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A new species of *Dactylella* and its teleomorph

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Abstract— *Dactylella lignatilis*, a new species, is described as the anamorph of an unidentified species of the genus *Hyalorbilia*. The fungus produces spindle-shaped to cylindrical conidia with 1-6 septa (usually 3-4). The conidia are 25-51 μm long ($\bar{x}$=41), 2.5-6.3 μm wide ($\bar{x}$=4.8), and are solitarily borne on extensively ramified conidiophores. The fungus fails to trap nematodes on water agar medium when challenged with nematodes.

Keywords—anamorph-teleomorph connection

Introduction

The fungi of *Orbiliaceae* Nannf. show cup-shaped ascomata and usually occur in nature on substrates that are either continually moist or periodically dry out. Traditionally, the *Orbiliaceae* was placed within the *Helotiales* Nannf. and originally included three genera, *Orbilia* Fr., *Hyalinia* Boud. and *Patinella* Sacc. (Nannfeldt 1932). However, in the opinion of Spooner (1987), *Patinella* was to be misplaced in *Orbiliaceae* and the genus *Habrostictis* Fuckel should be included in the family. Furthermore, a critical analysis of the combination of morphological characters showed that *Habrostictis* and *Hyalinia* were synonymized with *Orbilia* (Baral 1994). Molecular evidence proved that the *Orbiliaceae* are not closely related to the *Helotiales* and now only two genera, *Orbilia* and *Hyalorbilia* Baral & G. Marson, were accepted for which a new class Orbiliomycetes was created (Eriksson et al. 2003). Many fungi have life cycles that include both sexual states (teleomorphs) and asexual states (anamorphs), and these may legitimately be given separate names (Hennebert & Weresub 1977, Weresub & Hennebert 1979). The known anamorphs of *Orbilia* include both predacious and non-predacious fungi. The predacious forms fall into the genera *Arthrobotrys* Corda (Pfister 1994, Pfister & Liftik 1995) and *Monacrosporium* Oudem. (Rubner 1996, Liu et al. 2002). Apparently non-predacious anamorphs of *Orbilia* include *Anguillospora* Ingold (Webster & Descals 1979, Pfister 1997), *Dactylella* Grove (Thakur & Zachariah 1989; Webster et al. 1998), *Dicranidion* Harkn. (Berthet 1964, Korf 1992), *Dwayaangam* Subram. (Kohlmeyer et al. 1998), *Helicoon* Morgan (Pfister 1997), cf. *Idriella* P.E. Nelson & S. Wilh. (Haines & Egger 1982) and *Trinacrium* Riess. (Matsushima 1995). Here we report a new anamorph associated with an unidentified species of *Hyalorbilia*.

Materials and methods

While surveying orbiliaceous fungi, several apothecia of the genus *Hyalorbilia* on the periderm of *Pinus* sp. were collected from Xiaobailong Mountain, Kunming City, Yunnan Province, P. R. China on 10 Sep 2003. To isolate its anamorph, the apothecia were attached to the lid of a Petri-dish (diam=90 mm) using medicated Vaseline. The lid was placed over the base of the dish which contained 2% corn meal agar medium (CMA). The dishes were arranged so that the ascospores were projected upwards towards the light and were deposited on the CMA above. Ascospores projected on the agar after 2- 4 days and the blocks with germinating ascospores were transferred onto CMA slants and cultured at 28˚C. Finally, the apothecia whose ascospores partly projected were examined and identified. To identify the anamorph, the cultures in slants were inoculated on CMA plates. After 60 days at 28˚C, the taxonomic characters were examined and measured. The sizes of conidia and conidiophores were obtained after randomly measured 100 conidia and 20 conidiophores. To induce trap formation, the cultures were inoculated on 12 plates which containing water agar medium (WA), and for each plate, about 100 nematodes (*Panagrellus redivivus*) were added after incubation of 60 days at 28˚C. The potential of trap formation was determined after incubation for further10 days at 20˚C, 25˚C and 28˚C respectively. The micrographs were taken using an Olympus BX51 microscope.

Taxonomic Description

Anamorph: ***Dactylella lignatilis*** M.H. Mo & K.Q. Zhang, sp. nov. FIGURES 1-2

Mycelium effusum. Hyphis sterilibus hyalinis, septatis, ramosis, plerumque 2.5-5 µm crassis. Conidiophoris hyalinis, septatis, primum erectis, basi 3.5-5µm crassis, sursum 1.5-2.5µm crassis, uno conidio gentio 2-25 µm subter apicem a latere identidem repullulantibus et ex incrementis 7-35 µm longis 2-20 alia conidia gerentibus itaque postea usque 270 µm longis aliquantum ramosis degravatisque. Conidiis hyalinis, plerumque fusiformibus, cylindraceis, apice rotundatis, basi truncatis, 1-6-septatis (plerumque 3-4-septatis), 26-51 µm (saepius circa 41 µm) longis, 2.5-6.3 µm (saepius circa 4.8 µm) crassis.

Etymology: The species epithet refers to its habitat.

Holotype: *HT1.00596*, Xiaobailong Mount, Kunming City, Yunnan Province, P. R. China, 10 Sep 2003, MingHe Mo. The holotype and its living culture (YMF1.00596) are deposited in the Laboratory for Conservation and Utilization of Bio-resources, Yunnan, P. R. China.

Colonies on CMA plates growing slowly, attaining 2.8 cm diam. in 60 days at 28˚C, producing brown pigment resulting in medium colored mycelia. Mycelium spreading, vegetative hyphae hyaline, septate and branched, mostly 2.5-5 μm wide. Conidiophores colorless, septate, at first erect, 3.5 to 5 μm wide at the base and 1.5 to 2.5 μm wide above, after attaining a length of 60 to 180 μm producing a terminal conidium and repeatedly growing out laterally 2-25 μm below the apex to produce 2 20 additional conidia on the apices of branches or prolongations often 7-35 μm in length, thereby becoming rather extensively ramified. Conidia colorless, spindle shaped to cylindrical, both ends attenuated, rounded at the tip, truncate at the base, 1–6 septate, usually 3-4-septate (67%), 25-51(41)×2.5-6.3(4.8) μm. On WA, no trapping structures were induced when nematodes were added.

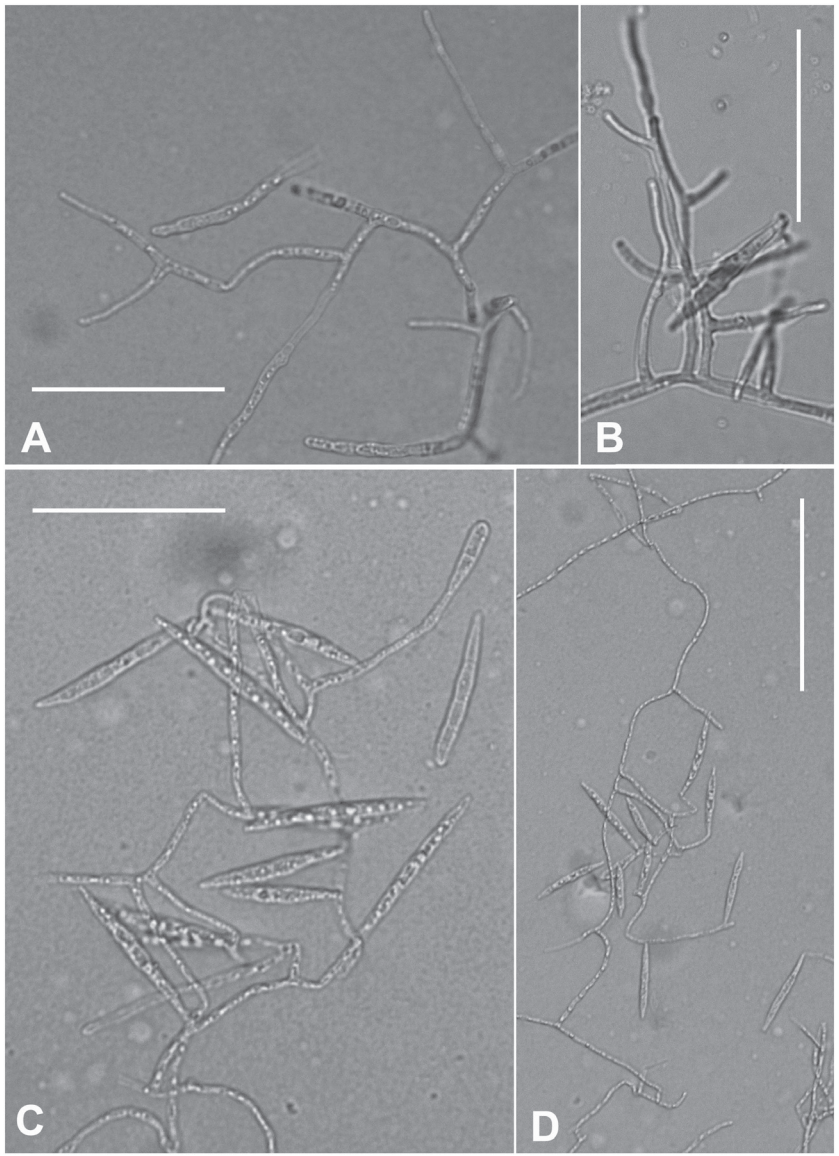

Fig 1. ***Dactylella lignatilis*** **sp. nov.** A-B. Conidiophores. C-D. Conidiophores bearing conidia. Scale bar: A-C=50 μm, D=100 μm.

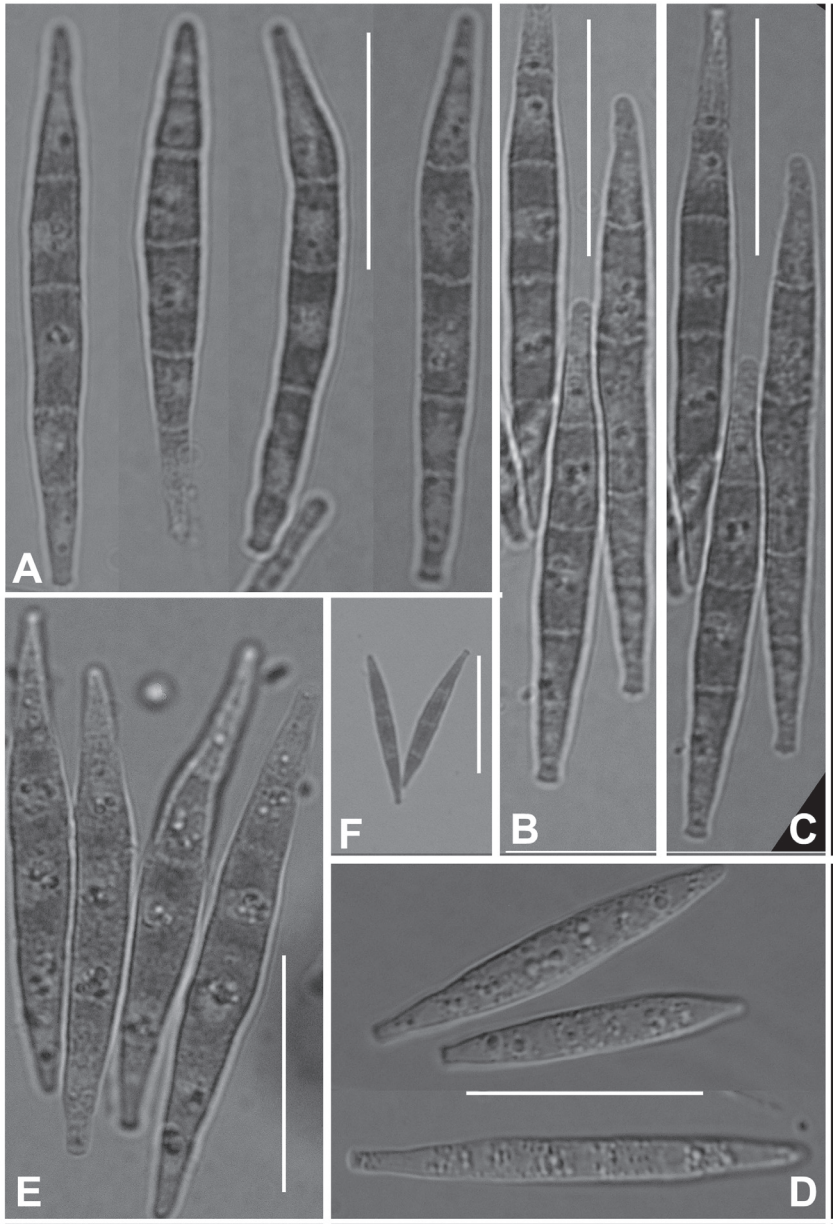

Fig 2. ***Dactylella lignatilis*** **sp. nov.** A-C. Conidia with distinct septa. D-F. Conidia with indistinct septa. Scale bar: A-E=18 μm, F=30 μm.

Teleomorph: ***Hyalorbilia*** sp. FIGURE 3

Apothecia, scattered, superficial, sessile, on the periderm of *Pinus* sp.. Disc 2-3 mm diam, concave or plano-concave, pale orange, margin even. Asci 20-25×3.2-4.5 μm (dead state), 8-spored, cylindric, sessile, slightly contracted at the base which is 2.6-3.1 μm wide, arising from croziers, apex broadly rounded, thin-walled. Ascospores cylindric, constantly curved (sickle-shaped), ends obtusely rounded, nonseptate, 5-7×0.8-1.0 μm (dead state, straight distance between the spore ends and widest width). Paraphyses hyaline, slender, not or slightly enlarged at the apex to 2-3 μm diam, and 1-2 μm diam below, equal to the asci, their apices agglutinated and encrusted to form a thin epithecial layer. Ectal excipulum formed of angular to prismatic hyaline cells, with thin or slightly thickened walls, mostly 10-20×6.5-12 μm.

Specimen examined: *MMH005*, Xiaobailong Mount, Kunming City, Yunnan Province, P. R. China, 10 Sep 2003, MingHe Mo. It was collected from the periderm of a decayed twig of *Pinus* with one end submerged into the moist soil.

Discussion

The genus *Dactylella*, which was established by Grove (1884) based on the type *D. minuta*, is characterized by having elongate, solitary, acrogenous, and multiseptate conidia. The circumscription of the genus was emended several times by different authors and was summarized by Miao et al. (2003) in detail. Here we prefer to place the new species in *Dactylella* following the generic concept of Subramanian (1963), who mainly characterized *Dactylella* as having cylindrical, ellipsoidal, clavate or fusoid conidia (without a large inflated central cell) solitarily borne on the conidiophore.

Dactylella lignatilis grows slowly on CMA medium and begins to produce conidiophores and conidia after incubation for about 30 days at 28˚C. The new species fails to trap nematodes when challenged with the saprophytic nematode *Panagrellus redivivus* on water agar medium. *Dactylella lignatilis* resembles *D. anisomeres* Drechsler, *D. atractoides* Drechsler, *D. cylindrospora* (R.C. Cooke) A. Rubner, *D. spermatophaga* Drechsler, and *D. stenocrepis* Drechsler in conidial shape, size, septation, and the manner of conidiophore branching or saprophytic habit, but can be distinguished as follows. *D. anisomeres* forms smaller conidia (20-43×3.5-4.5 μm) with 1-5 (often 3) septate on branched conidiophores and parasitizes oosporic fungi (Drechsler 1961). Like *D. lignatilis*, *D. atractoides* is a saprophytic species and forms extensively ramified conidiophores, but the fungus produces spindle conidia with 3-13 (mainly 10) septa (Drechsler 1943). *D. cylindrospora* produces cylindrical or obovoid conidia with 1-4 (usually 3) septa on denticles of unbranched rather than branched conidiophores (Cooke 1969). *D. spermatophaga* produces longer and slightly curved conidia, 35-65(50)×3.8-5.2(4.5) μm, with 2-4 (often 3) septa on unbranched or branched conidiophores and parasitizes oosporic fungi (Drechsler 1938). *D. stenocrepis* produces conidia similar to *D. lignatilis* in septation and size, but its conidia are often prolonged at the narrow base and slightly curved at the tip (Drechsler 1961).

The genus *Hyalorbilia* was created by Baral and Marson (2001) based on unstalked asci arising from croziers, with hemispherical apices without wall thickenings,

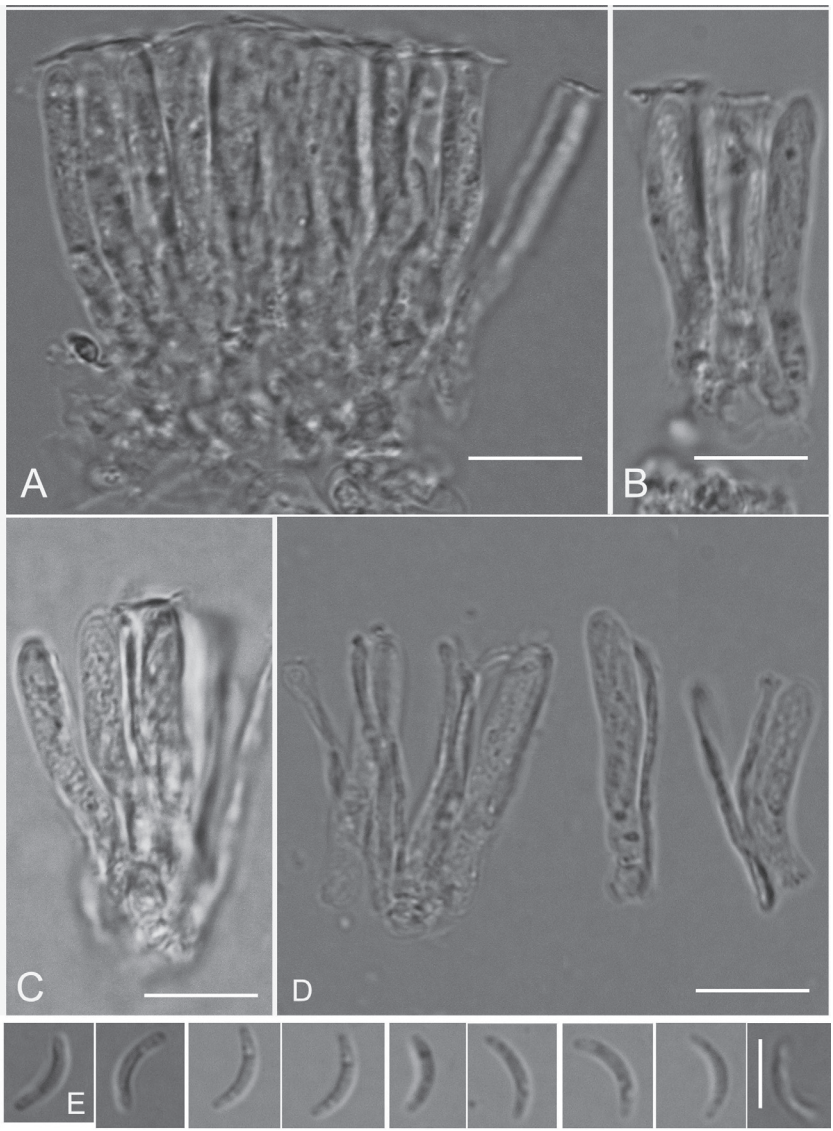

Fig 3. ***Hyalorbilia*** **sp.** A-D. Asci and paraphyses. E. Ascospores. Scale bar: A-D=9 μm, E=4 μm.

hymenial elements conglutinate in a gelatinous matrix, homopolar ascospores with a mostly bipolar-symmetrical guttule pattern in the living state, an ectal excipulum of horizontally oriented textura prismatica, and not or only slightly inflated paraphyses. The morphology of our teleomorphic specimen is close to that of *H. inflatula* (P. Karst.) P. Karst., which is characterized by its narrow, cylindrical, straight, or very slightly curved ascospores; broad, sessile, cylindrical asci; and not or only slightly inflated paraphyses (Spooner 1987). But the ascospores of our specimen are always medium curved rather than straight or only very slightly curved. On the same *Pinus* branch where our *Hyalorbilia* grew, we also collected the apothecia of *H. inflatula* (det. H.O. Baral). Yet, we confirmed that *D. lignatilis* is clearly the anamorph of the unidentified species of *Halorbilia* and not that of *H. inflatula* after examination of the specific apothecia that produced the anamorphic colonies. Another similar species is *H. citrina* (A.L. Smith) Baral & Marson, which is characterized by its cylindrical, distinctly helicoid ascospores and usually very thick-walled excipular cells (Baral pers. comm.); these two features were not observed in our specimen.

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Literature Cited

Baral HO. 1994. Comments on "Outline of the ascomycetes - 1993". Systema Ascomycetum 13 (1): 113-128.

Baral HO, Marson G. 2001. Monographic revision of *Gelatinopsis* and *Calloriopsis (Calloriopsideae, Leotiales)*. In Micologia 2000, Associazione Micologica Bresadola, Trento.

Cooke RC. 1969. *Candelabrella cylindrospora* sp. nov. and notes on the taxonomy of nematode-trapping species of *Dactylaria*. Trans. Brit. Mycol. Soc. 53: 475-478.

Drechsler C. 1938. Two hyphomycetes parasitic on oospores of root-rotting oomycetes. Phytopathology 38: 81-103.

Drechsler C. 1943. A new nematode-capturing *Dactylella* and several related hyphomycetes. Mycologia 35: 339-362.

Drechsler C. 1961. Two additional species of *Dactylella* parasitic on *Pythium* oospores. Sydowia 15: 92-100.

Eriksson O, Baral HO, Currah RS, Hansen K, Kurtzman CP, T Lassoe, Rambold G. 2003. Notes on ascomycete systematics Nos 3580-3623. Myconet 9: 91-103.

Grove WB. 1884. New or noteworthy fungi. J. Bot. 22: 195-201.

Haines JH, Egger KN. 1982. A new species of *Orbilia* from Canada. Mycotaxon 16: 107-113.

Hennebert GL, Weresub LK. 1977. Terms for states and forms of fungi, their names and types. Mycotaxon 6: 207-211.

Kohlmeyer J, Baral HO, Volkmann-Kohlmeyer B. 1998. Fungi on *Juncus roemerianus*. 10. A new *Orbilia* with ingoldian anamorph. Mycologia 90:303-309.

Korf RP. 1992. A preliminary discomycetes flora of Macronesia: Part 8, *Orbiliaceae*. Mycotaxon 45: 503-510.

Liu B, Liu XZ, Zhuang WY. 2003. The orbiliaceous fungi and its anamorphs. Mycosystem 22(4):671-677.

Liu B, Yang Y, Liu XZ, Zhuang WY. 2002. *Monacrosporium parvicolle*, a knob-forming nematophagous hyphomycetes from *Orbilia cunninghamii*. In: The 3rd Asia-Pacific Mycological Congress on Biodiversity and Biotechnology, Kunming Yunnan, China.

Matsushima T. 1995. *Orbilia trinacriifera* Mats. *Trinacrium* sp.. Matsushima Mycological Memoirs 8: 28-29.

Miao ZQ, Liu XZ, Li SD, Hi MX. 2003. *Dactylella pseudoclavata* sp. nov., a new nematode-trapping fungus. Can. J. Bot. 81: 1-5.

Nannfeldt JA. 1932. Studien über die morphologie und systematik der nichtlichenisierten inooperculaten Discomyceten. Nova Acta Reg. Soc. Sci. Uppsaliensis ser. 4 8(2):1-368.

Pfister DH, Liftik ME. 1995. Two *Arthrobotrys* anamorphs from *Orbilia auricolor*. Mycologia 87(5): 684-688.

Pfister DH. 1994. *Orbilia fimicola,* a nematophagous discomycete and its *Arthrobotrys* anamorph. Mycologia 86(3): 451-453.

Pfister DH. 1997. Castor, Pollux and life histories of fungi. Mycologia 89(1): 1-23.

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

Spooner BM. 1987. *Helotiales* of Australasia: *Geoglossaceae, Orbiliacease, Hyaloscyphaceae*. Biblioth. Mycol. 116: 5-711.

Subramanian CV. 1963. *Dactylella*, *Manocrosporium* and *Dactylina*. J. Indian Bot. Soc. 42: 291-300.

Thakur S, Zachariah K. 1989. Response of the fungus *Dactylella rhopalota* to bacteria. Plant & Soil 120: 87-93.

Webster J, Descals E. 1979. The teleomorphs of water-borne hyphomycetes from fresh water. In: The whole fungus (ed. B. Kendrick). National Museum of Natural Sciences, Canada.

Webster J, Henrici A, Spooner B. 1998. *Orbilia fimicoloides* sp.nov; the teleomrph of *Dactylella* cf. *oxyspora*. Mycol. Res. 102(1): 99-102.

Weresub LK, Hennebert GL. 1979. Anamorph & teleomorph: terms for organs of reproduction rather than karyological phases. Mycotaxon 8:181-186.