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Anamorphic fungi from French Guyana species. *Readeriella guyanensis* sp. nov., a new coelomycetous species

Cony DECOCK

Mycothèque de l'Université catholique de Louvain (MBLA, MUCL[1]*),*
Place Croix du Sud 3,
1348 Louvain-la-Neuve, Belgium
(decock@mbla.ucl.ac.be)

Abstract – *Readeriella guyanensis sp. nov.*, isolated from decaying leaves in French Guyana is described and illustrated. The species is compared to *Readeriella mirabilis* and *Trigonosporium cochinchinense*.

Coelomycetes / *Trigonosporium* / *Microsphaeropsis*

INTRODUCTION

In the course of the study of leaf litter fungi from French Guyana, a coelomycetous fungus producing pale brown, sub-obdeltoid (tetrahedral, triangular in section) phialoconidia, with small, apical, rounded protuberances, and born in small pycnidia was isolated in pure culture from a decayed leaf of an unidentified angiosperm, by a dilution plate method.

The pycnidial conidiomata and the peculiar conidial shape prompted us to relate this fungus to *Readeriella* H. & P. Sydow, a monotypic genus, with *R. mirabilis* H. & P. Sydow as type, and characterized, in addition to the conidiomata, by brown, obdeltoid (attached by the vertex) conidia, with three small, apical rounded protuberances, born from percurrently proliferating conidiogenous cells (Sydow & Sydow, 1908 ; Macauley & Thrower, 1965 ; Sutton, 1971, 1980 ; Morgan-Jones *et al*., 1972). Sutton (1971, 1980) redescribed and illustrated the conidiogenesis as phialidic (commonly mono-, rarely polyphialidic), "producing conidia normally at a single point", but noted that annellidic ("channel proliferating percurrently") conidiogenous cells also frequently occur, and eventually conclude that the conidiogenesis would be annellidic.

Our fungus obviously differs from *R. mirabilis* by having much smaller conidia : 2.5-3.3 × 2.5-3.3 µm, up to 3.5 µm in side length *versus* 7.0-9.5 × 6.5-9.0 µm in *R. mirabilis* (Sutton 1971). It would also differ by its conidiogenesis, which is phialidic. No percurrent proliferation has been observed. The taxonomic significance of the phialidic / annellidic conidiogenesis at generic level in the coelomycetous fungi could be questioned. There are examples within coelomycetous fungi

1. MUCL is a members of the Belgian Coordinated Collections of Microorganisms (BCCM™).

where the conidiogenesis has been emphasized as critical, resulting in the splitting of the generic concept: see for instance the case of *Coniothyrium* Corda (1840) versus *Microsphaeropsis* Höhn (1917), with respectively an annellidic and phialidic conidiogenesis (Sutton, 1971). On the basis of the latter case, our fungus would not be considered congeneric with *R. mirabilis*.

A search within the genera of coelomycetous fungi producing (hyaline) to pale brown phialoconidia in pycnidia, led to consider two alternative genera as possible placements: *Microsphaeropsis* (Sutton, 1971, 1980) and *Trigonosporium* Tassi (Sutton, 1971).

From a morphological point of view, *Microsphaeropsis* would have been an arguable option, the genus being also characterized by pycnidial conidiomata, phialidic conidiogenesis, and pale brown, thin- to thick-walled conidia, of variable shape but mainly globose, subglobose, pyriform or cylindrical (Sutton, 1980). It would differ from our fungus by the shape of the conidia, a feature of uncertain taxonomic significance within this group. Numerous species have been described in *Microsphaeropsis*, but its nomenclature status, circumscription, and the possible number of species are uncertain, and in need of re-evaluation (Sutton, 1980).

However, preliminary indications of the relationships of our fungus and of *M. olivacea* (Bonord.) Höhn. (*Microsphaeropsis* type species, Sutton 1980) obtained using the BLAST search option (Altschul *et al*., 1990) at GenBank and based on ribosomal Small SubUnit or ITS fragments, would not support the congenericity of both taxa. The BLAST search for our fungus (based on SSU) demonstrated homology with members of the Capnodiales (as the anamorphic *Capnobotryella* Sugyi.), some members of the Dothideales (such as species of *Delphinella* (Sacc.) Kuntze, *Discosphaerina* Höhn., the anamorphic genera *Hormonema* Lagerb. & Melin, *Aureobasidium* Viala & G. Boyer), and some so-called "black yeast" of uncertain taxonomic affinities (*Hortaea* Nishim. & Miyaji. or *Coccodinium* A. Massal), all belonging to the Dothideomycetidae. However, the same search for *M. olivacea*, but using an ITS fragment, demonstrated homology mainly with members of the Pleosporales and related anamorphic forms (as *Phoma* Sacc. [2], Dothideomycetidae). Both our fungus and *M. olivacea* belong to the large subclass Dothideomycetidae, but they are not so closely related as to be considered congeneric.

Trigonosporium Tassi also was considered and could be arguable. Indeed, the latter genus produces trigonous, pale brown conidia born in pycnidia (Sutton 1971). However, the precise circumscription and the status of *Trigonosporium* are uncertain (Sutton 1971, Kirk *et al.* 2001). Sutton (1971) studied the type species, *T. australiensis*, but was unable to find any conidiomata or conidia on the type material. The type specimen of *T. australiensis* [3] was again revised by us, and neither conidiomata nor conidia were found on this material, impeding any sound description of the species and genus. One has therefore to rely on Tassi's (1900) original description and illustration to have an idea of the species. However, and importantly, Tassi (1900) did not describe the conidial ontogenesis, which remains therefore unknown.

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2. A similar search using a SSU sequence of *Ph. glomerata* (Cda) Wollenw. & Hochapf. provided, unsurprisingly, the same results.
3. Type specimen: Australia, Sidney, on of branches of *Cupania serrata*, 1900, in Herb. SIENA.
4. Type specimen: Vietnam, Saigon, on decaying fruit or leaf fragments, Oct. 1902, in Herb. SIENA.
5. A permanent slide of T. *cochinchinense* kept at IMI was also studied.

The type material of the second species, *Trigonosporium. cochinchinense* [4, 5] Tassi (Tassi 1902), was also studied by Sutton (1971) and again revised by us. The fertile, sporulating structures observed on the substrate confirmed the observations of Tassi (1902) and Sutton (1971) regarding the conidial size and shape. Conidia are triangular in face view, almost ellipsoid in side view, the base [6] usually slightly centrally depressed, but without any apical protuberances, differing thus from those of our fungus and *R. mirabilis*. The conidia are also slightly larger than in our fungus (viz. 3.5-4.5 µm in longest dimension, Sutton 1971, pers. obs., *versus* 2.7-3.5 *µm* in our fungus). However, as not a single conidiogenous cell was found, neither on the type material, nor on a permanent slide kept at IMI, the conidial ontogenesis of the species remains also unknown. The conidiogenesis being unknown in *Trigonosporium*, it is difficult to discuss its possible relationship with our fungus.

Sutton (1971) also mentioned *Coniothyrium trigonicola* Rangel (1916), originally described from Brazil with brown, 6-9 µm, trigonous conidia, much longer than in our fungus. Sutton (1971) could not locate the type material of this species, and its status also remains uncertain.

In view of the uncertainties related to the various options discussed above, we propose to describe our species as *Readeriella guyanensis sp. nov.*, notwithstanding the difference regarding the conidiogenesis.

MATERIAL AND METHODS

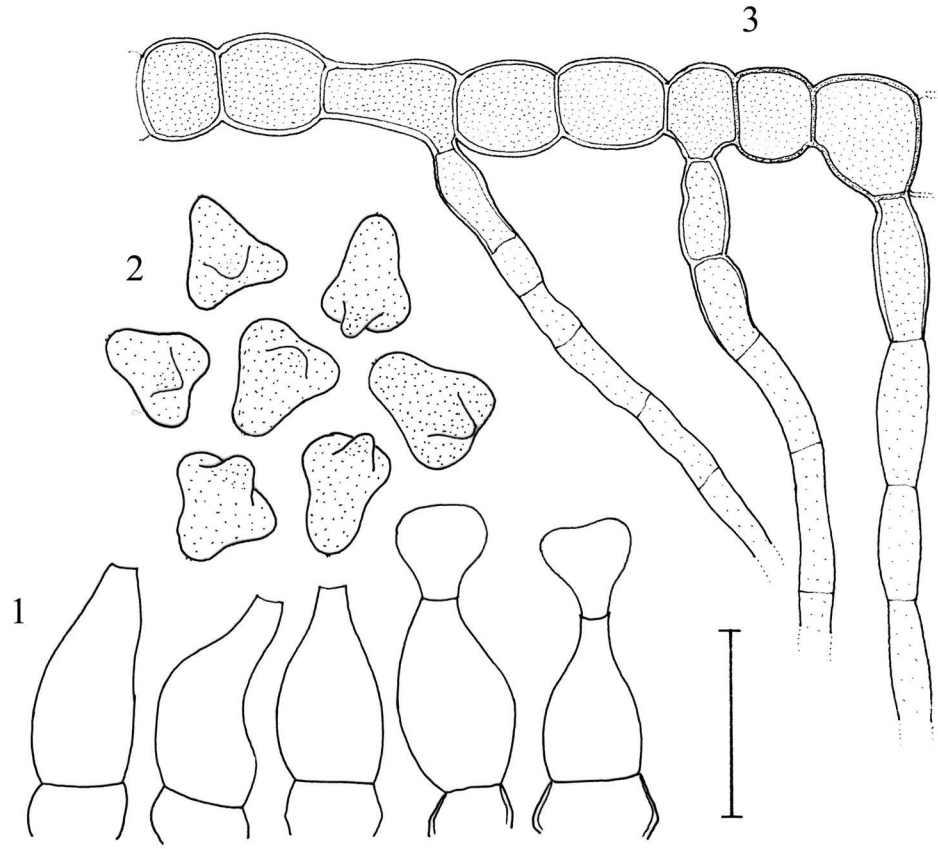
Cultures used in this study are preserved at MUCL. The type specimens of *T. australiensis* and *T. cochinchinense* were received from SIENA, with one permanent slide of the latter species received from IMI (herbarium acronym are from Holmgren *et al.*, 1990). Cultures were grown on corn meal agar (CMA), oatmeal agar (OMA), and vegetable juice agar (V8) (Untereiner *et al.* 1998) at 25°C, with a 12/12h. incident, near UV light periodicity. Microscopic measurements were done in lactic acid cotton blue (Kirk *et al.*, 2000). In presenting the size range of several microscopic elements, 5 % of the measurements at each end of the range are given in parentheses, when relevant. In the text, the following abbreviations are used: $\bar{x}$ = arithmetic mean; R = ratio of length/width of the conidia; $\bar{x}_R$ = arithmetic mean of the ratio R.

TAXONOMY

Readeriella guyanensis Decock, *sp. nov.* Fig. 1-3.

Typo generis Readeriella mirabili H. & P. Sydow *affinis, sed conidiis parvioribus, 2.5-3.3 × 2.5-3.3 µm (spatium inter conidiae fixationem et apicem × spatium inter duos extremitates apicales), $\bar{x}$ = 3.1 × 2.9 µm, lateribus 2.7-3.5 µm $\bar{x}$ = 3.0 µm et conidiogenesibus phialidibus satis differt.*

6. The base means the base of the triangle, which could in fact be the apex if the conidia were, as in *Readeriella*, attached by the vertex, but the attachment point was impossible to demonstrate.



Figs 1-3. 1. Conidiophores and phialides. 2. Conidia (scale bar = 10 µm). 3. marginal growing hyphae. (scale bar = 10 µm).

Colonies on CMA and OA reaching 17-18 mm diam. in one week; colonies plane, slightly wet, greenish, grayish green; mycelium immersed, composed of large, rather distant (hyphae easily distinguished under stereomicroscope, 40×), radiating hyphae with numerous late, perpendicular ramification at regular interval; colonies on V8 reaching 25 mm diam. in one week; wet, dark green at the margin to very dark green, greenish black near the center; mycelium immersed, dense, composed of large radiating hyphae with numerous lateral ramifications; Hyphae hyaline at the very margin soon turning yellowish to yellowish brown, septate at regular intervals, cylindrical at first than swelling, becoming barrel-shaped, thick-walled, forming moniloid chain of thick-walled cells, 3.5-7.5 × 4.0-6.2 µm in diam., with numerous lateral branches at regular intervals; conidiomatal primordia appearing after one week, scattered all over the colonies, mostly semi- or totally immersed; conidiomata pycnidial; pycnidia solitary or in groups of 2-3, mostly semi- or totally immersed, sometime superficial, often irregular, subglobose, globose to pyriform, very occasionally with a short ostiolar "neck-like" apex, brown to dark brown, the wall single layered, cells rectangular to irregular, angu-

lar, thin- to thick-walled; conidiogenous cells hyaline, thin-walled, lageniform to more commonly slightly ventricose, phialidic, with a single conidiogenous locus (the latter apparently thickening by wall addition during successive conidial formation[7]); conidia enteroblastic, obdeltoid (section obtriangular in outline), with a small frill at the attachment point on the vertex, with three apical, lateral, blunt, rounded projections, the apex plane to slightly depressed, hyaline at first, soon pale brown in lactic acid, but more olivaceous greenish in KOH 4%, thin- to soon and mainly thick-walled, 2.5-3.3 × 2.5-3.3 µm (attachment point (vertex) to the summit × distance between two apical extremities), $\overline{x}$ = 3.1 × 2.9 µm, sides 2.7-3.5 µm $\overline{x}$ = 3.0 µm (from attachment point to one of the apical extremities), exuded into a fluid, watery, brownish droplet at the apex or sometimes by wall dehiscence; teleomorph unknown.

HOLOTYPE : FRENCH GUYANA, Cayenne Area, Matouri, Sentier d'Interprétation de la Nature "Lamirande", from a dead, decaying leaf of unidentified angiosperm in leaf litter, isolated by dilution plate, Feb. 1994, M. Henry de Frahan FG 1166 = MUCL 46082, as a four weeks dried culture on V8 culture media (living culture ex-Holotype MUCL 46082).

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After having edited the final version of this manuscript, we were informed in lit. that Crous *et al.* (2004) described two new *Readeriella* species, *R. readeriellophora* Crous & J.P. Mansilla and *Readeriella novaezelandiae* Crous, but however different from *R. guyanensis*. Interestingly, *R. novaezelandiae* has also a phialidic conidiogenesis with periclinal thickening at the conidiogenous locus, and no percurrent proliferation (Crous *et al.*, 2004), a feature shared with *R. guyanensis*.

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7. A feature however difficult to ascertain due to the small size of the conidiogenous cells.

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