

tera, *Hexacladium* and *Articulospora*. In *Curucispora ponapensis* Matsushima (1981), the branches form a pleurogenous dichotomy. In *C. ombrogena* Ando & Tubaki (1984) there is also a dichotomy, although it is at the apex of the main axis, followed by the appearance of a further branch laterally on the first element. In *Isthmotricladia* Matsushima (1971) the conidial branches are clearly apical and arranged coronately. *Enantiop-tera* Descals (Descals & Webster, 1983) and *Hexacladium* Olivier (1983) typically have two pairs of lateral branches, but these are also pleurogenous. *Hexacladium*, moreover, occurs on pollen. *Articulospora ozeensis* Matsushima (1975) has much smaller conidia with a short axis and one apical and two subacrogenous branches. Finally, the clampless supposed monokaryon of *Taeniospora descalsii* Marvanová & Stalpers (1987), isolated from a Canadian stream by Marvanová & Baerlocher (in press) has cruciate, considerably smaller, uniseptate conidia with mostly subopposite sequential branches.

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## Two new species of *Dictyosporium* from Taiwan

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Two new species of *Dictyosporium* from Taiwan. *Mycological Research* **92** (4): 497–502 (1989).

*Dictyosporium bulbosum* sp. nov. and *D. verrucosum* sp. nov. are described, illustrated and compared with other *Dictyosporium* species of similar conidial morphology.

Key words: *Dictyosporium bulbosum*, *Dictyosporium verrucosum*, New species, Cheiroid conidia.

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*Dictyosporium* was erected by Corda in 1836 to accommodate a single species, *D. elegans*, which is characterized by cheiroid conidia (Ellis, 1971). Damon (1952) studied and compared the types in *Dictyosporium*, *Speira* and *Cattanea*, and provided a key to *Dictyosporium*, including seven accepted species. Sutton (1985) published a note with brief discussion on some deuteromycete genera with cheiroid or digitate brown conidia. *Dictyosporium australiense* was erected as a new species, and *D. subramanianii* sp. nov. was proposed for the invalidly published *D. intermedium* Subram., and *D. circinatum* Cke & Harkn. was transferred to *Helicorhoidion*. An additional new species, *D. gauntii* Bhat & Sutton (1985), was described, and brought the total in *Dictyosporium* to 21 (Batista *et al.*, 1960;

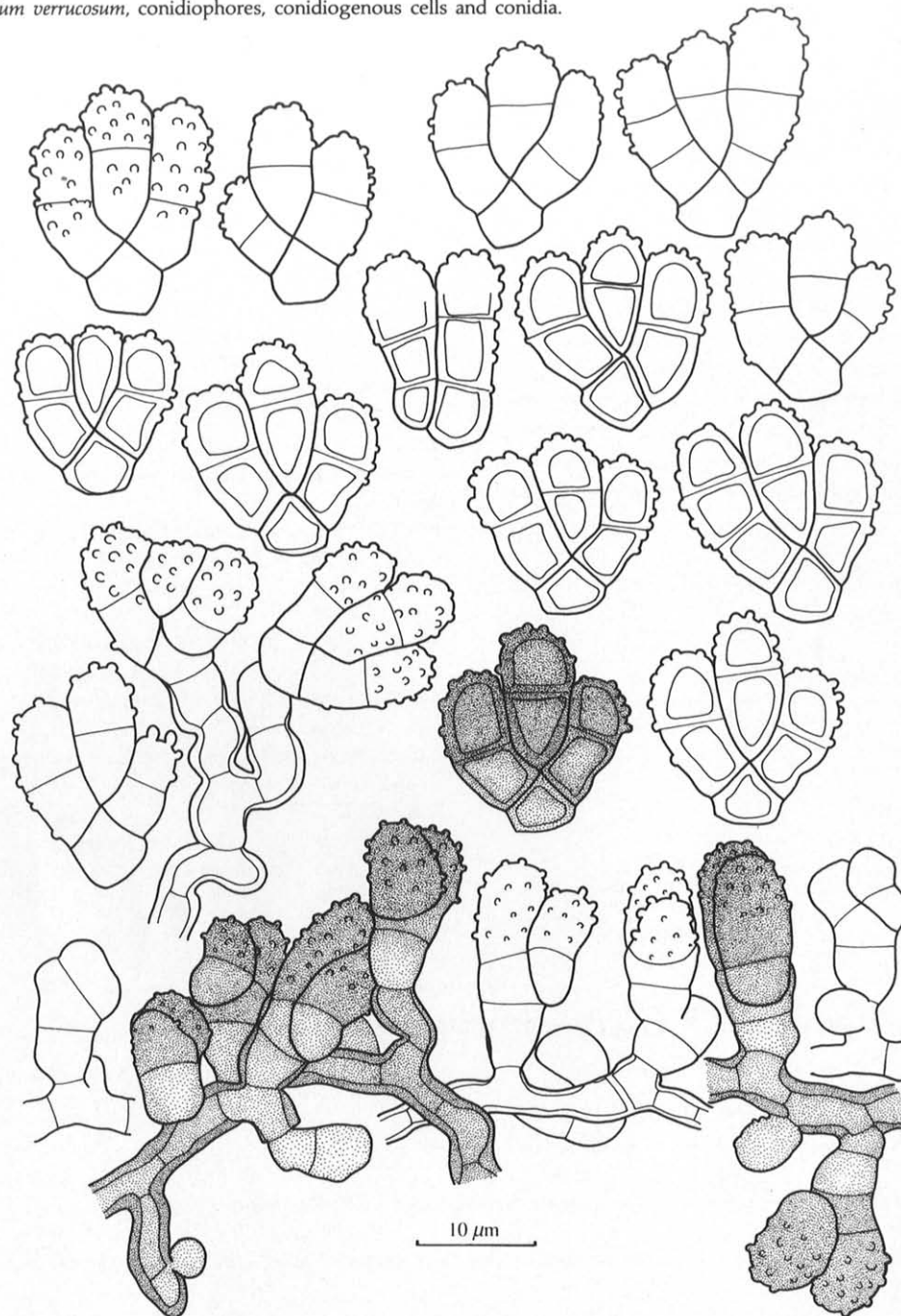
Batista & Farr, 1960; Ellis, 1971; Gareth Jones, 1963; Kirk & Spooner, 1983; Saccardo, 1918; Matsushima, 1975, 1980, 1981; Subramanian, 1971; Van Emden, 1975).

In surveying Hyphomycetes from Taiwan, many new or interesting species have been recovered from fallen, decaying stems or leaves, and two of them are congeneric with *Dictyosporium*, but with morphological characteristics which differ from any documented species.

***Dictyosporium verrucosum* Tzean & Chen, sp. nov.**

(Figs 1–6)

*Coloniae* punctiformes, dispersae, pulveraceae oleae ad oleas brunneas reversae in pallidis luteis ad obscure oleas umbras. *Mycelium* (2–5·2

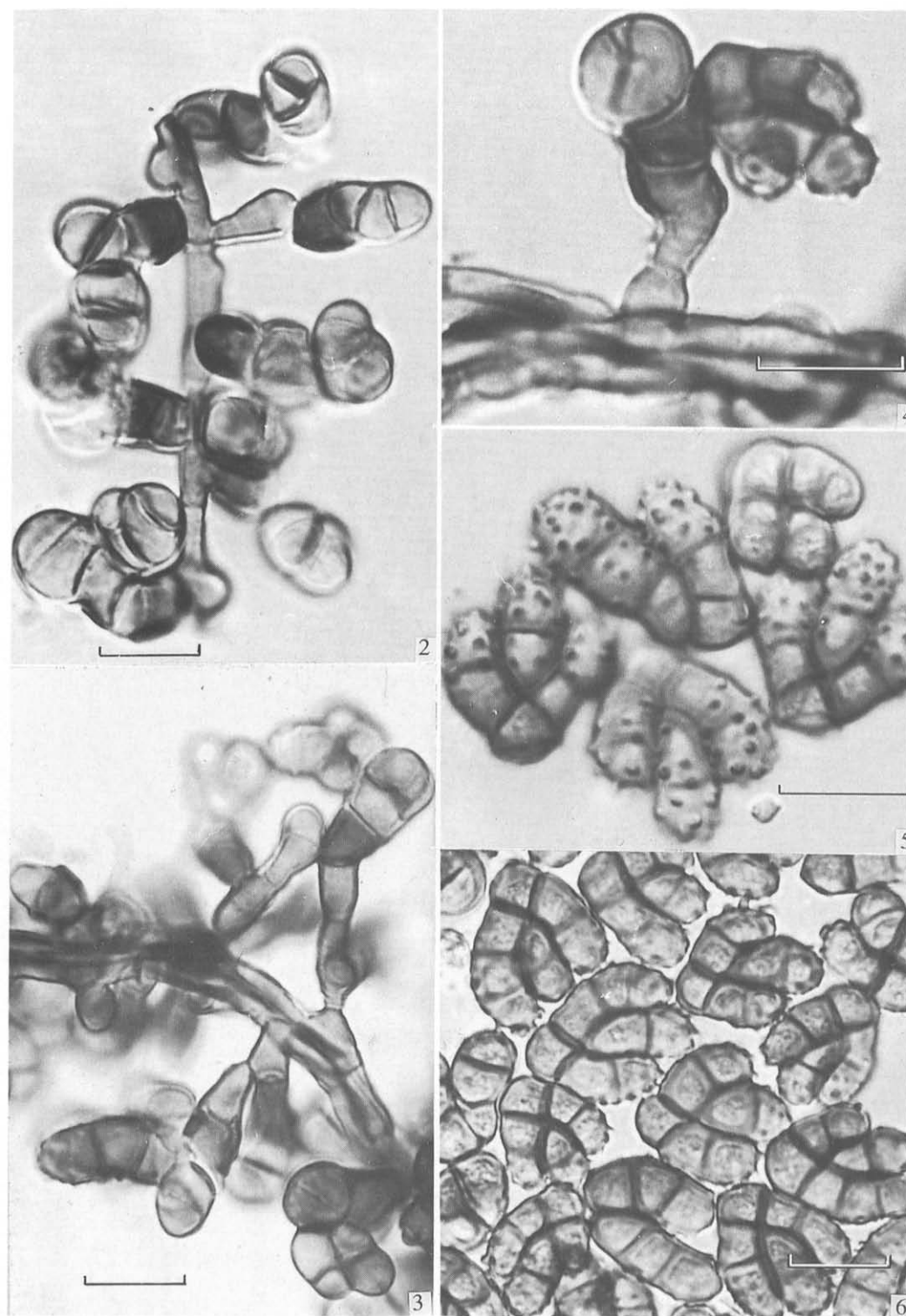
Fig. 1. *Dictyosporium verrucosum*, conidiophores, conidiogenous cells and conidia.

$\mu\text{m}$ ) maximam partem immersum, ramosum, septatum, subinde turba 3–5 anastomosis, faciens funiculus structura, subhyalinum. *Conidiophorum* portatum directe super mycelio, solitarium vel aggregatum ad caespitosum, faciens sporodochium, hyalinum ad pallidum brunneum, laeve, crasso-paries, usque ad  $1.7 \mu\text{m}$ , micro-, semi-, macronematoideum, mononematoideum, flexuosum, simplex vel irregulariter ramosum,  $4\text{--}12 \times 2.4\text{--}5 \mu\text{m}$ . *Cellulae conidiogenae*, in conidiophoris incorporatae vel discretae, acropleurogenae, cylindricae, doliiformes vel sphaeroideae, pallide brunneae ad brunneae, laeves,  $3.5\text{--}13 \times 3.1\text{--}5.8 \mu\text{m}$ . *Conidia* holoblastica, solitaria, exsiccata, acrogena vel pleurogena, pallide brunnea ad oleam brunneam,  $14\text{--}22 \times 10\text{--}18 \mu\text{m}$ , coalita cellulae basalis truncatae,  $2.8\text{--}5.2 \mu\text{m}$  lata, quae 2–3 (maximam partem 3) verticalis, stricta vel leviter brachium curvum oriens, parallele adpressa simul et complanata in una plana. Brachia valde verrucosa  $\frac{1}{2}\text{--}\frac{2}{3}$  apicis, 0–3 septata,  $4.6\text{--}5.4 \mu\text{m}$  lata, constantia 6–9 cellulae.

Holotypus in caulis emortuis, Tsubeu forestry recreation area, Taitung, Taiwan, 30 Mar. 1987, PPH1.

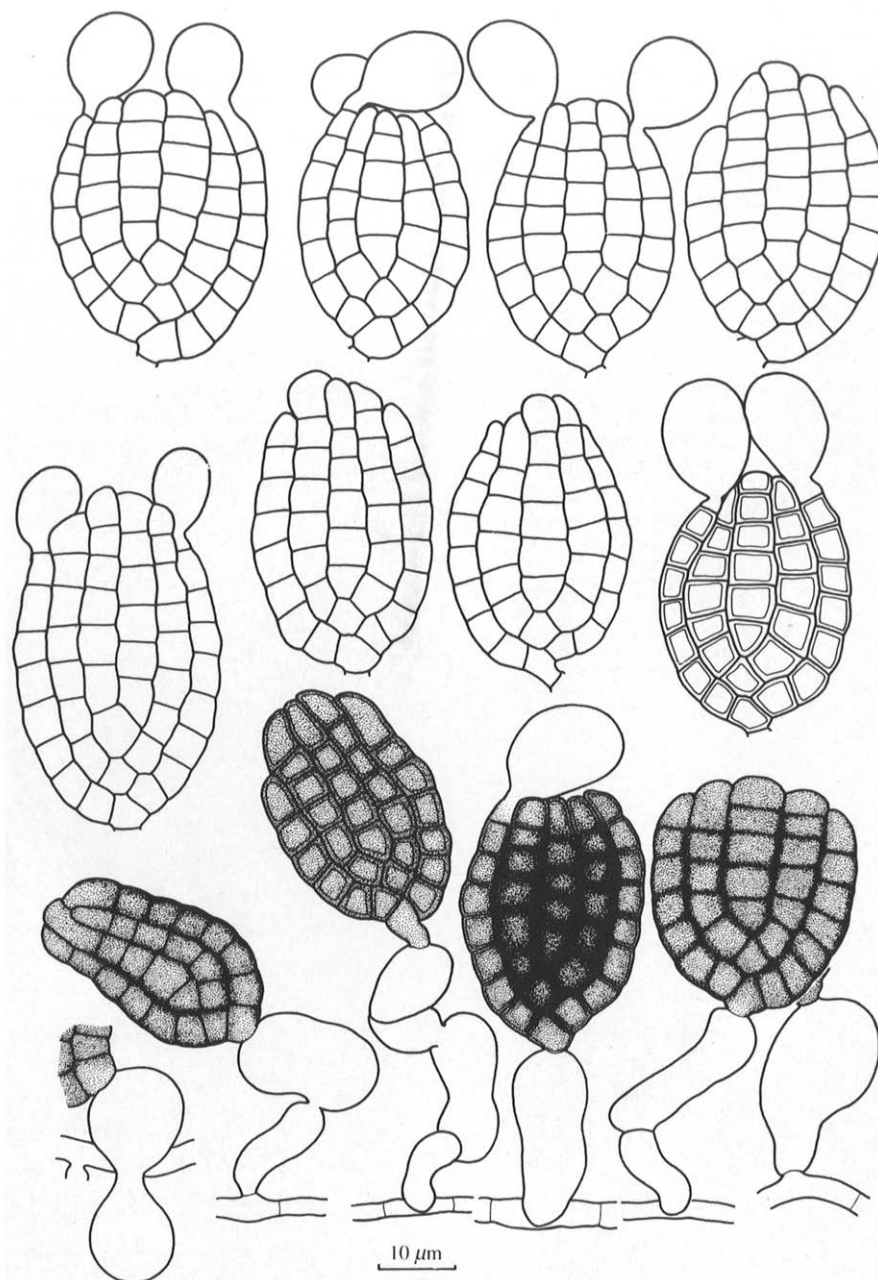
*Colonies* punctiform, scattered, powdery olive to olive brown, reverse in pale yellow to dull olive shade. *Mycelium* ( $2\text{--}5.2 \mu\text{m}$ ) mostly immersed, branched, septate, occasionally groups of 3–5 anastomosed, forming a funicular structure, subhyaline. *Conidiophores* borne directly on the mycelium, solitary or aggregated to caespitose, forming sporodochia, hyaline to pale brown, smooth, thick-walled, up to  $1.7 \mu\text{m}$ , micro-, semi-, macronematous, mononematous, flexuous, simple or irregularly branched,  $4\text{--}12 \times 2.4\text{--}5 \mu\text{m}$ . *Conidiogenous cells* integrated or discrete, acropleurogenous, cylindrical, doliiform, or sphaeroid, pale brown to brown, smooth,  $3.5\text{--}13 \times 3.1\text{--}5.8 \mu\text{m}$ . *Conidia* holoblastic, solitary, dry, acro-

**Figs 2–6.** Morphology of *Dictyosporium verrucosum*. **Fig. 2.** Conidia initiated from doliiform conidiogenous cells. **Fig. 3.** Simple or branched conidiophores with conidia arising from hyphal bundles. **Fig. 4.** Crooked conidiogenous cells bearing an almost mature conidium and a newly initiated one. **Fig. 5.** Conidia with distinctive verrucose cells. **Fig. 6.** Composite of cheiroid conidia. Bars = 10  $\mu\text{m}$ .



genous or pleurogenous, pale brown to olive brown,  $14\text{--}22 \times 10\text{--}18 \mu\text{m}$ , composed of a truncate basal cell,  $2.8\text{--}5.2 \mu\text{m}$  wide, on which 1–3 (mostly 3) vertical, straight or slightly curved arms arise, parallel and appressed together, flattened in one plane. Arms markedly verrucose at  $\frac{1}{2}\text{--}\frac{2}{3}$  of the apex, 0–3 septate,  $4.6\text{--}5.4 \mu\text{m}$  wide, consisting of 6–9 cells.

*Specimens examined:* on fallen stem, Tsubeu forestry recreation area, Taitung, Taiwan, 30 Mar. 1987. Holotype PPH1, iso-type PPH1E, deposited in Department of Plant Pathology and Entomology, National Taiwan University, Taipei, Taiwan, R.O.C., also deposited in Culture Collection and Research Center (CCRC), Hsinchu, Taiwan, R.O.C.

Fig. 7. *Dictyosporium bulbosum*, conidiophores, conidiogenous cells and conidia.***Dictyosporium bulbosum* Tzean & Chen, sp. nov.**

(Figs 7–11)

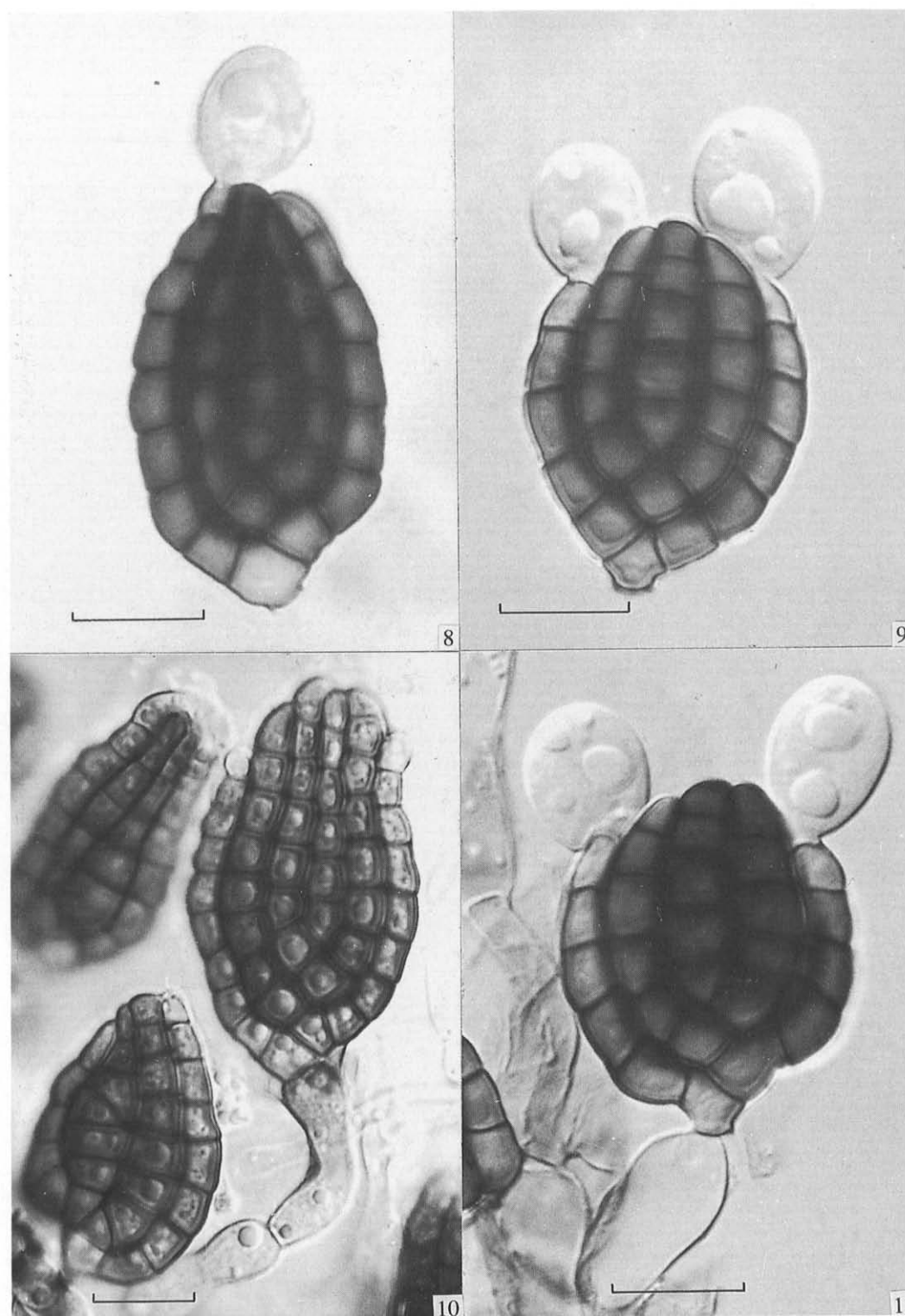
*Coloniae* effusae, zonatae constantes punitatae ad pulveraceae sporodochia, sporodochium usque ad ca 886  $\mu\text{m}$  diam, atroviridis. *Mycelium* maximam partem immersum, 2–6  $\mu\text{m}$  latum, ramosum, septatum, incolor, subhyalinum ad dilutum viride. *Conidiophorum* micro- vel macronematoideum, mononematoideum, flexuosum, irregulariter ramosum, hyalinum, dilutum viride vel dilute brunneum, laeve. *Cellulae conidiogenae* in conidiophoris incorporatae, determinatae, terminales vel intercalares, cylindratae, sigmoideae, reniformes, obovoideae, pyriformes, obpyriformes, subsphaericae vel sphaericae, hyalinae ad dilutae. *Conidia* 12–48 cellulae disposita in 2–6 serietibus, jecta in una plana, olea brunnea, 26.9–46  $\times$  11.1–30  $\mu\text{m}$ . *Cellula apicalis* exteriorum serietum instructa hyalina, appendix parietis

tenuis prime sphaerica, posteaescens obovoidea, 11–28  $\times$  10–19  $\mu\text{m}$ . Appendix maximam partem 0 vel 2; subinde 1 vel 3.

Holotypus in caulis emortuus, Wulai, Taipei, Taiwan, 4 Mar. 1987, PPH2.

*Colonies* effuse, with zonation consisting of punctate to powdery sporodochia up to ca 886  $\mu\text{m}$  diam, dark green. *Mycelium* mostly immersed, 2–6  $\mu\text{m}$  wide, branched, septate, colourless, subhyaline to pale green. *Conidiophores* micro- or macronematous, mononematous, flexuous, irregularly branched, hyaline, pale green or pale brown, smooth. *Conidiogenous cells* integrated, determinate, terminal or intercalary, cylindrical, sigmoid, reniform, obovoid, pyriform,

**Figs 8–11.** Morphology of *Dictyosporium bulbosum*. **Fig. 8.** Conidium with one bulbous appendage. **Fig. 9.** Conidium with two bulbous appendages. **Fig. 10.** Conidium arising from sigmoid conidiogenous cells. **Fig. 11.** Conidium arising from an ellipsoidal conidiogenous cell. Bars = 10  $\mu\text{m}$ .



obpyriform, subspherical or spherical, hyaline to pale. *Conidia* of 12–48 cells arranged in 2–6 rows, lying in one plane, olivaceous brown,  $26.9\text{--}46 \times 11.1\text{--}30 \mu\text{m}$ . The apical cells of the outer rows provided with a hyaline, thin-walled appendage, initially spherical, later becoming obovoid,  $11\text{--}28 \times 10\text{--}19$

$\mu\text{m}$ . Appendages mostly 0 or 2, occasionally 1 or 3 per conidium.

*Specimens examined:* on fallen, decayed stem, Wulai, Taipei, Taiwan, 4 Mar. 1987. Holotype PPH2, iso-type PPH2E, deposited in Department of Plant Pathology and Entomology, Taipei, Taiwan,

R.O.C., also deposited in Culture Collection and Research Center (CCRC), Hsinchu, Taiwan, R.O.C.

Among the 21 accepted species in *Dictyosporium*, *D. alatum* Van Emden is the only species in which the apical cell of the outer rows of the conidia one ornamented with hyaline, thin-walled, allantoid appendages. Later, these become considerably swollen and contain crystalline material (Van Emden, 1975). *Dictyosporium bulbosum* is the second species with appendages, but they are mostly obovoid or bulbous, thin-walled and hyaline. The development of conidial appendages in *D. alatum* and *D. bulbosum* is similar but the final appearance is strikingly different. Conidiogenous cells and conidia in these two species also differ in shape and size.

*Dictyosporium verrucosum* is characterized by distinct features, such as conidia being composed of 3 short, stout, arms (rarely 2); cells of the arms are thick-walled, and conspicuously verrucose at the apex; the number of cells in each conidium is very low, consisting of only 6–9 (mostly 7), contrast to most other *Dictyosporium* species. All these features of *D. verrucosum* distinguish it from other described *Dictyosporium* species.

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## *Gilmaniella multiporosa*, a new dematiaceous hyphomycete from Egyptian soils

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*Gilmaniella multiporosa*, a new dematiaceous hyphomycete from Egyptian soils. *Mycological Research* **92** (4): 502–505 (1989).

*Gilmaniella multiporosa*, a new species of dark-coloured hyphomycetes, isolated from salt marsh soil in Egypt, is illustrated and described. It produces conidia with 2–3 conspicuous germ pores.

Key words: *Gilmaniella multiporosa*, Soil fungi, Halophytes, New species.

During an ecological study of the fungal flora inhabiting the salt marsh ecosystem in North Sinai, Egypt, an interesting species of *Gilmaniella* was recorded several times. The most distinctive feature of this isolate is the production of conidia with numerous germ pores, a character which has not been reported previously for the genus. It is formally described as a new species and compared with four species already known. A key to accepted species is provided.

*Gilmaniella multiporosa* Moustafa & Ezz-Eldin, sp. nov.

(Figs 1–3)

*Coloniae* in agar PDA dict. 28 celeriter crescunt, post 7 dies ad 7 cm diam, laxe intricatae, velutinae, 2–3 mm altae, primum albae, cinerascens-olivaceiformes, margine angusta alba circumdatae. *Hyphae* ariae hyalinae, deinde dilute pigmentatae laeves, septis crassis, obscuris divisae. *Cellulae conidiogenae* laterales orthotropicae vel intercalares e cellulis haud differentiatis oriuntur, hyalinae, deinde