North West region of Nanda Devi Biosphere Reserves, Garhwal Himalaya with Unexplored Lichen Wealth and its Medicinal Lichen Distribution in Different Aspect

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Abstract: The present work describes lichen diversity in Nanda Devi Biosphere Reserves, Chamoli district, Garhwal Himalaya, Uttarakhand, in North West region of India. A total of 206 species belonging to 78 genera and 29 families were enumerated during the present study. Parmeliaceae family dominates with 72 species and 24 genera. The foliose lichen are represented by maximum growth of lichen families, namely Parmeliaceae > Physciaceae > Collemataceae by the no. of species 56 > 24 > 8 and maximum growth of crustose lichen Teloschistaceae > Lecanoraceae > Megasporacea by 11 > 9 > 5 and fruticose lichen Parmeliaceae > Cladoniaceae > Ramaliaceae by 16 > 9 > 3 respectively. Malari area has occurrence 67 species belonging to 45 genera of 18 families and the members of Parmeliaceae have 34 species and 15 genera While Jumma area has 62 species 31 genera. The Valley of Flowers represents 59 species belonging to 39 genera of lichens of 21 families. Parmeliaceae dominances with 19 species and 11 genera. Out of the 72 species of Parmeliceae lichens, 33 species have medicinal properties. Out of these species only 14 species have Traditional medicine; 24 with antimicrobial activity; 13 with Anticancer/Cytotoxicity activity; 7 have antioxidant/tyrosinase, 2 have Immuno modulating and 1with Antiinflamatory from the different localities. Thus present baseline information on lichen species in these localities will be useful for biomonitoring, bioprospection, conservation policy, formulation and pharmacological studies, keeping in view of global warming and climate change.

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Key Words: Lichen, Nanda Devi Biosphere Reserve, Western Himalaya, Uttarakhand, India.

Introduction

Nanda Devi Biosphere Reserve (NDBR) was established in 1988 under the UNESCO's Man and Biosphere (MAB) programme. Subsequently, in 1992, the NDBR was recognized as a "World Heritage Site" (Mohan and Bhaduria, 1996). It is one of least disturbed protected areas of world (Anonymous, 1987 and Gupta, 2002). The NDBR was named after the principal peak of the region i.e. Nanda Devi (7817 m); the bliss giving goddess. It is also the second highest peak of India. It has been an internationally recognized tourism center for naturalists, adventure tourists, scientists etc. for its exceptionally unique natural landscapes, endemic biodiversity (flora and fauna), high degree of inaccessibility and rich indigenous culture etc. (Banerjee, 2001 and 2003; Singh and Mal, 2009 and Srivastava, 1999a and b). The Nanda Devi National Biosphere Reserve spreads over three districts Chamoli in Garhwal and Pithoragarh and Bageshwer in near the Tibetan border in the Kumaun (western) Himalayan region of Uttrakhand, India. The Nanda Devi Biosphere Reserve lies between 79º 41´ 29" East and 30º 06´ 13 to 80º 12´ 51'' North over an area covers 5860.69 km^2 area with core zone (712.12 km^2 and transition zone 546.34 km^2. The Valley of Flowers is located in the Paspawati Valley 23 km North-Northwest of Nanda Devi Biosphere Reserve. "Nanda Devi is India's second highest mountain" (McGinley). The Reserve consists of a central core zone (624.62 km^2) surrounded by buffer zone (161212 km^2). Altitude varies from 1900 to 7817 m asl. From the geomorphological point of view, the Reserve covers the whole Rishi Ganga catchment (a tributary of Dauli Ganga) encircled by a number of high Himalayan peaks including India's second highest peak Nanda Devi (Figure 1). There are 17 villages, 10 in district Chamoli and 7 in district Bageswar and Pithoragarh) in the buffer zone spread over an altitude of 1900 to 3600 m asl.

The Lata village in Chamoli district, entry of biosphere reserve having 23 km distance from Joshimath. The temperatures range from 10° - 23° C from April to June, and from 7° - 22° C from July to October. Nanda Devi Biosphere Reserve forest shows altitudinal variations, viz. sub-tropical, tropical, temperate and alpine regions. The mixed oak and coniferous forests in temperate and subalpine areas form the major forest vegetation. The tree vegetation mainly comprises of *Pinus wallichiana, Pinus roxbughaii,* together with coniferous trees of *Abies pindrow* and *Taxus baccata.* The varied topography and climate of the area provide suitable condition for

growth of different plant groups including lichens. The climate of the area is moist temperate and with short cool summer and long severe winters.

The present study was carried out in enumeration of lichen diversity, from only in Chamoli district, region of Nanda Devi Biosphere Reserve, Uttarakhand. A number of taxonomic studies pertaining to the lichens of the Himalayas are available, however information on Kumaun region of Nanda Devi Biosphere Reserve by Upreti and Negi 1995, 1996, Upreti, et. al. 1995, Negi et. al. 1996, Joshi *et. al.* 2007, Rawat *et. al.* 2010, Upreti & Joshi 2010. Therefore, there has very few records of lichens diversity and and no record of medicinal importance lichens of Nanda Devi Biosphere Reserve in Chamoli district, Garhwal region, So that present study deal with made to enumeration of the lichen diversity, its medicinal importance having lichens.

Materials and Methods

The Nanda Devi Biosphere Reserve forest localities between altitudes of 2000-3600m were explored and more than 600 specimens of lichens were collected. The specimens were identified in respect of their morphology, anatomy and chemistry (Awasthi 1988, 2000; Divakar & Upreti 2005, Nayaka 2004). The chemistry of all the specimens were performed by colour spot tests (K, C, Pd) followed by thin layer chromatography (TLC) by Walker and James (1980). The chromatograms were developed in solvent A (Toluene: 1-4 dioxane: acetic acid 180: 60: 8 ml). The specimens examined in the present paper are preserved in the Herbarium of National Botanical Research Institute, Lucknow (LWG).

Results and Discussion

The area has comprised of 206 species lichen belonging to 73 genera and 28 families from seventeen different localities at different altitudes enroute Joshimath to Niti in Nanda Devi Biosphere Reserve (Table1). Out of the 206 species of lichens, foliose lichens were dominating with 115 species, where as crustose, fruticose and lignicolus lichens were represented by 60, 31 and 5 respectively. There was dominance of 114 corticolous lichen species in all the seventeen localities. Saxicolous and terricolous lichen repenting least number of lichen with 89 and 36 species respectively. In the studied area lichen family Parmeliaceae is the most common with 20 species and 12 genera. Within the family Physciaceae is most common genus with 10 species. *Evernia mesomorpha* Nyl. and *Flavoparmelia caperata* (L.) Hale these two lichens species are commonly present in maximum twelve localities out of seventeen localities. One of the most common species of the area *Heterodermia diademata* (Taylor) D. D. Awasthi species was found in all type of substratum as rock, bark, leaves and soil. Among the localities Malari exhibited highest number of lichens with 67 species followed by Jumma with 62 species. Four localities Rini, 2 km before Belta, 1 km before Belta and Srenikhal exhibited least number of lichen with 13 and 14 species each in the later three localities.

Out of 206 species of lichens from Nanda Devi Biosphere Reserve, 35 species of lichen have medicinal properties. Present medicinal property data analyzed on the base of literature. This data analyses first time report and analysis is base line pattern for medicinal lichens distribution and enumeration (Table: 2). Out of the 33 species 29 species have known antimicrobial activity followed by 17 each of traditional and anticancer/ cytoxicity. Single species of lichen *Dolichousnea longissima* (Ach.) Articus uses as Traditional medicine, Antimicrobial activity, Anticancer/Cytotoxicity, Antioxidant/ tyrosinase inhibition, Antiinflamatory purposes in India. *Thamnolia vermicularis* (Swattz) Schaer. used as Traditional medicine, Antimicrobial acticity, Anticancer/Cytotoxicity, Antioxidant/ tyrosinase inhibition (Table 1 Fig.A).

1. Traditional medicine Lichen have been appreciated in traditional medicine. In folklore, During the Middle Ages lichen figured prominently in the herbals used by medicinal practitioners (Hale 1983). Folk use of *Thamnolia vermicularis* (Swattz) Schaer. Hads has recorded from Lata village of Nanda Devi Biosphere Reserve (Upreti and Negi 1996). These common lichen *Cladonia pyxidata* (L.) Hoffm., *Lobaria retigera* (Bory) Trevisan, *Dolichousnea longissima* (Ach.) Articus, *Evernia prunastri* (L.) Ach., *Everniastrum nepalense* (Taylor) Hale ex Sipaman, *Flavoparmelia caperata* (L.) Hale, *Parmelia sulcata* Taylor, *Parmotrema reticulata* (Taylor) M. Choisy, *Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale, *Peltigera canina* (L.) Willd., *Peltigera membranacea* (Ach.) Nyl., *Heterodermia diademata* (Taylor) D. D. Awasthi, *Xanthoria parietina* (L.) Th. Fr. Beltr. (Fig.A) lichens are used as medicine and have been used in the different pharmacopoeias of the world.

2. Antimicrobial activity: These common lichens of study area *Cladonia fimbriata* (L.) Fr., *Cladonia furcata* (Huds.) Schrad., *Thamnolia vermicularis* (Swattz) Schaer., and microlichen *Lecanora muralis* (Schreb.) Rabenh., *Dolichousnea longissima* (Ach.) Articus, *Evernia prunastri* (L.) Ach., *Flavoparmelia caperata* (L.) Hale, *Parmelia squarrosa* Hale, *Parmelia sulcata* Taylor, *Parmotrema praesorediosum* (Nyl.) Hale, *Parmotrema reticulata* (Taylor) M. Choisy, *Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale, *Xanthoparmelia pulla* Ach., *Usnea subflorida* Stirton, *Peltigera canina* (L.) Willd., *Peltigera membranacea* (Ach.) Nyl., *Peltigera praetextata*

(Flörke ex Sommerf.) Vain., *Heterodermia leucomela* (L.) Poelt, *Ramalina conduplicans* Vainio, *Ramalina sinensis* Jatta, *Stereocaulon foliolosum* Nyl., *Xanthoria parietina* (L.) Th. Fr. Beltr., *Diploschistes scruposus* (Schreb.) Norman, *Dermatocarpon miniatum* (L.) Mann. extract showed antimicrobial activity against *Bacillus subtilis, Staphyrococcus aureus* (Yamamoto et al. 1998).

3. Anticancer/ Cytotoxicity: *Parmotrema tinctorium* (Nyl.) Hale, has not only most common lichen species of Nanda Devi Biosphere Reserve even it is also common from Garhwal Himalaya. These lichens having anticancerous and cytotoxicity property *Cladonia fimbriata* (L.) Fr., *Cladonia furcata* (Huds.) Schrad., *Leptogium cyanescens* (Pers.) Körb., *Thamnolia vermicularis* (Swattz) Schaer., *Dolichousnea longissima* (Ach.) Articus, *Everniastrum nepalense* (Taylor) Hale ex Sipaman, *Parmotrema praesorediosum* (Nyl.) Hale, *Xanthoparmelia pulla* Ach., *Peltigera membranacea* (Ach.) Nyl., *Xanthoria elegans* (Link.) Th. Fr., *Xanthoria fallex* (Hepp ex. Arnold) Arnold, *Xanthoria parietina* (L.) Th. Fr. Beltr. (Fig.A).

4. Antioxidant/Tyrosinase inhibition: *Thamnolia vermicularis* (Swattz) Schaer., *Dolichousnea longissima* (Ach.) Articus, *Evernia prunastri* (L.) Ach., *Parmotrema tinctorium* (Nyl.) Hale, *Peltigera rufescens* (Weiss) Humb., *Xanthoria fallex* (Hepp ex. Arnold) Arnold, *Dermatocarpon miniatum* (L.) Mann.

5. Antiinflamatory: *Dolichousnea longissima* (Ach.) Articus only single Antiinflamatory fruticose lichen from study area. This species has growing luxuriantly and having usnic acid medicinal important substance (Fig. A).

6. Immunomodulating: *Parmotrema tinctorium* (Nyl.) Hale, *Peltigera canina* (L.) Willd. *Dolichousnea longissima* (Ach.) Articus, these three mcrolichen are very common from localities. *Dolichousnea longissima* (Ach.) Articus, uses as Traditional medicine, antimicrobial activitiy, Anticancer/Cytotoxicity activity, antioxidant/tyrosinase, and Antiinflamatory antmicrobial activity and traditional medicine. It is the common combination of medicinal species (Fig.B).

Table 1: Total lichen taxa of Nanda Devi Biospere Reseve, Chamoli district, Uttarakhand, India

	Lichen species	Habitat	Habit	Valley of F lowers	Joshimath	Jogidhara	Rini	Lata	Jumma	Malari	2km before Belta	1 km before Belta	Belta	Kothidhar	Kanukdhar	Londcha Thaili	Lata kharkh	Srenikhal	10 Km. before Gamsali	10 km. before Niti	Medicinally important
1	**Acarosporaceae**																				
1	*Acarospora saxicola* Fink ex Hedrick	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	*Acarospora smaragdula* (Wahlenb.) A. Massal.	S	cr	+	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
3	*Sarcogyne privigna* (Ach.) A. Massal.	S	cr	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
2	**Biotoraceae**																				
4	*Biatora sp.*	C	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	**Caliciaceae**																				
5	*Amandinea punctata* (Hoffm.) Coppins & Scheid.	S	cr	-	-	-	-	-	-	+	-	-	+	+	+	-	+	+	+	-	-
6	*Buellia placodiomorpha* Vainio	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
7	*Calicium robustellum* Nyl.	C	cr	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
8	*Cyphelium sessile* (Pers.) Trevisan	C	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
9	*Pyxine berteriana* (Fée) Imshaug	C	fo	-		-	+	+	-	-	-	-	+	+	-	-	-	-	-	-	-
10	*Pyxine himalayensis* D. D. Awasthi	C S	fo	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
11	*Pyxine subcinerea* Stirton	C	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
4	**Candelariaceae**																				
12	*Candelaria concolor* (Dicks.) B. Stein	C	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

13	*Candelariella aurella* (Hoffm.) Zahlbr	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
14	*Candelariella reflexa* (Nyl.) Lettau	C	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	*Candelariella vitellina* (Ehrh.) Müll. Arg.	C	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
16	*Candelariella xanthostigma* (Pers.) Lettau	C	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
5	**Chrysothricaceae**																				
17	*Chrysothrix candelaris* (L.) J. R. Laundon	C S	cr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
6	**Cladoniaceae**																				
18	*Cladonia awasthiana* Ahti & Upreti	C	fr	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
19	*Cladonia cartilaginea* Müll. Arg.	L	fr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
20	*Cladonia coniocreae* (Flörke) Spreng.	C	fr	-	-	-	-	-	+	+	-	-	-	-	-	-	+	-	-	-	-
21	*Cladonia fimbriata* (L.) Fr.	C	fr	-	-	-	-	-	-	+	-	-	+		-	+	-	-	+	-	2, 3
22	*Cladonia fruiculosa* Kremp.	S C	fr	-	-	-	-	-	-	-	-		+	+	-	-	-	-	-	-	-
23	*Cladonia furcata* (Huds.) Schrad.	S T	fr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	2, 3
24	*Cladonia ochrochlora* Flörke	C	fr	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-	-	-
25	*Cladonia pocillum* (Ach.) O. J. Rich.	T	fr	-	-	-	-	-	-	-	-	-	-	-	-	-	+		-	-	-
26	*Cladonia pyxidata* (L.) Hoffm.	T	fr	+	-	-	-	-	-	+	-	-	+	+	+		+	+	+	-	1
7	**Coiniocybaceae**																				
27	*Chaenotheca furfuraceae* (L.) Tibell.	C	cr	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
8	**Collemataceae**										-										
28	*Collema subflaccidum* Degel.	C	fo	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-
29	*Collema subnigrescens* Degel.	S	fo	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
30	*Leptogium austroamericanum* (Malme) Dodge	C	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	*Leptogium burnetiae* C.W. Dodge	C T L	fo	+	-	-	-	+	-	-	-	+	+	+	+	-	+	-	+	-	-
32	*Leptogium cyanescens* (Rabenh.) Körb.	S	fo	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	3
33	*Leptogium furfuraceum* (Harm.) Sierk	S	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	*Leptogium pulchellum* (Ach.) Nyl.	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
35	*Leptogium saturninum* (Dickson) Nyl.	T S	fo	+	+		-	+	+	-	+	-	-	-	-	-	-	-	-	-	-
9	**Graphidaceae**																				
36	*Graphis lineola* Ach.	C	cr	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
37	*Graphis subglauconigra* Nagarkar & Patw.	C	cr	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
38	*Phaeographis dendritica* (Ach.) Müll. Arg.	C	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	**Icmadophilaceae**																				
39	*Thamnolia vermicularis* (Swattz) Schaer.	T	fr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1, 2, 3, 4
11	**Lecanoraceae**																				
40	*Lecanora alba* Lumbsch	C	cr	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-

41	*Lecanora albella* (Pers.) Ach.	C S	cr	+	-	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-
42	*Lecanora albescens* (Hoffm.) Branth & Rostr.	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	*Lecanora frustulosa* (Dickson) Ach.	C	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-
44	*Lecanora leprosa* Fée	C	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
45	*Lecanora muralis* (Schreb.) Rabenh.	S	cr	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	2
46	*Lecanora wilsonii* Müll. Arg.	S	cr	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	*Lecidella alaiensis* (Vainio) Hertel	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
48	*Lecidella elaeochroma* (Ach.) Choisy	S	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
49	*Lecidella stigmatea* (Ach.) Hertel & Leuckert	S	cr	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
12	**Lecideaceae**																				
50	*Lecidea confluens* (Weber) Ach.	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
51	*Lecidea fuscoatra* (L.) Ach.	C	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
52	*Lecidea plana* (J. Lahm) Nyl.	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
13	**Lobariaceae**																				
53	*Lobaria meridionalis* Vainio	C	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	*Lobaria pindarensis* Räsänen	C T	fo	+	-	-	-	-	-	+	+	-	+	+	+	+	+	-	-	-	-
55	*Lobaria retigera* (Bory) Trevisan	C T L	fo	+	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	1
56	*Sticta praetextata* (Räs.) D. D. Awasthi	C	fo	+	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-
14	**Megasporaceae**																				
57	*Aspicilia almorensis* Räsänen	S	cr	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	-	-	-
58	*Aspicilia coronata* (A. Massal.) B. de Lesd.	S	cr	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-
59	*Aspicillia dwaliensis* Räsänen	S	cr	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	*Lobothallia alphoplaca* (Wahlenb.) Hafellner	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	
61	*Lobothallia praeradiosa* (Nyl.) Hafellener	S	cr	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
15	**Nephromataceae**																				
62	*Nephroma helveticum* (Ach.) Ach.	C T L	fo	+	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-
63	*Nephroma parile* (Ach.) Ach.	C T	fo	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
16	**Parmeliaceae**																				
64	*Allocetraria nygricascens* (Nyl.) Karnefelt & Thell	T	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
65	*Bryoria smithii* (Du Rietz) Brodo & D. Hawksw.	C	fr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
66	*Bryoria tenuis* (Dahl) Brod & D. Hawksw.	C	fr	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-
67	*Bulbothrix meizospora* (Nyl.) Hale	C	fo	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68	*Cetrelia cetrarioides* (Delise) W. L. Culb. & C. F. Culb	C	fo	+	-	-	-	+	+	+	-	+	+	+	+	+	+	-	-	-	-

69	*Cetrelia collata* (Nyl.) W. L. Culb. & C. Culb	T	fo	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-
70	*Cetrelia olivetorum* (Nyl.) W. Culb. & C. F. Culb.	C S	fo	+	-	-	-	+	-	-	+		+	-	-	-	-	-	-	-	-
71	*Dolichousnea longissima* (Ach.) Articus	C	fr	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	1, 2, 3, 4, 5
72	*Evernia mesomorpha* Nyl.	C	fr	-	-	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	-
73	*Evernia prunastri* (L.) Ach.	C	fr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	1, 2, 4
74	*Everniastrum cirrhatum* (Fr.) Hale ex Sipman	C	fo	+	-	-	-	+	-	-	+	+	+		+	+	+	-	-	+	
75	*Everniastrum nepalense* (Taylor) Hale ex Sipman	C	fo	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	1, 3
76	*Everniastrum sorocheilum* (Vainio) Hale ex Sipman	C	fo	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
77	*Flavoparmelia caperata* (L.) Hale	C S	fo	+	+	+	+	+	+	+	+	-	-	-	+	+	+	-	+	-	1, 2
78	*Flavopunctelia borrerioides* Kurok.	C	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	*Flavopunctelia flaventior* (Stirton) Hale	C	fo	-	+	-	+	+	+	+	+	-	+	-	-	-	+	-	+	-	-
80	*Flavopunctelia soredica* (Nyl.) Hale	C	fo	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-
81	*Hypogymnia tubulosa* (Schaer.) Hav.	C	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
82	*Hypotrachyna imbricatula* (Zahlbr.) Hale	C S	fo	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
83	*Hypotrachyna pluriformis* (Nyl.) Hale	S	fo	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
84	*Melanelia tominii* (Oxner) Essl.	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
85	*Melanelixia fuliginosa* (Fr.ex Duby) O. Blanco Crespo, Divakar, Essl. D. Hawksw.	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
86	*Melanelixia vilosella*(Essl.) O. Blanco Crespo, Divakar, Essl. D. Hawksw..	C	fo	-	-	-	-	-	+	+	-	-	-	+	-	-	-	-	+	+	-
87	*Myelochroa aurulenta* (Tuck.) Elix & Hale	S	fo	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-
88	*Myelochroa metarevoluta* (Asahina) Elix & Hale	T	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89	*Nephromopsis laii* (A. Thell & Randlane) Saag & A. Thell	C	fo	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
90	*Nepromopsis nephromoides* (Nyl.) Ahti & Randlane	C	fo	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
91	*Nepromopsis pallescens* (Schaer.) Y. S. Park	S C	fo	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-
92	*Parmelia meiophora* Nyl.	C	fo	-	-	-	-	-	-	+	-	-	+	+	-	-	-	-	-	-	-
93	*Parmelia squarrosa* Hale	C	fo	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	-	-	2
94	*Parmelia sulcata* Taylor	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	1, 2
95	*Parmelina tiliacea* (Hoffm.) Hale	C	fo	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-

96	*Parmotrema andinum* (Müll. Arg.) Hale	C	fo	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
97	*Parmotrema crinitum* (Ach.) M. Choisy	C	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98	*Parmotrema hababianum* (Gyeln.) Hale	C	fo	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
99	*Parmotrema nilgherrense* (Nyl.) Hale	C	fo	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
100	*Parmotrema pseudonilgherrense* (Asahina) Hale	C	fo	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
101	*Parmotrema praesorediosum* (Nyl.) Hale	S	fo	-	+		-	+	-	-	-	-	-	-	-	-	-	-	-	-	2, 3
102	*Parmotrema rampoddense* (Nyl.) Hale	C	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
103	*Parmotrema reticulata* (Taylor) M. Choisy	C S	fo	+	+	+	+	+	-	-	-	-	+	-	+	-	-	-	-	-	1, 2
104	*Parmotrema tinctorium* (Nyl.) Hale	C S	fo	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	3, 4, 6
105	*Punctelia borreri* (Sm.) Krog	C	fo	+	-	-	-	+	+	+	+	-	+	+	+	-	-	-	-	-	-
106	*Punctelia neutralis* (Hale) Krog	C	fo	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
107	*Punctelia subflava* (Taylor) Elix & J. Johnst	S	fo	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
108	*Punctelia subrudecta* (Nyl.) Krog	C T S	fo	+	+	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-
109	*Rhizoplaca chrysoleuca* (Smith) Zopf	S	fo	+	-	-		-	+	+	-	-	-	-	-	-	-	+	-	-	-
110	*Rhizoplaca peltata* (Ramond) Leuck. & Poelt.	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
111	*Tuckermanopsis chlorophylla* (Willd.) Hale	T	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
112	*Xanthoparmelia antleriformis* (Elix) Elix & Jonston	S	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
113	*Xanthoparmelia australasica* D. Galloway	S	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
114	*Xanthoparmelia bellatula* (Kurok. & Filson) Elix & Johnston	T	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
115	*Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1, 2
116	*Xanthoparmelia maxicana* (Gyeln.) Hale	S	fo	-	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
117	*Xanthoparmelia murina* (Kurok.) Elix	C	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
118	*Xanthoparmelia pseudocongensis* Hale	T	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
119	*Xanthoparmelia pulla* Ach.	C	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	2, 3
120	*Xanthoparmelia stenophylla* (Ach.) Ahti & D. Hawksw.	S	fo	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-
121	*Xanthoparmelia terricola* Hale, Nash & Elix	S	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
122	*Xanthparmelia tinctina* (Maheu & Gill.) Hale	S	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
123	*Xanthoparmelia xizangensis* (J.C. Wei) Hale	S	fo	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-

124	*Usnea eumitrioides* Mot.	S	fr	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-
125	*Usnea himalayana* G. Awasthi	C	fr	+	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-
126	*Usnea nepalensis* G. Awasthi	C	fr	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
127	*Usnea norketti* G. Awasthi	C	fr	-	-	-	-	-	+		-	-	-	-	-	-	-	-	-	-	-
128	*Usnea orientalis* Mot.	C	fr	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
129	*Usnea pectinata* Taylor	C	fr	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
130	*Usnea perplexans* Stirton	C	fr	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	+	-	-
131	*Usnea subflorida* Stirton	C	fr	+	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	2
132	*Usnea subfloridana* Stirton	C	fr	-	-	-	-	+	+	+	-	-	+	-	-	+	+	-	+		-
133	*Usnea thomsonii* Stirton	C	fr	-	-	-	-	-	-	-	-	+		-	-	-	-	-	-	-	-
134	*Usnea undulata* Stirton	C	fr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135	*Vulpicida pinastri* (Scop.) Mattsson	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-
17	**Pannariaceae**																				
136	*Fuscopannaria praetermissa* (Nyl.) P.M. Jorg	T	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
18	**Peltigeraceae**																				
137	*Peltigera canina* (L.) Willd.	T	fo	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	1, 2, 6
138	*Peltigera didactyla* (With) J. R. Laundon	T	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
139	*Peltigera membranacea* (Ach.) Nyl.	T	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	1, 2, 3
140	*Peltigera praetextata* (Flörke ex Sommerf.) Vain.	C T	fo	+	-	-	-	+	+	+	-	-	+	-	+	+	-	-	+	-	2
141	*Peltigera pindarensis* D. D. Awasthi & M. Joshi	T	fo	-	-	-	-	-	-	-	-	-	+	-	+	+	-	-	-	-	-
142	*Peltigera rufescens* (Weiss) Humb.	T	fo	-	-	-	-	+		+	-	+	-	+	-	-	-	-	+	-	4
19	**Pertusariaceae**																				
143	*Pertusaria albescens* (Huds.) Choisy & Wern. in Wern.	C	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
144	*Pertusaria himalayensis* D. D. Awasthi & Srivast.	C T	cr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
20	**Physciaceae**																				
145	*Anaptychia ciliaris* (L.) Körb.	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
146	*Anaptychia kaspica* Gyeln.	C	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
147	*Dimelaena oreina* (Ach.) Norman	S	cr	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-
148	*Diplotomma alboratrum* (Hoffm.) Flot.,	C	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
149	*Heterodermia angustiloba* (Müll. Arg.) D. D. Awasthi	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
150	*Heterodermia diademata* (Taylor) D. D. Awasthi	T S L C	fo	-	+	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	1
151	*Heterodermia firmula* (Nyl.) Trevisan	S	fo	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
152	*Heterodermia galactophylla* (Tuck.) W. Culb.	C	fo	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
153	*Heterodermia himalayensis* (D. D. Awasthi) D. D. Awasthi	C	fo	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

154	*Heterodermia hypocaesia* (Yasuda) D. D. Awasthi	C	fo	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-
155	*Heterodermia japonica* (Satô) Swinsc. & Krog	C	fo	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
156	*Heterodermia leucomela* (L.) Poelt	C T	fo	-	-	+	-	+	+	-	-	+	+	+	+	+	+	-	-	-	2
157	*Heterodermia speciosa* (Wulfen) Trevisan	S	fo	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
158	*Phaeophyscia endococcina* (Körb.) Moberg	C	fo	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-
159	*Phaeophyscia hispidula* (Ach.) Essl.	C T S	fo	+	+	+	+	+	+	+	+	-	-	-	-	+	-	+	-	-	-
160	*Phaeophyscia orbicularis* (Necker) Moberg	S	fo	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
161	*Phaeophyscia primaria* (Poelt) Trass	S	fo	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
162	*Physcia dilatata* Nyl.	C S	fo	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
163	*Physcia dubia* (Hoffm.) Lett.	C S	fo	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
164	*Physcia gomukensis* D. D. Awasthi & S. R. Singh	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
165	*Physcia leptalea* (Ach.) DC in Lamarck & Candolle	C	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
166	*Physcia stellaris* (L.) Nyl.	C	fo	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-
167	*Physcia tribacia* (Ach.) Nyl.	C	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
168	*Physconia detersa* (Nyl.) Nyl.	C S	fo	-	-	-	-	-	+	-	-	-	+	+	+	+	-	-	+	-	-
169	*Physconia grisea* (Lam.) Nyl.	S T	fo	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-
170	*Physconia isidigera* (Zahlbr.) Essl.	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
21	**Porpidiaceae**																				-
171	*Porpidia albocaerulescens* (Wulfen) Hertel & Knoph	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
172	*Porpidia macrocarpa* (DC.) Hertel & A. J. Schwab	S	cr	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-
22	**Ramaliaceae**																				
173	*Bacidia arnoldiana* Körb	C	cr	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
174	*Ramalina conduplicans* Vainio	C	fr	-	-	-	-	+	+	-	-	-	+	-	-	+	-	-	-	-	2
175	*Ramalina hossie* Vain.	C	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
176	*Ramalina roesleri* (Hochst ex Schaer.) Hue	C	fr	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
177	*Ramalina sinensis* Jatta	C	fr	+	-	-	+	+	+	+	+	-	+	+	-	-	-	-	+	-	2
23	**Rhizocarpaceae**																				
178	*Rhizocarpon geographicum* (L.) DC.	S	cr	+	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	-
24	**Stereocaulaceae**																				
179	*Lepraria caesioalba* (B. de Lesd.) J. R. Laundon	T	cr	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-
180	*Lepraria lobificans* Nyl.	T S	cr	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
181	*Lepraria neglecta* Nyl.	C	cr	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

182	*Stereocaulon foliolosum* Nyl.	ST	fr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
25	**Teloschistaceae**																				
183	*Caloplaca arenaria* (Pers.) Mull. Arg.	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
184	*Caloplaca cerinelloides* (Erichs.) Poelt	S	cr	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
185	*Caloplaca flavocitrina* (Nyl.) H. Olivier	S	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
186	*Caloplaca flavovirescens* (Wulf.) Dalla Torre & Smith	S	cr	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
187	*Caloplca holocarpa* (Hoffm.) A. E. Wade	S	cr	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-
188	*Caloplaca lithophila* H. Magn.	S	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
189	*Caloplaca obliterans* (Nyl.) Blomb. & Forss.	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
190	*Caloplaca ochroplaca* Poelt & Hinter.	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
191	*Caloplaca pachychella* Poelt & Hinteregger	S	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
192	*Caloplaca phlogina* (Ach.) Flag.	S	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
193	*Caloplaca saxicola* (Hoffm.) Nordin	S	cr	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-
194	*Xanthoria elegans* (Link.) Th. Fr.	S	fo	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	3
195	*Xanthoria fallex* (Hepp ex. Arnold) Arnold	C	fo	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	3, 4
196	*Xanthoria fulva* (Hoffm.) Poelt & Petut.	S	fo	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-
197	*Xanthoria parietina* (L.) Th. Fr. Beltr.	C	fo	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1, 2, 3
198	*Xanthoria sorediata* (Vain.) S. Kondratyuk & Karuefelt	S	fo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
199	*Xanthoria ulophyllodes* Räsänen	C	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	**Thelotrematacеae**																				
200	*Diploschistes actinostomus* (Pers in ach) Zahlbr.	S	cr	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
201	*Diploschistes scruposus* (Schreb.) Norman	T	cr	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	2
27	**Umbilicariaceae**																				
202	*Lasallia pertusa* (Rass.) Llano	S	fo	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-
203	*Umbilicaria indica* Frey	S	fo	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	**Verrucariaceae**																				
204	*Dermatocarpon miniatum* (L.) Mann.	S	fo	+	+	+	+	-	+	+	-	+	+	-	-	-	-	-	-	-	2, 4
205	*Dermatocarpon vellereum* Zschacke	S	fo	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-
206	*Endocarpon subrosettum*A. Singh & Upreti	T	cr	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	Total lichen species			59	20	22	13	48	62	67	14	14	35	28	18	22	21	14	22	23	33
	C=Corticolous (growing on bark), T=Terricolous (growing on soil), S=Saxocolous (growing on rock), fr=Fruticose, fo=Foliose, cr=Crustose, 1= Traditional medicine, 2=Antimicrobial acticity, 3=Anticancer/Cytotoxicity, 4=Antioxidant/ tyrosinase ihibition, 5=Antiinflamatory, 6=Immunomodulating																				
	fr=30, f=116 cr=61 s=89 c=115 t=36																				

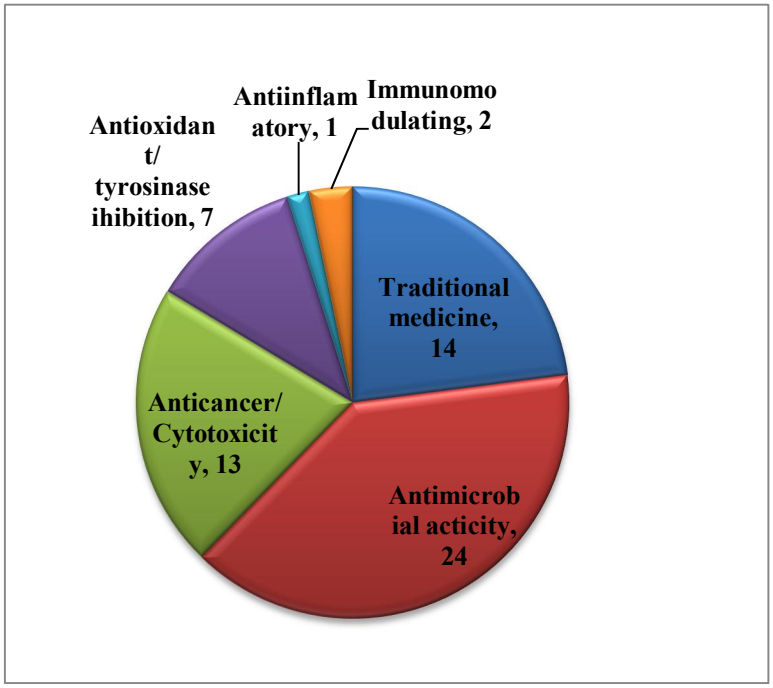

Fig. A: Total medicinal lichen species which is present in NDBR, these lichen is using in India in different perposes

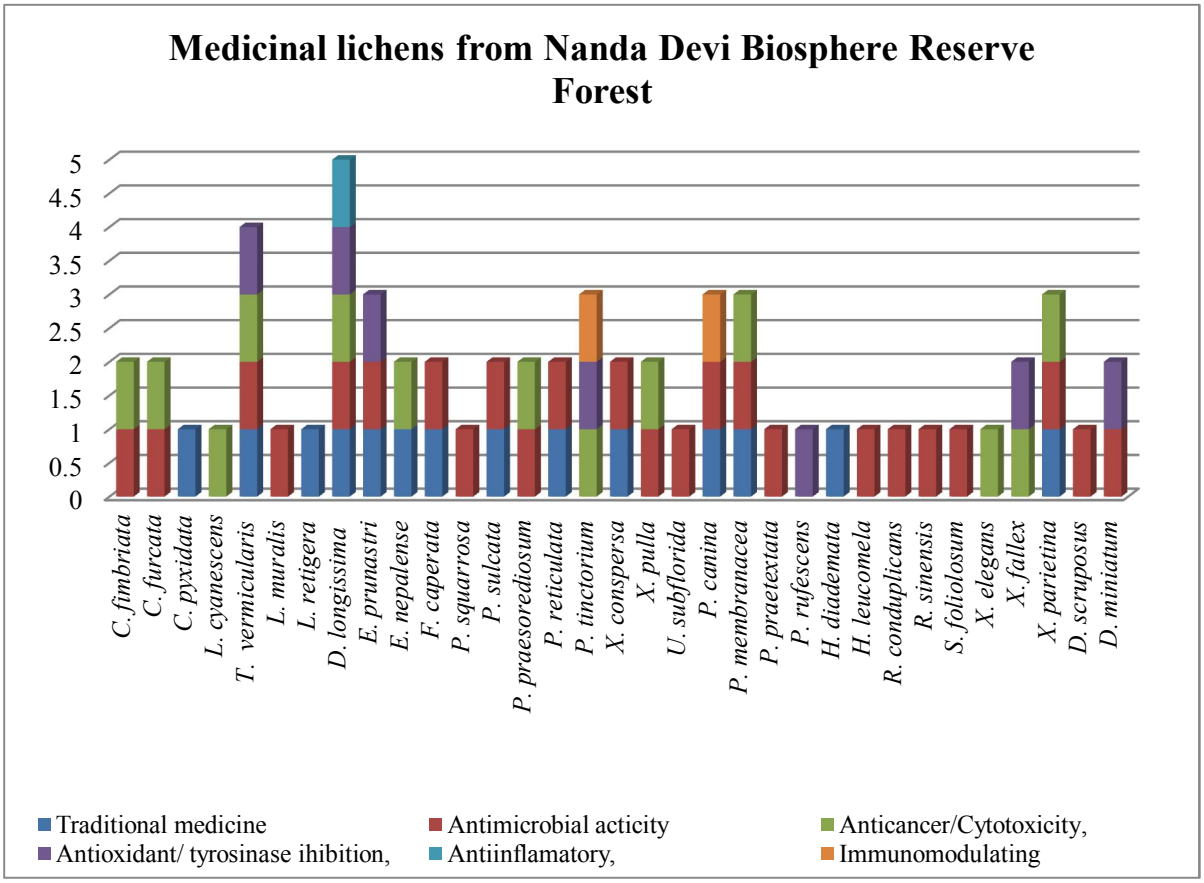

Fig. B: Medicinal importantnt lichen species, in India these lichen species are using in different medicinal aspect

Conclusion

From the present study it is evident that Nanda Devi Biosphere Reserve is dominated by foliose lichen which show moist and healthy habitat in a forest succession. It is interesting to note that a Parmeliaceae group of lichen was dominant in study areas. Most of genus in Parmeliaceae family having economically importance in India. It is good remarks foliose are growing luxuriantly in the Nanda Devi Biosphere Reserve forest. Out of 206 species, 33 medicinally important species are present in study area, which further apply for applied sciences. This information will be definitely helpful for further medicinal and pharmacopeia study in India. Ecologically lichens are probably the most important primary colonizers and stabilizers in an area. Lichens together with other cryptogams plays important role in holding the soil in place, prevent soil erosion, stabilishing the surface and building up humus to form more fertile soil.

The moist forest of the Nanda Devi Biosphere Reserve is especially rich in lichens. The vegetation and altitudinal range make this district rich in lichen diversity. The tall tree trunk and canopy of the forests contain more number of species because they are the best site for the lichen growth. The large number of medicinal and economic value of these lichens, which is using in world level but their local people using only one species only *Thamnolia vermicularis.* Present study will be help to local people for awareness, knowledge and medicinal prospect through this paper. Being a famous for tourist places in the Himalayas, the Hemkund Sahib, Niti Pass, Badrinath, Valley of Flowers and Nanda Devi Biosphere Reserve receives a large number of tourist activities throughout the year. The area in and around Rini, 2 km before Belta, 1 km before Belta, and Srenikhal exhibit poor diversity of lichens due to heavy anthropogenic pressure. The present study clearly indicates that the lichen poor sites of the forest probably may be the result of the heavy tourist pressure in the area. It has been observed in the present study that in many other sites of the forest the lichen population is decreasing fast. However, still a good number of lichen species are growing luxuriantly in some difficult and inaccessible terrain. The present inventory of the lichens can be used as base line information for future monitoring of lichen biodiversity and other environmental studies in the different localities. The present work of lichen enumeration will be helpful for future as commercial, economical, medicinal, traditional value and for climate changes of the localities. This baseline information on lichen species in the localities will be useful for conservation policy formulation, pharmacological, bioprospection, and biomonitoring studies keeping in view of global warming and climate change.

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