

**PHYLLACHORA CLADII-GLOMERATI AND *P. SCHOENICOLA*: NEW AUSTRALIAN RECORDS FROM SEDGES**

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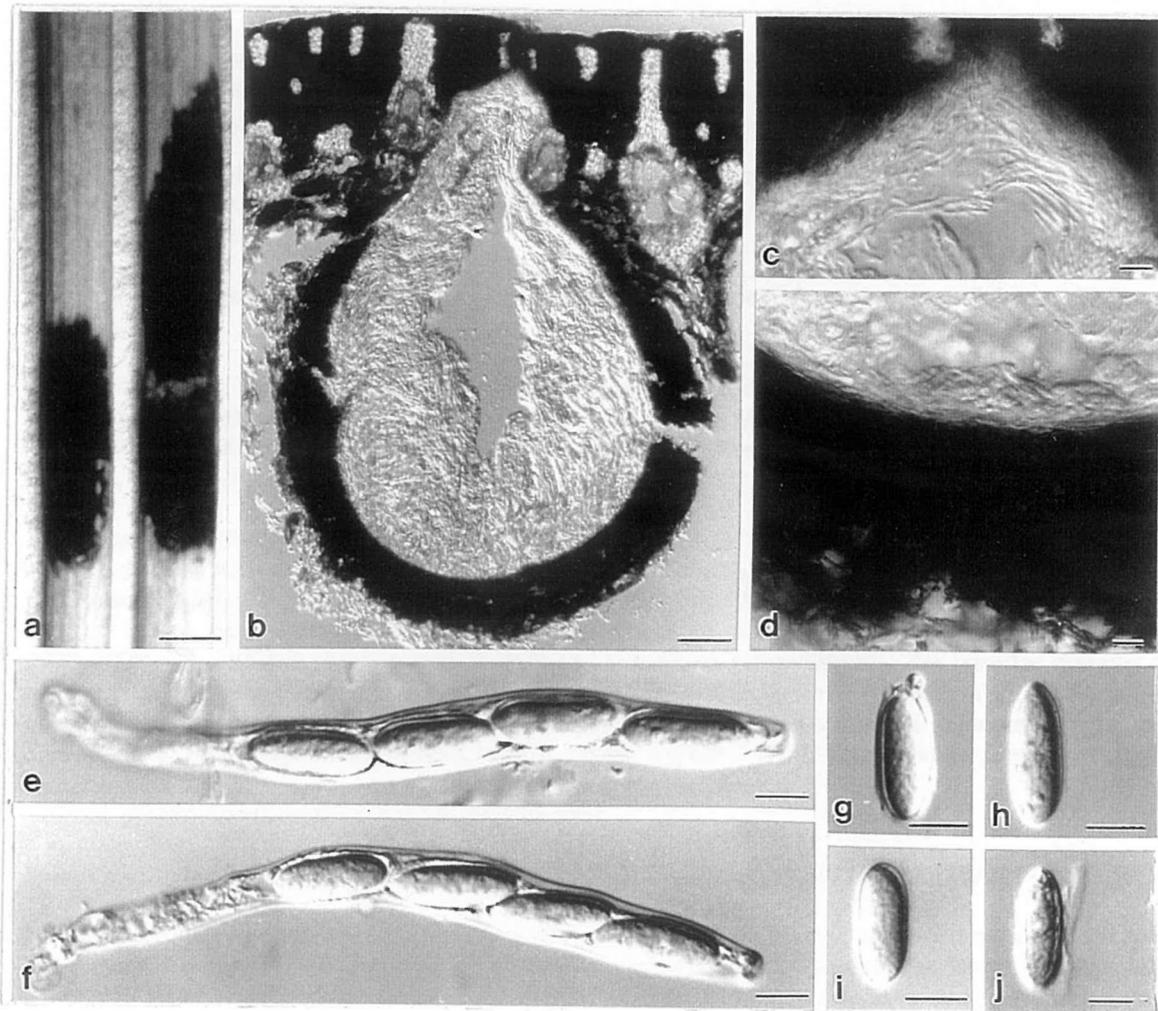
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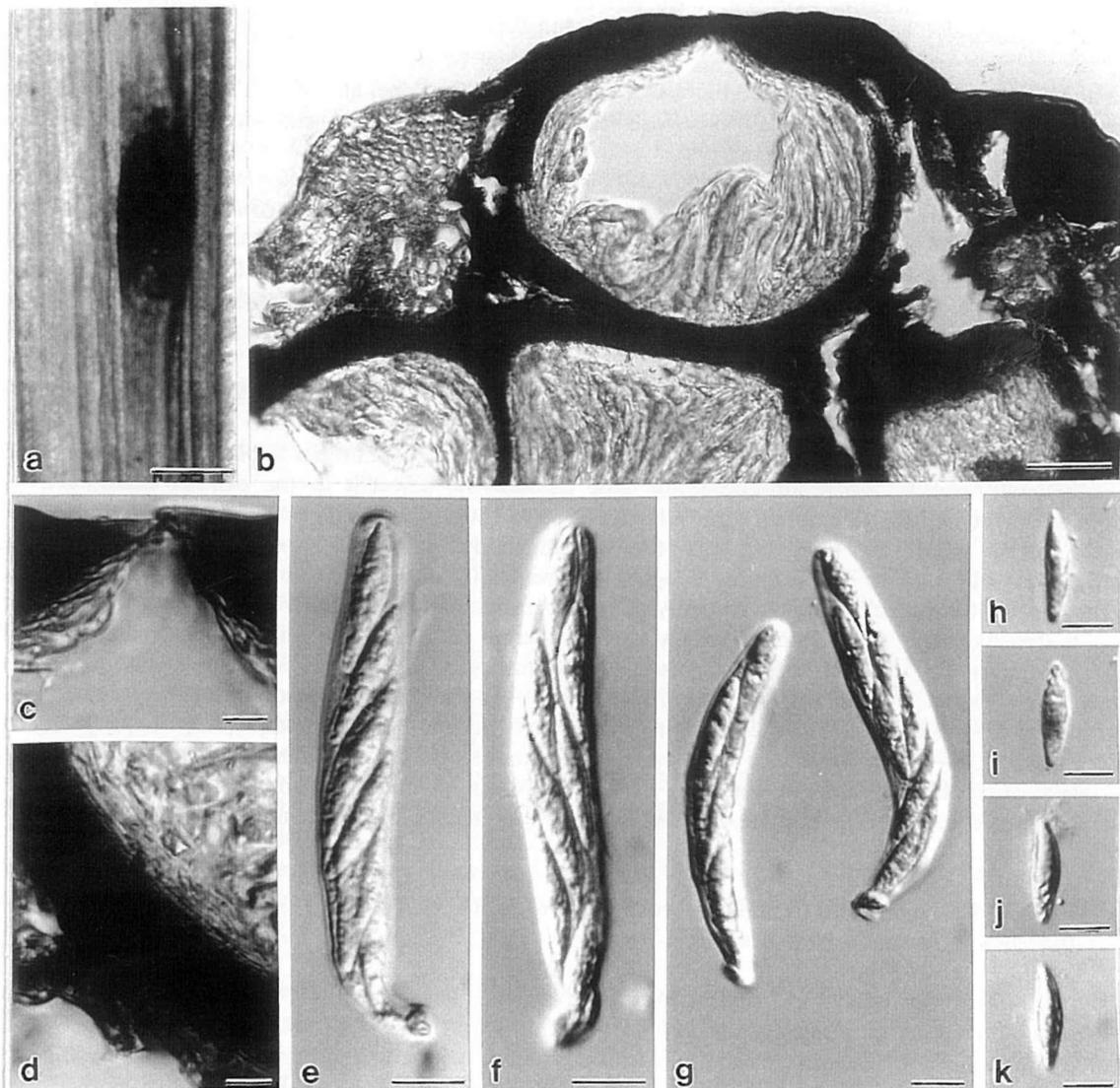
**Abstract**

Two new records of *Phyllachora* species on sedges (Cyperaceae) in Australia are recorded and described. *Phyllachora cladii-glomerati* which occurs on *Baumea* spp. was known previously only from New Zealand, and *P. schoenicola* on *Schoenus apogon* was recorded only from the Philippines. Each is widely distributed in Australia.

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**Plate 1.** *Phyllachora cladii-glomerati*. **a** Leaf spots, **b** Vertical section through ascoma illustrating central ostiole, peridium, and adjacent host tissue, **c** Vertical section through ostiolar canal illustrating periphyses, **d** Vertical section through peridium, **e, f** Asci, **g–j** Ascospores. **Scale bars:** **a** = 1 mm, **b** = 50  $\mu$ m, **c–j** = 10  $\mu$ m.



**Plate 2.** *Phyllachora schoenicola*. **a** Leaf spots, **b** Vertical section through ascogonium illustrating central ostiole, peridium, adjacent ascogonia and host tissue, **c** Vertical section through ostiolar canal, **d** Vertical section through peridium, **e–g** Asci, **h–k** Ascospores. **Scale bars:** **a** = 0.5 mm, **b** = 50  $\mu$ m, **c–k** = 10  $\mu$ m.

### Introduction

During a recent survey of phyllachoraceous fungi in Australia for the Australian Biological Resources Study (Pearce & Hyde 2001, Pearce, Reddell & Hyde 1999, 2000, 2001), two previously unrecorded species of *Phyllachora* on sedges were discovered. Both were found while examining dried specimens of Cyperaceae in plant herbaria. Comparison of the foliicolous tar spots with type specimens confirmed their identity as *Phyllachora cladi-glomerati* and *P. schoenicola*. *Phyllachora cladi-glomerati* has previously been recorded only on *Baumea rubiginosa* in New Zealand. *Phyllachora schoenicola* has previously been recorded only on *Schoenus apogon* in the Philippines. Both taxa are described in this paper and illustrated with photomicrographs.

### Material and methods

The holotypes of *P. cladi-glomerati* and *P. schoenicola* were borrowed from herbaria PDD and S and compared with specimens found on sedges in herbarium collections at AD, BRI, BRI (MBA), MELU and PERTH. Key

characters of the fungi including morphology and size of colonies, ascomata, asci, and ascospores were examined (Cannon 1991, Parbery 1967, Parbery and Langdon 1963, 1964). Specimens were prepared for light microscopy using the methods of Cannon (1996). This involved dissection of leaf spots in a drop of water. Following rehydration, squash mounts were prepared in water, lactophenol cotton blue, and Melzer's reagent. Sections were cut using a freezing microtome. Unless otherwise stated, all photographs and measurements were made from material mounted in water.

***Phyllachora cladii-glomerati* Hansf., *Proceedings of the Linnean Society of New South Wales* 82: 221 (1957)**

*Colonies*: containing several perithecia beneath a common clypeus on culms, clypei 1–4.5 × 0.5–2.5 mm, black, shiny, ellipsoidal, elongate, parallel with leaf veins, sometimes slightly raised and flattened, ostioles minute and indistinct, occasionally surrounded by a narrow halo of reddish brown discoloured host tissue, up to 1 mm wide.

*Anamorph*: not known.

*Teleomorph*: *Ascomata* immersed in the host parenchyma tissue, 136–420 µm diam., 294–600 µm high, usually ellipsoidal, occasionally globose, with a cylindrical to wide conical ostiolar canal, lined with fine hyaline periphyses. Upper peridium clypeate, consisting of deeply melanised, dark brown to black host epidermal cells and occasionally cuticle, often infiltrating the host parenchyma adjacent to the ostiolar canal, generally amorphous, but sometimes resembling *textura intricata*, up to 130 µm thick and extending laterally up to 1 mm from the ostiole, usually not involving host vascular bundles. Peridium also strongly melanised, comprising multiple layers of brown to brown-black, elongate, thin-walled, flattened cells, sometimes resembling *textura intricata*, c. 40–90 µm thick, merging inwardly with a hymenium consisting of several layers of hyaline, thin-walled, flattened cells, 5–10 µm thick. Peridium laterally merges with a narrow region of compressed host cells. *Paraphyses* numerous, filiform, as long as asci, 2.5–4 µm wide, tapering to rounded apices, thin-walled, hyaline, not constricted at the septa. *Asci* 114–194 × 9–16 µm, 2–4–6-spored, rarely 8-spored, narrow-cylindrical, short-pedicellate, thin-walled, unitunicate, apex truncate with an opaque, cup-shaped, ring-like, apical apparatus, 4–5 µm wide, 2.5 µm thick, non-reactive in Melzer's reagent. *Ascospores* arranged uniseriately, often oblique, rarely overlapping, 17–26 × 5–10 µm, oblong, poles rounded, occasionally slightly ovoid or slightly inaequilateral, aseptate, hyaline, thick-walled, enclosed in a clear mucilaginous sheath up to 13 µm thick. Plate 1.

*Known host*: *Baumea rubiginosa* (Spreng.) Boeck., *B. teretifolia* (R. Br.) Palla.

*Known distribution*: Australia, New Zealand.

*Material examined*: Australia. W.A.: south side of Toodyay Rd, 9 km from Great Northern Highway (just north of Northam), on culms of *B. rubiginosa*, 30 Nov. 1975, A.M. George (14) PERTH 02091267; Walpole-Nornalup National Park, Monastery Road, 1.4 km from junction with Gully road, on culms of *B. rubiginosa*, 2 Dec. 1992, J.R. Wheeler 3666 and S.T. Patrick PERTH 03823393; Yeaganup Lake, 34°32'S, 115°52'E., on culms of *B. rubiginosa*, 13 May 1991, C.J. Robinson (620) PERTH 03555593. Qld: Cape York Peninsula, 2.4 km north of Harmer Creek on track from Spencer's Lease to Heathlands, Mapping Site SBN 13, 11°57'S, 142°54'E, on living culms of *B. teretifolia*, 12 Oct. 1991, J.R. Clarkson (JRC9144) and V.J. Neldner BRI MBA. New Zealand. Silverdale, North Auckland, on *Cladium glomeratum* (= *Baumea rubiginosa*), Oct. 1950, J.M. Dingley PDD 17245 (holotype).

*Notes*: *Phyllachora cladii-glomerati* was originally described from New Zealand by Hansford (1957). The Australian collections differ from the holotype, in having 2, 4, or rarely 6 to 8-spored asci. The asci of Australian collections are also variable in size, and often slightly longer than those of the type, 114–194 × 9–16 µm versus 120–140 × 10–11 µm respectively. The size of the ascospores in the Australian collections are also more variable (17–26 × 5–10 µm versus 22–26 × 7.5–9.5 µm for the type) and in this study have been found with a hyaline, mucilaginous sheath up to 13 µm thick.

*Phyllachora cladii-glomerati* most closely resembles *P. epicladii* (Cooke & Masee) Arx, described on *Cladium* from Port Phillip, Victoria. Although we have been unable to locate the holotype, or any other collections of *P. epicladii*, Arx (1957) originally reports the asci as being 8-spored, and the ascospores forming a slimy yellow spore mass at the ostiole. *Phyllachora cladii-glomerati* rarely has 8-spored asci, and the gelatinous ascomatal contents are generally hyaline.

***Phyllachora schoenicola* Syd., *Annales Mycologici* 11: 265 (1913)**

*Colonies*: amphigenous, containing several perithecia beneath a common clypeus on culms, clypei 0.4–3 × 0.1–0.8 mm, black, shiny, roughly ellipsoidal, elongate, parallel with leaf veins, sometimes coalescing to form irregular lines, apex slightly to moderately raised and flattened, ostioles minute.

*Anamorph*: not known.

*Andromorph*: not known.

*Teleomorph*: *Ascomata* immersed in the parenchyma, occupying 1/2 to 3/4 leaf thickness, developing between vascular bundles, sometimes slightly distorted by them, often forming close to adjacent *ascomata*, up to five in an amphigenous group with ostioles opening to different leaf surfaces, 129–250 µm diam., 130–195 µm high, globose to oblate-sphaeroidal, with a central, or sometimes off-centre, wide conical ostiolar canal, lined with fine, hyaline periphyses. Upper and often lower peridium clypeate, consisting of deeply melanised, brown-black, amorphous host epidermis and adjacent parenchyma, sometimes incorporating the host cuticle, usually not infiltrating the host vascular tissue, up to 52 µm thick. Lateral peridium of variable thickness depending on number of *ascomata* involved. Single *ascomata* often thin-walled, lateral peridium 8–13 µm thick, consisting of multiple layers of thin-walled, flattened, light brown cells, sometimes resembling *textura intricata*, becoming hyaline on the inner hymenial surface. Groups of *ascomata* have thicker walls, similarly composed, but more deeply melanised, brown-black, 10–25 µm thick. The lateral peridium merges outwardly with a narrow region of discoloured yellow-brown, compressed host cells. *Paraphyses* numerous, filiform, slightly longer than *asci*, up to 4 µm diam., tapering to rounded apices, not constricted at septa, no branching observed. *Asci* 60–104 × 8.5–13 µm, 8-spored, cylindrical to cylindrical-clavate, tapering to a rounded apex, short-pedicellate, unitunicate, thin-walled, no apical structure visible. *Ascospores* arranged obliquely uniseriate, sometimes biseriate and overlapping, 15.5–23 × 3–6.5 µm, fusiform with attenuated poles, sometimes ovoid, slightly inaequilateral, hyaline, guttulate, aseptate. Plate 2.

*Known host*: *Schoenus apogon* Roem. & Schult.

*Known distribution*: Australia, Philippines.

*Material examined*: Australia. S.A.: Region 11 southern Lofty, Horsnell Gully, 34°56'S, 138°43'E, on *S. apogon*, 12 Nov. 1977, *Tineka Kempen* AD 9775012. Qld: Girraween National Park, 29°2'S, 152°2'E, on foliage of *S. apogon*, 11 Nov. 1974, *W. McDonald (690)* BRI 187960. N.S.W.: Gibraltar Range National Park, on leaves and stems of *S. apogon*, Apr. 1973, *C. Bell (no 573)* BRI 160018. Vic.: Grampians, roadside Epacris Falls, on *S. apogon*, 13 Nov. 1959, *D.E. Symon (293)* AD 98673880. Vic.: Warburton, 37°4'S, 145°4'E, on *S. apogon*, 19 Jan. 1935, *S.J. Blake (7216)* BRI 206883. Tas.: Hobart, 45°53'S, 147°19'E, on leaves and stems of *S. apogon*, 17 Feb. 1943, *W.M. Curtis* BRI 206882.

Philippines. Mt. Banahao, on living stems and leaves of *S. apogon*, 18 Feb. 1913, leg. *E.B. Copeland (C.F. Baker no. 853)* S (holotype); collection site not given, on living foliage of *S. apogon*, date not given, *R.T. Patton* MELU 5833F.

*Notes*: *Phyllachora schoenicola* is the only *Phyllachora* species described from *Schoenus*, and was previously known only from the Philippines (Sydow & Sydow 1913). The Australian collections differ from the holotype, in having slightly shorter *asci*, 60–85 × 8.5–13 µm versus 75–104 × 10–13 µm respectively, and slightly shorter and narrower *ascospores*, 15.5–23 × 3–6 µm versus 18–23 × 5–6.5 µm respectively.

We recognise six *Phyllachora* species from sedges in Australia, including *P. anceps*, *P. cladii-glomerati*, *P. cyperi*, *P. epicladii*, *P. fimbriatylis* and *P. schoenicola* (Pearce 2000).

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