

***OFF-PRINT***

Three new species and ten new records of buellioid lichens  
(Ascomycota, Caliciaceae) from New Zealand

John A. Elix & Helmut Mayrhofer

*Australasian Lichenology* **82** (January 2018), 68–79

**Three new species and ten new records of buellioid lichens  
(Ascomycota, Caliciaceae) from New Zealand**

**John A. Elix**

Research School of Chemistry, Building 137,  
Australian National University, Canberra, A.C.T. 2601, Australia  
e-mail: John.Elix@anu.edu.au

**Helmut Mayrhofer**

Institut für Pflanzenwissenschaften, NAWI-Graz,  
Karl-Franzens-Universität Graz, Holteigasse 6, 8010 Graz, Austria  
e-mail: helmut.mayrhofer@uni-graz.at

**Abstract**

*Amandinea okainensis* Elix & H.Mayrhofer, *Buellia porphyrilica* Elix & H.Mayrhofer and *Tetramelas kopuwaianus* Elix & H.Mayrhofer are reported as new to science, and the new combination *Amandinea discreta* (Darb.) Elix & H.Mayrhofer is proposed. *Amandinea discreta*, *A. prothallinata* Elix & H.Mayrhofer, *Buellia aeruginosa* A.Nordin, Owe-Larsson & Elix, *B. epiaeruginosa* Elix, *B. georgei* Trinkaus, H.Mayrhofer & Elix, *B. poimena* Elix & Kantvilas, *B. straminea* Tuck., *B. subadjuncta* Elix & Kantvilas, *Endohyalina arachniformis* Elix & Kantvilas and *Orcularia elixii* Kalb & Giralt are reported for the first time from New Zealand.

This paper continues our investigation of *Buellia*-like lichens in New Zealand, and follows from the previous accounts of *Buellia* and related genera (Elix *et al.* 2015, 2017a, 2017b; Elix 2015, 2016a, 2017a, 2017b; Elix & Kantvilas 2016a; Elix & Knight 2017; Elix & Mayrhofer 2016, 2017) and our additions and revisions to *Amandinea* (Blaħa *et al.* 2016; Mayrhofer *et al.* 2016). In this paper, we deal with a further three new saxicolous species of *Buellia* in the broad sense. Methods are as described in previous papers cited above.

**New species**

**1. *Amandinea okainensis*** Elix & H.Mayrhofer, sp. nov. Figs 1, 2  
Mycobank No. **MB 823943**

Similar to *Amandinea austroconiops* Elix & Kantvilas, but differs in having smaller ascospores and white-pruinose discs, and in containing variolaric acid.

*Type*: New Zealand, South Island, Canterbury, Banks Peninsula, Okains Peak, 43°44'25"S, 172°59'15"E, 514 m alt., on basalt, *J. Blaħa 0027*, 15.iii.2001 (holotype – GZU).

*Thallus* crustose, to 15 mm wide and 1 mm thick, epilithic, rimose-areolate to verrucose-areolate; individual areoles irregular, angular, 0.1–1 mm wide; upper surface off-white to pale grey, matt, cracked, chinky; prothallus black, marginal when abutting other lichens or not apparent; photobiont cells 10–17 µm wide; medulla lacking calcium oxalate (H<sub>2</sub>SO<sub>4</sub>), I+ indigo-purple. *Apothecia* 0.2–0.8 mm wide, abundant, lecideine, roundish, scattered, broadly adnate to sessile; disc black, white- to pale grey-pruinose, plane to weakly convex; proper exciple thick and persistent, in section 75–85 µm thick, outer part dark brown to brown-black, K–, N–, inner part brown. *Ephymenium* 12–15 µm thick, olive-brown, K–, N–. *Hypothecium* 90–150 µm thick, dark brown to brown-black, K–. *Hymenium* 100–150 µm thick, colourless, weakly interspersed; subhymenium 30–40 µm thick, pale brown, densely interspersed with oil droplets; paraphyses 1–2.2 µm wide, sparingly branched, with apices 5–7 µm wide and brown caps. *Asci* 8-spored or with 3–6 spores, *Bacidia*-type. *Ascospores* *Physconia*- then *Buellia*-type, 1-septate, pale then dark brown, ellipsoid, 14–[16.1]–18 × 7–[8.4]–10 µm, becoming constricted at the septum, sometimes curved; outer wall rugulate. *Pycnidia* common,

punctiform, immersed; ostiole black. *Conidia* curved, filiform, 16–25 × 0.7–1 µm. *Chemistry*: Thallus K–, P–, C–, UV–; containing variolaric acid.

*Etymology*: The species is named after the type locality.

**Remarks**

*Amandinea okainensis* is characterized by the crustose, rimose-areolate to verrucose-areolate, off-white to pale grey thallus, the strongly amyloid medulla, the interspersed subhymenium, white- to pale grey-pruinose discs, the *Physconia*- then *Buellia*-type ascospores that become constricted at the septum and have a rugulate outer wall, and by the presence of variolaric acid. It is superficially similar to *A. austroconiops*, a common saxicolous species in New Zealand and Tasmania (Elix & Kantvilas 2016a). However, *A. austroconiops* differs in having epruinose discs, larger ascospores (15–[19.6]–25 × 8–[11.2]–14 µm) and in lacking lichen substances. The common New Zealand species *A. nitrophila* (Zahlbr.) Elix has similar-sized ascospores and an interspersed subhymenium, but differs in having a non-amyloid medulla, mainly immersed apothecia with epruinose discs and in lacking lichen substances (Blaħa *et al.* 2016).

At present the new species is known from only the type collection.

**2. *Buellia porphyrilica*** Elix & H.Mayrhofer, sp. nov. Figs 3, 4  
Mycobank number: **MB 823944**

Similar to *Buellia fallax* Elix & Kantvilas, but differs in having a pruinose upper surface and in containing porphyrilic acid rather than hafellic acid.

*Type*: New Zealand, South Island, Canterbury, Banks Peninsula, Tumbledown Bay on road to Te Oka, 43°51'20"S, 172°46'20"E, 0–10 m alt., on coastal rocks, *H. Mayrhofer 6858*, *H. Hertel*, *C.D. Meurk* & *H.D. Wilson*, 19.i.1985 (GZU – holotype).

*Thallus* crustose, verrucose-areolate, chinky to markedly bullate, to 40 mm wide and *c.* 1.5 mm thick; individual areoles convex, contiguous, 0.5–2 mm wide, becoming agglomerate and sometimes subeffigurate at the margins; upper surface white to whitish grey or pale yellow, matt, esorediate, pruinose in part; prothallus absent; photobiont cells 8–19 µm wide; medulla white, containing calcium oxalate (H<sub>2</sub>SO<sub>4</sub>), I–. *Apothecia* 0.3–1 mm wide, lecideine, broadly adnate to sessile; disc black, epruinose, weakly concave at first, then plane to weakly convex, often crowded and distorted by mutual pressure; proper exciple distinct, persistent, black, in section 40–50 µm thick, outer part brown-black, brown within, K–. *Ephymenium* 10–15 µm thick, dark brown to olive-brown, K–, N–. *Hypothecium* 80–175 µm thick, dark brown to brown-black. *Hymenium* 70–100 µm thick, colourless, not interspersed; subhymenium 40–50 µm thick, brown, not interspersed; paraphyses 1.5–2.5 µm wide, simple to weakly branched, capitate, with apices 3.5–5 µm wide and dark brown caps. *Asci* of the *Bacidia*-type, 8-spored. *Ascospores* initially of the *Callispora*-type, then *Buellia*-type, 1-septate, olive-brown to brown, ellipsoid, 15–[21.1]–25 × 7–[8.4]–11 µm, constricted at the septum, sometimes slightly curved, often pointed at the apices, with medial and weak subapical wall-thickenings; outer spore-wall smooth. *Pycnidia* immersed; conidia bacilliform, straight, 4.5–6 × 0.7–1 µm. *Chemistry*: Thallus K+ yellow, P+ pale yellow, C–, UV+ blue-white; atranorin (major), porphyrilic acid (major).

*Etymology*: The species is named for the presence of porphyrilic acid, the first reported occurrence of this substance in a buellioid lichen.

**Remarks**

*Buellia porphyrilica* is characterized by the crustose, verrucose-areolate, chinky to markedly bullate, white to whitish grey or pale yellow thallus, the *Callispora*- then *Buellia*-type

ascospores with a smooth outer wall, and the presence of medullary calcium oxalate, atranorin and porphyritic acid. *Buellia fallax* is very similar to *B. porphyrilica*, but differs in having an epruinose upper surface and in containing atranorin and hafellic acid (Elix & Kantvilas 2016b). At present, the new species is known from only the type locality. Associated species include *Buellia aethalea* (Ach.) Th.Fr., *B. ocellata* (Flot.) Körb., *Lecanora farinacea* Fée, *Rinodina oleae* Bagl. and *Xanthoparmelia australasica* D.J.Galloway.

#### SPECIMEN EXAMINED

*South Island*: ● Type locality, on coastal rocks, *H. Mayrhofer 6835*, *H. Hertel*, *C.D. Meurk & H.D. Wilson*, 19.i.1985 (GZU).

**3. *Tetramelas kopuwaianus*** Elix & H.Mayrhofer, sp. nov.  
Mycobank No. **MB 823945**

Figs 5, 6

Similar to *Tetramelas papillatus* (Sommerf.) Kalb, but differs in having smaller ascospores, 13–[15.2]–17 × 6–[7.4]–9 µm, and an amyloid medulla.

*Type*: New Zealand, South Island, Otago, Hyde Rock, Old Man Range, SW of Alexandra, 45°23'30"S, 169°11'40"E, c. 1670 m alt., on dead mosses, *H. Mayrhofer 9746*, *H. Hertel & P. Child*, 3.ii.1985 (holotype – GZU).

*Thallus* crustose, to 20 mm wide, granular; granules 0.05–0.5 mm wide, compacted and becoming areolate to verrucose-areolate; upper surface white to pale grey-white; prothallus not apparent; photobiont cells 10–16 µm wide; medulla lacking calcium oxalate (H<sub>2</sub>SO<sub>4</sub>-), I+ blue-violet. *Apothecia* 0.05–0.5 mm wide, abundant, lecideine, roundish, scattered or crowded, broadly adnate to sessile; disc black, epruinose, plane to markedly convex; proper exciple thin, excluded in older, convex apothecia, in section 45–55 µm thick, outer part dark olive-brown to brown-black, K-, N-, inner part brown. *Ephymenium* 12–15 µm thick, olive-brown to dark brown, K-, N-. *Hypotheicum* 70–150 µm thick, dark brown to brown-black, K-. *Hymenium* 50–65 µm thick, colourless, not interspersed; subhymenium 15–25 µm thick, pale olive-brown, not interspersed; paraphyses 1–2.5 µm wide, sparingly branched, with apices 4–5 µm wide and brown caps. *Asci* 8-spored or with fewer spores (4), *Bacidia*-type. *Ascospores* initially of the *Callispora*-type, then of the *Buellia*-type, 1-septate, brown, ellipsoid to broadly fusiform, 13–[15.2]–17 × 6–[7.4]–9 µm, becoming constricted at the septum, sometimes curved, rarely 2–3-septate; outer spore-wall finely ornamented (microrugulate). *Pycnidia* uncommon, punctiform, immersed, ostiole brown. Conidia straight, bacilliform, 5–7 × 1 µm. *Chemistry*: Thallus K+ yellow, P+ pale yellow, C-, UV-; containing atranorin.

*Etymology*: The species is named after the type locality, *kopuwai*, the traditional Southern Maori name for the Old Man Range.

#### Remarks

*Tetramelas kopuwaianus* is characterized by the crustose, granular to verrucose-areolate, white to whitish grey thallus, the amyloid medulla which lacks calcium oxalate, the *Callispora* then *Buellia*-type ascospores with a microrugulate outer wall, and the presence of medullary atranorin. *Tetramelas papillatus* has identical chemistry, but differs in having a thicker and more coherent thallus, a non-amyloid medulla and significantly larger ascospores, 15–[20.2]–27 × 7–[8.7]–12 µm (Nordin 2005). *Tetramelas kopuwaianus* is most likely to be confused with *T. confusus* A.Nordin which occurs in similar habitats. However, *T. confusus* has a distinctly papillate thallus, a non-amyloid medulla, larger ascospores 14–[18.5]–25 × 5–[6.4]–8 µm, and it contains atranorin and 6-*O*-methylarthonin (Nordin 2005).

At present, the new species is known only from the type locality. Associated species include *Fruitedella caesia* (Schaer.) Kalb, *Lepraria neglecta* (Nyl.) Lettau, *Megaspora verrucosa* (Ach.) Hafellner & V.Wirth and *Rinodina olivaceobrunnea* C.W.Dodge & G.E.Baker.

#### New records for New Zealand

**1. *Amandinea discreta*** (Darb.) Elix & H.Mayrhofer, comb. nov.

Fig. 7

Mycobank number: **MB 823946**

*Buellia discreta* Darb., *Wissenschaftliche Ergebnisse der Schwedischen Südpolar-Expedition 1901–1903* 4, 14 (1912).

*Type*: Falkland Islands, Port Louis, *C. Skottsberg 88.89*, 25.vii.1901 (S – holotype!).

*Thallus* crustose, forming extended patches to c. 30 mm wide, endolithic and not apparent, or epilithic, discontinuous, white or pale grey, thin, membranaceous or rarely rimose-areolate; prothallus black or absent; medulla white, lacking calcium oxalate (H<sub>2</sub>SO<sub>4</sub>-), I-; photobiont cells 7–17 µm wide. *Apothecia* 0.2–0.4 mm wide, lecideine, broadly adnate to sessile, scattered or crowded, rounded or distorted through mutual pressure; disc black, epruinose, weakly concave to plane; proper exciple distinct, thin, persistent, raised above the disc, in section 25–30 µm thick, with the outer zone dark brown to black-brown, K-, brown within. *Ephymenium* 7–10 µm thick, dark brown, K-, N-. *Hypotheicum* 60–100 µm thick, dark brown to black-brown, in part K+ yellow solution, N+ orange-brown. *Hymenium* 50–70 µm thick, colourless, not interspersed; subhymenium 15–20 µm thick, pale brown, not interspersed with granules or oil droplets; paraphyses 1.2–1.5 µm wide, simple to moderately branched, apices 4–5 µm wide with dark brown caps. *Asci* of the *Bacidia*-type, 8-spored. *Ascospores* of the *Physconia*- then *Buellia*-type, 1-septate, brown, ellipsoid, 12–[13.9]–16 × 6–[7.9]–10 µm, older spores very rarely constricted at the septum; outer spore wall microrugulate. *Pycnidia* immersed, black; conidia filiform, curved, 14–18 × 0.7–1 µm.

*Chemistry*: Thallus K-, P-, C-, UV-; no lichen substances detected by TLC.

This species was previously known from the Falkland Islands (Darbishire 1912). It is characterized by an endolithic or inconspicuous, off-white to pale grey, crustose thallus lacking lichen substances, a non-amyloid medulla that lacks calcium oxalate, adnate to sessile, lecideine apothecia, 0.2–0.4 mm wide, a brown N- ephymenium, broad, ellipsoid *Physconia*- then *Buellia*-type ascospores, 12–16 × 6–10 µm, which are usually not constricted at the septum, having a microrugulate outer wall, and curved, filiform conidia, 14–18 µm long.

#### SPECIMEN EXAMINED

*South Island*: ● Otago, Clutha River valley, Old Man Range, road to Obelisk TV station, 14 km S of Alexandra, 45°20'13"S, 169°15'16"E, 900 m alt., on N-exposed schist rocks in pasture near the road, *M. Lambauer 0173*, 8.ix.2003 (GZU).

**2. *Amandinea prothallinata*** Elix & H.Mayrhofer, *Australas. Lichenol.* 80, 28 (2016)

This species was previously known from Australia and Norfolk Island (Elix *et al.* 2016). It is characterized by the crustose, rimose to rimose-areolate, pale grey to grey-brown or dark grey thallus, the prominent, marginal, dark brown to black prothallus, the immersed then broadly adnate to sessile apothecia, the non-amyloid medulla, the 1-septate, *Buellia*-type ascospores, 10–[13.1]–17 × 5–[7.1]–9 µm, curved, filiform conidia and the absence of lichen substances. Illustrations and a detailed description are provided in Elix *et al.* (2017c).

#### SPECIMEN EXAMINED

*South Island*: ● Nelson, on Lookout Track, coming from Brook Track over the water dam, 41°18'43"S, 173°17'26"E, 180–200 m alt., on N-exposed silicious rocks in open forest rocks, *M. Lambauer 0211*, *N. & B. Malcolm*, 20.xi.2003 (GZU).

**3. *Buellia aeruginosa*** A.Nordin, Owe-Larsson & Elix, *Mycotaxon* 71, 400 (1999)

This species was previously known from Australia (South Australia, New South Wales, Victoria and Tasmania) (McCarthy 2017). It is characterized by the crustose, rimose to rimose-areolate, whitish to yellow-white thallus, the prominent, marginal, dark brown to black prothallus, the immersed then broadly adnate to sessile apothecia with white-pruinose discs,

the amyloid medulla containing calcium oxalate ( $H_2SO_4+$ ), the intensely aeruginose epihymenium and outer excipulum (N+ red-violet), the submuriform ascospores,  $13$ – $[16.2]$ – $19 \times 7$ – $[9.1]$ – $10 \mu m$ , short bacilliform conidia and the presence of isoarthothelin and 2,5-dichloronorlichexanthone. Illustrations and a detailed description are provided in Nordin *et al.* (1999) and Elix (2011).

#### SPECIMEN EXAMINED

*South Island*: ● Marlborough, Ward Beach E of Ward, SW of Cape Campbell,  $41^\circ 50'S$ ,  $174^\circ 11'E$ , on coastal rocks, *H. Mayrhofer 12190*, 30.viii.1992 (GZU).

#### 4. *Buellia epiaeruginosa* Elix, *Australas. Lichenol.* **78**, 32 (2016)

This species was previously known from alpine or subalpine areas of Australia (Victoria and Tasmania) (Elix 2016b). It is characterized by the crustose, areolate, pale to dark grey thallus, the immersed then broadly adnate to sessile, lecideine apothecia with epruinose discs, a non-amyloid medulla lacking calcium oxalate ( $H_2SO_4-$ ), the aeruginose epihymenium and outer excipulum (N+ red-violet), the *Buellia*-type ascospores,  $12$ – $20 \times 7$ – $11 \mu m$ , which become constricted at the septum and have microrugulate outer spore-walls, elongate, bacilliform conidia,  $6.5$ – $12 \times 0.8$ – $1 \mu m$ , and the absence of lichen substances. An illustration and detailed description are provided in Elix (2016b).

#### SPECIMEN EXAMINED

*South Island*: ● Canterbury, Foggy Peak, Torlesse Range, Porters Pass W of Springfield,  $43^\circ 17'S$ ,  $171^\circ 44'E$ ,  $1200$ – $1500$  m alt., on rocks, *H. Mayrhofer 7474*, *H. Hertel & C. Meurk*, 25.i.1985 (GZU).

#### 5. *Buellia georgei* Trinkaus, *H. Mayrhofer & Elix, Lichenologist* **33**, 55 (2001)

This species was previously known from Australia (Western Australia, South Australia, New South Wales, the Australian Capital Territory, Victoria and Tasmania) (McCarthy 2017). It is characterized by the subcrustose to effigurate, rosette-forming, chalky white thallus with short marginal lobes, the immersed then broadly adnate to sessile, lecideine to cryptolecanorine apothecia, often with white-pruinose discs, a medulla containing calcium oxalate ( $H_2SO_4+$ ), the intensely aeruginose epihymenium and outer excipulum (N+ red-violet), the large ellipsoid ascospores,  $16$ – $24 \times 9.5$ – $14 \mu m$ , with rugulate outer spore-walls, filiform conidia and the presence of arthothelin. Illustrations and a detailed description are provided in Trinkaus *et al.* (2001) and Elix (2011).

#### SPECIMENS EXAMINED

*South Island*: ● Otago, Fortification Road, c. 5 km S of Oamaru, on limestone outcrops, *H. Mayrhofer 7471*, *10499 & H. Hertel*, 14.ii.1985 (GZU).

#### 6. *Buellia poimeneae* Elix & Kantvilas, *Australas. Lichenol.* **73**, 29 (2013)

This species was previously known from Australia (Western Australia, New South Wales, Victoria and Tasmania) (McCarthy 2017). It is characterized by the crustose, rimose-areolate, pale grey to pale blue-grey, more rarely brown thallus, the immersed or rarely adnate, lecideine apothecia  $0.3$ – $0.9$  mm wide, with epruinose discs, a non-amyloid medulla lacking calcium oxalate ( $H_2SO_4-$ ), the brown, N– epihymenium and outer excipulum, the large *Physconia*-then *Buellia*-type ascospores,  $11$ – $20 \times 6$ – $10 \mu m$ , with microrugulate outer spore-walls, elongate, bacilliform conidia  $5$ – $10$ – $(15) \times 1 \mu m$  and the presence of gyrophoric acid. Illustrations and a detailed description are provided in Elix & Kantvilas (2013).

#### SPECIMENS EXAMINED

*South Island*: ● Otago, Butters Peak, Dunedin,  $45^\circ 48' 45''S$ ,  $170^\circ 33' 42''E$ , 603 m alt., on N face of basalt outcrop on ridge E of peak, *A. Knight s.n.*, 21.vi.2016 (OTA 069119 *pr.p.*, 069121); ● Otago, Little Valley Road, 5 km E of Alexandra,  $45^\circ 15' 55''S$ ,  $169^\circ 25' 34''E$ , 350 m alt., on siliceous rock outcrops in grassland near road, SE exposed, *M. Lambauer 0183*,

8.ix.2003 (GZU); ● Otago, Flagstaff Hill near Dunedin,  $44^\circ 50'S$ ,  $170^\circ 28'E$ , c. 650 m alt., on rock outcrops near summit, *H. Mayrhofer 13688 & H. Hertel*, 1.ii.1985 (GZU).

#### 7. *Buellia straminea* Tuck., in B.L. Robinson, *Proc. Amer. Acad.* **38**, 84 (1902)

This species was previously known from the Galapagos Islands and Central America (Imshaug 1955). It is characterized by the pale yellow crustose thallus comprising contiguous or dispersed areoles which sometimes become sublobate at the margins, the lack of a prothallus, a non-amyloid medulla lacking calcium oxalate ( $H_2SO_4-$ ), immersed then adnate apothecia,  $0.15$ – $0.3$  mm wide with epruinose discs, a dark brown epihymenium and hypothecium, a non-inpersed hymenium, the *Buellia*-type ascospores,  $11$ – $[12.4]$ – $15 \times 5$ – $[6.3]$ – $8 \mu m$  which do not become constricted with age, and the presence of arthothelin. An illustration is available (Aptroot & Sparrius 2013), and a description is provided in Imshaug (1955).

#### SPECIMENS EXAMINED

*New Zealand*: ● North Island, Coromandel Peninsula, N of Coromandel township, E of Port Jackson, Fletchers Bay,  $36^\circ 28' 35''S$ ,  $175^\circ 23' 25''E$ , 0–3 m alt., on coastal greywacke rocks, *J. Blaha 0205*, 17.iv.2001 (GZU). *Ecuador*: ● Galapagos Islands, Isla Santiago, along the shore opposite Sombrero Chino, on semiconsolidated tufa, *W.A. Weber & H. Beck*, 5.i.1983 (Lichenes Exsiccati no. 642, University of Colorado Museum, CANB).

#### 8. *Buellia subadjuncta* Elix & Kantvilas, in Elix *et al.*, *Australas. Lichenol.* **81**, 37 (2017)

This lichenicolous species was previously known from South Australia (Elix *et al.* 2017). It occurs on *Caloplaca* species, and is characterized by the dark brown epihymenium and hypothecium, bacilliform conidia ( $4$ – $5 \times 1$ – $1.2 \mu m$ ), the *Physconia*- then *Buellia*-type ascospores,  $12$ – $[13.7]$ – $16 \times 7$ – $[7.5]$ – $10 \mu m$  that become constricted with age, and the lack of lichen substances. Illustrations and a detailed description are provided in Elix *et al.* (2017).

#### SPECIMEN EXAMINED

*North Island*: ● Auckland, Kawakawa Bay E of Auckland, Papanui Point,  $36^\circ 56'S$ ,  $175^\circ 13'E$ , 0–20 m alt., on coastal rocks, *H. Mayrhofer 5886 pr.p. & G.J. Samuels*, 8.i.1985 (GZU).

#### 9. *Endohyalina arachniformis* Elix & Kantvilas, *Australas. Lichenol.* **76**, 16 (2015)

This species was previously known from Tasmania (Elix & Kantvilas 2015). It is characterized by the crustose to areolate-subscamulose or bullate, yellow to pale yellow-brown thallus, the small, adnate to sessile lecideine apothecia, the 8-spored asci, the brown, 1-septate, broadly fusiform, *Dirinaria*-type grading into *Mischoblastia*- or *Physcia*-type ascospores,  $13$ – $23 \times 6$ – $12 \mu m$ , which are not constricted at the septum and often have paler apices, with ontogeny of type-B, bacilliform conidia,  $4$ – $7 \times 1$ – $1.4 \mu m$ , and by the presence of diploicin and xantholepinone A. A detailed description and illustrations are given in Elix & Kantvilas (2015).

#### SPECIMEN EXAMINED

*North Island*: ● Auckland, Kawakawa Bay E of Auckland, Papanui Point,  $36^\circ 56'S$ ,  $175^\circ 13'E$ , 0–20 m alt., on coastal rocks, *H. Mayrhofer 5885 & G.J. Samuels*, 8.i.1985 (GZU).

#### 10. *Orcularia elixii* Kalb & Giral, *Phytotaxa* **38**, 56 (2011)

This species was previously known from New South Wales (Kalb & Giral 2011) and Hawaii (Elix 2015). It is characterized by the grey to brownish grey, thin, crustose thallus, the small, adnate to sessile lecideine apothecia, the 8-spored asci, the pale brown, 1-septate, *Orcularia*-type ascospores,  $10$ – $16 \times 5$ – $8 \mu m$ , and by the absence of lichen substances. It is close to *Orcularia insperata* (Nyl.) Kalb & Giral, but is distinguished by smaller ascospores with larger lumina. A detailed description and illustrations are given in Kalb & Giral (2011).

#### SPECIMEN EXAMINED

*South Island*: ● Marlborough, Pelorus Bridge, Blenheim–Nelson road,  $41^\circ 18' 30''S$ ,  $173^\circ 34' 06''E$ , 50 m alt., on twigs, *W. Malcolm 2325*, 21.v.1995 (CANB).

## Acknowledgements

H.M. acknowledges financial support from the Austrian Science Fund (FWF-projects P8500-BIO, P10514-BIO and P25237-B16), and is indebted to Hannes Hertel (Munich), Colin D. Meurk (Christchurch) and Gary J. Samuels (formerly Auckland) for their company and support during a field trip in 1985. We thank Dr Patrick McCarthy for the illustration of *Amandinea discreta* and Drs Juliane Blaha (Graz), Michaela Kaschik (née Lambauer) (Gleisdorf), Allison Knight (Dunedin) and W. Malcolm (Nelson) for generously providing us with key collections, and to the curator of S for the loan of the holotype of *Buellia discreta*.

## References

- Aptroot, A; Sparrus, LB (2013): Pictures of tropical lichens. <http://tropicallichens.net/>
- Blaha, J; Mayrhofer, H; Elix, JA (2016): Five new saxicolous species of *Amandinea* (Ascomycota, Physciaceae) from New Zealand and southern Australia. *Australasian Lichenology* **79**, 35–57.
- Darbishire, OV (1912): The lichens of the Swedish Antarctic Expedition. *Wissenschaftliche Ergebnisse der schwedischen Südpolar-Expedition 1901–1903* **4**, 1–74.
- Elix, JA (2011): *Australian Physciaceae (Lichenised Ascomycota)*. Australian Biological Resources Study, Canberra. Version 18 October, 2011. <http://www.anbg.gov.au/abrs/lichenlist/PHYSICIACEAE.html>
- Elix, JA (2015): New species and new records of buellioid lichens from islands of the South Pacific Ocean. *Telopea* **18**, 527–536.
- Elix, JA (2016a): Two new species of *Buellia sens. lat.* (Ascomycota, Physciaceae) from New Zealand with pluriseptate ascospores. *Australasian Lichenology* **78**, 18–21.
- Elix, JA (2016b): Seven new species of *Buellia sens. lat.* (Ascomycota, Physciaceae) from southern mainland Australia. *Australasian Lichenology* **78**, 32–45.
- Elix, JA (2017a): Two new species and new records of buellioid lichens (Caliciaceae, Ascomycota) from Macquarie Island. *Australasian Lichenology* **81**, 6–15.
- Elix, JA (2017b): Three new species and eight new records of saxicolous buellioid lichens (Caliciaceae, Ascomycota) from New Zealand's subantarctic islands. *Australasian Lichenology* **81**, 68–78.
- Elix, JA; Kantvilas, G (2013): New taxa and new records *Buellia sensu lato* (Physciaceae, Ascomycota) in Australia. *Australasian Lichenology* **73**, 24–44.
- Elix, JA; Kantvilas, G (2015): New taxa and new records of crustose lichens in the family Physciaceae (Ascomycota) in Australia. *Australasian Lichenology* **76**, 16–23.
- Elix, JA; Kantvilas, G (2016a): *Amandinea conioops* (Physciaceae, Ascomycota) and its mimics in Tasmania and New Zealand. *Australasian Lichenology* **78**, 22–31.
- Elix, JA; Kantvilas, G (2016b): New species and new records of buellioid lichens (Ascomycota, Physciaceae) in Tasmania. *Australasian Lichenology* **79**, 26–34.
- Elix, JA; Knight, A (2017): Three new species of buellioid lichens (Caliciaceae, Ascomycota) from Otago, South Island, New Zealand. *Australasian Lichenology* **81**, 86–92.
- Elix, JA; Mayrhofer, H (2016): Two new species of *Buellia sens. lat.* (Ascomycota, Physciaceae) from New Zealand with 1-septate ascospores. *Australasian Lichenology* **79**, 10–15.
- Elix, JA; Mayrhofer, H (2017): New species and new records of buellioid lichens (Physciaceae, Ascomycota) from New Zealand. *Telopea* **20**, 75–84.
- Elix, JA; Knight, A; Blanchon, D (2017a): New species and new records of buellioid lichens (Physciaceae, Ascomycota) from New Zealand and Tasmania. *Australasian Lichenology* **80**, 46–52.
- Elix, JA; Kantvilas, G; McCarthy, PM (2017b): Thirteen new species and a key to buellioid lichens (Caliciaceae, Ascomycota) in Australia. *Australasian Lichenology* **81**, 26–67.
- Elix, JA; Mayrhofer, H; McCarthy, PM (2017c): New species and a new record of buellioid lichens (Ascomycota, Physciaceae) in Australia. *Australasian Lichenology* **80**, 28–37.
- Elix, JA; Malcolm, WM; Knight, A (2015): New records and new combinations of buellioid lichens (Physciaceae, Ascomycota) from New Zealand. *Australasian Lichenology* **77**, 36–41.
- Imshaug, HA (1955): The lichen genus *Buellia* in Central America. *Bryologist* **58**, 277–287.

- Kalb, K; Giral, M (2011): *Orcularia*, a segregate from the lichen genera *Buellia* and *Rinodina* (Lecanoromycetes, Caliciaceae). *Phytotaxa* **38**, 53–60.
- Mayrhofer, H; Ropin, K; Elix, JA (2016): Two new corticolous species of *Amandinea* (Ascomycota, Physciaceae) from New Zealand. *Australasian Lichenology* **78**, 11–17.
- McCarthy PM (2017) *Checklist of the Lichens of Australia and its Island Territories*. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html> (Version 2017). ABRIS, Canberra.
- Nordin, A (2004): New species of *Tetramelas*. *Lichenologist* **36**, 355–359.
- Nordin, A; Owe-Larsson, B; Elix, JA (1999): *Buellia aeruginosa*, a new Australian lichen with pluriseptate spores. *Mycotaxon* **71**, 399–404.
- Trinkaus, U; Mayrhofer, H; Elix, JA (2001): Revision of the *Buellia epigaea*-group (lichenized ascomycetes, Physciaceae) 2. The species in Australia. *Lichenologist* **33**, 47–62.





Figure 1. *Amandinea okainensis* (holotype in GZU). Scale bar = 1 mm.



Figure 3. *Buellia porphyrilica* (holotype in GZU). Scale bar = 2 mm.



Figure 2. Ascospore ontogeny of *A. okainensis*. Scale bar = 10  $\mu$ m.

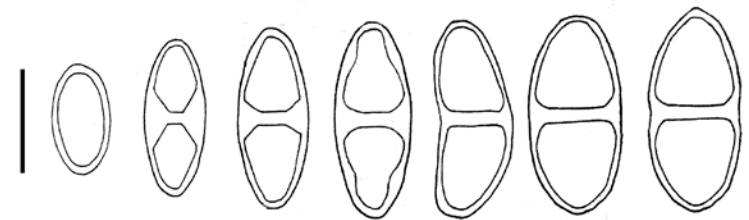


Figure 4. Ascospore ontogeny of *B. porphyrilica*. Scale bar = 10  $\mu$ m.





Figure 5. *Tetramelas kopuwaianus* (holotype in GZU). Scale bar = 1 mm.

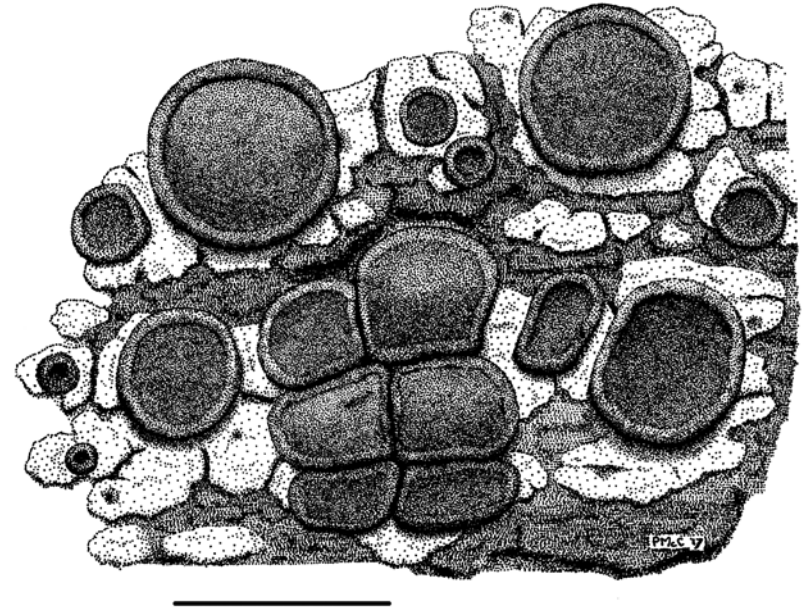


Figure 7. *Amandinea discreta* (M. Lambauer 0173 in GZU). Scale bar = 0.5 mm.

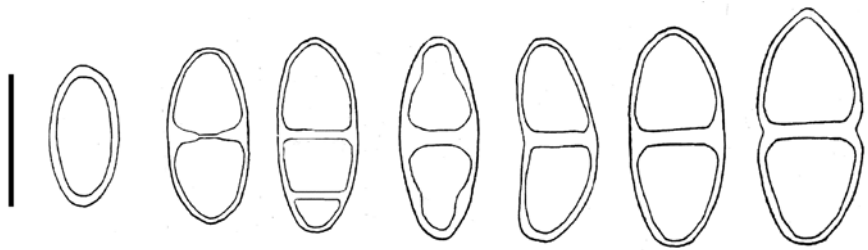


Figure 6. Ascospore ontogeny of *T. kopuwaianus*. Scale bar = 10  $\mu$ m.

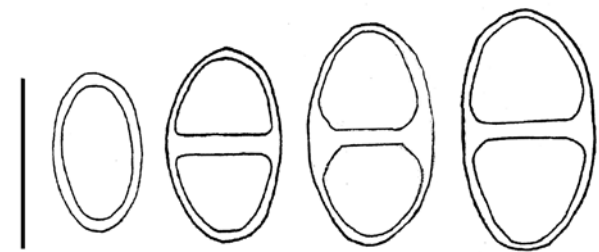


Figure 8. Ascospore ontogeny of *A. discreta*. Scale bar = 10  $\mu$ m.