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Monacrosporium multiseptatum, a new predacious fungus from China

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Abstract—*Monacrosporium multiseptatum*, a new predacious species, is described from Yunnan Province, China. The fungus is characterized by its simple, unbranched conidiophores and elongate fusiform to straight clavate conidia with 4-9 septa (usually 6-7) and a size of 67.5-132.5 (91.6) × 13.8-17.5(15.5)μm. The fungus captures nematodes by stalked adhesive knobs and forms spherical to ellipsoidal chlamydospores in older culture.

Key words—nematode-trapping fungi

Nematode-trapping fungi have been studied worldwide for their potential applications as bio-control agents and their unique predatory habits. Usually, these predacious hyphomycetes are assigned to the genera *Arthrobotrys* Corda (Corda 1839), *Dactylella* Grove (Grove 1884), and *Monacrosporium* Oudem. (Oudemans 1885) based on the morphology of their conidia, conidiophores, and trap devices (Subramanian 1963, Cooke & Dickinson 1965, Castaner 1968, Schenck et al. 1977, Oorschot 1985, Zhang et al. 1994, Rubner 1996, Miao et al. 2003).

During a survey of these fungi in Yunnan Province, China in 2003, soil was sampled and subsamples were sprinkled onto 2% corn meal agar (CMA) plates and challenged with free-living nematode (*Panagrellus redivivus*). After incubation for 2-4 weeks at 25°C, the plates were examined under a dissecting microscope. In the cultures isolated, an unusual species of the genus *Monacrosporium* was found. The culture was inoculated on 2% CMA and incubated at 28°C for 14-30 days and determined based on measurements of taxonomic characters. Trap formation was induced in a 10-day old culture by removing a 2 cm^2 piece of agar from the center of water agar (WA) plate to create an open space. About 200 nematodes (*Panagrellus redivivus*) were added the free space after the mycelia emerged from the cut margin. Microscopic photographs were taken from fresh living material mounted in water using an Olympus BX51 microscope. After comparing with the known species, we confirm that the culture represents a new taxon, which we name *Monacrosporium multiseptatum*.

** The authors contributed equally to this work.

Monacrosporium multiseptatum H.Y Su et K. Q. Zhang **sp. nov.** (Figs 1-14)

Coloniae in agaro CMA albidae, post 7 dies 25°C 6 cm diam. Mycelium sparsum, hyphis septatis, ramosis, 1.75–2.5 µm latis. Conidiophora erecta simplicia, 6-9 septata, 170-260 µm longa, 2.5–2.75 µm lata ad basim, 1.75–2.0 µm lata ad apicem. Conidia hyalini, vulgo fusiformis, basi truncatis 4–9 septatis, praecipue 6–7 septatis, 67.5–132.5 (91.6) × 13.8–17.5 (15.5) µm. Inprimis bullis tenacibus globosis 11.25 µm longis, 10 µm crassis. Chlamydosporis in culturis vetustioribus, globusae ad ellipsoidae, 5-8 × 4-6 µm.

Etymology: The species epithet refers to the septate characteristic of conidia.

Holotype: YMF1.00127D, Yunnan Province, China. The holotype and its culture (YMF1.00127) are deposited in the Laboratory for Conservation and Utilization of Bioresources of Yunnan University.

Colonies on CMA plates growing quickly, attaining 6 cm diam. in 7 days at 25°C. Mycelium spreading, vegetative hyphae hyaline, septate and branched, mostly 1.75-2.5 μm wide. Conidiophores (Fig 1) erect, simple, septate, 170-260 μm long, 2.5-2.75 μm wide at the base, gradually tapering upward to a width of 1.75-2.0 μm at the tip, bearing a single conidium on the tip of conidiophores, occasionally two conidia. Conidia (Figs 2-11) colorless, elongate fusiform to straight clavate, sometimes apparently curved (Figs3,7), narrowly round at the distal end, tapering towards the narrow truncate at the base, somewhat constricted at septa (Figs 8-11), 67.5-132.5(91.6)×3.8-17.5(15.5) μm, 4-9 septate, mainly 6-7 septate. The proportion of conidia with 4, 5, 6, 7, 8 and 9 septa accounts for 1.8%, 3.6%, 23%, 45%, 25.1% and 2% respectively. In the presence of nematode the fungus forms stalked adhesive knobs which are unicellular, subspherical. The knob usually 11.25 μm long, 10 μm wide, with a stalk of 20-67.5 μm. Chlamydospores spherical to ellipsoidal, intercalary, about 5-8 × 4-6 μm (Fig 14).

M. multiseptatum resembles but distinctly differs from two nematode-trapping fungi, *M. haptotylum* (Drechsler) X.Z. Liu & K.Q. Zhang (Drechsler 1950, Liu & Zhang 1994) and *M. ellipsosporum* (Preuss) R.C. Cooke & C.H. Dickinson (Preuss 1851, Cooke & Dickinson 1965) in conidial shape and kinds of predacious device. *M. multiseptatum* produces larger conidia [67.5-132.5(91.6)×3.8-17.5(15.5) μm] and more septa (usually 6-8) than *M. haptotylum* [33-50 (43.7) × 7.4-13.3 (10.7) μm, mainly 4-sepate] and *M. ellipsosporum* [37.5-62 (48.3) × 8.7-19.3 (13) μm, often 4-septate]. Additionally, *M. multiseptatum* does not form denticles on the apex of conidiophores, while *M. haptotylum* and *M. ellipsosporum* often produce two to five short branches near the apex. The fungus also resembles *M. yunnanense* K.Q. Zhang, X.Z. Liu & L. Cao (Zhang et al. 1996) with respect to conidial shape, but the latter produces smaller conidia [34-81 (47.3) × 8.5-12.5 (10.2) μm] and forms adhesive knobs and non-constricting rings when challenged with nematodes.

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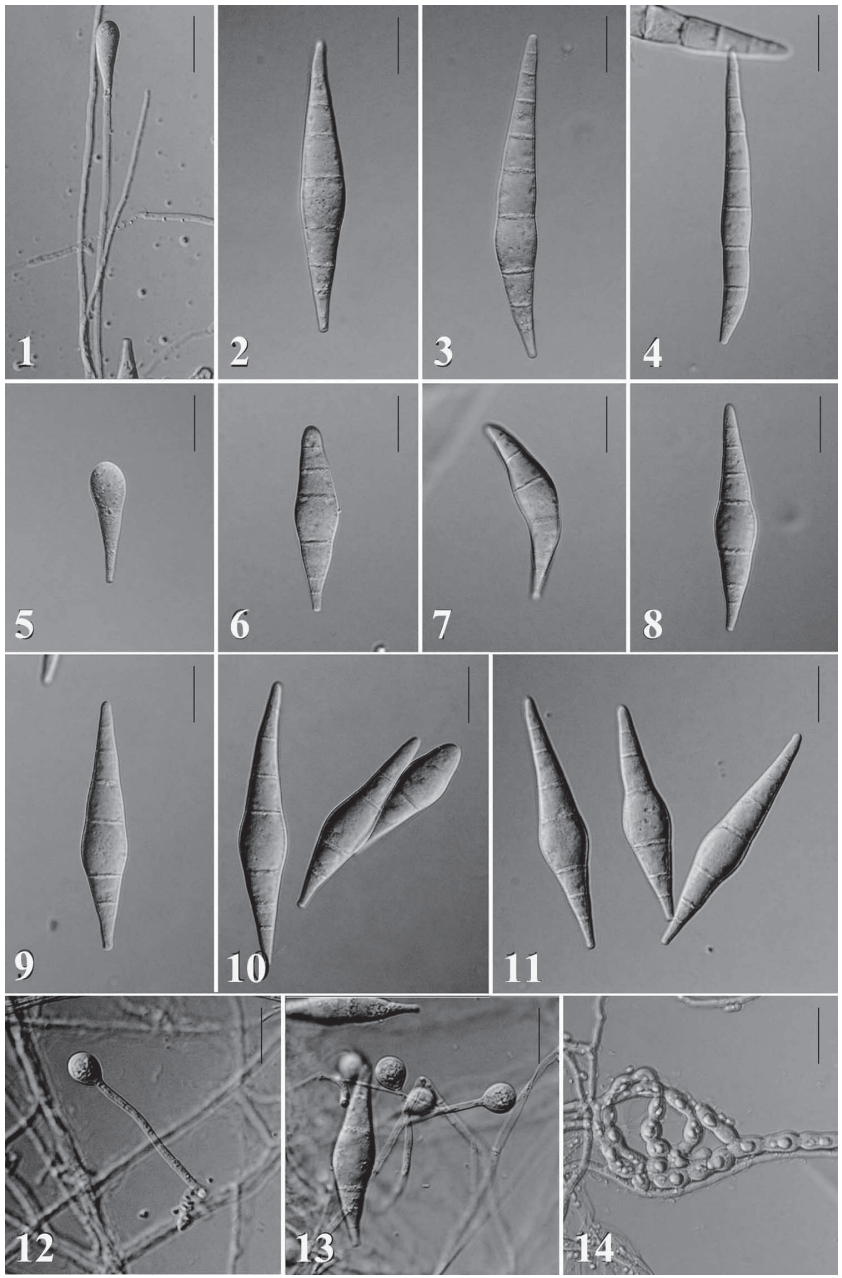

Figs 1-14 *Monacrosporium multiseptatum*. Fig 1. Conidiophores. Figs 5-6 Immature conidia. Figs 2-4, 7-11. Mature conidia. Figs 12-13 Adhesive knobs. Fig 14 Chlamydospores. bar=20μm.

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