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The Merosporangiferous Fungi from Taiwan (II): Two New Records of *Syncephalis*

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ABSTRACT: Two merosporangiferous fungi, *Syncephalis parvula* Gruhn and *S. tenuis* Thaxter are reported for the first time from Taiwan. Descriptions, photographs and variations noted for their morphological characters are provided.

KEY WORDS: Merosporangiferous fungi, *Syncephalis*, Taiwan, Zygomycetes.

INTRODUCTION

Species of the genus *Syncephalis* (Piptocephalidaceae, Zoopagales, Zygomycetes) are common inhabitants of soil and dung. They are obligate parasites of other fungi, mainly the members of Mucorales. The most distinguishing characters of *Syncephalis* are simple, straight or slightly recurved sporophores and cylindrical merosporangia born on sporophore heads. Of the 49 species of *Syncephalis* described (Van Tieghem and Le monnier, 1873; Gruhn and Petzold, 1991), only five species - *S. cornu* van Tieghem & Le Monnier, *S. reflexa* van Tieghem, *S. depressa* van Tieghem & Le Monnier, *S. sphaerica* van Tieghem and *S. obconica* Indoh are known from Taiwan (Chien, 1999; Ho, 2000, 2001). The purpose of this paper is to describe two additional new records of *Syncephalis* from Taiwan.

MATERIALS AND METHODS

Soil samples were collected from country roadsides and forests and brought to the laboratory in sterilized plastic bags. Two to three milligrams of soil particles were placed on corn meal agar plates. The plates were incubated at 24°C for nearly a week. Then, the plates were observed under a dissecting microscope. Sporophores of *Syncephalis* were transferred, by cutting a small block of agar with the sporophores along with its host, to a fresh corn meal agar plate and incubated as mentioned above. After one week, the regenerated, mature sporangia of *Syncephalis* were again transferred onto a new corn meal agar plate by using a sterilized needle to pre-marked spots. A day after inoculation of *Syncephalis* sporangia, the spores of mucoraceous host were also inoculated in the vicinity of the parasite. After 4-7 days, the host was found parasitized by the *Syncephalis* species, the mycoparasite.

For SEM, pertinent materials were selected under a dissecting microscope and fixed for 1 hr with 2.5% glutaraldehyde in distilled water, and post-fixed for 1 hr with 1% osmium tetraoxide in distilled water. The materials were washed with distilled water and dehydrated in a graded acetone series. Specimens were dried in a critical point dryer, coated with gold, observed, and photographed with a Hitachi S-520 scanning electron microscope (SEM) at 20 KV.

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For LM, materials observed were selected under a dissecting microscope and mounted in a drop of water or lactophenol cotton blue. Photographs were taken with a Leica MPS32 light microscope (LM).

TAXONOMY

Syncephalis parvula Gruhn, Can. J. Microbiol. 37: 356, 1991.

Vegetative mycelium slender, about 1 μm in diameter, smooth, hyaline, running over the host. Sporophores simple, 30-56.3 μm high (rhizoid not included), 8.8-12.5 μm wide at the broadest point near the base, tapering gradually to 2.4-3.8 μm wide immediately below the fertile vesicle, erect or slightly curved, single or in groups up to four, attached to the substratum by short, stout rhizoid. Fertile heads spherical, 10.0-17.5 μm in diameter bearing up to 18 unbranched merosporangia on its upper hemisphere (Fig. 1A). Merosporangia cylindrical (Fig. 1B), 10-23 X 2.3-2.7 μm, each mature merosporangium containing two to four (usually three) spores. Spores cylindrical, 4.5-7.5 X 2.2-2.7 μm, with persistent remnant of the merosporangial wall outside the spores (Fig. 1C). Warts visible on the heads after the release of the spores (Fig. 1D). At maturity, spores held in a brown liquid droplet on the top of the sporangiophore. Zygospores not observed.

Morphological characteristics of the isolate collected by the author shows similarities with Gruhn's original description (Gruhn & Petzold, 1991) except for the number of spores per merosporangium. In Gruhn's isolate, there are usually two spores in a merosporangium, while the present isolate possesses 2-4, usually 3 spores per merosporangium.

Material examined: S1P2O2, soil from Yamingshan, Taipei, Jan 2000; SWL0103, soil from Wulai, Taipei county, Sep 2000.

Slide and culture of this fungus are deposited in the Mycology Lab. of the Dept. of Natural Science Education, National Taipei Teachers College, Taipei, Taiwan.

Host: *Mucor* sp.

Distribution: Germany (Gruhn & Petzold, 1991).

Syncephalis tenuis Thaxter, Bot. Gaz. 24: 12, 1897.

Spinalia tenuis (Thaxter) Zycha, 1935

Vegetative hyphae slender, hyaline. Sporophores smooth, hyaline, unbranched, straightly erect, usually single or in groups up to four, attached to the substrate by short, stout, branched rhizoid, 170-305 μm high (rhizoid not included), 5.5-7.8 μm wide at the broadest point near the base, tapering gradually to 4.0-5.0 μm wide below the fertile head (Figs. 2A, B). Fertile head oval, with a slightly compressed top, 12.5-25.0 X 7.5-17.5 μm, bearing 5-7 (8) merosporangia on its upper surface. When mature, the spore head turning into a liquid drop. One merosporangium bearing two spores (Figs. 2A, C), the upper one budding from the basal one (Fig. 2D). Spores cylindrical with truncate ends, 18-25 X 7.5-10 μm, the merosporangial wall remaining persistently on the outside of the spore appearing as a wrinkled outcoat (Fig. 2E). Prominent warts visible on the head after the release of the spores (Fig. 2F). Zygospores not observed.

Due to unsuccessful cultivation, the description of *S. tenuis* is based on the organism growing directly on soil plate. The present isolate agrees with the original description (Thaxter, 1897) except that the sporophores of the author's isolate are smaller than that of Thaxter's.

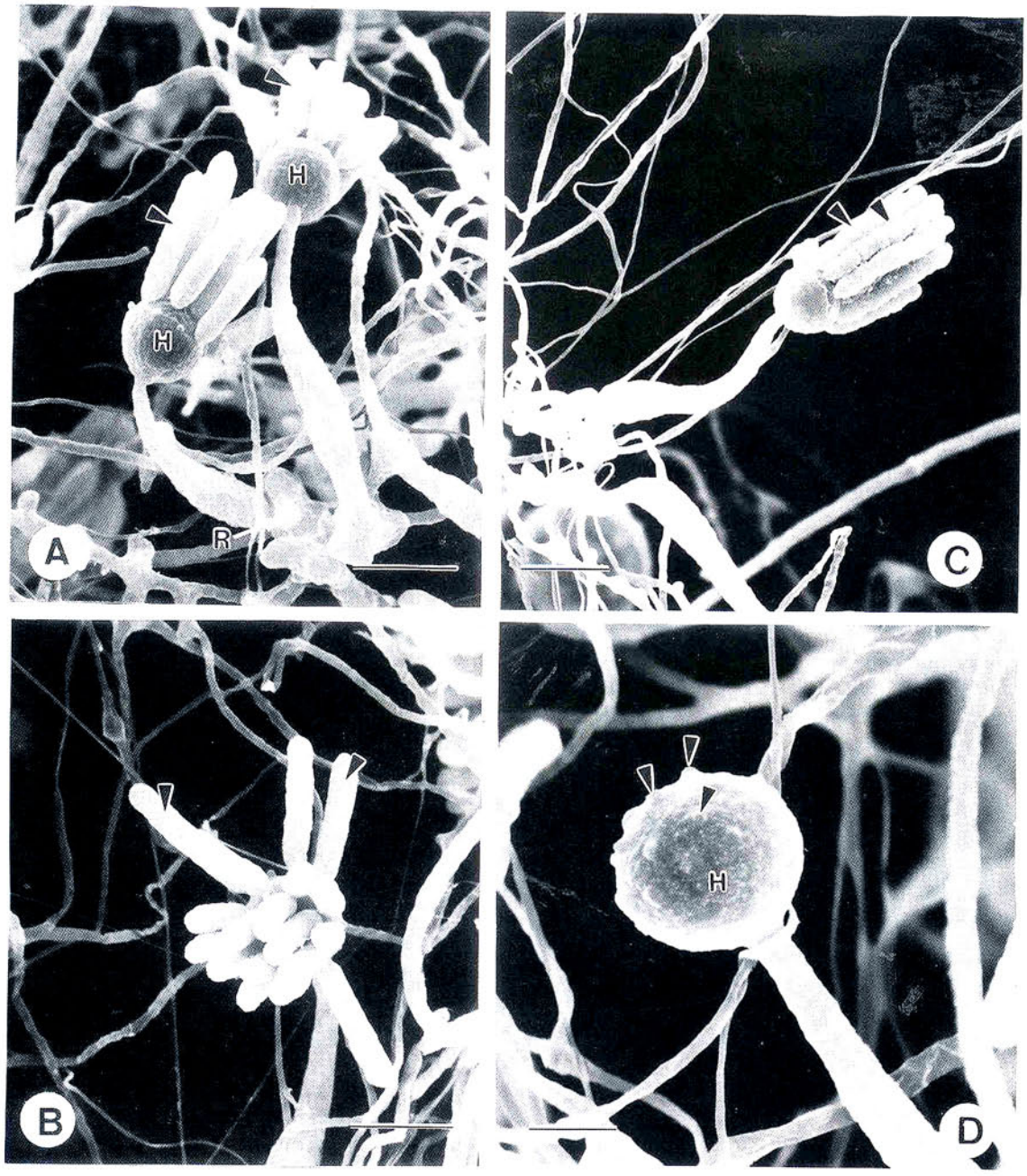

Fig. 1. *Syncephalis parvula*. A-D, SEM. A. Two sporophores with nearly mature merosporangia (arrow heads) on heads (H) and stout rhizoids (R). Bar=9 μm. B. Top view of head showing merosporangia (arrow heads). Bar=9 μm. C. Merosporangia frangmented into three cylindrical spores (arrow heads). Bar=10 μm. D. Fertile head (H) with warts (arrow heads) after merosporangia detached. Bar=3 μm.

Material examined: SJC0102, soil from Jansipau, Hsinju, Jan 2000.

Slides deposited in the Mycology Lab. of the Dept. of Natural Science Education, National Taipei Teachers College, Taipei, Taiwan.

Distribution: India (Mehrotra & Prasad, 1965); Japan (Kuzuha, 1973); UK (Dade, 1937); US (Thaxter, 1897).

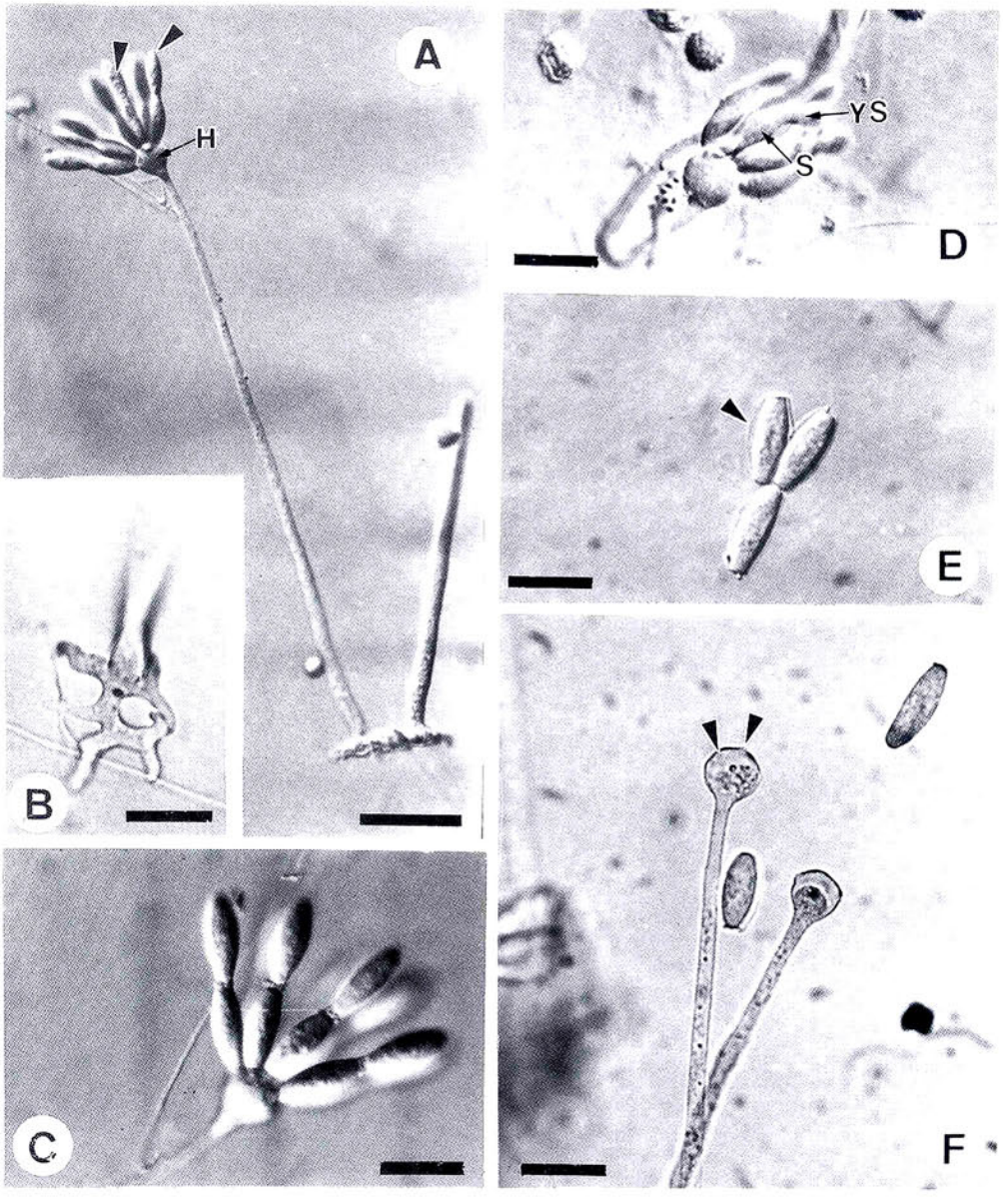

Fig. 2. *Syncephalis tenuis*. A-F, LM (ICT). A. Sporophore with head (H) bearing 2-spored merosporangia (arrow heads). Bar=50 μm. B. Basal portion of a sporophore showing rhizoid. Bar=20 μm. C. Two-spored merosporangia on the top of head. Bar=20 μm. D. Young spores (YS) budding from the basal spores (S). Bar=20 μm. E. Cylindrical spores showing wrinkled sporangial wall around them (arrow head). Bar=20 μm. F. Fertile head with warts (arrow heads) seen after detachment of merosporangia. Bar=20 μm.

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LITERATURE CITED

Benjamin, R. K. 1959. The merosporangiferous Mucorales. Aliso **4**: 321-433.

Chien, C.-Y. 1999. Zygomycota. In: Wang, Y.-J. *et al.* (eds). List of the fungi in Taiwan. Council of Agriculture, Executive Yuan, R.O.C. pp. 39-48.

Dade, H. A. 1937. New gold coast fungi. Trans Brit. Mycol. Soc. **21**: 16-28.

Fitzpatrick, H. M. 1930. The lower fungi. Phycomycetes. McGraw-Hill Book Company, Inc. New York. 331pp.

Gruhn, U. and H. Petzold. 1991. Two new species of *Syncephalis* (Zoopagales, Piptocephalidaceae). Can. J. Microbiol. **37**: 355-360.

Hesseltine, C. W. 1955. Genera of Mucorales with notes on their synonym. Mycologia **47**: 344-363.

Hesseltine, C. W. and J. J. Ellis. 1973. Mucorales. In: Ainsworth, G. C., F. K. Sparrow and A. S. Sussman. (eds). The fungi, an advanced treatise. Vol. IVB. Academic Press, New York. pp. 187-217.

Ho, H.-M. 2000. Notes on Zygomycetes of Taiwan (I). Fung. Sci. **15**: 65-68.

Ho, H.-M. 2001.The Merosporangiferous Fungi from Taiwan (I): Two New Records of *Syncephalis*. Taiwania, **46**: 318-324.

Kreisel, H. 1969. Grundzuge eines naturlichen Systems der Pilze. J. Cramer, Lehre. 245pp.

Kuzuha, S. 1973. Notes on Japanese *Syncephalis*. Trans. Mycol. Soc. Japan **14**: 237-245.

Mehrotra, B. S. and R. Prasad. 1965. Species of *Syncephalis* from India I. Sydowia **19**: 112-116.

Thaxter, R. 1897. New or peculiar zygomycetes. 2. *Syncephalastrum* and *Syncephalis*. Bot. Gaz. **24**: 1-15.

Van Tieghem, P. and G. Le Monnier. 1873. Recherches sur les Mucorinees. Ann. Sci. Nat. Bot. Ser.V, **17**: 261-399.

Zycha, H., R. Siepmann and G. Linnemann. 1969. Mucorales. J. Cramer, Germany. 355 pp.

台灣管狀孢子囊接合菌之研究(II): 兩種集珠黴屬新紀錄種

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摘　　要

本文報告兩種具管狀孢子囊的集珠黴屬接合菌 *Syncephalis parvula* 及 *S. tenuis*，兩者均為台灣的新紀錄種，文中並提供菌種描述、照相與其形態變異之簡短討論。

關鍵詞：管狀孢子囊真菌、集珠黴屬、台灣、接合菌綱。

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