



Introducing *Chaetothyriothecium*, a new genus of *Microthyriales*

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Abstract

The order *Microthyriales* comprises foliar biotrophs, epiphytes, pathogens or saprobes that occur on plant leaves and stems. The order is relatively poorly known due to limited sampling and few in-depth studies. There is also a lack of phylogenetic data for these fungi, which form small black spots on plant host surfaces, but rarely cause any damage to the host. A "Microthyriaceae"-like fungus collected in central Thailand is described as a new genus, *Chaetothyriothecium* (type species *Chaetothyriothecium elegans* sp. nov.). Phylogenetic analyses of LSU gene data showed this species to cluster with other members of *Microthyriales*, where it is related to *Microthyrium microscopicum* the type of the order. The description of the new species is supplemented by DNA sequence data, which resolves its placement in the order. Little molecular data is available for this order, stressing the need for further collections and molecular data.

Key words: foliar epiphytes, *Micropeltidaceae*, *Microthyriaceae*, phylogenetic analyses

Introduction

Fungal foliar epiphytes are a polyphyletic group found on plants worldwide (Schoch *et al.* 2009, Li *et al.* 2011, Wu *et al.* 2011, Hyde *et al.* 2013). The group has been poorly studied, few cultures are available in culture collections, and DNA sequence data is lacking in public databases. One major contributing factor is the fact that many of these species are obligate parasites and cannot be cultured (Wu *et al.* 2011).

The order *Microthyriales* comprises foliar epiphytes, which mainly form small, inconspicuous, black spots on host leaves. The spots consist of flattened thyriothecia with various ostiole forms, while the basal wall is usually poorly developed. Asci are bitunicate, fissitunicate, saccate to subglobose, obclavate to fusiform, or rarely cylindro-clavate, and ascospores are uni- to multi-septate, and hyaline or brown (Arnaud 1918, Luttrell 1973, von Arx & Müller 1975, Barr 1987, Kirk *et al.* 2008, Wu *et al.* 2011, Hyde *et al.* 2013). Little molecular data is presently available for the order and in an overview of Dothideomycetes (Schoch *et al.* 2009), *Microthyriales* was represented by a single strain, *Microthyrium microscopicum*, as a long branch sister to *Stomiopeltis betulae*. More recently, Wu *et al.* (2011) added sequence data for three "Microthyriaceae"-like species—*Paramicrothyrium* and *Neomicrothyrium* were introduced as new genera and *Micropeltis zingiberacicola* as a new species; molecular analysis indicated they can probably be placed in *Microthyriales*. Hyde *et al.* (2013) placed *Microthyrium microscopicum* (*Microthyriaceae* type species) and *Stomiopeltis betulae* (*Micropeltidaceae*) in *Microthyriales*, and the families *Microthyriaceae* and *Micropeltidaceae* were accepted based on morphological data. The family *Microthyriaceae* includes foliar biotrophs and saprotrophs, with easily removed thyriothecia comprising dark, mostly cuboid or angular cells, arranged in parallel rows from the prominent central ostiole to the periphery, and a poorly developed base. Asci are fusiform to cylindrical or elongate and ascospores are uniseptate and hyaline (Doidge 1942, Müller & von Arx 1962, Luttrell 1973, Barr 1987, Hofmann & Piepenbring 2006, Hofmann 2010, Wu *et al.* 2011, Hyde *et al.* 2013). Wu *et al.* (2011) recognized seven genera of *Microthyriaceae*, while a further

smooth-walled. On PDA, mycelium growing very slowly, colonies reaching 1.5 cm diam after 30 days, raised, comprising raised dark grey mycelium, white to greyish at the margin and also partly covering colonies, surface of colonies velvety. Asexual state: not observed.

Material examined:—THAILAND. Nakhon Nayok Province: Khao Yai National Park, on dead leaves of *Castanopsis* sp., 16 June 2012, *Narumon Tangtheerasunun* (MFLU13-0091!—**holotype**, ex-type living culture = MFLUCC12-0399 (MFU) = CPC 21375 = CBS 136075).

Discussion

Chaetothyriothecium differs from other genera in the *Microthyriales* that have thyriotheacial ascomata (Wu *et al.* 2011), because of the darkened rim surrounding the central ostiole, which is made up of long radiating setae. In other aspects, *Chaetothyriothecium elegans* is typical of *Microthyriales* in having thyriotheacia comprising radiating cells but with a poorly developed base, ovoid bitunicate asci with short pedicels and bi-celled, hyaline ascospores. The phylogenetic analyses of LSU sequence data indicate that *Chaetothyriothecium* is a well resolved genus in *Microthyriales*.

There is a lack of sequence data for *Microthyriales* available in GenBank and this group is also morphologically relatively poorly studied. A putative strain of *Microthyrium microscopicum*, which represents the type of the order indicates that the *Microthyriales* is well resolved (Schoch *et al.* 2009, Wu *et al.* 2011, Hyde *et al.* 2013). *Chaetothyriothecium elegans* is related to *Microthyrium microscopicum* and *Stomiopeltis betulae* and can be included in *Microthyriaceae* as it is morphologically similar and this is supported in the phylogenetic analysis. It is important that more gene sequences are obtained for taxa in this order so that a natural classification can be obtained.

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