula</i> (Asahina) Lamb & Ward	-	-	-	+	-	-	-	-	+	-	-	-	+	-	-	C	F

**Lobariaceae**

<i>Lobaria himalayensis</i> Upreti & Divakar	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	C	F
<i>Lobaria japonica</i> (Zahlbr.) Asahina	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	F
<i>Lobaria kurokawae</i> Yoshim	-	-	-	-	+	+	-	-	-	-	+	-	-	-	-	C	F
<i>Lobaria meridionalis</i> Vainio	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C	F
<i>Lobaria pindarensis</i> Räsänen	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C	F
<i>Lobaria retigera</i> (Bory) Trevisan	+	+	+	+	-	-	+	-	-	-	-	-	-	+	-	C,S	F
<i>Sticta limbata</i> (Sm.) Ach.	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	S	F
<i>Sticta nylanderiana</i> Zahlbr.	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	C	F







<i>Sulcaria sulcata</i> (Lev.) Bystrek ex Brodo & Hawksw.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Fr
<i>Sulcaria virens</i> (Taylor) Bystrek ex Brodo & Hawksw.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Fr
<i>Usnea aciculifera</i> Vainio	+	-	+	+	+	-	-	-	+	-	-	-	-	+	+	R,C	Fr
<i>Usnea compressa</i> Taylor	+	-	+	+	-	-	+	-	-	+	-	-	-	-	-	R	Fr
<i>Usnea eumitrioides</i> Mont.	+	-	+	-	-	+	+	-	+	+	-	-	-	+	-	C	Fr
<i>Usnea longissima</i> Ach.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	R,C	Fr
<i>Usnea orientalis</i> Mont.	+	-	+	-	+	+	+	-	-	-	-	-	+	-	-	C	Fr
<i>Usnea pectinata</i> Taylor.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Fr
<i>Usnea perplexans</i> Stirt.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Fr
<i>Usnea pseudosinensis</i> Asahina in Hara	+	-	-	-	+	-	-	-	+	-	-	+	-	-	-	R	Fr
<i>Usnea rubicunda</i> Stirt.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Fr
<i>Usnea sordida</i> Mot.	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	R	Fr
<i>Usnea spinosula</i> Stirt.	+	-	-	-	+	-	+	-	+	-	-	+	-	+	-	R	Fr
<i>Usnea splendens</i> Stirt.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	R	Fr
<i>Usnea subflorida</i> Stirt.	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	R	Fr
<i>Usnea thomsonii</i> Stirt.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	R	Fr
<i>Usnea undulata</i> Stirt.	+	-	-	+	+	-	-	-	-	-	-	-	-	-	-	C	Fr
<i>Xanthoparmelia coreana</i> (Gyeln.) Kurok.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Xanthoparmelia mexicana</i> (Gyeln.) Hale	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Xanthoparmelia stenophylla</i> (Ach.) Ahti & Hawksw	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Xanthoparmelia taractica</i> Hale et al.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Xanthoparmelia tinctoria</i> (Mah & Gill.) Hale	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<b>Peltigeraceae</b>																	
<i>Peltigera dolichorrhiza</i> (Nyl.) Nyl.	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	T	F
<i>Peltigera elisabethae</i> Gyelen.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Peltigera horizontalis</i> (Huds.) Baung.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	T	F
<i>Peltigera membranacea</i> (Ach.) Nyl. em. Thomson	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	T,S	F
<i>Peltigera polydactylon</i> ( Neck.) Hoffm.	-	-	+	+	-	-	+	-	-	-	-	+	-	+	+	T	F
<i>Peltigera praetextata</i> (Flörke in Sommerf.) Zopf.	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	T,C	F
<i>Peltigera rufescens</i> (Weis.) Humb.	-	+	+	+	-	-	-	-	-	-	-	-	+	-	-	T,S	F
<b>Peltulaceae</b>																	
<i>Peltula patellata</i> (Bagl.) Swinsc. & Krog	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Sq
<b>Pertusaricaceae</b>																	
<i>Pertusaria albescens</i> (Huds.) Choisy & Wern. in Wern.	-	-	+	+	-	-	+	-	-	+	-	-	-	-	+	C	Cr
<i>Pertusaria amara</i> (Ach.) Nyl.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria depressa</i> (Fée) Mont. & Bosch	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria himalayensis</i> Awasthi & Srivast.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria indica</i> Srivast. & Awasthi	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr
<i>Pertusaria leucosora</i> Nyl.	+	+	+	-	-	-	+	-	-	-	-	-	-	+	-	T,C,S	Cr
<i>Pertusaria leucosorodes</i> Nyl.	+	-	+	+	+	-	+	-	-	-	-	-	-	+	-	C	Cr

<i>Pertusaria melastomella</i> Nyl.	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	C	Cr
<i>Pertusaria pertusa</i> (Weig.) Tuck.	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	C	Cr
<i>Pertusaria pseudococcodes</i> Müll. Arg.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria punctata</i> Nyl.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	R,C	Cr
<i>Pertusaria pustulata</i> (Ach.) Duby	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria quassie</i> (Fée) Nyl.	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria rigida</i> Müll. Arg.	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria submultipuncta</i> Nyl.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Pertusaria subochracea</i> Stirt.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<b>Physciaceae</b>																	
<i>Heterodermia albidiflava</i> (Kuork.) Awasthi	+	-	+	+	-	-	-	-	-	-	-	-	-	+	-	C	F
<i>Heterodermia angustiloba</i> (Müll. Arg.) Awasthi	-	-	+	+	-	-	+	-	-	-	-	-	-	+	-	R,C	F
<i>Heterodermia comosa</i> (Eschw.) Follman & Redon	-	+	-	+	-	-	-	-	-	-	-	-	+	-	-	S	F
<i>Heterodermia dactyliza</i> (Nyl.) Swinc & Krog	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	F
<i>Heterodermia diademata</i> (Taylar) Awasthi	+	-	+	+	+	+	+	-	+	-	-	-	+	+	+	C	F
<i>Heterodermia dissecta</i> (Kurok.) Awasthi	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	S	F
<i>Heterodermia firmula</i> (Nyl.) Trevisan	-	+	+	+	-	-	-	-	-	-	-	-	-	+	-	S	F
<i>Heterodermia flabellata</i> (Fée) Awasthi	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	C	F
<i>Heterodermia hypocaustia</i> (Yasuda) Awasthi	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	C	F
<i>Heterodermia incana</i> (Stert.) Awasthi	+	-	-	-	-	+	+	-	-	-	-	-	-	+	-	C	F
<i>Heterodermia japonica</i> (Sato) Swinsc. & Krog	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	T,C	F
<i>Heterodermia microphylla</i> (Kurok.) Skorepa	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	T,S	F
<i>Heterodermia obscurata</i> (Nyl.) Trevisan	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Heterodermia podocarpa</i> (Bel.) Awasthi	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	C	F
<i>Heterodermia pseudospeciosa</i> ( Kurok.) W. Culb.	+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	C,S	F
<i>Heterodermia rubescens</i> (Räsänen) Awasthi	+	-	-	-	-	-	+	-	-	-	-	-	-	+	-	C	F
<i>Hyperphyscia adglutinata</i> (Flörke) Mayerh. & Poelt	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Hyperphyscia syncolla</i> (Tuck. in Nyl.) Kalb	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Phaeophyscia constipata</i> (Norrl. & Nyl.) Moberg.	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Phaeophyscia hispidula</i> (Ach.) Moberg.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	C	F
<i>Phaeophyscia endococcina</i> (Körber) Moberg.	-	+	-	-	-	-	-	-	-	+	-	+	-	-	-	S	F
<i>Phaeophyscia pyrrophora</i> (Poelt) Awasthi & Joshi	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	C	F
<i>Physcia dilatata</i> Nyl.	+	+	+	+	+	-	+	-	-	-	-	-	-	+	-	C	F
<i>Physcia dimidiata</i> (Arn.) Nyl.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	F
<i>Physcia phaea</i> (Tuck.) Thomson.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	F
<i>Physconia enteroxantha</i> (Nyl.) Poelt.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	S,T	F
<i>Rinodina sophodes</i> (Ach.) Massal.	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	C	Cr
<i>Rinodina straussii</i> Steiner em. Mayrh.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<b>Porinaceae</b>																	
<i>Porina subhibernica</i> Upreti	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	C	Cr









**Verrucariaceae**

<i>Dermatocarpon miniatum</i> (L.) Mann.	-	+	+	+	+	-	+	-	-	-	-	+	-	+	-	C,S	F
<i>Dermatocarpon vellereum</i> Zschake	+	-	+	+	+	-	+	-	-	-	-	+	-	-	-	S	F
<i>Endocarpon nanum</i> Singh & Upreti	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	C	Cr
<i>Endocarpon nigrozonatum</i> Singh & Upreti	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Endocarpon pusillum</i> Hedwig	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	S	Cr
<i>Staurothele fissa</i> (Taylor) Zwach.	-	-	+	-	-	+	+	-	-	-	-	-	-	+	-	S	Cr
<i>Verrucaria crotella</i> Ach.	-	+	+	-	-	-	+	-	-	-	-	-	-	+	-	S	Cr
<i>Verrucaria margacea</i> (Wahlenb. in. Ach.) Wahlenb.	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	S	Cr

**Abbreviations:** S: Saxicolous, C: Corticolous, T: Terricolous, R: Remicolous, L: Leprose Cr: Crustose, Sq: Squamulose, F: Foliose, Fr: Fruticose, Localities: 1: Pithoragarh, 2: Milam, 3: Gori-Ganga, 4: Askote, 5: Chandak, 6: Nainipatal, 7: Munsiyari, 8: Thalkedar forest, 9: Dhvaj, 10: Lori forest area, 11: Pagma forest, 12: Dharchula, 13: Barbey, 14: Sandev, 15: Berinag.

number of lichen species while *Q. leucotrichophora* in lower temperate areas (1500 to 2000m) also provide excellent substratum for many lichen taxa to colonize.

*Alnus nepalensis*, a smooth barked tree in temperate areas, also provide suitable habitat for colonization of pyrenocarpous and graphidaceous lichen genera which prefers the smooth bark. The *Pinus roxburghii* trees having thick rough bark are mostly preferred by the members of parmelioid lichen genera and other rough barked loving lichens. More than 30 lichen species are recorded on *Pinus roxburghii* trees. *Rhododendron campanulatum* trees in higher temperate region and bushy *Rhododendron* species in alpine region also provide substrate for many lichen taxa to colonize. Mostly the species of *Opegrapha*, *Pertusaria* and *Lecanora* prefers to grow on such bark. *Phaeophyscia hispidula*, *Heterodermia diademata*, *Parmotrema reticulatum*, *Bulbothrix setschwanensis*, *Physcia dilatata*, and *Everniastrum cirrhatum* are the most common and widely distributed lichen taxa found growing on various substrates both in tropical and temperate areas of the district.

Among the ten dominant lichen families in the district (Table 2), Parmeliaceae dominates with 20 genera, followed by Physciaceae with 10 genera. The other families, such as Verrucariaceae, Pyrenulaceae, Collemataceae, Acarosporaceae, Pertusariaceae and Thelotremaaceae, are represented by two or three genera each. *Lecanora* with 25 species is the dominant genus in the district followed by *Cladonia* with 24 and *Heterodermia* with 16 species. The

species of lichen genera *Pertusaria*, *Caloplaca* and *Usnea* also exhibit their presence in the district represented by 16, 12 and 15 species respectively.

From the above studies it is clear that localities situated in and around Pithoragarh HQ, Munsiyari proper and other populated areas exhibit poor to scarce growth of lichens due to heavy anthropogenic activities. The lichens in areas of heavy anthropogenic activities showed adaptation to colonize on cultivated trees of *Populus*, *Rubina*, *Grewia*, *Pyrus* and *Prunus*. The present enumeration of lichens from different localities of the Pithoragarh district will act as base line record of the lichens to study the effect of environmental changes in the area in future.

## DISCUSSION AND RESULTS

A total of 376 species belonging to 94 genera and 43 families of lichens are recorded from the Pithoragarh district. Of the fifteen major localities in the district, Munsiyari to Milam, Gori-Ganga and Milam exhibit luxuriant growth of lichens represented by 149, 142 and 101 species respectively. Based on the altitude and the forest vegetation, the lichen flora of the district clearly shows three major types.

**1. Tropical lichens:** The tropical forests are usually found below an altitude of 900m and form one of the major ecological types in the district situated in the river valleys on the lower slope of the hills. Most of the areas of the zone come under agriculture, horticulture and cultivation practices, thus mostly toxitolarent or light loving lichen species are found growing on cultivated



trees of *Pyrus*, *Prunus*, *Celtis*, *Punica*, *Populus*, *Grewia* and *Rubina*. The members of lichen family Physciaceae and Parmeliaceae, together with crustose species of *Bacidia*, *Graphis*, *Lecanora* and *Pertusaria*, are the most commonly distributed tropical lichens of this zone.

**2. Temperate lichens:** The lichen flora in the temperate regions exhibits the greater abundance in variety and luxuriance due to the presence of diverse micro-climatic conditions. The dense forests together with large boulders provide ample opportunity for lichens to colonize. The region has great diversity of trees which support luxuriant and miscellaneous growth of epiphytic lichens. Apart from trees, several species of shrubs, rocks and soil under forest and in exposed areas also act as a favorable substrate for lichens. The lichens growing on trees are greatly influenced by the age, height and canopy of tree. The physical characters of the bark also plays important role in lichen colonization. Among various trees the species of *Quercus*, *Rhododendron*, *Aesculus*, *Alnus*, *Pinus* and *Cedrus* bear good growth of a number of lichen taxa. *Quercus* trees bear the maximum diversity of lichens represented by 107 species. Pant (2002) studied the lichen flora of Askote and Sandev Botanical Hot Spot, situated in the temperate zone of Pithoragarh district and listed 203 species belonging 67 genera 32 families. *Quercus semecarpifolia*, the most common tree in the Hot Spot, bears the maximum diversity of lichens represented by 88 species. The species of lichen genera *Phyllopsora*, *Lobaria*, *Leptogium*, *Parmotrema* and *Heterodermia* are some of the commonly distributed lichen genera in temperate zone of the district.

**3. Alpine lichens:** The alpine zone usually lacks tree vegetation but small shrubs of *Rhododendron*, *Cotoneaster*, *Rosa* and *Juniperus* provide convenient substrate for lichens to colonize. Many foliose species of *Heterodermia*, *Cetraria*, *Nephromopsis*, *Ramalina*

and *Usnea* together with crustose taxa of *Pertusaria*, *Buellia*, *Ochrolechia* and *Lecanora* colonize luxuriantly on these shrubs. The alpine region exhibits abundance of saxicolous and terricolous lichens which grow in association or intermixed with mosses. The lichens in the zone form a felt-like growth on open surface of the substratum. On exposed rocks and boulders areolate species of *Rhizocarpon* and *Acarospora* together with some placodioid species of *Lecanora* and *Lobothallia* are the most commonly distributed lichens. The rocks in moist shady places, in proximity of small rivulets and streams bear good growth of *Stereocaulon*, *Umbilicaria* and species of *Dermatocarpon*. The soil on the vertical slopes of the rocks, provide suitable habitat for species of *Cladonia*, *Lobaria* and *Peltigera* to colonize.

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