**Dactylospora glaucomarioides** (Ascomycetes, Dactylosporaceae): A Lichenicolous Fungus New to South Korea

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The lichenicolous fungi flora of South Korea is poorly known. During recent field trips to various parts of South Korea and after an extensive examination of herbarium lichen specimens, we encountered a lichenicolous fungi growing over a thallus of the lichen *Ochrolechia yasudae* Vain., characterized by small black apothecia with mostly three-septate brown ascospores. It was identified as *Dactylospora glaucomarioides*. This is the first report of this lichenicolous fungus from South Korea. A taxonomic description and comments are presented.

**KEYWORDS**: Ascomycetes, Lichenicolous fungi, Lichens, New record, Ochrolechia

Lichenicolous fungi are a diverse group of fungi consisting of over 1,500 species [1], which grow on the thallus or apothecia of lichens, with many new species being described every year. They are usually studied by mycologists who are familiar with lichenized fungi and are often collected by lichenologists.

The lichenicolous fungi flora of South Korea is poorly known. Although many species of lichens have been reported from South Korea, we are aware of only one report of a lichenicolous fungus, *Sphinctrina leucopoda* Nyl. [2]. During recent field trips to various parts of South Korea and after examining lichen specimens housed at herbarium of Korean Lichen Research Institute (KoLRI), we encountered a lichenicolous fungi growing over a thallus of the lichen *Ochrolechia yasudae* Vain., characterized by small black apothecia with mostly three-septate brown ascospores. It was identified as *Dactylospora glaucomarioides* (Willey ex Tuck.) Hafellner, and verified by a holotype study at the Farlow Herbarium (FH) of Harvard University. Here, we provide a taxonomic description along with the hosts, ecology, and illustrations of this species. This is the first report of this lichenicolous fungus from South Korea. Previously it has been reported from eastern North America, Iceland, North Korea and Russia.

*Dactylospora* Körb. (1855) is a wide-spread genus of ascomycetes with over 70 binominals and at least 50 species with a center of distribution in cold to temperate regions of the world [3, 4]. It belongs to the family Dactylosporaceae and is found growing on lichens as a commensalist and as saprobie on hepatics or wood. It is characterized by brownish-black to black apothecia with a distinct margin; a hemiamyloid hymenium with thin paraphyses having expanded apices; broadly cylindrical to subclavate asci, with a distinctive euamyloid external apical cap; and brown, one-septate to submuriform ascospores.

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 made on material mounted in water, amyloid reactions were tested with I, and lactophenol cotton blue was used as a stain. A NIKON COOLPIX 4500 was used for taking the photographs of the species. The *O. yasudae* and *D. glaucomarioides* specimens are housed at herbarium of KoLRI, Sunchon National University, Korea. Type specimen of *D. parasitica* was studied from FH, while specimens of *D. saxatilis* (Schaer.) Hafellner were studied from the lichen herbarium of the University of California at Riverside.

**Taxonomic treatment of the species**

*Dactylospora glaucomarioides* (Willey ex Tuck.) Hafellner (Fig. 1A)

Beih. Nova Hedwigia 62: 109 (1979).

**Basionym.** Buellia glaucomarioides Willey ex Tuck., Synops. N. Americ. Lich. 2: 108 (1888). **TYPE:** U.S.A.: Massachusetts, New Bedford, 1868, H. Willey (FH Holotype).

**Diagnostic characters.** Apothecia apothecia, adpressed to sessile, round to angular, 0.2–0.5 mm diam., disc black, with thin prominent black margin. Hymenium hyaline, 50–65 μm high, hemiamyloid. Hypothecium dark brown. Exciple reddish-brown in section, pseudoparenchymatous.
Paraphyses septate, mostly thin, 1.5–2 µm wide, with apices expanded, mostly 2–3 µm wide. Asci broadly cylindrical to subclavate, 8-spored, 48–60 × 14–20 µm, with euamyloid apical cap. Ascopores brown, 12.5–19 × 5.5–7.5 µm, with 3–4 (~7) transverse septa, often quite various, with occasional longitudinal septa in individual cells (Fig. 1B).

Hosts. Ochrolechia species; only on O. yasudae in South Korea but D. glaucomarioides has also been reported growing on O. tartarea (L.) Zahlbr in other parts of the world.

Ecology. The species was found growing on O. yasudae over bark, rock, and moss at elevations between 340–1,473 m.

Geographical distribution. This species is common in eastern North America [5, 6] and has been reported from Iceland [7] and North Korea [8]. The recent report from Russia [9] might be a new taxon, as the ascospore size reported from it is slightly longer and wider than D. glaucomarioides and moreover it was on an unrelated host, Megaspora verrucosa (Ach.) Hafellner & V. Wirth.

Remarks. D. glaucomarioides is commensalistic on Ochrolechia species, causing no visible damage to the host. The species has ascospores 12.5–19 × 5.5–7.5 µm, with 3–5 transverse septa, and rarely even six or seven in the Korean specimens, with infrequent longitudinal septa in individual cells. The species is easily confused with D. parasitica, which can also occur on Ochrolechia species, but especially differs in having paraphyses with much wider apices (4–5 µm vs. mostly 2–3 µm). Dactylospora species can also be easily confused with Buellia and related genera but is distinguished by a gelatinous euamyloid apical cap (I+ blue), hemiamyloid hymenium (I+ blue turning red) and lacking a Bacidia-type or similar euamyloid tholus.

Specimens examined. South Korea, Chungbuk Prov., Jecheon city, Mt. Worak, N 36°51′37.6", E 128°06′13.2", alt. 340 m, on O. yasudae growing over rock, September 18, 2004, Jae-Seoun Hur 041173 (KoLRi). Kangwon Prov., Yangyang Co., Seo-myeon, Galjeongkobong, N 37°52′952", E 128°30′161", alt. 1,104 m, on O. yasudae growing over Quercus bark, May 22, 2009, Y. Joshi & party 090581 (KoLRi); N 37°52′880", E 128°26′849", alt. 1,101 m, on O. yasudae growing over rock, May 22, 2009, Y. Joshi & party 090613 (KoLRi).

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References

1. Lawrey JD, Diederich P. Lichenicolous fungi: interactions, evolution, and biodiversity. Bryologist 2003;106:80-120.
2. Thor G, Moon KH, Tibell L. New findings of calicioid lichens and fungi in Korea. J Jpn Bot 2008;83:256-8.
3. Kirk PM, Cannon PF, Minter DW, Stalpers JA. Ainsworth & Bisby’s dictionary of the fungi. 10th ed. Wallingford: CAB International; 2008.
4. The MycoBank engine and related databases [Internet]. International Mycological Association; 2005 [cited 2010 June 25]. Available from: http://www.mycobank.org.
5. Hafellner J. Karschia: Revision einer Sammelgattung an der Grenze von lichenisierten und nichtlichenisierten Ascomyceten. Nova Hedwigia Beih 1979;62:1-248.
6. Hodkinson BP, Harris RC, Case MA. A checklist of Virginia lichens. Evansia 2009;26:64-88.
7. Svane SJ, Alstrup V. Some lichenicolous fungi from Iceland. Acta Bot Isl 2004;14:53-8.
8. Honeck S, Lumbsch HT, Yoshimura I. Contribution to the lichen flora of the Diamond Mountains (Korea). J Hattori Bot Lab 1994;75:365-9.
9. Zhurbenko MP. Lichenicolous fungi and lichens from the Holarctic. Part II. Opuscula Philolichenum 2009;7:121-86.