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New specific records of *Cladonia* from North-Western Himalayas, India

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Five species of lichen genus *Cladonia* i.e., *C. digitata*, *C. glauca*, *C. gracilis*, *C. parasitica*, and *C. uncialis* from North- Western Himalayas are reported as a new record for lichen flora of India and three species *C. bacillaris*, *C. floerkeana* and *C. praetermissa* var. *praetermissa* as new records for North India.

Key words: Dimorphic lichen, taxonomy, lichenized ascomycetes, Western Himalayas.

INTRODUCTION

North-Western Himalayas with different climatic regions support both tropical and temperate vegetation; resembling Asian elements on one hand and European elements on the other hand. This has been proved correct by the reports of occurrence of new and interesting fungi belonging to different groups including lichenized fungi/ lichens (Adamčík *et al.* 2015, Prasher & Verma 2012a, b, 2014, 2015a, b, c, 2016; Prasher & Singh 2012, 2013, 2014a, b, 2015, Prasher & Sushma 2014, 2016/ Prasher and Jakhal 2007, 2009a, 2009b, Sharma and Jakhal 2005, Prasher *et al.* 2008, Prasher and Chander 2008/ Prasher 2015). A floristic survey of the state of Himachal Pradesh for lichen diversity was conducted which resulted in the identification of 8 species of *Cladonia* Browne. Out of these five species constitute new record for India (*Cladonia digitata*, *C. glauca*, *C. gracilis*, *C. parasitica*, and *C. uncialis*) where as three species (*C. bacillaris*, *C. floerkeana* and *C. praetermissa* var. *praetermissa*) are new records for North India. *Cladonia floerkeana*, *Cladonia parasitica* which were treated as excluded species from lichen flora of India (Singh and Sinha 2010) are revalidated.

MATERIALS AND METHODS

Various localities of the study area were visited for the collection of the specimens. The specimens were examined morphologically, anatomically and chemically. Thin hand-cut sections of apothecia and thallus were mounted in plain water, cotton blue and 5% KOH and observed under a compound microscope. For chemical spot tests the usual reagents of K, C and P were used. TLC was performed in solvent system A (Toluene: 1, 4-dioxane: acetic acid:: 180: 60: 8 ml) was carried out following Culberson (1972) and Walker and James (1980). All the specimens have been deposited in the herbarium of Botany Department (PAN), Panjab University, Chandigarh, India.

RESULTS AND DISCUSSION

Cladonia Browne, Civ. Nat. Hist. Jamaica : 90, 1756.

Primary thallus squamulose to subfoliose, rarely crustose, generally persistent, rarely evanescent or absent, heteromerous, corticated on upper surface, photobiont a green alga; secondary thallus (podetium) arising from primary thallus, upright,

simple or branched, tubular, tapering or widening above into a cup (scyphus), corticated or decorticated, with or without squamules on surface, perforated or not at axils and in cups; apothecia terminal on margin of cups or terminal on podetia, rarely mature.

Type species: *Cladonia subulata* (L.) F.H. Wigg.

The genus *Cladonia* is represented by 61 species from India/ Himalayas (Singh and Sinha 2010, Awasthi 2007). Now with the addition of these species the total number of species recorded are 66.

Cladonia bacillaris (Ach.) Genth, Deutsche Medic. Wochenschrift 8: 406 (1835) **Fig. 1 (a, b)**

=*Baeomyces bacillaris* Ach., Methodus, Sectio post.: 329 (1803)

=*Baeomyces bacillaris* Ach., Methodus, Sectio post.: 329 (1803) var. *bacillaris*

=*Cenomyce bacillaris* (Ach.) Ach., (1810)

=*Cladonia floerkeana* var. *bacillaris* (Ach.) Lynge, (1910)

=*Cladonia macilenta* subsp. *bacillaris* (Ach.) Boist., (1903)

=*Cladonia macilenta* var. *bacillaris* (Ach.) Schaer.

=*Scyphophorus bacillaris* (Ach.) Gray [as 'Scyphophora'], Nat. Arr. Brit. Pl. (London) 1: 422 (1821)

Thallus terricolous, dimorphic - a basal, prostrate (primary) thallus squamulose, indeterminate and an erect (secondary) thallus consisting of hollow podetia; squamules slightly erect, occur singly or in groups, small, broad, thick, round, margin wavy with cream - coloured underside, sorediate with numerous soredia; podetia slender, ascyphous, usually club - shaped, tips tapering or blunt, white, usually with yellowish or greenish tinge, pulverulent, squamules wanting, up to 2.5 cm tall, corticate at base, major part ecorticate - sorediate, soredia numerous, podetia with axils closed, inner medullary layer opaque, often with tiny red, pale or black pycnidia on tips, occasionally bearing apothecia, photobiont a green alga- trebouxoid; podetia K^+ , P^- , cortex K^- , C^- , KC^- , P^- , barbatic, didymic and usnic acid present; apothecia small, at tips of podetia, biatorine, thalline exciple absent, proper exciple often becomes excluded, red or dark-brown or black; asci clavate- cylindrical, apices obtuse, tapering lower down into a narrow stem- like base, thickened at apex, tholus and outer gelatinous sheath I^+ blue, 8-spored, spores biserially to irregularly arranged; ascospores ellipsoid, simple, smooth, thin- walled, hyaline; paraphyses filiform, hyaline; pycnidia on podetia tips, tiny, red, pale or black K^- .

Collection examined: India, Himachal Pradesh, Shimla district, Tara Devi, on bark of *C. deodara*, 03.10.2013, Sushma 31610 (PAN); India,

Himachal Pradesh, Shimla district, Kufri, alt. 2500 m, on the bark of *C. deodara*, 26.08.2000, Kiran Rana 25661 (PAN); India, Himachal Pradesh, Kinnaur district, in forest near bank of Baspa river, Sangla, alt. 2680 m, on the bark of *C. deodara*, 01.05.2002, Kiran Rana 28015 (PAN).

Remarks: The species is characterized by broad and thick, sorediate, squamulose primary thallus; pointed ascyphous podetia corticated at base, major part ecorticate- sorediate, little cortex, opaque inner medullary layer; apothecia and pycnidia small, red or dark- brown to black; ascospores ellipsoid, simple and hyaline. *Cladonia didyma* (Fée) Vain. an allied species is distinguished due to its non-sorediate squamules (primary thallus), translucent inner medullary layer, podetia corticated in patches with interspersed soredia which later disappear leaving exposed dark- brown translucent areas and slightly smaller ascospores. Another related species is *C. floerkeana* (Fr.) Florke which is corticate over all and has soredia in patches in contrast to *C. bacillaris* that is ecorticate- sorediate in major part. Although a new record for N. W. Himalayas, it has been earlier recorded as *Cladonia macilenta* from Arunachal Pradesh, Himachal Pradesh, Kerala, Sikkim, Tamil Nadu and West Bengal (Singh and Sinha, 2010).

Cladonia digitata (L.) Hoffm., Deutschl. Fl., Zweiter Theil (Erlangen): 124 (1796) [1795]

=*Cenomyce digitata* (L.) Ach., Syn. meth. lich. (Lund): 267 (1814)

=*Lichen digitatus* L., Sp. pl. 2: 1152 (1753)

Thallus saxicolous, dimorphic- a basal prostrate (primary) thallus of large, dominant, horizontally spreading, often overlapping squamules and an erect (secondary) thallus- poditium arising from the center of primary thallus; squamules rounded, entire scarcely indented, up to 1.5 cm × 5 mm, grey or yellowish- green to grey, densely white farinose- sorediate under surface and up turned margins, lower surface towards point of attachment to substratum necrotic, often with distinct orange tinge; podetia hollow, cylindrical, usually more or less curved, simple, up to 1.5 cm tall and 2 mm diameter, basally corticated, sorediate in upper part, pointed or bearing irregular cups at tips, interior of cups and axils closed, podetia; photobiont a green algae- trebouxoid; apotheca occasional, at the ends of pointed apices or on short projections arising from cups, marginal, stalked, dark- brown to reddish- brown, K^+ red; apothecal cups up to 6 mm diameter, occasionally proliferate from margins; asci clavate- cylindrical, apices obtuse, tapering lower down into narrow cylindrical stem like base, thickened at apex, tholus outer gelatinous sheath I^+ blue, 8-spored, biserially arranged; ascospores ellipsoid, simple, smooth, thin- walled, hyaline;

paraphyses filiform, hyaline; pycnidia rare, arise from margins of podetial cups, K⁺ red.

Chemistry: K⁺ yellow or purple, P⁺ yellow; cortex K⁺ yellow, C⁻, KC⁻, P⁺ orange; thamnolic acid present.

Collection examined: India, Himachal Pradesh, Sirmour district, *en route* to Chaundhar, alt. 3500 m, on rock, 09.10.2000, Kiran Rana 25713 (PAN).

Remarks: The species is characterized by its squamules that are densely farinose- sorediate, more or less horizontal, margins ascending, necrotic basal parts tinged orange; apothecia on podetia. *Cladonia parasilica* (Hoffm.) Hoffm. is an allied species which has much smaller, deeply incised and compact often coarsely granular-sorediate squamules. It is a new report for India.

Cladonia floerkeana (Fr.) Flörke, De Cladonia's uit de sectie Cocciferae in België (morfologie, chemie, ecologie, sociologie, verspreiding en systematiek) 2. Ph.D. Thesis (Wilrijk): 99 (1828) **Fig. 1 (c-d)**

=*Cenomyce carcata* Ach.

=*Cenomyce floerkeana* Fr., (1825)

=*Cladonia floerkeana* f. *carcata* (Ach.) J.W. Thomson, The Lichen Genus *Cladonia* in North America (Toronto): 71 (1968) [1967]

=*Cladonia floerkeana* f. *intermedia* (Hepp ex Vain.) J.W. Thomson, The Lichen Genus *Cladonia* in North America (Toronto): 71 (1968) [1967]

=*Cladonia floerkeana* f. *trachypoda* (Nyl.) Harm.

=*Cladonia floerkeana* var. *carcata* (Ach.) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 80 (1887)

=*Cladonia floerkeana* var. *intermedia* Hepp ex Vain., Flecht. Europ.: no. 222 (1857)

=*Cladonia floerkeana* var. *trachypoda* Nyl.

=*Cladonia macilenta* f. *intermedia* (Hepp ex Vain.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 20: 131 (1951)

=*Cladonia macilenta* subf. *trachypoda* (Nyl.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 20: 131 (1951)

=*Cladonia macilenta* subsp. *floerkeana* (Fr.) R. Sant., Lichens and Lichenicolous Fungi of Sweden and Norway (Lund): 66 (1993)

=*Cladonia macilenta* subsp. *floerkeana* (Fr.) V. Wirth, Stittg. Beitr. Naturk., Ser. A (Biol.) 517: 62 (1994)

=*Cladonia macilenta* var. *carcata* (Ach.) Nyl.

=*Cladonia macilenta* var. *floerkeana* (Fr.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 20: 131 (1951)

Thallus corticolous, dimorphic, primary thallus crustose, squamulose, persistent, giving rise to erect podetia (secondary thallii), primary squamules broad and thick, heteromerous, upper

surface green, corticate, sorediate, lower surface white, giving an appearance of orange- tinge; podetia up to 2.2 cm tall, usually short, axils closed, pale- green to dark- grey, awl- shaped, tubular or pointed apically, simple or occasionally sparingly branched near apices, sorediate at upper portion, non- cup bearing, major portion of the podetium corticate, partially decorticate near tips (podetia corticate in patches among soredia), smooth, areolate, with or without dense squamules, podetia usually hollow from the centre, medulla two layered- outer layer showing intricate hyphae while inner layer of fused hyphae, photobiont a green alga- trebouxoid, cortex of primary thallus K⁻, C⁻, KC⁻, P⁻, UV⁺ blue; barbatic, didymic and usnic acids present; apothecia numerous, biatorine, terminal, large in relation to the size of the thallus, bilobed, verrucose and irregular in shape, scarlet- red; hypothecium hyaline with reddish - tinge, thecium red; asci 31.5-42.0 x 12.3-14.0 µm, clavate- cylindrical, apices obtuse narrowing lower down with small pointed base, 8-spored in general, few mature asci 6-spored, spores biserially arranged; ascospores 14.0-24.5 x 5.3-10.3 µm, ellipsoid, slightly curved, 1 - 3 septate, when bicelled, the two halves equal or unequal, smooth, thin- walled, reddish- brown; paraphyses up to 2.8 µm thick, filiform, branched, septate, upper cell enlarged up to 3.5 µm and impregnated with reddish-brown amorphous matter, projecting up to 14.0 µm high above the tips of asci; epithecium 4.20 µm thick, hyaline; pycnidia occupy the same position as apothecia, red, conidia not found within pycnidia; apothecia and pycnidia K⁺ red.

Collection examined: India, Himachal Pradesh, Shimla, Tara Devi, on bark of *C. deodara*, 03.10.2013, Sushma 31614 (PAN); India, Himachal Pradesh, Kinnaur, Sangla, in forest, near bank of Baspa river, on the bark of *C. deodara*, c 2700 m, 01.05.2002, Kiran Rana 28003 (PAN).

Remarks: This species is similar to *C. macilenta* Hoffm., but the podetia are usually shorter and the apothecia are large in relation to the size of the plant as well as in K⁻ and P⁻ reactions, an allied *C. macilenta* has K⁺ yellow reaction. The spores in the specimens examined are brown, however, reported as hyaline to brownish. This species has been mentioned by Upreti (1987, p. 70) as reported from India in “Key to the species of lichen genus *Cladonia* from India and Nepal” without mentioning the place of collection. A detailed survey of literature reveals it to be a new record for N. W. Himalayas.

Cladonia glauca Flörke Clad. Comm. :140 (1828)

Fig. 1 (f, g)

=*Cladonia cenotea* var. *glauca* (Flörke) Leight.

Thallus terricolous, dimorphic, stratosediate- fruticose; primary thallus squamulose, squamules narrow, 3-5 X 0.7-1 mm, erect, incised, upper

surface greenish grey; lower surface white, erhizinate; secondary thallus podetia, coarsely sorediate, ecorticate, cylindrical, 10-115 mm tall, greyish, irregularly branched and split up lengthwise, P-, base of podetium persistent; primary thallus heteromerous, lower cortex absent, upper cortex 30-43 µm wide, plectenchymatous; algal layer 82-105 µm wide, algal cells green, spherical, 6-8 µm in diam.; medulla 86-103 µm wide, lax, hyphae septate and branched; secondary thallus (podetia) heteromerous, lower cortex absent, upper cortex 17-25 µm wide, algal layer 44-55 µm wide, algal cells green, spherical, 6.4-8 µm in diam.; medulla 105-150 µm wide, lax, hyphae septate and branched.

Collections examined: India, Uttarakhand, Nagtal, Valley of Flowers National Park, NDBR, alt. 3300 m, on soil, 24.09.2007, Hem Chander 28797 (PAN); India, Uttarakhand, Debrugheta, Nanda Devi National Park, NDBR, alt. 3500m, on soil, 30.09.2007, Hem Chander 28808 (PAN).

Remarks: This species is characterized by having intricately branched, finely or coarsely sorediate podetia. The species is being reported for the first time from India.

Cladonia gracilis (L.) Willd., Fl. berol. prodr.: 363 (1787) **Fig. 2 a**

- =*Baeomyces gracilis* (L.) Ach., Methodus, Sectio post.: 344 (1803)
- =*Capitularia gracilis* (L.) Flörke
- =*Capitularia gracilis* (L.) Flörke f. *gracilis*
- =*Cenomyce gracilis* (L.) Dufour, Rev. *Cladonia*: 15 (1817)
- =*Lichen gracilis* L., Sp. pl. 2: 1152 (1753)

Thallus corticolous, dimorphic- a prostrate (primary) thallus squamulose and an erect (secondary) thallus of hollow, cylindrical, slender podetia; squamules broad, 5.0 x 3.0 mm, upper surface smooth, corticate, usually conspicuously areolate, attached squamules mostly absent or scarce, margin crenate- lobate, indented, underside white; podetia simple or sparingly branched above, not pointed at apices, thin-walled, squamulose throughout with dispersed squamules, up to 2.5 cm tall and 2.0 mm diameter, non- sorediate, greenish-grey to dark- brown becoming dark brown- black towards base; bear regular shallow saucer - shaped cups, up to 2 mm diameter, non - perforate, often with dentate margins, cups proliferating frequently from the rim, 3 - 4 tiered, interior of cups and axils closed, podetia K⁻, P⁺ red; thallus K⁻, C⁻, KC⁻, P⁺ red, UV⁻; fumarprotocetraric acid present; photobiont a green alga - trebouxoid; apothecia rare, at margins of cups, biatorine, thalline exciple absent, proper exciple often becoming excluded, pale - brown to dark - brown, K⁻; asci clavate - cylindrical, apices obtuse, tapering lower down into

narrow stem - like base, thickened at apex, tholus and outer gelatinous sheath I⁺ blue, 8 - spored, spores biserially arranged; ascospores ellipsoid, simple, smooth, thin - walled, hyaline; paraphyses filiform, hyaline; pycnidia frequent, at margins of cups, brown, K⁻.

Collection examined: India, Himachal Pradesh, Shimla district, Tara Devi, on bark of *C. deodara*, 03.10.2013, Sushma 31612 (PAN); India, Himachal Pradesh, Shimla district, near Churdhar, alt. 3550 m Chopal, on the bark of *A. pindrow*, 08.10.2000, Kiran Rana 25710 (PAN).

Remarks: The species is distinguished by its slender habit, smooth podetia either pointed or terminating in small, non - perforate cups. The allied species are - *C. furcata* and *C. crispata* (Delise) Vain. The former lacks scyphus, has perforated axis whereas the latter bears cups that are perforated; is more branched, P⁺, UV⁺ white having squamatic acid. *Cladonia gracilis* differs from the above two species in possessing rather more delicate, sparingly branched habit, lacks perforations; has more continuous, P⁺ red and UV⁻ cortex without squamatic acid. A new report from India.

Cladonia parasitica (Hoffm.) Hoffm., Deutschl. Fl., Zweiter Theil (Erlangen): 127 (1796) [1795]

- =*Cenomyce delicatus* (Ehrh.) Ach., Lich. univ.: 569 (1810)
- =*Cladonia delicata* (Ehrh.) Flörke, (1828)
- =*Cladonia squamosa* var. *delicata* (Ehrh.) Fr.
- =*Helopodium delicatum* (Ehrh.) Gray, Nat. Arr. Brit. Pl. (London) 1: 416 (1821)
- =*Lichen delicatus* Ehrh.
- =*Lichen parasiticus* Hoffm.

Thallus corticolous, dimorphic - a basal prostrate (primary) thallus squamulose and an erect (secondary) thallus conspicuously raised above basal squamules, consisting of usually more or less hollow podetia; squamules tiny, narrow, elongate, up to 2.5 x 1.0 mm, crenate, much dissected, often coralloid to branched, margins more or less coralloid to sorediate, ascending, coarsely granular to sorediate with quite distinct granules forming crowded, compact, spreading swards; upper surface pale to dark -grey, lower side white, heteromerous, medulla two layered - outer arachnoid and inner of fused hyphae; podetia entire, simple or slightly irregularly branched, sometimes flattened, up to 9 mm tall and 1.2 mm diameter, not perforated, completely decorticate, surface rough covered with numerous or scattered squamules and granular soredia, grey - green to dark, tips ascyphous and usually with apothecia, podetia with axils open, P⁺ deep - yellow to orange, photobiont a green alga - trebouxoid; cortex K⁺ quickly turning bright - yellow, C⁻, KC⁻, P⁺ orange, UV⁻; thamnolic and barbatic acids present; apothecia sessile, small,

mostly clustered on tips of podetial stalks, often on extended projections, up to 2 mm diameter, biatorine, thalline exciple absent, proper exciple often becoming excluded, dark - brown, K^+ quickly turning bright – yellow; asci clavate - cylindrical, apices obtuse, tapering lower down into narrow stem - like base, thickened at apex, tholus and outer gelatinous sheath I^+ blue, 8 - spored, spores biserially arranged; ascospores ellipsoid, simple, smooth, thin - walled, hyaline; paraphyses filiform, hyaline, pycnidia on upper surface of basal squamules, dark -brown to black, K^+ .

Collection examined: India, Himachal Pradesh, Shimla district, near Churdhar, alt. 3550 m Chopal,

on the bark of *A. pindrow*, 08.10.2000, Kiran Rana 25711 (PAN).

Remarks: The species is characterized by podetia that are short, delicate, tapering without scyphous, simple to irregularly branched, ecorticate, squamulose with open axils: granular soredia on both squamules and podetia; brown, clustered apothecia K^+ quickly turning bright - yellow. It is quite close to *C. polydactyla* (Flörke) Spreng. and *C. vulcanica* Zoll. in being sorediate, but differs as both have closed axils, K^+ red apothecia in comparison to open axils and apothecia K^+ quickly turning bright - yellow. It is a new report from India.

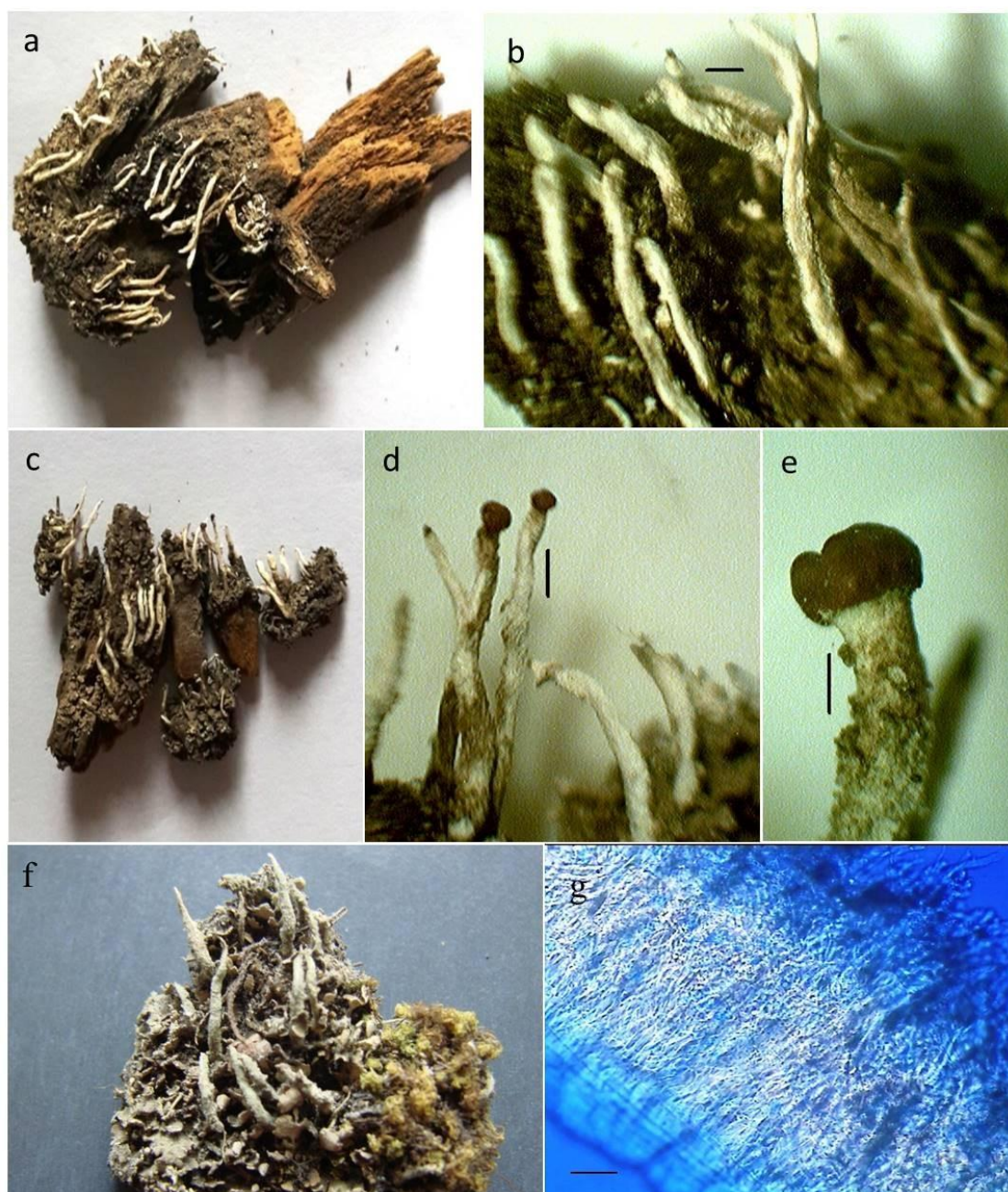


Fig. 1 a, b) *Cladonia bacillaris* c) *C. floerkeana* d, e) Magnified view of podetia f) *C. glauca* g) *C. glauca* T.S. of podetia. Bars b, d = 1mm; e = 0.200mm; g = 50 μ m.

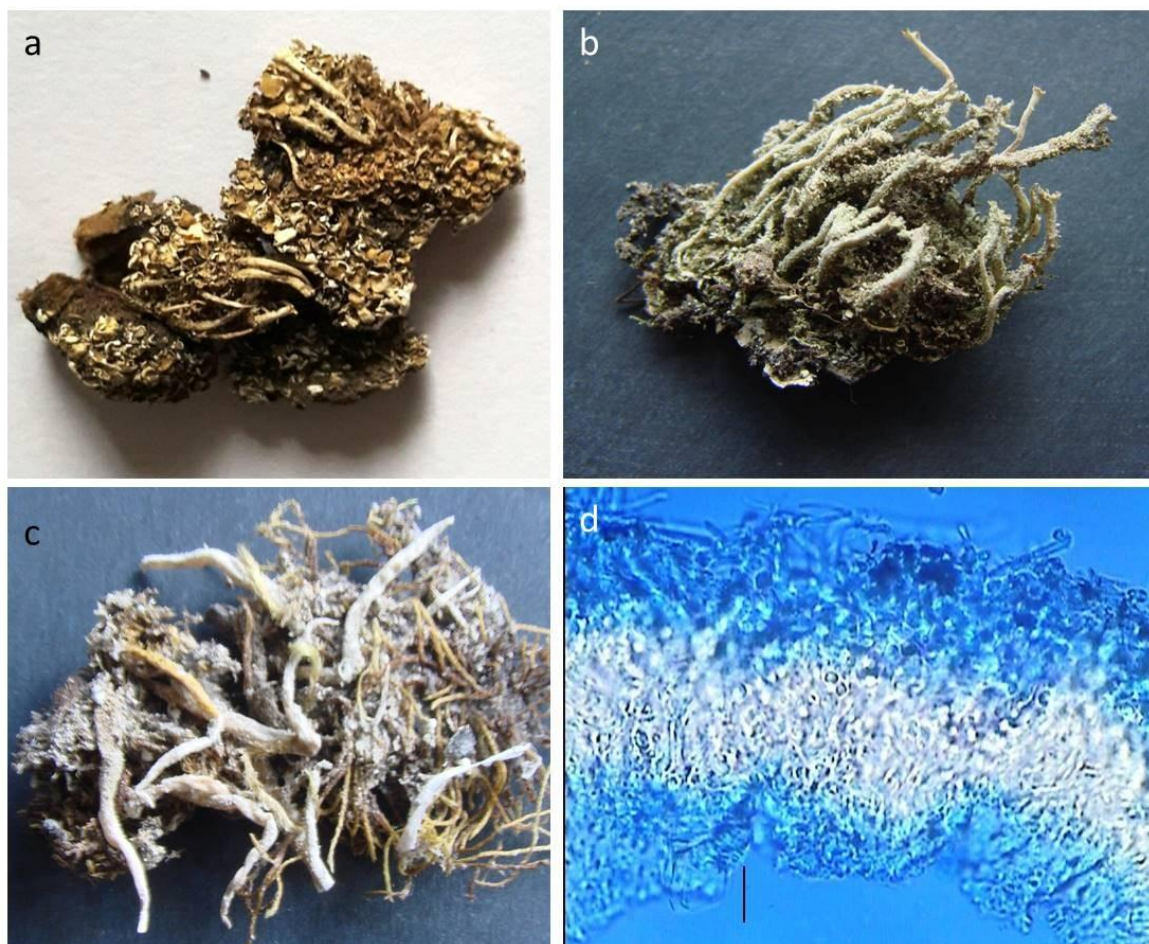


Fig. 2 a) *Cladonia gracilis* b) *C. praetermissa* var. *praetermissa* c) *C. uncialis* d) *C. uncialis* T.S. of podetia. Bar d = 50 μ m.

Cladonia praetermissa var. *praetermissa* A.W. Archer, *Muelleria* 5(4-5): 273 (1984) **Fig. 2 b**

=*Cladonia ceratophylla* (Sw.) Spreng., *Syst. veg.*, Edn 16 4(1): 271 (1827)

=*Imbricaria ceratophylla* (Sw.) Hepp, *Flecht. Europ.*: no. 52 (1853)

=*Lichen ceratophyllus* Sw., *Prodr.*: 147 (1788)

Thallus terricolous, dimorphic, stratose-radiate-fruticose; primary thallus squamulose, squamules broad, 5-8 mm wide, erect, incised, upper surface greenish grey, lower surface white, erhizinate; secondary thallus podetia, granulose-soresiate, decorticate, cylindrical, 5-15 mm long, 1 mm in diam., greyish, irregularly branched and split up lengthwise, P⁺ red, base of podetium persistent; primary thallus heteromerous, lower cortex absent, upper cortex 15-25 μ m wide, plectenchymatous; algal layer 50-75 μ m wide, algal cells green, spherical, 6.4-8 μ m in diam., photobiont a green alga; medulla 75-102 μ m wide, lax, hyphae septate and branched; secondary thallus (podetia) heteromerous, lower cortex absent, upper cortex

17-25 μ m wide, algal layer 45-70 μ m wide, algal cells green, spherical, 6.4-8 μ m in diam., photobiont a green alga; medulla 75-110 μ m wide, lax, hyphae septate and branched.

Collections examined- India, Uttarakhand, Semar, Valley of Flowers National Park, NDBR, alt. 3500 m, on soil, 25.09.2007, Hem Chander 28804 (PAN); India, Uttarakhand, Debrugheta, Nanda Devi National Park, NDBR, alt. 3500m, on soil, 30.09.2007, Hem Chander 28805 (PAN).

Remarks: This species is marked by the presence of terricolous, dimorphic, stratose-radiate-fruticose thallus; secondary thallus is greyish, irregularly branched and split up lengthwise. This is a new record for Himalayas as well as North India.

Cladonia uncialis (L.) Weber ex Wigg. *Prim. Fl. Holsat. (Kiliae)*: 90, 1780. **Fig. 2 (c, d)**

Thallus terricolous, dimorphic, stratose-radiate-fruticose; primary thallus squamulose, secondary thallus podetiate; squamules rounded, dissected to entire, 2-3 X 1-2 mm, yellowish grey, lower surface white; podetia hollow, sparingly branched, branching dichotomous to sympodial, stalk 1-1.5 \times

0.2-0.5 cm, surface corticated throughout, cortex glossy, dilated and perforated at axils, non sorediate, greyish green, podetia cupless, tip branchlets sharply pointed; photobiont a green alga; apothecia sessile.

Chemistry: Cortex K-, C-, KC+ yellow, P-, UV-.

Collections examined- India, Uttarakhand, Bhyundar, NDBR, alt. 2400 m, on soil, 21.09.2007, Hem Chander 28798 (PAN); India, Uttarakhand, Hemkund Sahib, NDBR, alt. 4200m, on soil, 22.09.2007, Hem Chander 28799 (PAN); India, Uttarakhand, Bamanidwar, Valley of Flowers National Park, NDBR, alt. 3450 m, on soil, 25.09.2007, Hem Chander 28800 (PAN); India, Uttarakhand, Bistoli, Valley of Flowers National Park, NDBR, alt. 3500m, on soil, 26.09.2007, Hem Chander 28801 (PAN); India, Uttarakhand, Kundaliyasain, Valley of Flowers National Park, NDBR, alt. 3500 m, on soil, 26.09.2007, Hem Chander 28802 (PAN); India, Uttarakhand, Drunager, Valley of Flowers National Park, NDBR, alt. 3550m, on soil, 27.09.2007, Hem Chander 28803 (PAN); India, Uttarakhand, Debruggheta, Nanda Devi National Park, NDBR, alt. 3500m, on soil, 30.09.2007, Hem Chander 28807 (PAN).

Remarks: This species is characterized by podetia which are not intricately branched. The species is being reported for the first time from India.

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