Notes on Some New Records of Foliicolous Lichens from Vietnam

Thi Thuy Nguyen(1,3), Yogesh Joshi(1), Robert Lücking(2), Xin-Yu Wang(1), Nguyen Anh Dzung(3), Young-Jin Koh(1) and Jae-Seoun Hur(1*)

1. Korean Lichen Research Institute, Sunchon National University, Sunchon 540-742, South Korea.
2. Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, Il 60605-2496, USA.
3. Plant Biological Department, Faculty of Agriculture, Tay Nguyen University, Buon Ma Thuot City, Daklak Prov., Vietnam.
* Corresponding author. Tel: 82-61-750-3383; Fax: 82-61-750-3308; Email: jshurl1@sunchon.ac.kr

ABSTRACT: Six new records of foliicolous lichens for Vietnam are described and illustrated. These are: *Aderkomyces albostrigosus* f. *albostrigosus*, *A. albostrigosus* 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 understorey 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 an 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


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


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.


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.


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.

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).
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.


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.


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.
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.


ACKNOWLEDGEMENTS
This work was supported by a grant from Vietnam Higher Education Project (HEP 2), Korea National Research Resource Center Program (Grant 20090062634) and Korea Research Foundation Grant funded by the Korean Government (MOEHRD, Basic Research Promotion Fund) (KRF-2008-313-C00801). The first author also gives his thankfulness to Miss. Jung Ae Ryu, Hae Sook Jeon and Jin Young Hur for their kind help and cooperation during this study.

LITERATURE CITED


越南新記錄葉生地衣化真菌記要

Thi Thuy Nguyen(1), Yogesh Joshi(1), Robert Lücking(2), 王欣宇(1), Anh Dung Nguyen(3), 高榮珍(1), 許宰銑(1*)

1. Korean Lichen Research Institute, Sunchon National University, Sunchon 540-742, South Korea.
2. Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, Il 60605-2496, USA.
3. Plant Biological Department, Faculty of Agriculture, Tay Nguyen University, Buon Ma Thuot City, Daklak Prov., Vietnam.
* 通信作者。Tel: 82-61-750-3383; Fax: 82-61-750-3308; Email: jshur1@sunchon.ac.kr

(收稿日期：2010 年 2 月 12 日；接受日期：2010 年 7 月 6 日)

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。