

Lecanora bicincta Ramond, a new record to Indian lichen flora and some additions to the lichen flora of Sikkim, India

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ABSTRACT

Joseph S. & Sinha G. P. 2013. *Lecanora bicincta* Ramond, a new record to Indian lichen flora and some additions to the lichen flora of Sikkim, India. Geophytology 42(1): 71-75.

The present paper deals with *Lecanora bicincta* Ramond, a new record to the lichen flora of India. In addition, 10 species of lichens, new to lichen flora of Sikkim, are also dealt with. These are: *Lecanora argentata* (Ach.) Degel., *L. chlarofera* Nyl., *L. cinereofusca* H. Magn., *L. luteomarginata* Nayaka et al., *L. phaeocardia* Vain., *L. pulicaris* (Pers.) Ach., *L. subrugosa* Nyl., *Lecidea confluens* (Weber) Ach., *Porpidia macrocarpa* (DC.) Hertel & A.J. Schwab and *Tylophoron protrudens* Nyl.

Key-words: Lichenized Ascomycota, *Lecanora bicincta*, new lichen records, Sikkim, India.

INTRODUCTION

The state of Sikkim has remained an attraction for botanists and naturalists. Several workers from India and abroad contributed on lichen diversity of Sikkim (Nylander 1860, 1863, Chopra 1934, Asahina 1966, Awasthi 1988, 1991, 2007, Sinha 1999, 2004a, b, Sinha & Chauhan 1996, 1998, Sinha & Elix 2003, Divakar et al. 2001, 2003, Upreti et al. 2004, Sinha & Singh 2005, Sinha & Jagadeesh Ram 2011). However, a comprehensive lichen flora remained elusive because of its rich natural wealth and several inaccessible areas. Publication on macrolichens of Sikkim (Sinha & Singh 2005) and current ongoing work on microlichens of Sikkim at Botanical Survey of India are steps to accomplish the task. Altogether, 506 species (Sinha & Jagadeesh Ram 2011) have so far been documented from Sikkim. Additional 11 species have been found which include a new record for India as well. These are described suitably to facilitate their identification.

MATERIAL AND METHOD

The specimens examined were housed at BSA and BSHC herbaria. Morphological, anatomical and chemical details of all specimens were studied. Chemical analyses were performed with usual spot tests and thin layer chromatography following Orange et al. (2001).

NEW RECORD TO LICHEN FLORA OF INDIA

Lecanora bicincta Ramond

Mém. Mus. Hist. Nat. 13: 248. 1825.

Figure 1

Description: Thallus saxicolous, crustose, rimose-areolate, areoles flat, thin or thick, small to large crystals present, ecorticate; surface pale yellow to whitish grey or grey, smooth, epruinose, esorediate. Prothallus indistinct, white at margins. Apothecia immersed to subimmersed when young, sessile when mature, up to 1.2 mm diam., lecanorine; disc orange-brown to red-brown (when pruina removed), concave to slightly

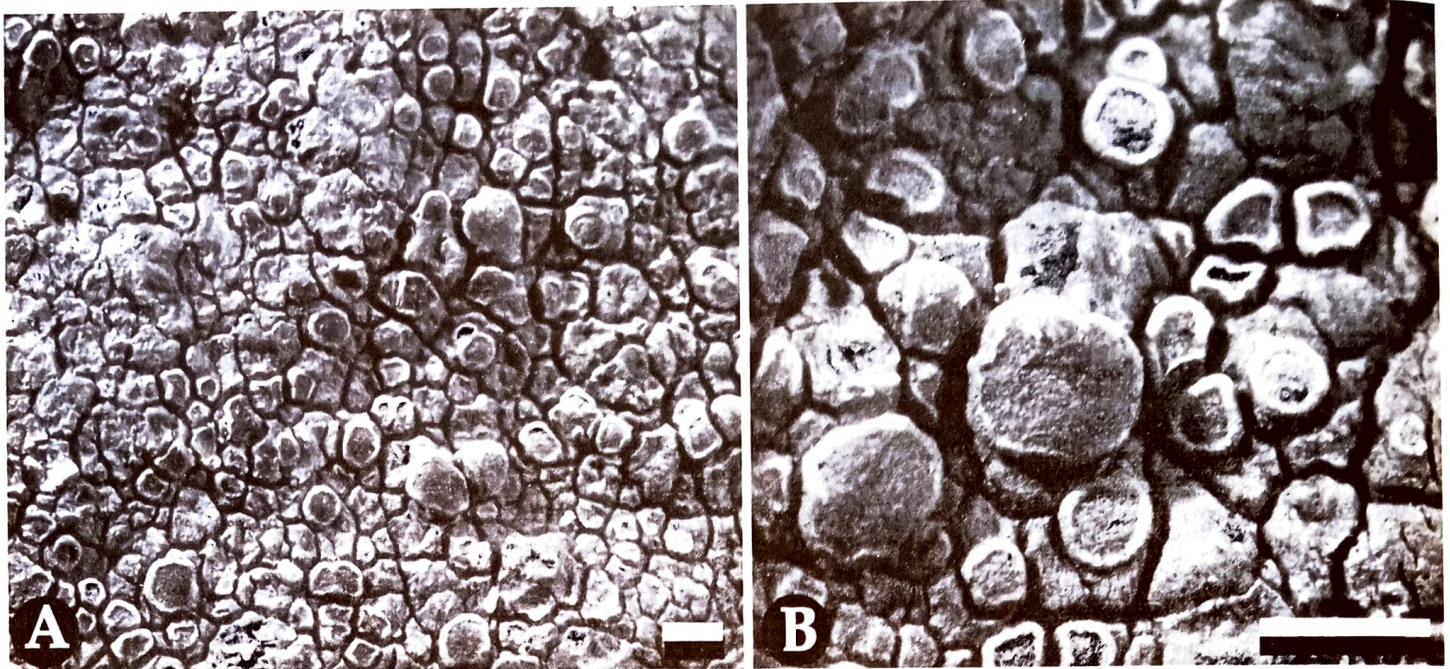


Figure 1. *Lecanora bicincta* Ramond; A. Thallus; B. An enlarged view of thallus. Scale bars = 1 mm.

convex, rarely some mature disc cracked, densely pruinose; pruina bluish grey to whitish grey; margin concolorous with thallus, thin or thick, persistent, prominent, smooth, entire. Amphithecium present, with alga filling the medulla, crystals present, corticated; cortex usually distinctly delimited, uniform or slightly thicker at the base than at the sides, 35–42 μm thick laterally and 42–50 μm thick at base. Parathecium hyaline, without crystals. Epihymenium dark green to olivaceous green, some areas light brown, with crystals, pigments turning light green in K. Hymenium hyaline, 60–90 μm high, slightly light green above at some regions. Paraphyses simple, slightly thickened apically, not pigmented. Subhymenium indistinct. Hypothecium hyaline, 130–200 μm thick, light yellow (only at thickened portion of section). Asci clavate, 30–48 \times 16–20 μm , 8-spored. Ascospores hyaline, simple, narrowly to broadly ellipsoid, (8.3–) 9.9–13.2 \times (3.9–) 4.9–5.3 (–6.6) μm . Pycnidia not seen.

Chemistry: Thallus K+ deep yellow, C-, KC+ yellow, P+ pale yellow; apothecial margin K+ yellow, C+ yellow, P+ pale yellow; disc K+ yellow – orange, C+ yellow, P-; apothecia UV+ yellow – orange; arthothelin (major), atranorin (major), sordidone (major), an unidentified fatty acid at Rf class 4–5 in solvent A and traces of unknown substances present.

Distribution: Previously known from Argentina, Arizona, Austria, Australia, California, Estonia, Germany, New Zealand, Norway, Mongolia, Poland, Sweden, Turkey and now India.

Specimen examined: Sikkim, Lashar, Nymateng, alt. 4500 m, 19.07.1996, G. P. Sinha 1189 (BSHC).

ADDITIONS TO LICHEN FLORA OF SIKKIM

1. *Lecanora argentata* (Ach.) Degel.

In Nilson, Ark. Bot. 24A: 78. 1931. *Parmelia subfusca* f. *argentata* Ach., Methodus: 169. 1803.

Description: Thallus corticolous, continuous to rimose-areolate, esorediate. Apothecia sessile; margin concolorous with thallus; disc red brown, epruinose. Amphithecium with large crystals, soluble in K. Epihymenium yellow brown-orangish, with crystals, pigments and crystals insoluble in K. Hymenium hyaline, not inspersed. Hypothecium hyaline to pale yellow. Asci 8-spored. Ascospores 10–14.5 \times 7–9 μm .

Chemistry: Thallus K-, C-, KC-, P-, UV-; atranorin and gangaleoidin present.

Distribution: Previously reported from Andaman & Nicobar Islands, Andhra Pradesh, Jammu & Kashmir, Maharashtra, Manipur, Orissa, Uttarakhand and West Bengal plains (Singh & Sinha 2010).

Specimen examined: Sikkim, Dikchu, 27°23'61.2''N, 88°30'96.7''E, alt. 725 m, 21.11.2006, G. P. Sinha 3647B (BSA).

2. *Lecanora chlarotera* Nyl.

Bull. Soc. Linn. Normandie, ser. 2, 6: 274. 1872.

Description: Thallus corticolous, continuous, rimose-areolate to verrucose. Apothecia sessile; margin concolorous with thallus, thin or thick; disc red brown to brown, epruinose. Amphithecium with large crystals, insoluble in K. Epihymenium granular, pigments and crystals soluble in K. Hymenium hyaline, not inspersed. Asci 8-spored. Ascospores 9–15 × 4.5–7 µm.

Chemistry: Thallus K+ yellow, C-, KC-, P-, UV-; atranorin present.

Distribution: Previously reported from Jammu & Kashmir, Karnataka, Maharashtra, Manipur, Nagaland, Rajasthan, Tamil Nadu, Uttarakhand and West Bengal (Singh & Sinha 2010).

Specimen examined: Sikkim, Pangthang-Rokshe, alt. 1795 m, 21.11.2006, G. P. Sinha 3623 (BSA).

3. *Lecanora cinereofusca* H. Magn.

Acta Horti Gothob. 7: 86. 1932.

Description: Thallus corticolous, continuous, smooth, slightly verruculose, esorediate. Apothecia immersed, soon becoming sessile; disc pale brown, epruinose. Amphithecium with small and large crystals, small crystals dissolving in K. Epihymenium granular, pigments soluble in K. Hymenium hyaline, not inspersed. Hypothecium hyaline. Asci 8-spored. Ascospores 12–17 × 7–9.5 µm.

Chemistry: K+ yellow, C-, KC-, P-, UV-; atranorin and pannarin present.

Distribution: Previously reported from Himachal Pradesh, Karnataka, Tamil Nadu and Uttarakhand (Singh & Sinha 2010).

Specimen examined: West Sikkim, Tashiding-Yoksum Road, near Chorung village, alt. 1500 m, 10.12.1994, G. P. Sinha 304 (BSHC).

4. *Lecanora luteomarginata* Nayaka, Upreti & Lumbsch

Lichenologist 38(5): 421. 2006.

Description: Thallus saxicolous, rimose-areolate,

esorediate; prothallus white. Apothecia immersed, sessile to substipitate; margin greenish yellow to golden yellow, prominent, thick; disc dark brown to red brown, epruinose to slightly pruinose. Amphithecium with small and large crystals, insoluble in K, cortex indistinct. Parathecium hyaline to pale yellow, with small crystals. Epihymenium granular, pigments and crystals insoluble in K. Hymenium hyaline, not inspersed. Hypothecium pale yellow K+ intensifying. Asci 8-spored. Ascospores simple, hyaline, ellipsoid. Pycnidia immersed; conidia filiform, curved, 18–25 µm.

Chemistry: Thallus K+ yellow, C-, KC-, P+ yellow, UV-; atranorin, zeorin and traces of unknown substances.

Remarks: Most of the apothecia were found lacking ascus with ascospores. Some of the characters show variation from original description of *L. luteomarginata*. According to Lumbsch (pers. com., Jan. 2011), these are some variations within the species. Further molecular studies may reveal this as a new species.

Distribution: It was previously known only from the type locality in Uttarakhand (Singh & Sinha 2010).

Specimen examined: East Sikkim, near lower Zuluk, alt. 2300 m, 05.04.1996, G. P. Sinha 893 (BSHC).

5. *Lecanora phaeocardia* Vain.

Suom. Elain-ja Kasvist. Seuran Van. Julk. 1(3): 41. 1923.

Description: Thallus corticolous, verrucose to verruculose, esorediate. Apothecia sessile; margin concolorous with thallus; disc brown to red brown, epruinose. Amphithecium with large crystals, insoluble in K. Epihymenium dark brown, granular, pigments and crystals soluble in K. Hymenium hyaline, not inspersed. Hypothecium dark brown. Asci 8-spored. Ascospores 10–16 × 5.5–7 µm.

Chemistry: Thallus K+ yellow, C-, KC-, P-, UV-; atranorin present.

Distribution: Previously reported from Arunachal Pradesh, Uttarakhand and West Bengal (Singh & Sinha 2010).

Specimens examined: East Sikkim, Tamsey, alt. 3500 m, May 1994, G. P. Sinha 677 (BSHC); Sikkim, Dikchu, 27°23'61.2"N, 88°30'96.7"E, alt. 725 m, 21.11.2006, G. P. Sinha 3647E (BSA).

6. *Lecanora pulicaris* (Pers.) Ach.

Syn. Meth. Lich. 336. 1814. *Patellaria pulicaris* Pers., Ann. Wetterauschen. Ges. Gesammte Naturk. 2(1): 13. 1810.

Description: Thallus corticolous, continuous to verrucose, esorediate. Apothecia sessile; margin concolorous with thallus, thin to thick; disc red brown to brown, epruinose. Amphithecium with large crystals. Parathecium hyaline. Epihymenium granular, soluble in K, pigments soluble in K. Hymenium hyaline, not interspersed. Hypothecium hyaline. Asci 8-spored. Ascospores 12–18 (-20) × 6–9 µm.

Chemistry: K+ yellow, C-, KC-, P+ yellow, UV-; atranorin and fumarprotocetraric acid present.

Distribution: Previously reported from Karnataka, Madhya Pradesh, Manipur, Nagaland, Tamil Nadu, Orissa and West Bengal (Singh & Sinha 2010).

Specimen examined: East Sikkim, Chhangu Lake surroundings, alt. 3550 m, 16.05.1998, G. P. Sinha 1371 (BSHC).

7. *Lecanora subrugosa* Nyl.

Flora 58: 15. 1875.

Description: Thallus corticolous, continuous, verrucose-areolate, esorediate. Apothecia sessile to constricted at base; margin concolorous with thallus; disc brown to red brown, epruinose. Amphithecium with large crystals insoluble in K. Parathecium hyaline, without crystals. Epihymenium pigments not soluble in K. Hymenium hyaline, clear. Hypothecium hyaline to pale yellow. Asci 8-spored. Ascospores 12–19 × 6–9.5 µm.

Chemistry: K+ yellow, C-, KC-, P+ pale yellow; atranorin and some unknown substances present.

Remarks: The specimen from Sikkim lacks gangaleoidin. Upreti (1997) reported presence of gangaleoidin, while it is absent in North American specimens (Ryan et al. 2004). European specimens may

or may not possess gangaleoidin. However, specimens with gangaleoidin can be distinguished from similar *L. argentata* (Ach.) Degel. by its raised, constricted apothecia, verrucose to granulose thallus and thick walled ascospores (Brodo 1984).

Distribution: Previously reported from Himachal Pradesh, Jammu & Kashmir, Karnataka, Tamil Nadu, Uttarakhand and West Bengal (Singh & Sinha 2010).

Specimen examined: Sikkim, Penangala, 27°22'23.9"N, 88°36'85.3"E, alt. 1880 m, 19.11.2006, G. P. Sinha 3601B (BSA).

8. *Lecidea confluens* (Weber) Ach.

Methodus: 14. 1803. *Lichen confluens* Weber, Spic. Fl. Goett.: 180, tab. 2. 1778.

Description: Thallus saxicolous, rimose-areolate, grey to whitish grey, medulla I+ deep violet. Prothallus black. Exciple carbonized. Epihymenium dark, pigments insoluble in K. Hymenium hyaline, K-, I+ violet-blue. Hypothecium dark brown to reddish brown, upper part slightly reddish brown. Asci 8-spored. Ascospores simple, 9–15 × 4–6 µm.

Chemistry: Thallus K-, C-, KC-, P-, UV-; no lichen substances detected in TLC.

Remarks: The specimen tallies well with *L. confluens* except for absence of confluent acid. It may be a strain of *L. confluens* lacking chemicals.

Distribution: Previously it was reported from Jammu & Kashmir and Uttarakhand (Singh & Sinha 2010).

Specimen examined: North Sikkim, Sebu La, Base camp east side, alt. 4960 m, 23.07.1996, G. P. Sinha 1232 (BSHC).

9. *Porpidia macrocarpa* (DC.) Hertel & A.J. Schwab

In Hertel, Beih. Nova Hedwigia 79: 437. 1984. *Patellaria macrocarpa* DC. in Lam. & DC., Fl. Franç., ed. 3, 2: 347. 1805.

Description: Thallus saxicolous, rimose to areolate, whitish grey to pale orange, medulla I-. Apothecia sessile, constricted at base, ± rounded, black; disc plane to convex, epruinose. Exciple brown to black. Hymenium hyaline below, not interspersed.

Hypothecium pale to dark brown. Asci 8-spored. Ascospores simple, hyaline, halonate, $15-20.5 \times 6-10 \mu\text{m}$.

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

Distribution: Earlier reported from Jammu & Kashmir and Uttarakhand (Singh & Sinha 2010).

Specimen examined: West Sikkim, on way between Tsoka-Phithang, alt. 3900 m, 12.05.1994, G. P. Sinha 218 (BSHC).

10. *Tylophoron protrudens* Nyl.

Bot. Zeitung (Berlin) 20: 279. 1862.

Description: Thallus corticolous, episubstratal, thin to thick. Ascomata sessile, cylindrical. Excipulum dark brown. Mazaedium well developed. Ascospores dark brown, 1-septate, ellipsoid, pointed at ends, septum thick and densely pigmented, $9-14 \times 4.5-6.5 \mu\text{m}$.

Chemistry: Thallus K-, C+ rose red, KC-, P-, UV-, apothecial margin C+ red; lecanoric acid present.

Distribution: Previously reported from Kerala, Orissa, Uttarakhand and West Bengal (Singh & Sinha 2010).

Specimen examined: Sikkim, Assam Lingzey, $27^{\circ}16'78.8''\text{N}$, $88^{\circ}36'33.0''\text{E}$, alt. 1078 m, 23.11.2006, G. P. Sinha 3686 (BSA).

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