

LICHEN FLORA OF MANDAL AND ADJOINING LOCALITIES TOWARDS UKHIMATH IN CHAMOLI DISTRICT OF UTTARAKHAND

SHOBHA RAWAT, D. K. UPRETI* and R. P. SINGH

Department of Environmental Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow, India.

*Lichenology Laboratory, Plant Biodiversity and Conservation Biology Division, National

Botanical Research Institute, Lucknow-226001, India.

upretidk@rediffmail.com

The paper deals with the lichen flora of Mandal and adjoining localities towards Ukhimath area of Rudraprayag district, comprising of Mandal, Kanchula Kharkh Musk Deer Sanctuary, Chopta, Dugalbitta, Baniyakund, Pothibasa, Talla, Mustura, Kimana and Ukhimath. A total 143 species belonging to 58 genera and 29 families have been reported from the area. Among the different growth forms of lichen, foliose lichens exhibit their dominance with 85 species followed by 41 species of crustose forms. The bark inhabiting lichens predominate over the rock and soil inhabiting species, *Quercus semecarpifolia* trees bear the maximum growth of 47 species, followed by *Alnus nepalensis*, *Acer oblongum*, and *Ilex dipyrrena* species with 24, 17 and 11 species, respectively. The area also exhibit occurrence of 31 rock inhabiting lichen while only 6 species of soil inhabiting lichens are known. The family Parmeliaceae with 16 genera and 38 species is the dominant lichen family in the area, followed by Physciaceae with 6 genera and 21 species.

Keywords: Lichen diversity; Mandal; Ukhimath; Uttarakhand.

Introduction

A large number of lichens were collected from the different region of Garhwal Himalayas in the past. However, so far no collection records of lichens from the Mandal area are available. Mandal, locally called as the Cherapunji of Garhwal Himalayas, is situated 12 km from Gopeshwar (Headquarter of Chamoli district). It has dense forest vegetation of *Acer*, *Alnus* and *Quercus* trees at different altitudes. The forest Vegetation varies at different altitudinal ranges. The altitude between 2000-2500m has mixed forest of *Acer*, *Alnus* and *Quercus*. *Quercus semecarpifolia* sometimes grow as pure or in patches around altitude of 3000m and in higher altitudes (3000-3200m) sometime it grows mixed with coniferous and *Rhododendron* trees¹. Out of the ten localities surveyed, the Kanchula Kharkh Musk Deer Sanctuary, Chopta and Dugalbitta forest situated between altitudes of 2500-3000m have the dominant vegetation of *Quercus semecarpifolia*, *Q. leucotricophora*, *Q. floribunda*, *Rhododendron arboreum*, *R. companulatum*, *Ilex excels*, *Betula utilis* and *Alnus nepalensis* trees. The Baniyakund, Pothibasa, Talla, Mustura regions situated between altitudes of 1500-2000m have *Acer oblongum* and *Alnus nepalensis* trees. The Kimana, Mandal, Ukhimath regions between altitudes of 1000-1500 meter, have *Acer*

oblongum, *Alnus nepalensis* and *Myrica esculenta* trees as dominant vegetation².

Material and Methods

More than 500 specimens of lichens were collected from ten localities enroute from Mandal to Ukhimath. The specimens were identified in respect of their morphology, anatomy and chemistry. The chemistry of all the specimens were performed by colour spot tests (K, C, P) followed by thin layer chromatography (TLC) methods³. The chromatograms were generally developed in solvent A (Toluene : 1-4 Dioxane : Acetic acid, 180 : 60 : 8ml). The identified specimens are preserved in the herbarium of National Botanical Research Institute, Lucknow (LWG).

Result and Discussion

A total of 143 species belonging to 58 genera and 29 families of lichens are enumerated enroute Mandal to Ukhimath area, from ten different localities at different altitudes (Table 1). Ecological conditions and Forest composition at different sites, from where collections were made, differ in details. Observation on their epiphytic lichen flora and factors determining them are therefore taken on separately as follows :

The forest cover at Mandal between altitudes of 1000-1500m has moist slope, covered with thick forest

of *Alnus nepalensis* and *Acer oblongum* trees. In this forest area 34 species belonging to 23 genera of lichen are recorded. *Alnus* and *Acer* trees contain mostly Pyrenocarpous lichens such as *Antraconothecium globiferum*, *A. himalayense*, *A. platystomum*, *Pyrenula immersa*, *P. immissa* and *P. Impressa*. The Pyrenocarpous lichens develop perithecia as their fruiting bodies and the smooth soft bark of *Acer* and *Alnus* trees provide suitable substrates to colonize them on their trunk and twigs.

In Kanchula Kharkh Musk Deer Sanctuary area, the forest comprised to mixed vegetation of *Cedrus deodara* and *Quercus semecarpifolia* together with *Acer*. The *Acer* trees having smooth bark, bear good growth of Pyrenocarpous (*Antraconothecium*, *Pyrenula*) and Graphidaceae (*Graphis*, *Phaeogarphis*) lichens. The *Cedrus* and *Quercus* tree bear luxuriant growth of foliose and fruticose lichens. The lichens grow luxuriantly on all the substrates available, thus the forest represents 58 species belonging to 32 genera of lichens. The Parmelioid lichen with 23 species belonging to 13 genera dominates the site.

Chopta forest area exhibits the dominance of *Quercus semecarpifolia* together with *Cedrus deodara* and *Rhododendron arboreum*. The area harbours more than 250 vascular plant species⁴ and 177 species of mosses⁵. The diverse phorophytes and moist shady forest condition support luxuriant growth of lichen in the area. The shade and moisture loving leprose (*Chrysothrix*, *Lepraria*) and Cyanolichens (*Collema*, *Leptogium* and *Lobaria*) grow luxuriantly both on trees and in soil, in association with mosses. The area represents growth of 64 species of lichens out of which 14 species of Parmelioid lichens exhibit their dominance.

Dugalbitta forest, near Makku village, between altitudes of 2000-2500m comprised of *Quercus leucotricophora*, *Betula*, *Alnus*, and *Acer* trees. The thick forest cover provides a most, shady condition for growth of Cyanolichens and many Parmelioid lichens. This area represent 25 species belonging to 19 genera, of which Parmelioid lichens with 100 species belonging to 6 genera dominates the area.

Baniyakund situated between altitudes of 2000-2500m is disturbed open forest because of heavy human activities in the area. *Quercus floribunda* tree forms the dominant vegetation in the area. Due to the thinned out forest, it receives higher intensity of light, which allow many light loving lichens (member of licanoraceae and Physciaceae) to colonize the area. A total of 18 species belonging to 7 genera have been recorded from this site. *Heterodermia dactyliza*, *H. himalayensis*, *Phaeophyscia*

hispidula and *Rinodina exigua* exhibit their dominance together with species of *Lecanora*.

Enroute from Pothibasa to Ukhimath most of the forests are disturbed due to the frequent human pressure on the forest. The *Quercus leucotricophora* tree at lower altitudes (1000-1500m) in dry habitats support few species of lichens to colonize on them. *Melia indica* and other cultivated trees along the roadside sometime support good growth of many Parmelioid (*Parmotrema*, *Bulbothrix*) and Physcioid (*Physcia*, *Phaeophyscia* and *Pyxine*) lichens on their trunk and twigs.

The Ukhimath, Mastura and Pothibasa sites exhibit poor to scarce growth of lichens. The Ukhimath area situated at an altitude of 1000m exhibits poor growth of lichens, as a single species of rock inhabiting lichen *Dermatocarpon* and few toxitolerent lichen taxa of Physciaceae grow on cultivated trees. The Talla area between altitudes of 1000-1500m has forest of *Alnus* and *Ilex*, mixed with *Melia indica*, exhibit good growth of 19 species of lichens. The *Alnus* trees with smooth bark bear good growth of Pyrenocarpous lichens together with other lichens. The *Melia indica* tree provides suitable substrate for Parmelioid genera *Hypotrachyna*, *Bulbothrix* together with Physcioid lichens.

The Mustura and Kimana sites between altitudes of 1000-1500m are exploited for agriculture purpose by the local inhabitants. The forest area are replaced for orchards. Further, the frequent lopping and pruning of the forest trees reduced the canopy of the trees to an extent that, low moisture content on the tree trunk does not allow many lichens to colonize. The *Melia indica* trees, cultivated in both the Kimana and Mustura area, are the best host for few lichen taxa. The mustura area is represented by the occurrence of 2 species of lichens while Kimana area has 6 species, of which 4 species are saxicolous. *Physcia dimidiata*, *Peltigera canina*, *Dermatocarpon vellereum* and *Verrucaria acrotella* are the common species of this area.

Out of the ten sites explored for lichens, enroute Mandal to Ukhimath, the forest area near Chopta and Musk Deer Sanctuary exhibit the luxuriant growth of lichens. The occurrence of a variety of phorophytes, thick tree canopy, moist and shady slopes together with higher altitudinal ranges support a conducive environmental condition for a luxuriant growth of diverse lichen taxa. The Dugalbitta, Mandal, Baniyakund and Talla sites exhibit moderate growth of lichens as the forest have less moist shady slope than the Chopta and Musk Deer Sanctuary forest.

The Pothibasa, Kimana and Mustura sites having

Table 1. Distribution of lichens in different localities enroute from Mandal to Ukhimath, their substrates and growth forms.

Note : C = Crustose, F = Foliose, Fr = Fruticose, Q = *Quercus*, I = *Ilex*, A = *Acer oblongum*, A = *Alnus nepalensis*, B = *Betula*, R = *Rhododendron*, M = *Melia*, (+) = presence of lichen, (-) = absence of lichen.

Lichen Taxa	Localities										Growth Form	Substratum
	Mandal	Musk Deer Park	Chopta	Dugabitta	Baniyakund	Pothibasa	Talla	Mustura	Kimana	Ukhimath		
ALECTORIACEAE												
<i>Sulcaria sulcata</i> (Lév.) Bystr.ex Brodo & D.Hawksw.	-	-	+	-	-	-	-	-	-	-	Fr	<i>Q. semecarpifolia</i>
ACAROSPORACEAE												
<i>Acarospora chlorophana</i> (Wahlenb. in Ach.) Massal	-	-	+	-	-	-	-	-	-	-	C	on rock
<i>Acarospora fusca</i> B.de Lesd.	-	-	+	-	-	-	-	-	-	-	C	on rock
BACIDIACEAE												
<i>Bacidia arnoldiana</i> Körb.	-	-	-	-	-	-	+	-	-	-	C	on rock
<i>Bacidia personata</i> Malme	-	+	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
BIOTORACEAE												
<i>Phyllopsora albicans</i> Müll.Arg.	-	-	+	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Biatora</i> sp1	+	-	-	-	-	-	-	-	-	-	C	on root & soil
<i>Biatora</i> sp2	-	+	-	-	-	-	-	-	-	-	C	on root & soil
CALICIACEAE												
<i>Calicium viride</i> Pers.	-	-	-	-	+	-	-	-	-	-	C	<i>I. dipyrena</i>
CANDELARIACEAE												
<i>Candelaria concolor</i> (Dicks.) B. Stein	+	-	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
CHRYSOTHRICACEAE												
<i>Chrysothrix candilaris</i> (L.) J. London	-	-	+	-	+	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Chrysothrix chlorina</i> (Ach.) J.Laundon	+	-	+	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
CLADONIAACEAE												
<i>Cladonia cartilaginea</i> Müll.Arg.	-	-	-	-	+	-	-	-	+	-	C, F	Coniferous wood, <i>M. indica</i>
<i>Cladonia coccifera</i> (L.) Willd.	-	-	-	-	+	-	-	-	-	-	C, F	<i>M. indica</i> , <i>I. dipyrena</i>
<i>Cladonia corymbescens</i> Nyl.	-	-	+	-	-	-	-	-	-	-	C, F	<i>Q. semecarpifolia</i>
<i>Cladonia furcata</i> (Huds.) Schrad.	-	-	+	-	+	-	-	-	-	-	C, F	<i>I. dipyrena</i>
<i>Cladonia ochrochlora</i> Flörk	-	-	-	-	-	-	+	-	-	-	C, F	<i>I. dipyrena</i>
<i>Cladonia squamosa</i> Hoffm.	-	+	-	+	-	-	-	-	-	-	C, F	<i>A. nepalensis</i>
<i>Cladonia squamosula</i> Müll.Arg.	-	-	+	-	-	-	-	-	-	-	C, F	on soil
COLLEMATACEAE												
<i>Collema rugosum</i> Krempelh.	-	-	-	-	-	-	+	-	-	-	F	<i>A. oblongum</i>
<i>Collema subconveniens</i> Nyl.	+	-	-	-	-	-	-	-	-	-	F	on rock
<i>Leptogium askotense</i> D.Awasthi in D.Awasthi & Akhtar	-	-	+	-	-	-	+	-	-	-	F	on rock
<i>Leptogium fallax</i> Müll. Arg.	+	-	-	-	-	-	-	-	-	-	F, Fr	<i>A. nepalensis</i>
<i>Leptogium pedicellatum</i> P. Jörg.	+	+	-	-	-	-	-	-	-	-	F, Fr	<i>A. oblongum</i>
<i>Leptogium trichophorum</i> Müll. Arg.	-	+	-	+	-	-	-	-	-	-	F, Fr	<i>A. nepalensis</i> , <i>I. dipyrena</i>
PANNARIAACEAE												
<i>Fuscopannaria subgemmascens</i> Upreti & Divakar	-	-	-	-	+	+	-	-	-	-	C, F	<i>I. dipyrena</i>
GRAPHIDACEAE												
<i>Glyphis cicatricosa</i> Ach.	-	-	-	+	-	-	-	-	-	-	C	<i>B. alnoides</i>
<i>Graphis assimilis</i> Nyl.	-	+	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Graphis lineola</i> Ach.	+	-	-	-	-	-	-	-	-	-	C	<i>A. nepalensis</i>

<i>Graphis scripta</i> (L.) Ach.	+	+	+	-	-	-	-	-	-	-	-	-	C	on rock
<i>Graphis supertecta</i> Müll. Arg.	-	-	+	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
HYMEMELIACEAE														
<i>Aspicilia caesiocinerea</i> (Nyl. in Malbr. Arnold)	-	+	+	-	-	-	-	-	-	-	-	-	C	on rock
<i>Aspicilia dwaliensis</i> Räsänen	-	-	+	-	-	-	-	-	-	-	-	-	C	on rock
IMPERFECT LICHENIZED FUNGI														
<i>Leprocaulon pseudoarbuscula</i> (Asah.) Lamb & Ward.	-	+	-	+	-	-	-	-	-	-	-	-	C, F	<i>A. nepalensis</i>
LECANORACEAE														
<i>Lecanora albella</i> (Pears.) Ach.	-	+	-	-	-	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Lecanora cinereofusca</i> H. Magn.	-	+	-	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Lecanora concilianda</i> Vainio	-	-	-	-	+	+	-	-	-	-	-	-	C	<i>I. dipryrena</i>
<i>Lecanora coronulans</i> Nyl.	-	+	+	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Lecanora fimbriatula</i> Stirton	-	-	-	-	+	-	-	-	-	-	-	-	C	on rock
<i>Lecanora formosula</i> Lumbsch	-	-	-	-	-	-	-	+	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Lecanora japonica</i> Müll. Arg.	-	-	+	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Lecanora phaeocardia</i> Vainio	-	-	-	-	+	-	-	-	-	-	-	-	C	on rock
<i>Lecanora tropica</i> Zahlbr.	-	+	+	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Lecanora</i> sp1	-	-	+	-	-	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
LOBARIACEAE														
<i>Lobaria kurokawai</i> Yoshim	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Lobaria retigera</i> (Bory) Trevisan	-	-	+	+	-	-	-	-	-	-	-	-	F	on soil
<i>Sticta nylanderiana</i> Zahlbr.	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
NEPHROMATACEAE														
<i>Nephroma helveticum</i> Ach.	-	+	-	-	-	-	-	-	-	-	-	-	F	<i>A. oblongum</i>
PARMELIACEAE														
<i>Alloctetraria stracheyi</i> (Bab.) Kurok. & Lai	-	+	-	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Bulbothrix bulbochaeta</i> (Hale) Hale	-	+	-	+	-	-	+	-	-	-	-	-	F	<i>A. nepalensis</i> , <i>Q. leucofribunda</i>
<i>Bulbothrix isidiza</i> (Nyl.) Hale	+	-	-	-	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Bulbothrix meizospora</i> (Nyl.) Hale	+	+	-	+	-	-	+	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Bulbothrix sensibilis</i> (Steiner & Zahlbr.) Hale	-	-	-	+	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Bulbothrix setschwanensis</i> (Zahlbr.)	-	-	-	-	-	-	+	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Canoparmelia texana</i> (Tulk.) Elix & Hale	+	-	-	-	-	-	-	-	-	-	-	-	F	on rock
<i>Cetrariopsis wallichiana</i> (Taylor) Elix & Hale	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Cetrelia braunsiana</i> (Müll. Arg.) W.Culb. & C. Culb	-	+	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Cetrelia cetrarioides</i> W. Culb. & C. Culb	-	+	+	-	-	-	-	-	-	-	-	-	F	<i>R. anthopogon</i>
<i>Cetrelia pseudoliveterum</i> (Asah.) W.Culb. & C. Culb.	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Cetrelia sanguinea</i> (Schar.) W.L. Culb. & C. F. Culb.	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Everniastrum cirrhatum</i> (Fr.) Hale	+	+	+	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Everniastrum nepalense</i> (Taylor) Hale ex Sipman	-	+	-	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Hypotrachyna crenata</i> (Kurok.) Hale	-	+	-	+	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Hypotrachyna pluriformis</i> (Nyl.) Hale	-	-	-	+	-	-	+	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Myelochroa aurulenta</i> (Tuck.) Elix & Hale	+	+	+	+	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Myelochroa denegans</i> (Nyl.) Elix & Hale	+	-	-	-	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i> , <i>Q. floribunda</i>
<i>Myelochroa irrugans</i> (Nyl.) Elix & Hale	-	+	-	+	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Myelochroa macrogalbimica</i> Divakar, Upreti & Elix	-	-	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Myelochroa upretii</i> Divakar & Elix	-	-	-	-	-	-	+	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Myelochroa xantholepsis</i> (Mont & Bosch) Elix & Hale	-	+	+	-	-	-	-	-	-	-	-	-	F	<i>A. oblongum</i>
<i>Nepromopsis pallezensis</i> (Schaerer in Moritzi)	-	+	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>

<i>Parmelaria thomsonii</i> (Stirton) D. Awasthi	-	+	+	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Parmelinella wallichiana</i> (Taylor) Elix & Hale	-	+	+	+	-	-	-	-	-	-	F	<i>A. nepalensis</i> , <i>Q. floribunda</i>
<i>Parmelinopsis minarum</i> (Vain.) Elix & Hale	-	+	-	+	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Parmotrema nilgherrense</i> (Nyl.) Hale	-	+	+	-	-	-	-	-	-	-	F	<i>R. compenulatum</i> , <i>Q. semecarpifolia</i>
<i>Parmotrema praesorediosum</i> (Nyl.) Hale	+	+	-	-	+	-	+	-	-	-	F	<i>A. oblongum</i> , on rock
<i>Parmotrema tinctorum</i> (Despr. ex Nyl.) Hale	+	-	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Punctelia borrieri</i> (Sm.) Krog	+	-	-	-	-	-	-	-	-	-	F	on rock
<i>Punctelia subrudecta</i> (Nyl.) Krog	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Rimelia reticulata</i> (Taylor) Hale & Fletcher	+	-	-	-	+	+	-	-	-	-	F	<i>M. indica</i> , <i>A. oblongum</i>
<i>Usnea eumitrioides</i> Mot.	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Usnea longissima</i> Ach.	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Usnea nepalensis</i> D.D. Awasthi	+	-	-	-	-	-	-	-	-	-	F	<i>Q. leucotricophora</i> , <i>I. dipyrena</i>
<i>Usnea orientalis</i> Mot.	-	+	+	-	+	-	-	-	-	-	F	<i>A. oblongum</i>
<i>Usnea pectinata</i> Taylor	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Usnea subfloridana</i> Stirton	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
PELTIGERACEAE												
<i>Peltigera canina</i> (L.) Wild.	-	-	-	-	-	-	-	-	+	-	F	on soil
<i>Peltigera rufescens</i> (Weis.) Humb.	-	-	+	-	+	+	-	-	-	-	F	on soil
PERTUSARIACEAE												
<i>Ochrolechia rosella</i> (Müll. Arg.) Verseghy	-	-	+	-	+	-	-	-	-	-	C	<i>I. dipyrena</i>
<i>Ochrolechia subpallenscens</i> Verseghy	-	-	+	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Pertusaria coccodes</i> Ach. Nyl.	+	-	-	-	-	-	-	-	-	-	C	<i>Q. leucotricophora</i> , <i>I. dipyrena</i>
<i>Pertusaria leucosorodes</i> Nyl.	-	+	+	+	-	-	-	-	-	-	C	<i>A. oblongum</i> , <i>Myrica esculenta</i>
<i>Pertusaria quassie</i> (Fée) Nyl.	+	+	+	-	-	-	+	-	-	-	C	<i>Q. semecarpifolia</i> , <i>Melia indica</i>
<i>Pertusaria rigida</i> Müll. Arg.	-	-	+	-	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
<i>Pertusaria rimosa</i> D. Awasthi & Srivast.	-	-	+	-	-	-	-	-	-	-	C	<i>R. companulatum</i>
PORPEDIACEAE												
<i>Porpidia macrocarpa</i> (DC.) Hertel & Schwab in Hertel	-	-	+	-	-	-	-	-	-	-	C	on rock
PHYSICIACEAE												
<i>Buellia leptocline</i> (Flotow) Massal.	-	+	-	+	-	-	-	-	-	-	C	<i>A. nepalensis</i>
<i>Heterodermia dactyliza</i> (Nyl.) Swinsc. & Krog	-	-	+	-	+	-	-	-	-	-	F	<i>I. dipyrena</i> , <i>A. nepalensis</i>
<i>Heterodermia dissecta</i> (Kurok.) D. Awasthi	+	-	-	-	-	-	-	-	-	-	F	<i>Q. leucotricophora</i>
<i>Heterodermia diademata</i> (Taylor) D. Awasthi	+	+	+	+	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Heterodermia himalayensis</i> (D. Awasthi) D. Awasthi	-	+	-	-	+	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Heterodermia hypocaustia</i> (Yasuda) D. Awasthi	-	+	-	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Heterodermia incana</i> (Stirton) D. Awasthi	-	-	+	-	-	-	-	-	-	-	F	<i>Q. semecarpifolia</i>
<i>Heterodermia japonica</i> (Sato) Swinsc. & Krog	-	-	+	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Heterodermia leucomela</i> (L.) Poelt	-	-	+	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Heterodermia pseudospeciosa</i> (Kurok.) W. Culb.	-	+	-	-	-	-	+	-	-	-	F	<i>A. nepalensis</i> , <i>M. indica</i> , rock
<i>Heterodermia punctifera</i> (Kurok.) D. Awasthi	-	-	+	-	-	-	-	-	-	-	F	on rock
<i>Heterodermia speciosa</i> (Wulfen) Trevis	+	-	-	-	-	-	-	-	-	-	F	on rock
<i>Phaeophyscia hispidula</i> (Ach.) Essl.	+	+	+	+	+	+	+	-	-	-	F	<i>A. oblongum</i> , <i>Q. leucotricophora</i> , rock
<i>Phaeophyscia primaria</i> (Poelt) Trass	+	-	-	-	-	-	-	-	-	-	F	on rock
<i>Physcia dilatata</i> Nyl.	+	+	-	+	-	-	+	-	-	-	F	<i>A. nepalensis</i>
<i>Physcia dimidiata</i> (Arn.) Nyl.	-	-	-	+	-	-	-	-	+	-	F	on rock
<i>Physcia dubia</i> (Hoffm.) Lett. em. Lynge	+	-	-	-	-	-	-	-	-	-	F	<i>Q. leucotricophora</i>
<i>Pyxine berteriana</i> (Fée) Imshaug	-	+	-	+	-	-	+	-	-	-	F	<i>A. oblongum</i>
<i>Pyxine cocoes</i> (Swartz) Nyl.	+	-	-	-	-	-	-	-	-	-	F	<i>A. nepalensis</i>
<i>Pyxine soreidiata</i> (Ach.) Mont. in Sagra	-	+	-	-	-	-	-	-	-	-	F	<i>A. oblongum</i>

<i>Pyxine subcinerea</i> Stirton	+	+	-	+	-	-	-	-	-	-	-	F	<i>A. nepalensis</i> , rock
<i>Rinodina exigua</i> (Ach.) Gray	-	-	-	-	+	-	-	-	-	-	-	C	<i>Q. semecarpifolia</i>
PYRENULACEAE													
<i>Antracothecium globiferum</i> (Eschw.) Müll. Arg.	-	+	-	-	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Antracothecium himalayense</i> (Räsänen) D. Awasthi	-	+	-	-	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Antracothecium platystomum</i> Müll. Arg.	-	+	-	-	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Pyrenula immersa</i> Müll. Arg.	-	+	-	-	-	-	-	-	-	-	-	C	<i>A. nepalensis</i>
<i>Pyrenula immissa</i> (Stirton) Zahlbr.	-	+	-	+	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Pyrenula impressa</i> Müll. Arg.	-	+	-	-	-	-	-	-	-	-	-	C	<i>A. oblongum</i>
<i>Pyrenula introducta</i> (Nyl.) Zahlbr.	+	-	-	-	-	-	+	-	-	-	-	C	<i>A. nepalensis</i>
RAMALINACEAE													
<i>Ramalina conduplicans</i> Vainio	+	+	+	-	+	-	-	-	-	-	-	Fr	<i>Q. semecarpifolia</i>
<i>Ramalina himalyensis</i> Räsänen	-	-	+	-	-	-	-	-	-	-	-	Fr	on rock
<i>Ramalina roesteri</i> (Hochst in Schaer) Hue	-	-	+	-	-	-	-	-	-	-	-	Fr	<i>Q. semecarpifolia</i>
<i>Ramalina sinensis</i> Jatta	-	+	+	-	-	-	-	-	-	-	-	Fr	<i>Q. semecarpifolia</i> , <i>Q. floribunda</i>
RHIZOCARPACEAE													
<i>Rhizocarpon geographicum</i> (L.) DC.	+	-	-	-	-	-	-	-	-	-	-	C	on rock
STEREOCAULACEAE													
<i>Lepraria lobificans</i> Nyl.	-	+	+	+	-	+	+	-	-	-	-	C	on rock, <i>Q. semecarpifolia</i>
<i>Stereocaulon foliolosum</i> Nyl.	-	-	+	-	-	-	-	-	-	-	-	Fr	on rock
<i>Stereocaulon pomiferum</i> DuRoi	-	-	+	-	-	-	-	-	-	-	-	Fr	on rock
TELOSCHISTACEAE													
<i>Caloplaca subsoluta</i> (Nyl.) Zahlbr.	-	-	-	-	-	-	-	+	-	-	-	C	on rock
<i>Ioplaca pindrensis</i> (Räsänen) Poelt & Hinter	-	-	+	-	-	-	-	-	-	-	-	C	on rock
THELOTREMATAACEAE													
<i>Diploshistes scruposus</i> (Schreb.) Norman	-	-	+	-	-	-	-	-	-	-	-	C	on rock
UMBILICARIACEAE													
<i>Umblicaria badia</i> Frey	-	-	+	-	-	-	-	-	-	-	-	F	on rock
<i>Umblicaria indica</i> Frey	-	-	+	-	-	-	-	-	-	-	-	F	on rock
<i>Umblicaria virginis</i> Schaer	-	-	+	-	-	-	-	-	-	-	-	F	on rock
VERRUCARIAACEAE													
<i>Dermatocarpon vellereum</i> Zschacke	+	-	+	-	-	-	+	-	+	+	-	F	on rock
<i>Verrucaria acrotella</i> Ach.	-	-	+	-	-	-	-	-	+	-	-	C	on rock

heavy human activities exhibit poor lichen diversity. The reasons attributed for the poor growth of lichens in the sites are the fact that these sites are more exploited for agricultural purposes from the past many years. The forest trees are frequently, lopped and pruned for their leaves, used as fodder. The lower altitudinal range together with dry habitats does not allow many lichen species to colonize in such sites. The fast pace of urbanization in Ukhimath town is responsible for loss of many habitats, which is reflected by the poor growth of lichens in the area. The present account of the lichens from the ten localities will be a baseline data for conducting biomonitoring studies in the area, in future.

Acknowledgement

One of the author (SR) is thankful to RJNF-UGC, New Delhi for financial support.

References

1. Gaur R D 1999, Flora of the district Garhwal, North-west Himalaya. Negi S S 1994, *India's Forests, Forestry and Wildlife* 399p.
2. Gaur R D 1982, A contribution to the flora of Gopeshwar (Chamoli Garhwal). In : Paliwal G.S. (ed.) *The vegetational wealth of Himalayas* 347-413.
3. Walker F J and James P W 1980, A revised guide to micro chemical technique for the identification of lichen products. *British Lichen Society Bulletin* 46 (supplement) 13-29.
4. Semwal J K and Gaur R D 1981, Alpine flora of Chopta Tungnath in the Garhwal Himalaya : *J. Bombay Nat. Hist. Soc.* 78 498-512.
5. Negi and Gangil, Bhatt A K, B P and Todaria N P 1997, Local population impact on forest of Garhwal Himalaya. *The Environmentalist* 17.