

**Two new species and four new records of buellioid lichens
(Caliciaceae, Ascomycota) from Australia**

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Abstract

Amandinea montanensis Elix & H.Mayrhofer and *Buellia tropica* Elix & H.Mayrhofer are described as new to science. The new combination *Amandinea manamiana* (Diederich) Elix & H.Mayrhofer, is made. It and *Buellia macularis* Zahlbr., *Gassicurtia elizae* (Tuck.) Marbach and *G. rufofuscescens* (Vain.) Marbach are reported for the first time from Australia. *Amandinea montanensis* also occurs in the South Island of New Zealand.

Introduction

The present paper continues our investigation of *Buellia*-like lichens in the Southern Hemisphere. For the more recent additions, see Elix (2020), Elix & Kantvilas (2020) and Elix & Mayrhofer (2020) and references cited therein. In this paper, we describe *Amandinea montanensis* from siliceous rocks in alpine and upland areas of southern New South Wales, the Australian Capital Territory, Victoria, Tasmania, and the South Island of New Zealand, as well as *Buellia tropica*, a new saxicolous species of *Buellia* in the broad sense, from north Queensland. The new combination *Amandinea manamiana* (Diederich) Elix & H.Mayrhofer is made. It and *Buellia macularis* Zahlbr., *Gassicurtia elizae* (Tuck.) Marbach and *G. rufofuscescens* (Vain.) Marbach are reported for the first time from Australia. Methods are as described in our previous papers cited above.

New species

1. *Amandinea montanensis* Elix & H.Mayrhofer, sp. nov.
Mycobank No.: **MB 839053**

Figs 1, 2

Similar to *Amandinea isabellina* (Hue) Søchting & Øvstedal, but differs in having a thinner thallus and smaller ascospores, 10–17 × 5–10 µm.

Type: Australia, New South Wales, Mount Kosciuszko National Park, Perisher Creek between Smiggin Holes and Guthega, 36°22'S, 148°24'E, 1620–1680 m alt., on granite, *H. Mayrhofer 15418*, *H. Hertel & R. Filson*, 3.iii.1985 (holotype – GZU).

Thallus crustose, membranaceous to areolate or subsquamulose, to 50 mm wide and 1 mm thick; individual areoles rounded to irregular, 0.1–1.5 mm wide, sometimes becoming aggregated and imbricate to form a secondary warted or subsquamulose crust; upper surface grey-green to grey-brown or olive-brown, matt; prothallus black and marginal, or not apparent; medulla white, lacking calcium oxalate (H₂SO₄⁻), I⁻; photobiont cells 6–19 µm diam. *Apothecia* 0.2–0.5 mm wide, lecideine, broadly adnate to sessile and constricted at the base, isolated or crowded, rounded; disc black, epruinose, plane to weakly convex; *proper excipulum* thin, persistent or excluded in convex apothecia, the outer zone dark brown, 30–50 µm thick, K⁻, N⁻, inner zone pale brown to colourless. *Epithymenium* 8–10 µm thick, dark brown to brown-black, K⁻, N⁻. *Hypothecium* brown to brown-black, 50–80 µm thick, K⁻. *Hymenium* 50–60 µm thick, colourless, not interspersed; subhymenium 20–25 µm thick, colourless to pale brown, not interspersed. *Paraphyses* 1.2–1.5(–2) µm wide, sparsely branched, with apices 3.5–5.5 µm wide and brown caps. *Asci* *Bacidia*-type, 8-spored. *Ascospores* *Physconia*-type when

immature, *Buellia*-type when mature, brown, ellipsoid, 10–[13.8]–17 × 5–[7.5]–10 µm, ± curved, rarely constricted at the septum; outer spore-wall weakly ornamented. *Pycnidia* immersed; ostiole black. *Conidia* filiform, curved, 16–32 × 0.7–1 µm.
Chemistry: Thallus K⁻, P⁻, C⁻, UV⁻; no lichen substances detected by TLC.

Etymology: The species is named after its distribution mainly in upland and montane regions.

Remarks

This species is characterized by the crustose, membranaceous to areolate or subsquamulose, grey-green to grey-brown or olive-brown thallus, the broadly adnate to sessile, lecideine apothecia, the non-amyloid medulla, the 1-septate, *Physconia*- then *Buellia*-type ascospores, 10–17 × 5–10 µm, curved, filiform conidia, 16–32 µm long, and the absence of lichen substances. It had previously been confused with *A. isabellina*, but that species has a thicker, congested verruculose thallus, 1–2.5 mm thick, and larger ascospores, 14–[16.1]–20 × 7–[8.3]–11 µm (Lamb 1968; Elix & Kantvilas 2013).

Amandinea montanensis is known from siliceous rocks in upland regions of south-eastern mainland Australia (New South Wales, Australian Capital Territory and Victoria), as well as Tasmania and the South Island of New Zealand. In Australia, associated species include *Acarospora veronensis* A.Massal., *Buellia aethalea* (Ach.) Th.Fr., *B. ocellata* (Flot.) Körb., *Lecanora farinacea* Fée, *Notoparmelia signifera* (Nyl.) A.Crespo, Ferencova & Divakar, *Pertusaria lophocarpa* Körb., *Rhizocarpon geographicum* (L.) DC. and *Xanthoparmelia mougeotina* (Nyl.) D.J.Galloway.

SPECIMENS EXAMINED

New South Wales: ● Mount Canobolas State Conservation Area, N slopes of Mt Canobolas, 12 km SW of Orange, 33°19'58"S, 148°58'52"E, 1100 m alt., on roadside trachytic rhyolite, *J.A. Elix 46876*, 1.x.2019 (CANB); ● same locality, *P.M. McCarthy 4901*, 1.x.2019 (CANB); ● Kybean, 22.5 km NE of Nimmitabel, *J.S. Williams s.n.*, 13.x.1966 (MEL 1018442); ● Cabonne, roadside between Canowindra and Cargo, c. 400 m alt., on rock, *D., M. & H. Mayrhofer 7988*, 12.viii.1988 (GZU).

Australian Capital Territory: ● Brindabella Range, Namadgi National Park, summit of Mt Ginini, 52 km WSW of Canberra, 35°31'47"S, 148°46'22"E, 1762 m alt., on loose stones, *P.M. McCarthy 4720*, 10.i.2018 (CANB).

Victoria: ● Grampians National Park, near Silverband Falls, 37°11'S, 142°31'E, on stone, *W.H. Ewers s.n.*, 29.viii.1986 (CANB 777032 *pr. p.*); ● Bogong High Plains, Langford West Aqueduct, Middle Creek, 36°55'S, 147°18'E, c. 1600 m alt., on granite, *H. Mayrhofer 15483*, *H. Hertel & R. Filson*, 26.ii.1985 (GZU); ● Mt Oberon, Wilsons Promontory, 39°02'S, 146°21'E, c. 540 m alt., on granite, *D. & H. Mayrhofer 11509 pr. p.*, 15483 & *E. Hierzer 30.vii.1992* (GZU).

Tasmania: ● Lake Kaye, 41°54'S, 146°31'E, 1140 m alt., on basalt boulders in alpine heathland, *G. Kantvilas 94/00 pr. p.*, 8.iii.2000 (HO); ● Daley property, "High Country", c. 2 km W of Long Point, *G. Kantvilas 44/06*, 1.i.2006 (HO).

New Zealand: ● South Island, Otago, Taieri Co., summit of Museum Rock, Rock and Pillar Range, 24 km W of Middlemarch, 1280 m alt., on rock tors in alpine zone, *H.A. Imshaug 56089*, 6.xii.1972 (MSC); ● South Island, Otago, Lake Hayes, NE of Queenstown, c. 310 m alt., on boulders along lake shore, *H. Mayrhofer 2243*, 20.ix.1981 (GZU).

2. *Buellia tropica* Elix & H.Mayrhofer, sp. nov.
Mycobank No.: **MB 839055**

Figs 3, 4

Similar to *Buellia herveyensis* Elix, but differs in having somewhat longer ascospores, 17–24 µm long, and a medulla that contains calcium oxalate.

Type: Australia, Queensland, Main Range, Millstream Falls National Park, Millstream Falls, 7 km WSW of Ravenshoe, 17°38'S, 148°22'E, 780 m alt., on basalt outcrop at base of falls, *H. Mayrhofer 11793 & E. Hierzer pr. p.*, 10.viii.1993 (CANB – holotype).

Thallus crustose, to 12 mm wide and 0.1 mm thick, rimose-areolate, individual areoles irregular, angular, 0.1–0.5 mm wide; upper surface white to whitish grey, matt, densely maculate; prothallus marginal and black, or not apparent; photobiont cells 5–13 µm wide; medulla white, containing calcium oxalate (H₂SO₄⁺), I–, K+ yellow in part. *Apothecia* 0.05–0.3 mm wide, cryptolecanorine or lecideine, immersed to just adnate; disc black, epruinose, weakly concave at first, then plane. *Excipulum* distinct, persistent, black, in section 30–40 µm thick, outer part brown to dark brown, inner part paler brown, K+ yellow. *Epihymenium* 10–12 µm thick, brown, K+ orange, N–. *Hypothecium* 60–75 µm thick, brown. *Hymenium* 60–75 µm thick, colourless, not interspersed; subhymenium c. 20 µm thick, pale brown, not interspersed. *Paraphyses* 1.5–2 µm wide, simple to weakly branched, capitate, the apices 3.5–5 µm wide, with brown caps. *Asci* *Bacidia*-type, 8-spored. *Ascospores* initially of the *Callispora*-type, then *Buellia*-type, 1-septate, olive-brown to brown, ellipsoid, 17–[20.8]–24 × 8–[9.6]–11 µm, constricted at the septum, sometimes slightly curved, often pointed at the apices, with weak subapical wall-thickenings; outer spore-wall rugulate. *Pycnidia* not seen. *Chemistry*: Thallus K+ yellow, P+ pale yellow, C–, UV–; containing atranorin (major).

Etymology: The species is named after its tropical distribution in Australia.

Remarks

The new species is characterized by the crustose, rimose-areolate, white to whitish grey thallus, the *Callispora* then *Buellia*-type ascospores, 17–24 × 8–11 µm, with a rugulate outer wall, and the presence of medullary calcium oxalate and atranorin. *Buellia herveyensis* is quite similar, but differs in having a rimose, chinky, reddish brown to dirty brownish white thallus, straight, *Buellia*-type ascospores and a medulla that lacks calcium oxalate (Elix 2015).

At present, the new species is known only from the type locality. Associated lichens include *Candelaria crawfordii* (Müll.Arg.) P.M.Jørg. & D.J.Galloway, *Heterodermia obscurata* (Nyl.) Trevis., *Lecanora margarodes* (Körb.) Nyl., *L. sulfurescens* Fée, *L. tropica* Zahlbr., *Lepra subventosa* (Malme) I.Schmitt & Lumbsch var. *subventosa* and *Rinodina xanthomelana* Müll.Arg.

New records

1. *Amandinea manamiana* (Diederich) Elix & H.Mayrhofer, comb. nov. Fig. 5
Mycobank No.: **MB 839051**

Basionym: *Buellia manamiana* Diederich, *Biblioth. Lichenol.* **64**, 33 (1997)

Type: Papua New Guinea, Madang Province, Manam Island (near Bogia), lava flow of 1957, 2 km S of Waris, on SE shore, 4°07'S, 145°04'E, 10 m alt., on lava rock, *P. Diederich 11413*, 23.vii.1993 (holotype – LG, not seen).

Thallus crustose, to 50 mm wide and 50 µm thick, areolate, finely rimose or granular, areoles 0.08–0.2 mm wide; upper surface yellow, flat, dull; prothallus black and marginal, or absent; medulla white, lacking calcium oxalate (H₂SO₄[–]), I–; photobiont cells 5–9 µm wide. *Apothecia* 0.1–0.5 mm wide, lecideine, adnate to sessile and constricted at the base, round; disc black, epruinose, plane to weakly convex. *Excipulum* distinct, persistent, in section 18–35 µm thick, outer zone dark brown, K–, N–, inner zone pale brown. *Epihymenium* 8–10 µm thick, brown, K–, N–. *Hypothecium* 20–50 µm thick, dark brown, K–. *Hymenium* 50–60 µm thick, colourless, not interspersed. *Paraphyses* 1–1.5 µm wide, sparsely branched towards apices, the apices 4–7 µm wide with brown caps. *Asci* *Bacidia*-type, 12–16-spored. *Ascospores* *Buellia*-type, brown, ellipsoid, 8–[9.9]–13 × 3–[4.5]–6 µm, older spores constricted at the septum; outer spore-wall weakly ornamented. *Pycnidia* immersed, black, punctiform. *Conidia* curved, filiform, 19–25 × 0.7–1 µm.

Chemistry: Thallus K–, P–, C–, KC+ orange, UV– or UV+ weak orange; containing thuringione (major), arthothelin (minor).

Remarks

This species was known previously from Papua New Guinea (Aptroot *et al.* 1997). It is characterized by the yellow, areolate, finely rimose or granular crustose thallus, the lecideine apothecia, 12–16-spored asci, *Buellia*-type ascospores, 8–13 × 3–6 µm, curved, filiform conidia, 19–25 µm long, and the presence of thuringione and arthothelin. *Amandinea melaxanthella* (Nyl.) Marbach is very similar, but has smaller apothecia (0.1–0.3 mm wide), 8–16-spored asci and ascospores with a rugulate outer spore-wall. It occurs only on corticolous substrata (Marbach 2000).

SPECIMEN EXAMINED

Queensland: ● Beerwah, Glass House Mountains National Park, above picnic area W of Mt Tibrogargan, N of Beerburum, 37°23'S, 144°19'30"E, 50–80 m alt., on rhyolite outcrops in open sclerophyll forest, *H. Mayrhofer 11499*, *E. Hierzer & N. Stevens*, 20.viii.1993 (GZU).

2. *Buellia macularis* Zahlbr., *Denkschr. Akad. Wiss. Wien math.-naturwiss. Kl.* **104**, 375 (1941) Fig. 6

Type: New Zealand: South Island, Central Otago, Hyde, *J.S. Thomson A 41 (T 2328)* (holotype – W, not seen; isotype – CHR).

Thallus crustose, to 50 mm wide and 0.1 mm thick, rimose-areolate, areoles 0.2–0.6 mm wide, ± angular, flat or weakly concave; upper surface pale to dark grey or pale grey-brown, dull, often roughened; prothallus usually conspicuous, black, surrounding the thallus, stellate-fimbriate, 0.5–2 mm wide, also growing ± between the areoles and forming mosaics; medulla white, lacking calcium oxalate (H₂SO₄[–]), I–; photobiont cells 8–15 µm wide. *Apothecia* 0.1–1 mm wide, lecideine, immersed, becoming adnate or rarely sessile; disc black, flat, epruinose. *Excipulum* thin, persistent, cupuliform, in section 35–60 µm thick, outer zone greenish black to brown-black, K–, N+ red-violet or red-brown, inner zone pale brown. *Epihymenium* 8–13 µm thick, dark greenish black to olive-brown, K–, N+ red-violet. *Hypothecium* 70–80 µm thick, colourless to pale brown. *Hymenium* 55–80 µm thick, colourless, not interspersed. *Paraphyses* 1.5–2.5 µm wide, simple to moderately branched, with apices 4–5 µm wide and aeruginose-brown caps. *Asci* *Bacidia*-type, 8-spored. *Ascospores* *Buellia*-type, 1-septate, olive-brown to brown, broadly ellipsoid, 12–[14.2]–18 × 8–[8.6]–10 µm, becoming constricted at the septum, with obtuse ends, uniformly thin-walled; outer spore-wall microrugulate. *Pycnidia* rare, immersed, urceolate to globose. *Conidia* bacilliform, 5–7 × 1 µm.

Chemistry: Thallus K+ yellow then red, P+ yellow-orange, C–, UV–; containing norstictic acid (major) and connorstictic acid (minor).

Remarks

This species was known previously from New Zealand (Galloway 1985, 2007). It is characterized by the crustose, pale to dark grey or pale grey-brown, rimose-areolate thallus, often with a roughened upper surface, the immersed to adnate, lecideine apothecia, the prominent, fimbriate-stellate, black prothallus, a non-amyloid medulla, the aeruginose, N+ red-violet epihymenium, the *Buellia*-type ascospores, 12–18 × 8–10 µm, bacilliform conidia, 5–7 µm long, and the presence of norstictic acid. *Buellia aethalea* (Ach.) Th.Fr. is somewhat similar, but it lacks the roughened upper surface and has an amyloid medulla in Australia and New Zealand (Elix 2011).

SPECIMENS EXAMINED

Australian Capital Territory: ● Brindabella Range, Namadgi National Park, summit of Mt Ginini, 52 km WSW of Canberra, 35°31'47"S, 148°46'22"E, 1762 m alt., on loose stones in grasses, *J.A. Elix 47103*, 2.iii.2021 (CANB); ● Bruce Ridge, Canberra Nature Park, 35°15'S, 149°05'E, 640 m alt., on quartzite rocks in dry, *Eucalyptus* woodland, *J.A. Elix 23282*, 26.xi.1989 (CANB).

New Zealand: ● South Island, Otago, Toko Mouth, 46°13'39"S, 170°01'40"E, 5 m alt., on quartz stones on sandy ground in dune slack, *A. Knight & J.M. Bannister s.n.*, 24.i.2004 (CANB, OTA).

Lecidea elizae Tuck., *Amer. J. Sci. Arts*, ser. 2, 25: 428 (1858); *Buellia elizae* (Tuck.) Tuck., *Lichens of California, Oregon and the Rocky Mountains* 25 (1866). *Type*: U.S.A., Virginia, Sussex, *E. Tuckerman ex 3251*, 1854 (holotype – FH, not seen).

Thallus crustose, to 50 mm wide and 0.1 mm thick, continuous, granular to coralloid-isidiate, individual granules 50–80 µm wide, isidia 50–100 µm thick; upper surface yellowish grey; prothallus marginal, black; medulla white, lacking calcium oxalate (H₂SO₄-), I-; photobiont cells 5–11 µm wide. *Apothecia* 0.2–0.5 mm wide, lecideine, scattered, round, broadly adnate, disc black, orange-pruinose, pruina darkening with age, plane to weakly convex. *Excipulum* persistent, black, in section 30–50 µm thick, the outer part brown-black, K-, paler within. *Epihymenium* 8–12 µm thick, orange to orange-brown, K+ orange solution. *Hypothecium* 100–120 µm thick, olive-black to brown-black, K-. *Hymenium* 60–70 µm thick, colourless, not interspersed but with a few small oil droplets. *Paraphyses* 1.5–1.8 µm wide, simple to sparsely branched, the apices 2–2.5 µm wide with colourless caps. *Asci* *Bacidia*-type, 8-spored. *Ascospores* *Buellia*-type, 1-septate, olive-green to brown, broadly ellipsoid, 10–[12.6]–15 × 5–[5.4]–7 µm, rarely constricted at the septum; outer spore-wall moderately ornamented. *Pycnidia* not seen.

Chemistry: Thallus K-, C-, KC+ orange, P-, UV-; containing barbatic acid (major), obtusatic acid (minor or trace).

Remarks

This species was known previously from North America, Japan and East Africa. (Marbach, 2000). It is characterized by the yellowish grey, crustose thallus, an orange-pigmented epihymenium (K+ orange solution), the orange-pruinose apothecia, *Buellia*-type ascospores, 10–15 × 5–7 µm, and by the presence of barbatic and obtusatic acids.

SPECIMENS EXAMINED

Queensland: • Atherton Tableland, Koombooloomba Dam, near weir, [17°50'25"S, 145°35'45"E, 700 m alt.], on bark, *W.H. Ewers 7951 pr. p.*, 23.ix.1991 (CANB).

Japan: • Prov. Kii, Mt Kōya, on bark, *Y. Asahina s.n.*, 23.viii.1952 (CANB, *Lichenes Japoniae Exsiccati* no. 206, as *Buellia crocata* Zahlbr.).

4. *Gassicurtia rufofuscescens* (Vain.) Marbach, *Biblioth. Lichenol.* 74, 242 (2000) Fig. 8
Buellia rufofuscescens Vain., *Acta Soc. Fauna Fl. Fenn.* 7: 172 (1890). *Type*: Brazil, Minas Gerais, Carassa, *E.A. Vainio, Lichenes Brasiliensis Exsiccati* 473, 1885 (isotype – KIEL not seen).

Thallus crustose, to 20 mm wide and 60 µm thick, continuous, smooth to verruculose; upper surface white to grey-white, shiny, esorediate; prothallus marginal, grey to black or absent; medulla white, lacking calcium oxalate (H₂SO₄-), I-; photobiont cells 5–10 µm wide. *Apothecia* 0.2–0.4 mm wide, lecideine, scattered, round, sessile, basally constricted, disc black, epruinose or red-brown-pruinose, plane to weakly concave. *Excipulum* persistent, glossy, black, in section 25–35 µm thick, mostly opaque dark brown to brown-black throughout, containing pigment that leaches in K to give a purple solution. *Epihymenium* 7–9 µm thick, red-brown to dark brown, K+ olive, containing granules that are sparingly soluble in K. *Hypothecium* 90–110 µm thick, brown-black, K-. *Hymenium* 55–65 µm thick, colourless, not interspersed but with scattered fine oil droplets, K+ yellow. *Paraphyses* 1.5–2 µm wide, simple to sparsely branched, the apices 3–3.5 µm wide with brown caps. *Asci* *Bacidia*-type, 8-spored. *Ascospores* *Physconia*-type then *Buellia*-type, 1-septate, olive-green to brown, ellipsoid, 11–[12.2]–14 × 5–[5.4]–6 µm, rarely slightly constricted at the septum; outer spore-wall moderately ornamented. *Pycnidia* not seen.

Chemistry: Thallus K+ yellow, KC-, C+ orange, P-, UV+ orange; containing thiophanic acid (major), 3-*O*-methylthiophanic acid (major) and chiodectonic acid (trace).

Remarks

This species was known previously from Central and South America (Marbach, 2000; van den Boom *et al.* 2013). It is characterized by a white to grey-white, smooth to verruculose thallus, a pigmented excipulum (K+ purple solution), *Buellia*-type ascospores, 11–14 × 5–6 µm, and the presence of 3-*O*-methylthiophanic, thiophanic and chiodectonic acids. The specimen cited below was formerly misidentified as *G. pseudosubpulcella* Marbach (Elix & Kantvilas 2015).

SPECIMEN EXAMINED

Queensland: • Clarke Range, 46 km S of Proserpine, 20°50'S, 148°32'E, 800 m alt., on dead log in *Eucalyptus-Casuarina*-dominated woodland, *J.A. Elix 20941* & *H. Streimann*, 29.vi.1986 (CANB).

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References

- Aptroot, A; Diederich, P; Sérusiaux, E; Sipman, HJM (1997): Lichens and lichenicolous fungi from New Guinea. *Bibliotheca Lichenologica* 64, 1–220.
- Boom, PPG van den; Giralt, M; Fankhauser, JD; Moberg, R (2013): Lichens of Panama: Biodiversity in Physciaceae (Ascomycota: Caliciales). *Galatia* 5, 1–15.
- 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 of *Buellia* sens. lat. (Physciaceae, Ascomycota) from tropical Australia. *Australasian Lichenology* 77, 42–51.
- Elix, JA (2020): Ten new species and two new records of buellioid lichens (Caliciaceae, Ascomycota) from Australia and Norfolk Island. *Australasian Lichenology* 87, 3–19.
- Elix, JA; Kantvilas, G (2013): New taxa and new records of *Amandinea* (Physciaceae, Ascomycota) in Australia. *Australasian Lichenology* 72, 3–19.
- 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 (2020): Three new species and a new record of buellioid lichens (Caliciaceae, Ascomycota) from Tasmania. *Australasian Lichenology* 87, 20–25.
- Elix, JA; Mayrhofer, H (2020): Four new species and a new record of buellioid lichens (Caliciaceae, Ascomycota) from Australia. *Australasian Lichenology* 86, 62–69.
- Galloway, DJ (1985): *Flora of New Zealand Lichens*. P.D. Hasselberg, Government Printer, Wellington.
- Galloway, DJ (2007): *Flora of New Zealand Lichens*. Revised 2nd edn. Manaaki Whenua Press, Lincoln.
- Lamb, IM (1968): Antarctic lichens II. The genera *Buellia* and *Rinodina*. *British Antarctic Survey Scientific Reports* 61, 1–129 + 16 plates.
- Marbach, B (2000): Corticole und lignicole Arten der Flechtengattung *Buellia* sensu lato in den Subtropen und Tropen. *Bibliotheca Lichenologica* 74, 1–384.



Figure 1. *Amandinea montanensis* (holotype in GZU). Scale bar = 2 mm.



Figure 3. *Buellia tropica* (holotype in CANB). Scale bar = 1 mm.



Figure 2. Ascospore ontogeny of *Amandinea montanensis*. Scale bar = 10 μ m.



Figure 4. Ascospore ontogeny of *Buellia tropica*. Scale bar = 10 μ m.

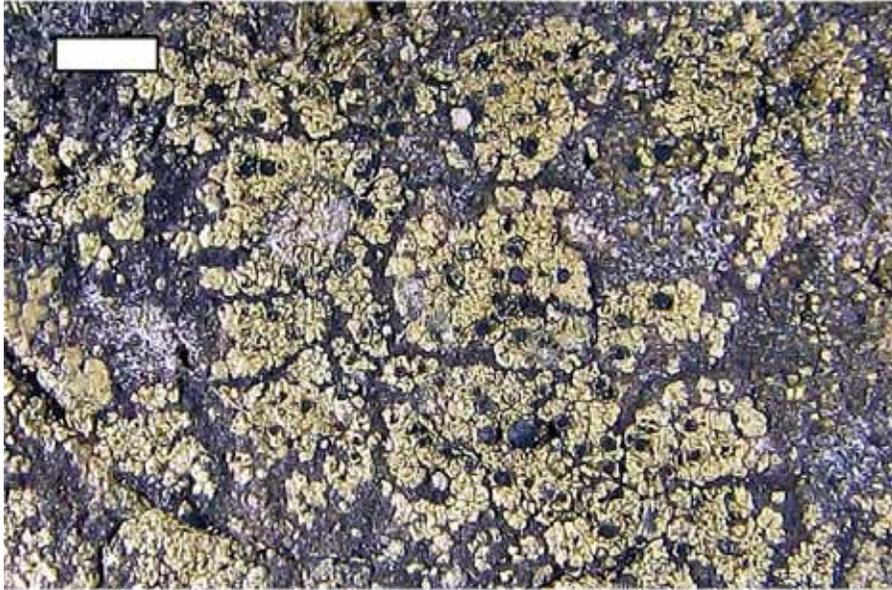


Figure 5. *Amandinea manamiana* (H. Mayrhofer 11499 et al. in GZU). Scale bar = 2 mm.



Figure 7. *Gassicurtia elizae* (Y. Asahina s.n. in CANB). Scale bar = 1 mm.



Figure 6. *Buellia macularis* (J.A. Elix 23282 in CANB). Scale bar = 2 mm.

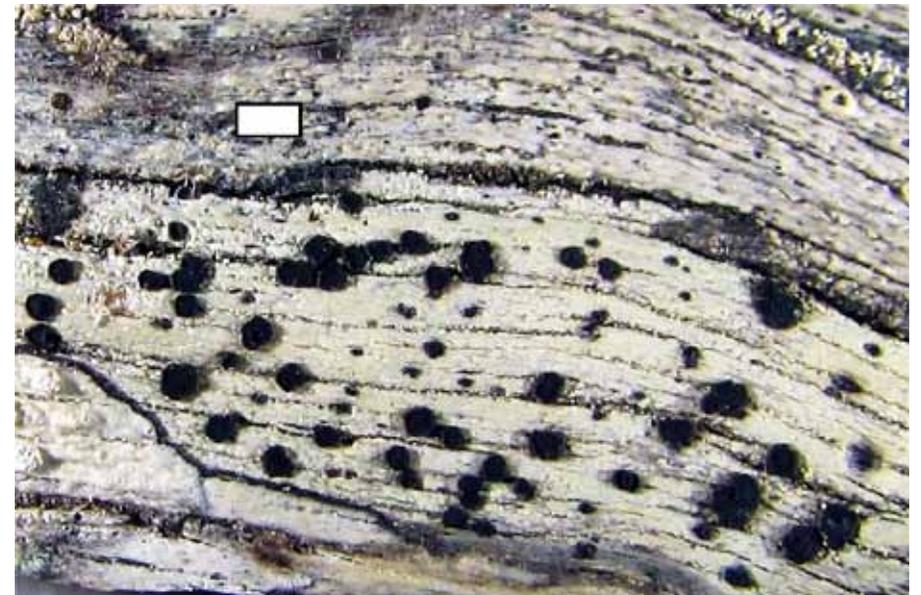


Figure 8. *Gassicurtia rufofuscescens* (J.A. Elix 23282 in CANB). Scale bar = 1 mm.