
Two new genera in the *Phyllachoraceae*: *Sphaerodothella* to accommodate *Sphaerodothis danthoniae*, and *Parberya* gen. nov.

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Sphaerodothis danthoniae produces black tar spots on leaves and culms of *Danthonia* spp. It is redescribed and illustrated in a new genus *Sphaerodothella*. *Sphaerodothella danthoniae* differs from *Sphaerodothis* in having a peridium composed of hyaline to brown, thin-walled, flattened fungal cells which merge with host cells, rather than a distinct stroma of melanised *textura globosa*, and pale brown ascospores which have a distinctive dark brown mucilaginous perisporium. *Parberya* is described for a new species of tar spot fungi, *P. kosciuskoa*, found on *Danthonia pallida* from Mt. Kosciusko, Australia, and to accommodate *Sphaerodothis arxii* P.F. Cannon on *Pentameris* sp. *Parberya* are typical phyllachoraceous tar spot fungi on grasses, which have distinctive golden-brown ascospores ornamented with short, blunt spines. The previously undescribed andromorph of *Parberya arxii* is also described.

Keywords: *Anthostomella danthoniae*, *Danthonia*, foliicolous fungi, *Poaceae*, *Sphaerodothis arxii*, tar spots, taxonomy.

Introduction

The *Phyllachoraceae* are generally plant parasites, characterised by ascohymenial development with paraphyses, thin-walled asci, which may have an apical apparatus that does not stain blue in iodine, and ascospores which are often hyaline and one-celled (Cannon, 1991). To date, Australian representatives of this family include species of *Cocodiella*, *Glomerella*, *Phyllachora*, *Polystigma*, *Ophiodothis*, *Rehmiodothis*, and *Sphaerodothis*, although it is not clear whether all of these genera should be retained in the *Phyllachoraceae*.

During a survey of phyllachoraceous fungi in Australia for the Australian Biological Resources Study (Pearce *et al.*, 1999, 2000), we located an undetermined species of *Sphaerodothis* (det. J. Walker) on leaves of *Danthonia* from Mt Kosciusko (DAR 28023). In order to identify this specimen we

Sphaerodothella is similar to *Sphaerodothis* in that both genera are characterised by black, slightly domed stromatal tar spots, and ascomata are immersed in the host leaf tissue. Although both genera have brown ascospores, *Sphaerodothella* differs in having a stroma and ascomata structure more typical of *Phyllachora* species. In *Sphaerodothis* the stroma is composed of thick-walled *textura globosa* with cells up to 10 µm diam. *Sphaerodothella* is also distinct in having pale brown, oval to broadly ellipsoidal ascospores, with a dark brown mucilaginous perisporium. This distinctive coloured outer ascospore wall layer has not previously been observed in the *Phyllachoraceae*.

***Sphaerodothella danthoniae* (McAlpine) C.A. Pearce and K.D. Hyde, comb. nov.**

(Figs. 1-12).

≡ *Anthostomella danthoniae* McAlpine, Proceedings of the Linnean Society of New South Wales 27: 373 (1902).

≡ *Sphaerodothis danthoniae* (McAlpine) Walker and S. Francis, Transactions of the British Mycological Society 69:151 (1977).

= *Sphaerodothis calospora* Syd., Annales Mycologici 22: 302 (1924).

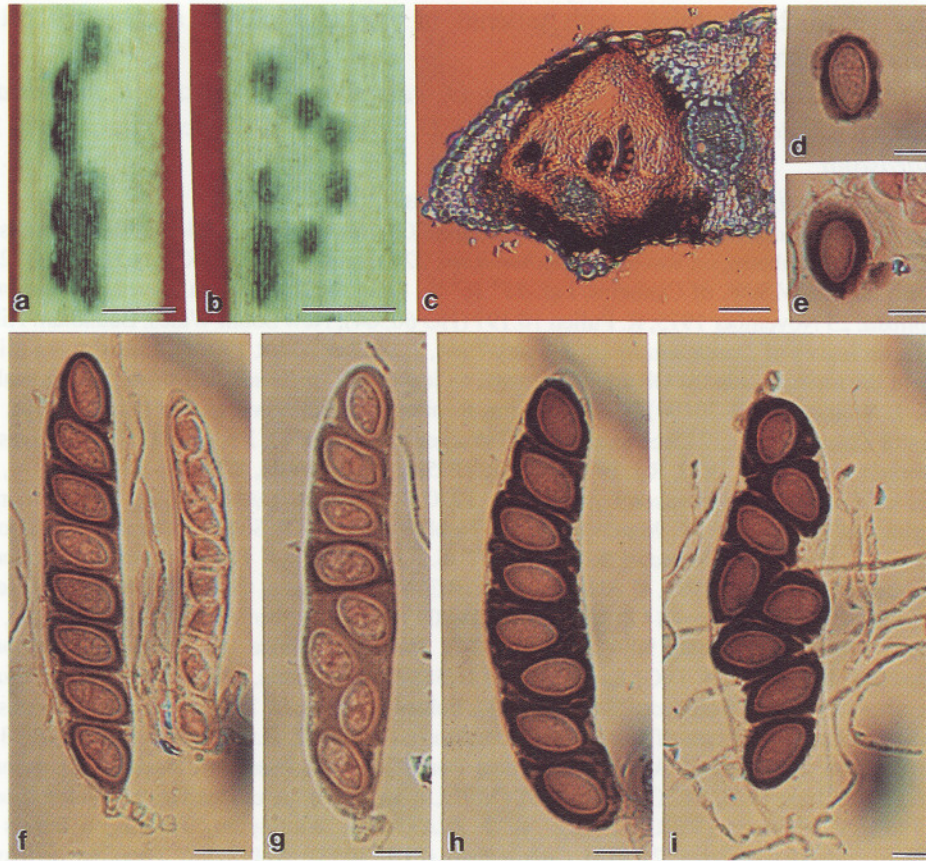
= *Sphaerodothis magnifica* Petr., Sydowia 1: 265 (1947).

Leaf spot: 180-490 × 100-310 µm, roughly suboblanceolate, black, shiny, usually gregarious, occasionally coalescing to form straight to irregular lines in the leaf surface, up to 5 mm long, 0.5 mm wide, slightly domed above the leaf surface, multiloculate, sometimes visible on both surfaces of the curled leaf, most prominent on the outer surface, ostiole central and circular, no chlorotic regions of host leaf tissue observed.

Andromorph: not observed.

Anamorph: not observed.

Teleomorph: *Ascomata* immersed in the host mesophyll between vascular bundles, often occupying the entire leaf thickness, 120-220 µm wide, 125-260 µm high, globose to irregularly shaped, occasionally almost stellate, distorted by the hosts vascular bundles, with a central to slightly off-centre, widely conical ostiolar canal, no periphyses seen. Upper and lower surface usually clypeate, composed of deeply melanised, brown-black, host epidermal cells and cuticle, sometimes infiltrating the host parenchyma, up to 80-130 µm thick. *Peridium* 6-10 µm thick, composed of multiple layers of orange-brown, flattened, elongate, thin-walled cells, gradually becoming hyaline on the interior, fertile ascomata surface, laterally fusing outwardly with adjacent distorted host mesophyll and vascular bundles, or occasionally adjacent ascomata. Peridium merging outwardly at the apex and often basally, with the clypeal layer. Asci and



Figs. 1-9. *Sphaerodothella danthoniae* (from holotype). 1, 2. Leaf spots. 3. Vertical section through ascoma illustrating central ostiolar canal, peridium and host tissue. 4, 5. Ascospores with dark brown perispore. 6-9. Asci and paraphyses (immature asci in f, g). Bars: 1, 2 = 1 mm, 3 = 50 μm , 4-9 = 10 μm .

paraphyses arising from the inner base of the ascoma. *Paraphyses* numerous, hypha-like, slightly longer than asci, up to 2 μm wide, septate, no branching observed. *Asci* 83-114 \times 13-23 μm , cylindrical to cylindrical-clavate, 8-spored, short, wide pedicellate, thick-walled when immature, unitunicate, at maturity ascospores embedded in a light brown to dark brown, melanised mucilage, of variable thickness within the ascus. *Ascospores* usually uniseriate, sometimes biseriate, 10-18 \times 6-13 μm , oval to broadly ellipsoidal, rarely globose, usually widest at the equator, tapering at the poles, sometimes ovoid, often inequilateral, aseptate, hyaline to pale yellow when immature, pale brown when mature, the outer perispore layer variable, dark brown, resembling a melanised gelatinous

sheath, of variable thickness depending on the position of the ascospore in the ascus, up to 2 μm thick, with tattered or irregular edges, ascospores often clumping together.

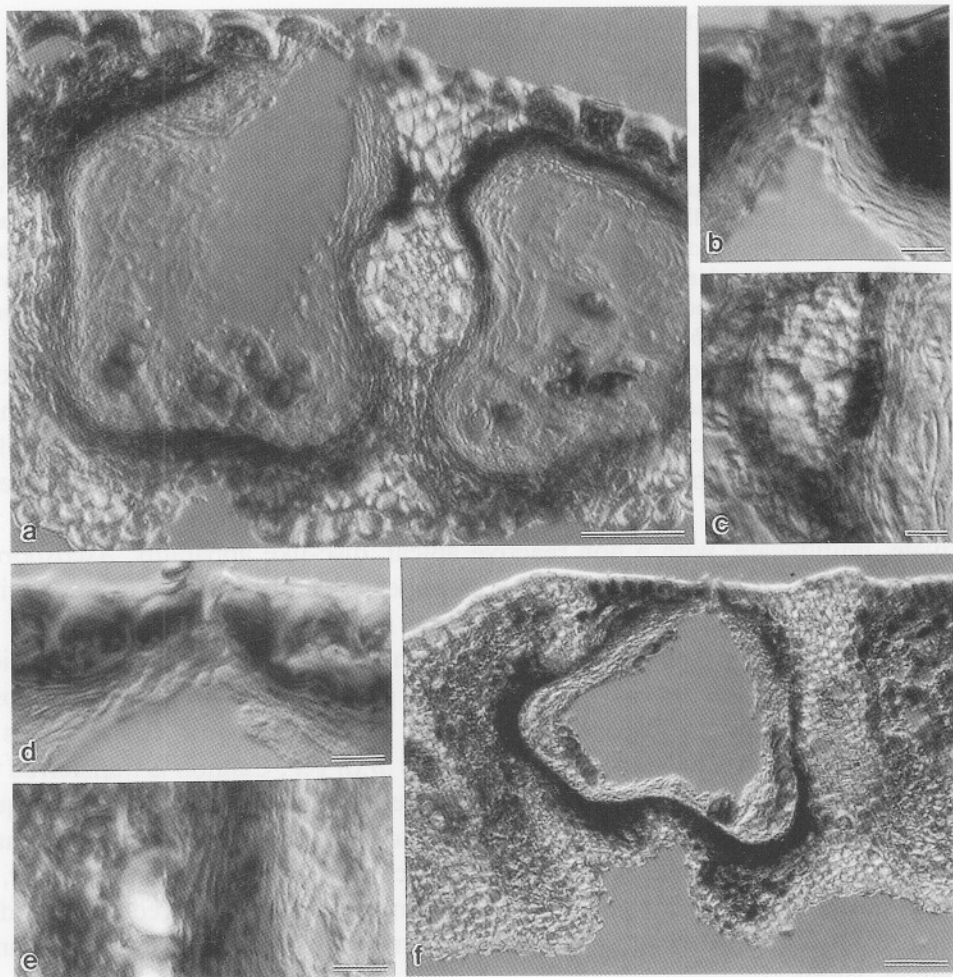
Host: *Danthonia* spp., including *D. caespitosa*, *D. linkii*, *D. penicillata* (synonym *Notodanthonia penicillata*), *D. pilosa*, *D. racemosa*, and *D. richardsonii*.

Known distribution: Australia, New Zealand.

Material examined: AUSTRALIA, Australian Capital Territory, Molongo River, banks of the river, near Canberra, on leaves of *Danthonia* sp., 22 December 1949, E. Gauba (DAR 24924); Stromlo Forest, W.S.W. of Canberra, Lat. 35° 16' S., Long. 149° 00' E, on leaves of *Danthonia caespitosa*, 23 November 1975, R. Pullen 10.197 (HO 60564); New South Wales, Baulkham Hills, RD 67, on leaves of *Danthonia linkii*, January 1964, J. Walker (DAR 13024); Culcairn, 13 miles south of the town, beside the Olympic Highway, on leaves of *Danthonia caespitosa*, 12 December 1973, J. Walker (DAR 30199); Cootamundra, 8 miles south of town on the Dimaseer Rd, on leaves of *Danthonia* sp., 7 December 1972, J. Walker (DAR 27058); Jindera RD 72, on leaves of *Danthonia* sp., 11 July 1972, R.J. Flynn, (DAR 27059); Walla Walla, S.W. of Culcairn, R 74, on leaves of *Danthonia richardsonii*, 1 October 1970, R.J. Flynn (DAR 22066); Yanco, Yanco Experimental Farm, RD 74, March 1926, N. Noble (DAR 981); South Australia, Naracoorte Creek, ca. 3 km N.E. of Naracoorte, Lat. 36° 57' S., Long. 140° 44' E., on leaves of *Danthonia caespitosa*, 7 November 1985, K Alcock 36 (HO103365); Tasmania, Central Highlands, Miller's Bluff, Lat. 41° 54' S., Long. 147° 10' E, altitude 800 m, on leaves of *Danthonia penicillata*, 26 February 1990, A. Moscal 19091 (HO 144474); Victoria, Echuca, on leaves of *Danthonia ?caespitosa*, 8 June 1966, D.G. Parbery (MELU 5850F); Ardmona, on *Danthonia penicillata*, September 1899, G.H. Robinson 284 (VPRI 404, **holotype**); Echuca, 7 miles west on the banks of the Murray River, on leaves of *Danthonia ?caespitosa*, June 1971, D.G. Parbery (MELU 7903F); Gippsland, on the banks of Albert Creek, near Port Albert Cemetery, on leaves of *Danthonia racemosa*, 27 June 1978, I.C. Clarke No 535 (MELU); Mt Derrimut, on dead leaves of *Danthonia* sp., 1982, V. Beilharz (VPRI 17212); NEW ZEALAND, Wellington, Tiritea, on leaves of *Danthonia pilosa*, 4 March 1921, G.H. Cunningham (PDD 1053); Wellington, Turakina, on leaves of *Danthonia penicillata*, 2 January 1921, G.H. Cunningham (PDD 1028, **isotype**).

Notes: Immature asci usually contain hyaline to pale yellow ascospores, surrounded by a layer of hyaline mucilage, up to 2.5 μm thick. Mature ascospores are pale brown, and dark brown mucilage-like material envelopes the ascospores. Asci appear to fracture, releasing adhesive groups of sheathed ascospores. The brown sheaths then appear to dissolve, releasing pale brown ascospores.

Walker and Francis (1977) found that the ascus gelatinous contents surrounding immature ascospores stained dark brown in Melzer's reagent. Cannon (1989) reported the outer ascospore wall layer of *Sphaerodothella danthoniae* (= *Sphaerodothella*) as weakly verrucose, and variable in thickness, comparing it to the variable wall thickness of *Neocosmospora* E.F. Sm. (Cannon and Hawksworth, 1984). *Neocosmospora* (*Hypocreales*) appear to have ornamented ascospores with a solid wall of variable thickness, whereas in *Sphaerodothella*, the ascospores may be faintly verrucose, and the perispore layer



Figs. 10-15. *Sphaerodothella danthoniae* and *Parberya kosciuskoa* (from holotype). **10-12.** *Sphaerodothella danthoniae*. **10.** Vertical section through ascomata. **11.** Vertical section through ostiolar canal. **12.** Vertical section through peridium. **13-15.** *Parberya kosciuskoa*. **13.** Vertical section through ostiolar canal. **14.** Vertical section through peridium. **15.** Vertical section through ascoma. Bars: 10, 15 = 50 μm , 11-14 = 10 μm .

appears mucilaginous in composition. As a result, the perispore in *Sphaerodothella* appears to eventually "wear off" in water.

During this study, plant herbarium specimens of *Danthonia* were examined in an effort to locate further collections of *Parberya kosciuskoa*. Although no other collections of this fungus were located, several new specimens of *S.*

danthoniae were located, which have extended the known distribution of this fungus to include Tasmania.

***Parberya* C.A. Pearce and K.D. Hyde, gen. nov.**

Macula parvus suboblata vel lineara, nigra et nitida, plana vel leviter elevata, multilocula.

Teleomorphosis: *Ascomata* globosa vel irregularia, immersa, clypeata. Ostiolum centralum vel propagulum, paraphysaticum. *Paraphyses* hyalines, septates. *Asci* octospori, cylindrici vel clavati, unitunicati, pedicellati, interdum opacus disciformis apparato apicali. *Ascospores* ovalis vel ellipsoideae, apiculus rotundae, unicellulares, aureus-brunneae, decus brevis obtuscus spinae.

Etymology: named in honour of D.G. Parbery, an eminent Australian plant pathologist, who has contributed greatly to our mycological understanding of the *Phyllachoraceae* on *Gramineae*.

Species typica: *Parberya kosciuskoa* C.A. Pearce and K.D. Hyde, sp. nov.

Stromata developing as suboblata to linear, black, shiny tar spots containing ostiolate *ascomata*. *Ascomata* immersed in the host tissue, beneath a black clypeus, globose to irregular with a central to slightly off-centre ostiolar canal, lined with paraphyses. *Peridium* composed of several layers of flattened, elongate, thin-walled cells. *Paraphyses* present. *Asci* 8-spored, cylindrical to clavate, unitunicate, with a non reactive apical, disc-like apparatus. *Ascospores* oval to ellipsoidal, with rounded poles, aseptate, golden-brown, ornamented with short blunt spines, lacking a germ pore or germ slit.

Notes: *Parberya* is introduced to accommodate phyllachoraceous species forming tar spots on leaves, which contain golden-brown to brown, spinose ornamented ascospores. *Parberya kosciuskoa* C.A. Pearce and K.D. Hyde is a new species from Australia, and *Sphaerodothis arxii* P.F. Cannon is transferred to this genus. The distinctly ornamented ascospores of *Parberya* appear to be unique in the *Phyllachoraceae*. *Oxodeora* K.D. Hyde and Cannon is the only other genus within the *Phyllachoraceae* with substantial ascospore ornamentation, however, it differs from *Parberya* in having light brown ascospores covered with wide, longitudinal, irregular ridges, and in its erumpent linear stromata (Hyde and Cannon, 1999).

Cannon (1989, 1991) noted that within the *Phyllachoraceae*, the ascospores of *Stigmochora* were faintly verrucose. However, they differ from *Parberya* in being hyaline and 1-septate. Cannon (1991) also noted that occasional specimens of *Phyllachora bakeriana* Henn. have slightly roughened ascospores.

Cannon (1989) suggested possible affinities between *Sphaerodothis arxii* and *Helochora*, which have ornamented, mid-brown ascospores. Sherwood (1979) described *Helochora hypertropha*, the type species of *Helochora*, and assigned it to the *Polystigmataceae* (= *Phyllachoraceae*, Hawksworth *et al.*, 1995). The fungus was reported as having large perithecia (1 × 0.5 mm), immersed in hypertrophied, colourless portions of living host leaves, which contain 8-spored, unitunicate, thin-walled asci, lacking an apical apparatus, and ascospores which are ovoid, dark brown and ornamented with coarse warts

separated by reticulated fissures. The host plant, *Puya* sp., belongs to the *Bromeliaceae*. Eriksson (1981) later examined the genus in his review of bitunicate ascomycetes, and transferred *Helochora* to *Mesnieraceae*.

Cannon (1989) examined recently collected material of *Helochora hypertropha* and found thin-walled asci typical of the *Phyllachoraceae*. *Parberya* differs from *Helochora* in having typical phyllachoraceous black leaf spots, which usually do not overtly disrupt the host leaf tissue, as compared to the colourless, hypertrophied host leaf tissue of *Helochora*. The peridium of *Parberya* also significantly differs, comprising several layers of thin-walled, flattened brown to hyaline fungal cells less than 0.5 μm diam. In *Helochora*, the peridium is colourless and composed of flattened interwoven hypha 2-5 μm diam.

Key to species of *Parberya*

1. Ascospores greater than 25 μm long..... *P. kosciuskoa*
 1. Ascospores less than 25 μm long..... *P. arxii*

Parberya kosciuskoa C.A. Pearce and K.D. Hyde sp. nov. (Figs. 16-22)

Macula 5-11 mm longa, 0.5-1 mm lata, interdum coalescena lineara, nigra et nitida, multilocula.

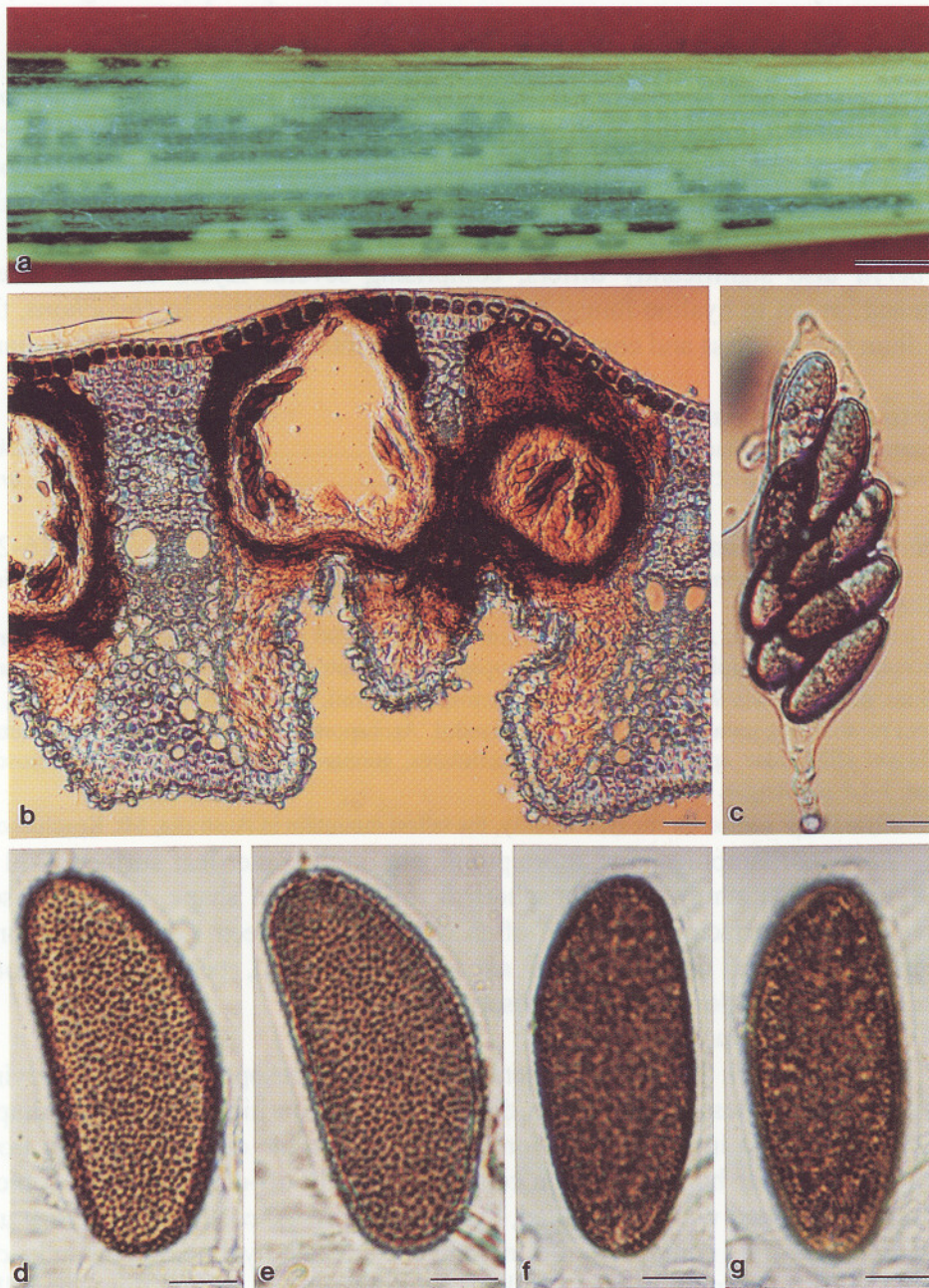
Teleomorphosis: *Ascomata* 200-260 μm diam., 200-290 μm alta, globosa vel irregularia, immersa, clypeata. *Ostiolum* centralum vel propagulum, paraphysaticum. *Paraphyses* 2 μm diam., hyalines, septates. *Asci* 91-132 \times 20-39 μm , octospori, clavati, unitunicati, breviter pedicellati, ad apicem rotundi, apparatus apicale, 2 \times 2 μm praediti. *Ascosporae* 28-36 \times 9-13 μm , 1-3 seriatas, ovalis vel ellipsoidae apiculis rotundae, unicellulares, aureis-brunneae, decus brevis obtusius spinas, 1-1.5 μm longae.

Etymology: named for the type locality, the tallest mountain in Australia, Mt. Kosciusko.

Leaf spot: amphigenous, more prominent on the outer leaf surface, 5-11 \times 0.5-1 mm, black, shiny, roughly spherical to irregular in shape, slightly raised above the leaf surface at maturity, often coalescing between leaf fibres to form linear black lines, ostiole visible as an apical, small, central round pore, multiloculate, no chlorotic regions observed.

Anamorph: not observed.

Teleomorph: *Ascomata* immersed in the host mesophyll, often occupying the full leaf thickness, 200-260 μm diam., 200-290 μm high, variable in shape, roughly globose to irregular, occasionally slightly stellate due to distortion from the host's vascular bundles, with a central to slightly off-centre, widely conical ostiolar canal, lined with thin-walled, hyaline paraphyses, ca. 1 μm wide, 6-9 μm long. *Endoperidium* composed of thin-walled, flattened, hyaline, fungal cells, ca. 5-8 μm thick, merging outwardly with an exoperidium, ca. 10 μm thick laterally, 10-18 μm thick at the base and upper ascoma, composed of orange-brown, flattened fungal cells, amorphous in places due to melanisation. *Exoperidium* fuses outwardly with an irregular region of orange-brown, partly melanised, distorted



Figs. 16-22. *Parberyia kosciuskoa* (from holotype). 16. Leaf spots. 17. Vertical section through ascomata illustrating ostiole, peridium and host tissue. 18. Ascus. 19-22. Ascospores. Scale bars: a = 1 mm, b = 50 μ m, c = 10 μ m, d-g = 5 μ m.

host mesophyll laterally, and an upper and lower clypeus, consisting of a brown-black melanised region of host epidermis and fungal cells, beneath yellow-brown discoloured host cuticle, *ca.* 12 μm thick adjacent to the ostiole, increasing to 18-50 μm at the ascomata perimeter. Asci and paraphyses arise from the inner ascomatal base. *Paraphyses* filiform, as long as asci, up to 2 μm diam., hyaline, septate, and generally deliquescent at maturity. *Asci* 91-132 \times 20-39 μm , clavate, conforming to the shape of ascospores, 8-spored, short pedicellate, unitunicate, thin-walled at maturity, apex rounded and often papillate, sometimes with an opaque, apical disc, 2 \times 2 μm , non-reactive in Melzer's reagent. Asci appear to mature sequentially, immature asci often thick-walled. *Ascospores* 2-3-seriate, often overlapping, 28-36 \times 9-13 μm , oval to ellipsoidal, with rounded apices, occasionally slightly reniform, sometimes inequilateral, hyaline-yellow, guttulate, and not markedly spinose when immature, when mature, golden-brown with an ornamentation of blunt spines, *ca.* 1-1.5 μm long, evenly distributed over the spore surface, no mucilaginous sheath noted, germ pores absent.

Host: Danthonia pallida R. Br. (= *Danthonia robusta* F. Muell.)

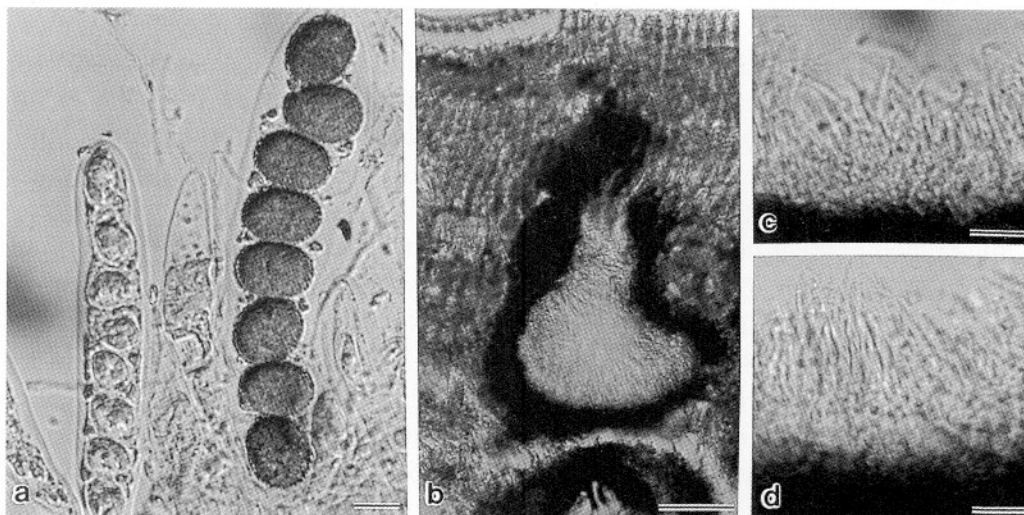
Known distribution: Australia.

Holotype: AUSTRALIA, New South Wales, Mt Kosciusko R.D. 71, on leaves of *Danthonia cf. pallida*, January 1899, J.H. Maiden and W. Froggart (DAR 28023).

Notes: *Parberya kosciuskoa* was originally collected nearly 100 years ago by J.H. Maiden and W. Froggart. During a review of *Sphaerodothis* on *Danthonia*, J. Walker re-examined the specimen and in a note enclosed with the specimen, wrote that it was "quite distinct from *Sphaerodothis danthoniae*," and was "perhaps undescribed". During this study of phyllachoraceous collections in Australia, we have also re-examined the specimen. It differs markedly from *Sphaerodothis* and *Phyllachora*, and in this paper, is described within a new genus, *Parberya*.

According to the type envelope, Maiden and Froggart originally identified the grass host as *Danthonia robusta* F. Muell. This taxon has since been synonymised with *Danthonia pallida* R. Br. Unfortunately, the type collection of *P. kosciuskoa* contains only small leaf fragments, therefore it is not possible to confirm the identity of the host. Despite a search of *Danthonia* herbaria collections at ADEL, HO, MELU and RBGS, no further collections of *P. kosciuskoa* have been located.

We have also examined *Sphaerodothis arxii* and have found it to be very similar to *P. kosciuskoa*, but the Australian collection has ascospores significantly larger as to warrant separate species status. Many species of *Phyllachora*, particularly graminicolous taxa, produce spermatia, which belong in the form genus *Linochora* Höhn. (Parbery, 1967; Parbery and Langdon, 1963, 1964). A *Linochora*-like andromorph has also been found associated with *P. arxii*, and is



Figs. 23-26. *Parberyia arxii* (from holotype). **23.** Ascus. **24.** Vertical section through ascoma illustrating ostiolar neck, peridium and host tissue. **25, 26.** Vertical section through spermatogonia illustrating spermatia bearing cells and spermatia. Bars: 23 = 10 μm , 24 = 50 μm , 25, 26 = 5 μm .

described here for the first time. This is another character that links *P. arxii* with the *Phyllachoraceae*.

Parberyia arxii (P.F. Cannon) C.A. Pearce and K.D. Hyde, **comb. nov.**

(Figs. 23-26).

\equiv *Sphaerodothis arxii* P.F. Cannon, *Studies in Mycology* 31: 51 (1989).

Leaf spots: on the outer leaf surface, variable in shape, ranging in size from minute, 65-130 \times 50-91 μm , singular, black shiny, circular to ellipsoidal, coalescing to form linear to irregular shaped, black leaf spots, 1-3 mm \times 0.3-0.75 mm, slightly raised above the leaf surface at maturity, ostiole a small, round apical pore, multiloculate. Visible on the inner surface of the curled leaf as a swelling in the leaf tissue, linear, blackened, discoloured host tissue visible only at the invaginations of the leaf surface.

Andromorph: similar in macroscopic morphology to minute black leaf spots. **Spermatogonia** in section; immersed in the host's mesophyll, occasionally occupying the full leaf thickness, developing singly, or adjacent to spermatogonia or ascomata, 115-300 μm diam., 160-295 μm high, roughly subglobose, shape sometimes distorted by the close proximity of adjacent vascular bundles, sometimes almost encircling the host's vascular bundles, with a long, wide cylindrical ostiolar canal. **Spermatogonial wall** 20-30 μm thick at the base and

apical ostiolar canal, increasing up to 30–40 μm at the lateral walls, comprised of multiple layers of small, brown to brown-black, thin-walled, flattened, fungal cells, grading into a narrow band of hyaline cells on the interior surface, merging outwardly on the upper and often the lower leaf surface with a clypeus, composed of deeply melanised, brown to black, host epidermal cells and cuticle, sometimes extending into the mesophyll, *ca.* 30–45 μm thick. Spermatogonial wall merging laterally with a narrow region of partly melanised, orange-brown, distorted host mesophyll. *Spermatiphores* numerous, arising from the entire interior surface of the spermatogonia, *ca.* 12–18 μm long, 1–2 μm thick, cylindrical, hyaline, no collarette seen. *Spermatia* borne singly, 14–26 \times 0.5–0.75 μm , filiform, straight, slightly curved, c-shaped, or sigmoidal, widest at the base, tapering slightly to an acute, rounded apex, hyaline, aseptate, smooth-walled.

Teleomorph: Ascomata immersed in the mesophyll, often occupying the full leaf thickness, developing singly, or adjacent to spermatogonia or other ascomata, shape variable, roughly globose to subglobose, shape sometimes distorted by the close proximity of adjacent vascular bundles, with a long, wide, cylindrical ostiolar canal. *Peridium* 10–34 μm thick, composed of multiple layers of thin-walled, flattened, fungal cells, dark-brown to black, grading into a narrow band of hyaline cells on the interior ascomata surface. Peridium merges outwardly on the upper leaf surface with deeply melanised, brown to black, host chlorenchyma cells and a clypeus, variable in size (see description of leaf spot above), composed of deeply melanised, brown to black, host epidermal cells and cuticle, sometimes extending into the mesophyll, *ca.* 30–45 μm thick. Peridium merging basally with a lower clypeal region, 25–65 μm thick, and similarly composed. Laterally, the peridium merges outwardly with the vascular bundles of the host and a narrow region of distorted mesophyll cells, or sometimes with the adjacent wall of developing conidiomata or ascomata. *Paraphyses* numerous, slightly longer than asci, 1.5–4 μm thick, tapering slightly to rounded apices, septate. *Asci* 117–150 \times 18–26 μm , cylindrical to cylindrical-clavate, 8-spored, unitunicate, immature asci thick-walled, thin-walled at maturity, short pedicellate, apex rounded to obtuse, no apical apparatus seen. *Ascospores* uniseriate, occasionally biseriate, 16–21 \times 13.5–16.5 μm , subglobose to widely ellipsoidal, immature ascospores hyaline to pale yellow, golden-brown when mature, surface ornamented with short blunt, reticulate spines.

Host: Pentameris sp.?

Known distribution: Africa, not localised.

Material examined: LESOTO, imported into Canada from Africa, via Air Losotho, on straw from a broom, *Pentameris* sp.?, 15 November 1984, L. Bedard (IMI 289814, **holotype**).

Notes: Cannon (1989) originally described *P. arxii* in *Sphaerodothis*, noting that it was the only species in *Sphaerodothis* with significantly ornamented ascospores. He provides an extensive description, including microphotographs.

The measurements obtained from our examination of the holotype are very similar to those given by Cannon (1989).

In their discussion on *Sphaerodothis*, Hyde and Cannon (1999) described an anamorphic state of *S. arengae*, which included ellipsoidal α -conidia and filiform β -conidia. The filiform spermatia associated with *P. arxii*, differ from *S. arengae*, but are similar to those found associated with many *Phyllachora* species, particularly those taxa on grasses.

According to Cannon (1989) the holotype of *Sphaerodothis arxii* was originally intercepted at Toronto International Airport by L. Bedard, on 5 May 1982, as an infection of grass used in the making of brooms from Lesotho. The host species, tentatively identified as *Pentameris* sp., belongs in the *Arundineae* subtribe *Danthoniae* (Cannon, 1989). Other members of this subtribe in Australia and New Zealand are *Danthonia* and *Notodanthonia*, which are parasitised by *Sphaerodothella*.

To date, only four phyllachoraceous taxa have been described from the *Danthoniae* worldwide; *Sphaerodothella danthoniae*, *Parberya kosciuskoa*, *P. arxii* and *Phyllachora danthoniae* (Chardon) Ciferri. *Phyllachora danthoniae*, known from the Dominican Republic, is quite distinct from other phyllachoraceous taxa on *Danthonia*, as colonies are subcuticular, asci are clavate, $70-85 \times 17-21 \mu\text{m}$, and ascospores are hyaline, long-ellipsoidal, with one end attenuate (Parbery, 1967).

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References

- Cannon, P.F. (1989). Notes on *Sphaerodothis* species parasitic on *Gramineae*. *Studies in Mycology* 31: 49-59.
- Cannon, P.F. (1991). A revision of *Phyllachora* and some similar genera on the family *Leguminosae*. *Mycological Papers* 163: 1-302.
- Cannon, P.F. (1996). Systematics and diversity of the *Phyllachoraceae* associated with *Rosaceae*, with a monograph of *Polystigma*. *Mycological Research* 100: 1409-1427.
- Cannon, P.F. and Hawksworth, D.L. (1984). A revision of the genus *Neocosmospora* (Hypocreales). *Transactions of the British Mycological Society* 82: 673-688.
- Eriksson, O. (1981). The families of bitunicate ascomycetes. *Opera Botanica* 60: 1-220.

- Hawksworth, D.L., Kirk, P.M., Sutton, B.C., and Pegler, D.N. (1996). *Ainsworth and Bisby's Dictionary of the Fungi* (8th edition). CAB International, Surrey, UK.
- Hyde, K.D. and Cannon, P.C. (1999). Fungi causing tar spots on palms. *Mycological Papers* 175: 1-114.
- Parbery, D.G. (1967). Studies on graminicolous species of *Phyllachora* Nke. in Fckl. V. A taxonomic monograph. *Australian Journal of Botany* 15: 271-375.
- Parbery, D.G. (1996). Spermatial states of fungi are andromorphs. *Mycological Research* 100: 1400.
- Parbery, D.G. and Langdon, R.F.N. (1963). Studies on graminicolous species of *Phyllachora* Fckl. III. The relationship of certain scolecospores to species of *Phyllachora*. *Australian Journal of Botany* 11: 131-140.
- Parbery, D.G. and Langdon, R.F.N. (1964). Studies on graminicolous species of *Phyllachora* Fckl. IV. Evaluation of the criteria of species. *Australian Journal of Botany* 12: 265-281.
- Pearce, C.A., Reddell, P. and Hyde, K.D. (1999). A revision of *Phyllachora* (Ascomycotina) on hosts in the angiosperm family *Asclepiadaceae*, including *P. gloriana* sp. nov., on *Tylophora bentharii* from Australia. *Fungal Diversity* 3: 123-138.
- Pearce, C.A., Reddell, P. and Hyde, K.D. (2000). A member of the *Phyllachora shiraiana* complex (Ascomycota) on *Bambusa arnhemica*: a new record for Australia. *Australasian Plant Pathology* 29: 205-210.
- Simon, B.K. (1993). *A Key to Australian Grasses* (2nd edition). Queensland Department of Primary Industries, Brisbane, Australia.
- Sherwood, M.A. (1979). *Helochora*, a new genus of *Polystigmataceae* from Chile. *Mycologia* 71: 648-652.
- Walker, J. and Francis, S.M. (1977). *Sphaerodothis danthoniae* (McAlp.) comb. nov. *Transactions of the British Mycological Society* 69: 151-152.

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