



Short communication

Two new records of Graphidaceae (Lichenized Ascomycota) from India

G. Swarnalatha[‡]Botanical Survey of India, Deccan Regional Centre
Hyderabad-500048, Telangana, India

ARTICLE INFO

Article history:

Received : 13 June 2017

Accepted : 12 December 2017

Keywords:

Arunachal Pradesh
West Bengal
Fissurina
Graphis
New Records

ABSTRACT

Two species of lichen viz. *Fissurina comparilis* (Nyl.) Nyl. and *Graphis erythrocardia* Müll. Arg. (Graphidaceae) collected from Eastern Himalaya are reported here as new distributional records for India.

© 2017 Orissa Botanical Society

Eastern Himalaya is one of the eleven bio-geographical zones in India and it forms a part of the globally recognised 'Biodiversity Hotspot'. The region lies between 26°27'22" - 29°30'2" N latitudes and 87°59'2" - 97°30'2" E longitudes and covers an area of 93,988 sq. km. It covers the states of Arunachal Pradesh, Sikkim and Darjeeling district of West Bengal. During the course of the revisionary studies on Indian *Graphidaceae*, several specimens from the Eastern Himalaya have been collected, analysed and identified. Till date, 94 species of Graphidoid *Graphidaceae*, belonging to 16 genera have been documented (Singh and Swarnalatha, 2011a, b; Singh *et al.*, 2011; Swarnalatha, 2016 a, b; Swarnalatha, 2017 a, b). In the present paper two species namely, *Fissurina comparilis* and *Graphis erythrocardia* belonging to the family *Graphidaceae* are reported as new distributional records for India.

Morphological examination of the specimens was carried out under a stereo-zoom microscope (Nikon SMZ 1500), while anatomical characters were examined using a compound microscope (Magnüs MLX - Tr). The chemical composition of lichen was investigated with Thin Layer Chromatography (TLC) in solvent system A, following the

method described by White and James (1985). The spot tests were performed with the usual chemical reagents (K, C and P). Further, the lichen specimens were examined under UV light (365 nm). The specimens cited in this paper were studied at the Lichen Laboratory, Botanical Survey of India, Central Regional Centre, Allahabad, during 2011. Identification of the specimens was done following the keys designed by Staiger (2002) and Lücking *et al.* (2009).

The up-to-date nomenclature, morphological description, chemistry, distribution and relevant taxonomic and ecological notes on these two species of lichen of the family *Graphidaceae* are provided below.

Fissurina comparilis (Nyl.) Nyl., Lich. Nov. Zeland.: 125 (1888). *Graphis comparilis* Nyl., Bull. Soc. Linn. Normandie, ser. 2, 2: 119 (1868). Type: *New Caledonia*, Loyalty, Lifou, *Thiébaud* 1864 (lectotype- H-NYL 7478).

Thallus corticolous, epiphloeodal, continuous to sometimes cracked according to the nature of bark; surface yellowish-green to olive-green, smooth to rough. Thallus in section has prosoplectenchymatous upper cortex and abundant calcium-oxalate crystals below the algal layer. Photobiont *Trentepohlia*.

[‡] Corresponding author; Email: swarnalathaginnaram@gmail.com



Fig. 1: *Fissurina comparilis* (Nyl.) Nyl. Thallus with ascomata. (Scale = 1 mm)

Ascomata lirelliform, concolorous, numerous, simple to sparsely branched, curved, fissurine to immersed or erumpent, up to 6 mm long, 0.2-0.35 mm broad, acute to acuminate at the ends; disc open, slit like, epruinose; excipulum complete, apically carbonised but laterally and basally uncarbonized and brown; laterally covered by thalline margin; labia convergent, entire; hymenium hyaline, not interspersed, I-; epihymenium indistinct to thin, *c.* 5 μ m thick; subhymenium hyaline; paraphyses simple, *c.* 1.5 μ m thick, tips simple; periphysoides not observed. Asci ellipsoid. Ascospores 8 per ascus, ellipsoid, transversely septate, constantly 4 locular, with thickened septa and lenticular lumina, halonate, 14-20 \times 6-9 μ m, hyaline.

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

Remarks: This species is characterised by its yellowish-green to olive-green coloured thallus; concolorous, fissurine to immersed or erumpent, lirelliform ascomata; apically carbonized excipulum; halonate, hyaline, transversely septate, 4 locular ascospores and lacking lichen substances in thallus. *F. comparilis* is somewhat similar to *F. khasiana* in anatomical characters but later species differs from former by having constictic and stictic acids in thallus.

Distribution: Africa, Australia (Queensland), Central America (Costa Rica), Cameroon and New Caledonia; it is reported here from India for the first time.

Note: Earlier this specimen was identified as *Fissurina inquinata* Knight & Mitten by Dubey *et al.* (2007). *F. inquinata* is characterised by 4-5 locular ascospores and presence of stictic acid in thallus, but *F. comparilis* has constantly 4 locular ascospores and lacks lichen substances.

Specimen examined: INDIA: Arunachal Pradesh, West

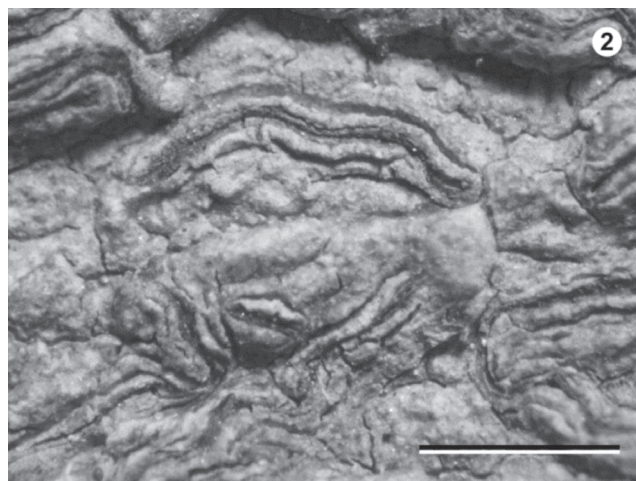


Fig. 2: *Graphis erythrocardia* Müll. Arg. Thallus with ascomata. (Scale = 1 mm)

Siang district, Doji-16 km from Along towards Basar, 26 March, 2006, *U. Dubey* 06-006386 (LWG).

Graphis erythrocardia Müll. Arg., Bot. Jb. 20: 280. 1894. Type: Tanzania, *Holst* 3081 (holotype-G). *Graphis vinosa* Müll. Arg., Type. Australia, Queensland, Thursday Island, 1887, *C. Knight* 341 (Lectotype G).

Thallus crustose, corticolous, epiphloeodal, irregular, *c.* 3.8 cm across, prothallus indistinct; surface pale-grey to grey or blackish-grey, wrinkled, uneven, matt, finely cracked. Thallus in section 160-290 μ m thick above the bark, ecorticate, abundant calcium oxalate crystals present in the thallus. Photobiont *Trentepohlia*.

Ascomata lirelliform, black, numerous, crowded, distributed all over the thallus, simple, immersed to often erumpent, straight to curved or flexuous, blunt at the ends, (-0.3) 1-5 mm long, 0.2-0.6 mm broad; disc closed, epruinose; excipulum complete, laterally carbonised, thin, uncarbonised brown at base, sloping lateral thalline margin; labia convergent, entire, covered with ashy-white layer; hymenium hyaline, not interspersed, I-, 70-145 μ m high; epihymenium dark brown, 9-12 μ m thick; subhymenium hyaline, 12-16 μ m thick; paraphyses simple. Asci 8 spored, clavate, 60-80 \times 22-29 μ m. Ascospores transversely septate, sub-biseriate to aggregate, distoseptate, (-24) 30-57 \times 8-12 μ m, 6-14 locular, hyaline, I+ blue violet.

Chemistry: Thallus K+ red, C-, KC-, P+ yellow, UV; norstictic acid (major) and connorstictic acid (trace) detected by TLC.

Remarks: This species is characterised by immersed to often erumpent, simple lirelliform ascomata; laterally carbonised excipulum; convergent, entire labia; hyaline, transversely septate, medium sized ascospores; presence of

norstictic acid (major) and connorstictic acid in its thallus. In anatomical characters *G. erythrocardia* resembles *G. longispora*, but later is distinguished by its saxicolous habit, elongated, much branched lirellae, larger ascospores and presence of salazinic acid in addition to norstictic acid.

Distribution: Australia and Tanzania; it is now reported here from India.

Specimens examined: INDIA: Arunachal Pradesh, Lohit, Tezu, Near Lohitpur Assam Rifle camp, alt. c. 250 m, 02 Jan. 1984, *K.P. Singh* 4222/A (ASSAM); West Bengal, Darjeeling district, Lava, 10 June 1983, *K.N. Roy Choudhary* 4722 (CAL).

Acknowledgements

The author is thankful to Director, Botanical Survey of India, Kolkata, and to former Head of Office, Botanical Survey of India, Central Regional Centre, Allahabad, for providing facilities during the study. Thanks are due to the authorities of CAL and LWG for loan of specimens. The author is also grateful to Ministry of Environment, Forests and Climate Change, Government of India, New Delhi for financial assistance under AICOPTAX - Lichens & Bryophytes project.

References

Dubey, U., Upreti, D. K. and Rout, J. (2007). Lichen flora of Along, West Siang district, Arunachal Pradesh. *Phytotaxonomy* 7: 21-26.

Lücking, R., Archer, A. W. and Aptroot, A. (2009). A world-

wide key to the genus *Graphis* (Ostropales: Graphidaceae). *Lichenologist* 41(4): 363-452.

- Singh, K. P. and Swarnalatha, G. (2011a). A new species of *Schistophoron* from India. *Lichenologist* 43(3): 209-212.
- Singh, K. P. and Swarnalatha, G. (2011b). A note on Graphidaceous lichens from Arunachal Pradesh, India. *Ind. J. Forestry* 34(3): 353-360.
- Singh, K. P., Swarnalatha, G. and Singh, S. B. (2011). New records to genus *Graphis* (Lichenized Fungi) from India. *Ind. J. Forestry* 34(2): 243-244.
- Staiger, B. (2002). Die Flechtenfamilie Graphidaceae: Studien in Richtung einer natürlicheren Gliederung. *Biblioth. Lichenol.* 85: 1-526.
- Swarnalatha, G. (2016). Lichen family *Graphidaceae* in Arunachal Pradesh, India. *Plant Science Research* 38 (1&2): 67-75.
- Swarnalatha, G. (2016). A new record of *Graphis* (Lichenized Ascomata) from India. *Plant Science Research* 38 (1&2): 106-108.
- Swarnalatha, G. (2017). *Graphis subregularis* A.W. Archer, a new lichen record for India. *Int. J. Adv. Res. Sci. Technol.* 6 (1): 664-665.
- Swarnalatha, G. (2017). Notes on the family Graphidaceae in Sikkim, India. *Int. J. Adv. Res. Sci. Technol.* 6 (1): 670-673.
- White, F. J. and James, P. W. (1985). A new guide to microchemical techniques for the identification of lichen substances. *British Lichen Society Bulletin* 57 (Supplement): 1-41.