

## Ascomycetes of New Zealand. 7.<sup>1)</sup> Some bizarre, inoperculate Discomycetes<sup>2)</sup>

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**Abstract.** – Some inoperculate discomycetes collected recently in New Zealand were very different from any other known discomycetes because of their unusual anatomy and morphology. *Cordierites acanthophora* SAMUELS & KOHN sp. nov., *Cryptohymenium pycnidiothorum* SAMUELS & KOHN gen. et sp. nov. and *Sclerocrana atra* SAMUELS & KOHN gen. et sp. nov. are described. In *Cryptohymenium pycnidiothorum* an eustromatic, *Fuckelia*-like pycnidium forms at the apex of the ascoma and the hymenium is covered by a multicellular epithecium that flakes away at maturity; apothecia arise singly or in groups at the tip of a rhizomorphic stipe that grows into the soil or through the substrate. The apothecium of *Sclerocrana atra* arises from a sclerotium; synnematos structures arise from the base of the apothecial stipe or from a separate stipe; the hymenium is either cylindrical or discoidal. *Cordierites acanthophora* differs from the other known members of the genus in lacking an ionomidotic reaction and in having pycnidia that arise from along the stipe.

During the past twelve years the senior author has collected several discomycetous fungi that, at least superficially, stretch the usual understanding of the term “discomycete”. The gross apothecial morphology of *Cryptohymenium* gen. nov. and *Sclerocrana* gen. nov. and the formation of anamorphs as integral parts of their fructifications have no precedent among the known discomycetes. While *Cordierites acanthophora* sp. nov. can be accommodated in a previously described genus, the physical association of its pycnidial anamorph to the teleomorph stipe is certainly intriguing. We do not know whether the anamorphs of these fungi act as disseminative propagules, as spermatia or as both. We have used apothecial anatomy to assign these taxa two families but we make these assignments without any strong conviction.

<sup>1)</sup> The first six papers in this series were published by the senior author in the New Zealand Journal of Botany.

<sup>2)</sup> This paper is dedicated to Prof. Dr. E. Müller (Zürich, Switzerland) on occasion of his 65<sup>th</sup> birthday (cf. SYDOWIA 38, 1985).

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1. *Cordierites acanthophora* SAMUELS & KOHN sp. nov. – Figs. 1 A–C, 2 A–D.

Stipites seu stroma recti, bruneoli, cylindrici, 2–8 cm longi × 1 mm diam., spiniferi. Apothecia 3–4 mm diam., terminalia, fasciculata, disciformia, atrobrunnea, margine dentata; dentes et excipulum ectale textura angulari. Asci (175–)190–223(–239) × (7–)9–10 µm, annulo iodo coerulescenti. Ascosporae (16–)22–28.8(–38) × (7–)7.6–9 (–10) µm, unicellulares, brunneolae, verrucosae. Paraphyses numerosae. Pycnidia spiniformia, ca. 1.5 mm alta, ex stipite exorientia.

Apothecia 2–8 cm high, produced from decaying herbaceous debris, scattered, consisting of a cylindrical stalk bearing thorn-like pycnidial projections and 2–3 apical, and 1–2 opposed, intercalary 3–4 mm diam. discs. – Hymenium dark brown, becoming nearly black when dry; fringed with regularly-spaced, flat, triangular, dark brown teeth; when fresh flat; receptacle dark brown, surface rugose. – Stipe cylindrical, in fresh condition yellow brown, becoming dark brown with age and when dry; surface with coarse warts and scattered pycnidia that appear as acute, dark brown to black thorns ca. 1.5 mm high; terminating in many coarse, unbranched, dark brown to black hyphae.

Asci 8-spored, (175–)190–223(–239) × (7–)9–10 µm, cylindrical, base forming a slight foot, wall ca. 1 µm thick; pore J + Melzer's, cylindrical, ca. 3 µm long × 3 µm wide; ascospores forming in the apical ca. 120 µm of the ascus. – Ascospores (16–)22–28.8(–38) × (7–)7.6–9 (–10) µm, obliquely uniseriate with overlapping ends; at first hyaline, becoming light brown within the ascus, fusiform with subacute to acute ends, with scattered, 1–1.5 µm diam. warts. – Paraphyses 10–20 µm longer than asci, consisting of a ca. 3 µm wide stalk and a clavate to subglobose, 7–10 µm wide tip; hyaline, unbranched or infrequently branched near the apex, septate, cells 20–40 µm long; tips of paraphyses encrusted in amorphous brown material, forming a pseudoepithecium. – Subhymenium 50–80 µm wide, not staining in Melzer's reagent, consisting of compacted, intertwined, 3–8 µm wide, smooth, light brown hyphae; depositions of brown pigment scattered in the subhymenium. – Medullary excipulum well developed, not delimited from the ectal excipulum, not staining in Melzer's reagent, consisting of tightly compacted, nearly circular, 10–15 µm diam. cells with walls ca. 1.5 µm thick, immediately below the subhymenium; cells of medullary excipulum gradually becoming vertically elongated, 20–40 × 10–15 µm with walls ca. 1.5 µm thick and merging with the cells of the stipe. – Ectal excipulum consisting of a single region of cells 125–200 µm wide along flanks, narrowing to ca. 60 µm along the stipe, consisting of textura angularis, cells 25–50 µm across, walls ca. 1.5 µm thick, light brown; continuing outward ± perpendicular to surface of receptacle to form triangular teeth consisting of cingu-

lar cells with long axis  $\pm$  perpendicular to surface of receptacle, cells  $15\text{--}30 \times 8\text{--}20 \mu\text{m}$ , walls ca.  $1.5 \mu\text{m}$  thick, brown. – Stipe with a sharply delimited, ca.  $125 \mu\text{m}$  wide cortex consisting of vertically oriented hyphal cells  $16\text{--}25 \times$  ca.  $15 \mu\text{m}$ , walls  $1.5\text{--}3.5 \mu\text{m}$  wide, brown; cells at surface of stipe joined into scattered warts; medulla of stipe consisting of vertically oriented, hyphal cells  $30\text{--}40 \mu\text{m}$  long  $\times 5\text{--}10 \mu\text{m}$  wide with walls  $\leq 1 \mu\text{m}$  thick, non-pigmented; stipe circular in cross section. – Pycnidia arising along length of stipe, cells at surface of stipe continuous with cells at surface of pycnidium; cells of medulla of stipe continuous with internal tissue of pycnidium; wall of pycnidium ca.  $80 \mu\text{m}$  wide; conidiogenous cells arising directly from cells of the inside of the pycnidial wall,  $11\text{--}15 \times 3\text{--}4 \mu\text{m}$  at base tapering  $\pm$  uniformly to  $1\text{--}2 \mu\text{m}$  wide at tip, sometimes widest in the middle, phialidic, monoblastic, pale brown. – Conidia  $3.5\text{--}5.0 \times 2\text{--}3 \mu\text{m}$ , oblong, lacking a basal abscission scar, unicellular, hyaline.

Habitat. – Growing in soil at base of *Leptospermum* sp. and in decaying wood (? *Leptospermum*).

Material. – NEW ZEALAND: Auckland, Waitakere Ranges, Waitemata City, off Scenic Drive, Old Coach Road, on ground among moss, SAMUELS & al., 14 Aug 1981 (PDD 46965, holotype; CUP).

Additional material examined. Same locality as holotype, SAMUELS & al., 24 Aug 1982 (PDD 46956); second collection, SAMUELS & ROSSMAN, 4 Jun 1983 (PDD 46300, BPI, NY).

Notes. – On the basis of gross morphology *Cordierites acanthophora* can easily be accommodated in the genus *Cordierites*. Whether the species is actually congeneric with other species of the genus is, however, questionable. Apothecial tissues of species of *Cordierites* (*sensu* KORF 1973) are ionomidotic, but apothecial tissues of *C. acanthophora* are not ionomidotic. The large brown, warted ascospores are unprecedented in *Cordierites* but they are also unusual among the inoperculate discomycetes and give no clues as to the affinities of the species. The ectal excipulum comprising dark angular cells and the pycnidial anamorph argue for the inclusion of the species in the Dermateaceae rather than the Leotiaceae, where KORF (1973) placed *Cordierites*. *Cordierites*, however, is a poorly known genus and in the absence of a critical study of its species, we prefer to refer *C. acanthophora* to it.

## 2. *Cryptohymenium* SAMUELS & KOHN gen. nov.

Capitulum et rhizomorphum nigra. Capitulum fertile rhizomorphum terminans, capitatum; sulco sterili manifeste continuationem inter hymenium et rhizomorphum interruptenti. Epithecium fugax, textura angulari; excipulum ectale textura angula-

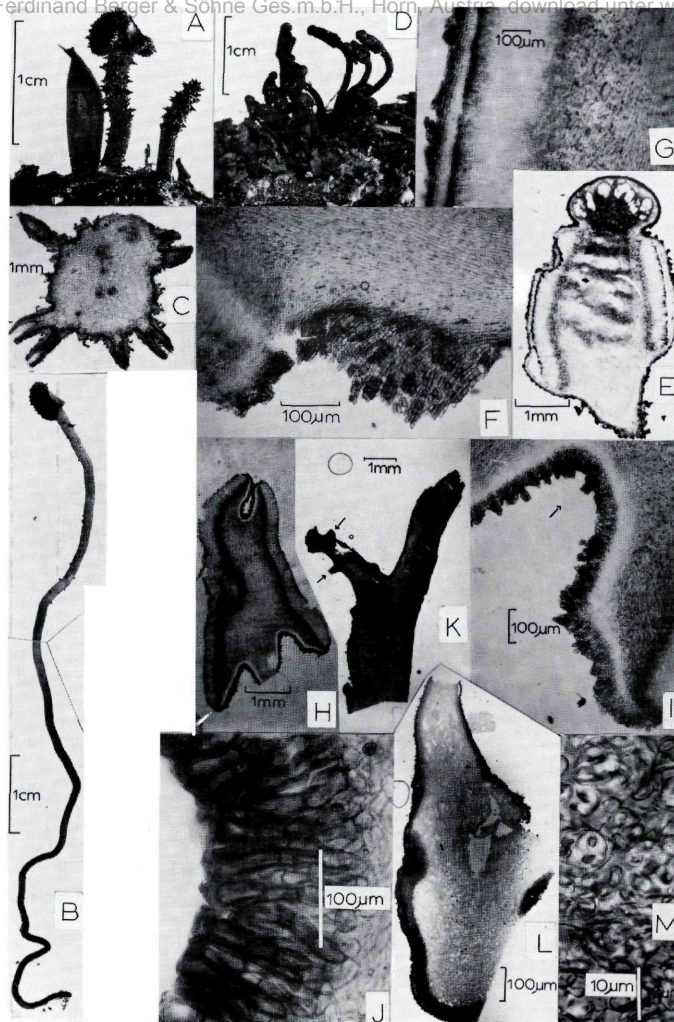


Fig. 1: A–C. *Cordierites acanthophora*: A. Apothecia as found in nature. – B. Apothecia on long stipe. – C. Transverse section through stipe showing peripherally situated pycnidia. (PDD 46956). – D–G. *Cryptohymenium pycnidiorum*: D. Apothecia found on decaying tree fern trunk. – E. Longitudinal section through mature cap. – F. Section showing ectal excipulum. – G. Section showing “epithecium”, hymenium and medullary tissue. (D: PDD 46969; E–G: Holotype). – H–M. *Sclerocrana atra*: H. Longitudinal section through a cylindrical cap. – I. Ectal excipulum. – K. Stipe, arrows indicate points where synnemata developed. – L. Longitudinal section of a sclerotium. – M. Tissue of medulla of sclerotium (PDD 46957).



ri. Asci cum annulo iodo coerulescenti. Ascospores unicellulares, hyalinae. Paraphyses numerosae.

Type species: *C. pycnidiophorum* SAMUELS & KOHN

*Cryptohymenium pycnidiophorum* SAMUELS & KOHN sp. nov. –  
Figs. 1, D–G; 3.

Characteribus generis. Capitulis fertilibus solitaribus vel fasciculatis, et breve stipitatis, conicis, 2–2.5  $\mu\text{m}$  longis, pycnidio et hymenio compositis, hymenium inter pycnidium et rhizomorphum locatum. Rhizomorphum usque ad 15 cm longum  $\times$  1–1.5 mm diam. Epithecium ca. 100  $\mu\text{m}$  latum. Hymenium viride. Asci (130–)150–196(–220)  $\times$  9–12(–14)  $\mu\text{m}$ . Ascospores (21–)23–28(–40)  $\times$  (3–)4.2–5.4(–6)  $\mu\text{m}$ , fusoides vel subfusoides, unicellulares, hyalinae.

Apothecia up to 10 cm long, arising from decaying herbaceous debris and soil, gregarious, consisting of a long, slender, scaly stipe 1–1.5 mm diam  $\times$   $\leq$  15 cm long and a conical, 2–2.5 mm long cap. Cap separated from stipe by a distinct groove; consisting of a hymenium surmounted by a globose, multiloculate pycnidium delimited from hymenium by a groove; hymenium covered by a cellular epithecium that eventually flakes off; stipe growing through substrate as a rhizomorph. – Stipe unbranched or branched one to several times near the apex to produce a panicle of stipitate caps; coarse, dark brown to black, unbranched hyphae arising from base of stipe, growing through substrate. Entire cap at first covered by an epithelial tissue ca. 100  $\mu\text{m}$  thick and consisting of an outer region 30–50  $\mu\text{m}$  wide composed of brick-like cells 10–20  $\mu\text{m}$  long  $\times$  ca. 10  $\mu\text{m}$  wide oriented with long axis perpendicular to asci, walls ca. 1.5  $\mu\text{m}$  thick, brown; cells of inner 20–30  $\mu\text{m}$  circular to square in outline, 10–15  $\mu\text{m}$  across with walls ca. 1  $\mu\text{m}$  thick, lightly pigmented; cells of inner layer breaking down; epithelial tissue eventually flaking away to reveal the hymenium; cells of epithecium continuous over pycnidium and with cortex of stipe.

Asci (130–)150–196(–220)  $\times$  9–12(–14)  $\mu\text{m}$ , narrowly clavate, tapering to truncate base, pore J + Melzer's, cylindrical, ca. 2  $\mu\text{m}$  long  $\times$  3  $\mu\text{m}$  wide; ascospores generally forming in the upper (25–)90–140(–150)  $\mu\text{m}$  of the ascus. – Ascospores (21–)23–28(–40)  $\times$  (3–)4.2–5.4(–6)  $\mu\text{m}$ , partially biseriata; fusoid to subfusoid, containing 2–3 irregularly shaped guttules, smooth, hyaline. – Paraphyses equal to or slightly longer than asci consisting of branching, septate, 2–3  $\mu\text{m}$  wide stalk and subglobose to clavate tip; tip 10–20  $\mu\text{m}$  long  $\times$  8–10  $\mu\text{m}$  wide; tips of paraphyses encrusted in amorphous, brown material; encrusting material turning red in 3% KOH. – Subhymenium 60–70  $\mu\text{m}$  thick, consisting of compact, interwoven hyphal cells with brown walls; irregularly shaped accretions of brown pigment scattered throughout the subhymenium. – Medullary excipulum well developed, consisting of brick-like cells 20–40  $\mu\text{m}$  long  $\times$  7–10  $\mu\text{m}$  wide, long axis oriented vertically, walls ca. 1  $\mu\text{m}$

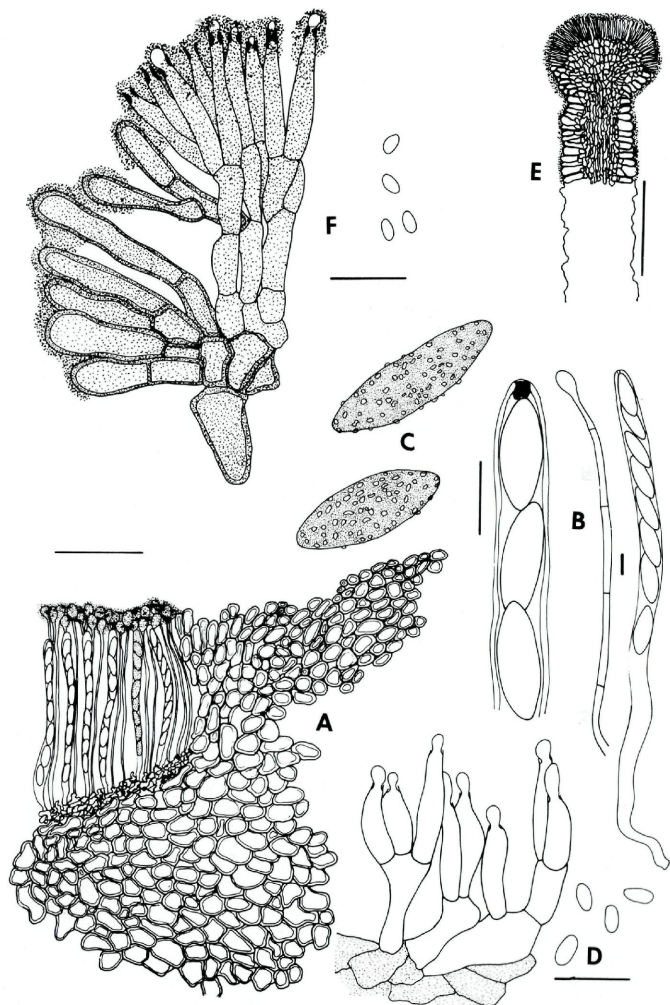


Fig. 2: A–D. *Cordierites acanthophora*: A. Section through apothecium showing margin and ectal excipulum. – B. Asci and paraphyses. – C. Two ascospores. – D. Phialides and conidia. (A: Holotype, B–D: PDD 46956). – E, F. *Sclerocrana atra*: E. Diagram of a synnematosus conidioma. – F. Phialides and conidia. (E, F: Holotype) (Lines: A, E = 100  $\mu$ m, all others = 10  $\mu$ m).

thick, lightly pigmented. – Ectal excipulum not well developed, 30–100  $\mu\text{m}$  wide, consisting of square to rectangular cells 15–25  $\mu\text{m}$  long  $\times$  7–15  $\mu\text{m}$  wide, walls dark brown, ca. 1.5  $\mu\text{m}$  thick, long axis of cells parallel to long axis of asci, continuous above with epithelial tissue and below with cortex of stipe. Tip of cap separated from body of cap by a constriction, cells of tip *textura angularis*, 5–10  $\mu\text{m}$  in greatest dimension; labyrinthiform, conidiogenous locules forming within tissue of the tip, lined with conidiogenous cells. – Conidiogenous cells arising directly from surrounding cells, ampulliform, tapering from base to tip, 10–15  $\mu\text{m}$  long  $\times$  3–4  $\mu\text{m}$  wide at base  $\times$  1–1.5  $\mu\text{m}$  wide at tip, phialidic, monoblastic, tip thickened, collarete not flared, light brown. – Conidia 2–3  $\times$  2–2.5  $\mu\text{m}$ , globose to subglobose, lacking a basal abscission scar, unicellular, hyaline. – Stipe composed of cortex and medulla; cortex 50–70  $\mu\text{m}$  wide, composed of 4–5 layers of square to rectangular cells 10–20  $\mu\text{m}$  long  $\times$  7–10  $\mu\text{m}$  wide, walls ca. 1.5  $\mu\text{m}$  thick, dark brown, with long axis parallel to long axis of stipe, aggregates of cells coming off as scales. Medulla composed of an inner and an outer region; outer medulla adjacent to cortex, ca. 150  $\mu\text{m}$  wide, cells rectangular, 30–45  $\mu\text{m}$  long  $\times$  8–11  $\mu\text{m}$  wide, walls very pale brown, with long axis parallel to long axis of stipe; merging at exterior with cortex and at interior with inner medulla. Inner medulla ca. 300  $\mu\text{m}$  wide, composed of hyphal elements with cells 40–100  $\mu\text{m}$  long  $\times$  4.5–6.0  $\mu\text{m}$  wide, walls ca. 1.5  $\mu\text{m}$  thick, pale brown, with long axis parallel to long axis of stipe.

Material: NEW ZEALAND: Gisborne, Urewera National Park, Lake Waikaremoana, Waikare-iti track, on soil among mosses, SAMUELS & al., 24 May 1981 (PDD 46964, holotype).

Additional material examined. – NEW ZEALAND: Northland: Hokianga Country, Waipoua State Forest, vic. Swing Bridge across Waipoua River, vic. forest H. Q., on soil, SAMUELS & PETERSEN, 25 Jun 1981 (PDD 46968). – Gisborne: Urewera National Park, vic. Lake Waikaremoana, on debris, track from Aniwanuiwa to Lake Waikare-iti, SAMUELS & SAMUELS, 23 May 1982 (PDD 46962); Lake Waikaremoana, Black Beech track, on decaying caudex of *Dicksonia squarrosa* (FORST. f.) SW., SAMUELS, 24 May 1982 (PDD 46969); Lake Waikaremoana, vic. Motor Camp, Ngamoko Track, between lake and large Rata tree, SAMUELS, 21 May 1981 (PDD 46966); Lake Waikaremoana, vic. Park H. Q., HORAK 806, 27 May 1981 (PDD 46967, ZT); same data as holotype, SAMUELS & KOHN, 11 May 1985 (PDD 47394). – Fiordland: Lake Hauroko, lake shore, on ground under *Nothofagus solandri* (HOOK. f.) OERST., JOHNSTON & al., 8 May 1984 (PDD 46963); vic. southern end of Lake Te Anau, Mt. Luxmore track, on decaying caudex of *Cyathea smithii* HOOK. f., SAMUELS & KOHN, 24 April 1985 (PDD 46965).

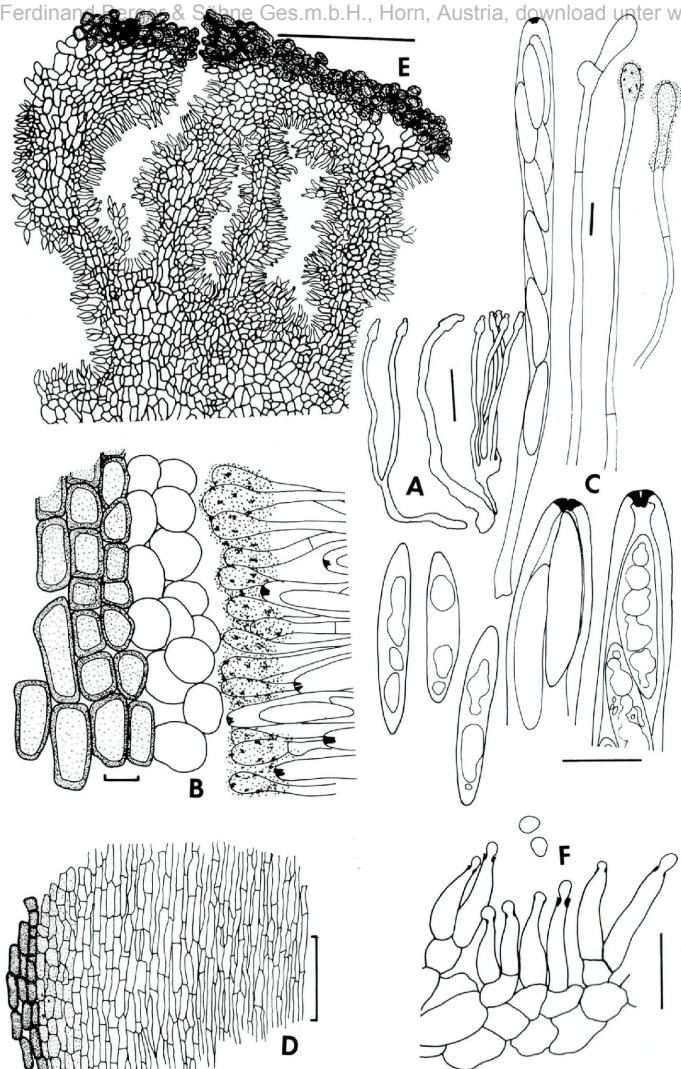


Fig. 3: A-G. *Cryptohymenium pycnidiosporum*: A. Diagram of nine apothecia. - B. Section showing "epithecium", tips of asci and paraphyses (Melzer's reagent). - C. Asci, ascospores and paraphyses (Melzer's reagent). - D. Median longitudinal section through stipe. - E. Longitudinal section through pycnidium. - F. Phialides and conidia. - G. Rind of sclerotium. (All except A and C, lower two ascus tips: Holotype; A: PDD 46967; C, lower ascus tips: PDD 46968) (Lines: A = 1 cm; B, C, F = 10  $\mu$ m; D, E = 100  $\mu$ m).



Notes. — *Cryptohymenium pycnidiophorum* is certainly among the most bizarre of the discomycetes. Its fructification appears to be a rhizomorph the tip of which expands to form, simultaneously, the anamorph and the teleomorph. The hymenium is surmounted by the pycnidium and is covered with a layer of pseudoparenchymatous cells that is continuous below over the rhizomorph. The hymenium is exposed when this layer of cells flakes off.

Although the fructification of *C. pycnidiophorum* is unusual, the dark pigmentation of the receptacular tissues, the green hymenium and the angular cells of the ectal excipulum, and the eustromatic pycnidium combine to indicate that the genus is a member of the Helotiales, family Dermateaceae (KORF, 1973). This species bears some similarity to *Atropellis* Karsten (REID & FUNK, 1966). The hymenium of species of both genera are covered with a tissue that is continuous with the ectal excipulum and that flakes away at maturity. In *Atropellis* the tissue is hyphal whereas in *Cryptohymenium* it is distinctly cellular. The covering of *Atropellis* dehisces through a preformed opening but such an opening was not seen in the covering of *C. pycnidiophorum*. Tips of the paraphyses in both genera are ensheathed in amorphous material. This material is green in *Cryptohymenium*, it turns red in 3% KOH and a red pigment is released in that reagent. The material of *Atropellis* is usually blue-black and a blue-green pigment is released in 3% KOH. The pycnidium of *Cryptohymenium* is eustromatic (ss. SUTTON, 1980) and is anatomically similar to pycnidia of *Fuckelia* BON., some species of which have been linked to *Atropellis* (KORF, 1973). We do not know whether the conidia of the *Cryptohymenium* anamorph are disseminative or spermatial.

Despite diligent efforts, we have not been able to establish a connection to a definite substrate. We note the near constant association of the species with living roots of the usually mycorrhizal genus *Nothofagus*. It is tempting to suggest a mycorrhizal role for *C. pycnidiophorum*.

### 3. *Sclerocrana* SAMUELS & KOHN gen. nov.

Apothecia stipitata, ex stromate tuberoso seu stipitibus ampliatis producta; nigra vel atrobrunnea; hymenophora discoidea; excipulum ectale exterius textura angulari. Paraphyses numerosae. Asci cum annulo iodo coerulescenti. Ascosporae unicellulares, hyalinae.

Type species: *S. atra* SAMUELS & KOHN

Etymology of the generic epithet. Refers to the helmet shaped hymenium (Greek: *crana*) arising from a sclerotium.

*Sclerocrana atra* SAMUELS & KOHN sp. nov. — Figs. 1, H–M; 2, E–F; 4

Apothecia stipitata, 1–3 cm alta, ex stromate tuberoso seu stipitibus ampliatis producta, atrobrunnea. Hymenophora discoidea, 4–5 mm diam., vel cylindrica,

1.5–2 mm alta × 2–3 mm diam. Asci (105–)113–142(–160) × 7–9 µm, cylindrici vel anguste clavati, cum annulo iodo coerulescenti. Ascospores (10–)15–20(–23) × (2.5–)3–4(–5) µm, ellipticae vel subfusiformes, unicellulares, hyalinae. Paraphyses numerosae. Synnemata aut ex stipitibus teleomorphae aut ex propriis stipitibus exorientia; phialoconidia ellipsoidea, 3–4 × 1.5–2 µm, hyalina.

Fructifications arising from herbaceous debris and from soil among mosses, solitary to gregarious and in groups of several, 1–3 cm high; consisting of a stroma, a stalked apothecium and synnematos conidiomata arising from the apothecial stipe or from a separate stipe. – Stroma black, rugose, tuberous, 3–7 mm long × ca. 3 mm diam, aggregated or solitary, anchored to substrate by coarse, unbranched, dark brown to black hyphae; 1–2 apothecia arising from each stroma. – Apothecial stipe 1–3 cm long × ca. 1 mm diam., cylindrical, dark brown to black, non-viscid, rugose, bearing along the lower half spine-like, stalked sporodochial conidiomata and bearing a single, terminal hymenophore. – Hymenophore dark brown to black, non-viscid, discoidal or cylindrical; when discoidal 4–5 mm diam., plane, convex or concave, symmetrically or asymmetrically inserted; when asymmetrically inserted, sometimes clasping back around the stipe; with a toothed margin and a rugose receptacle. – Hymenophore when cylindrical 1.5–2 mm high × 2–3 mm diam, circular in section, separated from stipe by a distinct notch, apex truncate and with a deep depression. – Hymenium continuous around the cap, concave, stalked, stromatic, spine-like conidiomata 1–1.5 mm long, black, arising from the lower half of the apothecial stipe or from a separate, ca. 3 mm long stipe situated at the base of the apothecial stipe; the conidiomata perpendicular to the long axis of the conidiophorous or apothecial stipe.

Asci 8-spored, (105–)113–142(–160) × 7–9 µm, cylindrical to narrowly clavate, tapering toward the base, indistinctly pedicellate; pore J + Melzer's, obconical, tapering slightly to base, 1–1.5 µm long × 1.5–2 µm wide at top; ascial wall uniformly thick; ascospores in the upper (44–)57–103(–115) µm of each ascus, partially biseriata to uniseriate with overlapping ends. – Ascospores (10–)15–20(–23) × (2.5–)3–4(–5) µm, hyaline, elliptical to subfusoid, straight or slightly inequilateral, with 1–8 guttules completely filling each ascospore, uniformly thin-walled, smooth. – Paraphyses equal to or extending beyond asci by 10–25 µm, unbranched or branching along the length, 2–3 µm wide, tip clavate to subglobose, 3–5 µm, light brown, tips encrusted in a continuous layer of amorphous brown material; brown material becoming red in 3% KOH. – Subhymenium well developed, up to 50 µm wide, not sharply delimited from medullary excipulum, consisting of a compact region of 3–5 µm wide, smooth, light brown hyphae; irregularly shaped deposits of brown pigment

scattered throughout subhymenium. – Medullary excipulum obconical when hymenophore discoidal, or nearly cylindrical when hymenophore cylindrical, continuous with ectal excipulum and medullary tissue of stipe, consisting of a compact region of vertically oriented, 3–5  $\mu\text{m}$  wide, septate, branched, non-pigmented hyphae. – Ectal excipulum ca. 250  $\mu\text{m}$  wide at point where stipe joins hymenophore, tapering to ca. 60  $\mu\text{m}$  wide at margin, outer ectal excipulum 30–40  $\mu\text{m}$  wide, consisting of chains of angular cells 15–25  $\times$  ca. 10  $\mu\text{m}$  with walls ca. 1.5  $\mu\text{m}$  thick and dark brown, cells built up at points and forming columns 25–75  $\mu\text{m}$  high; outer ectal excipulum continuous down stipe and over surface of umbilicate depression at apex of cylindrical hymenophore, covered with brown amorphous material; inner ectal excipulum 30–75  $\mu\text{m}$  wide, consisting of a compact region of hyphal cells 15–45  $\mu\text{m}$  long  $\times$  4–5  $\mu\text{m}$  wide, arranged with long axes parallel to each other and to surface of receptacle, non-pigmented; cells at edge of margin  $\pm$  angular in outline, 15–25  $\mu\text{m}$  in greatest dimension, dark brown, forming flat, triangular teeth around hymenium of discoidal apothecium. – Stipe solid, consisting of rind and medulla; rind ca. 30  $\mu\text{m}$  wide, consisting of compacted chains of angular to circular, dark brown cells ca. 10  $\mu\text{m}$  in greatest dimension with walls 1.5–2.0  $\mu\text{m}$  thick, built up at points and forming columns 30–60  $\mu\text{m}$  high; cortex of stipe continuous with outer cortex of stroma; covered with brown, amorphous material; medulla of stipe consisting of vertically oriented, light brown hyphae with cells 40–50  $\mu\text{m}$  long  $\times$  8–15  $\mu\text{m}$  wide, continuous with medulla of stroma.

Sclerotium and stipe base (and synnema) continuous; rind not ruptured by stipe base. Sclerotium appearing as a swelling ca. 3 mm diam. at base of stipe and synnema. – Rind 75–112  $\mu\text{m}$  wide, comprising 3 zones. Outermost zone 15–40  $\mu\text{m}$  wide, of dark brown, thin-walled *textura angularis* to *textura globulosa* arranged  $\pm$  in chains perpendicular to the sclerotial surface, giving rise to  $\pm$  pyramidal mounds 15–30  $\mu\text{m}$  long of globose brown cells on the rind surface; middle zone 15–30  $\mu\text{m}$  wide of hyaline to light brown-walled angular to inflated cells, 10–15  $\mu\text{m}$  diam., lacking definite orientation with reference to the sclerotial surface; inner zone 15–25  $\mu\text{m}$  wide of inflated angular to globose, light brown-walled cells, 10–15  $\mu\text{m}$  diam. with irregular intercellular deposits of dark brown material. – Cortex an extremely compact zone ca. 150  $\mu\text{m}$  wide of narrow, pale brown, possibly gelatinous-walled *textura intricata*, cells 2–3  $\mu\text{m}$  wide. – Medulla of loosely packed *textura intricata* to *textura oblita*, cells 4–10  $\mu\text{m}$  broad, walls  $\leq$  1  $\mu\text{m}$  thick; no host tissue incorporated into cortex or medulla.

Conidiomata arising at the base of the apothecial stipe or on a separate conidiomatal stipe which then arises directly from the

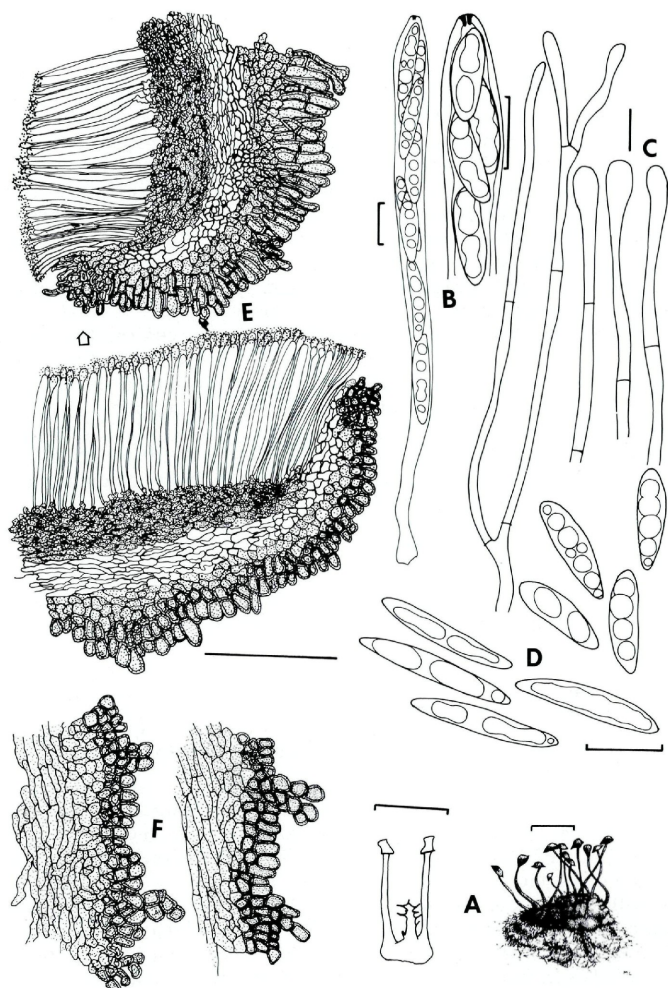


Fig. 4: A–F. *Sclerocrana atra*: A. Two types of apothecia, cylindrical cap on left (PDD 46959) discoidal cap on right (Holotype). – B. Two asci (Melzer's reagent; ascus at left: PDD 46957; at right: PDD 46961). – C. Paraphyses (PDD 46957). – D. Ascospores (4 above: PDD 46961; 4 below: 46957). – E. Longitudinal section through two apothecia (above: PDD 46957; below: Holotype; arrow indicates vertical axis of stipe). – F. Longitudinal section through stipe showing cortex and medulla (left: Holotype, right: PDD 46957) (Lines: A = 1 cm, B–D = 10 µm, E, F. = 100 µm).



sclerotium; up to 1.5 mm long, cylindrical, 100–250  $\mu\text{m}$  diam. or flask-shaped and ca. 500  $\mu\text{m}$  diam. at the widest point, each bearing a single, terminal globose to subglobose, 100–150  $\mu\text{m}$  diam. head covered with a palisade of phialides. – Head consisting of a convex hymenium and a central stromatic core; hymenium consisting of a compact, uniform palisade of phialides and marginal hyphae forming at the point where the head joins the stipe, entire hymenium covered with brown, amorphous material. – Conidiogenous cells phialidic, phialides cylindrical, 13–20  $\times$  2–3  $\mu\text{m}$ , straight, smooth, brown, monoblastic, apex thickened, collarette not flared; marginal hyphae cylindrical with rounded tips, 10–15  $\times$  6–9  $\mu\text{m}$ , multiseptate, smooth, brown; marginal hyphae and phialides arising from a central stromatic core. – Conidia ellipsoidal, 3–4  $\times$  1.5–2  $\mu\text{m}$ , lacking a basal abscission scar, unicellular, hyaline; central stromatic core consisting of textura angularis, cells 5–7  $\mu\text{m}$  in greatest dimension, brown, many filled with amorphous brown material; cells of central stromatic core continuous with medulla of stipe. – Stipe consisting of cortex and medulla; cortex consisting of a ca. 30  $\mu\text{m}$  wide layer of angular, dark brown cells 10–15  $\times$  8–10  $\mu\text{m}$ , arranged in short chains, tip cells of each chain rounded, forming columns at points, covered with amorphous brown material; cortex of stipe continuous with cortex of apothecial stipe or cortex of discrete conidiophorous stipe respectively; medulla of conidiomata 30–50  $\mu\text{m}$  wide, consisting of hyphal cells 30–50  $\mu\text{m}$  long  $\times$  5–6  $\mu\text{m}$  wide with long axes arranged parallel to long axis of stipe, walls 1–1.5  $\mu\text{m}$  thick, light brown, continuous with medulla of apothecial or conidiophorous stipe respectively.

**Material.** – NEW ZEALAND: Auckland, Waitemata City, Waitakere Ranges, Cascades, on rotting caudex of tree fern and on decaying log, SAMUELS & JOHNSTON, 16 Jul 1980 (PDD 46958, holotype; CUP, isotype).

**Additional material examined.** – NEW ZEALAND: Auckland: ca. 15 km S. of Wellsford, Waiwhiu Valley, on soil, SAMUELS & al., 6 Jun 1981 (PDD 46961). – Northland: Hokianga County, Waipoua State Forest, vic. Swing Bridge over Waipoua River at Forest H. Q., on soil, SAMUELS & PETERSEN, 26 Jun 1981 (PDD 46957); Waipoua State Forest, vic. Te Matua Ngahere, on trunk of decaying tree fern, SAMUELS & al., 31 May 1982 (PDD 46960); Waipoua State Forest, track between Yakas Kauri and forest H. Q., on soil and herbaceous debris, SAMUELS & HAWTHORNE, 24 Jun 1981 (PDD 46960).

**Notes.** – The hymenophore of *Sclerocrana atra* has two distinct aspects, one discoidal and the other capitate. Although these appear to be quite different morphologically, they are anatomically identi-

cal. In one of the collections cited above the hymenium was partially wrapped around and fused to the apex of the stipe, thus appearing to be intermediate between the two morphologies. Because features of anatomy of the hymenophore and conidiomata and morphology of asci and ascospores are the same in the two morphological types and because both types have been found in the same locality, we believe that the morphologically different hymenophores fall within the normal variation of this peculiar species.

In its morphology and anatomy, *S. atra* seems to straddle the boundary between the Sclerotiniaceae and the Dermateaceae. The complex rind structure and well-defined cortical zone of the sclerotium have no precedent in the Sclerotiniaceae. It is possible that this "sclerotium" represents not a sclerotial anamorph but rather a complex stipe base that does not function as an independent morph. Nevertheless, the complex stromatal structure compares with that in the Sclerotiniaceae (KOHN, 1979). The teleomorph, based on its dark pigmentation, and angular cells seems more dermateaceous than sclerotiniaceous but based on the stroma we provisionally place this species in the Sclerotiniaceae. Within the Sclerotiniaceae this species is similar to *Scleromitrla ushuaiae* (REHM) GAMUNDI and *S. viridis* GAMUNDI. *Scleromitrla ushuaiae* produces pycnidial locules within the stroma (GAMUNDI, 1976; KOHN & NAGASAWA, 1984).

The anamorph of *S. atra* cannot be accommodated in any known anamorph genus. In the compact, palisadal arrangement of dark phialides the sporodochial genera *Bloxamia* BERKELEY & BROOME and *Cystodendron* BUBAK, both anamorphs of discomycetes (HENNEBERT & BELLEMERE, 1979), are suggested but conidia of these two genera are produced within tubular phialides.

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We appreciate the comments of Prof. R. KORF on the fungi described in this paper. Ms Marie LANGAN, formerly of Plant Diseases Division, DSIR, prepared fig. 4, A (right). The efforts of the photography section, Mount Albert Research Centre, DSIR, are greatly appreciated. Dr. G. KUSCHEL, Entomology Division, DSIR, corrected the Latin diagnoses.

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