

A new species of *Thozetella* (anamorphic fungi) from Brazil

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Abstract – A new species of *Thozetella* growing on leaf litter is described. *Thozetella aculeata* has characteristic inverted T-shaped microawns with acerose and pointed apical part. The holotypes of the related *T. acerosa* (BRIP29318), *T. boonjiensis* (BRIP29319), *T. cubensis* (INIFAT C84/11) and *T. gigantea* (BRIP29202) were examined but all differ from *T. aculeata* in size and shape of their microawns.

anamorphic fungi / hyphomycetes / taxonomy / Chaetosphaeriaceae / Ascomycota

Résumé – Une nouvelle espèce de champignons anamorphes *Thozetella* poussant sur la litière de feuilles est décrite. *Thozetella aculeata* a la forme caractéristique en ‘T’ inversé avec microbarbes acérées. Les holotypes des espèces apparentées, *T. acerosa* (BRIP29318), *T. boonjiensis* (BRIP29319), *T. cubensis* (INIFAT C84/11) et *T. gigantea* (BRIP29202), ont été examinés mais différent tous de *T. aculeata* par la taille et la forme de leurs microbarbes.

champignon anamorphe / hyphomycetes / taxinomie / Chaetosphaeriaceae / Ascomycota

INTRODUCTION

Thozetella Kuntze was proposed in 1891 as nomen novum for *Thozetia* Berk. & Muel. However, at that time, there was no available description (Kuntze, 1891). The original description was known as “sporodochium minutum globosum; sporae hyalinae oblongae utrinque seta unica terminatae” (Berkeley, 1881) and is insufficient. Höhnelt (1909) provided a better description, but this was for *Thozetia nivea* Berk. Pirozynski & Hodges (1973) provided a revision of the genus. These authors proposed a new combination for *Thozetella nivea* (Berk.) Kuntze (type species) with important comments related to dimensions and description. Furthermore, they also proposed a new species, *T. cristata* Piroz. & Hodges, as well as two new combinations, *T. radicata* (E.F. Morris) Piroz. & Hodges and *T. tocklaiensis* (Agnihotur.) Piroz. & Hodges. At that time, four species were known.

Thozetella is an anamorphic fungi characterized by sporodochial, synnematal or effuse conidiomata, phialidic conidiogenesis and unicellular, setulate, lunate, hyaline conidia agglomerated in mucous mass at the top of conidiomata (Paulus *et al.*, 2004) and related to the teleomorph in the Chaetosphaeriaceae (Kirk *et al.*, 2008; Jeewon *et al.*, 2009; Hyde *et al.*, 2011). The

microawns are unicellular sterile elements present mainly at the top and around the conidia mass. These sterile elements are the only stable characters which support species identification and is a distinctive characteristic of this genus (Pirozynski & Hodges, 1973; Paulus *et al.*, 2004).

Currently, there are 15 accepted species in the genus. Species are saprobes found on leaf litter, bark and twigs in the temperate and tropical regions (Morris, 1956; Agnihotrudu, 1958; Pirozynski & Hodges, 1973; Nag Raj, 1976; Sutton & Cole, 1983; Castañeda Ruiz, 1984; Castañeda Ruiz & Arnold, 1985; Grandi *et al.*, 1995; Waipara *et al.*, 1996; Gusmão & Grandi, 1997; Tokumasu & Aoiki, 2002; Allegrucci *et al.*, 2004; Paulus *et al.*, 2004; Piontelli & Giusiano, 2004; Heredia Abarca *et al.*, 2006; Grandi & Silva, 2006; Barbosa *et al.*, 2007, 2011; Marques *et al.*, 2008; Jeewon *et al.*, 2009; Cruz & Gusmão, 2009a,b).

Throughout the investigation of hyphomycetes on leaf litter in the forest environments of São Paulo State, Brazil, specimens of *Thozetella* were collected. They have peculiar microawns, morphologically different from all other published species. Therefore, we describe it as a new species.

MATERIALS AND METHODS

Collecting sites: Leaf litter was collected in São Paulo State, Mogi-Guaçu County, Biological Reserve of Mogi-Guaçu, in a typical riparian forest, and in Altinópolis County, “Cachoeira da Gruta”, an area with transition between riparian and fragment of Forest.

Isolation and identification of specimens: Leaf litter was washed and incubated in moist chambers (Petri dishes with 9 cm diameter) stored at about 25°C. Moist chambers were polystyrene containers (10 until 30 L capacity) with 50 or 70 ml of sterile water and 2 ml of glycerol (Gusmão *et al.*, 2006; Castañeda Ruiz *et al.*, 2009, adapted). The specimens were examined in permanent slides with mounts of PVLG resin plus cotton blue [8.3 g polyvinyl alcohol in 100 ml distilled water, 50 ml lactic acid and 10 ml glycerin plus three to seven drops (about 1 ml) of cotton blue], under a stereomicroscope. Measurements and photomicrographs were obtained by using Zeiss Motic BA 300 and Axiostar plus, Axioskop 40, AxioCam MR and AxioVision microscopes, all material is deposited at the SP Herbarium. Type material of *Thozetella* species which seemed closely related to *T. aculeata* were loaned from LPS, BRIP, IFRD, INIFAT and IMI for morphological comparison.

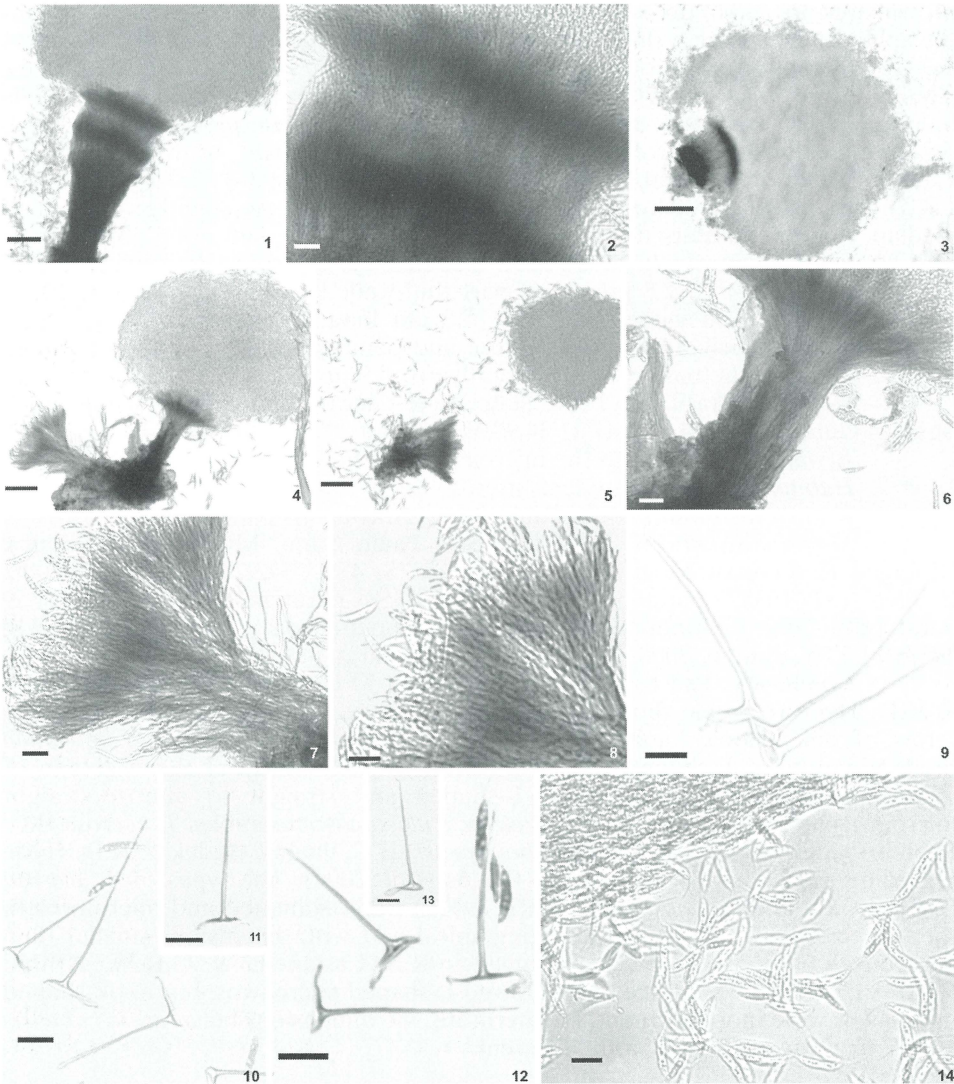
RESULTS AND DISCUSSION

***Thozetella aculeata* P. Silva & Grandi, anam. sp. nov.**

Figs 1-14

Mycobank: MB 561202

Microaristae continuae, praecipue forma T inversa aut L-forma, refractivae, laeves, hyalinae, 18.2-42.2 × 1.9-2.8 μm; basis pariete tenui, aut integra si recta, curvata vel lageniformi, lumine, 8.6-15.3 μm longo, frequenter cadente in forma triangulari vel in forma cellulae podali; pars apicalis, 0.4-0.9 μm lata, acerosa et acuta, recta, ex regione mediana basali aut laterali oriens.



Figs 1-14. *Thozetella aculeata*. 1-2. Synnemata with synchronous proliferations. 3. Sporodochium with mass of conidia. 4-8. Synnemata with distinct form and without proliferation. 9-13. Microawns with apical part acerose and pointed. 11. Microawn inverted T-shaped. 14. Conidia. Bars: 1, 4-5=50 μ m; 3=100 μ m; 2, 6-14=10 μ m; Figs 1-2, 11-12: Holotype SP416356. Figs 3,9-10, 13-14: SP416357. Fig. 5: SP416358. Figs 4, 6-8: SP416359.

Holotypus (hic designatus): Brazil, São Paulo State, Mogi-Guaçu County, Biological Reserve of Mogi-Guaçu, 22°15'34.8"S, 47°11'34.9"W, April 28, 2008, leg. P. Silva (SP416356).

Conidial fungi, hyphomycetes. **Conidiomata** sporodochial or synnematous, scattered on the surface of leaf litter. **Sporodochia** pulvinate 100-142.5 μ m long \times 57.5-132.5 μ m wide at the base \times 43.2-242.5 μ m wide at the apex, and **synnemata** infundibuliform or cylindrical, composed by elongated and light

brown stalk 167.5-340 μm long \times 40-50 μm wide at the base \times 117-155 μm wide at the apex, both bearing a slime, glistening white mass of conidia and microawns at the top. Synnemata with or without synchronous proliferation of conidiophores. **Conidiophore** macronematous, branched, light brown. **Conidigenous cells** monophialidic, without any noticeable collarete, unicellular, integrated, determinate, terminal, irregularly cylindrical, smooth, light brown to hyaline. **Conidia** lunate or fusiform, continuous, smooth, hyaline, (9.6-) 11.5-14.4 (-15.3) \times 1.9-2.6 μm , provided with a single setula at each end, some slightly constrict at median region. **Setulae** filiform, hyaline, (4.8-) 5.7-8.6 μm long. **Microawns** continuous, predominantly inverted T-shaped or L-shaped, refractive, smooth, hyaline, 18.2-42.2 \times 1.9-2.8 μm ; basal part thin-walled, when entire it is straight, curved or lageniform with lumen, 8.6-15.3 μm long, frequently collapsed as a triangle or a foot-cell; apical part acerose and pointed, straight, arising from the median region of the basal part or laterally, 0.4-0.9 μm wide.

Holotype: Brazil, São Paulo State, Mogi-Guaçu County, Biological Reserve of Mogi-Guaçu, 22°15'34.8"S, 47°11'34.9"W, 28 April 2008, P. Silva (SP416356).

Etymology: related to the microawn morphology.

Habitat: indeterminate leaf litter.

Known distribution: São Paulo State, Brazil (this paper).

Material examined: BRAZIL, São Paulo State, Mogi-Guaçu County, Biological Reserve of Mogi-Guaçu, 22°15'34.8"S, 47°11'34.9"W, April 28, 2008, P. Silva (SP416357 paratype); *Ibid.* (SP416358 paratype); *Ibid.* (SP416359 paratype); *Ibid.* Altinópolis County, "Cachoeira da Gruta", 21°4'8.9"S, 47°26'14.5"W, June 6, 2008, P. Silva (SP416360 paratype).

Comments: The L-shaped microawns in *T. gigantea* B.C. Paulus, Gadek & K.D. Hyde resemble those of *T. aculeata*, however, the species are distinct in terms of dimensions. Paulus *et al.* (2004) reported microawns in *T. gigantea* predominantly be L-shaped and up to 280 μm long. Study of the holotype of *T. gigantea* (BRIP29202) revealed L-shaped and straight to almost straight microawns up to 182.5 μm long. *Thozetella aculeata* also resembles *T. acerosa* B.C. Paulus, Gadek & K.D. Hyde and *T. boonjiensis* B.C. Paulus, Gadek & K.D. Hyde regarding the L-shaped microawns (Paulus *et al.* 2004). The types of *T. acerosa* (BRIP29318) and *T. boonjiensis* (BRIP29319) were examined and microawns in these species have a slightly undulating apical part with dimensions smaller than *T. aculeata*. Also the type of *T. cubensis* R.F. Castañeda & G.R.W. Arnold (INIFAT C84/11) was studied and showed L-shaped microawns, but hook-shaped microawns were more frequent. Furthermore, the dimensions between *T. cubensis* and *T. aculeata* are significantly different.

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