In Australasia, the cosmopolitan *Pyxine subcinerea* colonizes bark, lignum (fenceposts), and coastal rock, mostly in northern New Zealand and both eastern and western Australia (New South Wales, Queensland, and Western Australia). Among its notable traits are glistening patches of whitish laminal pruina, a yellow to ochre medulla, marginal soralia spreading to the upper lamina, and medul- lary lichexanthone (UV+ citrine yellow).
New species and new records of buellioid lichens (Physciaceae, Ascomycota) from New Zealand and Tasmania

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

Allison Knight
Department of Botany, University of Otago
PO Box 56, Dunedin 9054, New Zealand
e-mail: alli_knight@hotmail.com

Dan Blanchon
Department of Natural Sciences, Unitec New Zealand Te Whare Ūnoi o Tūranga
Dublanchon@unitec.ac.nz

Abstract
Buellia akatorensis Elix & A.Knight, B. hypopurpurea Elix & A.Knight and B. kantvilasii Elix, Blanchon & A.Knight are described as new to science. Bacillifera micromera (Vain.) Marbach and Buellia stellulata var. tasmanica Elix & Kantvilas are recorded for the first time from New Zealand.

This paper continues our investigation of Buellia-like lichens in New Zealand and Tasmania, and follows from the previous accounts of Buellia and related genera (Elix et al., 2015, Elix 2016, Elix & Mayrhofer 2016) and our additions and revisions to Amanodina (Blaha, Mayrhofer & Elix 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.

The new species

1. Buellia akatorensis Elix & A.Knight, sp. nov. Figs 1, 2
MycoBank No. MB 818431

Similar to Buellia procellarum A.Massal., but differs in having smaller, commonly curved ascospores, 15–25 × 8–13 µm, white to pale grey-pruinose discs and in containing medullary norstictic acid rather than diploicin.

Type: New Zealand, South Island, Otago, Akatore Creek, 46°06′45″S, 170°11′30″E, alt. 1 m, on schistose rock 15 m seaward from coastal cliff, A. Knight s.n., 26.xi.2015 (holotype – OTA 065319; isotype – CANB).

Thallus crustose, to 25 mm wide and 1.2 mm thick, epilithic, rimose-areolate, chinky, ± forming small rosettes, subeflagurate at the margins; upper surface off-white to pale grey, matt, cracked; prothallus not apparent or dark brown to black, marginal; photobiont cells 8–15 µm wide; medulla lacking calcium oxalate (H2SO4–), I–. Apothecia 0.4–1.2 mm wide, lecideine, rounded, scattered, initially immersed then broadly adnate to sessile; disc black, epruinose or often sparingly white- to pale grey-pruinose, weakly concave to convex; proper exciple thin, persistent, in section 25–60 µm thick, outer part dark brown to brown-black, K+ yellow then forming red, needle-like crystals, N–, inner part brown. Hypothecium 100–140 µm thick, dark brown to brown-black, K+ yellow then forming red, needle-like crystals, N+ orange-brown. Hypothecium 100–120 µm thick, colourless, with a few scattered oil droplets; subhymenium 50–75 µm thick, pale brown, inspersed with oil droplets; paraphyses 1.5–2 µm wide, sparingly branched, with apices 4–6 µm wide and dark brown caps; asci (4–6)-spored, Baccidia-type. Ascospores Callispora-like, Buellia-type, 1-septate, pale then dark brown, ellipsoid, 15–21.3 × 8–10.8 µm, becoming constricted at the septum and broadly fusiform with age, often curved; outer wall weakly ornamented. Pycnidia common, punctiform, immersed, obovate black. Conidia bacilliform, 4–6 × 1–1.5 µm.

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

Etymology: The species is named after its type locality.

Remarks

The new species is characterized by the crustose, thick and chinky, rimose-areolate, off-white to pale grey thallus, the inspersed subhymenium, ± white to pale grey-pruinose discs, the often curved, Callispora-like ascospores that often become broadly fusiform with age and have an ornamented outer wall, and the presence of atranorin and norstictic acid. Buellia akatorensis is superficially similar to B. procellarum, a common saxicolous species in Australia (Elix 2009). However, the latter differs in having epruinose discs, a densely inspersed hymenium, larger, straight ascospores (22–40 × 10–18 µm) and in containing atranorin and diploicin. Buellia falax Elix & Kantvilas, present in Tasmania and New Zealand (Elix & Kantvilas 2016) has similar but slightly smaller ascospores (15–22 × 7–10 µm) and has epruinose discs and a medulla that contains calcium oxalate (H2SO4–) and hafelic acid.

At present the new species is known from Otago in the South Island of New Zealand, where it occurs on siliceous rocks in coastal areas. Commonly associated species include Amandinea nitrophila (Zahlbr.) Elix, A. pelidna (Ach.) Fryday & L.Arcadia, Caloplaca cribrosa (Hue) Zahlbr., C. gallowayi Hertel, Pertusaria graphica C.Knight, Rinodina blastidiata Matzer & H.Mayrhofer and Jackeliaxia liguula (Körb.) S.Y.Kondr., Fedorenko, S.Stenroos, Kärnefelt & A.Thell.

SPECIMENS EXAMINED
Otago: • Type locality, on coastal schistose rock, A. Knight s.n., 26.xi.2015 (CANB, OTA 065318 prp.); • Black Head, Dunedin, 44°55′11″S, 170°27′13″E, 2 m alt., on basalt boulder at base of cliff in splash zone, A. Knight s.n., 28.xi.2015 (CANB, OTA 069081 prp.); (CANB, OTA 069084 prp.)

2. Buellia hypopurpurea Elix & A.Knight, sp. nov.
MycoBank No. MB 818432

Similar to Buellia stellulata (Taylor) Mudd var. stellulata, but differs in having an hypothecium and excipulum that effuse an intense purple solution in K and a non-aeruginose, N– ephiphyllium.

Type: New Zealand, South Island, Otago, Akatore Creek, 46°06′34″S, 170°11′03″E, alt. 2 m, on rocky Nothofagus betuloides forest, 250 m from mouth, A. Knight s.n., 26.xi.2015 (holotype – OTA 065320; isotype – CANB).

Thallus crustose, to 25 mm wide and 0.1 mm thick, epilithic, rimose-areolate, areoles irregular, 0.2–0.5 mm wide; upper surface off-white to pale brown, matt, cracked; photobiont prominent, black, marginal and between areoles; photobiont cells 8–17 µm wide and dark brown, medulla lacking calcium oxalate (H2SO4–). Apothecia 0.1–0.4 mm wide, lecideine, rounded, scattered, mainly immersed, rarely becoming adnate; disc black, pr.p.

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Eryngiocyclus hypotrophicus, a new species from New Zealand

**Remarks**

This new species belongs to *Buellia* in the broad sense (Bungartz et al. 2007; Elix 2009) and is characterized by the thin, crustose, rimoareolate, off-white to pale brown thallus, the prominent black prothallus, small, immersed apothecia, a dark brown to brown-black hypothecium and excipulum which give an intense purple solution in *K*. *Buellia*-type ascomata and the presence of atranorin and the anthraquinone rugulosin monoacetate. Morphologically, the new species closely resembles *Buellia stellulata var. stellulata*, but can be readily distinguished because the latter has a *K*-hypothecium and excipulum (Elix 2011).


**Etymology**

The epithet refers to the colour of the solution produced by treating the hypothecium and excipulum with *K*.

**Remarks**

This new species belongs to *Buellia* in the broad sense (Bungartz et al. 2007; Elix 2009) and is characterized by the thin, crustose, rimoareolate, off-white to pale brown thallus, the prominent black prothallus, small, immersed apothecia, a dark brown to brown-black hypothecium and excipulum which give an intense purple solution in *K*. *Buellia*-type ascomata and the presence of atranorin and the anthraquinone rugulosin monoacetate. Morphologically, the new species closely resembles *Buellia stellulata var. stellulata*, but can be readily distinguished because the latter has a *K*-hypothecium and excipulum (Elix 2011).


**Etymology**

The species is named after our colleague, friend and collector of the type specimen, Dr Gintaras Kantvilas.

**Remarks**

In many respects this new species resembles *B. albula*, a very common lichen on calcareous rocks in New Zealand and Australia (Elix 2011). Both species are characterized by the presence of norstictic acid, a non-amyloid medulla, *pruinose* discs and similar ascospores, conidia, apothecial anatomy including similar reactions of the hypothecium and epihymenium. However, *B. albula* differs in having apothecia that are initially immersed but soon become broadly adnate to sessile, discs that become markedly convex, a deep, red-brown hypothecium and in growing exclusively on limestone or limestone-impregnated rocks. Superficially, *B. kantvilasii* resembles *B. hypostictella* Elix & H.Mayrhofer, a species that also occurs on siliceous coastal rocks in New Zealand. However, the latter has longer conidia (5–9 µm), and contains hypostictic acid (Elix & Mayrhofer 2016).


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**Etymology**

The species is named after our colleague, friend and collector of the type specimen, Dr Gintaras Kantvilas.
New records

This species was known previously from Australia (Elix & Kantvilas 2014), Central and South America, and southern and eastern Africa (Marbach 2000). It is characterized by a white to pale grey, crustose thallus containing atranorin (K+ yellow), a green to greenish-brown black epihymenium [containing micromera-green pigment: K+ greenish-N+ purple-black or grey-black (Bungartz et al. 2007), Buellia-type ascospores, 12–17 × 5–7 µm, with weak subapical wall-thickenings and a strongly ornamented outer wall, and bacilliform conidia, 4–5 × 1 µm. A detailed description is given in Marbach (2000). Baculifera pseudomicromera Marbach is rather similar, but differs in containing additional norstictic acid and in having ascospores with a weakly ornamented outer wall, while B. macromera Elix & Kantvilas has larger ascospores with a smooth outer wall and lacks the micromera-green pigment in the epihymenium (Elix & Kantvilas 2014).

SPECIMENS EXAMINED
New Zealand. • North Island, South Auckland, Domain Drive, Museum Reserve, Parnell, 36°51′43″S, 174°46′52″E, alt. 60 m, on fallen bark, A. Knight s.n., 24.ii.2015 (CANB, OTA); 36°51′36″S, 174°46′45″E, alt. 50 m, on fallen oak branches, A. Knight s.n., 24.ii.2015 (CANB, OTA).

2. Buellia stellulata var. tasmanica Elix & Kantvilas, Australas. Lichenol. 73, 32 (2013)
This taxon was previously known from Australia (New South Wales and Tasmania). Morphologically, it is identical to Buellia stellulata var. stellulata, but can be readily distinguished chemically, because the latter contains additional 2′-O-methylperlatolic acid (major) and confluentic acid (minor). A detailed description is given in Elix & Kantvilas (2013).

SPECIMENS EXAMINED
New Zealand. • North Island, Auckland, Kauw Island, Bon Accord Harbour, Stockyard Bay, 36°25′01″S, 174°49′34″E, 2 m alt., on quartz vein in cliff, splash zone, A. Knight, 16.ii.2015 (CANB, OTA); • Antipodes Island, just S of Hut Cove, 49°40′30″S, 178°48′42″W, 45 m alt., on rock outcrops in tussock grassland, R.C. Harris 5813A, 19.i.1970 (MSC).

Acknowledgements
We thank Dr Alan Fryday (MSC), Dr Gintaras Kantvilas (HO) and Dr H. Mayrhofer (GZU) for their kind cooperation in arranging the loan of key collections.

References

Fig. 1. Buellia akatorensis (holotype in OTA). Scale = 1 mm.

Fig. 2. Ascospore ontogeny of B. akatorensis. Scale = 10 µm.
Fig. 3. *Buellia hypopurpurea* (holotype in OTA). Scale = 1 mm.

Fig. 4. *Buellia kantvilasii* (holotype in HO). Scale = 1 mm.

A new species of *Scytinium* (Ach.) Gray (lichenized Ascomycota, Collemataceae) from the Australian Capital Territory

Patrick M. McCarthy
64 Broadsmith St, Scullin, A.C.T. 2614, Australia
e-mail: pmcc2614@hotmail.com

Abstract

*Scytinium tenuilobum* sp. nov. (Collemataceae) is described from small limestone outcrops in *Eucalyptus* woodland in the Australian Capital Territory. This diminutive lichen has exceptionally small thalli, short and narrow, pseudocorticate lobes, clustered *Nostoc* cells and persistently transversely septate ascospores.

The large, cosmopolitan genera *Collema* F.H.Wigg. and *Leptogium* (Ach.) Gray, which have dominated the cyanolichen family Collemataceae, were until recently characterized by the absence of a true cortex in the former, with *Leptogium* having eucorticate thalli (e.g. Degelius 1954, 1974; Clauzade & Roux 1985; Filson 1992; Verdon 1992; Galloway 2007; Jørgensen 2007; Gilbert & Jørgensen 2009; Gilbert et al. 2009). However, molecular studies by Otálora et al. (2013) confirmed the monophyly of ten morphological groups within or spanning *Collema* and *Leptogium*, the groups being defined not only by the presence or absence of a true cortex or pseudocortex, but also by growth form and the dimensions of lobes, as well as ascospore characteristics, other attributes of thallus anatomy and habitat preferences. As a consequence, *Collema* and *Leptogium* were recircumscribed, several old generic names were resurrected, and new genera were described (Otálora et al. 2013). One of the resurrected genera, the comparatively heterogeneous *Scytinium* (Ach.) Gray, has minute to medium-sized thalli that are crustose, squamulose or foliose, and occupy the full suite of potential substrata, mainly in temperate latitudes. A cortex or pseudocortex can be present or absent, apothecial anatomy is variable, and the ascospores are comparatively small and predominantly submuriform to muriform. As explained by Otálora et al. (2013), the genus includes species formerly placed in three sections of *Leptogium* (*Homodium*, *Collemodium* and *Leptogium*) and three species groups previously included in *Collema* (*the fragrans*, *callopismum* and *leptogioides* groups).

An undescribed species of Collemataceae, collected from limestone outcrops in *Eucalyptus* woodland in the Australian Capital Territory, is assigned here to *Scytinium* by virtue of its diminutive size, crust-like habit and minute, pseudocorticate lobes. While its ascospores are persistently transseptate, rather than submuriform or muriform, this difference cannot reasonably be considered an obstacle to its inclusion in *Scytinium*. Conversely, placement in the resurrected *Blennophora* Trevis., which includes foliose species with transversely septate ascospores, would be inappropriate given its larger thalli and more robust lobes that are invariably ectocaricate and isidiate (Otálora et al. 2013). Similarly, species of *Enchylium* (Ach.) Gray (formerly the *Collema tenax* group) can have ascospores with one or more transverse septa (or submuriform in some species), but the thallus is also foliose, ectocaricate and isidiate (Otálora et al. 2013).

Methods

Observations and measurements of thalline, apothecial and pycnidial anatomy, asci, paraphyses, ascospores and conidia were made on hand-cut sections mounted in water.

*Scytinium tenuilobum* P.M. McCarthy, sp. nov.

MycoBank No. MB 818622

Characterized by the blackish, minutely and radially lobate, crust-like thallus that is pseudocorticate and non-isidiate and contains clusters of non-filamentous *Nostoc*