

# Lichen flora of Gangotri and Gomukh areas of Uttarakhand, India

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An enumeration of 149 lichen species belonging to 50 genera and 21 families from Gangotri and Gomukh areas of Uttarakhand is provided. The area is dominated by macrolichens (foliose-fruticose form) represented by 120 species whereas microlichens (crustose-squamulose) are represented by only 29 species. A total of 55 species of lichens are added to the earlier known lichen flora of the area. The members of lichen families Parmeliaceae and Physciaceae dominate the area as they are represented by 59 species (20 genera) and 28 species (8 genera) respectively. Among the microlichen families, Lecanoraceae and Rhizocarpaceae are represented by 6 species of *Lecanora* and 5 species of *Rhizocarpon* respectively.

**Key-words**—Lichens, Gangotri, Gomukh, Uttarakhand.

## INTRODUCTION

GANGOTRI and Gomukh areas are situated at a height of 3140m in the Uttarkashi district of Uttarakhand in Trans-Himalaya. The lichens occurring in these areas were recorded during the course of monographic and revisionary studies on Indian lichen taxa, in the past. Most of the collections were cursory or casual, except the exploration of the area during the year 1976, when Awasthi and Singh, exhaustively collected the lichens from the environs of Gangotri and Gomukh areas. The collections were made along the way from Lanka to Gomukh via Gangotri and at different moraines near Gomukh. Awasthi and Singh (1978) recorded the occurrence of 74 macrolichens in the area. The microlichen taxa from the area were not listed so far. The present study is the outcome of the analysis of about 500 specimens collected during August/September 2002. Apart from the environs of Gangotri and Gomukh, the authors also explored the route from Gangotri to Kedar Tal for collection of lichens. The present enumeration comprises the taxa of lichens reported from Gangotri and Gomukh. A total of 149 lichen species belonging to 50 genera and 21 families are recorded.

## MATERIAL AND METHOD

Lichen collections were made along the way from Gangotri to Gomukh and 5 km from Gangotri to Kedar Tal route in August/September 2002. The lichens were collected from base to chest height of the trunk and from other substrata at forest floor. The specimens were investigated morphologically, anatomically and chemically. The colour tests were performed with the usual reagents, i.e. K (5% Potassium hydroxide), C (aqueous solution of Calcium hypochlorite) and PD (paraphenylene diamine). Lichen substances were investigated with thin layer chromatography (TLC) in solvent A (180 toluene: 60 dioxane: 8 acetic acid) using the technique of Culberson (1972) and Walker and James (1980).

All the families, genera and species are arranged alphabetically together with their substrates, place and altitude. The identified specimens are preserved at Lichen herbarium of National Botanical Research Institute, Lucknow (LWG).

## LIST OF TAXA

## ACAROSPORACEAE

*Acarospora* Massal.

1. *A. bullata* (Anzi.); Chirwasa, 3500 m, on rocks, 02-000247/ A (LWG).
2. *A. fuscata* (Nyl.) Arnold; Chirwasa, 3500 m, on rocks, 02-000234 (LWG).
3. *A. schleicheri* (Ach.) Massal; Devwasa, 3200 m, on soil, 02-000267 (LWG).

## CLADONIACEAE

*Cladonia* (Hill) Weber in Wigg.

4. *C. corniculata* Ahti & Kashiwadani; Chirwasa, 3500 m, on soil, 02-000250 (LWG).
5. *C. coniocraea* (Floerke) Spreng; Gangotri-Kedar Tal, 3100 m, on soil, 02-000435, 02-000179 (LWG).
6. *C. pyxidata* (L) Hoffm; Before Chirwasa, 3400 m, on soil, 02- 000177 (LWG).  
Chirwasa-Bhojwasa, 3600 m, 02-000091, 02-000419, 02-000438, 02-000202, 02-000183, 02-000178 (LWG); Gangotri-Kedar Tal, 3100 m, 02-200416/ B, 02-000418 (LWG).
7. *C. fimbriata* (L.) Fr; Gangotri-Kedar Tal, 3100 m, on soil, 02-000251, 02-000175/A, 02-000207, 02-000420, 02-000417/A, 02-000416/A, 02-000215 (LWG).
8. *C. pocillum* (Ach.) Grognot; Gomukh-Gangotri, 2700-3600 m, on soil.
9. *C. rei* Schar; Gangotri, 2200-3100 m, on soil.

## CANDELARIAACEAE

*Candelaria* Massal.

10. *C. concolor* (Dicks) B. Stein; 4 km before Chirwasa, 3200 m, on *Pinus*, 02-000172/B (LWG).

## COLLEMATACEAE

*Collema* Weber ex Wigg.

11. *C. furfuraceum* (Arnold) Du Rietz em. Degel.; Gangotri-towards Kedar Tal 3100 m, on soil, 02-000292/B (LWG).

12. *C. polycarpon* Hoffm; 2 km after Chirwasa, 3660 m, on soil, 02- 000199 (LWG).

13. *C. tenax* var. *tenax* (Sw.) Ach. em. Degel.; Harsil, 2000-3000 m, on rocks and soil among mosses.

*Leptogium* (Ach.) Gray

14. *L. furfuraceum* (Harm.) Bystrek; Gangotri-Kedar Tal, 3100 m, on rocks, 02-000298 (LWG).

## HYMENELIACEAE

*Aspicilia* Massal.

15. *A. caesiocinerea* (Malbr.) Arnold; Gomukh, Gangotri, on rocks.
16. *A. calcarea* (L.) Mudd; Gangotri, Gomukh, on rocks.
17. *A. maculata* (H. Magn.) D. Awasthi; Devwasa 3200 m, on rocks, 02-000262 (LWG); Chirwasa 3500 m, on rocks, 02-000247/ A (LWG).
18. *A. praeradiosa* (Nyl.) Poelt & Leuck.; Gangotri-Kedar Tal, 3100 m, on rocks, 02-000409 (LWG).

## LECANORACEAE

*Lecanora* Ach.

19. *L. cinereofuseca* var. *himalayensis* Upreti; Gomukh, on rocks.
20. *L. garovaglii* (Korb.) Zahlbr; Devwasa, 3200 m, on rocks, 02-000263/C (LWG).
21. *L. indica* (Stirton) Zahlbr; Gomukh, on rocks.
22. *L. muralis* (Schreb.) Rabenh.; Gangotri-Kedar Tal, 3100 m, on rocks, 02-000414 (LWG).
23. *L. rubina* (Vill.) Ach; Gangotri to Gomukh Common on rocks.
24. *L. sulphurescens* Fée; Harsil, 1800 m on rocks.

## LECIDEACEAE

*Lecidea* Ach.

25. *Lecidea* sp.; Gangotri-Kedartal, 3100 m, on *Cedrus deodara*, 02-000287 (LWG).

## MYCOBILIMBIACEAE

*Mycobilimbia*

26. *M. sphaeroides* Awasthi; Near Gomukh, 3480 m, on mosses.

## NEPHROMATACEAE

*Nephroma*

27. *N. helveticum* Ach.; Bhojwasa, on trees, rocks and mossy ground in shady places.  
 28. *N. isidiosum* (Nyl.) Gyeln.; Chirwasa, on mossy ground.  
 29. *N. parile* (Ach.) Ach.; Chirwasa, Bhojwasa, on ground in shade of trees.

## PARMELIACEAE

*Allocetraria*

30. *A. ambigua* Bab.; Gomukh 4800 m on ground, rocks on mosses and twigs of *Rhododendron*.  
 31. *A. nivalis* (L.) Randl. & Saag; Gomukh, frequent on sandy soil.  
 32. *A. potaninii* (Oxner) Randl. and Saag; Gomukh, 3600 m on ground.  
 33. *A. stracheyi* (Bab) Kurok. Lai; & Gomukh, 2500-4200 m on ground among mosses, branches and trunks of trees.

*Bryoria*

34. *B. implexa* (Hoffm.) Brodo and D. Hawksw.; Gomukh, 3780 m, on soil.  
 35. *B. smithi* (Du Rietz) Brodo & D. Hawksw.; Gangotri and Gomukh, 2400-3700 m, on bark and soil, on twigs of *Rhododendron*.  
 36. *B. tenuis* (Dahl) Brodo and D. Hawksw.; Gomukh, 3650 m, on soil.

*Canoparmelia* Elix & Hale

37. *C. crozalsiana* (B. de. Lesd.) Elix and Hale; Chirwasa, 3500 m, on *Pinus*, 02-000172/A (LWG).  
 38. *C. texana* (Tuck) Elix and Hale; Chirwasa, 3500 m, on *Pinus*, 02-000172/E (LWG).

*Cetraria* Ach

39. *C. aculeata* (Schreb.); Gomukh, on sandy soil.  
 40. *C. chlorophylla* (Willd) Vain; Gomukh, 6<sup>th</sup> moraine.  
 41. *C. hepatizon* (Ach.) Vainio; Gangotri, Bhojwasa and Gomukh, on rocks in open areas.  
 42. *C. islandica* (L.) Ach.; Gomukh, 3400-3600m, frequent on ground in edges of older moraines.

43. *C. laureri* Krempelh. Gomukh, Gangotri, on rocks.

44. *C. muricata* (Ach.) Eckfeldt; Gomukh, 5<sup>th</sup> & 6<sup>th</sup> moraines, on soil.

45. *C. odontella* (Ach.) Röhl; Gomukh, on soil, 5<sup>th</sup> and 6<sup>th</sup> moraines; Chirwasa-Bhojwasa on soil over rocks.

*Cetrelia* W. Culb. & C. Culb.

46. *C. olivetorum* (Nyl.) W. Culb & C. Culb; between Bhairon Ghati and Gangotri, on bark.

*Evernia* Ach.

47. *E. mesomorpha* Nyl.; Bhairon Ghati to Gomukh common on the trunk and twigs of the trees.

48. *E. prunastri* (L.) Ach.; Gangotri-Kedar Tal, 3100 m, on *Cedrus deodara*, 02-000275 (LWG).

*Flavocetraria*

49. *F. cucullata* (Bell.) Karnef. & Thell; Gomukh, 3800-4200 m, on ground among moss.

*Flavoparmelia* Hale

50. *F. caperata* (L.) Hale; Gomukh, Bhairon Ghati-Gangotri, 1500-1800 m, on *Pinus* tree trunk and on rocks; Gangotri-Kedar Tal, 3100 m, on rock, 02-000299 (LWG); Gangotri-Chirwasa, 3200 m, on bark, 02-000171/B, 02-000215 (LWG).

*Flavopunctelia* (Krog) Hale

51. *F. flaventior* (Stittrton) Hale; Bhairon Ghati-Gomukh, 1800-2000 m, on bark of *Quercus* and *Pinus*.

52. *F. soledica* (Nyl.) Hale; Way to Chirwasa, 3100 m, on twigs; Bhojwasa, on *Cedrus deodara* bark.

*Hypogymnia* (Nyl.) Nyl.

53. *H. alpina* D. Awasthi in D. Awasthi & S. Singh; Gomukh, on bark

54. *H. fragillima* (Hillm.) Rass; Gomukh, 5<sup>th</sup> and 6<sup>th</sup> moraines, on soil with mosses.

55. *H. hypotrypa* (Nyl.) Rass; Bhojwasa, 3700 m, on soil, 02-000205 (LWG).

56. *H. physodes* (L.) Nyl.; Gangotri-Kedar Tal, 3200

- m, on *Cedrus deodara*, 02-000284 (LWG).
- Hypotrachyna** (Vainio) Hale
57. *H. physcioides* (Nyl.) Hale; Chirwasa, 3100 m, on twigs, 02-000173/A (LWG).
58. *H. pluriformis* (Nyl.) Hale; Gangnani, on bark of *Quercus*.
- Melanelia** Essl.
59. *M. glabrata* (Lamy) Essl.; Bhairon Ghati to Gomukh, Gangotri-Chirwasa, 3200 m, on rocks over soil, 02-000182/C (LWG); Chirwasa, 3660 m, on rocks, 02-000200 (LWG).
60. *M. exasperatula* (Nyl.) Essl.; Chirwasa and Gomukh, on trunk of *Betula*.
61. *M. panniformis* (Nyl.) Essl.; Gomukh, on rocks.
62. *M. sorediosa* (Almb.) Essl.; Gomukh, 3600 m, on rocks.
63. *M. stygia* (L.) Essl.; Gangotri-Chirwasa, 3500 m, on rocks over soil, 02-000182/B (LWG); Chirwasa, 3600 m, on rocks, 02-000193, 02-000235 (LWG); Chirwasa- Bhojwasa, 3660 m, on rocks, 02-000197 (LWG).
64. *M. subaurifera* (Nyl.) Essl.; Gangotri-Kedar Tal, 3200 m, on rocks over soil, 02-000408/B (LWG).
65. *M. substygia* (Nyl.) Essl.; Gangotri and Gomukh, common on boulders.
66. *M. tominii* (Oxner) Essl.; Gangotri-Gomukh, on rocks.
67. *M. vilosella* (Essl.) Essl.; Bhairon Ghati-Gomukh; Devwasa 3200 m, on *Pinus* twigs, 02-000260/B (LWG); Way to Chirwasa, 3500 m on *Pinus* tree trunk, 02-000229 (LWG); Gangotri-Kedar Tal, 3200 m, on rocks over soil, 02-000426/B, 02-000408/A (LWG).
- Parmelia** Ach. s. str.
68. *P. sulcata* Taylor; Gangotri-Kedar Tal, 3200 m, on rocks, 02-000422 (LWG); Chirwasa, 3500 m, on rocks, 02-000240, 02-000271, 02-000172/C, 02-000224/A, 02-000290/A (LWG).
- Parmelina**
69. *P. tiliaceae* (Hoffm.) Hale; Bhairon Ghati near bridge on Nilong river, on a fallen log.
- Parmotrema** Mass.
70. *P. austrosinense* (Zahlbr) Hale; Gangotri-Kedar Tal, 3200 m, on *Cedrus deodara*, 02-000283 (LWG).
71. *P. nilgherrense* (Nyl.) Hale; Ganganani, 1800-2700 m, on bark of *Quercus*, *Rhododendron*.
72. *P. praesorediosum* (Nyl.) Hale; Chirwasa, 3200 m, on *Pinus*, 02-000172/D (LWG).
73. *P. pseudonilgherrense* (Asah.) Hale; Bhairon Ghati to Gomukh, on bark and on ground.
- Rhizoplaca** Zopf
74. *R. chrysoleuca* (Smith) Zopf; Gangotri-Kedar Tal, 3200 m, on rocks, 02-000414 (LWG); Chirwasa, 3500 m, on rocks, 02-000243, 02-000234 (LWG).
- Rimelia** Hale & Fletcher
75. *R. reticulata* (Taylor) Hale & Fletcher; Chirwasa, 3500 m, on *Pinus*, 02-000226 (LWG).
- Usnea** Dill. Ex Adans
76. *U. aciculifera* Vainio; Gangotri-Chirwasa, 3200 m, on *Pinus*, 02-000174 (LWG).
77. *U. pectinata* Tayl; common on bark from Bhairon Ghati to Chirwasa.
78. *U. perplexans* Stirton; Gangotri, 3200 m, on bark of trees.
79. *U. subflorida* Stirton; Chirwasa, 3500 m, on twigs, 02-000185, 02-000209 (LWG).
80. *U. subfloridana* Stirton; Bhairon Ghati & Gomukh, 2800-3700 m, on soil and bark of trees.
- Vulpicida** Mattson & Lai
81. *V. pinastri* (Scop.) Mattson & lai; Gangotri-Gomukh, 3000-3600 m, on bark of conifers; Gangotri-Kedar Tal, 3200 m, on *Cedrus deodara* decaying wood, 02-000295 (LWG).
- Xanthoparmelia** (Vainio) Hale
82. *X. australasica* D. Galloway; Chirwasa 3500 m, on soil over rocks, 02-000252 (LWG).

83. *X. conspersa* (Ach.) Hale; Chirwasa, 3500 m, on rocks, 02-000252 (LWG).
84. *X. mexicana* (Gyeln.) Hale; Gangotri-Kedar Tal, 3200 m, on *Cedrus deodara* decaying wood, 02-000288 (LWG).
85. *X. somloensis* (Gyeln.) Hale; Bhairon Ghati-Gangotri, on rock; Gangotri-Chirwasa, 3200m, on rocks, 02-000171, 02-000180, 02-000181 (LWG); Chirwasa, 3500 m, on rock, 02-000238, 02-000242, 02-000243 (LWG).
86. *X. taractica* Kremp.; Bhairon Ghati and Gangotri, Gangotri and Gomukh, on rocks.
87. *X. terricola* Hale, T.H. Nash & Elix in Hale; Devwasa, 3200 m, on soil, 02-000256 (LWG).
88. *X. tinctina* (Mahe and Gill.) Hale; Gangotri, on boulders.

## PELTIGERACEAE

*Peltigera* Willd.

89. *P. canina* (L.) Willd.; Gomukh, on ground, mosses or on rocks, at base of tree trunks; Gangotri-Kedar Tal, 3200 m, on soil, 02-000432 (LWG).
90. *P. horizontalis* (Huds.) Baumg; Gomukh, 2500-3500 m, on ground over rocks, mosses or bark of trees; Bhojwasa, 3700 m, on soil, 02-000201 (LWG)
91. *P. membranacea* (Ach.) Nyl. em. Thomson; Gangotri-Chirwasa, 3200 m, on soil, 02-000175/B (LWG).
92. *P. praetextata* (Flörke in Sommerf.) Vain; Gomukh area, on sandy soil in the edges of big boulders.
93. *P. rufescens* (Weis.) Humb.; Gangotri, 2000-3600 m, on soil and rocks or at base of tree trunk; Gangotri-Kedar Tal, 3200 m, on soil, 02-000430, 02-000423, 02-000429, 02-000431 (LWG).

## PHYSICIACEAE

*Anaptychia* Körb.

94. *A. pseudoroemeri* D. Awasthi & S. Singh; Gomukh, 5<sup>th</sup> moraine, right bank, 3780 m, on ground.

*Buellia* De Not.

95. *B. stigmaea* Tuck.; Chirwasa, 3600 m, on rocks, 02-000192 (LWG).

*Heterodermia* Trevisan

96. *H. diademata* (Taylor) D. Awasthi; Gangotri-Chirwasa, 3500 m, on twigs, 02-000231 (LWG).
97. *H. firmula* (Nyl.) Trevisan; Devwasa, 3200 m, on rocks, 02-000264 (LWG).
98. *H. incana* (Stirton) D. Awasthi; Gangotri-Kedar Tal, 3200 m, on bark of *Cedrus deodara*, 02-000285 (LWG).
99. *H. japonica* (Sato) Swinsc. & Krog; Gangotri-Kedar Tal, 3100 m, on rocks over soil, 02-000403/B (LWG).
100. *H. leucomela* ssp. *boryi* (Fée) Swinsc. & Krog; Bhairon Ghati area, on soil over boulder.
101. *H. microphylla* (Kurok.) Skorepa; Gangotri-Kedar Tal, 3100 m on rocks over soil, 02-000405/A (LWG).

*Phaeophyscia* Møberg

102. *P. ciliata* (Hoffm.) Møberg.; Gangotri-Gomukh, on rocks and soil; Gangotri-Kedar Tal, 3200 m, on rocks over soil, 02-000403/A (LWG).
103. *P. constipata* (Norrl. in Nyl.) Møberg.; Devwasa, 3200 m, on rocks, 02-000263/A (LWG); Bhojwasa, 3700 m, on soil, 02-000204 (LWG); Gomukh, on soil.
104. *P. endococcina* (Körb.) Møberg.; Gomukh, on rocks.
105. *P. hispidula* (Ach.) Essl.  
Bhairon Ghati and Gangotri, on soil or rocks; Chirwasa, 3500 m, on soil, 02-000248/B (LWG); Gangotri-Kedar Tal, 3100 m, on soil over rocks, 02-000403/C (LWG).
106. *P. kairamoi* (Vainio) Møberg; on Bark between Gangotri to Gomukh.
107. *P. sciastra* (Ach.) Møberg; on sandy soil in Gomukh area.

**Physcia** (Schreb.) Michaux

108. *P. adscendens* (Fr.) Olivier; on soil in Gomukh area.  
 109. *P. caesia* (Hoffm.) Furnr; Bhairon Ghati to Gomukh area.  
 110. *P. dubia* (Hoffm.) Lett.; Gomukh area, on boulder.  
 111. *P. gomukhensis* D. Awasthi & S. Singh; Gomukh area, right bank, between 3<sup>rd</sup> and 4<sup>th</sup> moraine, 3810 m, on boulder.  
 112. *P. phaea* (Tuck.) Thomson; Gangotri to Gomukh area, on boulders.  
 113. *P. stellaris* (L.) Nyl.; Bhairon Ghati, on bark of trees; Gangotri, 3140 m, 02-000169/B (LWG); Devwasa, 3200 m, on twigs, 02-000272 (LWG); Gangotri-Chirwasa, 3500 m, on twigs, 02-000231 (LWG).  
 114. *P. tribacia* (Ach.) Nyl.; Gangotri-Kedar Tal, 3100 m, on rocks over soil, 02-000405/B (LWG).

**Physconia** Poelt

115. *P. deterosa* (Nyl.) Poelt; Bhairon Ghati-Gomukh, on bark and mossy soil; Gangotri-Kedar Tal, 3100 m, on rocks over soil, 02-000401, 02-000424, 02-000426/A (LWG).  
 116. *P. enteroxantha* (Nyl.) Poelt.; Half way to Gangotri from Bhairon Ghati, on mossy soil.  
 117. *P. grisea* (Lam.) Poelt; Gangotri-Kedar Tal, 3200 m, on rocks over soil, 02-000402 (LWG); Devwasa - 3200 m, on soil, 02-000257 (LWG); Chirwasa 3500 m, on soil, 02-000227 (LWG); Bhojwasa 3700 m, on soil, 02-000203 (LWG).  
 118. *P. muscigena* (Ach.) Poelt; Bhairon Ghati to Gomukh area, common on soil along with mosses.  
 119. *P. perisidiosa* (Erichsen) Møberg; At 4 km from Bhairon Ghati to Gangotri, on mossy soil.

**Pyxine**

120. *P. berteriana* (Feé) Imshaug; Gangotri, 1800-2700 m, on bark of trees.

**Rinodina** (Ach.) Gray

121. *R. oxydata* (Massal.) Massal.; Chirwasa, 3500 m, on rocks, 02-000232 (LWG).

## PORPIDIACEAE

**Porpidia** Körb.

122. *P. crustulata* (Ach.) Hertel & Knoph in Hertel; Gangotri-Kedar Tal, 3100 m, on rocks, 02-000411 (LWG).

## RAMALINACEAE

**Ramalina** Ach.

123. *R. farinacea* (L.) Ach.; On bark in Chirbasa area.  
 124. *R. roesleri* (Hochst. in Schaerr) Hue Gangotri-Gomukh, on bark or soil.  
 125. *R. sinensis* Jatta; Bhairon Ghati, on twigs of *Quercus* and *Rhododendrom* trees; Towards Chirwasa, 3200 m, on *Pinus* tree trunk and twigs, 02-000174/C, 02-000217, 02-000289 (LWG); Devwasa 3200 m, on *Pinus*, 02-000260/ A (LWG).

## RHIZOCARPACEAE

**Rhizocarpon**

126. *R. geographicum* (L.) DC.; Gomukh, on non calcareous rocks.  
 127. *R. lindsayanum* Räsänen; Gangotri-Gomukh, 3000-3700 m, on rocks.  
 128. *R. macrosporum* Räsänen; Gomukh, 3000-3500 m, on rocks.  
 129. *R. sphaerosporum* Räsänen; Gomukh, 3780 m, on rocks.  
 130. *R. sublucidum* Räsänen; Gangotri-Gomukh, 3300-3800 m, on rocks.

## SIPHULACEAE

**Thamnotia** Ach.

131. *T. subuliformis* (Ehrh.) W. Culb.; Gomukh on ground in older moraines in edges below boulders.  
 132. *T. vermicularis* (Swartz.) Schaer.; Gangotri-Chirwasa-Gomukh, 3500 m, on moraine and soil over rocks, 02-000241 (LWG).

## STEREOCAULACEAE

**Stereocaulon** (Schreb.) Hoffm.

133. *S. foliolosum* Nyl.; Gomukh area, on sandy soil in ledges of boulders in moraines.

134. *S. myriocarpum* Th. Fr.; Gomukh and Tapovan, common and densely growing in the older moraines.

## TELOSCHISTACEAE

*Caloplaca* Th. Fr.

135. *C. insularis* Poelt; Gangotri–Kedar Tal, 3100 m, on rocks, 02-000407 (LWG).

*Xanthoria* (Fr.) Th. Fr.

136. *X. candelaria* (L.) Th. Fr.; Bhairon Ghati–Gomukh, on rocks; Gangotri, 3140 m, on twigs, 02-000169/ A (LWG).

137. *X. elegans* (Links) Th. Fr.; Devwasa–Gomukh area 3200–3900 m, on rocks, 02-000263/C (LWG).

138. *X. fallax* (Hepp) Arn; Between Bhairon Ghati–Gangotri, common on bark.

## THELOTREMATAACEAE

*Diploschistes* Norman

139. *D. euganeus* (Massal.) Steiner; Harsil, 2500 m, on siliceous rocks.

140. *D. gypsaceus* (Ach.) Nyl.; Gangotri to Chirwasa–3500 m, on soil over rock, 02-000219, 02-000263/D, 02-000236 (LWG).

141. *D. muscorum* (Scop.) R. Sant; Gomukh, 2400–3000 m, on mosses.

142. *D. scruposus* (Schreb.) Norman; Gangotri, 3000–3600 m, on siliceous stones or on soil.

## UMBILICARIACEAE

*Lasallia*

143. *Lasallia pustulata* (L.) Mérat; Gomukh, on boulders.

*Umbilicaria* Hoffm.

144. *U. krascheninnikovii* (Savicz.) Zahlbr.; Chirwasa, 3660 m, on rocks, 02-000198 (LWG).

145. *U. vellea* (L) Ach. em. Frey; Gangotri–Gomukh, on rocks; Chirwasa, 3500 m, on rocks, 02-000248/A (LWG).

146. *U. virginis* Schaer.; Bhojwasa to Gomukh area, frequent on boulders.

## VERRUCARIACEAE

*Dermatocarpon* Hedwig

147. *D. miniatum* (L.) Mann.; Devwasa, 3200 m, on rocks, 02-000265/B (LWG).

148. *D. velleum* Zschacke; Devwasa, 3200 m, on rocks, 02-000265/ A (LWG); Chirwasa 3500 m, on rocks, 02-000230 (LWG).

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