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A NEW SPECIES OF MEMNONIELLA

De-Wei Li[1], Chin S. Yang,

P & K Microbiology Services, Inc., Cherry Hill, New Jersey, 08003

R. Haugland, and S. Vesper

National Exposure Research Laboratory, US Environmental Protection Agency, Cincinnati, Ohio, 45268

Abstract

A new species of hyphomycetes, *Memnoniella longistipitata* anam. sp. nov., is described and illustrated. This fungus was originally isolated from forest soil in Japan.

Key words: Hyphomycetes, *Memnoniella longistipitata*, *Stachybotrys*.

Introduction

Six species have been described in the mitosporic genus *Memnoniella* Höhnel: *M. echinata* (Rivolta) Galloway (=*M. aterrima* Höhn.), *M. levispora* Subramanian, *M. subsimplex* (Cooke) Deighton, *M. zingiberis* Rao, *M. stilboidea* (Munjal & Kapoor) Ellis, and *M. leprosa* Castañeda. Members of this genus did not attract much attention until several years ago, when public awareness of the apparent potential negative effects of indoor fungi on human health became an issue, and the ubiquitous and toxigenic *Stachybotrys* achieved considerable notoriety. There are several similarities between *Memnoniella echinata* and *Stachybotrys chartarum*: (1) widespread distribution, (2) production of an overlapping spectrum of mycotoxins, including trichothecenes, (3) saprobic lifestyles in indoor habitats (water-damaged buildings), (4) cellulolytic activities (the paper on damp wallboard), and (5) close phylogenetic relationships. During comparative sequence studies of *Stachybotrys* and *Memnoniella* to determine their phylogenetic relationships, one isolate (ATCC 22699) collected and deposited by T. Matsushima under the name of *M. subsimplex*, was found to be genetically different from both *M. subsimplex* and *M. echinata* (Haugland and Heckman, 1998; Haugland, Vesper and Harman, 2001). Further study at P & K Microbiology Services laboratory revealed that this isolate has distinctive morphological characteristics. The culture is therefore described as a new species.

[1] Contact author email: drdeweili@aol.com

Memnoniella longistipitata D. W. Li, Chin S. Yang, Vesper et Haugland sp. nov. Figures 1-4.

Fungi mitosporici, Hyphomycetes.

Coloniae in MEA, 27 mm diam. in 21 diebus ad 25°C, grisea; margina irregularia, massas conidiarum granulatae.

Conidiophora longissima, distincta, solitaria vel interdum fasciculata, determinata, erecta, recta vel exigue curvata, non ramosa, (170-) 260–460 (-610) µm longa (⊏ = 266 µm) and (3.2-) 3.6 - 4.7 (-4.9) µm crassa, primo hyalina, deinde olivacea, verrucosa, apice inflata.

Cellulae conidiogenae phialidicae, determinatae, discretae, laeviae, obovatae vel ellipsoideae vel clavatae, pallide olivaceae, 3-9 in verticillo dispositae, 9.7-10.2 × 4.7-5.5 µm, collulo conspicuo praeditae.

Conidia catenata, aliquando in extremis complanata, primo hyalina, laevia, deinde agro-olivacea vel nigra, sphaerica vel subsphaerica, echinulatae (tuberculatae), 5.8-8.5 × 6.3- 8.3 µm. Aliquot conidia (1% ad 5%) simile *Stachybotrys* formans: oblonga vel ovoidea, atro-olivacea in massis globosis aggregata, laevia vel verrucosa, 10.5-12 × 4.8-5.7 µm.

Teleomorphosis ignota.

Holotypus ATCC 22699 ex solo sylvarum isolatus, Japan.

Mitosporic fungi, Hyphomycetes.

Colonies reaching 27 mm in diameter in 3 weeks at 25°C on malt extract agar, becoming grayish and granular with the production of conidia (Figure 1).

Conidiophores very long, distinct, single, occasionally in groups, determinate, erect, straight or slightly curved, unbranched, (170-) 260–460 (-610) µm long (mean = 266 µm) and (3.2-) 3.6-4.7 (-4.9) µm wide (Figure 2), colourless at first, later becoming olivaceous and roughened (Fgiures 2, 3). Slightly enlarged apex bearing 3-9 phialides in a terminal whorl.

Phialides determinate, discrete, smooth, obovoid to ellipsoidal to clavate, light olivaceous, 9.7-10.2 × 4.7-5.5 µm, with noticeable collarettes (Figure 3).

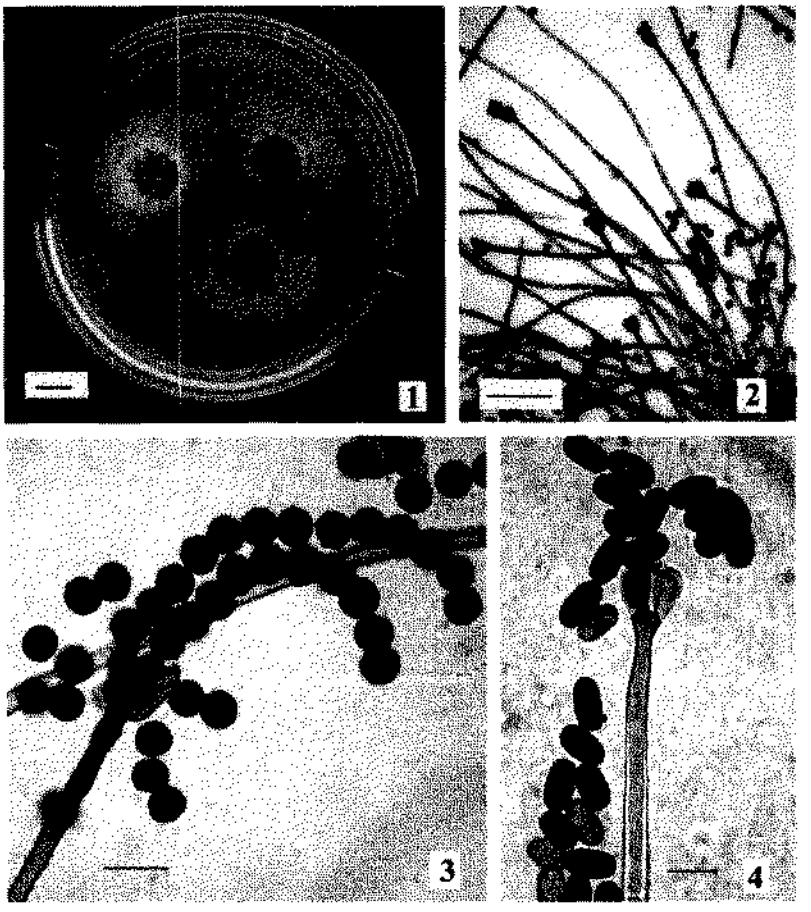
Conidia catenate, acrogenous, in basipetal succession, spherical or subspherical, sometimes flattened at the ends, colourless and smooth at first but becoming dark olivaceous or black, warty, 5.8-8.5 × 6.3-8.3 µm at maturity (Figure 3). This species also develops 1%-5% *Stachybotrys*-type conidia which are oblong or ovoid, dark olivaceous, smooth-walled to slightly rough, 10.6-11.9 × 4.8-5.7 µm, aggregated in slimy masses (Figure 4).

Teleomorph unknown

Holotype: Dried specimen derived from a culture ATCC 22699 from a specimen collected in Japan by T. Matsushima. Isotypes are deposited in BPI, CUP, CBS, DAOM, and IMI. Living cultures maintained at ATCC (ATCC22699).

Etymology: the specific epithet refers to the long stipe of this species.

This species is very similar to *M. subsimplex* (Cooke) Deighton (Deighton 1960). The isolate used in the study was deposited at ATCC by the collector, T. Matsushima, under



Figs. 1-4. *Memnoniella longistipitata*. 1. Colonies on MEA after 3 weeks. 2. Long conidiophores. 3. Conidiophore, phialides, and conidia. 4. *Stachybotrys*-type conidia. Bars = 10 µm (in Figs 3, 4), 40 µm (in Figure 2), 10 mm (in Figure 1), respectively.

the name of *M. subsimplex*, but conidia of *M. subsimplex* are coarsely warted, only 6-9 µm in diameter, and the species develops much shorter conidiophores. *M. echinata* (Riv.) Galloway is another similar species, but has smaller conidia, 3-6 µm in diameter. Zuck (1946) observed that *M. echinata* developed both *Memnoniella*- and *Stachybotrys*-type conidia. *M. longistipitata* also develops some *Stachybotrys*-type conidia in slimy heads at the edge of the colonies. However, phylogenetic and specific PCR primer studies using sequence analysis of rDNA showed that *M. longistipitata* is genetically different from *M. subsimplex* and *M. echinata* (Haugland and Heckman,

1998; Haugland, Vesper and Harman, 2001). Other similar species are *M. levispora* Subram. (1954) which has smooth-walled conidia, often hemisphaerical, 5 (3-7) µm in diameter; *M. zingiberis* Vasant Rao (1962) which has perfectly globose, warty conidia, (4.4-) 6-6.5 (-6.8) µm diam; and both *M. stilboidea* (Ellis, 1976) and *M. leprosa* (Castañeda, 1986) which are synnematous. Jong and Davis, (1976) considered that *M. zingiberis* is possibly a synonym of *M. echinata*. However the studies of Haugland, et al. (2001) indicated a closer genetic similarity between *M. zingiberis* and *M. subsimplex*.

Separation of *Stachybotrys* and *Memnoniella* has been controversial over the past 40 years. Smith (1962) considered that dry conidia in chains, as in *Memnoniella*, and slimy aggregated conidia, as in *Stachybotrys*, were not sufficient to separate them into two genera and demoted *Memnoniella* to synonymy with *Stachybotrys*. Kendrick and Carmichael (1973), Barron (1968) and Carmichael et al. (1980) concurred with Smith's treatment. Zuck (1946) observed that *M. echinata* developed conidia in both dry chains and slimy aggregates. Our observation of a number of isolates of *M. echinata* confirmed his results. *Memnoniella longistipitata* also developed both types of conidia. Zuck (1946) considered the isolates that developed both types of conidia were intermediate between *Stachybotrys* and *Memnoniella*. A study using comparative sequence analysis of species of *Stachybotrys* and *Memnoniella* convinced Haugland et al. (2001) that the names of *Stachybotrys echinata* (Rivolta) Smith and *Stachybotrys subsimplex* Cooke 1883 should be revived. Further studies are necessary before the fate of *Memnoniella* can be decided. Since *Memnoniella* is apparently still accepted, our new species is placed in this genus.

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