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## Distribution patterns of epiphytic lichens in Kumaun Himalaya, Uttarakhand

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### ABSTRACT

Based on published literature, preserved lichen specimens at lichen herbarium in National Botanical Research Institute, Lucknow (LWG) and recent collections of lichens from different regions of Kumaun Himalaya is provided. The Pithoragarh district exhibits the occurrence of 246. The available information regarding bark inhabiting lichen will be useful for conducting future biomonitoring studies in the area.

**Key Words:** Corticolous lichen diversity, Western Himalaya, Uttarakhand.

### INTRODUCTION

The Indian Himalayan lichen flora has been documented several times and included repeatedly in different monographic and revisionary studies. The lichen diversity in the Himalayas was first described by Babington (1852) who mentioned the occurrence of 44 species of which 4 species were new from the lichens collected by Strachey & Winterbottom (1846-49) in Kumaun Himalayas. Stirton (1879) reported 98 lichen taxa based on the collection of G. Watt, A. Watt, King and Thomson from Kumaun Himalayas and some states of east Himalayan region. Kashyap, 1925; Chopra, 1934; Quarashi, 1928 were some other early explorer of the Himalayas for lichen collection. Awasthi (1975) provided the floristic account based on the lichens of Pindari Glacier catchment area from Kapkote to Pindari glacier and enumerated 122 species of lichens belonging to 38 genera and 18 families. Subsequently, Awasthi and Joshi, 1977, 1978; Awasthi and Singh, 1978; Negi and Gadgil, 1996, 1997; Upreti and Negi, 1998; Negi, 1999, 2000, 2001; Upreti and Divakar, 2003 provided assorted account on lichens of Garhwal Himalayas

along with some other contributors (Kumar, 2008 ; Rawat, 2010). Pant (2002) enumerated 203 lichen species belonging to 64 genera and 32 families from Askote-Sandev and Gori-Ganga, the two botanical 'Hot Spot' of Pithoragarh district. Joshi *et al.*, (2008 a,b) described lichen species from Munsiyari area and have thrown some light on the impact of climate on lichen flora of Pindari. Earlier Upreti (1997; 2001) explored the lichens from Indian Himalayas. In higher altitudes area of the region Pindari and Milam Glacier region explored of lichens carried out by Joshi (2010). In Kumaun Himalaya the major localities were exhaustively explored for lichen collections. Based on the altitudinal variations, Kumaun Himalaya lichens can be divided into subtropical, temperate and alpine region. The temperate and alpine regions exhibit luxuriance and rich diversity of foliose lichens. The temperate region shows diversity of different phorophytes which provides suitable condition for a large number lichen genera to grow colonize epiphytically on them. The trees provide varied niches for the lichens to grow as at the base which is laden with soil and mosses, upper trunk with rough bark higher trunk with smooth bark

branches and twigs with varied p<sup>H</sup> and texture. The alpine region exhibit luxuriance of lichens grows on soil and rock. Both moist habitats along the rivers and dry exposed areas provided varied climatic conditions for foliose and other lichen taxa on rock and soil. Earlier Upreti and Chatterjee (1999a,b) studied the distribution of epiphytic lichen in Kumaun Himalaya and reported 64 lichen species of lichen on *Quercus* trees. Similarly in the year 1975 Awasthi studied Pindari Glacier lichen flora and recorded 122 species belonging to 38 genera and 18 families. Furthermore in the Kumaun region floristic and revisionary studies of lichen from India carried out by various workers (Divarkar & Upreti 2005, Nayaka 2005, Joshi 2010, Kumar *et al.* 2011, Mishra *et al.* 2010, Kholia *et al.* 2012, Mishra *et al.* 2011 & Mishra 2012). But so far not a single foliose floristic account of Kumaun Himalayas is available. Thus the present study is carried out with an aim to list the epiphytic lichen from Kumaun Himalaya together with their distribution pattern in different districts.

## MATERIALS AND METHODS

The dried samples were packed on hard card sheets inside a lichen herbarium packet (17cm X 13 cm) with details of the locality, date of collection, substratum and are preserved at the lichen herbarium of National Botanical Research Institute, Lucknow (LWG). The study is based on the lichen material collected from the region and the specimens collected earlier and preserved in the lichen herbarium of National Botanical Research Institute, Lucknow (LWG), lichen herbarium of Lucknow University, Lucknow (LWU) and personal herbarium of Dr. D.D. Awasthi (AWAS).

The specimens were identified by studying their morphology, anatomy and chemistry. The morphology of the taxa was studied under stereo-zoom binocular microscope. The details of thallus anatomy and fruiting bodies were studied by compound microscope. The colour test were carried out on cortex and medulla with usual chemical reagents such as aqueous potassium hydroxide (K), Steiner's stable paraphenylene diamine (PD) and aqueous calcium hypochlorite (C). Thin layer chromatography was performed for identification of the lichen substances in solvent system A (Toluene 180: 1-4 Dioxane 60: Acetic acid 8) following the techniques of Walker & James (1980) and Orange *et al.*, (2001). For authentic identification of different lichen taxa literature of Awasthi (1988, 1991, 2000 and 2007), Divakar and Upreti (2005), Nayaka (2004) and Joshi (2008) were consulted for the identification of specimens up to species level.

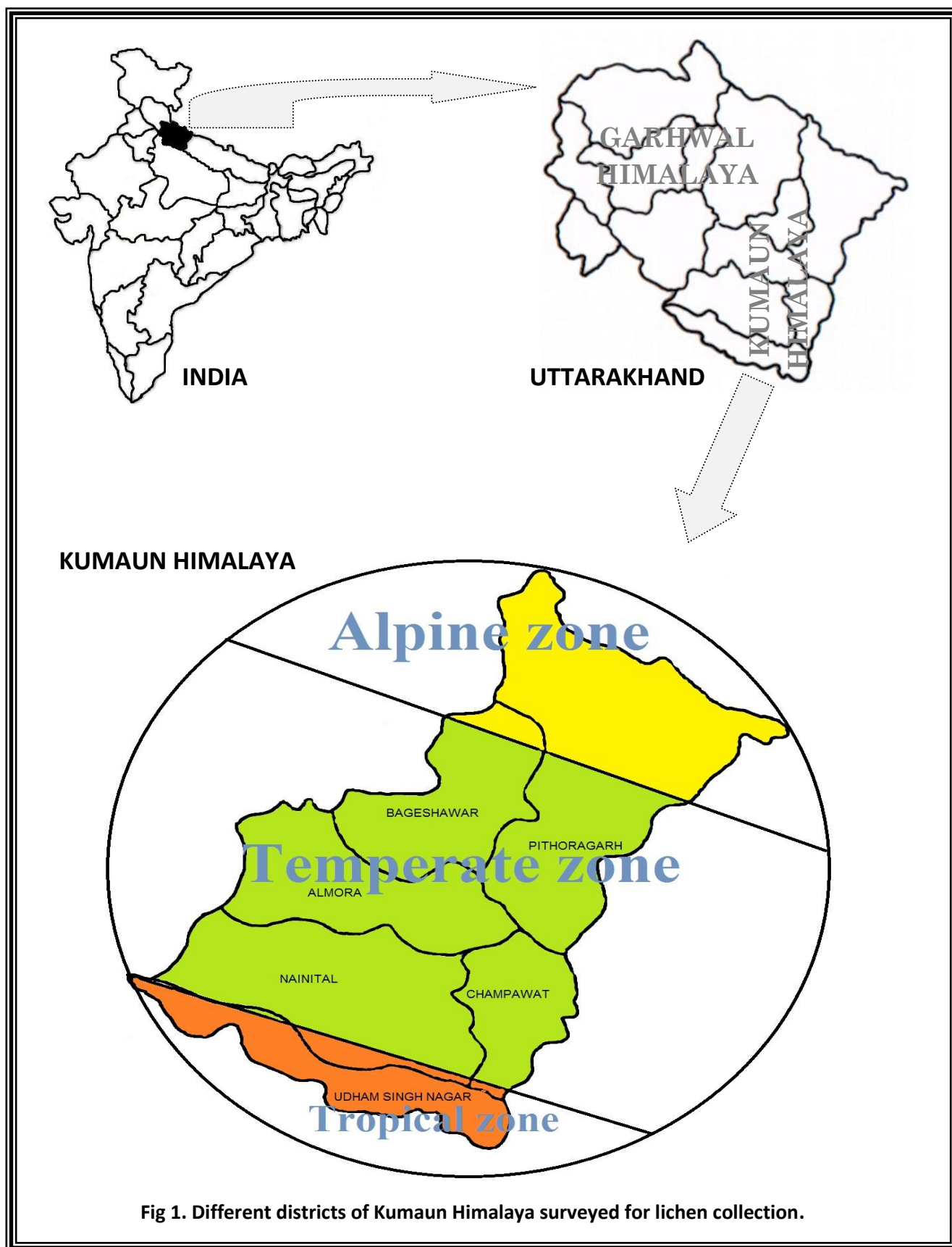
## RESULTS AND DISCUSSION

Among the different habitats of lichens the corticolous species (bark inhabiting) dominates with 429 species belonging to 90 genera and 36 families. The probable reason for luxuriant growth of corticolous lichens in the region may be due to the rich diversity of phorophytes at different altitudinal gradients. A number of tree species such as *Syzygium cumini*, *Shorea robusta*, *Quercus leucotrichopora*, *Quercus floribunda*, *Quercus semecarpifolia*, *Pinus wallichiana*, *Pinus roxburghii*, *Rhododendron arboreum*, *Cedrus deodara*, *Alnus nepalensis* and *Betula utilis* trees growing in moist, shady and open areas both in subtropical and temperate areas provide suitable substrate to various lichen forms to colonize on them. The corticolous lichen taxa of the lichen family Parmeliaceae with 103 species under 21 genera followed by 67 species of 14 genera of Physciaceae are the dominant lichens in the area. Among the different growth form the foliose form of corticolous lichens exhibit their dominance by 189 species followed by 187 crustose, 32 fruticose, 12 squamulose and 5 leprose species. The different districts of the Kumaun exhibit a great variation in altitude, topography and climate. The lichen diversity of each district is provided separately as following (Table 1):

**Almora district** - Almora district shows occurrence of 80 species of corticolous lichens. The lichen family Parmeliaceae dominates the district represented by 8 genera and 26 species followed by Physciaceae with 5 genera and 17 species of lichens. The lichen genera *Heterodermia*, *Lecanora*, *Parmotrema* and *Usnea* are the dominant genera in the. The lichen species *Parmotrema tinctorum* (Despr. ex Nyl.) Hale, *Phaeophyscia hispidula* (Ach.) Moberg and *Usnea eumitrioides* Motyka are widely distributed and recorded from most of the localities of the district.

**Bageshwar district**- Among the different districts of the Kumaun the Bageshwar district exhibit maximum diversity of corticolous lichens represented by 235 species. Parmeliaceae with 18 genera and 58 species and Physciaceae with 6 genera and 29 species are the dominant families in the study area. The lichen genera *Lecanora* with 16 species and *Cladonia* with 11 species dominate the district. The rich diversity of phorophytes and different altitudinal gradients support luxuriant growth of corticolous lichens.

**Champawat district**- The Champawat district is represented by the occurrence of 129 species of corticolous lichens. The member of lichen family Parmeliaceae dominates with 25 species followed by 8 Physciaceae and 5 Lecanoraceae species respectively. The lichen genera *Heterodermia*, *Caloplaca*, *Parmotrema* and *Lecanora* are the dominant genera of the district.



**Table 1.** Distribution of corticolous lichens in different districts of Kumaun Himalaya and their growth forms.

S.N.	Taxa	Family	Groth Forms	Almora	Bageshwar	Chmapawat	Nainital	Pithoragarh	USN
1	<i>Acarospora hassei</i> here	Acarosporaceae	Cr	-	-	-	-	+	-
2	<i>Allocetraria oakesiana</i> (Tuck) A. Ahti	Parmeliaceae	Fo	-	-	-	-	+	-
3	<i>Amandinea montana</i> (H. Magn.) Marbach	Physciaceae	Cr	-	-	-	+	+	-
4	<i>Anisomeridium biforme</i> (Borrer) R.C. Harris in Vi zda	Monoblastiaceae	Cr	-	-	-	-	+	-
5	<i>Anisomeridium nidulans</i> (Müll. Arg.) R. C. Harris	Monoblastiaceae	Cr	-	-	-	-	+	-
6	<i>Anthracothecium assamiense</i> (Stirt.) Ajay Singh	Pyrenulaceae	Cr	-	+	-	-	+	-
7	<i>Anthracothecium depressum</i> Müll. Arg.	Pyrenulaceae	Cr	-	+	-	-	-	-
8	<i>Anthracothecium globiferum</i> var. <i>microsporum</i> Ajay Singh	Pyrenulaceae	Cr	-	+	-	-	-	-
9	<i>Anthracothecium himalayense</i> (Räsänen) D.D. Awasthi	Pyrenulaceae	Cr	-	+	+	-	+	+
10	<i>Anthracothecium himalayense</i> var. <i>pseudohimalayense</i> (A. Singh) A. Singh	Pyrenulaceae	Cr	-	+	+	-	-	-
11	<i>Anthracothecium macrosporum</i> (Hepp) Müll. Arg.	Pyrenulaceae	Cr	-	-	+	-	-	-
12	<i>Anthracothecium manipurensense</i> Müll. Arg.	Pyrenulaceae	Cr	-	+	-	-	-	-
13	<i>Anthracothecium oculatum</i> Müll. Arg.	Pyrenulaceae	Cr	-	+	-	-	-	-
14	<i>Anthracothecium platystomum</i> Müll. Arg.	Pyrenulaceae	Cr	-	+	+	-	+	-
15	<i>Anthracothecium platystomum</i> var. <i>papillatum</i> A. Singh & Upreti	Pyrenulaceae	Cr	-	+	-	-	-	-
16	<i>Anthracothecium thwaitesii</i> (Leight.) Müll. Arg.	Pyrenulaceae	Cr	-	+	+	-	+	-
17	<i>Arthonia antillarum</i> (Fée) Nyl.	Arthoniaceae	Cr	-	+	-	-	-	-
18	<i>Arthonia subgyrosa</i> Nyl.	Arthoniaceae	Cr	-	-	-	-	-	+
19	<i>Arthothelium abnorme</i> (Ach.) Müll. Arg.	Arthoniaceae	Cr	-	-	-	-	+	-
20	<i>Arthothelium albescens</i> Patw. & Makhija	Arthoniaceae	Cr	-	-	-	+	-	-
21	<i>Arthothelium chiodectoides</i> (Nyl.) Zahlbr.	Arthoniaceae	Cr	-	+	+	-	-	-
22	<i>Bacidia alutacea</i> (Kremp.) Zahlbr.	Ramalinaceae	Cr	-	+	+	-	+	+
23	<i>Bacidia arnoldiana</i> Körb.	Ramalinaceae	Cr	-	-	-	-	+	-
24	<i>Bacidia connexula</i> (Nyl.) Zahlbr.	Ramalinaceae	Cr	+	-	-	-	-	-
25	<i>Bacidia delicata</i> (Larbal. ex Leighton) Coppins	Ramalinaceae	Cr	-	-	-	-	-	+
26	<i>Bacidia incongruens</i> (Stirt.) Zahlbr.	Ramalinaceae	Cr	-	+	-	-	-	+
27	<i>Bacidia laurocerasi</i> (Delise ex Duby) Vain.	Ramalinaceae	Cr	-	+	-	-	-	-
28	<i>Bacidia millegrana</i> (Taylor) Müll. Arg.	Ramalinaceae	Cr	-	+	-	+	-	-
29	<i>Bacidia nigrofusca</i> (Müll. Arg.) Zahlbr.	Ramalinaceae	Cr	-	+	-	-	-	-
30	<i>Bacidia personata</i> Malme	Ramalinaceae	Cr	-	-	+	-	+	-
31	<i>Bacidia phaeolomoides</i> (Müll. Arg.) Zahlbr.	Ramalinaceae	Cr	-	+	-	-	-	-
32	<i>Bacidia rosella</i> (Pers.) De Not.	Ramalinaceae	Cr	-	+	-	-	-	-
33	<i>Bacidia rubella</i> (Hoffm.) A. Massal.	Ramalinaceae	Cr	-	+	+	-	+	-
34	<i>Baculifera remensa</i> (Stirt.) Marbach	Physciaceae	Cr	-	-	+	-	-	-
35	<i>Biatora vernalis</i> (L.) Fr.	Ramalinaceae	Cr	-	-	-	-	+	-

36	<i>Biatora subduplex</i> (Nyl.) Printzen	Ramalinaceae		-	-	-	-	+	-
37	<i>Biatorella conspersa</i> (Fée) Vain.	Biatorellaceae	Cr	-	-	-	-	+	-
38	<i>Bryoria bicolor</i> (Ehrh.) Brodo & D. Hawksw.	Parmeliaceae	Fr	-	+	-	-	-	-
39	<i>Bryoria confusa</i> (D.D. Awasthi) Brodo & D. Hawksw.	Parmeliaceae	Fr	-	+	-	-	-	-
40	<i>Bryoria smithii</i> (Du Rietz) Brodo & D. Hawksw.	Parmeliaceae	Fr	-	+	-	-	+	-
41	<i>Bryoria tenuis</i> (Å.E. Dahl) Brodo & D. Hawksw.	Parmeliaceae	Fr	-	+	-	-	-	-
42	<i>Buellia almorensis</i> S.R. Singh & D.D. Awasthi	Physciaceae		+	-	-	-	-	-
43	<i>Buellia betulinoidea</i> Schubert & Klement	Physciaceae		-	-	-	-	+	-
44	<i>Bulbothrix bulbochaeta</i> (Hale) Hale	Parmeliaceae	Fo	-	-	-	-	+	-
45	<i>Bulbothrix isidiza</i> (Nyl.) Hale	Parmeliaceae	Fo	-	+	+	-	+	-
46	<i>Bulbothrix meizospora</i> (Nyl.) Hale	Parmeliaceae	Fo	+	+	-	+	+	-
47	<i>Bulbothrix sensibilis</i> (J. Steiner & Zahlbr.) Hale	Parmeliaceae	Fo	-	+	-	-	+	-
48	<i>Bulbothrix setschwanensis</i> (Zahlbr.) Hale	Parmeliaceae	Fo	+	+	+	+	+	-
49	<i>Calicium subquercinum</i> Asah.	Caliciaceae	Cr	-	+	-	-	-	-
50	<i>Caloplaca abuensis</i> Y. Joshi & Upreti	Teloschistaceae	Cr	-	-	+	-	-	-
51	<i>Caloplaca bassiae</i> (Willd. ex Ach.) Zahlbr.	Teloschistaceae	Cr	-	-	-	+	+	+
52	<i>Caloplaca cerina</i> (Ehrh. ex Hedw.) Th. Fr.	Teloschistaceae	Cr	-	-	-	-	+	-
53	<i>Caloplaca ferruginea</i> (Huds.) Th. Fr.	Teloschistaceae	Cr	-	-	+	-	+	-
54	<i>Caloplaca flavorubescens</i> (Huds.) J.R. Laundon	Teloschistaceae	Cr	-	+	-	-	-	-
55	<i>Caloplaca flavovirescens</i> (Wulfen) Dalla Torre & Sarnth.	Teloschistaceae	Cr	-	+	+	+	+	-
56	<i>Caloplaca himalayana</i> Y. Joshi & Upreti	Teloschistaceae	Cr	-	-	+	+	-	-
57	<i>Caloplaca jatolii</i> Y. Joshi & Upreti	Teloschistaceae	Cr	-	+	-	-	-	-
58	<i>Caloplaca pyracea</i> (Ach.) Th. Fr.	Teloschistaceae	Cr	-	+	+	-	-	-
59	<i>Caloplaca saxicola</i> (Hoffm.) A. Nordin	Teloschistaceae	Cr	-	+	-	-	-	-
60	<i>Caloplaca squamosa</i> (de Lesd.) Zahlbr.	Teloschistaceae	Sq	+	+	-	-	+	-
61	<i>Caloplaca trilocolans</i> Zahlbr.	Teloschistaceae	Cr	-	+	-	+	-	-
62	<i>Candelaria concolor</i> (Dicks.) Stein	Candelariaceae	Fo	-	+	+	+	+	-
63	<i>Candelaria indica</i> (Hue) Vain.	Candelariaceae	Fo	-	+	-	+	-	-
64	<i>Canoparmelia aptata</i> (Kremp.) Elix & Hale	Parmeliaceae	Fo	+	+	+	+	+	-
65	<i>Canoparmelia ecaperata</i> (Müll. Arg.) Elix & Hale	Parmeliaceae	Fo	+	-	+	-	+	-
66	<i>Canoparmelia eruptens</i> (Kurok.) Elix & Hale	Parmeliaceae	Fo	-	-	-	+	-	-
67	<i>Canoparmelia texana</i> (Tuck.) Elix & Hale	Parmeliaceae	Fo	+	-	+	+	+	-
68	<i>Cetrelia braunsiana</i> (Müll. Arg.) W.L. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	+	+	-	+	-
69	<i>Cetrelia cetrarioides</i> (Del. ex Duby) W. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	+	-	-	+	-
70	<i>Cetrelia collata</i> (Nyl.) W.L. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	+	-	-	-	-
71	<i>Cetrelia olivetorum</i> (Nyl.) W.L. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	+	-	-	+	-
72	<i>Cetrelia pseudolivatorum</i> (Asahina) W.L. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	-	+	-	-	-
73	<i>Cetreliaopsis rhytidocarpa</i> subsp. <i>rhytidocarpa</i> (Mont. & v.d. Bosch) M. J. Lai	Parmeliaceae	Fo	-	+	-	-	+	-

74	<i>Chapsa leprocarpa</i> (Nyl.) A. Frisch	Thelotremataceae	Cr	-	-	-	-	+	-
75	<i>Chrysothrix candelaris</i> (L.) Laundon	Chrysothricaceae	Le	-	+	+	+	+	-
76	<i>Chrysothrix chlorina</i> (Ach.) J.R. Laundon	Chrysothricaceae	Le	+	+	+	-	+	-
77	<i>Clathroporina duplicascens</i> (Nyl.) Zahlbr.	Porinaceae	Cr	-	-	+	-	-	-
78	<i>Coccocarpia palmicola</i> (Spreng.) Arv. & D.J. Galloway	Coccocarpiaceae	Fo	-	-	-	-	+	-
79	<i>Coccocarpia pellita</i> (Ach.) Müll. Arg.	Coccocarpiaceae	Fo	-	+	+	-	-	-
80	<i>Collema auriculiforme</i> (With.) Coppins & J.R. Laundon	Collemataceae	Fo	-	+	-	-	+	-
81	<i>Collema furfuraceum</i> (Arn.) Du Rietz	Collemataceae	Fo	-	+	+	-	-	-
82	<i>Collema japonicum</i> (Müll. Arg.) Hue	Collemataceae	Fo	-	-	+	-	+	-
83	<i>Collema kauaiense</i> H. Magn.	Collemataceae	Fo	-	+	-	-	-	-
84	<i>Collema leptaleum</i> var. <i>bilosum</i> (Mont.) Degel.	Collemataceae	Fo	+	-	-	-	-	-
85	<i>Collema leptaleum</i> var. <i>leptaleum</i> Tuck.	Collemataceae	Fo	-	-	-	-	+	-
86	<i>Collema nigrescens</i> (Huds.) DC.	Collemataceae	Fo	-	-	+	-	-	-
87	<i>Collema pulcellum</i> Ach.	Collemataceae	Fo	-	+	-	-	-	-
88	<i>Collema pulcellum</i> Ach. var. <i>subnigrescens</i> (Müll. Arg.) Degel.	Collemataceae	Fo	-	-	-	-	+	-
89	<i>Collema shiromanum</i> Yasuda in Räsänen	Collemataceae	Fo	-	-	-	-	+	-
90	<i>Collema subconveniens</i> Nyl.	Collemataceae	Fo	-	+	-	+	+	-
91	<i>Collema subflaccidum</i> Degel.	Collemataceae	Fo	-	+	-	-	-	-
92	<i>Collema subnigrescens</i> Degel.	Collemataceae	Fo	-	+	-	-	-	-
93	<i>Collema tenax</i> (Sw.) Ach. Champawat	Collemataceae	Fo	-	-	+	-	+	-
94	<i>Coniocybe coniophaea</i> Norm.	Coniocybaceae	Cr	-	+	-	-	-	-
95	<i>Cryptothecia anamalaiensis</i> Patw. & Makhija	Arthoniaceae	Cr	-	-	+	-	+	-
96	<i>Cryptothecia dispersa</i> Makhija & Patw.	Arthoniaceae	Cr	-	-	-	-	+	-
97	<i>Cryptothecia lunulata</i> (Zahlbr.) Makhija & Patw.	Arthoniaceae	Cr	-	-	+	-	+	-
98	<i>Cryptothecia polymorpha</i> Makhija & Patw.	Arthoniaceae	Cr	-	-	-	-	+	-
99	<i>Cryptothecia subsecta</i> Stirt.,	Arthoniaceae	Cr	-	-	-	-	+	-
100	<i>Diorygma heiroglyphicum</i> (Pers.) Staiger & Kalb	Graphidaceae	Cr	-	-	+	+	+	+
101	<i>Diorygma junghuhnii</i> (Mont. & Bosch) Kalb & al.	Graphidaceae	Cr	-	-	+	+	+	-
102	<i>Diorygma megaspermum</i> Makhija & al.	Graphidaceae	Cr	-	-	-	-	+	-
103	<i>Dirinaria aegialita</i> (Afzel.) Moore	Physciaceae	Fo	-	-	+	-	+	-
104	<i>Dirinaria applanata</i> (Fée) D. Awasthi & M.R. Agarwal	Physciaceae	Fo	-	-	+	+	+	+
105	<i>Dirinaria confluens</i> (Fr.) D. Awasthi	Physciaceae	Fo	-	+	+	-	-	-
106	<i>Dirinaria consimilis</i> (Stirt.) D.D. Awasthi & M.R. Agarwal	Physciaceae	Fo	-	-	+	-	+	-
107	<i>Dirinaria picta</i> (Sw.) Clem. & Shaer	Physciaceae	Fo	+	-	-	-	-	-
108	<i>Everniastrum cirrhatum</i> (Fr.) Hale ex Sipman	Parmeliaceae	Fo	+	+	+	+	+	-
109	<i>Everniastrum nepalense</i> (Taylor) Hale ex Sipman	Parmeliaceae	Fo	+	+	-	+	+	-
110	<i>Flavoparmelia caperata</i> (L.) Hale	Parmeliaceae	Fo	-	+	+	+	+	-
111	<i>Flavopunctelia flaventior</i> (Stirt.) Hale	Parmeliaceae	Fo	-	-	-	-	+	-
112	<i>Graphis anfractuosa</i> (Eschw.) Eschw. in Mart.	Graphidaceae	Cr	-	-	-	-	+	-

113	<i>Graphis chlorotica</i> Massal in Kremp.	Graphidaceae	Cr	-	+	-	-	-	-
114	<i>Graphis duplicata</i> Ach.	Graphidaceae	Cr	-	+	-	-	+	-
115	<i>Graphis lineola</i> Ach.	Graphidaceae	Cr	-	+	+	+	+	+
116	<i>Graphis longiramea</i> Müll. Arg.	Graphidaceae	Cr	-	+	-	-	+	+
117	<i>Graphis proserpens</i> Vain.	Graphidaceae	Cr	-	+	+	+	+	-
118	<i>Graphis pyrrohocheiloides</i> Zahlbr.	Graphidaceae	Cr	-	-	-	-	+	-
119	<i>Graphis scripta</i> (L.) Ach.	Graphidaceae	Cr	-	+	+	+	+	+
120	<i>Graphis subasahinae</i> Nagarkar & Patw.	Graphidaceae	Cr	-	+	-	-	-	-
121	<i>Graphis subserpentina</i> Nyl.	Graphidaceae	Cr	-	-	-	+	-	-
122	<i>Graphis subvirginia</i> Nyl. in Leight.	Graphidaceae	Cr	-	-	+	-	-	-
123	<i>Haematomma puniceum</i> (Sw.) A. Massal.	Haematommataceae	Cr	-	+	-	-	+	-
124	<i>Hafellia tetrapla</i> (Nyl.) Pußwald in Marbach	Physciaceae	Cr	-	-	-	+	-	-
125	<i>Hemitecium aphanes</i> (Mont. & Bosch) M. Nakan. & Kashw.	Graphidaceae	Cr	-	+	-	+	-	-
126	<i>Hemitecium divaricoidea</i> (Räsänen) V. Tivari & Upreti	Graphidaceae	Cr	-	-	+	-	-	-
127	<i>Herpothallon isidiatum</i> Jagadeesh & G.P. Sinha	Arthoniaceae	Le	-	-	+	+	-	-
128	<i>Heterodermia albidiflava</i> (Kuork.) D. D. Awasthi	Physciaceae	Fo	-	+	-	-	+	-
129	<i>Heterodermia angustiloba</i> (Müll. Arg.) D.D. Awasthi	Physciaceae	Fo	-	+	-	-	+	-
130	<i>Heterodermia boryi</i> (Fée) Kr.P. Singh & S.R. Singh	Physciaceae	Fo	-	+	-	+	+	-
131	<i>Heterodermia comosa</i> (Eschw.) Follmann & Redón	Physciaceae	Fo	+	-	+	-	+	-
132	<i>Heterodermia dactyliza</i> (Nyl.) Swinsc. & Krog	Physciaceae	Fo	-	+	-	-	+	-
133	<i>Heterodermia diademata</i> (Taylar) D. D. Awasthi	Physciaceae	Fo	+	+	+	+	+	-
134	<i>Heterodermia dissecta</i> (Kurok.) D.D. Awasthi	Physciaceae	Fo	+	+	-	+	+	-
135	<i>Heterodermia dissecta</i> var. <i>koyana</i> (Kurok.) J.C. Wei	Physciaceae	Fo	-	+	-	-	+	-
136	<i>Heterodermia firmula</i> (Nyl.) Trevis.	Physciaceae	Fo	+	+	-	+	+	-
137	<i>Heterodermia flabellata</i> (Fée) D.D. Awasthi	Physciaceae	Fo	-	-	-	-	+	-
138	<i>Heterodermia himalayensis</i> (D. Awasthi) D. Awasthi	Physciaceae	Fo	+	-	+	-	+	-
139	<i>Heterodermia hypocaesia</i> (Yasuda) D.D. Awasthi	Physciaceae	Fo	+	+	-	-	+	-
140	<i>Heterodermia incana</i> (Stirt.) D. D. Awasthi	Physciaceae	Fo	+	+	+	+	+	-
141	<i>Heterodermia indica</i> (H. Magn.) D.D. Awasthi	Physciaceae	Fo	-	-	-	+	-	-
142	<i>Heterodermia isidiophora</i> (Nyl.) D.D. Awasthi	Physciaceae	Fo	+	-	-	-	-	-
143	<i>Heterodermia japonica</i> (M. Satô) Swinscow & Krog	Physciaceae	Fo	+	+	-	+	+	-
144	<i>Heterodermia leucomelos</i> (L.) Poelt	Physciaceae	Fo	+	+	-	-	+	-
145	<i>Heterodermia microphylla</i> (Kurok.) Skorepa	Physciaceae	Fo	-	+	-	+	+	-
146	<i>Heterodermia obscurata</i> (Nyl.) Trevisan	Physciaceae	Fo	-	+	+	-	-	-
147	<i>Heterodermia pellucida</i> (D.D. Awasthi) D.D. Awasthi	Physciaceae	Fo	-	-	-	+	-	-
148	<i>Heterodermia podocarpa</i> (Bél.) D.D. Awasthi	Physciaceae	Fo	-	-	+	-	+	-
149	<i>Heterodermia pseudospeciosa</i> (Kurok.) W.L.	Physciaceae	Fo	-	+	-	-	+	-

	Culb.									
150	<i>Heterodermia punctifera</i> (Kurok.) D.D. Awasthi	Physciaceae	Fo	+	-	-	-	-	-	-
151	<i>Heterodermia rubescens</i> (Räsänen) D.D. Awasthi	Physciaceae	Fo	+	+	-	-	+	-	-
152	<i>Heterodermia speciosa</i> (Wulf.) Trevis.	Physciaceae	Fo	+	+	-	+	+	-	-
153	<i>Hyperphyscia adglutinata</i> (Flörke) H. Mayrhofer & Poelt	Physciaceae	Fo	-	-	+	-	+	+	-
154	<i>Hyperphyscia syncolla</i> (Tuck. ex Nyl.) Kalb.	Physciaceae	Fo	-	+	+	-	+	-	-
155	<i>Hypotrachyna adducta</i> (Nyl.) Hale	Parmeliaceae	Fo	-	+	-	-	-	-	-
156	<i>Hypotrachyna awasthii</i> Hale & Patw.	Parmeliaceae	Fo	-	+	-	-	-	-	-
157	<i>Hypotrachyna crenata</i> (Kurok.) Hale	Parmeliaceae	Fo	-	+	-	-	+	-	-
158	<i>Hypotrachyna exsecta</i> (Taylor) Hale	Parmeliaceae	Fo	-	-	-	-	+	-	-
159	<i>Hypotrachyna flexilis</i> (Kurok.) Hale	Parmeliaceae	Fo	-	-	+	+	+	-	-
160	<i>Hypotrachyna imbricatula</i> (Zahlbr.) Hale	Parmeliaceae		-	-	-	-	+	-	-
161	<i>Hypotrachyna immaculata</i> (Kurok.) Hale	Parmeliaceae	Fo	+	-	-	-	-	-	-
162	<i>Hypotrachyna infirma</i> (Kurok.) Hale	Parmeliaceae	Fo	-	+	-	-	+	-	-
163	<i>Hypotrachyna osseoalba</i> (Vain.) Y.S. Park and Hale	Parmeliaceae	Fo	-	+	-	-	+	-	-
164	<i>Hypotrachyna physcioides</i> (Nyl.) Hale	Parmeliaceae	Fo	-	+	-	-	+	-	-
165	<i>Hypotrachyna pluriformis</i> (Nyl.) Hale	Parmeliaceae	Fo	-	+	-	-	+	-	-
166	<i>Hypotrachyna radiculata</i> (Kurok.) Elix	Parmeliaceae	Fo	-	+	-	-	-	-	-
167	<i>Lecanora achroa</i> Nyl.	Lecanoraceae	Cr	-	+	+	+	+	+	+
168	<i>Lecanora alba</i> Lumbsch	Lecanoraceae	Cr	-	-	+	+	+	-	-
169	<i>Lecanora albella</i> (Pers.) Ach.	Lecanoraceae	Cr	-	-	-	+	-	-	-
170	<i>Lecanora argentata</i> (Ach.) Degel.	Lecanoraceae	Cr	-	+	-	-	+	-	-
171	<i>Lecanora austrointumescens</i> Lumbsch & Elix	Lecanoraceae	Cr	+	+	-	-	-	-	-
172	<i>Lecanora caesiorubella</i> Ach.	Lecanoraceae	Cr	+	-	-	-	+	-	-
173	<i>Lecanora chlarotera</i> Nyl.	Lecanoraceae	Cr	+	-	+	+	-	-	-
174	<i>Lecanora cinereofusca</i> H. Magn	Lecanoraceae	Cr	+	+	-	-	+	-	-
175	<i>Lecanora concilianda</i> Vain.	Lecanoraceae	Cr	+	-	-	-	+	-	-
176	<i>Lecanora concilians</i> Nyl.	Lecanoraceae	Cr	-	-	-	-	+	-	-
177	<i>Lecanora fimbriatula</i> Stirt.	Lecanoraceae	Cr	+	+	-	-	+	-	-
178	<i>Lecanora flavidofusca</i> Müll. Arg.	Lecanoraceae	Cr	-	+	-	-	+	-	-
179	<i>Lecanora frustulosa</i> (Dicks.) Ach.,	Lecanoraceae	Cr	-	+	-	+	-	-	-
180	<i>Lecanora helva</i> Stizenb.	Lecanoraceae	Cr	+	+	-	+	+	+	+
181	<i>Lecanora henssenii</i> Vänskä	Lecanoraceae	Cr	-	+	-	-	-	-	-
182	<i>Lecanora impudens</i> Degel.	Lecanoraceae	Cr	-	+	-	-	-	-	-
183	<i>Lecanora imshaugii</i> Brodo.	Lecanoraceae	Cr	-	+	-	-	+	-	-
184	<i>Lecanora indica</i> Zahlbr.	Lecanoraceae	Cr	-	-	-	-	+	-	-
185	<i>Lecanora insignis</i> Degel	Lecanoraceae	Cr	-	+	-	-	-	-	-
186	<i>Lecanora interjecta</i> Müll. Arg.	Lecanoraceae	Cr	-	+	+	-	-	-	-
187	<i>Lecanora japonica</i> Müll. Arg.	Lecanoraceae	Cr	-	+	-	-	+	-	-
188	<i>Lecanora leprosa</i> Fée	Lecanoraceae	Cr	+	-	-	-	-	-	-
189	<i>Lecanora meridionalis</i> H. Magn.	Lecanoraceae	Cr	-	+	-	-	-	-	-
190	<i>Lecanora muralis</i> var. <i>dubyi</i> (Müll. Arg.) Poelt	Lecanoraceae	Cr	-	+	-	-	+	-	-
191	<i>Lecanora perplexa</i> Brodo	Lecanoraceae	Cr	-	+	-	-	+	-	-



192	<i>Lecanora phaeocardia</i> Vain.	Lecanoraceae	Cr	-	-	+	-	-	-
193	<i>Lecanora pseudistera</i> Nyl.	Lecanoraceae	Cr	-	-	+	-	+	-
194	<i>Lecanora pulicaris</i> (Pers.) Ach.	Lecanoraceae	Cr	-	+	-	-	-	-
195	<i>Lecanora queenslandica</i> C. Knight	Lecanoraceae	Cr	-	-	-	-	+	-
196	<i>Lecanora saligna</i> (Schrad.) Zahlbr.	Lecanoraceae	Cr	+	-	-	-	-	-
197	<i>Lecanora subrugosa</i> Nyl.	Lecanoraceae	Cr	-	+	-	-	-	-
198	<i>Lecanora tropica</i> Zahlbr.	Lecanoraceae	Cr	-	-	+	-	-	-
199	<i>Lecidea granifera</i> (Ach.) Vain.	Lecideaceae	Cr	-	-	+	-	+	-
200	<i>Lecidea paraclitica</i> Nyl.	Lecideaceae	Cr	-	-	-	-	+	-
201	<i>Lecidea turgidula</i> Fr.	Lecideaceae	Cr	-	-	-	-	+	-
202	<i>Lecidella carpathica</i> Körb.	Lecanoraceae	Cr	-	+	-	+	-	-
203	<i>Lecidella euphorea</i> (Flörke) Hertel	Lecanoraceae	Cr	-	-	-	-	+	-
204	<i>Lepraria lobificans</i> Nyl.	Stereocaulaceae	Le	-	+	+	+	+	+
205	<i>Lepraria vouauxii</i> (Hue) R.C. Harris	Stereocaulaceae	Le	-	+	-	-	+	-
206	<i>Leprocaulon arbuscula</i> (Nyl.) Nyl.	Lecanoromycetes	Fo	-	-	-	-	+	-
207	<i>Leprocaulon pseudoarbuscula</i> (Asah.) Lamb & Ward.	Lecanoromycetes	Fo	-	-	-	-	+	-
208	<i>Leptogium arisanense</i> Asahina	Collemataceae	Fo	-	-	-	-	+	-
209	<i>Leptogium asiaticum</i> P.M. Jørg.	Collemataceae	Fo	-	+	-	-	-	-
210	<i>Leptogium askotense</i> D. D. Awasthi	Collemataceae	Fo	-	+	+	+	+	-
211	<i>Leptogium austroamericanum</i> (Malme) C.W. Dodge	Collemataceae	Fo	-	-	-	-	+	-
212	<i>Leptogium azureum</i> (Sw. ex Ach.) Mont.	Collemataceae	Fo	-	-	-	-	+	-
213	<i>Leptogium burgessii</i> (L.) Mont.	Collemataceae	Fo	-	+	-	+	-	-
214	<i>Leptogium burnetiae</i> C.W. Dodge	Collemataceae	Fo	-	+	+	-	+	-
215	<i>Leptogium chloromelum</i> (Sw.) Nyl.	Collemataceae	Fo	-	-	+	-	+	-
216	<i>Leptogium cyanescens</i> (Rabenh.) Körb.	Collemataceae	Fo	-	+	-	-	-	-
217	<i>Leptogium delavayi</i> Hue	Collemataceae	Fo	-	+	-	+	+	-
218	<i>Leptogium denticulatum</i> Nyl.	Collemataceae	Fo	-	-	-	-	+	-
219	<i>Leptogium furfuraceum</i> (Harm.) Sierk	Collemataceae	Fo	-	+	-	-	+	-
220	<i>Leptogium javanicum</i> Mont.	Collemataceae	Fo	-	+	-	-	+	-
221	<i>Leptogium pedicellatum</i> P.M. Jørg.	Collemataceae	Fo	-	+	+	-	+	-
222	<i>Leptogium phyllocarpum</i> (Pers.) Mont.	Collemataceae	Fo	-	-	+	-	+	-
223	<i>Leptogium pseudopapillosum</i> P.M. Jørg.	Collemataceae	Fo	-	-	-	-	+	-
224	<i>Leptogium saturninum</i> (Dicks.) Nyl.	Collemataceae	Fo	-	+	-	-	+	-
225	<i>Leptogium trichophorum</i> Müll. Arg.	Collemataceae	Fo	-	+	-	-	+	-
226	<i>Letrouitia transgressa</i> (Malme) Hafellner & Bellem.	Letrouitiaceae	Cr	-	-	-	-	+	-
227	<i>Lithothelium himalayense</i> Upreti & Aptroot	Pyrenulaceae	Cr	-	+	-	+	+	-
228	<i>Lithothelium obtectum</i> (Müll. Arg.) Aptroot	Pyrenulaceae	Cr	-	+	-	-	-	-
229	<i>Lobaria himalayensis</i> Upreti & Divakar	Lobariaceae	Fo	-	-	-	-	+	-
230	<i>Lobaria isidiosa</i> (Müll. Arg.) Vain.	Lobariaceae	Fo	-	+	-	-	-	-
231	<i>Lobaria japonica</i> (Zahlbr.) Asahina	Lobariaceae	Fo	-	+	-	-	+	-
232	<i>Lobaria kurokawae</i> Yoshim.	Lobariaceae	Fo	-	+	-	-	+	-
233	<i>Lobaria meridionalis</i> Vain.	Lobariaceae	Fo	-	+	-	-	+	-
234	<i>Lobaria pindarensis</i> Räsänen	Lobariaceae	Fo	-	+	-	-	+	-
235	<i>Lobaria pseudopulmonaria</i> Gyeln.	Lobariaceae	Fo	+	+	-	-	-	-

236	<i>Lobaria retigera</i> (Bory) Trev.	Lobariaceae	Fo	+	+	+	+	+	-
237	<i>Lopadium leucoanthum</i> (Spreng.) Zahlbr.	Pilocarpaceae	Cr	-	-	+	+	-	+
238	<i>Lopadium pulchrum</i> (Müll. Arg.) Zahlbr.	Pilocarpaceae	Cr	-	-	-	-	+	-
239	<i>Maronea constans</i> (Nyl) Hepp.	Fuscideaceae	Cr	-	-	-	-	+	-
240	<i>Micarea</i> sp.	Pilocarpaceae	Cr	-	-	-	-	-	+
241	<i>Myelochroa aurulenta</i> (Tuck.) Elix & Hale	Parmeliaceae	Fo	+	+	+	+	+	-
242	<i>Myelochroa entotheiochroa</i> (Hue) Elix & Hale	Parmeliaceae	Fo	-	+	+	-	-	-
243	<i>Myelochroa macrogalbinica</i> Divakar & al	Parmeliaceae	Fo	-	+	-	-	+	-
244	<i>Myelochroa metarevoluta</i> (Ach.) Elix & Hale	Parmeliaceae	Fo	-	+	-	-	+	-
245	<i>Myelochroa perisidians</i> (Nyl.) Elix & Hale	Parmeliaceae	Fo	-	-	-	+	-	-
246	<i>Myelochroa subaurulenta</i> (Nyl.) Elix & Hale	Parmeliaceae	Fo	-	+	-	+	+	-
247	<i>Myelochroa upretii</i> Divakar & Elix in Divakar & al.	Parmeliaceae	Fo	-	+	-	-	+	-
248	<i>Myelochroa xantholepis</i> (Mont. & Bosch) Elix & Hale	Parmeliaceae	Fo	-	+	+	-	+	-
249	<i>Nephroma helveticum</i> Ach.	Nephromataceae	Fo	+	+	-	-	+	-
250	<i>Nephroma isidiosum</i> (Nyl.) Gyeln.	Nephromataceae	Fo	-	+	-	-	-	-
251	<i>Nephromopsis ahtii</i> (Randlane & Saag) Randlane & Saag	Parmeliaceae	Fo	-	+	-	-	-	-
252	<i>Nephromopsis laii</i> (A. Thell & Randlane) Saag & A.Thell	Parmeliaceae		-	-	-	-	+	-
253	<i>Nephromopsis nephromoides</i> (Nyl.) Ahti & Randl.	Parmeliaceae	Fo	-	+	-	-	+	-
254	<i>Nephromopsis pallescens</i> (Schaer.) Park	Parmeliaceae	Fo	-	+	-	-	+	-
255	<i>Nephromopsis stracheyi</i> (C. Bab.) Müll. Arg.	Parmeliaceae	Fo	-	+	-	-	+	-
256	<i>Ocellularia eumorpha</i> (Stirt.) Hale	Thelotremataceae		-	-	-	-	+	-
257	<i>Ochrolechia harmandii</i> versegghy	Ochrolechiaceae	Cr	-	+	-	-	-	-
258	<i>Ochrolechia pallescens</i> (L.) A. Massal.	Ochrolechiaceae	Cr	-	+	-	-	-	-
259	<i>Ochrolechia rosella</i> (Müll. Arg.) Versegghy	Ochrolechiaceae	Cr	-	+	+	-	+	-
260	<i>Ochrolechia subpallescens</i> Versegghy	Ochrolechiaceae	Cr	-	+	-	-	+	-
261	<i>Ochrolechia yasudae</i> var. <i>corallina</i> Poelt	Ochrolechiaceae	Cr	-	+	-	-	+	-
262	<i>Opegrapha dimidiata</i> Müll. Arg.	Roccellaceae	Cr	-	-	-	-	+	-
263	<i>Opegrapha vulgata</i> (Ach.) Ach.	Roccellaceae	Cr	-	-	-	-	-	+
264	<i>Pallidogramme chrysenteron</i> (Mont.) Staiger & al.	Graphidaceae	Cr	-	-	-	-	+	-
265	<i>Pannaria emodii</i> P. M. Jorg.	Pannariaceae	Sq	-	-	-	-	+	-
266	<i>Parmelaria subthomsonii</i> D.D. Awasthi	Parmeliaceae	Fo	+	+	-	-	+	-
267	<i>Parmelaria thomsonii</i> (Stirt.) D.D. Awasthi	Parmeliaceae	Fo	-	+	+	+	+	-
268	<i>Parmelia marmariza</i> Nyl.	Parmeliaceae	Fo	-	+	-	-	-	-
269	<i>Parmelia meiophora</i> Nyl.	Parmeliaceae	Fo	-	+	-	-	-	-
270	<i>Parmeliella himalayana</i> Upreti & Divakar	Pannariaceae	Sq	-	-	-	-	+	-
271	<i>Parmeliella papillata</i> P.M. Jørg.	Pannariaceae	Sq	-	+	-	-	-	-
272	<i>Parmelinella wallichiana</i> (Taylor) Elix & Hale	Parmeliaceae	Fo	+	+	+	+	+	-
273	<i>Parmotrema austrosinense</i> (Zahlbr.) Hale	Parmeliaceae	Fo	+	-	-	+	+	-
274	<i>Parmotrema cooperi</i> (J. Steiner & Zahlbr.) Sërus.	Parmeliaceae	Fo	-	-	-	-	+	-
275	<i>Parmotrema crinitum</i> (Ach.) M. Choisy	Parmeliaceae	Fo	-	-	+	-	-	-
276	<i>Parmotrema direagens</i> (Hale) Hale	Parmeliaceae	Fo	-	+	-	-	-	-
277	<i>Parmotrema eunetum</i> (Stirt.) Hale	Parmeliaceae	Fo	-	+	-	-	-	-

278	<i>Parmotrema hababianum</i> (Gyeln.) Hale	Parmeliaceae	Fo	+	+	+	-	+	-
279	<i>Parmotrema indicum</i> Hale	Parmeliaceae	Fo	-	+	-	-	+	-
280	<i>Parmotrema mesotropum</i> (Müll. Arg.) Hale	Parmeliaceae	Fo	-	-	-	-	+	+
281	<i>Parmotrema nilgherrense</i> (Nyl.) Hale	Parmeliaceae	Fo	+	+	+	+	+	-
282	<i>Parmotrema praesorediosum</i> (Nyl.) Hale	Parmeliaceae	Fo	+	+	+	+	+	+
283	<i>Parmotrema pseudocrinitum</i> (Abbayes) Hale	Parmeliaceae	Fo	-	-	-	-	+	-
284	<i>Parmotrema rampoddense</i> (Nyl.) Hale	Parmeliaceae	Fo	+	-	-	-	-	-
285	<i>Parmotrema ravum</i> (Krog & Swinscow) Sérus	Parmeliaceae	Fo	-	-	-	-	+	-
286	<i>Parmotrema reticulatum</i> (Taylor) M. Choisy	Parmeliaceae	Fo	+	+	+	+	+	-
287	<i>Parmotrema sancti-angelii</i> (Lynge) Hale	Parmeliaceae	Fo	+	+	+	-	+	-
288	<i>Parmotrema subtinctorium</i> (Zahlbr.) Hale	Parmeliaceae	Fo	+	-	+	-	+	-
289	<i>Parmotrema tinctorum</i> (Despr. ex Nyl.) Hale	Parmeliaceae	Fo	+	+	+	+	+	+
290	<i>Pertusaria albescens</i> (Huds.) M. Choisy & Werner	Pertusariaceae	Cr	+	+	+	-	+	-
291	<i>Pertusaria amara</i> (Ach.) Nyl.	Pertusariaceae	Cr	-	+	-	-	+	-
292	<i>Pertusaria amarkantakana</i> P. Srivast. & D.D. Awasthi	Pertusariaceae	Cr	-	-	-	+	-	-
293	<i>Pertusaria bryontha</i> (Ach.) Nyl.	Pertusariaceae	Cr	-	+	-	-	-	-
294	<i>Pertusaria coccodes</i> (Ach.) Nyl.	Pertusariaceae	Cr	-	-	-	-	+	-
295	<i>Pertusaria concinna</i> Erichsen	Pertusariaceae	Cr	-	+	-	-	+	-
296	<i>Pertusaria coronata</i> (Ach.) Th. Fr.	Pertusariaceae	Cr	-	+	-	-	+	-
297	<i>Pertusaria depressa</i> (Fée.) Mont & Bosch	Pertusariaceae	Cr	-	+	-	-	+	-
298	<i>Pertusaria himalayensis</i> D.D. Awasthi & P. Srivast.	Pertusariaceae	Cr	+	-	-	+	+	-
299	<i>Pertusaria indica</i> P. Srivast. & D.D. Awasthi	Pertusariaceae	Cr	+	-	+	-	+	-
300	<i>Pertusaria leucosora</i> Nyl.	Pertusariaceae	Cr	+	+	-	-	+	-
301	<i>Pertusaria leucosorodes</i> Nyl.	Pertusariaceae	Cr	+	+	+	+	+	-
302	<i>Pertusaria leucostoma</i> (Bernh.) A. Massal.	Pertusariaceae	Cr	-	-	-	-	+	+
303	<i>Pertusaria melastomella</i> Nyl.	Pertusariaceae	Cr	-	-	+	+	+	-
304	<i>Pertusaria multipuncta</i> (Turn.) Nyl	Pertusariaceae	Cr	-	+	-	-	-	-
305	<i>Pertusaria pallidula</i> Stirt.	Pertusariaceae	Cr	-	+	-	-	-	-
306	<i>Pertusaria pertusa</i> (L.) Tuck	Pertusariaceae	Cr	+	+	+	-	+	-
307	<i>Pertusaria pseudococcodes</i> Müll. Arg.	Pertusariaceae	Cr	-	-	-	-	+	-
308	<i>Pertusaria punctata</i> Nyl.	Pertusariaceae	Cr	-	+	-	-	+	-
309	<i>Pertusaria pustulata</i> (Ach.) Duby	Pertusariaceae	Cr	-	-	-	-	+	-
310	<i>Pertusaria quassie</i> (Fée) Nyl.	Pertusariaceae	Cr	+	+	+	+	+	-
311	<i>Pertusaria rigida</i> Müll. Arg.	Pertusariaceae	Cr	-	-	-	-	+	-
312	<i>Pertusaria subdepressa</i> Müll. Arg.	Pertusariaceae	Cr	-	-	-	+	-	-
313	<i>Pertusaria submultipuncta</i> Nyl.	Pertusariaceae	Cr	-	-	+	-	+	-
314	<i>Pertusaria subochracea</i> Stirt.	Pertusariaceae	Cr	-	-	+	-	+	-
315	<i>Pertusaria variolosa</i> (Kremp.) Vain.	Pertusariaceae	Cr	+	-	-	-	-	-
316	<i>Phaeographina limbata</i> Müll. Arg.	Graphidaceae	Cr	-	-	-	-	+	-
317	<i>Phaeographis angulosa</i> Müll. Arg.,	Graphidaceae	Cr	-	-	+	-	-	-
318	<i>Phaeographis endophaeiza</i> (Stirt.) Zahlbr.	Graphidaceae	Cr	-	+	-	-	-	-
319	<i>Phaeographis inusta</i> (Ach.) Müll. Arg.	Graphidaceae	Cr	-	-	-	+	-	-
320	<i>Phaeophyscia ciliata</i> (Hoffm.) Moberg	Physciaceae	Fo	-	+	-	-	+	-
321	<i>Phaeophyscia constipata</i> (Norrl. & Nyl.) Moberg	Physciaceae	Fo	-	+	-	-	+	-

322	<i>Phaeophyscia endococcina</i> (Körb.) Moberg	Physciaceae	Fo	-	+	-	+	+	-
323	<i>Phaeophyscia hispidula</i> (Ach.) Moberg	Physciaceae	Fo	+	+	+	+	+	+
324	<i>Phaeophyscia nepalensis</i> (Poelt) D.D. Awasthi	Physciaceae	Fo	-	+	-	-	-	-
325	<i>Phaeophyscia orbicularis</i> (Neck.) Moberg	Physciaceae	Fo	-	+	-	-	-	-
326	<i>Phaeophyscia primaria</i> (Poelt) Trass	Physciaceae		+	+	-	-	-	-
327	<i>Phaeophyscia pyrrophora</i> (Poelt) D.D. Awasthi & M. Joshi	Physciaceae	Fo	+	+	-	-	+	-
328	<i>Phlyctis himalayensis</i> (Nyl.) D.D. Awasthi	Phlyctidaceae	Cr	+	-	-	-	-	-
329	<i>Phyllopsora buetteneri</i> (Müll. Arg.) Zahlbr.	Ramalinaceae	Sq	-	-	-	-	+	-
330	<i>Phyllopsora catervisorediata</i> G.K. Mishra, Upreti & Nayaka	Ramalinaceae	Sq	-	+	-	-	-	-
331	<i>Phyllopsora corallina</i> (Eschw.) Müll. Arg.	Ramalinaceae	Sq	-	+	+	-	+	-
332	<i>Phyllopsora corallina</i> var. <i>subglauca</i> G.K. Mishra, Upreti & Nayaka	Ramalinaceae	Sq	-	-	-	-	+	-
333	<i>Phyllopsora furfuracea</i> (Pers.) Zahlbr.	Ramalinaceae	Sq	-	+	+	-	+	-
334	<i>Phyllopsora himalayensis</i> G.K. Mishra, Upreti & Nayaka	Ramalinaceae	Sq	-	+	-	-	-	-
335	<i>Phyllopsora isidiotyla</i> (Vain.) Riddle	Ramalinaceae	Sq	-	-	-	-	+	-
336	<i>Phyllopsora parvifolia</i> (Pers.) Müll. Arg.	Ramalinaceae	Sq	-	+	+	-	+	-
337	<i>Physcia aipolia</i> (Ehrh. ex Humb.) Fűrnr.	Physciaceae	Fo	+	-	-	-	-	-
338	<i>Physcia dilatata</i> Nyl.	Physciaceae		+	+	-	+	+	-
339	<i>Physcia dimidiata</i> (Arn.) Nyl.	Physciaceae	Fo	-	-	-	-	+	-
340	<i>Physcia phaea</i> (Tuck.) J.W. Thomson	Physciaceae	Fo	-	+	-	-	+	-
341	<i>Physcia tribacoides</i> Nyl.	Physciaceae	Fo	+	-	-	-	-	-
342	<i>Physconia enteroxantha</i> (Nyl.) Poelt	Physciaceae	Fo	+	-	-	-	+	-
343	<i>Platismatia erosa</i> W.L. Culb. & C.F. Culb.	Parmeliaceae	Fo	-	+	-	-	-	-
344	<i>Platygramme wattiana</i> (Müll. Arg.) V. Tewari & Upreti	Graphidaceae	Cr	-	-	-	-	+	-
345	<i>Porina subhibernica</i> Upreti	Porinaceae	Cr	-	-	-	-	+	-
346	<i>Porpidia albocoerulescens</i> (Wulfen) Hertel & Knoph	Lecideaceae	Cr	+	+	-	-	+	-
347	<i>Porpidia crustulata</i> (Ach.) Hertel & Schwab in Hertel	Lecideaceae	Cr	-	+	-	-	-	-
348	<i>Porpidia macrocarpa</i> (DC.) Hertel & Knoph in Hertel	Lecideaceae	Cr	-	+	-	-	+	-
349	<i>Punctelia borreri</i> (Sm.) Krog	Parmeliaceae	Fo	+	-	+	-	+	-
350	<i>Punctelia neutralis</i> (Hale) Krog	Parmeliaceae	Fo	-	-	+	-	-	-
351	<i>Punctelia rudecta</i> (Ach.) Krog	Parmeliaceae	Fo	+	+	+	+	+	-
352	<i>Punctelia subrudecta</i> (Nyl.) Krog	Parmeliaceae	Fo	+	-	+	+	+	-
353	<i>Pyrenula albella</i> Müll. Arg.	Pyrenulaceae	Cr	-	+	-	-	-	-
354	<i>Pyrenula anamalaiensis</i> (Upreti & A. Singh) Upreti	Pyrenulaceae	Cr	-	+	-	-	-	-
355	<i>Pyrenula astroidea</i> (Fée) R.C. Harris	Pyrenulaceae	Cr	-	-	-	+	+	-
356	<i>Pyrenula glabrescens</i> Vain.	Pyrenulaceae	Cr	-	+	-	-	-	-
357	<i>Pyrenula globifera</i> (Eschw.) Aptroot	Pyrenulaceae	Cr	-	+	-	-	-	-
358	<i>Pyrenula himalayana</i> Upreti	Pyrenulaceae	Cr	-	+	-	-	+	-
359	<i>Pyrenula immisa</i> (Stirt.) Zahlbr.	Pyrenulaceae	Cr	-	+	-	-	-	-
360	<i>Pyrenula interducta</i> (Nyl.) Zahlbr.	Pyrenulaceae	Cr	+	+	+	+	+	-
361	<i>Pyrenula leucostoma</i> Ach.	Pyrenulaceae	Cr	-	-	+	-	-	-
362	<i>Pyrenula pinguis</i> Fée	Pyrenulaceae	Cr	-	+	-	-	+	-
363	<i>Pyrenula pyrenuloides</i> (Mont.) R.C. Harris	Pyrenulaceae	Cr	-	+	-	-	-	-
364	<i>Pyrenula quassiaecola</i> Fée	Pyrenulaceae	Cr	-	+	-	-	+	-

365	<i>Pyrenula submastophora</i> Ajay Singh & Upreti	Pyrenulaceae	Cr	-	-	+	-	-	-
366	<i>Pyrenula subochraceoflavens</i> Upreti	Pyrenulaceae	Cr	-	-	+	-	-	-
367	<i>Pyrenula subumbilicata</i> (C. Knight) Aptroot	Pyrenulaceae	Cr	-	+	+	-	+	-
368	<i>Pyxine berteriana</i> (Fée) Imshaug	Physciaceae	Fo	+	-	-	+	+	-
369	<i>Pyxine berteriana</i> var. <i>himalaica</i> D.D. Awasthi	Physciaceae	Fo	+	-	-	+	-	-
370	<i>Pyxine cocoes</i> (Sw.) Nyl.	Physciaceae	Fo	-	-	+	-	+	+
371	<i>Pyxine himalayensis</i> D.D. Awasthi	Physciaceae	Fo	-	+	+	-	+	-
372	<i>Pyxine meissnerina</i> Nyl.	Physciaceae	Fo	-	-	+	-	+	-
373	<i>Pyxine minuta</i> Vain.	Physciaceae	Fo	-	+	-	-	+	-
374	<i>Pyxine petricola</i> Nyl. in Cromb.	Physciaceae	Fo	-	-	-	-	+	-
375	<i>Pyxine philippina</i> Vain.	Physciaceae	Fo	-	+	-	-	+	-
376	<i>Pyxine reticulata</i> (Vain.) Vain.	Physciaceae	Fo	-	-	-	-	-	+
377	<i>Pyxine sorediata</i> (Ach.) Mont.	Physciaceae	Fo	+	+	+	-	+	+
378	<i>Pyxine subcinerea</i> Stirt.	Physciaceae	Fo	-	+	-	+	+	-
379	<i>Ramalina celastri</i> (Spreng.) Krog & Swinscow	Ramalinaceae	Fr	-	+	-	-	-	-
380	<i>Ramalina conduplicans</i> Vain.	Ramalinaceae	Fr	+	+	+	+	+	-
381	<i>Ramalina hossei</i> Vain.	Ramalinaceae	Fr	-	-	+	+	+	-
382	<i>Ramalina roesleri</i> (Hochst.) Hue	Ramalinaceae	Fr	-	+	+	+	+	-
383	<i>Ramalina sinensis</i> Jatta	Ramalinaceae	Fr	+	+	+	+	+	-
384	<i>Ramboldia russula</i> (Ach.) Kalb & al.	Lecanoraceae	Cr	-	-	+	-	-	-
385	<i>Rinodina conradii</i> Körb.	Physciaceae	Cr	-	+	-	-	-	-
386	<i>Rinodina oxydata</i> (A. Massal.) A. Massal.	Physciaceae	Cr	-	-	-	+	-	-
387	<i>Rinodina sophodes</i> (Ach.) A. Massal.	Physciaceae	Cr	-	+	+	-	+	-
388	<i>Rinodina straussii</i> J. Steiner	Physciaceae	Cr	-	-	-	-	+	-
389	<i>Sphinctrina tubaeformis</i> A. Massal.	Sphinctrinaceae	Cr	-	+	-	-	-	-
390	<i>Sticta damaecornis</i> (Sw.) Ach.	Lobariaceae	Fo	-	+	-	-	-	-
391	<i>Sticta henryana</i> Müll. Arg.	Lobariaceae	Fo	+	+	-	-	+	-
392	<i>Sticta indica</i> D.D. Awasthi & Upreti	Lobariaceae		-	+	-	-	+	-
393	<i>Sticta limbata</i> (Sm.) Ach.	Lobariaceae	Fo	-	-	-	-	+	-
394	<i>Sticta nylanderiana</i> Zahlbr.	Lobariaceae	Fo	-	+	-	-	+	-
395	<i>Sticta orbicularis</i> (R. Br.) Hue	Lobariaceae	Fo	-	+	-	-	-	-
396	<i>Sticta platyphylloides</i> Nyl.	Lobariaceae	Fo	-	+	-	-	+	-
397	<i>Sticta praetextata</i> (Räsänen) D.D. Awasthi	Lobariaceae	Fo	-	+	-	-	-	-
398	<i>Sticta weigelii</i> (Ach.) Vain	Lobariaceae	Fo	-	-	-	-	+	-
399	<i>Sulcaria sulcata</i> (Lév.) Bystrek	Parmeliaceae	Fr	-	+	-	-	+	-
400	<i>Sulcaria virens</i> (Taylor) Bystrek	Parmeliaceae	Fr	-	-	-	-	+	-
401	<i>Tephromela atra</i> (Huds.) Hafellner	Mycoblastaceae	Cr	-	+	-	-	+	-
402	<i>Tephromela khatiensis</i> (Räsänen) Lumbsch	Mycoblastaceae	Cr	+	+	+	-	+	-
403	<i>Thelidiopsis mangiferae</i> Räsänen	Verrucariaceae		-	-	+	-	-	-
404	<i>Trypethelium eluteriae</i> Spreng.	Trypetheliaceae	Cr	-	-	-	+	-	-
405	<i>Trypethelium endosulphureum</i> Makhija & Patw.	Trypetheliaceae	Cr	-	+	-	-	-	-
406	<i>Tuckneraria laureri</i> (Kremp.) Randle & A. Thell	Parmeliaceae	Fr	-	+	-	-	-	-
407	<i>Tylophoron protrudens</i> Nyl.	Lecanorales	Cr	-	+	-	-	+	-

408	<i>Usnea aciculifera</i> Vain.	Parmeliaceae	Fo	+	-	+	-	+	-
409	<i>Usnea baileyi</i> (Stirt.) Zahlbr.	Parmeliaceae	Fr	-	+	+	-	-	-
410	<i>Usnea compressa</i> Taylor in Hook.f.	Parmeliaceae	Fr	+	+	-	-	-	-
411	<i>Usnea dendritica</i> Stirt.	Parmeliaceae	Fr	-	+	-	-	-	-
412	<i>Usnea eumitrioides</i> Motyka	Parmeliaceae	Fr	+	+	+	+	+	-
413	<i>Usnea fragilis</i> Stirt.	Parmeliaceae	Fr	+	-	-	-	-	-
414	<i>Usnea himalayana</i> C. Bab.	Parmeliaceae		-	-	-	-	+	-
415	<i>Usnea longissima</i> Ach.	Parmeliaceae	Fr	+	+	-	-	+	-
416	<i>Usnea nepalensis</i> D.D. Awasthi	Parmeliaceae	Fr	-	+	-	-	-	-
417	<i>Usnea orientalis</i> Motyka	Parmeliaceae	Fr	+	+	-	+	+	-
418	<i>Usnea pangiana</i> Stirt.	Parmeliaceae	Fr	-	+	-	-	-	-
419	<i>Usnea pectinata</i> Taylor	Parmeliaceae	Fr	-	-	-	-	+	-
420	<i>Usnea perplexans</i> Stirt.	Parmeliaceae	Fr	-	+	-	-	-	-
421	<i>Usnea pseudosinensis</i> Asahina	Parmeliaceae	Fr	-	-	+	-	+	-
422	<i>Usnea robusta</i> Stirt.	Parmeliaceae	Fr	-	+	-	-	-	-
423	<i>Usnea rubicunda</i> Stirt.	Parmeliaceae	Fr	+	-	-	-	+	-
424	<i>Usnea sordida</i> Motyka	Parmeliaceae	Fr	-	+	-	+	-	-
425	<i>Usnea spinosula</i> Stirt.	Parmeliaceae	Fr	-	-	-	-	+	-
426	<i>Usnea splendens</i> Stirt.	Parmeliaceae	Fr	+	+	+	-	-	-
427	<i>Usnea subfloridana</i> Stirt.	Parmeliaceae	Fr	+	+	-	+	-	-
428	<i>Usnea thomsonii</i> Strit.	Parmeliaceae	Fr	-	+	-	+	-	-
429	<i>Usnea undulata</i> Stirt.	Parmeliaceae	Fr	+	+	+	-	+	-

**Abbreviations:** Sub. - Substrate, + Present, - Absent, F-, Foliose, Fr-Fruticose, Cr-Crustose, Sq- Squamulose, Di- Dimorphic

**Nainital district** - The Nainital district represented by the occurrence of 92 species of epiphytic lichens. The members of lichen family Parmeliaceae with 26 species under 6 genera followed by Physciaceae with 6 genera and 18 species exhibit their dominance in the area. The epiphytic lichens grow luxuriantly on *Quercus* and other coniferous trees of *Cedrus deodara* and *Abies*. Among the different tree *Quercus semecarpifolia* bears the maximum diversity of lichens.

**Pithoragarh district** - Pithoragarh district is represented by the occurrences of 246 bark inhabiting lichens species. The lichen family Parmeliaceae dominates the district with 16 genera followed by Physciaceae with 9 genera. Among the different phorophyte the *Quercus* trees bear the maximum diversity of lichens. The forest of *Quercus semecarpifolia* between altitudes of 2500-3000m are preferred by a number of lichen species while *Q. leucotrichophora* in lower temperate areas (1500-2000m) also provide excellent substratum for many taxa of lichens to colonize. *Alnus nepalensis* a smooth barked tree in temperate areas also provide suitable habitat for colonization of Pyrenocarpous and Graphidaceous lichens 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. The *Rhododendron campanulatum* trees in higher temperate and bushy *Rhododendron* species in alpine regions also provide suitable substrate for many lichens taxa to colonize. Mostly the species of *Opegrapha*, *Pertusria* 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.

**Udham Singh Nagar district** - Udham Singh Nagar district is represented by the occurrences of 28 species. The Physciaceae is the dominant family in the study area represented by 6 species belonging to 4 genera. The lichen genera *Bacidia* exhibits its dominance as represented by 4 species followed by *Pyxine* and *Parmotrema* with 3 species each. *Caloplaca bassiae* (Willd. ex Ach.) Zahlbr., *Dirinaria appalanata* (Fée) D. Awasthi and *Pyxine cocoes* (Swartz) Nyl., are the common lichen species of the district. Among the different phorophytes in all three localities of the district,

*Mallotus philippensis* exhibits maximum diversity of lichens represented by 13 species. Lichens prefer *Shorea robusta* trees to grow luxuriantly on trunk at base and up to chest height and above branches and twig.

Out of the six districts of Kumaun the Pithoragarh district exhibit the maximum diversity of epiphytic lichens because of varied altitudinal variations and the presence of diverse porophytes that provides a wide range of substratum to different lichen communities to colonize. Bageshwar district also exhibit rich diversity of lichens as the district has diverse altitudinal gradients, rich diversity of porophytes together with thick undisturbed forest areas. The forest area in Almora, Champawat, Nainital and Udham Singh Nagar districts experience tremendous pressure of human activities. Local population is dependent on the forest resources for their daily need, this dependence induce some activities such as lopping and pruning of twigs, bark wood for fodder and kitchen fuel. Besides these activities, the local population is also indulged in collection of medicinal herbs and shrubs along with lichens which are sold to big markets in the foothill areas of Kumaun Himalaya. The agriculture practise, urbanization, construction of roads and other anthropogenic activities leads to the destruction of forest in and around village and other human settlements. The thinned out forest do not support many lichen taxa to colonize thus resulted in the loss of lichen diversity. In alpine region, *Rhododendron* and shrubs destroyed by tourists for bonfires and other activities also cause damage to number of lichen species. The grazing of sheep and goat in alpine meadow destroy many soil lichens in alpine areas.

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