mycotaxon

Volume 89(2), pp. 235-239 *April-June 2004*

A new aquatic nematode-trapping hyphomycete

YU'E HAO, JING LUO, AND KEQING ZHANG*

kqzhangl@yahoo.com.cn
Laboratory for Conservation and Utilization of Bioresources
Yunnan University, Kunming 650091, P.R. China

Abstract—A new *Dactylella* species was isolated during a survey of aquatic fungi on submerged wood in Dianchi Lake, Kunming, Yunnan Province, China. Its simple and branched conidiophores form a few short branches or spurs near apex and produce 2–3 conidia in sympodial arrangement. Conidia are hyaline, spindle or clavate, round at the distal end, truncate at the base, 1–7-septate, mainly 2-5-septate, 37.5–100.0 (70.0) X 10.0–17.5 (14.3) µm.

Keywords—aquatic hyphomycete, *Dactylella dianchiensis.*, nematode-trapping fungi

Introduction

Nematode-trapping fungi are usually isolated from rotten plant debris and soil. Their distribution on waterlogged soil or submerged wood is rarely mentioned in research literature. Only seven species of predacious hyphomycetes from an aquatic environment have been recorded (Ingold 1944, Peach 1950 and 1952, Nakagiri 1991). Recently, a survey of the fungi on submerged wood and waterlogged soil in Dianchi Lake was conducted. The methods used for the survey were to place wood samples into zipped plastic bags with waterish filter papers and to sprinkle soil samples onto CMA agar challenged with the free-living nematode, *Paragrellus redivius.* After incubation for 1-4 weeks at 25° C, the samples were examined under a dissecting microscope. A *Dactylella* species was isolated from the submerged wood and several recorded nematode-trapping fungi such as *Arthrobotrys oligospora* Fres, *A. conoides* Drechsler, *Monacrosporium elegans* Oudem, *M. thaumasium* (Drechsler) de Hoog & van Oorschot, *M. sphaeroides* Castaner, *M. cystosporium* Cooke & Dickinson and *Dactylella leptospora* Drechsler were isolated from the waterlogged soil. After a study of the morphological characteristics of the *Dactylella* species and a survey of the literature (Ingold 1944, Dowsett et al. 1984, Watanabe 1992, Liu & Qiu 1993, Zhang, Liu & Cao 1994, Rubner 1996, Nakagiri & Tadeyoshi 1996, Miao et al. 1999), we believe that this fungus is an undescribed species and name it *Dactylella dianchiensis.*

We follow the traditional view that the genera *Arthrobotrys, Dactylella* and *Monacrosporium* are distinguished by conidia with or without the largest cell, conidia septa, shape and size and conidiophores knotted or producing solid conidia, which has been widely accepted (Cooke & Dickinson 1965, Castaner 1968, Scheuck et al. 1977, Van Oorschot 1985, Zhang et al. 1994, Rubner 1996, Li & Miao et al. 2003, Liu & Zhang 2003). We therefore place the new fungus into *Dactylella* rather than *Arthrobotrys*, which has been amended by Schaller et al. (1999), who considered that *Arthrobotrys* forms adhesive networks. The detailed morphological characteristics of the new species are described in comparison with those of its similar species.

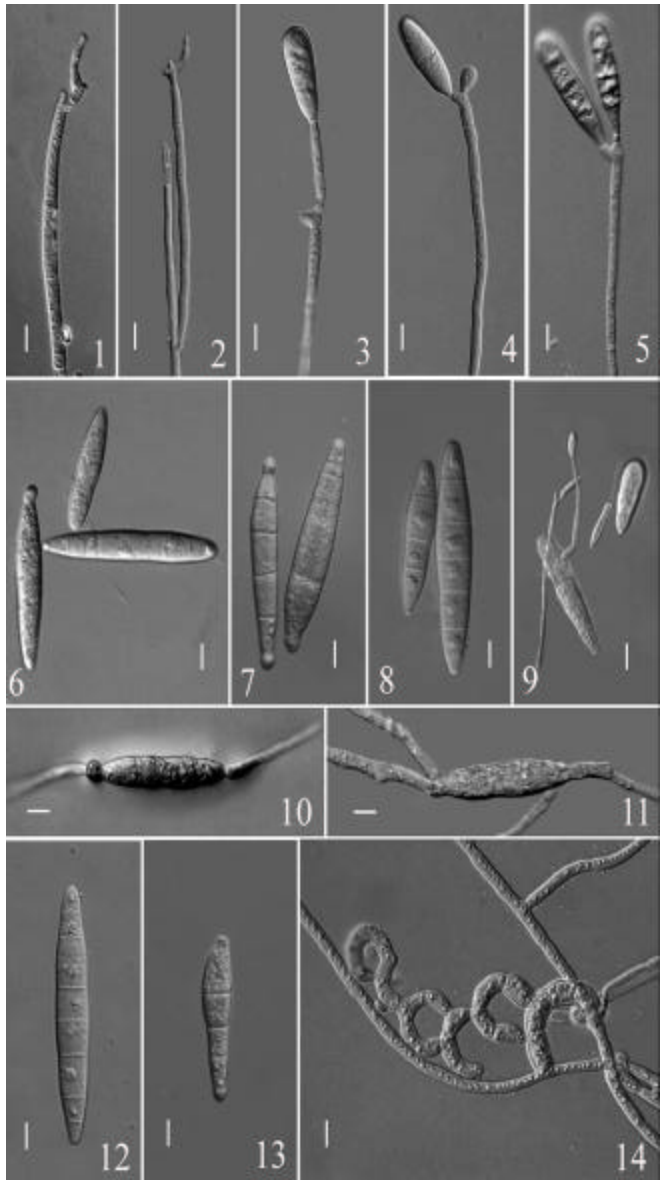
Dactylella dianchiensis Y. E. Hao et K. Q. Zhang sp. nov. (Figs 1-14)

Etym.: The species *Dactylella dianchiensis* was named after Dianchi Lake, Kunming, Yunnan Province, China, where it was first isolated.

Coloniae in agaro CMA albidae, post 6 dies 25°C 6 cm diam. Mycelium sparsum, hyphis septatis, ramosis, 2.5–5 µm latis, trimensionis formantibus. Conidiophora erecta simplex vel ramosa, 2–4 septata, 245–425 µm longa, 5–7.5 µm lata ad basim, 2.5–5 µm lata ad apicem. Conidia hyalina, fusiformis vel clavata, conidia e tuberculis geminate. 1–7 septata, praecipue 2–5 septata. Conidia secundaria clavatia, plerumque 1 septata, vulgo circa 23.9 µm longa et 5 µm lata. Habitat in ligno submerse.

Holotype: YMF1.00571D, Dianchi Lake, Kunming, Province Yunnan, China, 10-II-2003, Jing Luo. The holotype and its culture (YMF1.00571) are deposited in the Key Laboratory of Microbial Fermentation, Yunnan University.

A single spore was inoculated on PDA, a colony reached 7 cm in diameter at 28°, 5 cm at 25°C and did not grow at –4° or 35° within 4 days. The colony was initially whitish and turned orange white after 10 days of incubation. At the same time the reverse side of the media became faintly yellow to reddish orange. Colonies on CMA whitish, rapidly- growing and extending a diameter of 6 cm at 25° within 6 days. Mycelium hyaline, scanty, hyphae septate, branched, 2.5–5 µm wide. Primary conidiophores (Figs 1-5) erect, simple or branched, 2–4-septate, 245–425 µm high, 5–7.5 µm wide at the base, gradually tapering upward to a width of 2.5–5 µm at the tip, initially a width of 2.5–5 µm at the tip, initially with a single apical spore, later often producing a few short branches or spurs near the apex, and bearing 2-3 conidia in sympodial arrangement. Primary conidia (Figs 6, 8, 12) hyaline, spindle or clavate, narrowly round at the distal end, truncate at the base, 37.5–100.0 (70.0) X10.0–17.5 (14.3) µm, 1-7-septate, mainly 2-5-septate. The proportion of conidia with 1, 2, 3, 4, 5, 6 and 7 septa was 10.0%, 17.1%, 14.3%, 24.3%, 21.4%, 8.6% and 4.3% respectively. Some primary conidia



Figs 1-14. *Dactylella dianchiensis* sp. nov. Figs 1-2. Conidiophores. Figs 3-5. Conidia on conidiophores. Figs 6-8,12-13. Mature conidia. Fig 9. Germinated conidium with secondary conidiophore with a secondary one-septate conidium attached. Figs 10-11. Germinated conidia. Fig 14. Adhesive network. bar=10 μm.

had small tubercles at both ends (Figs 7, 13) and could germinate from these tubercles (Fig 10).The primary conidia could produce secondary conidiophores and secondary conidia (Fig 9). The secondary conidia spindle-shaped, about 23.9 X 5 µm, with 1 septum. Capturing nematodes by simple adhesive networks (Fig 14).

Table 1. Morphological comparison of *Dactylella dianchiensis*, *D. iridis (Trinacrium iridis, D. ramiformis)*[1], *D. crassa*, and *D. multiformis*

SPECIES	SIZE OF PRIMARY CONIDIA	NUMBER OF PRIMARY CONIDIAL SEPTA
D. dianchiensis	37.5–100.0 (70.0) X 10.0–17.5 (14.3) µm	1-7 (mainly 2-5)
D. iridis	47.5–155.0 X 7.5–16.3 µm	4-10
D. crassa	44.5–60 X 10–13 µm	1-5 (mainly 3-4)
D. multiformis	35–90.3 X 4–7.5 µm	4-12

1 *Trinacrium iridis* (Watanabe 1992) and *Dactyllela ramiformis* (Liu & Qiu 1993) are synonyms of *Dactyllela iridis* (Nakagiri & Tadeyoshi 1996, Rubner 1996).

Dactylella dianchiensis is distinguished from *D. iridis* (Zhang, Liu & Cao 1994), *D. crassa* (Miao, Lei & Liu 1999) and *D. multiformis* (Dowsett, Reid & Kalkat 1984) by the size and septation of primary conidia (table 1), although it resembles those fungi in primary conidial shape and traps nematodes by means of the three-dimensional adhesive networks. *D. dianchiensis* produces conidia with small tubercles at both ends and without any branches, while *D.iridis* produces some branched conidia. Another similar species, *D. submerse* (Ingold 1944), does not produce any trapping devices.

ACKNOWLEDGMENTS

We wish to thank Dr. Xuefeng Liu and Dr. Minghe Mo for their helpful suggestions during the investigation. We also appreciate Dr. Zhuliang Yang for correction of the Latin diagnosis and Dr Xinzhong Liu, Dr Shidong Li, Dr. Mark Notzon and Dr. Leming Zhang for their revision on the manuscript. This work was jointly financed by " 973 Project " (30230020) and the National Key Natural Science Foundation Program of China (2002CCC02800).

LITERATURE CITED

Castaner D. 1968. A conidiobolus-like fungus destroying nematode in Iowa. Mycologia 60:440-443.

Cooke RC, Dickinson CH. 1965. Nematode-trapping species of *Dactylella* and *Monacrosporium*. Trans. Brit. Mycol. Soc. 48:621-629.

Dowsett JA, Reid J, Kalkat.RS 1984. A new species of *Dactylella*. Mycologia 76: 563-566.

Ingold CT. 1944. Some new aquatic hyphomycetes. Trans. Brit. Mycol. Soc. 27:45-46.

Li SD, Miao ZQ, Zhang YH, Liu XZ. 2003. *Monacrosporium janus* sp. Nov., a new nematode-trapping hyphomycete parasitizing sclerotia and hyphae of *Sclerotinia sclerotiorum.* Mycol. Res. 107(7):888-894.

Liu XF, Zhang KQ. 2003. *Dactylella shizishanna* sp. Nov., from Shizi Mountain, China. Fungal Diversity 14:103-107.

Liu XZ, Qiu WF. 1993. A new species of *Dactylella* from China. Mycol. Res. 97(3): 359-362.

Miao ZQ., Lei LP, Liu XZ. 1999. *Dactylella crassa*, A new species of nematode-trapping fungi. Mycosystema 18: 354-356.

Nakagiri A, Tadeyoshi L. 1996. Taxonomy and ecology of *Dactylella iridis*: its redescription as an entomogenous and nematode-capturing hyphomycete. Mycoscience 37:81-89.

Nakagiri A. 1991. A new *Trinacrium*-like aquatic hyphomycete with predacity for nematode. Proc. 35th Ann. Meet. Mycol.Soc.Japan (Abstract) 55

Peach M 1950. Aquatic predacious fungi. Trans. Brit. Mycol. Soc. 33:148-153.

Peach M. 1952. Aquatic predacious fungi II. Trans. Brit. Mycol. Soc. 35:19-23.

Rubner A. 1996. Revision of predacious hyphomycetes in the *Dactylella-Monacrosporium* complex. Stud. Mycol. 39:1-134.

Schenck S, Kendrick WB, Pramer D. 1977. A new nematode-trapping species and a revaluation of *Dactylaria* and *Arthrobotrys*. Can. J. Bot. 55:977-985.

Van Oorschot CAN. 1985. Taxonomy of the *Dactylaria* complex. V. A review of *Arthrobotrys* and allied genera. Stud. Mycol. 26:61-96.

Watanabe T. 1992. *Trinacrium iridis*. sp.nov. from iris roots in Japan. Mycologia 84:794-798.

Zhang, KQ, Liu, XZ., Cao L. 1994. A review of *Dactylella* and a new species. Mycosystema 7:111-118.