RINODINA

John A. Elix


From the Greek _rinos_ (a shield), and a suffix without apparent meaning, in reference to the shape of the apothecia.


Type: _R. sophodes_ (Ach.) A.Massal.

Thallus crustose to subsquamulose, rarely squamulose or lobate, superficial, thin or evanescent, continuous, rimose or areolate, occasional granular, verrucose or bullate, corticate or not, occasionally immersed and inconspicuous. Soredia, isidia and blastidia present or absent. Prothallus a thin dark brown or black marginal line, or not apparent. Upper surface pale to dark grey, yellow, yellow-brown or dark brown. Medulla present; lower cortex absent. Ascomata apothecial, discoid, immersed to sessile, lecanorine, pseudolecanorine, biatorine or rarely lecideine; disc brown to black, rarely pruinose, plane to convex; margin concolorous with the thallus, occasionally partially developed or absent, entire, rarely crenulate or flexuose, usually persistent, becoming excluded in convex apothecia; thalline exciple usually present, concolorous with the disc or thallus, entire or crenulate, persistent or more rarely excluded at maturity, with or without a distinct cortex; excipulum usually colourless, rarely brown. Ephyphenium brown, red-brown or blue-black; hymenium colourless, rarely brownish, inspersed or not, amyloid; hypothecium colourless, rarely brown to dark brown. Paraphyses septate, simple or with short branches near the apices, apices expanded, brown-capped. _Asci Lecanora_-type, clavate, (4–) 8-spored; tholus with a strongly amyloid lateral part, a non-amyloid broadly diverging axial mass with a thick non-amyloid cap above, and a weakly amyloid outer layer. Ascospores olive-green or pale or dark brown, 1–5-septate, mainly double-walled, the walls variously thickened, ellipsoidal; septa well developed at maturity; outer wall smooth to strongly ornamented; torus present or absent; ontogeny type-A or B. _Conidiumata_ pycnidial, usually immersed; _conidiophores_ of types I, II, V or VI (Vobis, 1980). Conidia bacilliform.

_Rinodina_ is a cosmopolitan genus currently thought to contain about 300 species, 33 of which occur in Australia. Species grow on calcareous and siliceous rocks, on bark, wood and on other lichens.

The structure and distribution of the thickenings of the ascospore walls are diagnostic for various species of _Rinodina_. Furthermore, special care must be taken to examine a range of spores from each specimen as immature or overmature spores can give misleading information. For discussion and other illustrations of spore types in _Rinodina_, see Mayrhofer & Moberg (2002), Kaschik (2006) and Giavarini _et al._ (2009).

References


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Thallus crustose, usually thick, rimose-areolate or verrucose, rarely thin and smooth; areolae contiguous or dispersed, 0.1–0.3 mm wide, ±plane; prothallus absent. Upper surface dull olive-green to brownish grey, matt, at times ±abraded. Apothecia 0.25–1.2 mm wide, lecanorine, numerous, scattered or crowded, sessile or adnate; thalline margin prominent, concolorous with the thallus, smooth and entire to crenulate or verruculose; generally
persistent; disc brown to black-brown, plane to convex or uneven with age. Ephymenium 10–15 μm thick, brown to olive-brown, K–; hymenium 70–100 μm thick, colourless; hypothecium 60–100 μm thick, colourless to pale yellowish brown. Paraphyses 1.5–2.0 μm wide, simple to branched, with apices 3–5 μm wide and brown to olive-brown caps; oil paraphyses occasionally developed. Asci 8-spored. Ascospores Pachysporaria-type, 1-septate, pale olive-green to brown, ellipsoidal, 15–22 × 7–12 μm; ontogeny of type-A; outer wall smooth; torus indistinct. Pycnidia not seen.

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

Common and widespread endemic on bark in open woodland and dry-sclerophyll forest in southern and eastern Australia (W.A., S.A., Qld, N.S.W., A.C.T., Vic. and Tas.).


This species is characterised by the dull olive-green to brownish grey, crustose thallus, and the small Pachysporaria-type ascospores with an indistinct torus.


[Rinodina colobinoides auct. non (Nyl.) Zahlbr.: J. Müller, Bull. Herb. Boissier 1: 40 (1893)]

Illustrations: H. Mayrhofer, G. Kantvilas & K. Ropin, op. cit. 178, fig. 6.

Thallus crustose, thick and areolate to subsquamulose; areolae contiguous or discrete, 0.1–0.5 mm wide, convex to verruculose or minutely lobulate; prothallus absent. Upper surface dull olive-grey to brownish grey, 2 becoming granular and blastidiate. Apothecia 0.3–1.0 mm wide, lecanorine, scattered or crowded, initially immersed, becoming adnate or sessile; thalline margin prominent, concolorous with the thallus, entire or incomplete, smooth to crenulate, generally persistent but becoming thin and partially excluded with age; disc reddish brown to dark brown or brown-black, initially plane, strongly convex at maturity. Ephymenium 7–10 μm thick, brown, K–; hymenium 100–120 μm thick, colourless; hypothecium 50–100 μm thick, pale yellowish brown, K–. Paraphyses 1.0–1.5 μm wide, simple or rarely branched, with apices 3–5 μm wide and brown caps; oil paraphyses common, 4.0–6.5 μm wide. Asci 8-spored at first, later 4–6-spored. Ascospores initially Mischoblastia-type, becoming Pachysporaria-type, 1-septate, brown, ellipsoidal, 18–33 × 9–16 μm; ontogeny of type-A; outer wall smooth to finely ornamented; torus absent. Pycnidia immersed, found mainly at base of apothecia; conidia bacilliform, 3–4 × 1 μm.

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

Scattered on bark in coastal and lowland sclerophyll forest in southern and eastern Australia (W.A., S.A., N.S.W., Vic. and Tas.); also in Namibia.


This species is characterised by the olive-grey to brownish grey, areolate to subsquamulose thallus that often becomes granular and blastidiate, and by the large, initially Mischoblastia-type, but subsequently Pachysporaria-type ascospores that lack a torus.


Thallus crustose, initially thin and smooth, becoming ±entirely blastidiate and forming a ±continuous leprose-granulose crust; prothallus absent. Upper surface dull pale blue-grey to whitish grey; sorediate granules 30–50 μm diam.; consoredia to 125 μm wide. Apothecia 0.4–1.2 mm wide, uncommon, lecanorine, scattered, adnate or sessile; thalline margin concolorous with the thallus, thin, entire in immature apothecia, becoming flexuose, densely blastidiate-sorediate, finally completely excluded; disc dark brown to brown-black, plane before becoming markedly convex. Epiphy menium 7–10 μm thick, brown, K−; hymenium 75–125 μm thick, colourless; hypothecium 75–110 μm thick, pale yellow. Paraphyses 1.5–2.0 μm wide, simple or rarely branched, with apices 3–5 μm wide and dark brown caps. Asci 8-spored. Ascospores Physcia-type, 1-septate, brown, ellipsoid, 15–20 × 10–13 μm; ontogeny of type-A; outer wall smooth; torus present. Pycnidia not seen

Chemistry: Thallus K+ yellow, C−, P+ yellow; containing atranorin (major), chloroatranorin (major), zeorin (major).

This very rare endemic is known only from bark at the type locality.

This species is characterised by the thin thallus, the small, dense blastidia forming a ±continuous leprose-granulose crust, the Physcia-type ascospores and the presence of atranorin, chloroatranorin and zeorin.

4. Rinodina bischoffii (Hepp) A.Massal., Framm. Lichenogr. 26 (1855)

For further synonymy, see Mayrhofer & Moberg (2002).

Thallus crustose, endolithic to epilithic, consisting of scurfy granules, rarely thin and rimose-areolate; prothallus absent. Upper surface pale grey to grey-brown or yellow-brown. Apothecia 0.4–1.0 mm wide, lecanorine to pseudolecanorine and biatorine, scattered or contiguous, sessile; thalline margin initially concolorous with the thallus, later concolorous with the disc, entire, occasionally thick and crenate, persistent or becoming excluded; disc dark brown to black, plane to convex, epruinose. Epiphymenium 15–35 μm thick, medium to dark brown or pale red-brown; hymenium 80–135 μm thick, colourless, inspersed with oil globules; hypothecium 80–180 μm thick, colourless, inspersed with oil globules, K−. Paraphyses 1.5–2.5 μm wide, usually simple, rarely branched, with broadened apices, 3.0–6.5 μm wide, and dark brown caps. Asci 8-spored. Ascospores Bischoffii-type, 1-septate, brown, with a heavily pigmented band around the central part, ellipsoid, 15–21 × 9–13 μm; ontogeny of type-A; outer wall finely ornamented; torus absent. Pycnidia immersed; conidia bacilliform, 4–5 × 1 μm.

Chemistry: Thallus K−, C−, P−, UV−; no lichen substances detected.

Common on limestone in southern W.A., S.A., N.S.W., A.C.T., Vic. and Tas.; also in Europe, North America, Africa, Asia and New Zealand.


This species is characterised by having Bischoffii-type ascospores and an inspersed hymenium.


Illustrations: M.Matzer & H.Mayrhofer, op. cit. 112, fig. 2; 113, figs 4–7 (1994); M.Kaschik, Biblioth. Lichenol. 93: 33, fig. 7 (2006).

Thallus crustose to weakly squamulose, epilithic, rimose to areolate, continuous or of discrete squamules or areolae; areolae and squamules, 0.2–0.5 mm wide; prothallus marginal, dark brown, often evanescent. Upper surface greenish grey, pale grey, yellow-brown, brown or dark brown, usually blastidiate; blastidia somewhat segmented, with clavate to globose sections. Apothecia 0.2–1.2 mm wide, usually lecanorine, rarely leciideine, frequent, rare or absent, adnate to sessile; thalline margin concolorous with the thallus, entire, crenate or blastidiate, persistent; disc dark reddish brown, brown dark brown to brown-black, plane to convex, epruinose. Epiphysmecium 10–15 µm thick, reddish brown, K–; hymenium 75–130 µm thick, colourless; hypothecium 80–150 µm thick, colourless to yellowish, K–.

Paraphyses 1–4 µm wide, simple or rarely branched, with slightly broadened apices to 5 µm wide, and dark brown caps; occasionally with enlarged oil-cells to 7 µm wide [oil-paraphyses]. Asci with 8 or fewer ascospores. Ascospores Teichophila-type, 1-septate, brown, ellipsoidal, 16–32 × 9–15 µm; ontogeny of type-A; outer wall smooth to finely ornamented; torus absent. Pycnidia immersed; conidial bacilliform, 3–4 × 1.0–1.5 µm.

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

This species is common on siliceous coastal rocks in south-eastern S.A., N.S.W., Vic. and Tas. Also in South America, the Falkland Islands and New Zealand.


This lichen is characterised by the Teichophila-type ascospores, the blastidiate upper surface and by the presence of oil paraphyses.


T: Anawhata Bay, Auckland, North Island, New Zealand, J.S.Cranwell 183; holo: W n.v.


Illustrations: H.Mayrhofer, Lichenologist 15: 271, fig. 11; 277, fig. 21 (1983), as R. tibellii; M.Kaschik, Biblioth. Lichenol. 93: 39, fig. 11 (2006).

Thallus crustose, epilithic, membranaceous or rimose-areolate to warted or squamulose, often associated with small cyanophilic lichens, areolae 0.1–0.3 mm wide; prothallus absent. Upper surface dirty white to pale grey or brown. Medulla occasionally containing an insoluble orange pigment. Apothecia 0.2–0.8 mm wide, lecanorine, subimmersed to adnate or sessile, scattered to contiguous; thalline margin concolorous with the thallus, entire, thin to thick or subcrenate, usually persistent, rarely becoming excluded; disc brown-black, weakly concave to plane or convex, epruinose; ± with a brown proper margin that is visible as a thin line. Epiphysmecium 10–15 µm thick, brown to dark brown, ± with granular epipsamma, K–; hymenium 70–110 µm thick, colourless; hypothecium 80–150 µm thick, colourless, K–.

Paraphyses 1.0–1.5 µm wide, simple, with apices to 5 µm wide and brown caps. Ascospores Physcia-type, grading into Milvina-type and Tunicata-type (internal wall thickenings of Physcia-type), 1-septate, brown, ellipsoidal, 15–23 × 7.0–12.5 µm; ontogeny of type-A; outer wall finely ornamented; torus well developed. Pycnidia immersed; conidial bacilliform, 3.5–4.0 × 1 µm.
Chemistry: Thallus K−, C−, UV−; no lichen substances detected.

Scattered on siliceous and calcareous rocks in western and south-eastern Australia (W.A., S.A., N.S.W., Vic. and Tas.); also in New Zealand and on the Juan Fernández Islands, south-eastern Pacific Ocean.


Characterised by The Physcia-type ascospores grading into Milvina-type and Tunicata-type, combined with a very well-developed torus, are diagnostic for _R. cacaotina_.


For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose to squamulose, epilithic, thin to thick, continuous to rimose or areolate, or composed of discrete warts, occasionally minutely squamulose; areolae 0.3−0.7 mm wide; prothallus brown to black or not apparent. Upper surface dirty white to pale grey or yellow-brown. Apothecia 0.5−1.5 mm wide, lecanorine, usually sessile, rarely adnate, crowded or contiguous; thalline margin concolorous with the thallus, entire, persistent; disc brown to black, plane or convex, epruinose, ±with a proper margin. Epihymenium 5−20 µm thick, brown, K−; hymenium 80−110 µm thick, colourless; hypothecium 120−200 µm thick, colourless, K−. Paraphyses 1.0−2.5 µm wide, simple, with broadened apices, 3−5 µm wide, and brown caps. Asci 8-spored. Ascospores Physcia-type, 1-septate, brown, ellipsoidal, 3−4 × 1 µm.

Chemistry: Thallus K+ yellow, C−, P− or P+ faint yellow, UV−; containing atranorin (major), chloroatranorin (minor), ±zeorin (major).

Very rare on granite in alpine Vic.; also in Europe, Macaronesia, Africa, Asia and North and South America.

Vic.: Langford West Aqueduct, Middle Ck, Bogong High Plains, H.Mayrhofer 15485, H.Hertel & R.B. Filson (GZU).

This lichen is characterised by its Physcia-type ascospores and by the presence of atranorin.


[Irinodina kozikkenkis auct. non (Vain.) Zahlbr.: H.Mayrhofer, Beih. Nova Hedwigia 79: 518 (1984)]


Thallus crustose, epilithic, thin to rather thick, rimose to areolate, occasionally minutely squamulose; areolae 0.2−0.6 mm wide; prothallus black or not apparent. Upper surface dirty white to pale grey. Cortex, excipulum and pycnidia often containing a blue-green (N+ reddish) pigment, while an insoluble orange pigment can be present in the medulla.
Apothecia 0.2–0.8 mm wide, lecanorine or becoming lecideine, submersed to adnate, discrete, scattered or contiguous; thalline margin concolorous with the thallus, entire, persistent; disc dark brown to black, weakly concave to plane or subconvex, epruinose. Ephydemium 10–30 µm thick, red brown to brown or blue-green, N– or N+ reddish; hymenium 70–120 µm thick, colourless; hypothecium 180–250 µm thick, colourless, K–. Paraphyses 1.0–1.5 µm wide, simple, with apices 3–6 µm wide and brown caps. Ascii with 8 or fewer spores. Ascospores Tunicata-type (internal wall thickenings of Pachysporaria-type grading into Milvina-type), 1-septate, brown, ellipsoidal, 14–25 × 7.5–16.0 µm; ontogeny of type-A; outer wall finely ornamented; torus well developed. Pycnidia immersed; conidia bacilliform, 3–5 × 0.7–2.0 µm.

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

Scattered on siliceous rocks in pasture and dry-sclerophyll forest in all States and Territories; also in South Africa, New Caledonia and New Zealand.

This lichen is characterised by Tunicata-type ascospores grading into Pachysporaria-type and Milvina-type, and a well-developed torus, and the common occurrence of the blue-green pigment (N+ reddish) in the ephydemium and excipulum.


Illustration: H.Mayrhofer, G.Kantvilas & K.Ropin, op. cit.181, fig. 8.

Thallus crustose, thick, areolate to subsquamulose; areolae dispersed or contiguous, 0.1–0.4 mm wide, ±plane or becoming abraded, lobulate, granular or microphylline, ±blastidiate; prothallus absent. Upper surface dingy olive-grey to olive-brown. Apothecia 0.2–0.8 mm wide, lecanorine or becoming lecideine, sessile, scattered to clustered; thalline margin usually poorly developed, incomplete, smooth or more commonly nodulose, becoming excluded with age; proper margin usually distinct, concolorous with the disc; disc reddish brown to blackish brown, plane to convex, epruinose. Ephydemium 10–15 µm thick, red-brown to dark brown, K–; hymenium 90–110 µm thick, colourless; hypothecium 45–55 µm thick, colourless, K–. Paraphyses 1.5–2.0 µm wide, predominantly simple, but branched near apices, with 3–4 µm wide and brown caps. Ascii 8-spored. Ascospores initially Physcia-type, then Pachysporaria-type, 1-septate, brown to dark brown, ellipsoidal, 16–20 × 8.0–10.5 µm; ontogeny of type-A; outer wall finely ornamented; torus well developed. Pycnidia not seen.

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

This rare endemic species is known only from the type locality in S.A.

Characterised by the variable ascospores, initially Physcia-type then Pachysporaria-type, and a well-developed torus.


Thallus crustose, thin, effuse, continuous to weakly rimose-areolate, smooth; prothallus absent. Upper surface whitish to grey-white. Apothecia 0.5–0.8 mm wide, lecanorine, sessile to adnate, scattered to crowded; thalline margin thin to thick, concolorous with the thallus, smooth and entire, persistent; disc brown to black-brown or black, plane but soon convex, epruinose. Epihymenium 10–15 μm thick, dark brown, K–; hymenium 120–150 μm thick, colourless; hypothecium 50–100 μm thick, colourless, K–. Paraphyses 1.5–2.0 μm wide, predominantly simple, with broadened apices 3–4 μm wide, and red-brown caps; oil paraphyses frequent, 4.5–6.0 μm wide. Asci 8-spored. Ascospores Physcia-type, initially 1-septate, 3-septate at maturity, brown, ellipsoidal, 20–30 × 9.5–14.0 μm; lumina of immature 2-celled spores bone-shaped; ontogeny of type-A; outer wall smooth; torus indistinct. Pycnidia not seen.

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

This species is characterised by juvenile ascospores having bone-shaped lumina, but which are 3-septate at maturity.


Illustrations: H.Mayrhofer, G.Kantvilas & K.Ropin, Muelleria 12: 173, fig. 3A; 182, fig. 9a–c (1999).

Thallus crustose, thin and evanescent to rather thick and well developed, rarely areolate, finely verrucose to granular; prothallus absent. Upper surface cream-coloured to grey-brown or brown. Apothecia 0.2–1.0 mm wide, lecanorine, sessile to adnate, scattered or crowded; thalline margin prominent, concolorous with the thallus, smooth and entire, persistent; disc reddish brown to black-brown or black, plane. but soon convex, epruinose. Epihymenium 10–15 μm thick, red-brown, K–; hymenium 120–150 μm thick, colourless; hypothecium 50–100 μm thick, colourless, K–. Paraphyses 1.5–2.0 μm wide, mainly simple, with apices 3–4 μm wide and red-brown caps; oil paraphyses frequent, 4.5–6.0 μm wide. Ascii 8-spored. Ascospores Physcia-type, initially 1-septate, 3-septate when mature, brown, ellipsoidal, 23–30 × 10–13 μm, lumina of immature 2-celled spores subcircular; ontogeny of type-B; outer wall smooth; torus indistinct. Pycnidia not seen.

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

Occurs on bark and lignum in south-western W.A. and Tas.; also in Europe, Asia, North and South America and New Zealand.


Characterised by the juvenile, Physcia-type that which become 4-celled when mature.


Thallus crustose, occasionally thin and effuse, more frequently rather thick, areolate to subsquamulose; areolae contiguous to discrete and ±dispersed, 0.3–1.0 mm wide, plane to weakly convex or concave with ascending margins, somewhat microphylline or lobulate; prothallus black, thin, ±evident between areolae. Upper surface pale olive-grey to olive-brown. Apothecia 0.2–1.0 mm wide, lecanorine, sessile, scattered; thalline margin prominent to coronate or incomplete, concolorous with the thallus, surrounding a distinct pale brown to brown proper margin; disc dark brown to black-brown or black, plane to undulate, rarely
convex, epruinose. Epihymenium 10–15 µm thick, orange-brown to dark brown, K–; hymenium 100–130 µm thick, colourless; hypothecium 100–120 µm thick, colourless to pale yellow, K–. Paraphyses 1.5–2.0 µm wide, usually simple or ±branched subapically, with apices 3–4 µm wide and dark brown caps; oil paraphyses absent. Ascii 6–8-spored. Ascospores *Pachysporaria*-type, 1-septate or rarely simple, brown, ellipsoid, 24–31 × 12.5–16.0 µm, frequently with minute granular or globaral inclusions; ontogeny of type-A; outer wall smooth; torus indistinct. Pycnidia immersed; conidia bacilliform, 4.5–6.0 × 1.5 µm.

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

Occurs on bark in coastal N.S.W.; also in South America and western North America.

N.S.W.: Buckenbowra R., estuary, 7.5 km WNW of Batemans Bay, *H.Steimann 35824 & J.A.Curnow* (CANB); Red Rock, Corindi Ck, N of Coffs Harbour, *G.Kantvilas 129/98 (GZU, HO)*.

This lichen is characterised by the olive-grey to olive-grey, areolate to subsquamulose thallus, the large, *Pachysporaria*-type ascospores that lack a torus but contain minute, granular or globaral inclusions.


*Thallus* crustose, thick and areolate to subsquamulose; areolae contiguous and coalescing, 0.2–0.5 mm wide, plane, tightly adnate, occasionally rather abraded and lobulate; prothallus absent. Upper surface pale olive-grey to olive-green. Apothecia 0.4–1.0 mm wide, lecanorine, at first immersed in the thallus, soon emerging through ragged fissures, rather sunken, adnate to sessile when mature, scattered to crowded; thalline margin ragged initially, derived from adhering thalline fragments, becoming ±smooth and entire, ultimately thin or absent; proper margin thin or not apparent, concolorous with the disc; disc brown-black, initially plane or concave, becoming undulate to markedly convex, epruinose. Epihymenium 10–20 µm thick, brown, K–; hymenium 130–150 µm thick, colourless; hypothecium 100–150 µm thick, colourless to yellow-brown, K–. Paraphyses 1.0–1.5 µm wide, predominantly simple or ±branched subapically, with 3–5 µm wide and brown caps; oil paraphyses sometimes present, 5–6 µm wide. Ascii 4–8-spored. Ascospores *Physcia*-type, 1-septate, dark brown, ellipsoid, 23–30 × 12.5–16.0 µm; ontogeny of type-A; outer wall minutely ornamented; torus distinct. Pycnidia immersed; conidia bacilliform, 4–5 × 1 µm.

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

A rare endemic species on bark in inland areas of N.S.W. and Vic.

N.S.W.: Carbonne, c. 5 km S of Molong, *D., M.Kaschik, op. cit.* 186, fig. 11a–d (1999).

This lichen is characterised by the thick, pale olive-grey to olive-green, areolate to subsquamulose thallus, the erumpent apothecia and the large, *Physcia*-type ascospores with a distinct torus.


*Thallus* crustose, epilithic, continuous to rimose and areolate; areolae 0.1–0.5 mm wide; prothallus black or not apparent. Upper surface dirty white to pale grey. Medulla occasionally containing an insoluble orange pigment. Apothecia 0.2–0.5 mm wide, common, lecanorine, subimmersd to adnate, contiguous; thalline margin concolorous with the thallus, entire, persistent or becoming excluded with age; disc black, weakly concave to plane, epruinose. Epihymenium 10–20 µm thick, brown to blue-green, usually N+ reddish, rarely N–; hymenium 60–75 µm thick, colourless; hypothecium 60–80 µm thick, colourless, K–.
Paraphyses 1.5–2.0 µm wide, simple, with apices 4–5 µm wide and dark brown caps. Ascii 8-spored. Ascospores *Mischoblastia*-type grading into *Pachysporaria*-type or *Physcia*-type, 1-septate, brown, ellipsoidal, 15–21 × 9–11 µm; ontogeny of type-A; outer wall smooth; torus indistinct or absent. Pycnidia not seen.

Chemistry: Thallus K+ pale yellow, C+ red, P–, UV–; containing atranorin (minor), gyrophoric acid (major).

A scattered endemic species on coastal, siliceous rocks in eastern Qld.

Qld: SE end of Island Pt, Port Douglas, H.Mayrhofer 11408 & E.Hierzer (GZU); N end of Sunshine Beach, SE of Noosa Heads, H.Mayrhofer 11647 & N.Stevens (GZU).

Characterised by the combination of small apothecia, the *Mischoblastia*-type ascospores, the common occurrence of the blue-green pigment (N+ reddish) in the epihymenium and excipulum and the presence of atranorin and gyrophoric acid in the thallus.


Thallus crustose, usually endolithic, rarely very thinly epilithic, finely granular; prothallus absent. Upper surface whitish to pale grey. Apothecia 0.3–1.0 mm wide, pseudolecanorine to lecideine, immersed in depressions in the substratum, with scattered groups of photobiont cells in the margin, or lecideine with a brown amphithecium; proper margin entire, concolorous with the disc or thallus, persistent; disc brown to black, plane to convex, epruinose or white-pruinose. Epihymenium 15–20 µm thick, dark brown; hymenium 75–100 µm thick, colourless, not inspersed; hypothecium 45–130 µm thick, colourless, ±inspersed with oil globules, K–. Paraphyses 1.5–2.5 µm wide, usually simple, rarely branched, with apices 4.5–5.0 µm wide and dark brown caps. Ascii 8-spored. Ascospores *Bischoffii*-type, 1-septate, brown, with a heavily pigmented band around the central part, ellipsoidal, 13–18 × 8–12 µm; ontogeny of type-A; outer wall finely ornamented; torus absent. Pycnidia not seen.

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

Very rare on limestone in south-eastern N.S.W.; also in Europe, North America, Africa, Asia and New Zealand.

N.S.W.: 12 km SE of Cooma, G.Rambold 3684 (M).

*Rinodina immersa* is characterised by the usually endolithic thallus, immersed, pseudolecanorine to lecideine apothecia and *Bischoffii*-type ascospores.


For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose, epilithic, rarely endolithic, rimose-areolate; areolae contiguous, 0.5–0.8 mm wide; prothallus absent. Upper surface yellow-brown to grey or black; an insoluble orange pigment can be present in the upper medulla. Apothecia 0.3–0.7 mm wide, common, lecanorine, immersed to adnate, usually 1 per areole; thalline margin entire, concolorous with the thallus, persistent or becoming excluded; disc dark brown to black, plane to weakly convex, often sparingly pale grey-pruinose. Epihymenium 10–15 µm thick, reddish brown;
hymenium 110–150 µm thick, colourless, not inspersed; hypothecium 70–100 µm thick, colourless to pale yellow-brown, K–. Paraphyses 1.5–3.0 µm wide, simple or rarely branched, with apices 5–7 µm wide and dark brown caps. Ascii 8-spored. Ascospores *Bicincta*-type, 1–septate, brown, broadly ellipsoidal, 11–15 × 6.5–10.5 µm; ontogeny of type-A; outer wall not ornamented; torus absent. Pycnidia not seen.

Chemistry: Thallus K–, C–, P–, UV–; containing zeorin.

Scattered on limestone in inland areas of south-eastern N.S.W. and Vic.; also in Europe, North America, Africa, Asia and New Zealand.


This species is characterised by the yellow-brown to grey or black thallus, the immersed, lecanorine apothecia (often with grey-pruinose discs), the small *Bicincta*-type ascospores and the presence of zeorin.


Illustrations: H.Mayrhofer, op. cit. 513, fig. 3; 525, fig. 15 (1984); M.Kaschik, Biblioth. Lichenol. 93: 69, fig. 35 (2006).

Thallus crustose, lichenicolous on *Aspicilia* sp., rimose-areolate to verrucose or bullate, insular to spreading over the host thallus; areolae contiguous, 0.5–0.8 mm wide; prothallus black. Upper surface medium to dark brown. Excipulum and medulla often containing a blue-green (N+ reddish) pigment; an insoluble orange pigment can also be present in the medulla. Apothecia 0.35–0.50 mm wide, common, lecanorine, scattered to contiguous, adnate to sessile; thalline margin entire, concolorous with the thallus, persistent; disc dark brown to black, plane to weakly convex, epruinose, often with a black proper margin. Epihymenium 10–15 µm thick, reddish brown to brown; hymenium 70–90 µm thick, colourless, not inspersed; hypothecium 100–150 µm thick, colourless, K–. Paraphyses 1.0–1.5 µm wide, usually simple, rarely branched, with apices 3–5 µm wide and brown caps. Asci 8-spored. Ascospores *Milvina*-type grading into *Pachysporaria*-type, 1–septate, brown, broadly ellipsoidal, 18–25 × 11–15 µm; ontogeny of type-A; outer wall ornamented; torus well developed. Pycnidia not seen.

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

This rare endemic is lichenicolous on a saxicolous *Aspicilia* sp. in inland areas of S.A. and Vic.


This species is characterised by its lichenicolous habit, the *Milvina*-type ascospores grading into *Pachysporaria*-type, a well-developed torus, and the common occurrence of a blue-green pigment (N+ reddish) in the medulla and excipulum.


For further synonymy, see Mayrhofer (1984a).

Thallus crustose, epilithic, rimose or areolate, rarely somewhat warty or bullate; areolae 0.5–0.8 mm wide; prothallus black. Upper surface yellow-brown to pale grey or brown. Excipulum occasionally with a blue-green (N+ reddish) pigment; an insoluble orange pigment can also be present in the medulla. Apothecia 0.2–0.6 mm wide, common, lecanorine, immersed to adnate, contiguous; thalline margin entire, concolorous with the thallus, persistent or becoming excluded; disc brown to black, plane, epruinose. Hypothecium 10–15 µm thick, brown; hymenium 70–110 µm thick, colourless, not inspersed; hypothecium 50–100 µm thick, colourless, K−. Paraphyses 1–3 µm wide, simple or rarely branched, with apices 3.5–5.0 µm wide and dark brown caps. Ascii 8-spored. Ascospores Mischoblastia-type grading into Pachysporaria-type, 1-septate, brown, ellipsoidal, 18–27 × 10.0–14.5 µm; ontogeny of type-A; outer wall not ornamented; torus present or absent. Pycnidia not seen.

Chemistry: Thallus K+ yellow, C−, P− or P+ faint yellow, UV−; containing atranorin (major), chloroatranorin (trace). Common on siliceous rocks (and often associated with cyanobacteria), in coastal and inland areas of W.A., N.T., Qld, N.S.W., Vic. and Tas.; also in Japan, New Zealand and on the Juan Fernández Islands, south-eastern Pacific Ocean.


This species is characterised by the yellow-brown to pale grey or brown thallus, immersed to adnate, lecanorine apothecia, Mischoblastia-type ascospores grading into Pachysporaria-type, and by the presence of atranorin.


Illustrations: H.Mayrhofer, op. cit. 275, fig. 15; M.Kaschik, Biblioth. Lichenol. 93: 79, fig. 43 (2006).

Thallus crustose, epilithic, rimose-areolate to granular-verrucose; areolae dispersed, 0.1–0.5 mm wide; prothallus blackish or not apparent. Upper surface whitish, yellowish or pale grey-brown. Apothecia 0.4–0.8 mm wide, common, lecanorine, adnate to sessile, scattered or contiguous; thalline margin entire, concolorous with the thallus, subcrenum, persistent; disc black, plane to convex, weakly white-pruinose. Hypothecium 10–15 µm thick, pale brown, P+ red-orange (pannarin); hymenium 90–110 µm thick, colourless, not inspersed; hypothecium 100–150 µm thick, colourless, K−. Paraphyses c. 1 µm wide, often branched, with broadened apices 2–4 µm wide and dark brown caps. Asci 8-spored. Ascospores Milvina-type grading into Physcia-type, 1-septate, brown, ellipsoidal, 16–22 × 10–13 µm; ontogeny of type-A; outer wall finely ornamented; torus well developed. Pycnidia not seen.

Chemistry: Thallus K+ yellow, C−, P+ red-orange, UV−; containing atranorin (major), pannarin (major).

Uncommon on siliceous rocks in south-eastern Australia (N.S.W., A.C.T., Vic. and Tas.); also in New Zealand.


Characterised by the whitish, yellowish or pale grey-brown thallus, the sessile to adnate, lecanorine apothecia, Milvina-type ascospores grading into Physcia-type, and the presence of atranorin and pannarin. Rinodina occulta differs in having smaller apothecia and ascospores and in lacking pannarin.


Thallus crustose, very thin and effuse to moderately thick and areolate; areolae scattered or contiguous, 0.1–0.3 mm wide; prothallus absent. Upper surface dull olive-grey to olive-brown, rarely pale grey. Apothecia 0.2–1.0 mm wide, lecanorine, at first immersed in the thallus, soon emerging and adnate to sessile, scattered; thalline margin initially ragged, derived from adhering thalline fragments, becoming zsmooth to abraded, ultimately thin or excluded with age; proper margin very thin, dark brown to black, occasionally not apparent; disc black, plane or undulate to convex, epruinose. Epihymenium 10–20 µm thick, dark brown, K–; hymenium 80–100 µm thick, colourless; hypothecium 40–150 µm thick, colourless to yellow-brown, K–. Paraphyses 1.5–2.0 µm wide, agglutinated, branched subapically, with apices 2.5–4.0 µm wide and brown caps; oil paraphyses sometimes present, 6–7 µm wide. Asci 8-spored. Ascospores Physcia-type, 1-septate, dark brown, ellipsoidal, 16–20 × 6–9 µm; ontogeny of type-A; outer wall smooth; torus distinct. Pycnidia immersed; conidia bacilliform, 3.5–4.5 × 1.5 µm.

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

A scattered endemic species on bark in south-eastern Australia (S.A., N.S.W., Vic., Tas.).


The dull olive-grey or rarely pale grey thallus, erumpent apothecia and the small, Physcia-type ascospores with a distinct torus are diagnostic. Rinodina elixii differs in having a thicker and more well-developed thallus and larger ascospores with finely ornamented walls.


For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose, epithilic, thin, verrucose to areolate, the areolae usually contiguous, 0.2–0.7 mm wide; prothallus blackish or not apparent. Upper surface pale grey to yellow-brown or brown; an insoluble orange pigment can be present in the medulla. Apothecia 0.1–0.3 mm wide, common, lecanorine and subimmersed or pseudolecanorine and adnate to sessile, scattered or contiguous; thalline margin entire, concolorous with the thallus, persistent or occasionally excluded; proper margin persistent or becoming excluded; disc dark brown to black, plane to weakly convex, epruinose. Epihymenium 10–15 µm thick, brown; hymenium 50–85 µm thick, colourless, not inspersed; hypothecium 10–60 µm thick, colourless, K–. Paraphyses 1.5–2.0 µm wide, branched subapically, with apices 3–6 µm wide and brown caps. Asci 8-spored. Ascospores Milvina-type grading into Physcia-type, 1-septate, brown, ellipsoidal, 11–16 × 5–9 µm; ontogeny of type-A; outer wall smooth; torus ±well developed. Pycnidia not seen.

Chemistry: Thallus K+ pale yellow, C–, P+ pale yellow or P–, UV–; containing atranorin.

Uncommon on siliceous rocks in south-eastern Australia (N.S.W., A.C.T., Vic. and Tas.); also in Europe, Asia and Subantarctic islands.

This lichen is characterised by the pale grey to yellow-brown or brown thallus, the very small apothecia, small Milvina-type ascospores grading into Physcia-type, and the presence of atranorin. Rinodina murrayi differs in having larger apothecia and ascospores and in containing additional pannarin.


For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose, immersed to superficial, thin, rimose, but often with discrete scabrid or well-developed areolae 0.2–0.7 mm wide; prothallus absent. Upper surface whitish, pale to dark grey or yellow-brown; sometimes the medulla with an insoluble orange pigment. Apothecia 0.2–0.6 mm wide, common, lecanorine or rarely biatorine, adnate to sessile, contiguous; thalline margin entire, concolorous with the thallus, persistent or rarely excluded; disc dark brown to black, plane to convex, epruinose. Epithemiun 5–15 µm thick, brown; hymenium 60–110 µm thick, colourless, not inspersed; hypothecium 50–150 µm thick, colourless, K−. Paraphyses 1.5–2.0 µm wide, branched subapically, with apices 3–6 µm wide and dark brown caps. Asci 8-spored. Ascospores Dirinaria-type grading into Physconia-type, 1-septate, brown, ellipsoidal, 11.0–18.5 × 6–11 µm; ontogeny of type-A or type-B; outer wall smooth or finely ornamented; torus indistinct or absent. Pycnia immersed; conidia bacilliform, 3–5× 1 µm.

Chemistry: Thallus K−, C−, P−, UV−; no lichen substances detected.

Common on siliceous rocks or, more rarely, on concrete, bark or wood in southern and eastern Australia (W.A., Qld, N.S.W., A.C.T., Vic. and Tas.); also in Europe, Asia, Africa, North and South America, New Zealand and the Pacific.


Rinodina oleae is characterised by the whitish, pale to dark grey or yellow-brown thallus, the Dirinaria-type ascospores and the absence of lichen substances.


[Rinodina compensata auct. non (Nyl.) Zahlbr.: H.Mayrhofer, Pl. Graec. Lich. 331 (1985)]

For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose, epilithic, often thin, cracked or composed of discrete to contiguous areolae; areolae 0.3–0.6 mm wide; prothallus black or not apparent. Upper surface pale grey to yellow-brown or brown. Excipulum sometimes containing a blue-green (N+ reddish)
pigment; an insoluble orange pigment can be present in the medulla. Apothecia 0.3–0.8 mm wide, common, lecanorine, pseudolecanorine or lecideine, immersed to adnate or sessile, contiguous or scattered; thalline margin entire, concolorous with the thallus, persistent or becoming excluded; proper margin entire, persistent; disc brown to blackish, plane to weakly convex, epruinose. Epiphyllium 10–20 μm thick, brown; hymenium 70–115 μm thick, colourless, not inspersed; hypothecium 20–100 μm thick, colourless, K–. Paraphyses 1–2 μm wide, branched subapically, with apices 3–6 μm wide and dark brown caps. Asci 8-spored or with fewer spores. Ascospores *Mischoblastia*-type, grading into *Pachysporaria*-type, 1-septate, brown, ellipsoidal, 11–25 × 7–14 μm; ontogeny of type-A; outer wall smooth or torus present. Pycnidia immersed; conidia bacilliform, 3–5×1–5 μm.

**Chemistry:** Thallus K+ pale yellow, C–, P+ pale yellow or P–, UV–; containing atranorin.

Common on siliceous rocks in northern and eastern Australia (W.A., N.T., Qld, N.S.W., A.C.T., Vic. and Tas.); also in Europe, Asia, Africa, North and South America and New Zealand.


Characterised by the pale grey to yellow-brown, *Mischoblastia*-type ascospores grading into *Pachysporaria*-type, and the presence of atranorin.


For further synonymy, see Matzer *et al.* (1998).


Thallus crustose, epithecial, membraneaceous to rimose-areolate; areolae 0.3–0.9 mm wide; prothallus black or absent. Upper surface dirty white to pale grey, rarely brownish. Medulla containing skyrin and an unknown yellow pigment. Apothecia 1.0–1.3 mm wide, common, usually lecanorine, rarely biatorine, immersed to adnate, contiguous; thalline margin entire, concolorous with the thallus, persistent or becoming excluded; proper margin usually visible as a thin brown line; disc dark brown to black, plane to weakly convex, epruinose. Epiphyllium 15–35 μm thick, brown or yellow-brown, often covered by a colourless epitipsamma; hymenium 100–115 μm thick, colourless, not inspersed; hypothecium 100–170 μm thick, colourless to pale yellow, K+ yellow intensifying. Paraphyses 1–3 μm wide, unbranched, with apices 4–6 μm wide and dark brown caps. Asci 8-spored. Ascospores *Physconia*-type, 1-septate, brown, ellipsoidal, 12–27 × 8–15 μm; ontogeny of type-A; outer wall finely ornamented; torus indistinct or absent. Pycnidia immersed; conidia bacilliform, 4–5×1–2 μm.

**Chemistry:** Thallus K–, C–, P–, UV–; medulla K+ red-violet, C–, P–; containing skyrin, triterpenes including an isomer of zeorin.

Common on coastal siliceous rocks in south-eastern Tas.; also in South America, the Falkland Islands, South Georgia, Heard Island, New Zealand and Macquarie Island, and on other Subantarctic and Antarctic islands.

Tas.: Surprise Bay, A.Blackman 74/291, 74/292 (HO); Clifton Beach, G.C.Bruett & J.A.Cashin 1555 (HO); Mayfield Beach, Mayfield Bay Coastal Reserve, c. 14 km S of Swansea, H.Mayrhofer 12048 (GZU, HO, UPS).

*Rinodina peloleuca* is characterised by the dirty white to pale grey or brownish thallus, the *Physconia*-type ascospores, the yellow-orange pigmented medulla (K+ red-violet) and the presence of skyrin.
25. Rinodina pyrina (Ach.) Arnold, *Flora* 64: 196 (1881)


For further synonymy, see Mayrhofer & Moberg (2002).


Thallus crustose, thin and effuse to moderately thick and areolate, often scabrid and mealy; areolae minute, 0.1–0.3 mm wide, ±dispersed and discontinuous at the thallus margin, contiguous in the centre; prothallus absent. Upper surface pale grey to dingy olive-grey. Apothecia 0.1–0.6 mm wide, common, lecanorine, at first immersed in the thallus, soon emerging and eventually sessile, scattered; thalline margin well developed, thin, entire, occasionally abraded, persistent; disc brown to black, usually plane, rarely convex, matt, usually somewhat scabrid. Epiphymenium 5–10 µm thick, brown to dark brown, K−; hymenium 60–70 µm thick, colourless, not inspersed; hypothecium 50–60 µm thick, colourless, K−. Paraphyses 1.5–2.0 µm wide, simple or branched subapically, with apices 4–6 µm wide and dark brown caps; oil paraphyses not seen. Ascii 8-spored. Ascospores *Physconia*-type or *Buellia*-type, 1-septate, pale to dark brown, ellipsoidal, often slightly curved, 15–17 × 5–7 µm; ontogeny of type-A; outer wall smooth; torus present or absent. Pycnidia not seen.

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

Occurs on bark of exotic trees and on wood in S.A., A.C.T. and Tas. Also in Europe, North America and New Zealand.


This lichen is characterised by the corticolous habit, pale grey to dingy olive-grey thallus, and mature ascospores that lack any apical wall-thickenings and the median thickenings are so reduced as to appear *Physconia*-type or *Buellia*-type.


T: beside walking track from Katherine Gorge Campground to Butterfly Gorge, 23 km NE of Katherine, N.T., 14°19'S, 132°25'E, alt. 180 m, on sandstone boulders, 20 Mar. 1986, G.Rambold 5094; holo: M n.v.; iso: CANB.

Illustration: M.Kaschik, op. cit. 106, fig. 64.

Thallus crustose, endolithic to thinly epilithic to areolate-squamulose; areolae and squamules contiguous to dispersed, 0.3–0.7 mm wide; prothallus not apparent. Upper surface olive-brown to yellow-brown or brown. Excipulum occasionally with a blue-green (N+ reddish) pigment; an insoluble orange pigment can also be present in the medulla. Apothecia 0.15–0.60 mm wide, scattered, lecanorine, immersed to adnate; thalline margin entire, concolorous with the thallus, persistent or rarely excluded; proper margin often visible as a thin brown line; disc dark brown to black, plane to convex, epruinose. Epiphymenium 15–20 µm thick, pale brown; hymenium 100–140 µm thick, colourless, not inspersed; hypothecium 100–180 µm thick, colourless, K−. Paraphyses 2–3 µm wide, unbranched, with apices 4–5 µm wide and brown caps. Ascii 8-spored. Ascospores *Pachysporaria*-type, 1-septate, brown, ellipsoidal, 17–27 × 8–15 µm; ontogeny of type-A or type-B; outer wall smooth; torus indistinct or absent. Pycnidia not seen.

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

Scattered on siliceous rocks in northern Australia (N.T. and Qld) and in Vic.; also on the Juan Fernández Islands in the south-eastern Pacific Ocean.

Qld: Rocky Pt, SE of Bramstons Beach, N of Innisfail, H.Mayrhofer 11693, 11694 (GZU); Wagooroo Ck, Carnarvon Natl Park, 94 km NNW of Innisfail, H.Streimann 52167 (CANB). Vic.: Marmers Lookout, Apollo Bay, 6 July 1986, W.Ewers (MEL).
Characterised by an endolithic to olive-brown, yellow-brown or brown epilithic thallus, the *Pachysporaria*-type ascospores, a spore ontogeny of type-A and/or (occasionally in the same apothecium) type-B and the absence of lichen substances.


Illustrations: M.Matzer & H.Mayrhofer, *op. cit.* 111, fig. 1; 112, fig. 3; 114, figs 10, 11 (1994); M.Kaschik, *Biblioth. Lichenol.* 93: 106, fig. 64 (2006).

Thallus crustose, epilithic, thick, rimose-areolate to subsquamulose, contiguous or of discrete areolae; areolae 0.2–0.6 mm wide; prothallus evanescent or absent. Upper surface yellow-brown or brown. The *Arceutina*-yellow pigment (K+ yellow-orange) can be present in the epihymenium, hypothecium and pycnidia. Apothecia 0.5–1.7 mm wide, lecanorine, immersed to adnate, scattered to contiguous; thalline margin entire, concolorous with the thallus, subcrenate, persistent; proper margin occasionally visible as a thin brown line; disc reddish brown, dark brown or black, plane to convex, epruinose. Epihymenium 10–30 µm thick, brown or yellowish brown; hymenium 100–150 µm thick, colourless, not inspersed; hypothecium 100–180 µm thick, colourless to partly or entirely yellow-green, K+ yellow-orange. Paraphyses 1.5–2.0 µm wide, unbranched, with apices 4–6 µm wide and pale brown caps. Ascii 8-spored. Ascospores *Teichophila*-type, 1-septate, brown, ellipsoidal, 22–31 × 10–19 µm; ontogeny of type-A; outer wall finely ornamented; torus absent. Pycnidia immersed; conidia bacilliform, 3.5–5.5 × 1.5–2.0 µm.

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

Very rare on calcareous rocks in S.A.; also in South Africa and New Zealand.


This species is characterised by the yellow-brown to brown thallus, the presence of a yellow-green (K+ yellow-orange) pigment in the hypothecium, epihymenium and pycnidia, large, *Teichophila*-type ascospores and the absence of lichen substances.


T: Outshoorn–Prince Albert road, near Ombinda Karambi, 7.5 km NW of Cango Caves, Outshoorn, Western Cape, South Africa, 32°23'30"S, 22°98'45"E, alt. c. 740 m, 20 Feb. 1992, J.Hafellner & A.Hafellner 30650; holo: GZU n.v.


Thallus crustose, epilithic, thin to verrucose-areolate; areolae 0.1–0.4 mm wide; prothallus absent. Upper surface grey to brown; an insoluble orange pigment can be present in the medulla. Apothecia 0.2–0.7 mm wide, lecanorine, immersed to adnate, scattered to contiguous; thalline margin entire, concolorous with the thallus, persistent; disc brown to black, plane to convex, epruinose. Epihymenium 10–20 µm thick, pale brown; hymenium 70–120 µm thick, colourless, not inspersed; hypothecium 70–150 µm thick, colourless, K–. Paraphyses 1.5–2.0 µm wide, unbranched, with apices 3–5 µm wide and pale brown caps. Ascii 8-spored. Ascospores *Tunicata*-type and *Physcia*-type, 1-septate, brown, ellipsoidal, 19–25 × 10–15 µm; ontogeny of type-A; outer wall striate; torus present. Pycnidia not seen.

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

Rare on calcareous and siliceous rocks in N.S.W.; also in Europe, South Africa.

N.S.W.: Carbonne, roadside between Canowindra and Cargo, H.Mayrhofer 7980, D. & M.Mayrhofer (GZU); near Wellington Caves, Mitchell Hwy, S of Wellington, H.Mayrhofer 8221, D. & M.Mayrhofer (GZU).

**Rinodina striatitunicata** is characterised by the grey to brown thallus, lecanorine apothecia, *Tunicata*-type ascospores with internal wall-thickenings of the *Physcia*-type, striate spore wall ornamentation and the absence of lichen substances.


Thallus crustose, epilithic, thick, rimose to squamulose-verrucose or finely lobate, contiguous to dispersed, ±loosely attached to rock; verrucose squamules 0.2–0.5 mm wide; prothallus blackish brown. Upper surface yellow-brown, grey-brown to dark brown. Medulla blackish brown, often containing an insoluble orange pigment. Apothecia 0.3–1.0 mm wide, lecanorine, sessile, scattered to contiguous; thalline margin entire, concolorous with the thallus, prothallus black or not apparent. Upper surface yellow-brown. Thallus *K*+ yellow, *C*–, *P*–, *UV*–; no lichen substances detected.

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

A scattered endemic lichen on siliceous rocks and overgrowing mosses in W.A., S.A., N.S.W., Vic. and Tas.


Characterised by the rimose to squamulose-verrucose oro finely lobate, yellow-brown, grey-brown or dark brown thallus, the lecanorine apothecia, the large, *Physcia*-type ascospores, a blackish brown medulla and the absence of lichen substances.


T: Wadi Keschin, Socotra, [Yemen], alt. 650 m, 1881, Schweinfurth s.n.; holotype: G n.v.


For further synonymy, see Mayrhofer (1984a); Matzner & Mayrhofer (1996).


Thallus crustose, epilithic, thin, areolate or effuse; prothallus blackish or not apparent. Upper surface pale yellow to pale yellowish brown. Apothecia 0.2–0.6 mm wide, lecanorine or lecideine, adnate to sessile, scattered; thalline margin entire, concolorous with the thallus, soon becoming excluded; proper margin black; disc brown, dark reddish brown to black, plane to strongly convex, epruinose. Ephymenium 10–20 µm thick, brown or greenish black (then *N*+ reddish); hypothecium 90–110 µm thick, colourless, inspersed; paraphyses 1–3 µm wide, unbranched or sparingly branched subapically, with apices 4–6 µm wide and brown caps. Ascii usually with 8 ascospores, often only 4 or 6. Ascospores *Physcia*-type, 1-septate, brown, ellipsoidal, 14–28 × 10–16 µm; ontogeny of type-A; outer wall finely ornamented; torus indistinct or absent. Pycnidia immersed; conidia bacilliform, 4–6 × 0.5–0.7.

Chemistry: Thallus *K*–, *C*–, *P*– or *P*+ faint yellow, *UV*–; containing atranorin (major).

Very rare on siliceous rocks in south-eastern Qld; also in Central America, West Africa, South Africa and Indonesia.

Qld: Brisbane, F.M. Bailey 1878 (G).

*Rinodina substellulata* is characterised by its pale yellow to pale yellowish brown thallus, lecanorine or lecideine apothecia, *Physcia*-type ascospores and the presence of atranorin.

**T:** Dunedin, Otago, South Island, New Zealand, on basaltic rocks, W.L.Lindsay; *lecto:* E n.v., *fide* H.Mayrhofer, *Lichenologist* 15: 278 (1983); *isolecto:* H-NYL 29088 n.v.

**T:** Lake Harris Saddle, Otago, South Island, New Zealand, on rocks in alpine grassland, 1927, G.E. & G. Du Rietz; *holo:* UPS n.v.


Thallus crustose, epilithic, thick, continuous, granular, rimose-areolate; areolae 0.1–0.4 mm wide; prothallus blackish. Upper surface sulfur-yellow to yellow-green. Apothecia 0.2–0.5 mm wide, lecanorine or cryptolecanorine, immersed to adnate or sessile, uncommon to frequent; thalline margin entire, concolorous with the thallus, persistent; disc dark brown to blackish brown or black, weakly concave to plane, epruinose. Epiphymenium 10–20 µm thick, reddish brown; hymenium 120–150 µm thick, colourless, not inspersed; hypothecium 120–200 µm thick, colourless, K–. Paraphyses 1.0–1.5 µm wide, unbranched or sparingly branched subapically, with apices 2–4 µm wide and pale brown caps. Asci with 8 (occasionally 4 or 6) spores. Ascospores *Pachysporaria*-type, 1-septate, brown, ellipsoidal, 20–34 × 11–17 µm; ontogeny of type-A; outer wall smooth; torus weakly developed. Pycnidia immersed; conidia bacilliform, 5–6 × 1 µm.

**Chemistry:** Thallus K–, C+, UV+ orange; containing zeorin, thiomelin, 8-O-methylthiomelin, 2-dechlorothiomelin, 4-dechlorothiomelin, 2-dechloro-8-O-methyl thiomelin, 4-dechloro-8-O-methylthiomelin, northiomelin, 5,7-dichloro-2,8-dihydroxy-1,3-dimethyl-9H-xanthene-9-one.

Common on siliceous rocks throughout Australia (W.A., N.T., S.A., Qld, N.S.W., A.C.T., Vic. and Tas.); also in New Zealand.

W.A.: Castle Rock, Porongurup Ra., G.C.Bratt 67/421 (HO).  
Qld: Jourama Falls, Paluma Range Natl Park, 23 km S of Ingham, J.A.Elix 37205A (CANB).  
N.S.W.: along Reedy Ck, Marble Arch, 48 km S of Braidwood, J.A.Elix 4414 (CANB).  
A.C.T.: Molonglo Gorge Reserve, 14 km SE of Canberra, J.A.Elix 11784 (CANB).  
Tas: Stony Pt, Montague, G.Kantvilas 372/81 (HO).

This species is characterised by the thick sulfur-yellow to yellow-green thallus, the lecanorine to cryptolecanorine apothecia, the large *Pachysporaria*-type ascospores, the dark brown to blackish brown or black discs and the presence of zeorin and numerous xanthones.


**T:** Parlour Mtn area, 35 km NE of Armidale, New England, N.S.W., alt. c. 1000 m, 11 Oct. 1981, H.Mayrhofer 5487 & J.Williams; *holo:* GZU n.v.; *iso:* MEL, UPS n.v.


Thallus crustose, rarely endolithic, usually epilithic and growing autonomously between other crusts, rarely zilichenchicolous; prothallus absent. Upper surface olive-green to grey-brown or dark brown. Medulla colourless to brown, occasionally containing an insoluble orange pigment. Apothecia 0.15–0.40 mm wide, lecanorine, sessile, scattered; thalline margin entire, concolorous with the thallus, persistent or becoming excluded; disc black, plane to convex, epruinose. Epiphymenium 15–20 µm thick, brown; hymenium 80–100 µm thick, colourless, not inspersed; hypothecium 80–150 µm thick, colourless, K–. Paraphyses 1.0–1.5 µm wide, agglutinated, with clavate apices 3–5 µm wide and brown caps. Asci 8-spored. Ascospores *Pachysporaria*-type grading into *Milvina*-type, 1-septate, brown, ellipsoidal, 13–21 × 7.5–11.5 µm; ontogeny of type-A; outer wall smooth; torus present. Pycnidia not seen.

**Chemistry:** Thallus K–, C–, P–, UV–; no lichen substances detected.
Scattered on siliceous rocks in southern and eastern Australia (W.A., Qld, N.S.W. and Tas.); also on the Juan Fernández Islands in the south-eastern Pacific Ocean.


This lichen is characterised by its olive-green to grey-brown or dark brown thallus forming ‘islands’ between other crusts, rarely ±lichenicolous on *Ramboldia petraeoides* and *Rhizocarpon* sp., and also by the colourless to brown medulla, the *Pachysporaria*-type grading into *Milvina*-type ascospores, type-A spore ontogeny and the absence of lichen substances.


*T: s. loc.*, Qld, 1889, F.M.Bailey 709; holo: G n.v.


Thallus crustose, epilithic, thin, membranaceous or rimose, rarely areolate; prothallus blackish or not apparent. Upper surface sulfur-yellow to yellow-green. Apothecia 0.1–0.3 mm wide, cryptolecanorine, immersed, scattered or contiguous; thalline margin entire, concolorous with the thallus, persistent; disc blackish brown, concave to plane, epruinose. Epiphymenium 10–20 µm thick, reddish brown; hymenium 80–100 µm thick, colourless, not inspersed; hypothecium 60–100 µm thick, colourless, K−. Paraphyses 1.0–1.5 µm wide, unbranched or sparingly branched subapically, with apices 2–4 µm wide and dark brown caps. Asci 8-spored. Ascospores *Pachysporaria*-type, 1-septate, brown, ellipsoidal, 14–21 × 7.5–10.5 µm; ontogeny of type-A; outer wall smooth; torus developed. Pycnidia immersed; conidia bacilliform, 5–6 × 1 µm.

Chemistry: Thallus K−, C+ yellow-orange, P−, UV+ orange; containing zeorin, thiomelin, 8-O-methylthiomelin, 2-dechlorothiomelin, 4-dechlorothiomelin, 2-dechloro-8-O-methylthiomelin, 4-dechloro-8-O-methylthiomelin, northiomin, 5,7-dichloro-2,8-dihydroxy-1,3-dimethyl-9H-xanthen-9-one.

Apparently very rare on siliceous rocks in northern Australia (W.A. and Qld); also in Indonesia and Taiwan.


This species is characterised by the membranaceous to rimose, sulfur-yellow to yellow-green thallus, the cryptolecanorine apothecia, small *Pachysporaria*-type ascospores, the immersed, blackish brown discs and the presence of zeorin and numerous xanthones in the thallus. *Rinodina thiomela* differs in having larger ascospores, lecanorine apothecia and a thicker thallus.