Ten new species and two new records of buellioid lichens (Physciaceae, Ascomycota) from Australia and Norfolk Island

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

Abstract
Amandinea pilbarensis Elix, Baculifera confusa Elix, Buellia arida Elix, B. craevenii Elix, B. eldrigdei Elix, B. kowenensis Elix & P.M.McCarthy, B. lordhowensis Elix, B. philipensis Elix, Tetramelas flindersianus Elix and T. gariverdensis Elix are described as new to science. In addition, Amandinea brugierae (Vain.) Marbach and Buellia hypostictella Elix & H.Mayrhofer are reported for the first time from Australia.

Introduction
This paper continues my investigation of Buellia-like lichens in Australia. For the more recent additions, see Elix et al. (2017) and Elix & McCarthy (2018) and the references cited therein. In this paper, I describe a new saxicolous species of Amandinea, a new species of Baculifera, six new species of Buellia in the broad sense and two of Tetramelas. Methods are as described in the papers cited above.

New species
1. Amandinea pilbarensis Elix, sp. nov. MycoBank No. MB834721

Similar to Amandinea polyxanthonica (Elix) Elix, but differs in having smaller ascospores, 8–9.9 × 5–6.1 × 7 µm, and in containing medullary calcium oxalate and thiophanic acid.

Type: Australia, Western Australia, Pilbara Region, 27 km SW of DeGrey River, E of Port Headland, on siliceous rock, A.C. Beauglehole 13962A, 10.viii.1965 (holotype – MEL).

Thallus crustose, continuous, rimose-areolate, to 15 mm wide and 0.1 mm thick; individual areoles angular to irregular, 0.1–0.5 mm wide, becoming weakly radiate at the margin; upper surface white to pale cream, matt; prothallus not apparent; medulla white, containing calcium oxalate (H₂SO₄+), I–; photobiont cells 6–12 µm diam. Apothecia 0.1–0.4 mm wide, lecideine, immersed then broadly adnate, more rarely sessile and constricted at the base, dispersed, rounded; disc black, epruinose, plane or becoming convex with age; proper exciple thin, persistent, often with adhering, necrotic thalline fragments; in section outer zone dark brown, cupuliform, K–, N–, 20–30 µm thick; inner zone pale brown to colourless. Epihymenium 5–8 µm thick, brown, K–, N–. Hypothecium colourless to pale brown, 40–60 µm thick, K–. Hymenium 38–48 µm thick, colourless, not inspersed; subhymenium 10–15 µm thick, colourless, not inspersed. Paraphyses 1.2–1.5(–2) µm wide, sparsely branched, with apices 3–5 µm wide and brown caps. Ascii of the Bacidiaceae-type, 8-spored. Ascospores Buellia-type when mature, pale brown to brown, ellipsoid, 8–9.9 × 5–6.1 × 7 µm, becoming constricted at the septum; outer spore-wall smooth. Pycnidia immersed; ostiole black. Conidia filiform, curved, 12–20 × 0.7 µm.

Chemistry: Thallus K–, P–, C+ orange, UV+ orange; containing thiophanic acid.

Etymology: The species is named after the type locality.

Remarks
Amandinea pilbarensis is characterized by the crustose, rimose-areolate, white to pale cream thallus, the immersed then broadly adnate apothecia, the non-amyloid medulla, a non-inspersed
**Thallus** crustose, endophloedal and not apparent, or epiploedal, to c. 15 mm wide, rimose or rimose-aroteolate, pale grey to dark brown, up to 100 mm thick, areoles 0.1–0.8 mm wide, esorediate; prothallus marginal, black when abutting other lichens or not apparent; medulla lacking calcium oxalate (H₂SO₄–), I–; photobiont cells 10–20 µm wide.

**Hymenium** 50–60 µm thick, colourless to very pale yellow-brown, K–. 

**Asci** 8–12 µm thick, dark olive-brown to dark brown, K+ yellow solution, N+ intense blue-black, HCl+ intensifying purple-black.

**Conidia** 7–10 µm long, becoming constricted at the septum, or not, rounded at apices, with subapical wall-thickenings; outer spore-wall strongly ornamented. 

**Pyxidia** immersed. 

**Conidia** bacilliform, straight, 5–6 × 1 µm.

**Chemistry** Thallus K–, P–, C–, UV–; no lichen substances detected.

**Etymology:** The species name follows from its previous confusion with *Baculifera xylophila*.

**Remarks**

In several respects, the new species resembles the common and widely distributed *Baculifera xylophila*, in that both lack lichen substances, have ephemymenia containing similar pigments (N+ grey-black or blue-black), and ascospores that exhibit subapical wall-thickenings during ontogeny. However, *B. xylophila* differs in having a dark brown to brown-black hymenium, a thicker hymenium, 100–150 µm thick, larger ascospores, 12–17.6 × 22–6 [8.9]–11 µm, and longer conidia, 7–10 µm long (Marbach 2000; Elix & Kantvilas 2014). Moreover, the ephemymenia pigments differ in the two species. *Baculifera xylophila* contains the micromera-green pigment, a greenish brown to greenish black substance that reacts N+ greasy black, K+ green, HCl+ intensifying bluish green (Bungartz et al. 2007), whereas the epihymenia of *B. confusa* contains dark olive-brown to dark brown pigment that reacts K+ chestnut or yellow-brown, forming a yellow solution, N+ intense blue-black, HCl+ intensifying purple-black.


**Similar to** *Baculifera xylophila* (Malme) Marbach, but differs in having a colourless to pale yellow-brown hypothecium, smaller ascospores, 11–17 × 5–8 µm, and shorter conidia, 5–6 µm long.

**Type:** Australia, South Australia, Murray Park Flora and Fauna Reserve, Murray Bridge, 35°07’S, 139°15’E, 30 m alt., on dead wood in remnant mallee scrub with *Callitris* and *Eucalyptus*, J.A. Elix 36810, 31.vi.2005 (holotype – CANB).

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has shorter, broader ascospores, 10–15–6.9–9 µm, and shorter conidia c. 3 µm long, and a subhymenium inspersed with oil droplets (Elix et al. 2017).

The new species is known from far-western New South Wales and southern parts of the Northern Territory. Common associated lichens include Buellia dispersa A.Massal., B. spuria var. amblyogona (Müll.Arg.) Elix, Caloplaca australiensis S.Y.Kond., Kärnefelt & Filson, Sarcoxyge iridana P.M.McCarthy & Kantvilas and Xanthoparmelia cravenii Elix & J.Johnst.

### ADDITIONAL SPECIMENS EXAMINED

**Northern Territory.** ● 25 km SW of Alice Springs, 24°49’S, 133°47’E, on S-face of sandstone hill, P.K. Latz 6380B, 24.i.1976 (MEL); ● East McDonnell Ranges, 1 km W of entrance to Ruby Gap National Park, 23°29’05”S, 134°57’46”E, 434 m alt., on rocky outcrop with SE aspect, K. Ralston 2559, 1.x.2002 (MEL).

**New South Wales.** ● South Western Plains, Manara Hills, Mount Manara Station, 66 km N of Ivanhoe, 32°28’S, 143°55’E, on rock face in exposed situation, R.B. Filson 14576, 10.xi.1972 (MEL).

### 4. Buellia cravenii

Elix, sp. nov.

Fig. 4

MycoBank No. MB834724

Similar to Buellia psoromica Elix, but differs in having a non-amyloid medulla, oil paraphyses in the hymenium, somewhat longer ascospores, 12–19 µm long, and shorter conidia, 5–7 µm long.

**Type:** Australia, Northern Territory, Macdonnell Range, 1 km N of Glen Helen Tourist Camp, 24°41’S, 132°41’E, 640 m alt., on sandstone rocks with a southerly aspect in mulga scrub, J.A. Elix 11260 & L.A. Craven, 16.ix.1983 (holotype – CANB).

**Thallus** crustose, to 35 mm wide and 0.6 mm thick, continuous, rimose-areolate; areoles 0.2–1 mm wide, irregular, angular; upper surface grey-white, matt, epruinose; prothallus absent; medulla white, lacking calcium oxalate (H₂SO₄−), I–.

**Apothecia** long, and a subhymenium inspersed with oil droplets (Elix has shorter, broader ascospores, 10–15–6.9–9 µm, and shorter conidia 11.7 × 6.9 µm).

**Chemistry:** Medulla K–, P–, C+ orange, UV+ orange; containing psoromic acid (major), arthothelin (minor).

**Etymology:** This species is named in honour of my co-collector, friend and colleague, the late Dr Lyn A. Craven.

## Remarks

**Buellia cravenii** resembles *B. psoromica* in that both contain psoromic acid and atranorin, have an agarigenous, N+ purple-brown epiphyemenum and proper exciple, *Buellia*-type ascospores and basidiomata. However, *B. psoromica* has an intensely amyloid medulla, a hymenium that lacks oil paraphyses, somewhat-shorter ascospores, 11–16 µm long, and longer conidia, 6–10 µm long. In addition, *B. psoromica* usually has a well-developed black prothallus that is apparent at the thallus margins and between adjacent areoles (Elix 2009). In several respects the new species also resembles the common and widely distributed *Buellia aethalea* (Ach.) Th.Fr. in that both have initially immersed apothecia and agarigenous epiphyemenum. However, in *B. aethalea* the medulla reacts K+ yellow then red due to the presence of norstictic acid and the ascospores are much larger, 12–20 × 7–12 µm (Elix 2011).

This species is known from siliceous rocks in the arid inland areas of South Australia, the Northern Territory and Western Australia. Common associated lichens include *Buellia dispersa* A.Massal., *B. spuria* var. amblyogona (Müll.Arg.) Elix, *Caloplaca australiensis* S.Y.Kondr., Kärnefelt & Filson, *Sarcocyste iridana* P.M.McCarthy & Kantvilas and *Xanthoparmelia cravenii* Elix & J.Johnst.

### ADDITIONAL SPECIMENS EXAMINED

**South Australia.** ● Flinders Ranges, Nooliana Creek, 12 km N of Hawkier, 31°49’S, 138°23’E, 550 m alt., on rocks in chenopod shrubland, J.A. Elix 17941 & L.H. Elix, 29.x.1984 (CANB).

**Western Australia.** ● Karjini National Park, Hamersley Range, Dales Gorge, Circular Pool, [22°30’S, 118°24’E], on rock, A.C. Beggthole 13983, 14.viii.1965 (MEL).

### 5. Buellia eldridgei

Elix, sp. nov.

Fig. 5

MycoBank No. MB834725

Similar to *Buellia diana* Trin kaus, but differs in having shorter ascospores, 11–16 µm long, a thinner hymenium, 65–75 µm thick, and in containing additional 6-O-methylarthothelin.

**Type:** Australia, Queensland, Andersen Paddock, Merigol Station, c. 40 km W of Charleville on the Quipolo ridge, 29°47’46”S, 148°49’19”E, on soil in open woodland on soft mulga sandplain with Eucalyptus populnea and Acacia aneura, D. Eldridge CCS18 & T. Beutel, 9.iv.2002 (holotype – CANB).

**Thallus** crustose, areolate to subsquamulose, to 10 mm wide; areoles crowded or dispersed, 0.4–1 mm wide, rounded, flat to weakly convex; upper surface pale yellow-brown, shiny; prothallus absent; medulla white, containing calcium oxide (H₂SO₄−), I–; photobiont cells 7–14 µm diam. *Apothecia* 0.4–0.8 mm wide, lecideine, immersed to just adnate, 1 per areole, round; disc black, epruinose, weakly concave to flat; proper exciple persistent, thick and raised above disc at first, thinner with age and level with disc; in section outer zone dark brown, 25–30 µm thick, K–, N–; inner zone pale brown. *Hymenium* 10–12 µm thick, brown, K–, N–, Hypothecium brown to dark brown, 150–175 µm thick, K–, Hymenium 65–75 µm thick, colourless, not inspersed; subhymenium, pale yellow-brown, 20–30 µm thick. *Paraphyses* 2–2.5 µm wide, sparsely branched, with apices 4–5 µm wide and agarigenous caps; oil paraphyses 4–8 µm wide.

**Ascospores** Bacillarid-type, 8-spored. *Ascospores* initially Physconia-type then *Buellia*-type, 1-septate, pale then dark brown, ellipsoid, 12–[14.3]–15 × 7–9 µm, becoming constricted at the septum; outer wall finely ornamented. *Pycnidia* brown, punctiform, immersed. *Conidia* bacilliform, straight, 5–7 × 0.8–1 µm.

**Chemistry:** Medulla K–, P–, C+ orange, UV+ orange; containing 6-O-methylarthothelin (major), arthothelin (minor).

**Etymology:** This species is named after Prof. David Eldridge, the collector of the type specimen.

### Remarks

*Buellia eldridgei* is characterized by the areolate to subsquamulose, pale yellow-brown terricolous thallus, the immersed to adnate, lecideine apothecia, the non-amyloid medulla containing calcium oxide, a non-inspersed hymenium, the ellipsoid, 1-septate, *Buellia*-type ascospores, 11–16 × 6–9 µm, and by the presence of 6-O-methylarthothelin and arthothelin. *Buellia diana* has longer ascospores, 14–[17.2]–21 µm long, a thicker hymenium, 75–110 µm, and contains only arthothelin (Trinkaus et al. 2001).

*Buellia eldridgei* is known only from the type collection. Associated species were not recorded.
6. Buellia kowenensis Elix & P.M.McCarthy, sp. nov.  
MycoBank number: MB834726

Similar to Buellia halonia (Ach.) Tuck., but differs in having smaller, persistently Buellia-type ascospores and in containing medullary calcium oxalate.

Type: Australia, Australian Capital Territory, Kowen Road, Kowen Forest, 11.7 km E of Canberra, 35°19'02"S, 149°15'07"E, 700 m alt., on sandstone rocks along old road bordering open Eucalyptus woodland, J.A. Elix 46788, 31.vii.2019 (CANB – holotype).

Thallus crustose, rimose-areolate, to 10 mm wide and 0.3 mm thick; individual areoles 0.1–0.7 mm wide; upper surface white to off-white, dull, appearing crystalline or maculate due to the incorporation of silica in the thallus, esorediate; prothallus not apparent; photobiont cells 8–14 µm wide; medulla white, containing calcium oxalate (H₂SO₄ crustose, rimose-areolate, to 10 mm wide and 0.3 mm thick; individual areoles 0.1–0.7 mm wide, lecideine, separate, broadly adnate; disc black, epruinose, weakly concave to convex; proper exciple thin, initially elevated above the disc, excluded in older cortex apothecia, in section 15–25 µm thick, the outer part dark brown, K–, paler within. Hypotheicum 50–60 µm thick, deep red-brown, K–, N–, Epiphytium 10–12 µm thick, brown dark, K–, N–, Hymenium 50–60 µm thick, colourless, not inspersed with oil droplets; paraphyses 1.5–2 µm wide, simple to sparsely branched, with apices 4–5 µm wide and brown caps. Ascii of the Bacida-type, 8 sporid. Ascospores of the Buellia-type, 1-septate, brown, ellipsoid, 9–[10.9]–13 × [5.2]–7 µm, becoming constricted at the septum; outer spore wall microrugulate. Pycnidia punctiform, immersed; ostiole brown. Conidia bacilliform, 8–10 × 1 µm. Chemistry: Cortex K–, C–, yellow; KC+ orange, P–, UV+ dull orange; containing isoarthritisin (major), 4,5-dichlororolichexanthone (trace).

Etymology: The epithet is derived from the type locality.

Remarks
Chemically, B. kowenensis closely resembles B. halonia, a widespread saxicolous species known from Australia, North America, South America and South Africa (Elix 2011). Both are characterized by the presence of arthothelin or isoarthothelin, and both ultimately have 4,5-dichlorolichexanthone as a major substance, and the presence of 4,5-dichlorolichexanthone. Buellia lichexanthonica, from Brazil, has a similar thallus, ascospores and anatomy and identical chemistry, but it lacks a prothallus and has larger, sessile apothecia, 0.2–0.5 mm wide and up to 0.2 mm high (Aptroot et al. 2017). Superficially, B. lordhowensis is very similar to B. stellulata (Taylor) Mudd, but the latter differs chemically in containing atranorin, 2′-O-methylperlatolic acid, ± confluentic acid and ± roccellic acid.

Buellia lordhowensis is known only from the type collection. Associated species include Buellia homophylia (C.Knight) Zahlbr., Megalaria cf. laureri (Hepp ex Th.Fr.) Hafellner, Parmotrema reticulatum (Kurok.) Hale.

8. Buellia phillipensis Elix, sp. nov.  
MycoBank No. MB834728

Similar to Buellia cranwelliae Zahlbr., but differs in having cryptolecanorine apothecia and in lacking medullary calcium oxalate.


Thallus crustose, rimose-areolate, to 15 mm wide; areoles crowded, 0.3–1 mm wide, irregular, angular, flat; upper surface pale yellow-grey, dull; prothallus black, prominent, marginal and between areoles; medulla white, lacking calcium oxalate (H₂SO₄–), 1–2 photobiont cells 6–11 µm diam. Apothecia 0.1–0.25 mm wide, lecideine, immersed to level with the thallus, round; disc black, epruinose, flat; proper exciple persistent, thin, initially slightly raised above the disc, becoming level with age; in section outer zone aeruginose-black, 25–35 µm thick, K–, N+ purple-brown; inner zone brown. Epiphytium 8–10 µm thick, dark brown to aeruginose, K–, N+ purple-brown. Hypotheicum brown to dark brown, 70–80 µm thick, K–, Hymenium 45–55 µm thick, colourless, not inspersed; subhymenium pale brown, 10–15 µm thick. Paraphyses 1.5–2 µm wide, sparsely branched, with apices 4–5 µm wide and aeruginose-brown caps. Ascii of the Bacida-type, 8-spored. Ascospores Buellia-type, brown, ellipsoid, 9–[10.6]–13 × [5.8]–8 µm, older spores constricted at the septum; outer spore-wall microrugulate. Pycnidia brown to black, immersed. Conidia straight, bacilliform, 6–9 × 0.7–1 µm. Chemistry: Medulla K–, P–, C–, UV+ orange; containing 4,5-dichlororolichexanthone (major).
Tetramelas flindersianus

Elix, sp. nov.

Figs 9, 10

MycoBank No.: MB834729

Similar to Tetramelas filsonii Elix, but differs in having a non-amyloid medulla, narrower ascospores and in containing only atranorin.

Type: Australia, Tasmania, Flinders Island, c. 5.8 km at 34° SE of West Point (on or within 2.6 m of the outcrop at Trig Point 881), 40°59’S, 144°39’E, on siliceous rock, J. Whinray s.n., 29.i.1969 (holotype – MEL 2314982).

Thallus crustose, areolate, to 60 mm wide and 1 mm thick; areoles scattered or contiguous, irregular to angular, 1–2.5 mm wide, becoming aggregated and imbricate to form a secondary subsquamulose crust, in places lifting off the substratum; upper surface off-white to grey-white, dull, uneven, granular in part; prothallus not apparent; photobiont cells 8–23 µm wide; medulla white, dull, uneven, epruinose; prothallus not apparent; photobiont cells 9–15 µm wide; and the absence of lichen substances. Buellia cranwelliae has a similar thallus and ascospores anatomy, and also lacks lichen substances, but it has larger, sessile, lecideine apothecia, 0.4–0.8 mm wide, and a medulla that contains calcium oxalate (Elix 2016). Superficially B. philippinensis is similar in the septate, brown- to black-immersed ascospores, 13–20 × 5–7 µm, which become constricted at maturity, and bacilliform conidia, 5–7 × 0.7–1 µm. The ascospores and hymenium of T. flindersianus are most similar to those of T. filsonii from Antarctica (Elix 2019), with ascospores 12–17 × 6–10 µm, and a hymenium 70–80 × µm high. However, T. filsonii has a suberect, pulvinate thallus and an amyloid medulla, and it contains 6-O-methylarthothelin and norstictic acid.

Etymology: The species is named from two localities on Flinders Island, Tasmania, and one in Victoria. It occurs on hard, siliceous rocks such as quartzite, associated with typical littoral species including Buellia stellulata (Taylor) Mudd var. stellulata, Caloplaca cribrosa (Hue) Zahlbr., C. gallowayi (Hue) Zahlbr., Pertusaria xanthoplaca Müll.Arg., Rinodina blas-tidiata Matzner & H.Mayrhofer and Tylophalla verrucosa (Müll.Arg.) Kantvilas.

ADDITIONAL SPECIMENS EXAMINED
Victoria. • East Gippsland, Cape Conran Coastal Park, West Cape, 37°49’43”S, 148°43’43”E, 1–3 m alt., on granite rock along foreshore above the high tide mark, J.A. Elix 422904, 30.v.2016 (CANB).
Tasmania. • Flinders Island, on the E side of Long Point (c. 118 m from the southern tip), 3 m alt., on quartzite rock, J. Whinray 630 pr. p., 12.v.1970 (MEL).

Tetramelas gariwerdensis

Elix, sp. nov.

Fig. 11

MycoBank No.: MB834730

Similar to Tetramelas darbishirei (L.M.Bamb.) Elix, but differs in having an areolate, crustose thallus rather than a suberect, pulvinate thallus.

Type: Australia, Victoria, Grampians National Park, Mt William, 37°17’33”S, 142°36’03”E, 1167 m alt., on stone, W.H. Ewers 367, 25.xi.1985 (holotype – CANB).

Thallus crustose, areolate, to 15 mm wide and 0.3 mm thick; areoles scattered or contiguous, round to irregular or angular, 0.3–1 mm wide; upper surface off-white to pale yellow, dull, uneven, epruinose; prothallus not apparent; photobiont cells 9–15 µm wide; medulla white, lacking calcium oxalate (H₂SO₄−), 1+ pale purple. Apothecia 0.2–0.6 mm wide, lecideine, separate and ± round to crowded and distorted by mutual pressure, broadly adnate to sessile; disc black, epruinose, weakly concave to plane or convex, undulate with age; proper exciple prominent, elevated above the disc but excluded in older, convex apothecia, in section 25–35 µm thick, the outer part brown-black, K+ yellow solution, N–, paler brown within. Hypothecium 100–120 µm thick, brown to brown-black, K+ yellow solution. Epiphymenium 10–15 µm thick, dark brown to dark olive-brown, K–, N–, Hymenium 55–70 µm thick, colourless, ± with scattered oil droplets; subhymenium 10–15 µm thick, pale brown. Paraphyses 1.5–2.0 µm wide, simple to sparsely branched, with apices 3–4 µm wide and dark brown caps. Asci of the Bacidia-type, 8-spored. Ascospores initially of the Callispora- or Physconia-types, then of the Buellia-type, 1-septate, brown, ellipsoid to broadly fusiform or bottle-shaped, 13–[15.9]–20 × 5–[6.4]–7 µm, becoming constricted at the septum, often curved, sometimes with 1 or 2 endoapertures; outer wall microrugulate. Pycnidia immersed, punctiform. Conidia bacilliform, 5–7 × 0.7–1 µm.

Chemistry: Thallus K+ yellow, C+ pale orange, KC+ orange, P+ pale yellow, UV+ very pale orange; containing atranorin (major), 6-O-methylarthothelin (minor).

Etymology: The species is named after the type locality. Gariwerd (Grampians range) is a special place for the traditional people of this area (the Djab Wurrung and the Jardwadjali), because of the dreaming stories and the abundance of food, water and shelter it provides.
Remarks

The ascospores and hymenium of T. garwariensis are most similar to those of T. darbishirei from Antarctica (Lamb 1968; Elix 2018), which has ascospores 15–18.8 × 23–7 × 8.6–10 µm and a hymenium 70–80 µm high. However, T. darbishirei differs in having a suberect, pulvinar thallus. It is also similar to T. oreophila Elix & Kantvilas from Tasmania, but that species lacks atranorin and has shorter conidia (Elix & Kantvilas 2020).

The new species is known only from the Grampians in western Victoria. Associated species include Circinaria caesiocinerea (Nyl. ex Malbr.) A.Nordin, Buellia aethalea (Ach.) Th.Fr., B. ocellata (Flot.) Körb., Lecidea lygmonyna Nyl., Ramboldia petraeoides (Nyl. ex C.Bab. & Mitt.) Kantvilas & Elix, Rhizocarpon geographicum (L.) DC. and several Xanthoparmelia species.

New records


Fig. 12


Type: South Africa, near Durban, Natal, on bark of Brugieria, P.A. van der Bijl 138, 1921

(holotype – TUR).

Thallus crustose, continuous, to 25 mm wide; upper surface white to grey-white, dull, rarely becoming granular; prothallus black, marginal when abutting other lichens; medulla white, lacking calcium oxalate (H2SO4–), I–; photobiont cells 6–10 µm diam. Apothecia 0.1–0.8 mm wide, lecidine, broadly adnate to sessile and constricted at the base, isolated or crowded, rounded; disc black, epruinose, plane; proper exciple thin, slightly raised above the disc, becoming granular; prothallus black, marginal when abutting other lichens; medulla white, K–, P–, C–, UV–; containing atranorin. A detailed description and illustration are provided in Marbach (2000).

SPECIMEN EXAMINED

South Australia. • Port Elliot, S side of bay, on coastal granite, R.B. Filson 15445, 13.xi.1975 (MEL).

Acknowledgements

I thank the curators of MEL for their kind cooperation in providing a loan of numerous collections in their care, and Dr Chris Cargill and Ms Judith Curnow of CANB for their kind cooperation in providing me with ready access to key collections.

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Figure 1. *Amandinea pilbarensis* (holotype in MEL). Scale = 2 mm.

Figure 2. *Baculifera confusa* (holotype in CANB). Scale = 1 mm.

Figure 3. *Buellia arida* (holotype in MEL). Scale = 2 mm.

Figure 4. *Buellia cravenii* (holotype in CANB). Scale = 2 mm.
Figure 5. *Buellia eldridgei* (holotype in CANB). Scale = 1 mm.

Figure 6. *Buellia kowenensis* (holotype in CANB). Scale = 1 mm.

Figure 7. *Buellia lordhowensis* (holotype in CANB). Scale = 1 mm.

Figure 8. *Buellia phillipensis* (holotype in CANB). Scale = 1 mm.
Figure 9. *Tetramelas flindersianus* (holotype in MEL). Scale = 2 mm.

Figure 10. Ascospore ontogeny of *Tetramelas flindersianus*. Scale = 10 µm.

Figure 11. *Tetramelas gariwerdensis* (holotype in CANB). Scale = 1 mm.

Figure 12. *Amandinea brugierae* (Elix 44760 in CANB). Scale = 1 mm.