

Notes on Deuteromycetes II

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New species of hyphomycetes from Australia are described and illustrated, including *Bactridium australe*, *Corynesporopsis cylindrica*, *Helicorhoidion conicum*, *Pulvinotrichum capitatum*, *Triadelphia australiensis* and *Sporidesmium nigroacuum*.

This paper is a continuation of earlier studies on miscellaneous Deuteromycetes (SUTTON, 1985).

6. *Bactridium australe* B.C. SUTTON sp. nov. – Fig. 1.

Mycelium immersum, ramosum, septatum, laeve, compactum. Conidiomata sporodochialia, pulvinata, alba vel pallidissime lutea, dispersa, sparsa, raro confluentia, usque ad 150 μm diam., ex textura intricata composita. Conidiophora hyalina, septata, basim versus parce ramosa, laevia, usque ad 20 μm longa \times 2 μm crassa, ex cellulis superioribus conidiomatum formata. Cellulae conidiogenae in conidiophoris incorporatae, determinatae, cylindricae, interdum rectae vel plerumque basim conidiorum versus leniter contortae, hyalinae, laeves, 2–15.5 \times 2 μm , omnes conidium apicale singulare producentes. Conidia holoblastica, solitaria, longi-obovoidea, ad apicem rotundata et obtusa, basim truncatum versus gradatim deminuta, hyalina, laevia, 8–14 septata, ad septis leviter constricta, aequidistantibus, cellulis singulis omnibus centrale pallidior, cellula apicali sine contento et saepe collapsa, cellula basali interdum sine contento, 43–71 \times 8–10 μm .

In lignis ignotis, Cunningham's Gap National Park, Queensland, Australia, Sept. 1981, B.C. SUTTON & J.A. ALCORN, IMI 263589b, holotypus.

Mycelium immersed, branched, septate, hyaline, smooth, compacted. – Conidiomata sporodochial, pulvinate, white to very pale luteous, scattered, sparse, rarely confluent, up to 150 μm diam., composed of textura intricata. – Conidiophores hyaline, septate, sparingly branched towards the base, smooth, up to 20 μm long \times 2 μm wide, formed from the upper cells of the conidiomata. – Conidiogenous cells integrated, determinate, cylindrical, sometimes straight but more often slightly contorted towards the conidial base, hyaline, smooth, 2–12.5 \times 2 μm , producing a single conidium at the apex. – Conidia holoblastic, solitary, long obovoid, rounded and obtuse at the apex, gradually tapered towards the truncate base, hyaline, smooth, 8–14 septate, slightly constricted at the septa which are more or less equidistant, individual cells each with a paler central lumen, apical cell often devoid of contents and frequently collapsed, basal cell occasionally devoid of contents, 43–71 \times 8–10 μm .



Fig. 1: *Bactridium australe* (holotype).

Twenty six binomials have been published in the genus *Bactridium* KUNZE of which one, *B. coccophilum* SAWADA is not valid, and two others, *B. lichenicola* (MASS.) WOLLENW. and *B. gymnosporangii* (JAAP) WOLLENW. have been transferred to *Cylindrocarpum* WOLLENW. (HAWKSWORTH, 1979; ROSSMAN, 1983). A number have been considered synonyms of *B. clavatum* BERK. & BR., *B. flavum* KUNZE and *B. fulvellum* BERK. (HUGHES, 1966). The holotypes of two species, *B. acutum* BERK. & WHITE and *B. effusum* SCHWEIN., did not appear to bear the fungi described in the protologues (M.B. ELLIS in litt.).

Of the species hitherto described, *B. australe* shows most resemblance to *B. xathertum* BERCH (1982). They share many common features but *B. australe* differs in the long obovoid conidia which are slightly longer (43–71 compared with 13–60 μm) and significantly wider (8–10 compared with 4–6 μm). Such differences in width are considered to be significant although it is possible that they are induced by a difference in substratum. So far as I am aware no species of *Bactridium* have been cultivated. The only information on this aspect is by TUBAKI (1970) who failed to induce germination in *B. clavatum*, *B. flavus* and an unnamed species from Japan.

Of the remaining species only *B. versicolor* MCALPINE (1897) is comparable with either *B. australe* or *B. xathertum*, having been described with a conidial size of 47–60 \times 3.5–4.5 μm and up to 15 septa in the conidia which are decidedly constricted at the septa. The conidiophores were referred to as hyaline, septate and 130–140 \times 4 μm . The epithet described the sporodochia which were fawn, pink and brown when young, finally becoming black. The type collection from MCALPINE'S herbarium in VPRI was examined and proved to be a lichenized fungus belonging to *Bacidia* DE NOT. sensu stricto (det. D.L. HAWKSWORTH), the epithet '*versicolor*' used to describe the varying states of maturity of the apothecia. It bears no relationship to *Bactridium*.

7. *Corynesporopsis cylindrica* B.C. SUTTON sp. nov. – Fig. 2 A, B.

Coloniae effusae, pilosae, atro brunneae, sparsae. Mycelium partim superficiale, pro parte immersum, ex hyphis ramosis, septatis, medio brunneis, laevibus, 2–3 μm crassis compositum. Conidiophora macronematosa, mononematosa, singula vel in quaternis aggregata, terminalia vel lateralia, erecta, recta vel ad basim sinuata, 4–6 septata, interdum ad septis constricta, medio brunnea, apicem versus pallidiora, laevia, cylindrica sed cellula penultima apicali leviter tumida, 22–43 μm longa \times 3–4.5 μm crassa (cellula penultima usque ad 7 μm crassa). Cellulae conidiogenae in conidiophoris incorporatae, terminales, monotreticae, cylindricae vel clavatae, determinatae, 9.5–18 μm longae, ad apicem 4.5–5.5 μm crassae et ad basim 3.5–4.5 μm crassae. Conidia catenata, tribus conidiis per catena, tretica, sicca, laevia, cylindrica, in medio 1 euseptata, raro 2 euseptata, medio brunnea, guttulata, ad apicem et basim truncata, 12.5–20.5 \times 6–7.5 μm .

In lignis emortuis *Eucalypti*, Mt Nebo, Queensland, Australia, 27 August 1981, B.C. SUTTON & J.L. ALCORN, IMI 263323a holotypus, isotypus BRIP.



Fig. 2:A,B. *Corynesporopsis cylindrica* (holotype) – A. conidiophores and developing conidia. – B. conidia – C. *C. quercicola*, conidia – D. *C. uniseptata*, conidia.

Colonies effuse, hairy, blackish brown, sparse. – Mycelium partly superficial, mostly immersed, composed of branched, septate, medium brown, smooth hyphae 2–3 μm wide. – Conidiophores macronematous, mononematous, single or fasciculate in groups of up to 4, terminal or lateral on vegetative hyphae, erect, straight but often sinuate at the base, 4–6 septate, sometimes slightly constricted at the septa, medium brown, becoming paler towards the apices, smooth, cylindrical but occasionally with the penultimate apical cell slightly swollen, 22–43 μm long \times 3–4.5 μm wide (penultimate cell up to 7 μm wide). – Conidiogenous cells integrated, terminal, monotretic, cylindrical to clavate, determinate, 9.5–18 μm long \times 4.5–5.5 μm wide at the apex (3.5–4.5 μm at the base). – Conidia catenate, up to 3 per chain, tretic, dry, smooth, cylindrical, medianly 1 euseptate, rarely 2 euseptate, medium brown, guttulate, apex and base truncate, 12.5–20.5 \times 6–7.5 μm .

The generic name *Corynesporopsis* was introduced by KIRK (1981a) to accommodate a single species, *C. quercicola* (BOROWSKA) P.M. KIRK, which was based on *Corynespora quercicola* BOROWSKA (1975). A second species *C. uniseptata* KIRK (1981b) was described shortly after. The species from Queensland differs markedly from these two. The conidiophores are consistently shorter and typically become wider towards the apices. Similar conidia are formed in the three species but whereas in both *C. uniseptata* (Fig. 2D) and *C. cylindrica* (Fig. 2C) they are 1-euseptate, in the former there is a median constriction around the septum but the latter has no constriction. Occasionally a 2-euseptate conidium is formed in *C. cylindrica* and although this invites comparison with the symmetrically septate conidia of *C. quercicola*, in the latter species the conidia are versicoloured with the end cells paler than the median one. In *C. cylindrica* conidia are of even pigmentation throughout and when an additional septum is formed the resultant conidia are asymmetric.

8. *Helicorhoidion conicum* B.C. SUTTON sp. nov. – Fig. 3.

Coloniae effusae, inconspicuae. Mycelium partim immersum, pro parte maxima superficiale, laxum, medio brunneum, laeve, ramosum, septatum, 4–6 μm crassum. Conidiophora semi macronematosa vel micronematosa, non ramosa, recta, cylindrica, medio brunnea, apicem versus pallidiora, laevia, 1–4 septata, 15–30 \times 6–10 μm . Cellulae conidiogenae 5–15 μm longae, in conidiophoris incorporatae vel raro discretatae, determinatae, intercalares, cylindricae, pallide brunneae, laeves, apicem complanatae. Conidia holobastica, solitaria, sicca, helicoidea, 3–6 spiras arctis, apicem versus parvioribus, in centro conidii ad basim helicis in cellulis conidiogenis affixa, laevia, pallide brunnea, euseptata, 45–60 μm longa, ad basim 45 μm crassa, schizolytica.

In lignis ignotis, Joalah National Park, Queensland, Australia, B.C. SUTTON & J.L. ALCORN, 31 Aug. 1981, IMI 263477c holotypus, inter *Pleurothecium recurvatum* (MORGAN) HÖHNEL, *Bactrodesmium microleucurum* (SPEG.) M.B. ELLIS et *Candelabrum spinulosum* VAN BEVERWIJK.

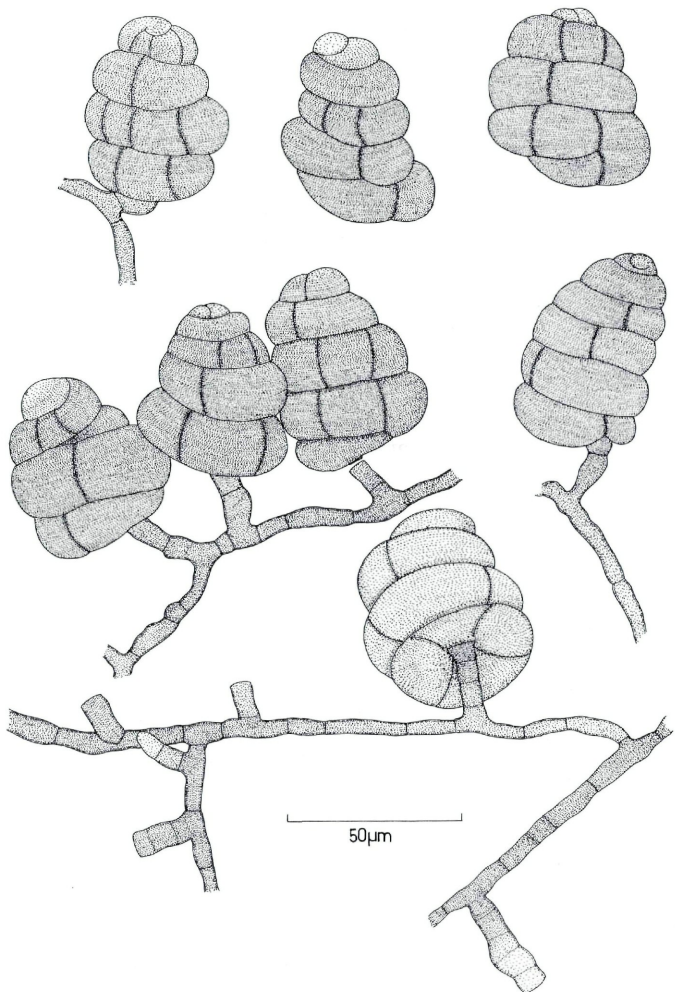


Fig. 3: *Helicorhoidion conicum* (holotype).

Colonies effuse, inconspicuous. – Mycelium partly immersed, mostly superficial, lax, medium brown, smooth, branched, septate, 4–6 μm wide. – Conidiophores semi macronematous to micronematous, unbranched, straight, cylindrical, medium brown, becoming paler towards the apices, smooth, 1–4 septate, 15–30 \times 6–10 μm . – Conidiogenous cells 5–15 μm long, integrated or rarely discrete, determinate, intercalary, cylindrical, pale brown, smooth, apex flattened. – Conidia holoblastic, solitary, dry, helicoid, very tightly coiled 3–6 times, the coils becoming progressively smaller towards the apex, attached to the conidiogenous cell in the centre at the base of the helix, smooth, pale brown, euseptate, 45–60 μm long \times up to 45 μm diam at the base, seceding by schizolysis.

There is no satisfactory genus to accommodate this particular species (LINDER, 1929; MOORE, 1955, 1957). The three dimensionally coiled conidia combined with micronematous conidiophores are not wholly typical of *Helicorhoidion* HUGHES (1958) or *Xenosporium* PENZIG & SACCARDO (1902) which are the two most closely related genera.

In *X. thaxteri* (LINDER) PIROZYNSKI (1966) the muriform conidia have only a tendency to be three dimensionally coiled but the integrated conidiogenous cells are truncate at the apices. Small secondary conidia are formed in groups on the inside of the coil and point of attachment of the conidia may be at the base in the centre of the coil or at its perimeter. The type species of *Helicorhoidion*, *H. botryodeum* (CKE) HUGHES also has three dimensionally coiled conidia but they are formed from small denticles produced on indeterminate conidiogenous cells. Although *H. pulchrum* is similar to *H. botryodeum* in this respect, the conidia of *H. irregulare* MULDER (1973) develop not from denticles but from micronematous conidiophores in a similar way to the new species described here.

For the present it is preferred to place this species in *Helicorhoidion* rather than *Xenosporium* because conidial morphology in the two genera is too disparate. By including it with *H. irregulare* in *Helicorhoidion* the two closely related species will be maintained in a single genus so that if in the future the generic circumscription of *Helicorhoidion* becomes more restrictive, they may be segregated.

9. *Helicorhoidion pulchrum* (BERK. & CDA) HUGHES. – Can J. Bot. 36:773 (1958). – Fig. 4.

BAS.: *Mystrosporium pulchrum* BERK. & CDA apud BERK. – Hooker's Lond. J. Bot. 4: 70 (1845).

Colonies effuse to compact, greenish glaucous (RAYNER, 1970). – Mycelium partly immersed, mostly superficial, hyaline to pale brown, verruculose, branched, septate, 4–5 μm wide. – Con-

idiophores macronematous, branched or unbranched, flexuous, pale brown, verruculose, septate, up to 150 μm long \times 4–6 μm wide. – Conidiogenous cells 10–35 μm long, integrated, determinate or indeterminate, terminal or intercalary, cylindrical, pale brown, verruculose, with 1–4 short unthickened denticles 2 μm long. – Conidia holoblastic, solitary, dry, helicoid, very tightly coiled 3–4 times in three places and attached to the conidiogenous cell in the centre at the base of the helix, at first smooth and hyaline, becoming medium brown and verruculose with age, euseptate and often constricted at the septa, 40–50 \times 22–25 μm , seceding from the denticles by schizolysis.

Material examined. – On wood, Swan R., W. Australia, leg. DRUMMOND 270, holotype in K; in insect galleries in dead rotten wood of *Eucalyptus*, Mt Glorious State Forest, Queensland, Australia, B.C. SUTTON & J.L. ALCORN, 27 Aug. 81, IMI 263308.

Hitherto this species was only known from the type collection on dead wood from Australia (ELLIS, 1971). The Queensland material agrees in most details with the illustrations and accounts by HUGHES (1958) and ELLIS (1971) but differs in some minor respects. The mycelium, conidiogenous apparatus and conidia are verruculose, as indicated by HUGHES (1958), although ELLIS (1971) referred to conidiophores in the generic description of *Helicorhoidion* as smooth. The conidiophores and conidiogenous cells illustrated by HUGHES (1958) bear 4–5 apical to subapical denticles on the slightly wollen apical cell of the conidiophore with sometimes a single denticle on an intercalary conidiogenous cell. In the Queensland collection the

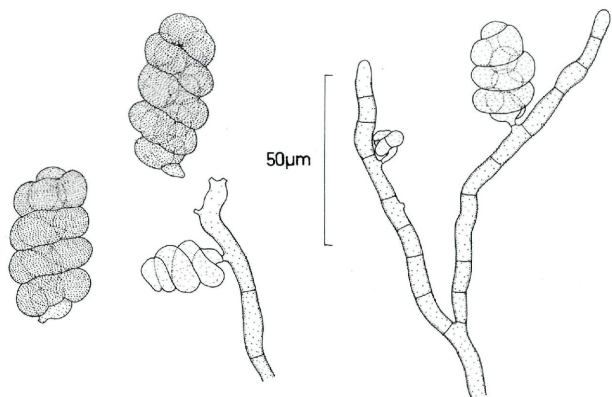


Fig. 4: *Helicorhoidion pulchrum* (IMI 263308).

apices were not swollen and the intercalary monoblastic conidiogenous cells were the rule rather than the exception.

10. *Pulvinotrichum capitatum* B.C. SUTTON sp. nov. – Fig. 5.

Coloniae sparsae, dispersae, albae. Mycelium superficiale, repens, ramosum et anastomosans, hyalinum, laeve, septatum, parietibus crassis (ex comparatione phialidibus), 2–3 μm crassum. Conidiomata sporodochialia, superficialia, separata, raro gregaria, sessilia, setosa, pulveracea, alba, 50–80 μm diam. Setae in conidiomatibus et mycelio superficiale oriundae, erectae, rectae vel leniter curvatae, parietibus crassis, hyalinae, laeves, non ramosae, cylindricae, apicem versus gradatim deminutae, ad basim tantum septatae, usque ad 70 μm longae, ad basim 2–2.5 μm crassae; apices parietibus tenuibus, inflati, clavati, longo-clavati, spatulati, 6–17 μm longi \times 3–5 μm lati. Conidiophora absentia. Cellulae conidiogenae discretae, determinatae, intercalares vel laterales, hyalinae, parietibus tenuibus (ex comparatione setis et mycelio), ampulliformes, enteroblasticae, phialidicae, ad basim 2.5–4 μm diam., ad collum 1 μm diam. decrescentes, collo minuto, crassitie periclinali et canale. Conidia hyalina, aseptata, laevia, cylindrica, ad basim vel apicem guttulata vel biguttulata, 6–9 \times 1.5 μm .

In foliis emortuis *Araucariae bidwellii*, Boombana National Park, Queensland, Australia, B.C. SUTTON & J.L. ALCORN, 27 Aug. 1981, IMI 263277a, holotypus; BRIP, isotypus.

Colonies sparse, scattered, white. – Mycelium superficial, repent, branched and anastomising, hyaline, smooth, septate, thick-walled (compared to phialides), 2–3 μm wide. – Conidiomata sporodochial, superficial, separate, occasionally gregarious, sessile, setose, powdery, white, 50–80 μm diam. – Setae originating from the conidiomata and the superficial mycelium, erect, straight or slightly curved, thick-walled, hyaline, smooth, unbranched, cylindrical, tapered gradually towards the apices, septate only at the base, up to 70 μm long \times 2–2.25 μm wide at the base; apex thin-walled, inflated, clavate, long clavate, spatulate, 6–17 μm long \times 3–5 μm wide. – Conidiophores absent. – Conidiogenous cells discrete, determinate, intercalary or lateral, hyaline, thin-walled (compared with setae and mycelium), ampulliform, enteroblastic, phialidic, at the base 2.5–4 μm diam., narrowing to 1 μm diam. at the neck, minute collarette, periclinal thickening and channel present. – Conidia hyaline, aseptate, smooth, cylindrical, guttulate at one or both ends, 6–9 \times 1.5 μm .

The generic name *Pulvinotrichum* GAMUNDI, ARAMBARRI & GIAIOTTI was introduced by ARAMBARRI & al. (1981) for a minute hyphomycete on *Nothofagus dombeyi* leaves collected in Argentina. The single species, *P. album* GAMUNDI, ARAMBARRI & GIAIOTTI, was characterized by setose white sporodochia, phialides and hyaline 1-septate conidia. *P. capitatum* differs from *P. album* most noticeably by the aseptate smaller conidia. Other differences includes the smooth rather than verruculose setae which are much shorter and only sep-



Fig. 5: *Pulvinotrichum capitatum* (holotype).

tate at the base. Phialides in *P. capitatum* are distinctly ampulliform with a comparatively long neck whilst in *P. album* they are more lageniform and tapered towards the apex.

11. *Triadelphia australiensis* B.C. SUTTON sp. nov. – Fig. 6.

Coloniae diffusae, sparsae. Mycelium initio immersum deinde superficiale, sparsum, ex hyphis pallide brunneis vel hyalinis irregulariter ramosis, laevibus, septatis, 2–3.5 μm crassis. Cellulae conidiogenae in conidiophoris incorporatae, termi-

nales vel laterales, hyalinae vel pallide brunneae, parietibus crassis, laeves, globosae vel ampulliformes, raro lageniformes, 3.5–7 μm longae \times 3–4 μm crassae, omnis denticulo singulo, brevi incrassato conidiogeno instructae. Conidia holoblastica, solitaria, laevia, basim versus 1-septata, eguttulata, ellipsoidea, raro cellula superiora leviter dilatata, cellula inferiora pallide brunnea, 8.5–10 \times 4.5–6 μm .

In corticis emortuis ignotis, Maiala National Park, Queensland, Australia, B.C. SUTTON & J.L. ALCORN, 27 Aug. 1981, IMI 263294, holotype, BRIP 13857, isotype; Mapleton Falls National Park, Queensland, Australia, B.C. SUTTON & J.L. ALCORN, 30 Aug. 1981, IMI 263451 b, paratypus.

Colonies diffuse, sparse. – Mycelium initially immersed, finally superficial, sparse, of pale brown to hyaline, irregularly branched, smooth, septate hyphae 2–3.5 μm wide. – Conidiogenous cells integrated, terminal or lateral, hyaline to pale brown, thin-walled, smooth, globose to ampulliform, more rarely lageniform, 3.5–7 μm long \times 3–4 μm wide, each with a single, short, unthickened denticle upon which a conidium is formed. – Conidia holoblastic, solitary, smooth, 1-septate towards the base, eguttulate, ellipsoid, occasionally with the medium brown upper cell slightly enlarged, lower cell pale brown, 8.5–10 \times 4.5–6 μm .

The most recent treatment of *Triadelphia* SHEARER & CRANE (1971) has been by CONSTANTINESCU & SAMSON (1982) where six species are accepted. The highly pleomorphic nature of the genus was emphasized and the generic description amended to account for the 2–5 forms of conidia found in some species. The conidia found in *T. australiensis* correspond to the 'a' type recorded for *T. heterospora* SHEARER & CRANE, *T. inquinans* (SACC.) HUGHES & PIROZ., *T. loudetiae* MAGGI et al., *T. pulvinata* MAGGI et al. and *T. romanica* CONSTANTINESCU & SAMSON. They differ in having a single excentrically situated transverse septum located towards the base of the conidium, and

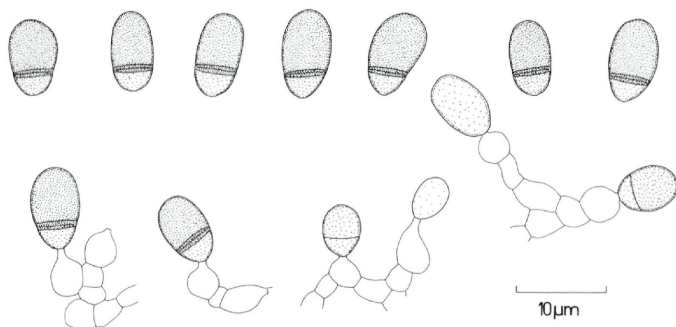


Fig. 6: *Triadelphia australiensis* (paratype).

conidial cells of different pigmentation, the upper cell being darker than the lower one.

All other species placed in *Triadelphia* show at least two conidial forms but this is not the case in *T. australiensis*. No additional forms have been found, but the colonies are mixed with many other fungal spores and fragments of mycelium including effete *Pestalotiopsis* conidia, conidiophores of *Sporidesmium*, and ascospores of Xylariaceae. There are many small brown smooth spores which may possibly represent the type 'f' conidial form but none have been unequivocally linked with conidiogenous cells and organic connexion with the mycelium bearing *T. australiensis* conidia has not been confirmed.

Triadelphia australiensis is most closely related to *T. uniseptata* (BERK. & BR.) KIRK (1983) which again lacks any other conidial form than the 'a' type. The two species differ only in conidial size; whereas in *T. uniseptata* conidia are 12.5–16 µm long × 6.5–10.5 µm wide at the broadest point, in *T. australiensis* they are appreciably smaller, 8.5–10 × 4.5–6 µm.

12. *Sporidesmium nigroacus* B.C. SUTTON sp. nov. – Fig. 7.

Coloniae effusae, diffusae et dispersae, nigrae, nitentes. Mycelium partim immersum, pro parte superficiale, ex hyphis irregulariter, septatis, brunneis, laevibus, anastomosantibus, 2.5–3 µm crassis compositum. Conidiophora absentia. Cellulae conidiogenae 3–5 in turmis minutis formatae, discretae, determinatae, terminales vel laterales, atro brunneae, lageniformes, doliiformes vel irregulares, 8–14 µm altae, ad basim 7–12 µm crassae, apicem versus 3–4 µm crassae, omnes conidio singulo formatae. Conidia 130–214 µm longa × 10–12 µm crassa, holoblastica, solitaria, sicca, laevia, pro parte maxima valde atro brunnea vel nigra, apicem obtusum et basim truncatam versus atro rubello brunnea, acicularia, recta, leniter curvata vel apicem et basim versus valde curvata et irregularia, 23–36 euseptis aequidistantibus.

In corticis emortuis ignotis, Lamington National Park, Queensland, Australia, B.C. SUTTON & J. L. ALCORN, 3 Sept. 1981, IMI 263653, holotypus, BRIP 13858, isotypus.

Colonies effuse, diffuse and scattered, black, shining. – Mycelium partly immersed, mostly superficial, composed of irregularly branched, septate, brown, smooth, frequently anatomising hyphae 2.5–3 µm wide. – Conidiophores absent. – Conidiogenous cells formed in groups of 3–5, discrete, determinate, terminal or lateral, dark brown, lageniform to doliiform or irregular, 8–14 µm high × 7–12 µm wide at the base, narrowing to 3–4 µm wide at the apex, each producing a single conidium. – Conidia 130–214 µm long × 10–12 µm wide, holoblastic, solitary, dry, smooth, for the most part very dark brown to black, becoming dark reddish brown towards the obtuse apex and the truncate base, acicular, straight, slightly curved or markedly curved to irregular at the apex and/or the base, with 23–36 equidistant eusepta.

Comparatively few species of *Sporidesmium* LINK share the combination of long euseptate conidia and short conidiogenous cells (ELLIS, 1976; SUTTON, 1980). Only four species come into consideration in distinguishing *S. nigroacus* viz. *S. hormiscioides* CDA, *S. larvatum* CKE & ELL., *S. harknessii* (SACC.) M.B. ELL. and *S. anglicum* (GROVE) M.B. ELL. Of these *S. anglicum* has much larger conidia (90–600 μ m) with more eusepta (up to 54) than the rest. In neither *S. larvatum* nor *S. harknessii* do the conidia exceed 100 μ m in length so the only reasonable comparison to be made with *S. nigroacus* concerns *S. hormiscioides*. This species has much more variably shaped conidia in which the apex is usually inflated; the pigmentation is even throughout and normally no more than 25 eusepta are produced. The most distinctive feature of conidia in *S. nigroacus* is the pigmentation – dark brown to almost black becoming dark reddish brown at each end. Although some species of *Sporidesmium* such as *S. ghanaense* M.B. ELL., *S. bicolor* (HUGHES) M.B. ELL. and *S. valdivianum* (SPEG.) M.B. ELL. have conidia in which some cells show different depths of pigmentation, none of them show the striking variation throughout the conidia that distinguishes *S. nigroacus*.

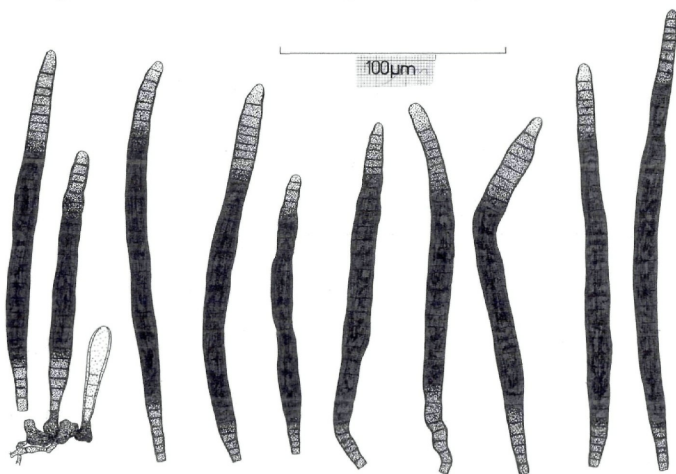


Fig. 7: *Sporidesmium nigroacus* (holotype).

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