Mycobiology

Research Note

Endocarpon subramulosum (Verrucariaceae) a New Species of Lichenized Fungi from South Korea

Yogesh Joshi[1] and Jae-Seoun Hur[2,*]

[1]*Lichenology Division, Department of Botany, S.S.J. Campus, Kumaun University, Almora 263601, Uttarakhand, India*
[2]*Korean Lichen Research Institute, Sunchon National University, Suncheon 540-742, Korea*

Abstract In this paper, we describe *Endocarpon subramulosum* as a new species from temperate regions of South Korea, which grows over soil on rocks. The proposed new species is morphologically similar to *E. ramulosum* Harada, which has so far been reported from Japan.

Keywords New species, Pyrenocarpous lichens, Taxonomy, Verrucariaceae

Endocarpon Hedw. comprises an estimated 50 species of pyrenocarpous lichens found across the world. The genus has not been studied extensively in South Korea, and five species from South Korea have been reported so far by Moon and Aptroot [1] and Joshi *et al.* [2, 3].

During a field trip to Mt. Geumwon and Mt. Bannon, Xin Yu Wang and team collected 200 samples of lichens, including some *Endocarpon* species. After examining the specimens of *Endocarpon*, the authors concluded that some specimens did not match any other *Endocarpon* species described so far and showed close resemblance to *E. ramulosum*, henceforth hereby described as new to science.

The specimens were examined using standard microscopic techniques and were hand sectioned under a NIKON C-PS 1068908 dissecting microscope (Nikon, Tokyo, Japan). All measurements were performed on material mounted in water, and lactophenol cotton blue was used only as a stain. Anatomical descriptions based on these preparations were made under a NIKON Eclipse E 200 compound microscope. Measurements of thallus layers, perithecia, and ascospores were made at ×400 and ×1,000 magnifications. The mycological terminology follows that of Kirk *et al.* [4] and Harada [5].

Mycobiology 2013 December, **41**(4): 243-244
http://dx.doi.org/10.5941/MYCO.2013.41.4.243
pISSN 1229-8093 • eISSN 2092-9323

*Corresponding author
E-mail: jshur1@sunchon.ac.kr

Received June 24, 2013
Revised August 26, 2013
Accepted September 3, 2013

Taxonomic treatment of the species

***Endocarpon subramulosum* Y. Joshi & J. -S. Hur, sp. nov. (Fig. 1A and 1B)**

MycoBank No.: MB805423.

Type: Mt. Geumwon, Wicheon-myeon, Geochang-gun, Gyeongsangnam-do, Korea, 35°43'390" N, 127°47'314" E, 704 m, on soil over rocks, 25 Jun 2010, X. Y. Wang, H. S. Jeon, G. S. Han, 100561 (holotype KoLRI, isotype KU).

Etymology: The specific epithet derives its name from a morphologically similar species – *E. ramulosum*.

Endocarpon ramulosum affinis, sed grandi sporae et habitus.

Description: Thallus squamulose to ± lobate; squamules/lobes solitary or loosely aggregated, attached to the substratum only at the basal ends, ascending. Lobe shape linear to ± regular, 0.5~3 × 0.5~0.7 mm, sparsely or repeatedly, radiately, pinnately or irregularly branched, frequently imbricate. Lobes ligulate in juvenile stage but at maturity become flabellate. Lobe tips are rotund. Lobe margins are irregular, laciniate. Upper surface is pale brown with an olive tinge, ± glossy, smooth, ± convex. The lower surface is almost black around the attaching parts, white near the apices or margin (usually ascending parts), fibrous or cottony, with sparse rhizohyphae, rhizines absent. Perithecia laminal, common, abundant, immersed in the thallus, 1~10 per squamule/lobe, with pale brown ostioles. Pycnidia laminal, common, immersed in the thallus, indistinct.

Thallus (119.5~) 175~212.5 (~235) µm thick. Upper cortex (22~) 25~37.5 (~50) µm thick, hyaline, euparaplectenchymatous.

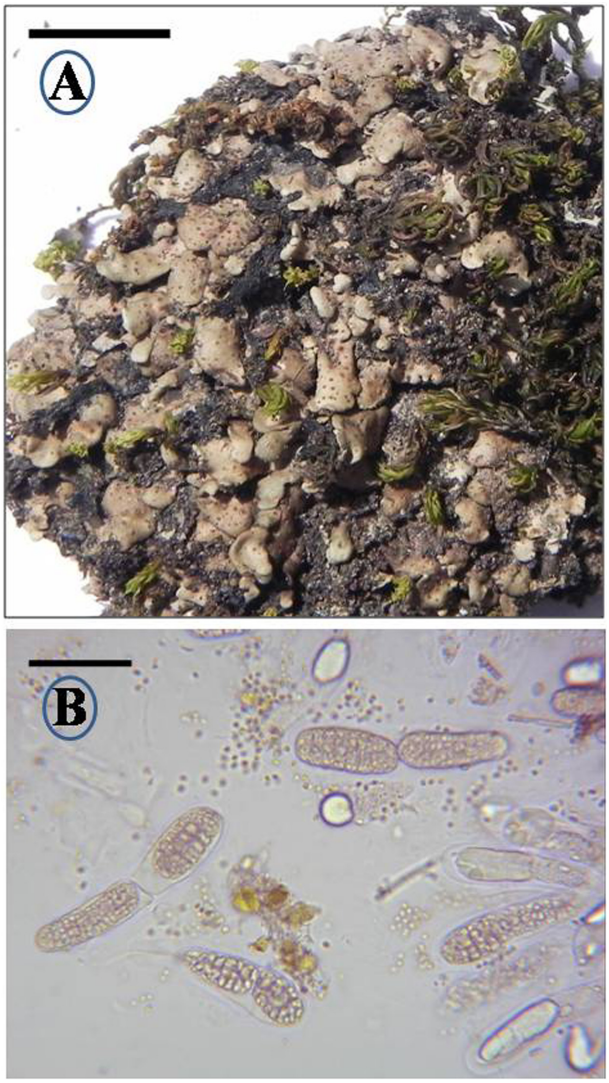

Fig. 1. A, Habit of *Endocarpon subramulosum*; B, Asci and spores of *Endocarpon subramulosum* (scale bars: A = 5 cm, B = 45 μm).

Algal layer (45~) 50~55 (~60) μm thick. Medulla (52.5~) 100~120 (~125) μm thick, composed primarily of filamentous hyphae, sparsely with spherical hyphal cells. Lower cortex absent, undifferentiated; lower most part of the thallus is weakly differentiated from the remainder of the medulla. Perithecia are triangular to spherical in the vertical section, (200~) 212.5~280 (~293) μm. Exciple is dark brown to almost black, 37.5~50 μm thick. Subhymenium is 12.5~17.5 μm thick. Hymenium 150~162.5 × 212.5~225 μm high. Hymenial algae 2.5~3 μm across. Periphyses 20~40 μm long. Asci clavate, bisporous, 88~110 × 19~27 μm. Spores are hyaline to pale brown, muriform, ellipsoidal to bacilliform, (37.5~) 40~50 (~60) × (11~) 12.5~15 (~22) μm. Pycnidia of *Staurothele* type, immature, conidia not seen.

Chemistry: Spot tests: Cortex and medulla K–, C–, KC–, Pd–. Thin layer chromatography (TLC): No substances detected.

Habitat and distribution: *Endocarpon subramulosum* from two localities within South Korea is found growing over soil on rocks in association with moss, Physciaceae members, *Leptogium* sp. and *Staurothele* sp. The species is found growing in shady places at elevations of 700~750 m.

Remarks: *Endocarpon subramulosum* is morphologically similar to *E. ramulosum*, but differs in having larger spores (31~40 × 12~16 μm) and habitat preference. *E. ramulosum* is found growing over river side rocks, while the new taxon is not found growing along river side rocks. In addition, Harada reported that the lower surface of *E. ramulosum* rarely becomes pinkish in color and assumed that this color would show correlation with some ecological factors [5]. The lower surface of *E. subramulosum* is always white. In external morphology, the new taxon is also confused with *Neocatapyrenium cladonioideum* (Vain.) Harada and *Scleropyrenium kurokawae* Harada [6]. *N. cladonioideum* differs from new taxon in lacking hymenial algae and having hyaline exciple, eight spored asci with simple, oval, smaller ascospores (15~17 × 7~8 μm), while *S. kurokawae* differs in lacking hymenial algae and having a pachydermatous upper cortex, eight spored asci with simple, oval, smaller ascospores (16~17 × 7~7.5 μm).

Additional specimen examined: Mt. Bannon, Buk-myeon, Jeongseon-gun, Gangwon-do, Korea, 37°26'34.9" N, 128°45'21.3" E, 748 m, on rocks, 28 Aug 2010, X. Y. Wang & party, 100801 (KoLRI).

ACKNOWLEDGEMENTS

This work was supported by a grant from the Korea National Research Resource Center Program (NRF, 2012M3A9B8021726), and the Korean Forest Service Program (KNA 2012) through the Korea National Arboretum. One of the authors (YJ) is thankful to the Head, Dept. of Botany, S. S. J. Campus, Almora for providing laboratory facilities for performance of work. The authors are thankful to Dr. Xin Yu Wang for his generous help and kindness.

REFERENCES

1. Moon KH, Aptroot A. Pyrenocarpous lichens in Korea. *Bibl Lichenol* 2009;99:297-314.
2. Joshi Y, Wang XY, Lee YM, Byun BK, Koh YJ, Hur JS. Notes on some new records of macro- and micro-lichens from Korea. Mycobiology 2009;37:197-202.
3. Joshi Y, Hur JS. *Endocarpon maritima* sp. nov. (lichenized *Ascomycota*) from the maritime region of South Korea. Mycotaxon 2013;123:163-7.
4. Kirk PM, Cannon PF, Minter DW, Stalpers JA. Ainsworth and Bisby's dictionary of the fungi. 10th ed. Wallingford: CAB International; 2008.
5. Harada H. A taxonomic study of the lichen genus *Endocarpon* (Verrucariaceae) in Japan. Nova Hedwigia 1993;56:335-53.
6. Harada H. A taxonomic study on *Dermatocarpon* and its allied genera (Lichenes, Verrucariaceae) in Japan. Nat Hist Res 1993;2:113-52.