
***Brobdingnagia eucalypticola* sp. nov. and *Phyllachora neolitseae* sp. nov., two new phyllachoraceous ascomycetes from Australia**

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Brobdingnagia eucalypticola sp. nov. and *Phyllachora neolitseae* sp. nov., causing tar spots on leaves of *Eucalyptus* sp. and *Neolitsea dealbata* respectively are described and illustrated.

Key words: ascomycetes, *Eucalyptus*, foliicolous fungi, *Neolitsea*, tar spots, taxonomy.

Introduction

During investigations of undetermined ascomycetes in Herbarium BRIP, two species causing tar spots were found to be similar to species of *Phyllachora*. One on leaves of *Neolitsea dealbata* is described as a new species of *Phyllachora* and the other on leaves of *Eucalyptus* sp. is a new species of *Brobdingnagia*, another member of the *Phyllachoraceae*. Currently eight genera of *Phyllachoraceae*, namely *Coccodiella*, *Glomerella*, *Ophiodothella*, *Parberya*, *Phyllachora*, *Polystigma*, *Rehmiodothis* and *Sphaerodothella* are represented in Australia (Pearce and Hyde, 2001). *Brobdingnagia* is an additional genus reported for the first time from Australia.

Materials and methods

Observations and measurements were made from dried herbarium specimens. Lactofuchsin was used as mounting medium. Sections were cut using a freezing microtome, mostly at a thickness of 10 µm mounted in lactofuchsin and observed using brightfield and Nomarski differential interference contrast microscopy. Photomicrographs were taken using a digital camera (Leica 200 with IM 1000 Multifocus Module).

Taxonomy

***Brobdingnagia eucalypticola* Sivan. & R.G. Shivas, sp. nov.** (Figs. 1-9)

Etymology: based on *Eucalyptus*, the name of the host genus.

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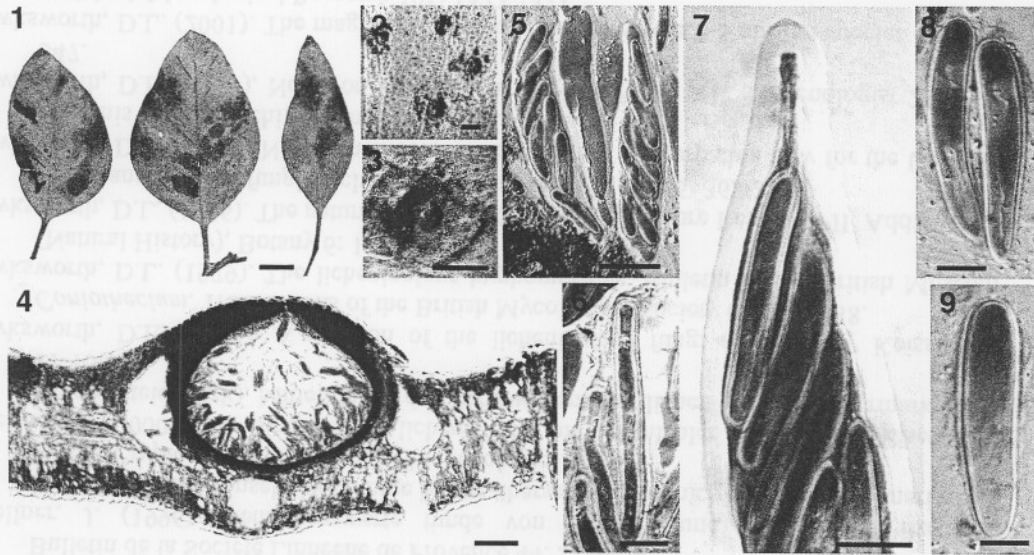
Maculae epiphyllae, 1-2.5 mm diam., quasi circulares, tela epiphylla affecta brunnea et moribunda, vitta purpurascens-atra vel atrobrunnea per areae marginem. Paries atra 0.5-2 mm diam., plerumque conice globosa vel hemisphaerica, significanter superficiem telae nuriciae tollens, atra, 1-5 loculata. *Ascomata* epigena, hologena, immersa, totam superficiem foliorum tenentia infra cuticulam vel epidermidem, tela quasi vallum et mesophylli pars, ostiolata, 450-650 μm latum, 475-650 μm altum, paries superiore transiens in clypeum. *Clypeus* constitutus tela epidermali et partim quasi vallo, plena cellulis fungalibus oclusis materia atrobrunnea, amorphia, atrata, quae ultra ascomata porrigitur et, ubi multilocularis est, continua inter valde contigua ascomata, 19-22 μm lata. Paries ascomati lateralis et inferiore 13-18 μm crassus, cellulis brunneis, crassimuratis, compressis constitutus. *Ostiolum* inconspicuum, periphysatum, epigenum, aliquando papillatum, usque ad 60 μm latum. *Paraphyses* multae, simplices vel ramosae, hyalinae, filamentosae, procul septatae, 3.5-5 μm crassae. *Asci* late cylindrici, cylindrici-clavati, brevi vel sublongipedicellati, gelatinosi, octospori, unitunicati structura tenui, nonamyloidea, vestigiali, apicali, 75-138 \times 10-22 μm . *Ascospores* allantoideae (botuliformes), anguste cylindricae, cylindricae-clavatae vel clavatae, aseptatae, hyalinae, rectae vel curvatae, laeves vel asperae, tenuitunicatae, 38-115 \times 7-11 μm , saepe 40-53 \times 7-9 μm .

Andromorph: not observed.

Leaf spots 1-2.5 mm diam., roughly circular, the affected leaf tissue brown and necrotic with a purplish black to brown border at the edge of the area. *Blackened region* 0.5-2 mm diam., usually conic spherical to hemispherical, significantly raising the surface of the host tissue, black, 1-5 loculate, ostiolate. *Ascomata* epigenous to hologenous, developing below the cuticle or the epidermis, within the palisade tissue and part of the mesophyll, 450-650 μm wide, 475-650 μm high, with the upper wall merging with the clypeus. *Ostiole* epigenous, periphysate, sometimes papillate, central, up to 60 μm wide. *Clypeus* composed of epidermal and some palisade tissue filled with fungal cells which are occluded by dark brown amorphous, melanized material, extending beyond ascomata and when multilocular continuous between closely adjacent ascomata, 19-22 μm wide. Lateral and lower peridium 13-18 μm thick are composed of brown, thick-walled compressed cells. *Paraphyses* numerous, simple or branched, hyaline, filamentous, distantly septate, 3.5-5 μm thick. *Asci* broadly cylindrical to cylindric-clavate, short to fairly long stalked, unitunicate with a faint, nonamyloid, rather vestigial apical structure, gelatinous, evanescent, 75-138 \times 10-22 μm . *Ascospores* allantoid (sausage-shaped), narrowly cylindrical, mostly cylindric-clavate to clavate, hyaline, thin-walled, aseptate, smooth to roughened, 38-115 \times 7-11 μm , commonly 40-53 \times 7-9 μm , without mucilaginous sheaths.

Material examined: AUSTRALIA, Queensland, Brisbane, Gumdale, on leaves of *Eucalyptus* sp., 4 Feb. 1986, M. Cox (BRIP 15042, holotype, designated here); on leaves of *Eucalyptus* sp., 5 Jan. 1986, M. Cox (BRIP 14981), 8 Sep. 1985, M. Cox (BRIP 14899); Western Australia, Wittanoon, on leaves of *Eucalyptus brevifolia* F. Muell., Sep. 1974, J.H. Simmonds (BRIP 8949).

Host: *Eucalyptus* sp.



Figs. 1-9. *Brobdingnagia eucalypticola* 1. Habit on leaves of *Eucalyptus brevifolia* (from paratype). 2-9. *B. eucalypticola* (from holotype) on *Eucalyptus* sp. 2, 3. Leaf spots. 4. Vertical section of ascoma. 5. Asci. 6. Ascospore. 7. Ascus with apical structure. 8, 9. Ascospores. Bars: 1 = 1 cm; 2, 3 = 1 mm; 4 = 100 μ m; 5 = 20 μ m; 6-9 = 10 μ m.

Known distribution: Australia.

Notes: *Brobdingnagia* is a genus of phyllachoraceous ascomycete characterised by large cylindrical to clavate ascospores inside a gelatinous evanescent unitunicate ascus. *Brobdingnagia nigeriensis* (Sivan. and Okpala) K.D. Hyde and P.F. Cannon and *B. nigeriensis* subsp. *corneri* K.D. Hyde & P.F. Cannon (1999) are the two known taxa in the genus. Their ascospores are arranged fasciculately inside the ascus and are not more than 85 μ m long. Both subspecies occur on the palm hosts, *Calamus* and *Eremospatha*, respectively in West Africa (Hyde and Cannon, 1999).

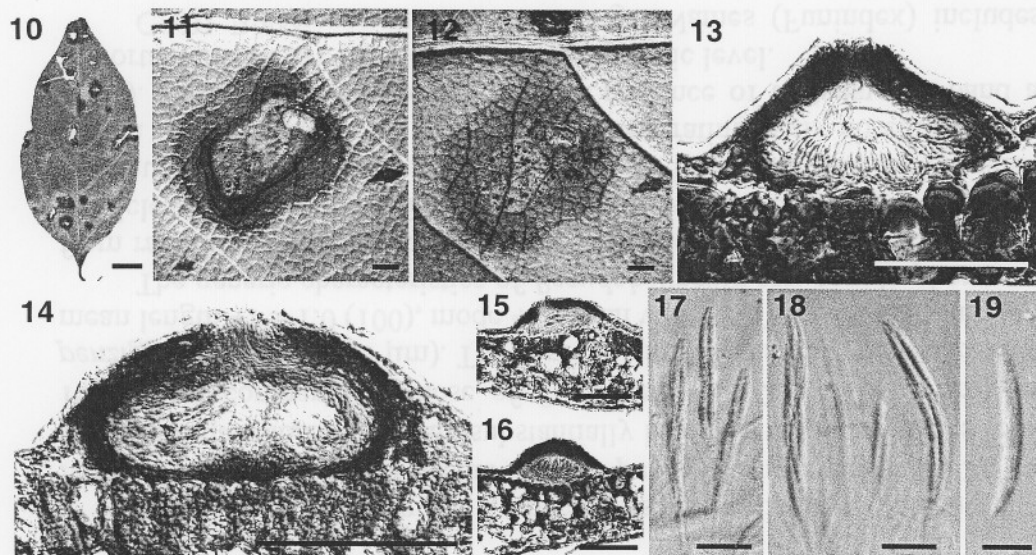
Brobdingnagia eucalypticola causes tar spots on leaves of *Eucalyptus* sp. It differed from the two known species of *Brobdingnagia* by its relatively larger ascospores. The variations in size and shape of the ascospores seem to occur during different stages of the ascospore development. Immature ascospores often show these variations in structure, shape and size. Mature ascospores are mostly cylindrical-clavate to clavate.

***Phyllachora neolitsea* Sivan. & R.G. Shivas, sp. nov.**

(Figs. 10-19)

Etymology: based on *Neolitsea*, the name of the host genus.

Maculae epiphyllae, pallide brunneae, margine atrobrunneo limitatae, rotundatae vel irregulares, usque 1 cm diam., partes superficiei foliorum extra marginem decolorantes, spectabiles ut maculae atrae in superficie inferiore. **Ascostromata** epigena, solitaria, dispersa, raro aggregata, subcuticularia, superficiem nutricianum fortiter tollentia, regionem inter



Figs. 10-19. *Phyllachora neolitseae* (from holotype). 10. Leaf spots. 11. Leaf spot on adaxial surface. 12. Leaf spot on abaxial surface. 13. Vertical section of pycnidium. 14-16. Vertical sections of ascum. 17, 18. Asci. 19. Ascospore. Bars: 10 = 1 cm; 11, 12 = 1 mm; 13-16 = 100 μ m; 17, 18 = 10 μ m; 19 = 5 μ m.

cuticulum et epidermidem, tenentia. *Peridium* 8-17 μ m latum, cellulis constitutum crassimuratis, hyalinis usque ad brunneis. *Clypeus* transiens in parietem peridi superiores, cellulis constitutus crassimuratis, atrobrunneis, opacis, atratis, origine et fungali et epidermali. *Paraphyses* filiformes, simplices, hyalinae, septatae, usque ad 2 μ m latae. *Asci* cylindrici vel cylindrici-clavati, unitunicati, octospori, tenuimurati, brevi- vel sub longi-pedicellati, 42-70 \times 3.5-6 μ m. *Ascospores* anguste fusiformes, apicibus attenuati, aseptatae, hyalinae, rectae vel leviter curvatae, imbricate biseriatae, laeves 17-21 \times 1.5-2 μ m.

Leaf spots epigenous, pale brown, delimited by dark brown border, rounded to irregular, up to 1 cm diam., discolouring areas of the leaf surface outside the border, visible as black spots on the lower surface. *Ascomata* epigenous, solitary, scattered, rarely aggregated, immersed, subcuticular, strongly raising the host surface, occupying the region between the cuticle and epidermis, ostiolate. *Peridium* 8-17 μ m wide, composed of thick-walled, hyaline to brown cells. *Clypeus* merging with the peridial wall, composed of thick-walled, dark brown, opaque, melanized cells of both fungal and epidermal origin. *Paraphyses* filiform, simple, hyaline, septate, up to 2 μ m wide. *Asci* cylindrical to cylindrical-clavate, unitunicate, 8-spored, thin-walled, short to moderately long stalked, 42-70 \times 3.5-6 μ m. *Ascospores* narrowly fusiform with attenuated ends, aseptate, hyaline, straight to slightly curved, smooth, overlapping biseriatae, 17-21 \times 1.5-2 μ m.

Andromorph: *Conidiomata* similar to ascostromata, immersed, subcuticular, strongly raising the host surface, occupying the region between the cuticle and epidermis, ostiolate. *Conidiogenous cells* arising from the basal and lateral walls, up to 7.5 μm long, 0.5-0.8 μm wide, cylindrical, phialidic, aseptate, hyaline, forming conidia singly at the apex. *Conidia* hyaline, filiform, aseptate, up to 20 \times 0.8 μm .

Material examined: AUSTRALIA, Queensland, Ravensbourne State Forest, on leaves of *Neolitsea dealbata*, 1 Sep. 1990, J.W. Tierney (BRIP 17267, holotype designated here); on leaves of *N. dealbata*, 23 Apr. 1978, J.L. Alcorn 73-096 (BRIP 8848a); Cunningam's Gap National Park, on leaves of *N. dealbata*, 2 Sep. 1981, J.L. Alcorn 81138 (BRIP 13777a).

Notes: *Phyllachora queenslandica* Hansf. is the only other *Phyllachora* species described on *Neolitsea* and is also found in Queensland, Australia (Hansford, 1956). *Phyllachora queenslandica* has rather longer and wider, oblong elliptical ascospores measuring 19-32 \times 8-12.5 μm and a thick mucilaginous sheath which surrounds the ascospores. Pearce and Hyde (1993) give a recent description of this species.

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