the maximum radial growth of species in culture, agar plugs (3 mm in diameter) from the periphery of young, actively growing colonies of each fungus were placed at the centre of MEA plates and incubated at 25°C for 1 d to promote active growth. Radial growth after 1 d was noted, and thereafter plates were placed in incubators at the temperatures under consideration. Optimum growth temperature (expressed as mean radial growth) was determined after isolates had been incubated for 10 d in the dark at temperatures ranging from 5 to 35°C at 5°C intervals. Each treatment had three replications and the experiment was continued out twice. Average growth was calculated from four radial measurements from each of the three plates. Colony color was determined after growth at 25°C in the dark for 10 d, and the color designations used were those of Rayner (1970). Voucher specimens are lodged at the National Collection of Fungi, Pretoria (PREM), and reference strains are maintained in the culture collection of the Department of Plant Pathology, University of Stellenbosch, South Africa (CPC) and CBS in The Netherlands.

Results and discussion

Anung rake Sp. nov. Crous, Kendrick et Wingfield sp. nov.


Coloniae effusae, smooth, straw colored (2l'f) on MEA. Radial growth 12 mm after 10 d at 25°C in the dark. Mycelium mostly immersed, composed of brown, smooth, septate hyphae, 2–3 μm wide. Setae erectae, straight, smooth-thick-walled, dark brown, becoming pale brown to hyaline toward a thin-walled, round apex, 5–17-septate, 50–340 μm high, 3.5–5 μm wide just above the base, sterile, or terminating in a conidiogenous cell. Conidiophores distinct, mononematus, unbranched, in divergent tufts of up to 6, arising from a knot of hyphal cells associated with the bases of setae, brown at the base, becoming paler toward the apex, 3–6-septate, straight, 30–65 μm high, 3–4 μm wide just above the swollen base. Conidiogenous cells terminal, integrated, polyblastic, proliferating symposium, hyaline to pale brown, with numerous inconspicuous denticle in the apical region, 10–15 × 3 μm.

Primary conidia blastic, sympodial, arising from apical denticles, clavate or spindle-shaped, tapering from rounded apices to truncate bases, occurring singly, giving rise to secondary conidia. Secondary conidia blastic-acroptalae, in short unbranched chains, clavate to ellipsoid, tapering to truncate apices and bases, nonseptate, dry, hyaline, smooth, 11–20 × 3–3.5 μm (Figs. 8, 9).

Cardinal temperatures for growth: minimum above 5°C, optimum 25°C, maximum below 35°C.


Anungitaea Sutton (1973) was introduced for A. fragilis, which has pale brown, mononematus, distinct conidiophores each with a terminal, closely denticulate conidiogenous cell with flattened, unthickened conidial scars. Conidia are cylindrical, smooth, hyaline to pale olivaceous, produced in unbranched chains, and have flattened, refractive, apical and basal scars.

Anungitaea caespitosa is easily distinguished from other species of this genus by the tufted arrangement of its conidiophores and the presence of setae, which could also become fertile conidiophores (Fig. 1). This arrangement of conidiophores in the presence of setae was also observed in vitro on SLA. Although these criteria could also be used to defend the assignment of this fungus to a new genus, we believe that the characteristic mode of conidiogenesis is sufficient justification for placing it in Anungitaea.

Anungitaea syzygii Crous, Kendrick et Wingfield sp. nov.

Etymology: Occurring on Syzygium. Coloniae effusae, irregulares, viridii-nigrae. Mycelium plerumque immersum, ex hyphis pallide brunneis, leavibus, septatis, 1–2 μm latis; hyphae superficiales brunneae septatae verruculosae, 2–3 μm latae. Conidiophora distincta, mononemata, erecta, solitaria, recta ad flexuosa, parietibus crassis, nonnominis vulnosa in parte apicali, septata demum intercalaria, polyblasticae, symodia proliferantia, denticula numerosa apicale cicatris truncatis, laevia, recta vel bis geniculata, brunnea, parietibus, saepe tumida 10–40 × 3–5 μm. Primaria conidia bastico-symblidia, in denticulis posita; conidia bastica-acroptalae in catenatis duorum, subellipsoida ad subcylindracea, laevia, (0–1)–7-septata, hyalina ad pallide brunnea, primaria apicibus tundatis et basibus truncatis; conidia extremis trunctatis; bases conidiarium refractiae, incrustatae, parum constrictae; catenacae plerumque post separatione cellulis conidiogenes persistentes; conidia 8–15 × 2–2.5 μm.

Coloniae effusae, irregular, greenish-black (33°“‘k”) on MEA, radial growth 1 mm after 10 d at 25°C in the dark. Mycelium mostly immersed, composed of pale brown, smooth, septate hyphae, 1–2 μm wide; superficial hyphae brown, septate, verruculose, 2–3 μm wide. Conidiophores distinct, mononematus, erect, solitary, straight to flexuous, smooth, thick-walled, unbranched or branched in the apical part, septate, brown, 50–130 μm high, 2–4 μm wide at basal septum (Fig. 2). Conidiogenous cells integrated, terminal, becoming intercalary, polyblastic, proliferating sympodial, with numerous apically cisternated, flattened denticles, smooth, straight or once geniculate, brown, thick-walled,
Figs. 1 and 2. Anungitea caespitosa and A. syzygii in vivo. Fig. 1. Fasciculate conidiophores with catenulate conidia of A. caespitosa. Fig. 2. Macronematous conidiophores with catenulate conidia of A. syzygii. Scale bars = 10 μm.

frequently swollen, 10–40 × 3–5 μm. Primary conidia blastic-symphodial, clavate or cylindric, borne on denticles, apex rounded, base truncate; secondary conidia blastic-acropetal, in chains of 2, sub-ellipsoid to sub-cylindric, smooth, (0–)1-septate, hyaline to pale brown, with truncate ends; conidial bases refractive, thickened, and slightly constricted; conidial chains frequently persisting after separation from conidiogenous cells; conidia 8–15 × 2–2.5 μm (Figs. 10, 11).

Cardinal temperatures for growth: Minimum above 15°C, optimum 25°C, maximum below 30°C.

only apical denticles, and are shorter (15–50 μm) than those of _A. syzygii_.

**Chloridium constrictospora** Crous, Wingfield et Kendrick sp. nov. Figs. 3, 12, 13

**Etymology:** Named after the characteristic median conidial constriction.

Coloniae effusae, marginis irregularis, olivaceo-bubalinae, chlamydospora intercalaria. Mycelium immersum et superficie, ex hyphis astro ad pallide brunneis, septatis ramosis, 1.5–5 μm latissimis. Conidiophora, erecta vel flexuosa, cylindracea, parietibus crassis, cellulae basali tumida, atro-brunnea, sursum pallidiora, singulare vel in caespitis ad 4, ex rebushis gangliorum hyphosorum, 75–340 μm longa, 3–7 μm lata supra base, apicale cellula conidiogenea parum tumida collo terminali. Conidiogeneae cellulae monophialidicae integratae, terminalies, pallide brunneae, tumidae, ad 2 μm, contractae demum in colla expansae, 3–5 μm profunda, 1.5–3.5 μm lata; permeante proliferantes collis vesiotes sub collis novis persistentibus. Conidia hyalina laevia, cylindrica, constrictione medio et apicibus obtusiis, singulare incola cellula producentiae, in massis mucusc proceri, 3–6 x 1.5–2.5 μm.

Coloniae effusae, with an irregular margin, olivaceous buff (23 °C) on MEA, radial growth 17 mm after 10 d at 25 °C in the dark. Mycelium immersed and superficial, consisting of light to dark brown, septate, branched hyphae, 1.5–5 μm wide; chlamydospores dark brown, intercalary. Conidiophores, erect, straight or flexuous, cylindrical, thick-walled, with a swollen basal cell, dark brown, becoming paler toward the apex, occurring singly, or in tufts of up to 4, arising from groups of hyphal knots, 75–340 μm long, 3–7 μm wide just above the base, ending in a slightly swollen conidiogenous cell with a terminal collarette (Fig. 3). Conidiogenous cells monophialidic, integrated, terminal, pale brown, swollen, tapering near apex to 2 μm, with flared collarettes 3–5 μm deep, 1.5–3.5 μm wide (Fig. 12); proliferating percurrently with older collarettes persisting below the new ones. Conidia hyaline, smooth, cylindrical with a central constriction and rounded ends (Fig. 13), produced singly within collarettes, aggregating in slimy masses, 3–6 x 1.5–2.5 μm.

**Cardinal temperatures for growth:** Minimum above 5 °C, optimum 25 °C, maximum below 35 °C.


Gams and Holubová-Jechová (1976) characterized the genus _Chloridium_ Link as producing unbranched, darkly pigmented conidiophores with integrated, terminal phialides that proliferate enteroblastically. Species are distinguished by culture characteristics, conidium ontogeny, and general morphology of conidia and conidiophores.

Several _Chloridium_ spp. resemble _Chloridium syzygii_ in producing cylindrical conidia (Gams and Holubová-Jechová 1976; Morgan-Jones et al. 1983). _Chloridium syzygii_ can, however, easily be distinguished from these species by the central constriction of the conidia, which give the impression of conidia with swollen ends.

Conidiophores of _Chloridium syzygii_ are much larger on host material (Fig. 3) than in vitro on MEA or SLA. Several conidiophores were observed to be sterile with bluntly rounded heads, giving the impression of setiform conidiophores. These occurred singly or in the same tufts with fertile conidiophores but were not observed in vitro.

**Conoplea mangenotii** Reisinger, Rev. Mycol. 31: 329–340, 1967

Figs. 4, 14

Coloniae buff (19 °C), becoming brown (17 °C) with abundant aerial mycelium on MEA, radial growth 16 mm after 10 d at 25 °C in the dark. Mycelium dark brown, becoming pale brown to hyaline toward apices, septate, warty, thick-walled, continuously branching dichotomously (Fig. 14), septate, 1.5–6 μm wide. Conidiophores distinct, erect, terminating in apical conidiogenous cells, branching dichotomously below fertile region, brown and warty at base, becoming pale brown to hyaline and verrucose toward apex, 25–150 μm high, 1.5–5 μm wide at the base. Conidiogenous cells hyaline, integrated, proliferating sympodially, terminal, sometimes becoming intercalary, smooth to verrucose, polyblastic, 8–30 x 4–6 μm; proliferation, symphodial with rhizoidly secession. Conidia dark brown, smooth, thick-walled, globose to subglobose, nonseptate, single, dry, 6.5–13 x 6–9 μm, base truncate, 1–1.5 μm wide, with a minute marginal frill (Fig. 4); germ slits absent.

**Cardinal temperatures for growth:** Minimum above 5 °C, optimum 25 °C, maximum below 35 °C.


**Conoplea Persoon** is characterized by its dematiaceous, straight or flexuous, often twisted, branched, and usually echinulate conidiophores. Conidiogenous cells are terminal, integrated, polyblastic, cylindrical, usually twisted, sympodial, often indistinguishable from denticulate, and produce brown, dry, nonseptate, solitary, usually echinulate conidia that often have germ pores or germ slits (Ellis 1971). _Conoplea mangenotii_ is easily distinguished from other species of _Conoplea_ by its smooth conidia and germ slits that are rare or absent (Ellis 1976). Not mentioned in its original description is the fact that the dark brown, warty mycelium branches dichotomously below the conidiogenous cells, which give rise to dark, thick-walled, globose to subglobose conidia with truncate bases that secede rhizoidly.

We are unconvinced that _Conoplea mangenotii_ is a species of _Conoplea_, because it has little in common with the type species. However, we do not feel adequately informed to revise the genus at present.

_Conoplea mangenotii_ was isolated from leaf litter of _S. cordatum_ collected in the Eastern Transvaal province of South Africa and appeared to be restricted to the woody midribs of leaves. Ellis (1976) reports a collection from branches of _Rhus cotinus_ Torr. & Gray in France.

**Parasymphodia elongata** Crous, Wingfield et Kendrick sp. nov.

**Etymology:** Named for the elongated conidiophores. Colonyae effusae, hyphis sparse distributis. Mycelium immersum et superficie ex hyphis ramosis, septatis, laevibus, brunneis, 5–6 μm latis. Conidiophora distincta, mononota, non ramosa, recta, parietibus, crassis, brunnea, base ad 25 μm lata, pallidiora regionem conidiogenam versus.
Figs. 5 and 6. *Parasymphydia elongata* and *Podosporium etheldoidgene* in vivo. Fig. 5. Elongate conidiophores and catenulate conidia of *P. elongata*. Fig. 6. Synnematous conidiophores and conidia of *P. etheldoidgene*. Scale bars = 10 μm.

apice 5–6 μm lata, in cellulis fertilibus terminantia; pars basalis atra ad 900 × 8 μm, septis ad 40; pars apicalis hyalina ad 400 × 5 μm, septis ad 8, catenas longas formantia. Cellulae conidiogenae holothallicae, terminales, demum intercalares, integratae, indeterminatae, irregulariter sym-podiales, 25–50 × 5–6 μm, laeves, atrobrunneae ad hyalinae, 20–150 μm inter locis conidiogenis, demum catenis longis nonramosis. Conidia thallico-arthrica, hyalina, sicca,
laevia, cylindracea, apice et base conidiorum intercalariorum truncata, conidiis apicalibus, apicale obtusis, base truncatis, (0−)1(−2)-septata, 20−40 × 6−12 μm.

Colonies effuse, hyphae sparsely distributed, hyaline on MEA, radial growth 40 mm after 10 d at 25°C in the dark. Mycelium immersed and superficial, composed of branched, septate, smooth, brown hyphae, 5−6 μm wide. Conidiophores distinct, mononematous, unbranched, straight, thick-walled, brown, up to 25 μm wide at the base, becoming paler toward the thin-walled conidigenous region (Figs. 5, 15). 5−6 μm wide at apex, terminating in fertile cells; basal, darker part of conidiophores up to 900 μm long and 8 μm wide, with up to 40 septa; apical, hyaline portion up to 400 μm long and 5 μm wide with up to 8 septa, and forming long chains of conidia (Fig. 16). Conidigenous cells hyalohallic, terminal, becoming intercalary, integrated, indeterminate, irregularly sympodial, 25−50 × 5−6 μm, smooth, hyaline to dark brown, 20−150 μm between conidigenous loci, giving rise to long, unbranched conidial chains. Conidia conidial-arthric, hyaline, dry, smooth, cylindrical, apex and base of intercalary conidia truncate, apical conidia with obtuse apex and truncate base, (0−)1(−2)-septate, 20−40 × 6−12 μm.

Cardinal temperatures for growth: Minimum above 10°C, optimum 25°C, maximum below 35°C.


Morgan-Jones et al. (1983) extended the generic concept of Parasymbola to include species without conidial conidia and with conidigenous loci dispersed at regular intervals, as in Parasymbola africana Morgan-Jones. Sinclair & Eicker. Inclusion of species with conidia that are not catenulate makes Parasymbola similar to Subulispora Tubaki as emended by de Hoog (1985). However, Castañeda and Kendrick (1990) erected the genus Cylindrosympodium Kendrick and Castañeda to include species with cylindrical conidia formerly assigned to Subulispora by de Hoog (1985).

Furthermore, Cylindrosympodium is characterized by having a nonseptate conidigenous region, crowded conidigenous cells, and hyaline conidiophores. These characteristics make Cylindrosympodium unsuitable to accommodate Parasymbola africana. Although Parasymbola africana differs from the generic concept of Parasymbola, it is best retained in that genus until more collections and cultures can be obtained for detailed study. Parasymbola elongata, with its dematiaceous conidiophores, irregularly dispersed conidigenous loci, and chains of hyaline conidia, is a typical species of Parasymbola.

Morphologically, Parasymbola elongata is most similar to Parasymbola laxa (Subramanian & Vittal) Ponnappa (1975). Parasymbola elongata is distinguished from the latter species by its wider, longer conidiophores with greater distances between the conidigenous loci. Furthermore, Parasymbola laxa has 0−3-septate conidia 18−50 × 6−8 μm, with punctiform septal plugs that are absent in Parasymbola elongata, Parasymbola clarkii (Sutton 1978) and Parasymbola africana (Morgan-Jones et al. 1983). Parasymbola elongata can be distinguished from species such as Parasymbola minima Crane & Schoknecht (1982) and Parasymbola clarkii Sutton (1978) by its (0−)1(−2)-septate conidia; conidia of Parasymbola minima and Parasymbola clarkii are 3-septate.

Podosporium etheldoidgae Crous, Wingfield et Kendrick sp nov. Figs. 6, 17−19

Etymology: Named in honour of Dr. Ethel M. Doidge, who dedicated her life to studying the South African mycota.

Colonial effuse, brown. Mycelium fere immersum, ex hyphis pallide brunnescis, verruculosis, septatis, ramosis compositis. Synnemata erecta, recta, simplicia, atrobrunnea, solitaria, circa costas in partibus basaliis, foliorum dispersa, 100−260 μm alta, 15−40 μm lata in parte apicali fertilia, 25−60 μm lata base. Conidiophora distincta septata, simplicia vel in apicibus ramosa, subtiliter verrucosa, recurvum vel irregulariter constricta, 4−6 μm lata, supra partem basaliis tumidiis; zona conidigena septata. Conidigenae cellae polytreticae, simplicies vel ramosae, terminales, demum intercalae, clavatae apicibus, truncato-obtusis, 1−2 locis per cellulum, pariete crasso, mediobrunnea, subtiliter verruculose, 7−15 μm longae, 5−7 μm latae. Conidia sicca, solitaria, obclavata, recta ad parum curvata, 4−12-septata, in septa parum ad prominente constricta, 32−85 × 6−9 μm, rugosa et verrucosa, brunea, demum pallidior ad apicem cicatricibus, basaliis prominentes depresosis, 1.5−3 μm latis.

Colonies effuse, brown. Mycelium mostly immersed, composed of pale brown, verruculose, septate, branched hyphae. Conidiophores erect, arranged in synnemata, straight, unbranched, dark brown, solitary (Fig. 6), scattered around the midrib at the basal areas of leaves, 100−260 μm high, 15−40 μm wide at apical, fertile region, 25−60 μm wide at the base. Conidiophores distinct, septate, simple or branched at apices, dark brown, finely verruculose, straight or irregularly constricted, 4−6 μm wide above the swollen basal part; conidigenous zone septate (Fig. 17). Conidigenous cells polytretic, terminal becoming intercalary, bent at right
Figs. 8–16. Conidiophores, conidiogenous cells and conidia. Fig. 8. Conidiogenous region of *Anungitea caespitosa*. Fig. 9. Conidia of *A. caespitosa*. Figs. 10 and 11. Conidiogenous region and conidia of *Anungitea sycygii*. Figs. 12 and 13. Conidiogenous cells and conidia of *Chloridium constrictospora*. Fig. 14. Dichotomously branched mycelium and conidia of *Conoplea mangenotii*. Figs. 15 and 16. Conidiophore and catenulate conidia of *Parasympodiella elongata*. Scale bars = 10 μm.
Figs. 17–23. Conidiomata, conidiophores, conidigenous cells and conidia. Figs. 17–19. Conidigenous cells and conidia of *Podosporium etheldoidgeae*. Scale bar = 10 μm. Figs. 20–23. Sporodochia, conidia, setae and conidigenous cells of *Vermiculariopsiella spiralis*. Fig. 20. Scale bar = 110 μm. Fig. 21. Scale bar = 10 μm. Fig. 22. Scale bar = 50 μm. Fig. 23. Scale bar = 10 μm.

angles, clavate with bluntly rounded apexes. 1–2 loci (pores) per cell, thick-walled, medium brown, finely verruculose, 7–15 μm long, 5–7 μm wide. Conidia dry, solitary, obclavate, straight to slightly curved, 4–12-septate, slightly to prominently constricted at septa, 32–85 × 6–9 μm, rugose and verrucose, brown, becoming paler toward apex, with prominent basal scars, 1.5–3 μm wide (Figs. 18, 19).


The genus *Podosporium* Schweinitz is characterized by darkly pigmented synnemata consisting of distinct conidiophores terminating in mono- to poly-tretic, sympodially proliferating conidigenous cells giving rise to brown, multi-septate, obclavate conidia (Seifert and Okada 1990; Chen and Tzean 1993).

*Podosporium etheldoidgeae* is morphologically most similar to *Parasympodiella elongata* Chen and Tzean (1993). It can be distinguished from that species by the shorter conidia and conidiophores and polytretic conidigenous cells of *Podosporium etheldoidgeae*. The right angle bend, or lateral outgrowth of the conidigenous cell apex seen in *Podosporium etheldoidgeae* is also typical of *Podosporium rigidum* Schweinitz, which is not, however, polytretic.