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## New *Plectronidium* and *Tunicago* Species (Mitosporic Fungi) from Australia

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### Abstract

*Plectronidium cultriforme*, sp. nov., and *Tunicago triodiae*, sp. nov., found on *Triodia* sp. in Australia are described and illustrated. The generic circumscription of *Plectronidium* is broadened to include sporodochial conidiomata and phialidic conidiogenous cells borne on branched conidiophores.

### Introduction

Collections of plant-inhabiting microfungi were made in north-western Queensland in 1995 as part of a scientific survey of the Musselbrook Reserve. Subsequent moist chamber incubation of dead leaves often revealed fungi not obvious at the time of collection, and some of these have been listed elsewhere (Alcorn 1998a). The two species described here were found on a single collection of *Triodia* sp. (probably *T. pungens* R.Br.) so treated. A new species of *Cochliobolus* with a *Curvularia* anamorph was also found on the same material (Alcorn 1998b).

### Taxonomy

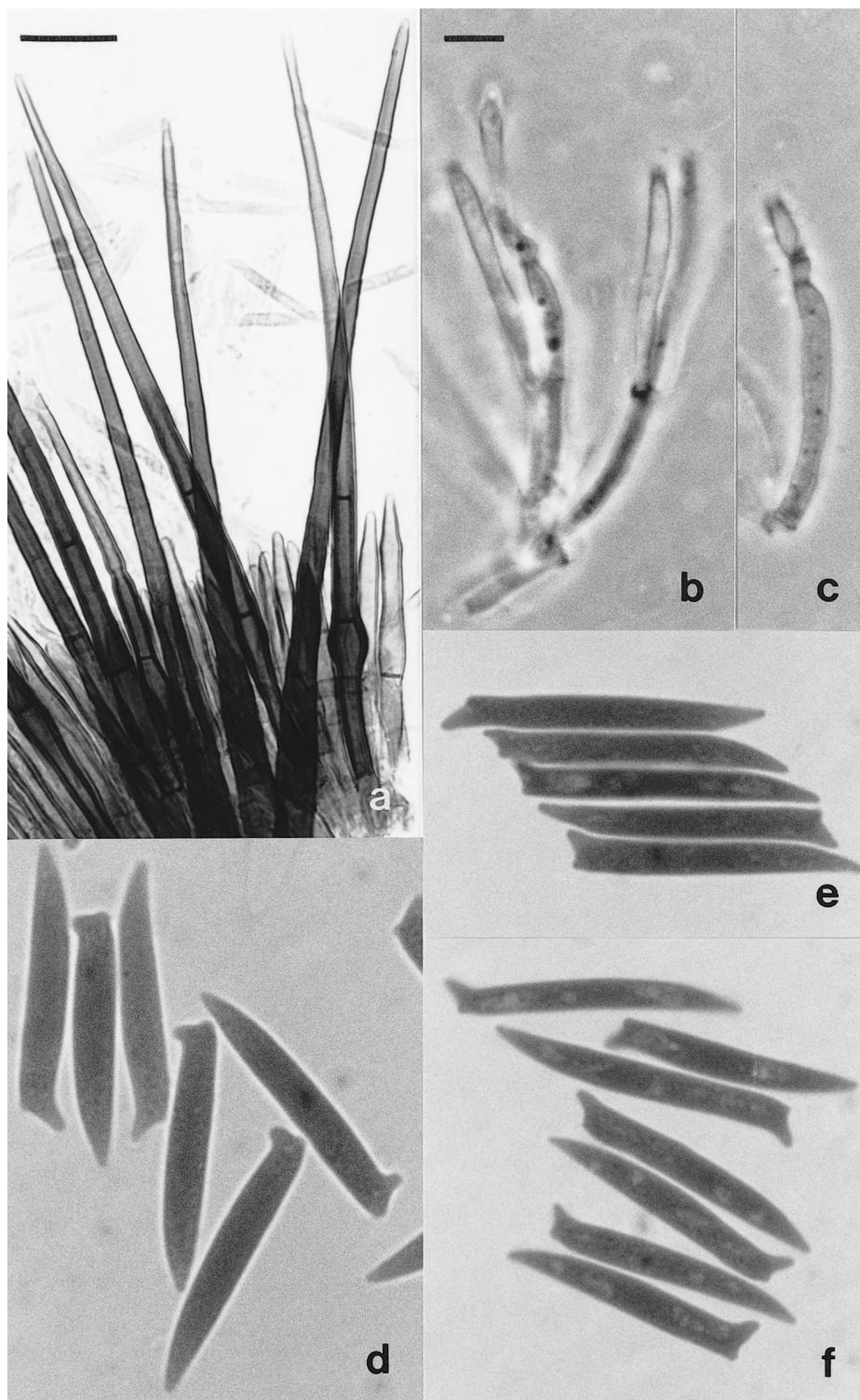
*Plectronidium cultriforme* Alcorn & B.Sutton, sp. nov. (Fig. 1)  
(Etym.: cultriformis (L.), knife-shaped: for the conidial shape)

Sporodochia in cultura superficialia, solitaria vel confluentia, dense setosa, 70–700 (–1000)  $\mu\text{m}$  diam. Setae biformes: infra atrobrunneae, versus apicem pallide brunneae, erectae, non ramosae, rectae vel leviter curvatae, gradatim angustatae, laeves, 3–6 septatae, 150–210  $\mu\text{m}$  longae, ad basim 6–10  $\mu\text{m}$  crassae, ad apicem 1.5–2.5  $\mu\text{m}$  crassae; vel pallide brunneae, erectae, rectae, laeves, usque ad 80  $\mu\text{m}$  longae, parce septatae, 4–6  $\mu\text{m}$  crassae. Conidiophora hyalina vel pallide brunnea, laevia, multiseptata, cylindrica, ramosa, usque ad 140  $\mu\text{m}$  longa, ad basim (3–) 3.5–4 (–6)  $\mu\text{m}$  crassa. Cellulae conidiogenae in conidiophoris incorporatae, terminales vel laterales, hyalinae, laeves, ‘phialidicae’, 14–25  $\times$  2.5–3  $\mu\text{m}$ , interdum proliferationibus percurrentibus. Conidia hyalina, holoblastica, solitaria, in muco formata, cultriformia, recta vel curvata, versus apicem gradatim attenuata, basim truncata, (18–) 20–29 (–32)  $\times$  3–3.5  $\mu\text{m}$ ; appendix basalis, lateralis, cylindrica vel obtusa conica, 2–3.5  $\mu\text{m}$  longa, ad basim 1.5–2  $\mu\text{m}$  crassa, ad apicem 1–1.5  $\mu\text{m}$  crassa.

*Holotypus* BRIP 23037a, *isotypus* ATCB 221<sup>1</sup>.

Conidiomata sporodochial, superficial, densely setose, in culture 70–700 (–1000)  $\mu\text{m}$  in diameter. Setae of two types. Type I setae dark brown below, paler above, smooth, gradually tapered to the apex from a somewhat swollen base, wall c. 2.0  $\mu\text{m}$  thick in the lower part, thinner above, straight or slightly curved, sometimes abruptly narrowed at the base to form a

<sup>1</sup>The abbreviation ATCB refers to the personal herbarium of B. C. Sutton (Apple Tree Cottage Blackheath) and is not officially designated in Index Herbariorum.



**Fig. 1.** *Plectronidium cultriforme*. (a) Portion of conidioma showing two types of setae, (b) branched conidiophore, (c) conidiogenous cell with two percurrent proliferations, (d-f) conidia. (a-c from conidioma developed in moist chamber; d-f from culture). Scale bars = 20  $\mu\text{m}$  (a), 5  $\mu\text{m}$  (b-f).

short pedicel-like part 4–5  $\mu\text{m}$  diam., 150–210  $\mu\text{m}$  long, 6–10  $\mu\text{m}$  diam. in the basal portion, 1.5–2.5  $\mu\text{m}$  diam. at the apex, 3–6 septate. Type II setae occur with Type I setae but are shorter and thinner walled, pale brown, sparingly septate, smooth, up to *c.* 80  $\mu\text{m}$  long, 4–6  $\mu\text{m}$  wide, tip rounded to bluntly pointed. Conidiophores hyaline or sometimes pale brown in the lower part, smooth, multiseptate, cylindrical, branched, up to *c.* 140  $\mu\text{m}$  long and (3–) 3.5–4 (–6)  $\mu\text{m}$  wide at the base. Conidiogenous cells integrated, terminal and lateral, cylindrical, hyaline, ‘phialidic’ (*sensu* Ellis 1971), periclinal thickening slight, collarete small, 14–25  $\times$  2.5–3  $\mu\text{m}$ , sometimes proliferating percurrently to form a conidiogenous locus at a higher level. Conidia hyaline, aseptate, smooth, thin-walled, straight to slightly curved, (18–) 20–29 (–32)  $\times$  3–3.5  $\mu\text{m}$ , knife-shaped, walls more or less parallel in the lower part and with one side curved more strongly above to the bluntly pointed apex, base truncate with a short lateral cylindrical to commonly blunt conical cellular appendage extending at various angles to the long axis, 2–3.5  $\mu\text{m}$  long  $\times$  1.5–2  $\mu\text{m}$  diameter where it joins the conidium and 1–1.5  $\mu\text{m}$  at the tip. The conidial hilum is slightly protuberant in some conidia, forming a very short truncate denticle, but the hilar scar is not thickened. Conidia germinate by forming an apical or basal germ tube, or sometimes both, when incubated on water agar. The basal germ tube develops by a resumption of growth from the apex of the appendage. After *c.* 17 hours germinated conidia have 1–2 (–3) transverse septa in the body of the spore, and sometimes also septa delimiting the germ tubes.

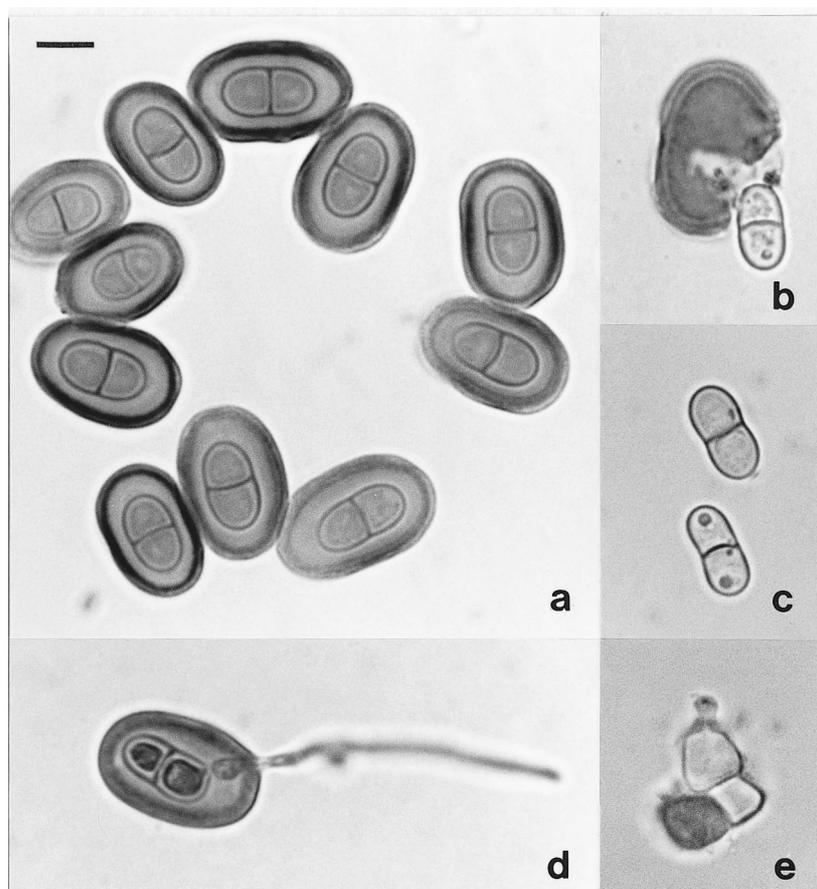
The genus *Plectronidium* was introduced by Nag Raj (1977) to accommodate two coelomycetes occurring on *Bambusa* in India and China. They differ from the taxon described above as *P. cultriforme* in having sub-epidermal acervular conidiomata, and percurrently proliferating (annellidic *sensu* Ellis 1971) conidiogenous cells not supported on conidiophores. Sutton and Pascoe (1986) broadened the generic concept to include taxa with both sympodially proliferating and annellidic conidiogenous cells and conidia lacking appendages, but this expanded circumscription of the genus was not accepted by Nag Raj (1993). Conidiophore morphology and conidium ontogeny in *P. cultriforme* are similar to these features in *Pseudolachnella*, but conidia in that genus are septate and have bipolar appendages (Nag Raj 1993). Introduction of a new genus for *Plectronidium cultriforme* based on the differences between it and the generic type was considered. The distinctions between acervuli and sporodochia are commonly not maintained in culture (Sutton 1973; Nag Raj 1981), and the similarity in conidiomatal variation found in the closely related genus *Vermiculariopsiella* Bender (Nawawi *et al.* 1990) have influenced the authors’ decision about the generic affinities of this species. Until information about the morphology of other *Plectronidium* spp. in culture is available they have therefore taken the option of again expanding the generic limits of *Plectronidium* as was done by Sutton and Pascoe (1986).

***Tunicago triodiae*** Alcorn & B.Sutton, sp. nov. (Fig. 2)  
(Etym.: from *Triodia*, the host genus)

Conidiomata pycnidialia, globosa vel leviter applanata, separata, immersa vel superficialia, unilocularia, laevia, ostiolo nullo, 70–250  $\mu\text{m}$  diam.; paries pallide brunneus ex textura angulari 4–12  $\mu\text{m}$  diam. compositus. Cellulae conidiogenae ‘phialidicae’, hyalinae, laeves, globosae vel doliiformes, discretae, pariete periclinali incrassato, interdum collo, 5–9  $\times$  5–7  $\mu\text{m}$ . Conidia holoblastica, brunnea, recta, laevia, ovalia vel oblonga, ad apicem et basim obtusa, 1–euseptata, non vel leviter constricta, in vagina gelatinosa inclusa, 11–17  $\times$  8–11  $\mu\text{m}$ , vel 7–10  $\times$  4–6  $\mu\text{m}$  (vagina exclusa).

*Holotypus* BRIP 23037b, *isotypus* ATCB 222.

Conidiomata pycnidial, simple, single, globose or flattened globose, 70–250  $\mu\text{m}$  diam., immersed to superficial, flattened across the base when formed on hard substrata such as wheat straw in culture, wall pale brown and consisting of several layers of thin-walled textura angularis 4–12  $\mu\text{m}$  diam., non-ostiolate, appearing dark brown due to the internal spore mass. Conidiogenous cells phialidic (*sensu* Sutton 1980), more or less globose to doliiform, 5–9  $\times$  5–7  $\mu\text{m}$ , discrete, arising from the inner cells of the conidioma wall, with slight to pronounced periclinal thickening and sometimes a small collarete. Conidia oval to oblong



**Fig. 2.** *Tunicago triodiae*. (a) Conidia, (b) crushed conidium with expelled inner spore body, (c) inner spore bodies after expulsion from sheaths, (d) germinating conidium. Note origin of germ tube and displacement of inner spore body within sheath. (e) Conidigenous cell. (All illustrations from culture.) Scale bar = 5  $\mu\text{m}$  (a–e).

with rounded ends, brown, 1-septate, smooth, consisting of an outer sheath enclosing a smooth thin-walled hyaline to pale brown oblong 1-euseptate spore body 7–10  $\times$  4–6  $\mu\text{m}$ , often constricted at the septum, overall dimensions including the sheath 11–17  $\times$  8–11  $\mu\text{m}$ . In some mature conidia the sheath is slightly wrinkled. The conidium body is central in the sheath or sometimes placed asymmetrically. The latter condition is common if slight pressure is applied to the coverslip, and increased pressure will result in expulsion of the spore body intact, leaving an obviously split outer envelope which otherwise retains its integrity. In mature conidia the outer region of the sheath appears darker, and might be mistaken for a thickened wall. The authors interpret this as probably being due to the greater concentration of granular pigment seen in optical section. Conidia allowed to germinate on water agar each produce a single germ tube from the body of the spore, often from where the periclinal wall curves to the end, and the germ tube grows out through the sheath.

The genus *Tunicago* was established by Sutton and Pollack (1977) for a coelomycete with unique conidia occurring on *Uniola paniculata* L. in Florida. It was distinguished from similar genera by the thick conidial sheath, initially hyaline and irregular in contour but maturing to a rigid brown structure through which the germ tube grows from the spore body in germinating conidia. The genus has remained monotypic, and the collection from *Triodia* in Australia differs sufficiently in conidial morphology and dimensions to warrant its

description as a new species. No other fungus described from *Triodia* would appear to provide a suitable epithet; the most likely possibility, *Hendersonia triodiae* Hansford, has fusoid 3–5 septate conidia 20–35 × 5–7 µm (Hansford 1954).

#### *Specimens Examined*

BRIP 23037a (ATCB 221) *Plectronidium cultriforme*; BRIP 23037b (ATCB 222) *Tunicago triodiae*; on dead leaves of *Triodia* sp. probably *T. pungens*, Ridgepole track, Musselbrook Reserve, Queensland, Australia, 18°39'S, 139°18'E, J.L. Alcorn 95/1854, 2 May 1995.

IMI 187331 *Tunicago uniolae* (isotype), on *Uniola paniculata*, Bahamas, Miami, Florida, USA, F.G. Pollack 004903, 23 Jan. 1974.

#### **Acknowledgments**

J. L. A. thanks Dr J. C. David for lending the isotype of *Tunicago uniolae*.

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