CSIRO PUBLISHING

www.publish.csiro.au/journals/app *Australasian Plant Pathology*, 2005, **34**, 509–515

An annotated check list of *Ramularia* species in Australia

U. Braun[A], *J. Cunnington*[B,E], *M. J. Priest*[C], *R. G. Shivas*[D] *and K. Schubert*[A]

[A]Martin-Luther-Universität, FB. Biologie, Institut für Geobotanik und Botanischer Garten, Herbarium, Neuwerk 21, D-06099 Halle, Germany.
[B]Department of Primary Industries, 621 Burwood Hwy, Knoxfield, Vic 3180, Australia.
[C]Plant Pathology Herbarium (DAR), NSW Agriculture, Orange Agricultural Institute, Forest Road, Orange, NSW 2800, Australia.
[D]Plant Pathology Herbarium, Plant Science, Department of Primary Industries and Fisheries, 80 Meiers Road, Indooroopilly, Qld 4068, Australia.
[E]Corresponding author. Email: james.cunnington@dpi.vic.gov.au

Abstract. An annotated check list of *Ramularia* species in Australia, based on re-examinations of collections deposited at BRIP, DAR and VPRI, is presented. Twenty-eight species are reported in Australia, most of them on introduced host plants. The new species *Cladosporium myrtacearum*, *Ramularia craspediicola* and *R. muehlenbeckiae* are described. Collections of *Cladosporium uredinicola*, *Neoramularia karelii*, *Passalora perfoliati* and *Pseudocercospora pongamiae-pinnatae*, previously deposited in Australian herbaria under '*Ramularia* sp.', are newly recognised for Australia.

Introduction

The genus *Ramularia* Unger comprises moniliaceous hyphomycetes, mostly plant pathogenic, causing leaf spots, but occasionally also saprobic or hyperparasitic. The conidiophores of *Ramularia* are mostly fasciculate, emerging through stomata or erumpent through the cuticle, and the conidiogenous cells are provided with conspicuous, somewhat thickened and darkened conidiogenous loci (scars). The conidia, formed singly or in chains, are amero- to phragmosporous. Braun (1998*a*) monographed the genus *Ramularia* and described and illustrated 328 species. Braun (1998*b*) listed additions to host ranges and distributions of many *Ramularia* species. As far as is known, *Ramularia* species are anamorphs of *Mycosphaerella* Johanson, which has been confirmed by molecular data (Crous *et al*. 2000, 2001). There has been no survey of the *Ramularia* species in Australia, although numerous economically important plant diseases are caused by this genus. Therefore, all undetermined herbarium collections deposited in the Australian herbaria BRIP, DAR and VPRI under *Ramularia* have been re-examined, as well as a broad selection of specimens from all previously recorded/identified species. The results are summarised in the following annotated check list. A few specimens originally deposited in these herbaria under *Ramularia* sp. belong to other genera and are discussed in an appendix.

List of species

The listed names of *Ramularia* species are alphabetically arranged. Herbarium specimens are cited when seen and some literature references are given for additional host ranges and distributions in Australia. All collections cited have been examined and checked on the basis of the monograph of *Ramularia* species by Braun (1998*a*). Species not previously reported in the literature to occur in Australia have been noted as new records and are listed in bold. The taxonomy of the host plants follows the Australian Plant Name Index (2004). Abbreviations of the herbaria are based on Holmgren *et al*. (1990). States and Territories of Australia have been abbreviated as NSW (New South Wales), NT (Northern Territory), QLD (Queensland), SA (South Australia), TAS (Tasmania), WA (Western Australia) and VIC (Victoria).

Ramularia ajugae (Niessl) Sacc.

On *Ajuga australis*, NSW, Warrumbungle National Park, 9 Oct. 1964, L.R. Fraser, BRIP 16096; QLD, Ravenshoe, 1 May 1987, J.L. Alcorn, BRIP 15860.

Notes: New to Australia.

Ramularia bellunensis Speg.

On *Leucanthemum* sp., VIC, Rosebud, 15 Sep. 1998, A. Santospiraito, VPRI 22024.

 10.1071/AP05055 0815-3191/05/040509

Notes: New to Australia. The conidia in this sample are verruculose. Braun (1998*a*) described the conidia of *R. bellunensis* to be smooth, but they are smooth to verruculose, which could also be seen in various collections on *Argyranthemum* spp. from Germany and New Zealand, deposited at HAL.

Ramularia beticola Fautrey & Lambotte

On *Beta vulgaris*, TAS, New Norfolk, 23 Sep. 1966, I. Geard, DAR 15842.

Ramularia craspediicola U. Braun & Priest, **sp. nov.** (Fig. 1)

Differt a R. asteris, R. baccharidis, R. cynarae, R. triboutiana et R. tanaceti stromatibus saepe intraepidermalibus, conidiophoris erumpentibus et conidiis 0–1(–2)-septatis.

Holotype: on *Craspedia uniflora* Forst. (Asteraceae), Australia, NSW, Snowy Mountains, Perisher Valley, near Snowy River Hotel, 20 Jun. 1968, O.M. Williams 68/29, DAR 16959.

On *Craspedia* sp., Australia, NSW, Snowy Mountains, behind Southern Cross Ski Lodge, Smiggin Holes, 19 Jan. 1972, Y. Fripp, DAR 23246; NSW, Kosciusko, near the Chalet, 6 Jan. 1971, Y. Fripp, DAR 23245; NSW, Kosciusko National Park, Mount Selwyn, 18 Apr. 1987, I. Pascoe *et al*., DAR 58905, ex VPRI 15289 and DAR 58924, ex VPRI 15308.

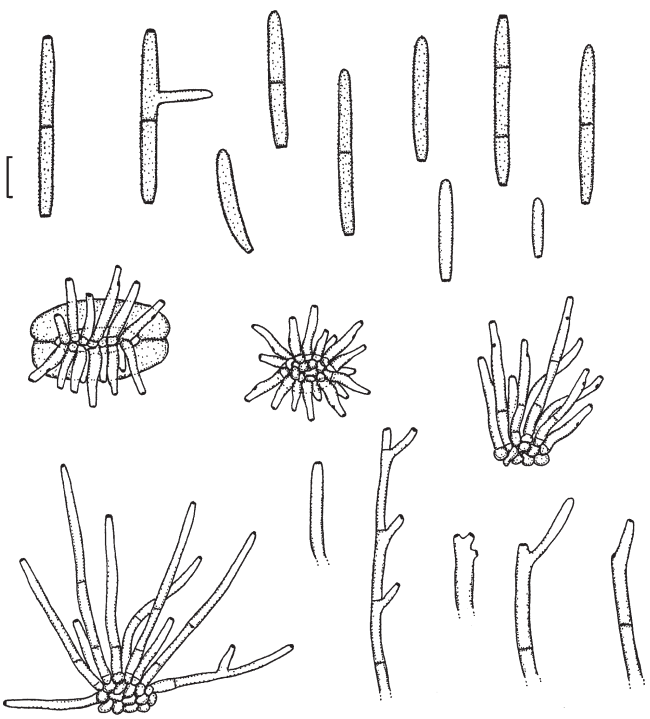

Fig. 1. *Ramularia craspediicola* sp. nov., conidiophore fascicle, conidiophores, conidia (based on DAR 16959). Bar: 10 µm. U. Braun del.

Leaf spots amphigenous, subcircular to irregular, 1–10 mm wide, medium to dark brown, centre greyish white, occasionally somewhat zonate, margin indefinite or darker. Caespituli amphigenous, usually hypophyllous, rather inconspicuous to punctiform, delicate, scattered, greyish white. Mycelium internal. Stromata substomatal to intraepidermal, 10–50 µm diam, subhyaline to yellowish-ochraceous, cells 2–4 µm diam. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from stromatic hyphal aggregations, emerging through stomata or usually erumpent through the cuticle, erect or almost so, occasionally decumbent, straight, subcylindrical to geniculate-sinuous, unbranched or occasionally branched, 5–90 × 2–4 µm, 0–4-septate, hyaline or subhyaline (content occasionally yellowish-greenish to very pale olivaceous), thin-walled, smooth; conidiogenous loci conspicuous, 1.5–2 µm wide, somewhat thickened and darkened. Conidia in chains, cylindrical, subcylindrical, occasionally slightly clavate, 12–40 × 2–5 µm, 0–1(–2)-septate, hyaline to subhyaline (content slightly yellowish-greenish), thin-walled, almost smooth to verruculose, apex obtuse to truncate, somewhat attenuated, base short obconically trunacte, 1–2 µm wide, hila slightly thickened and darkened.

Notes: *Ramularia craspediicola* on *Craspedium* spp. (Asteraceae, Inuleae [Angiantheae]) belongs to a group of *Ramularia* species on composites characterised by long, cylindrical conidia. *Ramularia asteris* (W. Phillips & Plowr.) Bubák (hosts: Astereae), *R. baccharidis* (Ellis & Everh.) U. Braun (hosts: Astereae), *R. cynarae* Sacc. (hosts: Cynareae), *R. triboutiana* (Sacc. & Letendre) Nannf. (hosts: Anthemideae) and *R. tanaceti* Lind (hosts: Anthemideae) are comparable species (Braun 1998*b*). However, the stromata in these species are usually substomatal, with conidiophores usually emerging through stomata, and the conidia are 0–3(–4)-septate. These species occur on unrelated hosts and they are geographically isolated from *C. craspediicola*, which is probably endemic in Australia.

Ramularia deusta (Fuckel) Karak

On *Lathyrus latifolius*, NSW, Oberon, Mar. 1943, DAR 3945.

Notes: New to Australia.

Ramularia gei (A.G. Eliasson) Lindr.

On *Geum urbanum*, NSW, Yarrangobilly, banks of Yarrangobilly River, near bridge, 29 Mar. 1989, I. Pascoe & S. Templer, VPRI 16227.

Notes: New to Australia.

Ramularia grevilleana (Oudem.) Jørst.

On *Fragaria* × *ananassa*, VIC, Wandin, 30 Sep. 1986, B. Barker & R. Soderland, VPRI 14541; QLD, Woombye, 11 Oct. 1926, E. Stewart, BRIP 5657.

Notes: The authorship of this species has usually been cited as '*Ramularia grevilleana* (Tul. & C. Tul.) Jørst.',

but must be corrected to '(Oudem.) Jørst.' (see Braun & Pennycook 2003).

Ramularia heraclei (Oudem.) Sacc.
= *Ramularia pastinacae* Bubák
On *Pastinaca sativa*, QLD, Brisbane, Sunnybank, 24 Jun. 1958, W. Woff, BRIP 5643; SA (Warcup & Talbot 1981); WA (Shivas 1989).

Ramularia inaequale (Preuss) U. Braun
= *Ramularia picridis* Fautrey & Roum.
On *Hedypnois cretica*, TAS, Glenorchy, 6 Jul. 1982, D. Morris, DAR 72532; VIC, Pinnaroo, 6 Oct. 2001, R.G. Shivas & K. Vánky, BRIP 28401. On *Picris echioides*, TAS, Prince of Wales Bay, 5 Jan. 1978, DAR 43797. On *Taraxacum officinale*, TAS, New Town, 6 Oct. 1978, D. Morris, DAR 72955.
Notes: This species has not been previously recorded on *Hedypnois cretica* in Australia.

Ramularia lamii Fuckel var. *lamii*
= *Ramularia menthicola* Sacc.
On *Mentha laxiflora*, VIC, Mount Macedon, 18 Jan. 1998, J. Edwards, VPRI 21676.
Notes: New to Australia; new host species.

Ramularia lamii Fuckel var. *minor* U. Braun
≡ *Ramularia brunellae* Ellis & Everh.
On *Prunella vulgaris*, VIC, Cathedral Range State Park, Cooks Mill Camp Site, 4 Feb. 1986, I. Pascoe, VPRI 13383.
Notes: New to Australia.

Ramularia lapsanae (Desm.) Sacc.
On *Lapsana communis* (as '*Senecio* sp.'), VIC, Bright, 6 May 1994, S. Isaacs, VPRI 20052.
Notes: New to Australia.

Ramularia muehlenbeckiae U. Braun & Priest, **sp. nov.** (Fig. 2)
Differt a R. pleuropteri conidiis brevioribus, 8–25 µm, 0–1-septatis, levibus vel verruculosis.

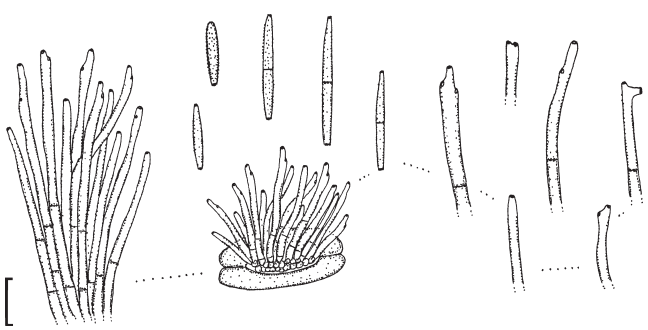

Fig. 2. *Ramularia muehlenbeckiae* sp. nov., conidiophore fascicles, conidiophores, conidia (based on DAR 70269). Bar: 10 µm. U. Braun del.

Holotype: on *Muehlenbeckia gunnii* (Polygonaceae), Australia, TAS, Mt. Helen plantation, near Scottsdale, 12 Sep. 1988, T. Wardlaw, DAR 70269.
Leaf spots amphigenous, subcircular to irregular, 2–12 mm wide, medium to dark brown, somewhat zonate, margin indefinite or narrow, darker brown, occasionally with a narrow reddish-purplish halo. Caespituli hypophyllous, punctiform, greyish white, not very conspicuous. Mycelium internal. Stromata substomatal, subglobose to irregular, 20–50 µm diam, hyaline. Conidiophores in small to moderately large fascicles, usually dense, arising from stromata, emerging through stomata, erect, straight, subcylindrical-filiform, barely geniculate-sinuous, unbranched, 10–100 × 2–4 µm, continuous to pluriseptate, hyaline, smooth, thin-walled; conidiogenous cells integrated, terminal, 10–30 µm long, conidiogenous loci conspicuous, 1–2 µm wide, slightly thickened and darkened. Conidia in simple chains, narrowly ellipsoid-ovoid, fusiform to cylindrical, 8–25 × 2–3.5 µm, 0–1-septate, smooth to verruculose, ends obtuse to subacute, hila 1–2 µm wide, slightly thickened and darkened.
Notes: Among *Ramularia* species on hosts belonging to the Polygonaceae, *R. pleuropteri* U. Braun on *Fallopia multiflora* in Japan is morphologically close to *R. muehlenbeckiae*, but differs in having longer, smooth conidia, up to 35 µm, with up to three septa. *Ramularia fagopyri* Abramov ex U. Braun (on *Fagopyrum* spp. in Asia, Europe and South America) and *R. occidentalis* Ellis & Kellerm. (on *Rumex* spp. in Asia, North and South America) have similar, but narrower conidia, usually 1.5–2 µm wide, and usually much shorter conidiophores (Braun 1998*a*).

Ramularia occidentalis Ellis & Kellerm. var. *occidentalis* (Fig. 3)
On *Emex australis*, QLD, Brisbane, Long Pocket, CSIRO Laboratories, 11 Feb. 1974, K.L.S. Harley,

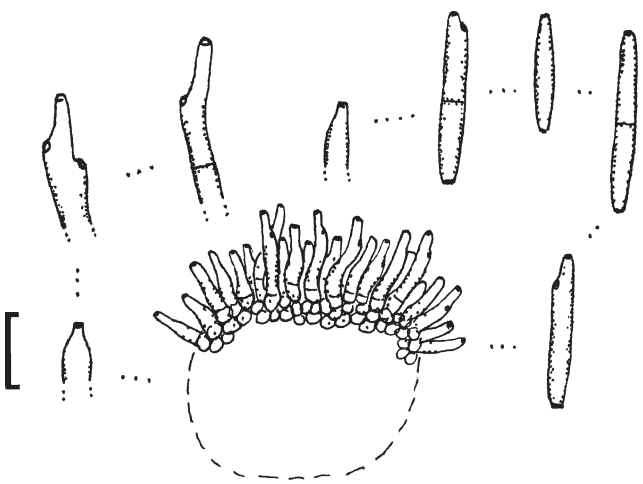

Fig. 3. *Ramularia occidentalis*, conidiophore fascicles, conidiophores, conidia (based on BRIP 5663). Bar: 10 µm. U. Braun del.

BRIP 8900; Gatton, Jun. 1974, K.L.S. Harley, BRIP 5663.

Notes: New to Australia; new host. This species is common in North and South America on various host species of the genus *Rumex*. *Ramularia occidentalis* var. *indica* (K.L. Kothari, M.K. Bhatn. & N.S. Bhatt) U. Braun is known from India and Pakistan on *Rumex dentatus*. The Australian fungus on *Emex australis* is morphologically indistinguishable from *R. occidentalis* var. *occidentalis*, having numerous conidiophores in dense fascicles, 5–20 × 1–4 µm, 0–1-septate, hyaline; conidia in simple or branched chains, subcylindrical, narrowly ellipsoid-fusiform, 5–20 × 1.5–4 µm, 0–1-septate, hyaline, smooth or almost so. The genus *Emex* is allied to *Rumex*.

Ramularia paspali (Deighton) U. Braun (Fig. 4)

≡ *Mycovellosiella paspali* Deighton.

On *Chloris ventricosa*, QLD, Moggill State Forest, 22 Mar. 1973, J.L. Alcorn 73.055, BRIP 5662.

Superficial hyphae sparingly branched, 0.5–2.5 µm wide, septate, hyaline, smooth; conidiophores solitary, arising from superficial hyphae, lateral, occasionally terminal, rarely arising from swollen hyphal cells, erect, subcylindrical-conical, 2–12 × 1–2.5 µm, aseptate, hyaline, conidiogenous loci minute, *ca* 0.5 µm wide, very slightly thickened and darkened; conidia in simple chains, subcylindrical-fusiform, 5–25 × 1–2.5 µm, 0–1-septate, hyaline, smooth to very faintly rough-walled.

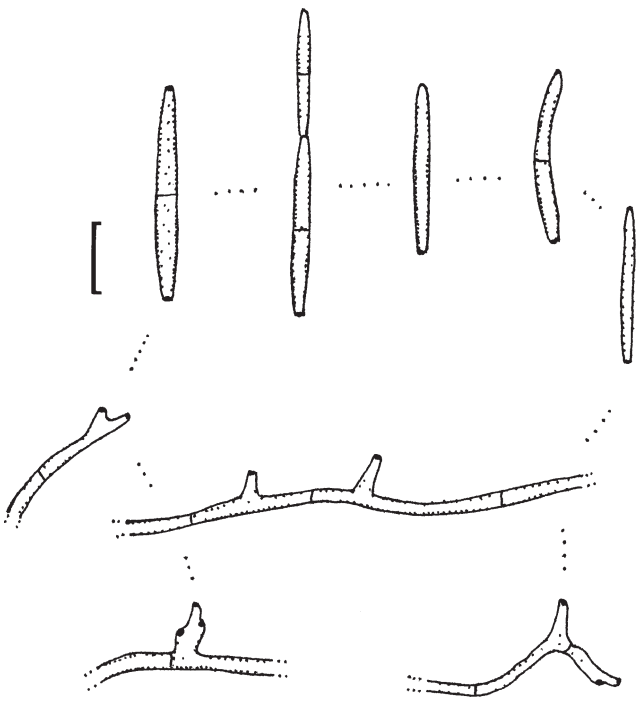

Fig. 4. *Ramularia paspali*, conidiophore fascicles, conidiophores, conidia (based on BRIP 5662). Bar: 10 µm. U. Braun del.

Notes: New to Australia; new host. This species was originally described from Trinidad on *Paspalum* sp. (Braun 1998*a*). The Australian collection on *Chloris ventricosa* is morphologically indistinguishable from *R. paspali*.

Ramularia pratensis Sacc. var. *pratensis*

= *Ramularia rhei* Allesch.

On *Rheum rhaponticum*, QLD, Tamborine Mountain, 14 Sep. 1984, A. Jordan, BRIP 14497; WA (Shivas 1989).

Ramularia primulae Thüm.

On *Primula* sp., VIC, Melbourne, May 1935, A.T. Pugsley, VPRI 2844; TAS (Sampson and Walker 1982). On *P. malacoides*, VIC, Burnley, Aug. 1935, A.T. Pugsley, VPRI 2846.

Ramularia proteae Crous & Summerell

On *Protea longifolia*, TAS, Hobart, Royal Botanic Gardens, Aug 1999, A. MacFayden, DAR 74883.

Ramularia pusilla Unger

On *Bromus catharticus*, NSW, Barooga, Nov. 1956, L. Fraser, DAR 4858. On *B. unioloides*, NSW, Fellow Hills, 5 miles north of town, 11 Nov. 1969, J. Walker, DAR 19105. On *Lolium rigidum*, NSW, Wagga Wagga, Oct. 1956, F.C. Butler, DAR 4866. On *Phalaris aquaticus*, NSW, Tooma, Tooma Station, 18 Dec. 1986, D. Stewert, DAR 58139. On *Vulpia bromoides*, NSW, Tumbarumba, 7 miles south of town, 13 Nov. 1969, R. Flynn, DAR 19661.

Notes: New to Australia.

Ramularia rhabdospora (Berk. & Broome) Nannf.

On *Plantago lanceolata*, NSW, Baulkham Hills, Oct. 1955, J. Walker, DAR 4544; NSW, Baulkham Hills, 3 Jul. 1965, J. Walker, BRIP 11825, ex DAR 14237; Norfolk Island, Norfolk Island National Park, near Cook memorial, 10 Dec. 1986, J.L. Alcorn 8656, BRIP 15585.

Ramularia rubella (Bonord.) Nannf.

On *Ramularia crispus*, NSW, Baulkham Hills, 23 May 1965, J. Walker, BRIP 5653, DAR 14060; QLD, Ma Ma Creek, 29 Sep. 1977, K.L. Harley, BRIP 12363; Brisbane, Kenmore, 14 Sep. 1975, J.L. Alcorn, BRIP 11161; TAS, Margate, 12 Jun. 1980, P. Wong, DAR 72857. On *R. obtusifolius*, QLD, Kalinga, Sep. 1948, K.N. Shea, BRIP 5654. On *R. brownii*, TAS (Sampson and Walker 1982).

Ramularia simplex Pass.

On *Ranunculus* sp., VIC, Knoxfield, 16 Nov. 2001, I.G. Pascoe, VPRI 22994.

Ramularia sphaeroidea Sacc.

On *Lotus pedunculatus*, NSW, Moto, 15 Aug. 1990, D. McCoy, DAR 67051. On *Lotus uliginosus*, NSW (Walker 1969).

Ramularia uredinis (W. Voss) Sacc.

Hyperparasitic on *Melampsora coleosporioides* Dietel, on *Salix babylonica*, NSW, 10 km north of Kyogle, 26 Feb. 1979, C.A. Nicholson, DAR 33593; NSW, Baulkham Hills, Railway Street, 10 Mar. 1988, J. Walker 88/5, DAR 61861.

Notes: New to Australia; new host.

Ramularia valerianae (Speg.) Sacc. var. *centranthi* (Brunaud) U. Braun.

≡ *Ramularia centranthi* Brunaud

On *Centranthus ruber*, VIC, 'Heronswood', 105 Latrobe Parade, Dromana, 16 Mar. 1993, I. Pascoe & A. Sivapalan, VPRI 18924.

Ramularia variabilis Fuckel

On *Digitalis purpurea*, VIC, Burnley, 11 Jun. 1935, A.T. Pugsley, VPRI 2851.

Ramularia veronicae Fuckel

On *Veronica persica*, NSW, Pennant Hills, Sep. 1941, L.R.F., DAR 4047; NSW, Springwood, 17 Nov. 1986, P. Wong, DAR 57845b.

Notes: New to Australia.

Appendix 1

Some collections deposited in Australian herbaria under *Ramularia* sp. proved to belong to other genera, including a new species and four new records.

Cladosporium myrtacearum K. Schub., U. Braun & R.G. Shivas, **sp. nov.** (Fig. 5)

Maculae amphigenae, subcirculares vel ovales-oblongae, 3–12 mm latae, spadiceae ad porphyreae, centro pallide brunneo, interdum perforato, margine irregulari, indistincto vel angusto, leviter elevato, interdum purpureo. Caespituli amphigeni, in centro aggregati, densi, olivaceo-brunnei. Mycelium immersum, subcuticulares vel intraepidermales; hyphae sparse ramosae, septatae, subhyalinae vel pallide olivaceae, leviae, tenuitunicatae. Stromata nulla vel minuta, ex hyphis aggregatis, cellulis inflatis, subglobosis vel subangularibus, 5–10(–13) µm diam, pallide olivaceis vel mediobrunneis composita. Conidiophora solitaria vel laxe ad dense fasciculata, per stoma emergentia vel erumpentia, erecta, recta vel curvata, simplicia vel ramosa, geniculata-sinuosa, subnodulosa, 14–96 × 3–7 (–9.5) µm, pluriseptata, pallide olivacea vel mediobrunnea, levia, leviter incrassata. Cellulae conidiogenae integratae, Terminales vel intercalares, 10–43 µm longae, sympodiales. Cicatrices conidiales conspicuae, 1–2 µm diam, incrassatae, fuscatae. Conidia catenata vel ramocatenata, recta, subglobosa, ovoidea, obovoidea, late ellipsoidea-fusiformes, subcylindracea, 3–22 × 2–7 µm, 0–1(–2)-septata, non- vel distincte constricta, pallide olivacea vel olivacea, levia, tenuitunicata vel leviter crassitunicata, apice rotundato, basi rotundata vel obconice attenuata, hila 1–5, protuberantes, 1–2 µm diam, incrassata et fuscata.

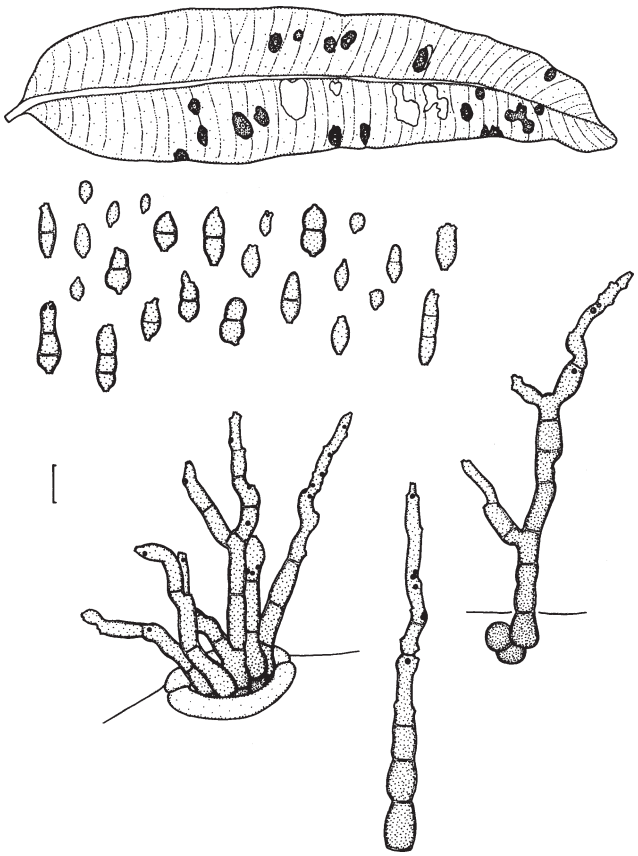

Fig. 5. *Cladosporium myrtacearum* sp. nov., conidiophore fascicles, conidiophores, conidia and symptoms (based on BRIP 26527). Bar: 10 µm (conidiophores, conidia). K. Schubert del.

Holotype: on *Corymbia polycarpa* (Myrtaceae), Australia, NT, Millingimbi, Townsite, 17 Aug. 1999, A.A. Mitchell, BRIP 26527. Isotype: DNAP 26527.

Leaf spots amphigenous, subcircular to oval-oblong, 3–12 mm wide, medium to reddish brown, centre paler, occasionally with a small hole in the centre, margin irregular, inconspicuous or narrow, somewhat raised, occasionally with a narrow, brown or purplish halo, finally leaf spots dropping out, leaving shot-hole symptoms. Colonies amphigenous, mostly in the centre, densely caespitose, olivaceous-brown. Mycelium immersed, subcuticular to intraepidermal; hyphae sparingly branched, septate, subhyaline to pale olivaceous, smooth, thin-walled. Stromata lacking or only with small hyphal aggregations, composed of swollen hyphal cells, subglobose to somewhat angular, 5–10(–13) µm diam, pale olivaceous to medium brown. Conidiophores solitary or in small, loose to dense fascicles, arising from swollen hyphal cells, emerging through stomata or erumpent, erect, straight to curved, simple or branched, geniculate-sinuous, subnodulose, often somewhat attenuated towards the apex and swollen at the base, 14–96 × 3–7(–9.5) µm, pluriseptate, often constricted at the septa,

pale olivaceous to medium brown, somewhat paler towards the apex, smooth, wall somewhat thickened. Conidiogenous cells integrated, terminal and intercalary, 10–43 µm long; conidiogenous loci numerous, scattered, not confined to swellings, cladosporium-like (with central dome and raised periclinal rim), 1–2 µm diam, somewhat protuberant, thickened and darkened. Conidia in simple or branched chains, straight, subglobose, ovoid, obovoid, broadly ellipsoid-fusiform, subcylindrical, 3–22 × 2–7 µm, 0–1(–2)-septate, not to distinctly constricted at the septa, pale olivaceous to olivaceous, smooth, wall unthickened to somewhat thickened, apex rounded, base rounded to somewhat attenuated, with 1–5 hila, somewhat protuberant, 1–2 µm diam, thickened and darkened.

Notes: At first sight, the subnodulose conidiophores of this fungus resemble those of *Cladosporium herbarum* (Pers.: Fr.) Link. However, the conidiogenous loci of *C. myrtacearum* are not confined to swellings, the conidia are smooth and the new species is a leaf-spotting fungus. *Cladosporium herbarum*, a common saprobic fungus, is characterised by having nodulose conidiophores with conidiogenous loci confined to these swellings, and the conidia are verruculose. *Cladosporium jacarandicola* K. Schub. *et al*. (Schubert & Braun 2004), recently described from New Zealand on *Jacaranda mimosifolia*, and *C. praecox* (Niessl) U. Braun (Braun 2000) on *Tragopogon orientalis* in Europe are two broadly similar species, but they differ in having shorter and somewhat narrower, sparsely septate conidiophores and conidia with different surface ornamentations (smooth to verruculose in *C. jacarandicola* and faintly to conspicuously verruculose-echinulate in *C. praecox*). Various *Cladosporium* species have been described from hosts belonging to the Myrtaceae, but all of these species are quite distinct from *C. myrtacearum*.

The following taxa on Myrtaceae have to be excluded from *Cladosporium* s. str. and pertain to different genera since the conidiogenous loci do not agree with the *Cladosporium* type ('coronate' according to David (1997), i.e. with central dome surrounded by a raised periclinal rim): *Cladosporium amoenum* R.F. Castañeda, nom. nud. (≡ *Anungitopsis amoena* R.F. Castañeda & F.M. Dugan), *C. myrticola* Bubák (type material examined), *C. myrticola* R.F. Castañeda & W.B. Kendr. (type material examined; homonym, nom. illeg.), *C. rhodomyrti* Sawada (type material examined) and *C. uleana* Henn. (type material examined). Type material of *C. eucalypti* Tassi (Saccardo & Sydow 1902), deposited at SIEN, has not yet been re-examined but, according to the original description, this species differs from *C. myrtacearum* in having much wider, 1–3-septate conidia, 25–30 × 8–10 µm. Type material of *C. psidiicola* J.M. Yen (1980) is deposited at LAM, but not available. According to the original description and illustration, this species is easily distinguishable from *C. myrtacearum* by superficial hyphae with solitary conidiophores. Furthermore, the conidiophores in *C. psidiicola* are subcylindrical, non-nodulose, and without any constrictions.

Cladosporium uredinicola Speg.

On *Melampsora coleosporioides* Dietel, on *Salix babylonica*, NSW, 10 km north of Kyogle, 27 Feb. 1979, C.A. Nicholson, DAR 33593, traces of *C. uredinicola* together with *Ramularia uredinis*. On *Melampsora laricis-populina* Kleb., on *Populus deltoides*, NSW, Snowy Mountain Plantation Authority, Tumut, 4 Mar. 1974, R.L. Nielsen, DAR 24066; on *Populus gelrica*, NSW, Snowy Mountain Plantation Authority, Tumut, 5 Mar. 1974, R.L. Nielsen, DAR 24060.

Notes: New to Australia; new host.

Neoramularia karelii (Bremer & Petr.) U. Braun (Fig. 6)

≡ *Cercosporella karelii* Bremer & Petr.

On *Vitex trifolia*, QLD, near Southport, Anglers Paradise, 26 Apr. 1971, J.L. Alcorn, BRIP 5658, IMI 161720; Curtis Island, South End, 3 May 1971, J.L. Alcorn, BRIP 5659, IMI 161724; Brisbane, Jindalee, Wynyabbie Nursery, 9 Dec. 1971, J.L. Alcorn, BRIP 5660; Brook Island, near Cardwell, 10 Oct. 1979, J.H. Simmons, BRIP 13091.

Caespituli epiphyllous, stromata immersed, somewhat erumpent, 10–60 µm diam, colourless; conidiophores numerous, in dense fascicles, straight, subcylindrical-conical, somewhat geniculate-sinuous, 5–30 × 2–7 µm, 0–1-septate, hyaline, smooth; conidiogenous loci unthickened, not darkened; conidia solitary, subcylindrical, obovoid, short obclavate, fusiform, subclavate, 15–50 × (3–)4–7 µm, 0–3(–4)-septate, hyaline, smooth, apex obtuse, base

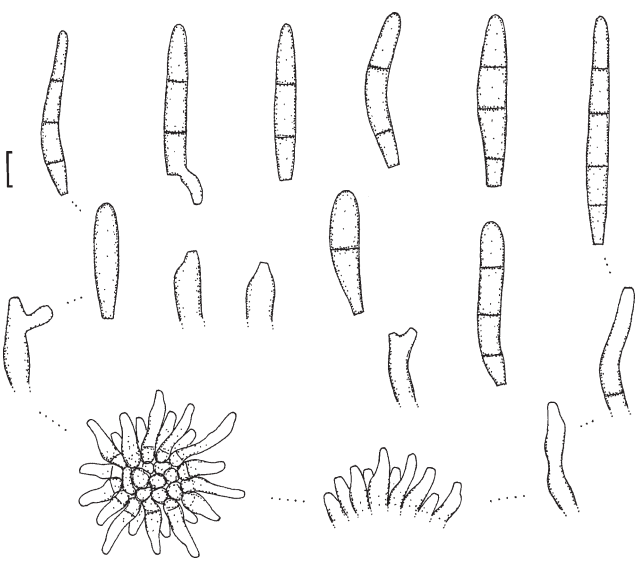

Fig. 6. *Neoramularia karelii*, conidiophore fascicles, conidiophores, conidia (based on BRIP 5658). Bar: 10 µm. U. Braun del.

obconically truncate, 1.5–2 µm wide, hila unthickened, not darkened.

Notes: New to Australia and on a new host species. The Australian collections agree well with *N. karelii*, which was described from Turkey on *Vitex agnus-castus* (Braun 1998*a*). However, the conidia are more mature, somewhat larger, and possess up to four septa. Due to the conidial shape, size and septation, *N. karelii* is somewhat intermediate between *Neoramularia* U. Braun and *Pseudocercosporella* Deighton.

Passalora perfoliati (Ellis & Everh.) U. Braun & Crous
≡ *Cercospora perfoliati* Ellis & Everh.
≡ *Mycovellosiella perfoliati* (Ellis & Everh.) Deighton
= *Ramularia agerati* Sawada

On *Ageratum houstonianum*, QLD, Palmwoods, 24 July 1957, BRIP 5661.

Notes: New to Australia; new host.

Pseudocercospora pongamiae-pinnatae M. Raghu Ram & Mallaiah (Fig. 7)

On *Pongamia pinnata*, QLD, Green Island near Cairns, 8 Sep. 1965, O.M. Williams, DAR 69737.

Stromata 20–40 µm diam, olivaceous-brown; conidiophores reduced to conidiogenous cells, numerous, in dense sporodochial fascicles, subcylindrical-conical, 5–20 × 2–3 µm, subhyaline to pale olivaceous, 0(–1)-septate, mostly unilocal, determinate, rarely sympodial; conidia formed singly, narrowly obclavate-cylindrical, subacicular, 30–60 × (1.5–)2–3(–3.5) µm, 3–6-septate, subhyaline.

Notes: New to Australia. This is the second record of this species, which was described on *Pongamia pinnata* from India (Raghu Ram and Mallaiah 1993). The Australian collection agrees well with the original description.

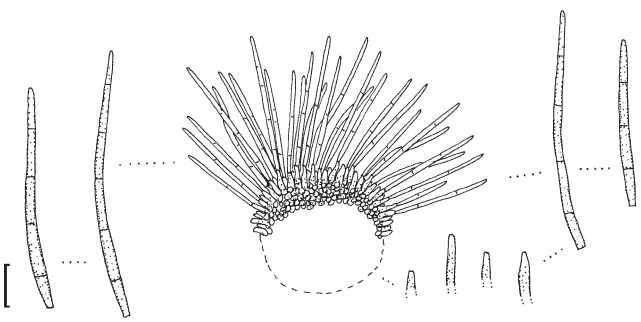

Fig. 7. *Pseudocercospora pongamiae-pinnatae*, conidiophore fascicles, conidiophores, conidia (based on DAR 69737). Bar: 10 µm. U. Braun del.

Acknowledgements

We acknowledge the contributions to this paper by former herbarium curators of BRIP (J. Alcorn), DAR (J. Walker) and VPRI (I. Pascoe), for collecting and providing preliminary identifications of many of the specimens examined in this work.

References

Australian Plant Name Index (2004) Available at http://www.anbg.gov.au/cgi-bin/apni. (Verified 18 Aug 2004)

Braun U (1998*a*) 'A monograph of *Cercosporella, Ramularia* and allied genera (phytopathogenic hyphomycetes), Vol. 2.' (IHW-Verlag: Eching)

Braun U (1998*b*) A monograph of *Cercosporella*, *Ramularia* and allied genera (phytopathogenic hyphomycetes). Additions to host range and distribution. *Schlechtendalia* **1**, 41–43.

Braun U (2000) Miscellaneous notes on some micromycetes. *Schlechtendalia* **5**, 31–56.

Braun U, Pennycook SR (2003) Nomenclature and typification of *Ramularia grevilleana. Mycotaxon* **88**, 49–52.

Crous PW, Aptroot A, Kang J-C, Braun U, Wingfield MJ (2000) The genus *Mycosphaerella* and its anamorphs. *Studies in Mycology* **45**, 107–121.

Crous PW, Kang J-C, Braun U (2001) A phylogenetic redefinition of anamorph genera in *Mycosphaerella* based on ITS rDNA sequences and morphology. *Mycologia* **93**, 1081–1101.

David J (1997) A contribution to the systematics of *Cladosporium*. Revision of the fungi previously referred to *Heterosporium. Mycological Papers* **172**, 1–157.

Holmgren PK, Holmgren NH, Barnett LC (1990) 'Index herbariorum. Part 1: The Herbaria of the World. 8th edn.' *Regnum Vegetabile* **120**, 1–163.

Raghu Ram M, Mallaiah KV (1993) *Pseudocercospora pongamiae-pinnatae* sp. nov. from India. *Mycological Research* **97**, 127–128.

Saccardo PA, Sydow P (1902) 'Sylloge Fungorum, Vol. 16.' (Padova)

Sampson PJ, Walker J (1982) 'An annotated list of plant diseases in Tasmania.' (Department of Agriculture: Tasmania)

Schubert K, Braun U (2004) Taxonomic revision of the genus *Cladosporium* s. lat. 2. Morphotaxonomic examination of *Cladosporium* species occurring on hosts of the families Bignoniaceae and Orchidaceae. *Sydowia* **56**, 296–317.

Shivas RG (1989) Fungal and bacterial diseases of plants in Western Australia. *Journal of the Royal Society of Western Australia* **72**, 1–62.

Walker J (1969) New records of plant diseases in New South Wales. *Agricultural Gazette of New South Wales* **80**, 237–242.

Warcup JH, Talbot PHB (1981) 'Host-pathogen index of plant diseases in South Australia'. (University of Adelaide: Adelaide)

Yen JM (1980) Étude sur les champignons parasites du Sud-Est asiatique. 35. Champignons parasites de Hong Kong, I. *Bulletin Trimestriel de la Société Mycologique de France* **95**, 185–191.

Received 23 December 2004, accepted 1 June 2005