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Two new species and some new records of ascomycetes from Taiwan

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Abstract. Two new species of ascomycetes, *Phyllachora schimae* sp. nov. on *Schima* and *Schiffnerula villebruneae* sp. nov. on *Villebrunea* are described and illustrated. Additionally nine new records of ascomycetes are reported. They are *Coleroa chaetomium, Dimerium meliolicola, Gloniopsis praelonga, Gnomonia setacea, Glyphium elatum, Herpotrichia macrotricha, Melomastia mastoidea, Rhytidhysteron rufulum,* and *Thyronectria pseudotrichia.*

Keywords: New species; New records; *Phyllachora schimae; Schiffnerula villebruneae;* Taiwan ascomycetes.

Introduction

There are several recent reports of ascomycetes from Taiwan by Sivanesan and Hsieh (1989), Li and Hsieh (1991), Chen and Hsieh (1994a, b). Many further collections have now been examined, some of which were found to be new species and new records in Taiwan.

Materials and Methods

Specimens were collected during a continuous survey of ascomycetes from Taiwan. Thin microtome sections were mounted in lactophenol for detailed morphological observation of the fruit bodies. Asci and ascospores were also mounted in lactophenol. For some ascomycetes fluorescent staining in calcofluor (Rohringer et al., 1977) was used to obtain clear pictures of their morphology, including septation in the ascospores. Literature reference to the species of new records is given under the heading-descriptions. NCHUPP is an acronym for the herbarium in National Chung Hsing University Plant Pathology.

New Species

Phyllachora schimae C.Y. Chen & W.H. Hsieh, sp. nov. Figure 1

Maculae 1–2 mm lata, circulares, flavidae brunneae, cum maculis piceis, circularibus, nigris et nitidis. Stromata usque 1 mm lata, plusminusve circularis, nigra, nitida. Ascomata 240–360 μm lata, 280–380 alta, subglobosa, immersa, solitaria vel aggregata, ostiolata, clypeata. Ostiolum centrale, periphysatum. Peridium 8–16 μm crassum. Asci 65–110 × 12–13 μm, cylindrici, pedicellati, unitunicati, octospori. Ascosporae 16–20 × 7–9 μm, ovales, aseptatae, hyalinae, guttulatae, uniseriatae vel imbricate biseriatae.—TYPE: Taiwan. Taoyuan Hsien; Loloshan, In foliis *Schimae superbae* Gard. et Champ. (Theaccae), leg. C.Y. Chen, 20 Oct 1994, NCHUPP 2319.

Leaf spots 1–2 mm wide, mostly rounded, solitary or sometimes coalescing, discolouring the host tissue to yellow brown. Stromata up to 1 mm wide, roughly circular, black, shiny, dome-shaped tar spots scattered within the leaf spot, visible on both sides but more prominent on the upper surface. Ascomata 280–380 μm high, 240–360 μm wide, subglobose, immersed in the host mesophyll with a small conical apex forming a periphysate neck, solitary or gregarious. Clypeus black brown amorphous layer 80–120 μm wide and 360–400 μm long composed of melanized host palisade and epidermal cells and fungal hyphae beneath the cuticle. Peridium 8–16 μm, composed of several layers of thin-walled, hyaline to pale brown, elongated, compressed cells. Asci 65–110 × 12–13 μm, cylindrical, pedicellate, unitunicate, 8-spored. Ascospores 16–20 × 7–9 μm, hyaline, smooth, guttulate, aseptate, ovoid, uniseriate to overlapping biseriate inside the ascus.

Notes. Four species of *Phyllachora* have been reported on the genera of Theaceae (Arx and Müller, 1954; Hosagoudar, 1985; Kamat et al., 1978). These are *P. cymbispora* T. S. & K. Ramkr., *P. euryae* (Rac.) Arx & Müller, *P. transiens* Syd. & Butl. and *P. gordoniae* Hos. The first three species occur on *Eurya* and the last species on *Gordonia*. *Phyllachora schimae* is distinguished from them by size and shape of ascospores and asci. No *Phyllachora* have been reported on *Schima*, and *Phyllachora* species are based on host, so this fungus is described as a new species.

Schiffnerula villebruneae C.Y. Chen & W.H. Hsieh, sp. nov. Figure 2

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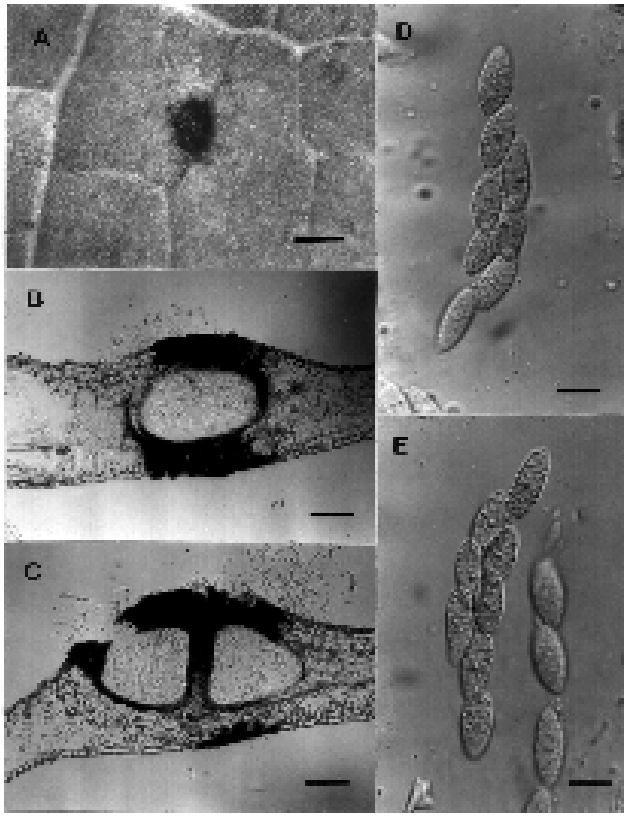

Figure 1. *Phyllachora schimae*. A, leaf spot with ascostroma on host; B–C, vertical sections of ascostromata; D–E, asci with ascospores. Scale bars, A=1 mm, B–C=100 μm, D–E=10 μm.

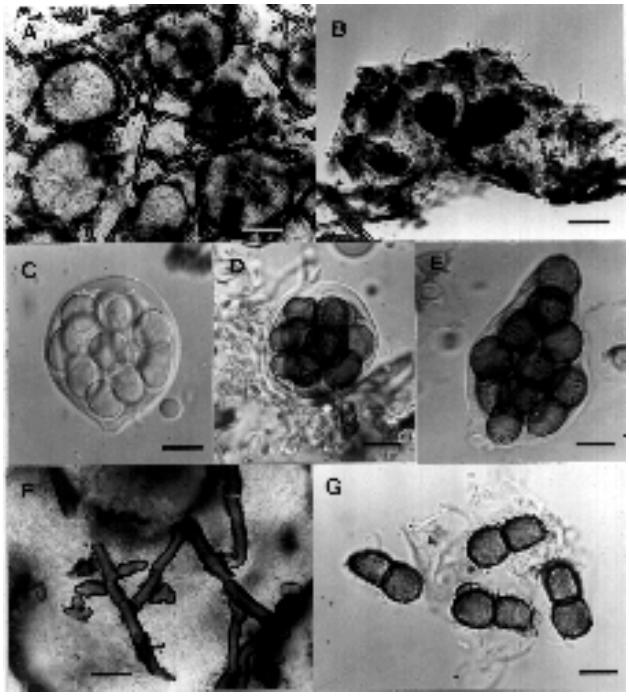

Figure 2. *Schiffnerula villebruneae*. A, ascomata and mycelium on surface of leaf; B, vertical section of ascoma; C, immature ascus; D, mature ascus; E, ascus with protruded endotunica; F, hyphae with hyphopodia; G, ascospores. Scale bars, A=40 μm, B=20 μm, C–G=10 μm.

Mycelium superficiale, hypophyllum, ex hyphis repentibus, atrobrunneis, septatis, laevibus, ramosus, 3–4 μm latis. Hyphopodia 4–8 μm lata, usque 10 μm alta, integra vel 2–3-lobata, continua, alternata, raro opposita, brunnea, laevia. Ascomata 70–90 μm lata et 35–60 μm alta, globosa, superficialia. Paries ascomati gelatinosum diffluentes. Asci 30–45 μm lati, globosi, pauci, bitunicati, crassitunicati, octospori. Ascosporae 17.5–22 × 8–11 μm, ellipsoideae vel oblongo ovoideae, atrobrunneae, mediane 1-septatae, constrictae, echinulatae.—TYPE: Taiwan, Nantou Hsien; Tungpu, In foliis *Villebruneae pedunculatae* Shirai (Urticaceae), leg. C.Y. Chen, 7 Apr 1995, NCHUPP 2356.

Superficial mycelium loosely reticulate, hypophyllous, dark bown, septate, smooth, branched, hyphopodiate, 3–4 μm wide. Hyphopodia 4–8 μm wide, up to 10 μm high, entire or 2–3-lobed, alternate, rarely opposite, brown. Ascomata 70–90 μm wide, 35–60 μm high, superficial on mycelia, globose. Peridium mucose diffluent early. Asci 30–45 μm wide, globose, thick-walled, few, bitunicate, 8-spored. Ascospores 17.5–22 × 8–11 μm, ellipsoid or oblong ovoid, dark brown, 1-septate in the middle, constricted at the septum, distinctly echinulate, conglobate inside the ascus. No anamorphs found associated on the material.

Notes. Many species have been described in this genus (Hughes, 1984, 1987; Sivanesan, 1984). No species have been reported either on *Villebrunea* (Urticaceae), or on other host genera belonging to Urticaceae.

New Records

Coleroa chaetomium (Kunze : Fr.) Rabenh., Herb. Mycol. no. 1456, 1859 Figure 3

For synonyms, see Barr (1968).

Mycelium epiphyllous, occasionally forming hypostroma of one or two layers of palisade-like cells, hyaline to pale brown in colour, not forming leaf spots. Ascomata developing originally from the subcuticular mycelium or hypostroma, erumpent and then becoming superficial, subglobose, 126–180 μm in diam., connate with a flattened base, ostiolate at the rounded apex, scattered to aggregated in small groups, often confluent, setose over the upper half, setae few to numerous, continuous or with few septa, dark brown, erect, stiff, up to 60 μm long, swollen at the base, slightly attenuate upwards. Peridium 10–14 μm thick around the upper and lateral sides, composed of 3–4 layered, dark brown, polygonal, laterally compressed cells, the basal portion 20–32 μm thick, applanate, composed of many layers of hyaline to light brown, polygonal cells, peridial wall of cells of textura angularis, up to 16 μm wide. Asci bitunicate, basal, saccate to oblong, 39–57 × 11–14 μm, sessile, apex rounded and thick-walled; pseudoparaphyses sparse, deliquescent. Ascospores biseriate, broadly clavate, 11–16 × 5–6 μm, widest at the upper third, septate below the middle, yel-

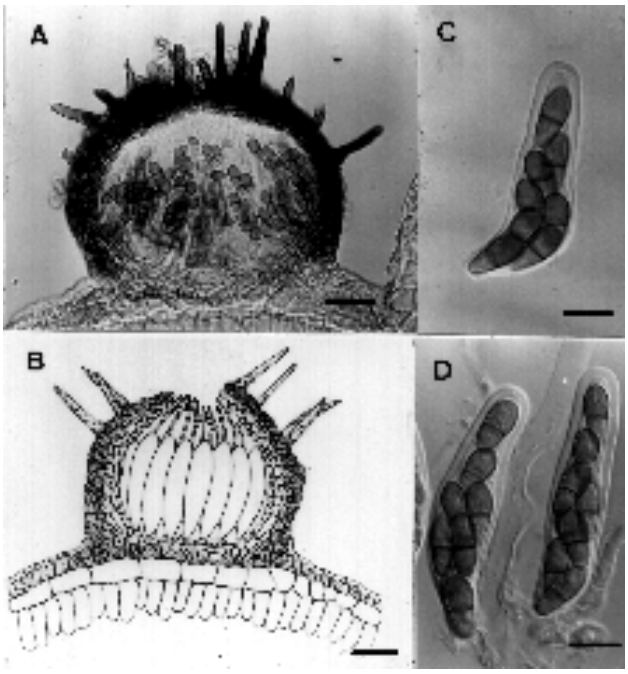

Figure 3. *Coleroa chaetomium*. A–B, vertical sections of ascomata; C–D, asci with ascospores. Scale bars, A–B=30 μm, C–D=10 μm.

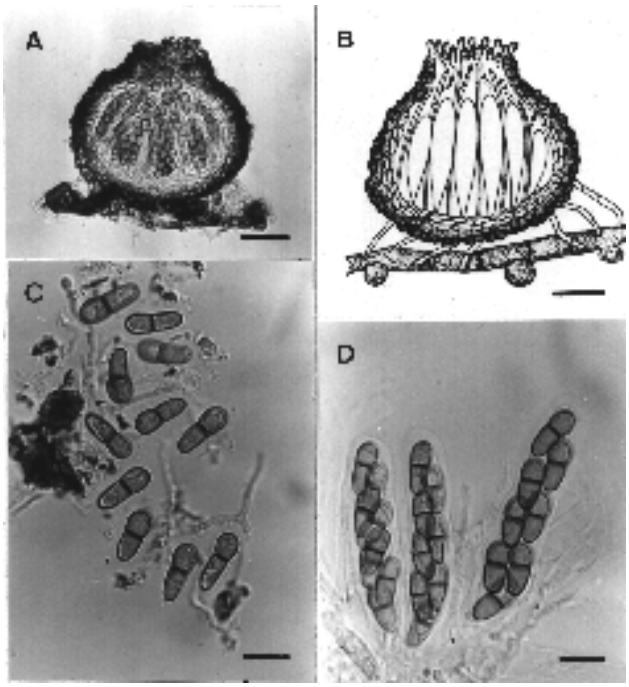

Figure 4. *Dimerium meliolicola*. A–B, vertical sections of ascomata; C, ascospores; D, asci. Scale bars, A–B=30 μm, C–D= 10 μm.

lowish to olivaceous brown, smooth or minutely verruculose.

Habitat. On living leaves of *Rubus incanus* Liu and Yang (Rosaceae).

Specimen examined. NANTOU HSIEN: Meifeng, leg. C. Y. Chen, 23 Mar 1995, NCHUPP-2336.

Distribution. Asia, Europe, North America.

Descriptions. Barr (1968), Müller and Arx (1962).

Notes. Another specimen collected from Meifeng, Nantou Hsien (NCHUPP-2382) on the same host had hemispherical to flattened globose ascomata which were mostly gregarious, often confluent forming circular spots limited by the underlying subcuticular hypostroma. It is apparent that this Meifeng collection is a stromatic form of this species (Barr, 1968).

Dimerium meliolicola (Petr.) Hansf., Mycol. Pap. 15: 77, 1946. Figure 4

Pseudodimerium meliolicolum Petr., Ann. Mycol. 22: 21, 1924.

Hyperparasitic on *Schiffnerula* parasitic on living leaves of *Rubus*. Mycelium superficial, composed of thin-walled, roughened, interwoven, olivaceous to pale brown hyphae, 1.5–4 μm wide, forming a mycelial mat. The mycelium of *Schiffnerula* easily distinguished by the thick-walled, hyphopodiate, dark brown hyphae, up to 9 μm wide. Ascomata globose, 80–130 μm in diam., smooth, scattered, with a blunt 23–40 μm wide apex, superficial on mycelia. Ascomatal wall 6–10 wide, composed of cells forming a textura angularis, the outer region composed of 1–2 layers of polygonal, brown cells, and the inner of several layers of compressed, hyaline cells. Asci bitunicate, basal, 8-spored, cylindrical-clavate to saccate, 44–67 × 10–16 μm, sessile to shortly stipitate, pseudoparaphysate. Pseudoparaphyses up to 3 μm wide, few in number. Ascospores overlapping uniseriate to biseriate, oblong to broadly clavate, straight to slightly curved, 10–13 × 4–6 μm, 1-septate slightly above the middle, rounded at apex and tapering below, brown.

Habitat. Hyperparasitic on *Schiffnerula* sp. on living leaves of *Rubus* sp. (Rosaceae).

Specimen examined. NANTOU HSIEN: Piluchi, leg. C. Y. Chen, 28 Apr 1994, NCHUPP-2368.

Distribution. Africa, Europe, Taiwan.

Description. Hansford (1946).

Notes. Hughes (1993) has discussed the taxonomic problems regarding the placement of *Dimerium*. He suggested that the mycoparasitic species of *Dimerium* may be disposed into one of the generic names listed as synonyms of *Dimerium* auct. (Müller and Arx, 1962) and that *Phaeostigme* H. Sydow & Sydow could be a suitable genus. We do not propose to transfer *D. meliolicola* to *Phaeostigme* at present as we have not been able to examine the type specimen of this fungus. Moreover, many other species in *Dimerium* have to be examined to ascer-

tain whether *Phaeostigme* or other genera are the correct choice for the transfer.

D. meliolicola is originally reported on *Meliola*. Although *Schiffnerula* is a different host genus, it is not unusual as many other fungi have been reported to parasitize more than one fungal host genus.

Gloniopsis praelonga (Schwein.) Zogg, Beitr. Kryptogamenflora Schweiz 11(3): 50, 1962. Figure 5

For synonyms, see Zogg (1962).

Hysterothecia gregarious, elongated, straight or curved up to 3 mm in length, flattened at the base, with a longitudinal and furrowed slit, 220–310 μm high, 360–470 μm wide, hyphae from basal wall penetrate into the epidermis and the host tissues below, slightly discolouring them. Peridium externally composed of blackened, pseudoparenchymatous cells, 30–70 μm wide and internally of a hyaline, 20–40 μm wide cells forming a textura intricata. Asci bitunicate, clavate, 74–100 × 18–27 μm, 8-spored, sessile or short stalked, pseudoparaphysate. Ascospores hyaline, oblong and broader in the middle, 18–25 × 6–8 μm, muriform up to six transverse septa (A-transsepta), strongly constricted at the middle septum, most segments divided by 1–2 longisepta, occasionally with B-transsepta or angular septa laid within segments, with a conspicuous mucilaginous sheath.

Habitat. On indet. wood.

Specimen examined. NANTOU HSIEN: Meifeng, leg. A. Sivanesan, 28 Jan 1992, NCHUPP-2282.

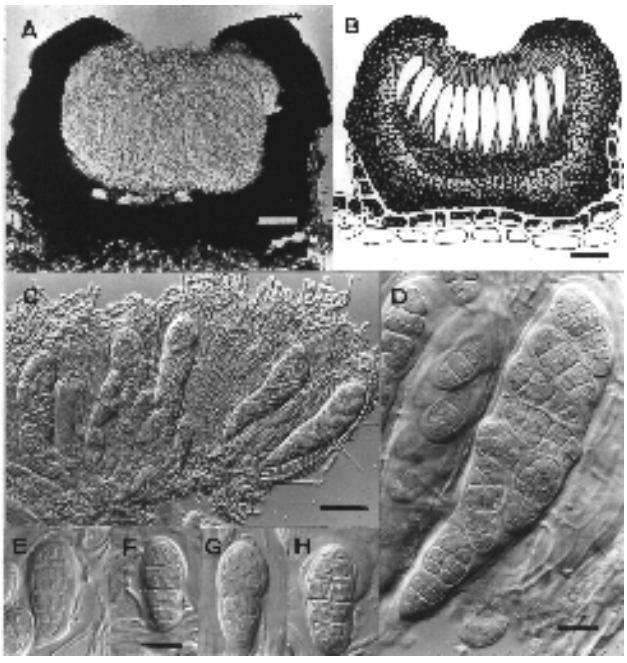

Figure 5. *Gloniopsis praelonga*. A–B, vertical sections of ascomata; C, asci, ascospores and pseudoparaphyses; D, asci with ascospores; E–H, ascospores. Scale bars, A–B=50 μm, C=30 μm, D=10 μm, E–H=10 μm.

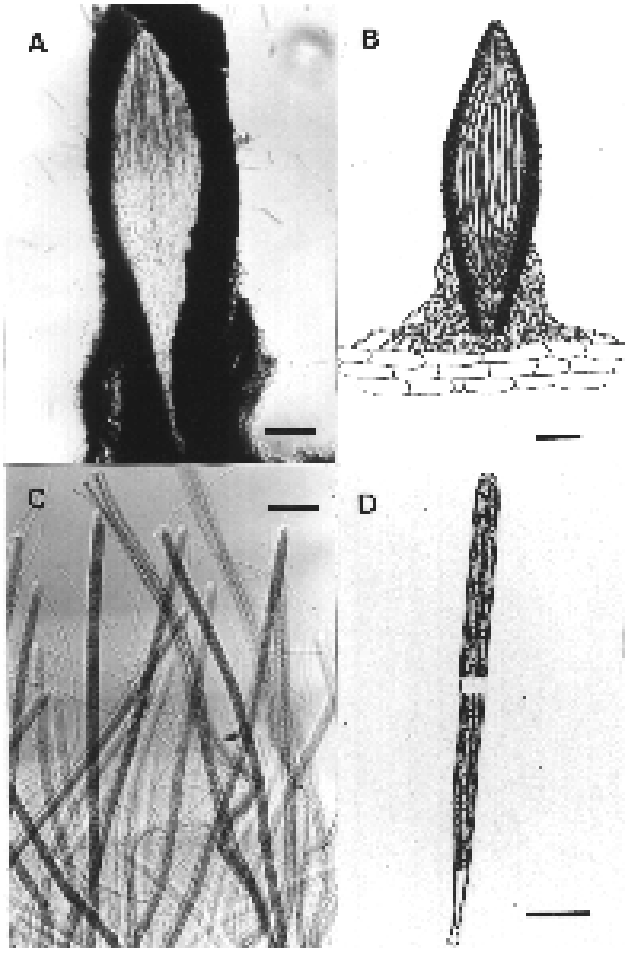

Figure 6. *Glyphium elatum*. A–B, vertical sections of ascomata; C–D, asci with ascospores. Scale bars, A–B=1,000 μm, C=40 μm, D=20 μm.

Distribution. Cosmopolitan.

Descriptions. Dennis (1978), Zogg (1962).

Glyphium elatum (Grev.: Fr.) Zogg, Beitr. Kryptogamenflora Schweiz 11(3): 99, 1962. Figure 6

For synonyms, see Goree (1974).

Ascomata hysteriaceous, erect to slanted, vertically elongated and compressed, ligulate with the middle always broader and thicker, 0.8–1 mm high, 0.3–0.5 mm wide, 0.2–0.4 mm thick (the latter two measurements are made at the wider middle portion), transversely striate at the surface, blunt at apex, carbonaceous, scattered to aggregated, superficial on subiculum, with a bivalve shell-like fissuring along the lateral edges, and the two halves of shell separating to expose the lateral slits except at the apex and base, appearing lenticular in longitudinal section. Peridium 40–60 μm thick, composed of many layered, dark brown, polygonal cells, with the basal portion forming tufts of thick-walled, brown hyphae, growing downward to the underlying subiculum. Pseudoparaphyses trabeculate. Asci bitunicate, long cylindrical, rounded at apex, 270–420 × 6–8 μm, basal, 8-spored, stipitate, the

stipe 40–55 μm long. Ascospores filiform, almost as long as the ascus, light brown, multiseptate, septa 6–14 μm apart, fasciculate, parallel or partly twisted, obtuse at both ends.

Habitat. On indet. wood.

Specimen examined. ILAN HSIEN: Tuling, leg. C. Y. Chen, 29 Apr 1994, NCHUPP-2375.

Distribution. Europe, North America, Taiwan.

Descriptions. Barr (1990), Bisby & Ellis (1952), Goree (1974), Zogg (1962).

Gnomonia setacea (Pers.: Fr.) Ces. & De Not., Sfer. Ital. 1: 58, 1863. Figure 7

For synonyms, see Barr (1978).

Ascomata on fallen leaves, hypophyllous, subglobose and occasionally irregular in venter, 140–240 wide, 120–190 high, immersed, with a protruding long neck, scattered to aggregated, mostly on midrib and lateral veins, not forming any leaf spots. Peridium 10–30 μm thick,

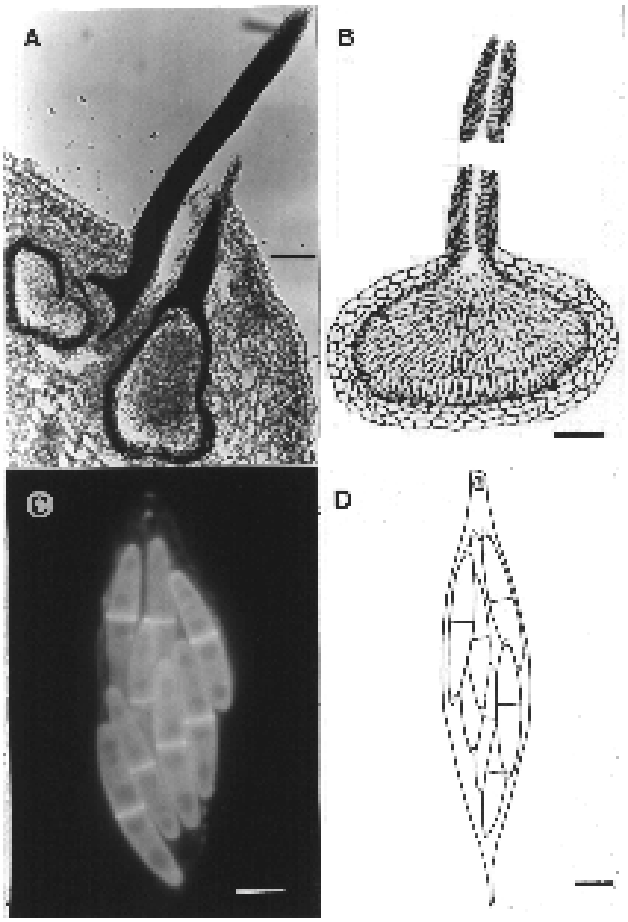

Figure 7. *Gnomonia setacea*. A–B, vertical sections of ascomata with one in A showing the whole neck; C, ascus in calcofluor; D, ascus with ascospores. Scale bars, A=50 μm, B=40 μm, C–D=3 μm.

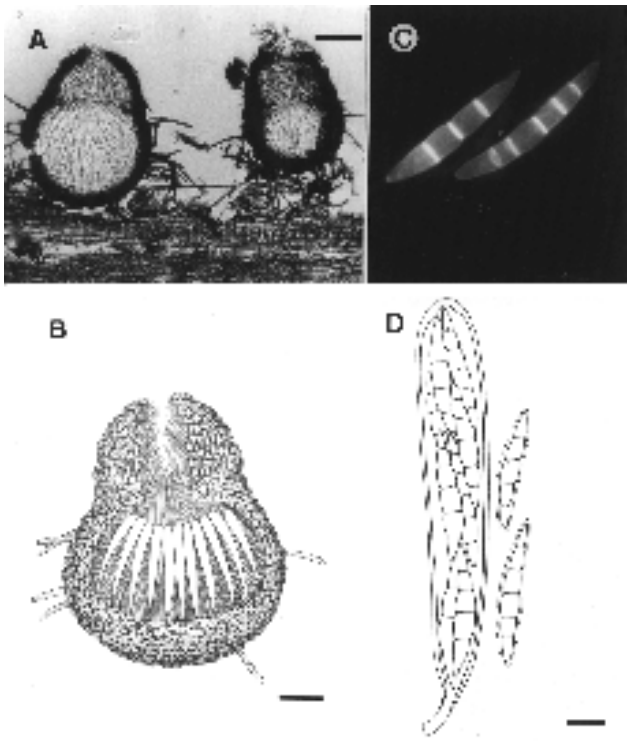

Figure 8. *Herpotrichia macrotrichia*. A–B, vertical sections of ascomata; C, ascospores in calcofluor; D, asci and acospores. Scale bars, A=100 μm, B=50 μm, C–D=10 μm.

externally composed of polygonal to compressed, 2–4 layered, brown cells, internally of 2–3 layered hyaline cells; surface of peridium of textura angularis, each cell up to 20 μm in diam. Necks long, up to 1 mm, and 30–40 μm wide, pointed at the apex, periphysate, surface composed of parallel rows of elongated cells of textura porrecta. Asci numerous, loosening in the centrum, 8-spored, aparaphysate, cylindrical to fusiform, 23–48 × 4–8 μm, including the base which tapers to 4–14 μm long, slender stipe. Ascospores fusiform, 10–13 × 1.5–2 μm, overlapping biseriate to 4-seriate, hyaline, 1-septate in the middle, with a 1–1.5 μm long mucilaginous appendage at each end.

Habitat. On fallen leaves of *Quercus variabilis* Blume (Fagaceae).

Specimen examined. NANTOU HSIEN: Wushia, leg. C. Y. Chen, 10 Mar 1994, NCHUPP-2335.

Distribution. Asia, Europe, North America.

Descriptions. Barr (1978), Kobayashi (1970), Müller and Arx (1962).

Herpotrichia macrotricha (Berk. & Br.) Sacc., Sylloge Fung. 2: 213, 1883. Figure 8

For synonyms, see Barr (1984).

Mycelium superficial to partly innate in substrate, composed of thick-walled, dark brown hyphae, 5–8 μm wide

forming a dense subiculum in which the ascomata are embedded. Ascomata globose to subglobose, 290–390 μm high, 250–330 μm wide, gregarious, slightly rugose, covered with numerous hyphae with a broadly conical ostiolar region, 90–100 μm high, lined on the inside with periphyses. Peridium of two regions, the outer 30–44 μm thick, composed of brown, thick-walled polygonal cells, and the inner of hyaline, thin-walled cells, forming a textura angularis to epidermoidea, inner layer of peridium variable in thickness, widest at the basal portion, 8–20 μm wide, and becoming narrower towards the lateral sides. Asci bitunicate, basal and peripheral, cylindrical, 110–140 × 10–14 μm, shortly stipitate, 8-spored. Ascospores 30–43 × 5–7 μm, fusiform, overlapping biseriate, 3–5 septate, slightly constricted at septa, at first hyaline and then becoming brown, with mucilaginous sheath.

Habitat. On indet. wood.

Specimen examined. ILAN HSIEN: Tuling, leg. C. Y. Chen, 29 Apr 1994, NCHUPP-2364.

Distribution. America, Europe, Taiwan.

Descriptions. Barr (1984), Sivanesan (1971).

Melomastia mastoidea (Fr.) Schroet., Kryptogamenflora von Schlesien 3(2): 320, 1896. Figure 9

For synonyms, see Barr (1994).

Ascomata obpyriform with a flattened base, 450–580 μm wide, 480–600 μm high, separate and widely scattered, immersed beneath the epidermis which is pierced by a conical papillate ostiole, with the central canal up to 100 μm wide. Peridium of two regions, the outer region of variable thickness with the papillate portion wider and carbonaceous, 60–100 μm wide, while at the sides and base 14–30 μm wide composed of thick-walled, brown, compressed cells, and the inner region of hyaline, elongated, thin-walled, pseudoparenchymous cells. Asci numerous, unitunicate, cylindrical, 130–160 × 5–7 μm, 8-spored, apex rounded, stalked, with a nonamyloid apical ring. Paraphyses present. Ascospores, uniseriate, oblong with obtuse ends, hyaline, smooth, 14–17 × 4–6 μm, 2-septate, with a slightly longer middle cell and shorter end cells with mucilaginous sheath visible when mounted in water. Ascospores may separate into individual cells when slight pressure is applied on them.

Habitat. On indet. wood.

Specimen examined. NANTOU HSIEN: Piluchi, leg. C. Y. Chen, 5 Nov 1994, NCHUPP-2381.

Distribution. Europe, Taiwan.

Description. Barr (1994), Dennis (1978).

Notes. Barr (1994) described the ascospores as becoming verruculose with age. This character has not been observed in the specimen examined.

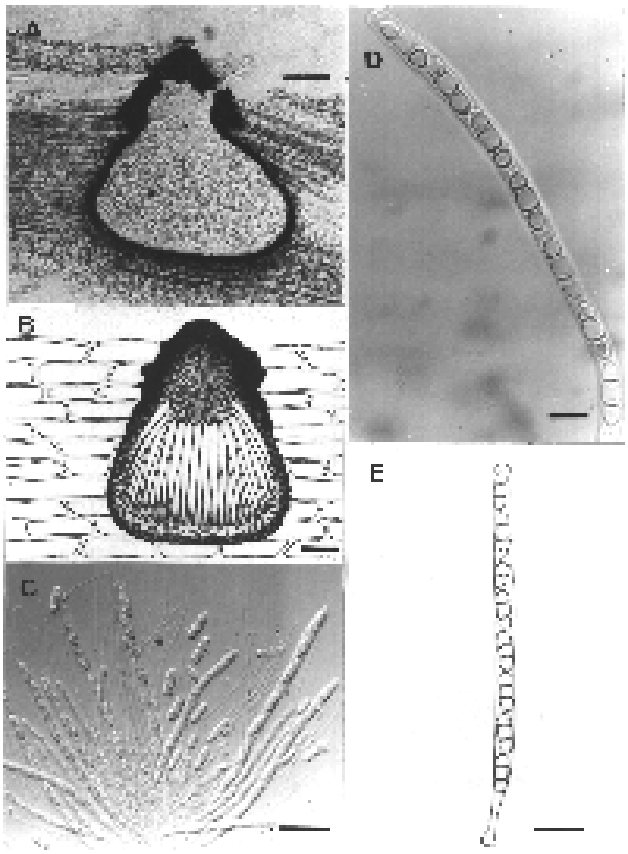

Figure 9. *Melomastia mastoidea*. A–B, vertical sections of ascomata, C, asci, ascospores and paraphyses; D–E, asci with ascospores. Scale bars, A–B=100 μm, C=30 μm, D=10 μm, E= 20 μm.

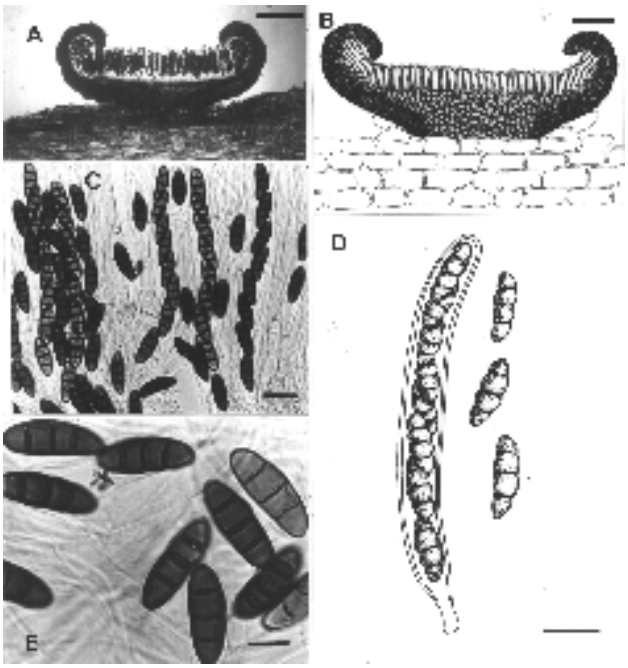

Figure 10. *Rhytidhysteron rufulum.* A–B, vertical sections of ascomata; C, asci, ascospores and pseudoparaphyses; D, ascus and ascospores, E, ascospores. Scale bars, A=300 μm, B=200 μm, C–D= 20 μm, E=10 μm.

Rhytidhysteron rufulum (Spreng.: Fr.) Speg., An. Soc. Cient. Argent. 90: 177, 1920. Figure 10

For synonyms see Samuels and Müller (1979).

Ascomata apothecioid, up to 1.5 mm in diam. with a brick-red hymenium, when dry the sides of apothecium rolling inwards and becoming hysterothecioid and 1–3 × 0.5–1 mm, rarely branched and triradiate, coriaceous, scattered to aggregated, erumpent-superficial, subsessile, the lips (apex of ectal excipulum) involuted, with distinct or indistinct transverse striae when viewed from the surface. The wall of two regions, the outer (ectal excipulum) 80–100 μm, composed of polygonal, thick-walled, dark brown cells, and the inner (medullary excipulum) composed of light brown, thin-walled cells which are arranged longitudinally toward the base. Asci bitunicate, cylindrical, 130–160 × 11–14 μm, with a short stipe up to 24 μm in length, 8-spored, interspersed with paraphysoidal hyphae which branch and swell at the tip to form an dark reddish epithecium. Ascospores uniseriate, broadly fusiform, straight to inequilateral, 23–30 × 7–10 μm, reddish brown, 3-septate, slightly constricted at septa.

Habitat. On indet. wood.

Specimen examined. NANTOU HSIEN: Sun-Moon-Lake, leg. A. Sivanesan, 20 Feb 1992, NCHUPP-2306.

Distribution. Common in the tropics.

Descriptions. Samuels and Müller (1979), Shear (1933), Voorhees (1939).

Thyronectria pseudotrichia (Berk. & M. A. Curtis) Seeler, J. Arnold Arbor. 21: 438, 1940. Figure 11

Nectria pseudotrichia Berk. & M. A. Curtis, J. Acad. nat. Sci. Philad., N.S. 2, 2: 289, 1853.

For other synonyms see Seifert (1985).

Anamorph: *Tubercularia lateritia* (Berk.) Seifert (1985).

For anamorph synonyms see Seifert (1985).

Ascomata globose to turbinate, 350–470 μm in diam., ostiole periphysate with a flattened apex, yellow to red, rough, collabent when dry, gregarious and occasionally laterally confluent on an underlying erumpent to superficial, pulvinate stroma of the same colour and texture as the ascomata. The anamorph, *Tubercularia lateritia,* of a characteristic capitate shape and always associated with the teleomorph. Peridium of three regions, continuous and intergrating into the underlying stroma, 60–100 μm wide, the outer region of globose to angular, yellow, thick-walled cells, the middle of elongated, yellow, thick-walled cells, the inner of elongated, hyaline, thin-walled cells, which in some cases are strongly compressed and agglutinated at the upper half, delimitation between middle and inner wall ambiguous. Region between outer and middle wall around the ostiole sometimes showing separation and gelatinization. Apical paraphyses extending from the sides below the ostiole and growing downwards, evanescent when mature and visible as gelatinous strands. Asci unitunicate, elliptical to ovoid, widest in the middle, 70–90 × 15–20 μm, 8-spored, with a sessile to short stipe up to 12 μm long. Ascospores oblong to broadly clavate, variable in length, 20–40 × 8–11 μm, hyaline, partly biseriate, muriform, 6–9 transversely septate, with one or rarely two longitudinal septum in most of the cells.

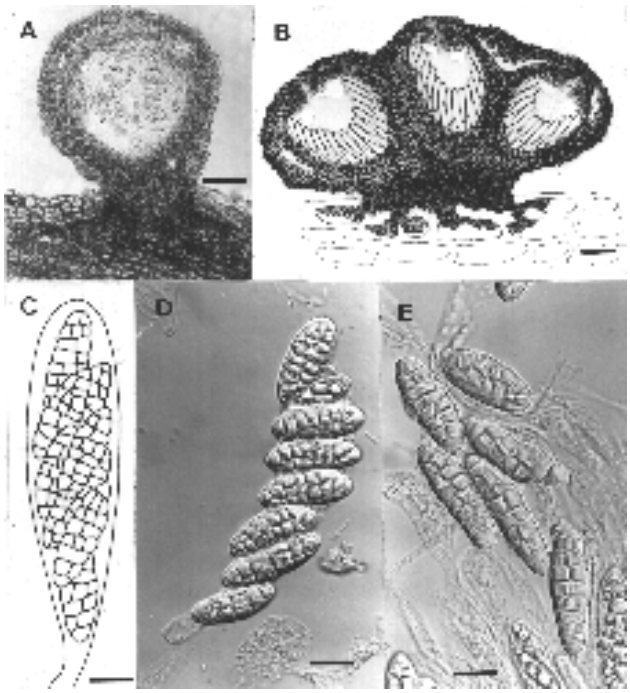

Figure 11. *Thyronectria pseudotrichia*. A–B, vertical sections of ascomata; C–D, asci; E, ascospores. Scale bars, A–B=100 μm, C–E=10 μm.

Habitat. On stems of *Villebrunea pedunculata* Shirai (Urticaceae).

Specimen examined. NANTOU HSIEN: Puli, leg. W. H. Hsieh, 20 Apr 1995, NCHUPP-2359.

Descriptions. Booth (1959), Seaver (1909), Seifert (1985 as *N. pseudotrichia*).

Distribution. Cosmopolitan.

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