NOTE

Notes on Some New Records of Foliicolous Lichens from Vietnam

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ABSTRACT: Six new records of foliicolous lichens for Vietnam are described and illustrated. These are: *Aderkomyces albostrigosus* f. *albostrigosus*, *A. albsostrigosus* f. *aggregatus*, *Asterotherium rotuliforme*, *Byssoloma vanderystii*, *Fellhanera emarginata* and *Trichothelium minutum*. The species were collected at Thác Dray Sap region (commonly called Dray Sac Waterfall) situated in the Central Highland part of Vietnam.

KEY WORDS: East Asia, Geographical distribution, Lichenized fungi, Taxonomy.

INTRODUCTION

The lichen biota of Vietnam has not attracted much attention by lichenologists, although the climate is favorable for tropical lichens. The number of publications dealing with lichens of Vietnam is limited, notably by Krempelhuber (1873), Müller (1891), Harmand (1928), Abbayes (1964), Tixier (1966), Ahti (1986, 1991), Lücking and Vězda (1998) and Sparrius et al. (2006). There is a total of 275 species of lichens reported, representing only small fractions of the actual lichen diversity in Vietnam. A brief visit by Aptroot and Sparrius (2006) resulted in 122 new records, indicating the diversity of lichens awaiting to be discovered.

Studies of foliicolous lichens were mostly undertaken in the Neotropics (Lücking, 2008), whereas comparatively fewer are available from tropical Africa and SE Asia. Foliicolous lichens were reported from Vietnam by Santesson (1952), Vězda (1977, 1986), Vězda and Poelt (1991), Lücking and Vězda (1998), Thor et al. (2000), Aptroot and Sparrius (2006) and Sparrius et al. (2006), adding to a current total of 70 (Papong et al., 2007) and representing about 25% of the lichen species known from Vietnam.

Samples were collected around Thác Dray Sap region, which is situated in the Central Highland of Vietnam (Fig. 1). Six new records of foliicolous lichens were found. Most of the leaf specimens were collected from understory of trees where high humidity and low light intensity prevail.

MATERIALS AND METHODS

Specimens were collected in July 2008 and deposited in the herbarium of the Lichen and Allied Bioresource Center at Korean Lichen Research Institute (KoLRI), Sunchon National University, South Korea. Morphological characters of thallus, reproductive structures, colour, size and shapes were examined under a NIKON C-PS 1068908 dissecting microscope. Hand-cut sections were made for studying the anatomy of thalli and fruiting bodies and were examined under a OLYMPUS BX 50 compound microscope. All measurements were made on material mounted in water and lactophenol cotton blue (LCB) was used as a stain. For characters such as size of thallus, ascomata and thickness of the hymenium, hypothecium, exciple, involucrellum, ascospores dimension, average of ten measurements was recorded for each structure. Only free ascospores lying outside the asci were measured. The dimensions of ascospores are generally presented as (smallest single value recorded−) smallest mean recorded − largest mean recorded (−largest single value recorded). Spot test reactions were carried out on hand sections of thalli and apothecia under the compound microscope. Iodine (I) was used to check the colour reactions of the ascus wall and the hymenium. Thin Layer Chromatography (TLC) was performed in solvent system C (Toluene:Acetic acid 85:15) as described by Elix et al. (1987) and White and James (1985). Terminology used in this study follows the usage in Kirk et al. (2008) and Lücking (2008).

RESULTS

Aderkomyces albostrigosus (R. Sant.) Lücking, Sérus. & Vězda, Lichenologist 37: 161, 2005.

Diagnostic characters: Thallus continuous or dispersed, 4-6 mm across, smooth, green. Setae 0.5-1 mm long, white, aggregated around the apothecia or

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Fig. 1. Collection locality in Vietnam for this study (▲ representing collections made by previous workers; ★ represents the fresh collection made by the authors).

dispersed over the thallus. Ascomata apothecia, sessile, biatorine, rounded, 0.2-0.3 mm diam.; disc concave, pale yellow, translucent; margin distinct, prominent, concolorous to disc. Ascospores single per ascus, hyaline, ellipsoid, muriform, 42-65 × 16-26 µm. Hypophores not seen. For further descriptions see Lücking (2008). Both forms of this species are reported for the first time from Vietnam.

Chemistry: no substances detected by TLC.

Remarks: *Aderkomyces* and *Arthotheliopsis* are two genera with white sterile setae and smooth thallus (Lücking, 2008), the latter being distinguished from the former by the applanate apothecia not or hardly raised above thallus level. *Aderkomyces albostrigosus* is well characterized by its sessile, yellow, non-pruinose apothecia and single-spored asci. The most similar species is *A. heterellus* (Stirt.) Lücking, Sérus. & Vezda, which has adnate, orange apothecia and 2–8-spored asci. Other species with single-spored asci in the two genera can mostly be distinguished by their grey-brown, adnate to applanate apothecia (Lücking, 2008).

Aderkomyces albostrigosus (R. Sant.) Lücking, Sérus. & Vězda f. ***albostrigosus***, Lichenologist 37: 161, 2005. Figs. 2A & B

This form is characterized by sterile setae dispersed over the thallus.

Geographical distribution and Ecology: Pantropical (Lücking, 2008), in SE Asia known from Brunei, India, Indonesia (Java), Japan, Malaysia (Borneo), Papua New Guinea, and Thailand; new to Vietnam, found growing on the understory leaves in tropical rain forest.

Specimen examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12°32'21.39", E107°53'19.80", on leaves of *Phrynium placentarium*, 22 July 2009, Y. Joshi & T. Nguyen 090096 (KoLRI).

Aderkomyces albostrigosus f. ***aggregatus*** Lücking & Vězda, Flora Neotropica 103: 457, 2008. Figs. 2C & D

This form is characterized by sterile setae aggregated around the apothecia.

Geographical distribution and Ecology: Pantropical (Lücking, 2008), in SE Asia previously collected in the Philippines; new to Vietnam, growing on the understory leaves in tropical rain forest.

Specimen examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12°32'21.39", E107°53'19.80", on leaves, 22 July 2009, Y. Joshi & T. Nguyen 090025 (KoLRI).

Asterothyrium rotuliforme (Müll. Arg.) Sérus., in Sérusiaux & de Sloover, Veröff. Geobot. Inst. Zürich 91: 268, 1986. Figs. 2E & F

Diagnostic characters: Thallus in round patches 1-1.5 mm across, smooth, pale greenish grey at margin but whitish in the center, with cortex formed by rectangular, radiating cells. Ascomata apothecia, numerous (with a central one surrounded by a circle of 3-9 smaller apothecia), immersed-erumpent, zeorine, rounded, 0.2-0.4 mm diam.; disc plane, greenish yellow; margin thick, slightly protruded, entire, pale green. Epithecium composed of algae. Ascospores single per ascus, hyaline, oblong-ellipsoid, muriform, 55-70 × 14-22 µm. Pycnidia not seen. For further descriptions see Lücking (2008).

Chemistry: no substances detected by TLC.

Geographical distribution and Ecology: Pantropical (Lücking, 2008), in SE Asia known from India and the Philippines; new to Vietnam, found growing on the understory leaves in tropical rain forest.

Remarks: *A. microsporum* R. Sant., another species of this genus reported from Vietnam, differs in having 1-septate ascospores and a different apothecial morphology (Lücking, 2008). Many more species of this are expected to occur in Vietnam, since most grow on leaves in the rarely rain forest canopy (Lücking, 2008).

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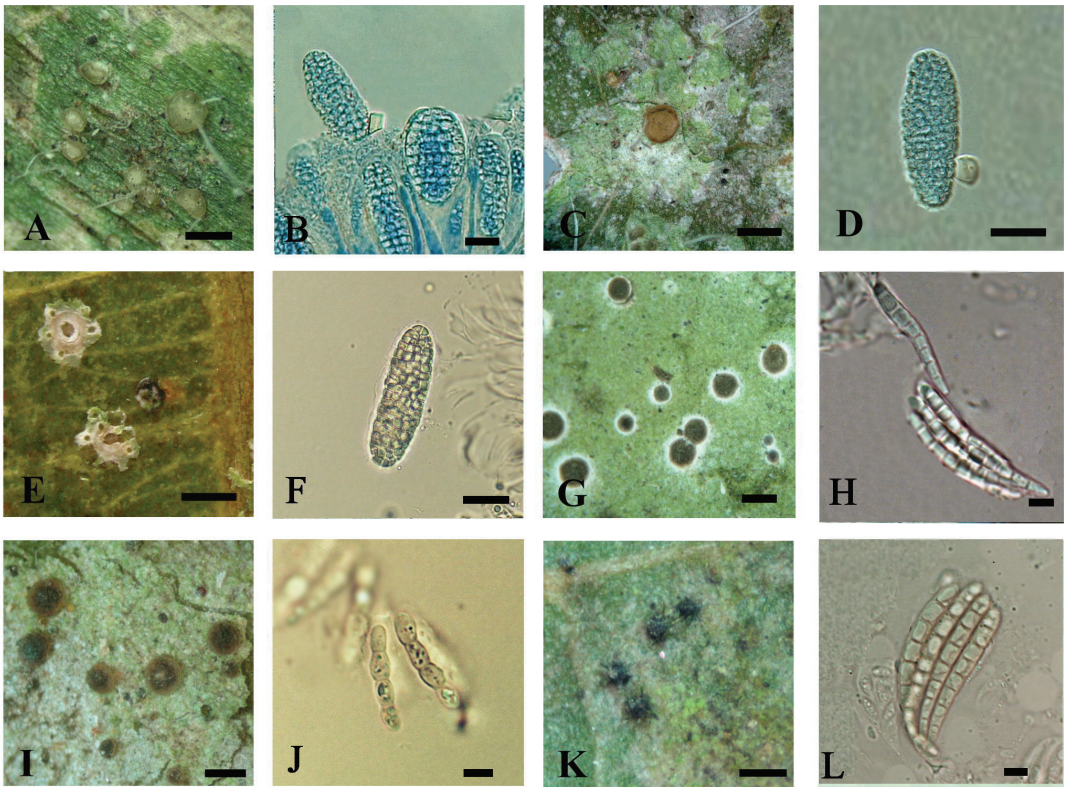


Fig. 2. Habit and ascospores of six newly reported foliicolous lichens in Vietnam. A & B: *Aderkomyces albostrigosus* f. *albostrigosus*. C & D: *Aderkomyces albostrigosus* f. *aggregatus*. E & F: *Asterothyrium rotuliforme*. G & H: *Byssoloma vanderystii*. I & J: *Fellhanea emarginata*; K & L: *Trichothelium minutum*. Scale bars A, C, G = 0.5 mm; B = 40 µm; D, F = 20 µm; E, H, J, L = 10 µm; I, K = 0.2 mm.

Specimens examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12˚32'21.39", E107˚53'19.80", on leaf, 22 July 2009, Y. Joshi & T. Nguyen 090020, 090198 (KoLRI).

Byssoloma vanderystii Sérus., Lichenologist 11: 181, 1979. Figs. 2G & H

Diagnostic characters: Thallus continuous, 12-18 mm across, farinose, greenish-grey. Ascomata apothecia, sessile to adnate, rounded, 0.3-0.5 mm diam.; disc slightly to strongly convex, chocolate-brown with a paler reddish brown marginal zone; margin well developed and byssoid. Ascospores 8 per ascus, hyaline, cylindrical, 7-septate, not constricted at septa, 25-28 × 3-4.5 µm. Pycnidia not seen. For further descriptions see Lücking (2008).

Chemistry: no substances detected by TLC.

Geographical distribution and Ecology: Pantropical (Lücking, 2008), Malaysia (Borneo) and Australia; new to Vietnam, growing along with *Strigula spp.* on the understory leaves in tropical rain forest.

Remarks: *B. chlorinum* (Vain.) Zahlbr., *B. leucoblepharum* (Nyl.) Vain. and *B. subdiscordans* (Nyl.) P. James are the other species of *Byssoloma* reported from Vietnam. *B. subdiscordans* differs in having a dispersed, white thallus and a black apothecial disc with blackish aeruginose epithecium, as well as smaller, 3-septate ascospores (10-17 × 3-5 µm); *B. chlorinum* and *B. leucoblepharum* are similar in thallus and apothecial morphology but have smaller, 3-septate ascospores.

Specimens examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12˚32'21.39", E107˚53'19.80", on leaf, 22 July 2009, Y. Joshi & T. Nguyen 090025, 090062 (KoLRI).

Fellhanera emarginata Lücking, Trop. Bryol. 13: 148, 1997. Figs. 2I & J

Diagnostic characters: Thallus continuous, 4-5 mm across, farinose, greenish-grey. Ascomata apothecia, sessile to adnate, rounded, 0.1-0.3 mm diam.; disc convex, dark grayish brown; emarginate. Ascospores 8 per ascus, hyaline, ellipsoid, 3-septate, constricted at septa, 15-18 × 3.5-5 µm. Pycnidia not seen. For further descriptions see Lücking (2008).

Chemistry: no substances detected by TLC.

Geographical distribution and Ecology: Neotropics (Lücking, 2008); new to Vietnam, growing on the understory leaves in tropical rain forest.

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Remarks: *F. bouteillei* (Desm.) Vězda, *F. microdiscus* (Vain.) Vězda and *F. sublecanorina* (Nyl.) Vězda are the other species of *Fellhanera* reported from Vietnam. *F. bouteillei* differs in having 1-septate ascospores and yellow apothecia, *F. sublecanorina* has apothecia with a well-developed whitish margin, and *F. microdiscus* has 5-septate ascospores which are slightly curved and attenuated at one end, and also features apothecia with a thin but distinct margin. More species of this genus are to be expected in Vietnam especially in undisturbed lowland to montane rain forest.

Specimen examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12˚32'21.39", E107˚53'19.80", on leaf, 22 July 2009, Y. Joshi & T. Nguyen 090027 (KoLRI).

Trichothelium minutum (Lücking) Lücking, Nova Hedwigia 66: 397, 1998. Figs. 2K & L

Diagnostic characters: Thallus rounded, up to 5 mm across, sometimes confluent, smooth, grayish green. Ascomata perithecia, subglobose, 0.1-0.13 mm diam., black. Setae few, irregularly scattered around top of perithecia and usually incurved, bristle shaped, black. Excipulum black. Involucrellum brownish black. Ascospores 8 per ascus, hyaline, bacillar, 7-septate, not constricted at septa, 38-43 × 4-5 µm. Pycnidia not seen. For further descriptions see Lücking (2008).

Chemistry: no substances detected by TLC.

Geographical distribution and Ecology: Neotropics (Lücking, 2008); new to Vietnam, growing on the understory leaves in tropical rain forest.

Remarks: *T. alboatrum* Vain. and *T. epiphyllum* Müll. Arg. are the other species of *Trichothelium* reported from Vietnam. *T. alboatrum* differs in having entirely white, straight or recurved perithecial setae and shorter ascospores, while *T. epiphyllum* has larger, fin-shaped to lanceolate or acute perithecial setae which project horizontally and are confluent at the base.

Specimens examined: VIETNAM: Daknong Prov., Thác Dray Sap, N12˚32'21.39", E107˚53'19.80", on leaf, 22 July 2009, Y. Joshi & T. Nguyen 090022, 090196 (KoLRI).

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越南新記錄葉生地衣化真菌記要

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摘要：本文中描述了六個越南的葉生地衣化真菌的新記錄，它們分別屬於三個不同的科–Gomphillaceae (*Aderkomyces albostigosus* fo. *albostigosus*, *A. albostrigosus* fo. *aggregatus* 和 *Asterotherium rotuliforme*), Pilocarpaceae (*Byssoloma vanderystii* 和 *Fellhanera emarginata*) 以及 Porinaceae (*Trichothelium minutum*)。它們都是從 Thác Dray Sap 地區（通常被稱為 Dray Sac 瀑布）採集到的標本，這個地區位於越南中部高原。

關鍵詞：東亞、地理分佈、葉生地衣真菌、分類。

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