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A NEW SPECIES OF *TRIADELPHIA* FROM TAIWAN

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Triadelphia was erected by Shearer and Crane (1971) to accommodate a single species, *T. heterospora*, a saprophyte on balsa wood blocks submerged in the Patuxent River, Maryland. *Triadelphia heterospora* characteristically produces two different forms of conidia; one is cylindrical and 2-septate, the other is broadly obclavate to ellipsoid and 4–7-septate (Shearer and Crane, 1971). Constantinescu and Samson (1982) reexamined herbarium specimens of *T. inquinans* (Sacc.) Hughes & Pirozynski and *T. heterospora* Shearer & Crane and living cultures of *T. loudetiae* Maggi et al. and *T. pulvinata* Maggi et al. Their studies indicated these species to be highly

pleomorphic, possessing 3–5 forms of conidia. Constantinescu and Samson (1982) described a new species, *T. romanica*, and transferred *Stemphylium albamensis* Matsushima to *Triadelphia*. They also emended the generic description of *Triadelphia*, redescribed and illustrated all previously documented species and provided a key to six described or newly combined species. Recently, *Dicoccum uniseptatum* (Berk. & Br.) Sacc. was transferred to *Triadelphia* based on conidigenous cell morphology, conidium ontogeny and conidium morphology, which are all comparable to the six *Triadelphia* species. *Triadelphia uniseptatum* differs from other *Triadelphia* species,

FIG. 1. Conidiophores, conidiogenous cells, and conidia of *Triadelphia diversa*. Conidia, pleomorphic, of five types: A, B, D, E, and F.

possessing one type of conidium which is ob-ovoid to broadly obovoid and 1-septate conidia (Kirk, 1983).

During investigations of the Hyphomycetes on fallen decaying leaves and stems from Taiwan,

a fungus in culture produced five types of conidia (cf. FIG. 3): A-type, cylindrical, 1–2-septate, septa covered with broad dark bands; B-type, club-shaped, 1-septate, septum covered with a dark band; D-type, obclavate with acicular tips, mul-

FIG. 2. A-F. Conidiogenous cells and pleomorphic conidia of *Triadelpchia diversa*. A. A-type conidia, cylindrical, initiated from doliiform conidiogenous cells, 1-2-septate, septa covered with broad dark bands. B. A-type conidia with basal cells hyaline, rounded (arrow) or truncate. C. A- and B-type conidia; B-type conidium club-shaped. D. E-type conidia, allantoid, initiated from cylindrical conidiogenous cells. E. D-type conidia, obclavate with acicular tips. F. A-, E- and F-type conidia. F-type conidia obovate, pale brown, unicellular, thin-walled (arrows). Bars = 10 µm.

FIG. 3. Synoptic table of conidial forms (A–F) in eight species of *Triadelfia*: 1. *T. heterospora*. 2. *T. inquinans*. 3. *T. loudetiae*. 4. *T. pulvinata*. 5. *T. romanica*. 6. *T. alabamensis*. 7. *T. uniseptatum*. 8. *T. diversa*. 1–6 redrawn with permission from Constantinescu and Samson (1982).

tiseptate, central septa covered with dark bands; E-type, allantoid or reniform, 1-septate; F-type, obovate, unicellular. C-type conidia, such as those formed by some species of *Triadelfus*, were not observed in *T. diversa*. These conidia are similar to *Triadelfia*, but A-, B- and D-type conidia

exhibited morphological characteristics which differed from any described species (Constantinescu and Samson, 1982; Hughes and Pirozynski, 1972; Kirk, 1983; Maggi et al., 1978; Matsushima, 1981). The strain is described and illustrated as a new species, using Kornerup and

Wanscher (1978) as color standard. A key and illustrations adapted from Constantinescu and Samson (1982) are provided.

Triadelfia diversa Tzean & Chen, *sp. nov.*

FIGS. 1, 2

Coloniae on CMA (*Zea mays* L. farinosis, agaribus) tenuiter effusae, centra cinerea alba ad atrobunneas margine hyalina. Mycelium septatum, ramosum, partim superficiale sed maximam partem submersum. Cellulae conidioportatae hyalinae, laeves, portatae directe in mycelio, solitariae vel agglomeratae ad caespitosas, facientes sporodochia-similes structurae, ampulliformes, cylindratae, doliiformes, macronematoidae, holoblastae, monoblastae, determinatae, $2.8\text{--}6.4 \times 2.7\text{--}3.9 \mu\text{m}$. Conidia acroportata, solitaria, exsiccata 5 dissimilis formae: 1) cylindrata, stricta vel leviter curva, paries laevis, $13.7\text{--}24 \times 4\text{--}8 \mu\text{m}$, 1–2-septatus, septum tectum cum $2 \mu\text{m}$ atro-vittis. Cellulae apicis & centralis brunneae, cellulae basis hyalinae vel dilutae brunneae, apice rotundatae, base rotundatae, vel truncatae $1.3\text{--}3.1 \mu\text{m}$ latae, raro cum inconspicuis poris; 2) late clavatae, $11.5\text{--}15.3 \times 6.3\text{--}8 \mu\text{m}$, in transversalibus septis prope bases, tectae cum $1.8\text{--}2 \mu\text{m}$ atro-vittis, cellula apicis brunnea, cellula basis hyalina vel diluta brunnea cum truncatis basis $2\text{--}4 \mu\text{m}$ lata; 3) obclavata, $4\text{--}6$ -septata, $15\text{--}26 \times 6\text{--}7 \mu\text{m}$, cellula terminata hyalina vel diluta brunnea acicularis, cellula basis subhyalina ad dilutam brunneam, truncata, cellula centralis diluta brunnea ad brunneam, saepe cum $0.8\text{--}1.6 \mu\text{m}$ atrovittis ad septum; 4) allantoida vel reniformis, hyalina vel diluta brunnea, 1-septata, laevis, tenuis-partes, $8\text{--}16 \times 3\text{--}5 \mu\text{m}$; et 5) obovata, diluta brunnea, unicellularis, laevis, base truncata, $5.9\text{--}9.8 \times 4.3\text{--}5.6 \mu\text{m}$, hilum inconspicuum.

Colonies on corn meal agar thinly effuse; center grey white to dark brown; margin hyaline. Mycelium septate, branched, partly superficial but mostly submerged. Conidiogenous cells hyaline, smooth, borne directly on the mycelium, solitary or agglomerate to caespitose, forming sporodochia-like structures, flask-shaped, cylindrical, doliiform, macronematous, holoblastic, monoblastic, determinate, $2.8\text{--}6.4 \times 2.7\text{--}3.9 \mu\text{m}$. Conidia acrogenous, solitary, dry, of five different forms: 1) cylindrical, straight or slightly curved, $13.7\text{--}24 \times 4\text{--}8 \mu\text{m}$, 1–2-septate; septa covered with dark $2 \mu\text{m}$ bands; wall smooth; tip and central cells brown, basal cell hyaline or pale brown; tip rounded and base rounded or truncate, $1.3\text{--}3.1 \mu\text{m}$ wide, rarely with inconspicuous

pore; 2) broadly clavate, $11.5\text{--}15.3 \times 6.3\text{--}8 \mu\text{m}$, with one transverse septum near the base, covered with a dark $1.8\text{--}2 \mu\text{m}$ band; wall smooth; tip cell brown, basal cell hyaline or pale brown, with truncate base $2\text{--}4 \mu\text{m}$ wide; 3) obclavate, $4\text{--}6$ -septate, $15\text{--}26 \times 6\text{--}7 \mu\text{m}$; end cells hyaline or pale brown, acicular, basal cells subhyaline to pale brown, truncate, central cells pale brown to brown, often with $0.8\text{--}1.6 \mu\text{m}$ dark bands at the septa; 4) allantoid or reniform, hyaline or pale brown, 1-septate, smooth, thin-walled, $8\text{--}16 \times 3\text{--}5 \mu\text{m}$; and 5) obovate, pale brown, unicellular, smooth, $5.9\text{--}9.8 \times 4.3\text{--}5.6 \mu\text{m}$; hilum inconspicuous; base truncate.

Habitat.—Isolation from fallen, decayed angiosperm tree stem collected from Tsuben forestry recreation area, Taitung, Taiwan, 30.III.87. **HOLOTYPE:** PPH3 (dried culture) and ex-typus PPH3E, deposited in the Department of Plant Pathology and Entomology, National Taiwan University, Taipei, Taiwan; ex-typus PPH3E also deposited in Culture Collection and Research Center (CCRC 32225), Hsinchu, Taiwan. **ISOTYPUS:** PPH3-1 (dried culture) also deposited in New York Botanical Garden.

Gross morphological characteristics of *T. diversa* are similar to *T. heterospora* and *T. inquinans*. Nevertheless, there are several noticeable differences. For instance, *T. heterospora* did not produce B-type conidia, while *T. diversa* does so (FIG. 3). While A-type conidia produced by *T. diversa* are characterized by septa covered with 1–2 dark bands, A-type conidia of *T. heterospora* show a single broader dark band covering the septa. The basal cell is usually brown and rounded in *T. heterospora*, but conidia of *T. diversa* possess hyaline or pale brown, truncate or rounded basal cells. The D-type conidia of *T. diversa* are obclavate, those of *T. heterospora* are broadly obclavate or ellipsoid. Pronounced differences also exist in shape, size, band position and band number in A-, B-, and E-type conidia in *T. diversa* and *T. inquinans* (FIG. 3). Additionally, C-type conidia are produced by *T. inquinans* but not by *T. diversa*, and E-type conidia are produced by *T. diversa* but not by *T. inquinans*.

KEY TO TRIADELPHIA SPECIES

1. At least one form of broadly obclavate, fusiform, or ellipsoidal, multiseptate conidia present	2
1. Not as above	5
2. Conidia fusiform, ellipsoidal, without acrose end cells	<i>T. alabamensis</i>
2. Conidia broadly obclavate, or ellipsoidal, with acrose end cells	3

3. Allantoid or reniform conidia absent	<i>T. inquinans</i>
3. Allantoid or reniform conidia present	4
4. Clavate conidia present	<i>T. diversa</i>
4. Clavate conidia absent	<i>T. heterospora</i>
5. Acerose to obclavate conidia present	6
5. Acerose to obclavate conidia absent	<i>T. uniseptatum</i>
6. Clavate conidia present	<i>T. romanica</i>
6. Clavate conidia absent	7
7. Cylindrical conidia 2-septate	<i>T. loudetiae</i>
7. Cylindrical conidia 1-septate	<i>T. pulvinata</i>

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Key Words: *Triadelfia*, Hyphomycetes, taxonomy.

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SPORE-TO-SPORE CULTURE OF *PHYSARUM SPINISPORUM* AND ITS TRANSFER TO *BADHAMIA*¹

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Physarum spinisporum U. Eliass. & Lundq. is a distinctive and apparently rare myxomycete species isolated from herbivore dung. Eliasson and Lundqvist (1979), in their study of fimico-

lous Myxomycetes, described *P. spinisporum* based on moist chamber cultures of goat, rabbit, and camel dung from Spain and Ethiopia. Six additional collections were reported by Cox (1981) from Butte and Lassen counties in California as isolates from cow dung in moist chambers. These specimens had "a strongly badhamioid capillitium with calcareous tubules attached

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