

PHYLLOPSORACEAE

John A. Elix¹

Phyllopsoraceae Zahlbr., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 1, 1: 138 (1905) *emend.* J.Hafellner, *Beih. Nova Hedwigia* 79: 312 (1984).

Type: *Phyllopsora* Müll.Arg.

Thallus crustose, squamulose or foliose. Isidia, lobules (lacinules) and soredia present or absent. Upper cortex consisting of thin- or thick-walled anticlinally orientated hyphae, with round to narrowly cylindrical lumina; in section the cortex sometimes consisting of highly gelatinised hyphae with lumina reduced to narrow thread-like channels so that the section appears net-like (type 1), or the hyphae are far less gelatinised and the cortex is formed of isodiametric cells (type 2), or the cortex can be intermediate, with somewhat angular locules connected by channels with moderately narrowed lumina (type 1–2) (Swinscow & Krog, 1981). Photobiont *Pseudochlorella* or another unicellular green alga; cells 5–20 µm diam., forming a continuous layer or not. Medulla absent or poorly developed, frequently containing lichen substances. Lower cortex absent or poorly developed; lower surface with or without a spongiostratum. Prothallus present or absent. Ascomata apothecia, zeorine, biatorine or lecideine, sessile, simple or aggregated; disc ±round, plane to convex, yellow, pale brown to dark reddish brown or black. Proper exciple composed of conglutinated radially orientated hyphae, rarely with a thalline exciple. Epihymenium indistinct or black, brown or green. Hymenium colourless, red-brown, brown or green, 20–70 µm thick, amyloid. Hypothecium colourless, yellow-brown, brown or dark red. Paraphyses thick, septate, straight, sparingly branched and anastomosing, 1.5–3.0 µm wide, weakly to strongly conglutinated; apices thickened or not, with or without a pigmented cap. Asci 8-spored, clavate to rhomboidal, of the *Bacidia*-type, usually with a well-developed amyloid tholus with a paler conical axial mass and an ocular chamber. Ascospores simple or 1–3-septate, ellipsoidal to fusiform or acicular, 5–55 × 1.5–7.0 µm, colourless, not halonate. Conidiomata pycnidial, immersed or superficial. Conidia formed acrogenously or pleurogenously, subglobose, ellipsoidal, bacilliform or filiform.

This family is especially common in subtropical and tropical regions of the world; all four genera are known from Australia.

J.Hafellner, Studien in Richtung einer natürlicheren Gliederung der Sammenfamilien Lecanoraceae und Lecideaceae, *Beih. Nova Hedwigia* 79: 241–371 (1984).

- | | | |
|----|--|-----------------|
| 1 | Thallus with an upper and lower cortex, each composed of a thin layer of rounded or cuboidal cells | 1. ESCHATOGONIA |
| 1: | Thallus lacking a lower cortex; upper cortex not a thin layer of rounded or cuboidal cells | 2 |
| 2 | Apothecia zeorine; divaricatic acid present (1:) | 3. PHYSCIDIA |
| 2: | Apothecia biatorine or lecideine; divaricatic acid absent | 3 |
| 3 | Ascospores acicular; fumarprotocetraric and/or lobaric acids present (2:) | 4. TRICLINUM |
| 3: | Ascospores usually ellipsoidal to fusiform (acicular in <i>P. conwayensis</i>); fumarprotocetraric and lobaric acids absent | 2. PHYLLOPSORA |

¹ Department of Chemistry, Building 33, Australian National University, Canberra, Australian Capital Territory 0200.

1. ESCHATOGONIA

Eschatogonia Trevis., *Spighe e Paglie* 6 (1853); from the Greek *eskhatos* (end, at the end) and *gonion* (a seed), in reference to the propagules developing at the margins of the squamules.

Type: *E. montagnei* Trevis. [= *E. prolifera* (Mont.) R.Sant.]

Thallus squamulose. Squamules 0.5–2.0 mm wide, elongate and incised, lacking isidia and soredia. Lacinules (lobules) 0.02–0.50 mm wide, developing on squamule margins, often proliferating, becoming coralloid and imbricate and dominating the thallus. Upper and lower cortices 5–9 μm thick, consisting of a single layer of rounded or cuboidal cells with thickened walls. Photobiont a unicellular green alga (*Pseudochlorella*); cells 8–15 μm diam., forming a continuous layer. Medulla poorly developed, consisting of loosely woven non-amyloid hyphae, frequently containing lichen substances. Prothallus white or pale. Apothecia biatorine, sessile, simple or aggregated, laminal on the squamules; disc \pm rounded in outline, plane to convex, pale brown to dark reddish brown. Proper exciple composed of conglutinated radially orientated hyphae, colourless, pale tan, yellow-brown or dark red, K–. Epithemium indistinct. Hymenium colourless to pale yellow, 35–60 μm thick, amyloid. Hypothecium colourless, pale yellow or pale red-brown. Paraphyses 1.5–2.0 μm wide, slightly thickened at the apex. Asci elongate-clavate, with a well-developed tholus and a narrow paler conical axial mass. Ascospores 0–3-septate, bacilliform to filiform, colourless, 12–55 \times 1.7–3.0 μm , thin-walled. Conidiomata pycnidial, immersed or superficial; outer wall tan to reddish brown; ostiole pale to brown; conidiogenous cells elongate, enteroblastic. Conidia bacilliform, straight, 9–15 \times 0.5–1.0 μm .

Eschatogonia is a tropical genus of three species, one of which occurs in Australia. These lichens are primarily corticolous, but they also grow on corticolous bryophytes.

K.Kalb, New or otherwise interesting lichens II, *Biblioth. Lichenol.* 88: 301–329 (2004).

Eschatogonia marivelensis (Vain.) Kalb, *Biblioth. Lichenol.* 88: 310 (2004)

Tonia marivelensis Vain., *Ann. Acad. Sci. Fenn.*, ser. A, 15(6): 61 (1921). T: Mt Mariveles, Bataan, Luzon, Philippines, *E.D.Merrill* 6274; holo: TUR-V 20360.

Illustration: K.Kalb, *op. cit.* 321, fig. 10.

Thallus 3–7 cm wide, with adnate squamules 0.5–1.0 mm wide, soon becoming lacinulate. Lacinules 0.05–0.10 mm wide, forming along the margin of the squamules, dense and imbricate, subsending. Prothallus sparse to moderate, white; hyphae loosely interwoven. Upper surface grey-green to pale olive, dull. Medulla white or off-white. Apothecia common, 0.5–1.2 mm wide, solitary or moderately confluent, \pm becoming tuberculate; disc weakly convex and depressed in the centre, rarely becoming markedly convex with age, yellow-brown to reddish, pruinose; margin concolorous with or slightly darker than the disc, thin, becoming excluded with age. Hymenium 40–50 μm thick, colourless to pale yellow, intensely amyloid. Hypothecium pale yellow to pale red-brown, K–. Ascospores 0–3-septate, filiform, 30–40 \times 1.7–2.2 μm . Pycnidia not seen in Australian specimens.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV–; containing \pm bourgeanic acid.

Occurs in northern N.T. and north-eastern Qld; rare on the bark of trees and on dead wood in coastal and hinterland rainforest. Also in East Asia. Map 51.

N.T.: below Florence Falls, Litchfield Natl Park, 40 km SW of Batchelor, *J.A.Elix* 37749 (CANB, Herb. Kalb). Qld: Clarke Ra., 46 km SSW of Proserpine, *J.A.Elix* 20857 & *J.A.Curnow* (BRI, CANB); Dicks Tableland, c. 10 km SE of Eungella, c. 60 km W of Mackay, 1992, *K. & A.Kalb* (Herb. Kalb); a few km N of Cardwell, 2002, *K. & A.Kalb* (Herb. Kalb).

Eschatogonia marivelensis is characterised by the squamulose thallus with dense, coralloid, imbricate, subsending lacinules, the yellow-brown to reddish apothecia, filiform ascospores and the presence of bourgeanic acid.

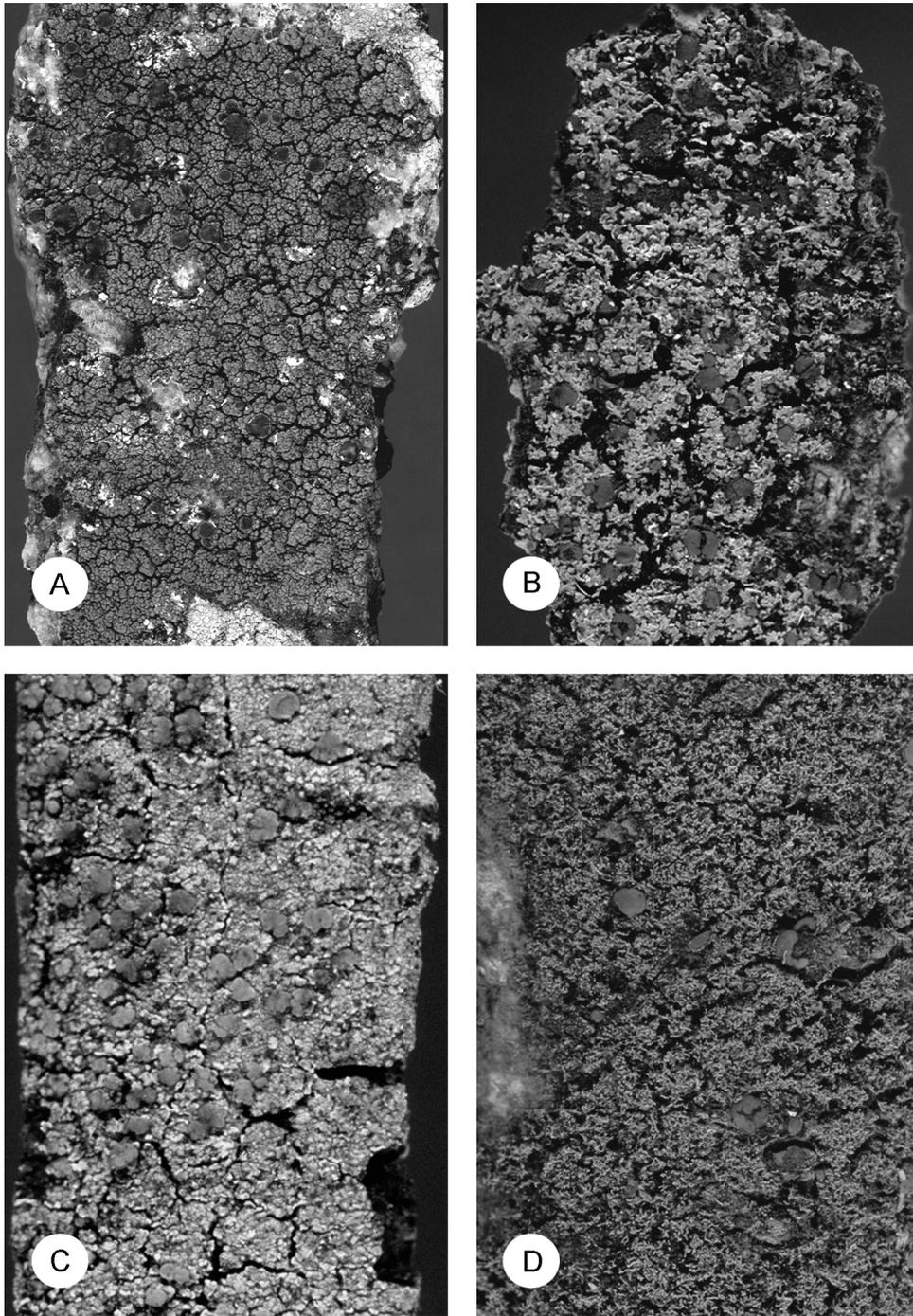


Figure 3. **A,** *Protoparmelia rogersii* (holotype). **B,** *Phyllopsora chodatnica* (holotype). **C,** *P. conwayensis* (holotype). **D,** *P. homosekikaica* (holotype). Photographs: A by N.McCracken; B–D by N.McCracken and S.Hay. [A reproduced from *Australas. Lichenol.* 62: 40 (2008); B–D from *Australas. Lichenol.* 59: 27–28 (2006)]

2. PHYLLOPSORA

Phyllopsora Müll.Arg., *Bull. Herb. Boissier* 2, App. 1: 11 (1894); from the Greek *phyllon* (a leaf) and *psoros* (a scab, scurvy), in reference to the squamules occurring in scab-like patches on a basal prothallus.

Lecto: *P. breviuscula* (Nyl.) Müll.Arg.

Thallus crustose or squamulose, rarely placodioid or subfoliose. Squamules 0.1–1.0 mm wide. Isidia common, sometimes dominating the thallus; lacinules (phyllidia) common; soredia absent. Upper cortex 5–60 µm thick, of types 1, 2 or 1–2 (see p. 41). Photobiont a unicellular green alga; cells 5–15 µm diam., forming a continuous layer. Medulla usually poorly developed, of loosely woven non-amyloid hyphae, frequently containing lichen substances. Lower cortex absent. Prothallus whitish to dark red or purple-black. Apothecia biatorine, sessile, simple or aggregated, laminal on the squamules; disc ±round in outline, plane to convex, yellow, pale brown to dark reddish brown. Proper exciple composed of conglutinated radially orientated hyphae, pale tan to yellow-brown or dark red, sometimes containing crystals or pigments, K– or K+ red or purple-brown. Epiphyllum indistinct or a thin gelatinous layer with slight pigmentation, K–. Hymenium colourless to brown or dark reddish brown, 20–60 µm thick, amyloid. Hypothecium colourless, yellow-brown to brown or dark red, sometimes containing crystals or pigments, K– or K+ red or purple-brown. Paraphyses 1.5–2.0 µm wide, only slightly thickened at the apex. Asci elongate-clavate, with a well-developed tholus and a narrow paler conical axial mass. Ascospores simple or 1-septate, colourless, ellipsoidal to fusiform, rarely acicular, 5–45 × 0.8–5.0 µm, smooth-walled. Conidiomata pycnidial, immersed or superficial; outer wall tan to reddish brown; ostiole pale to brown; conidiogenous cells elongate, enteroblastic; conidiophores irregular in shape, sometimes branched, of type IV (*sensu* Vobis, 1980). Conidia bacilliform to filiform, straight or bent, 7–15 × 0.5–1.0 µm.

Phyllopsora is a pantropical and subtropical genus of c. 55 species; 21 are known from Australia. These lichens occur in forest where they grow primarily on bark, but also on decorticated wood, rock and bryophytes.

G.Vobis, Bau und Entwicklung der Flechten-Pycnidien und ihrer Conidien, *Biblioth. Lichenol.* 14: 1–141 (1980); T.D.V.Swincow & H.Krog, The genus *Phyllopsora*, with a report on East African species, *Lichenologist* 13: 203–247 (1981); L.Brako, *Phyllopsora* (Bacidiaceae), *Fl. Neotropica Monogr.* 55: 1–66 (1991); E.Timdal & H.Krog, Further studies on African species of the lichen genus *Phyllopsora* (Lecanorales), *Mycotaxon* 77: 57–89 (2001); J.A.Elix, Five new species of *Phyllopsora* (lichenized Ascomycota) from Australia, *Australas. Lichenol.* 59: 23–29 (2006); J.A.Elix, Additional lichen records from Australia, *Australas. Lichenol.* 60: 6–12 (2007).

1	Thallus lacking isidia and lacinules.....	3. P. breviuscula
1:	Thallus with isidia or lacinules	2
2	Thallus lacinulate; isidia absent (1:).....	3
2:	Thallus isidiate; lacinules absent	10
3	Lichen substances absent (2).....	4
3:	Lichen substances present.....	6
4	Squamules 0.5–1.0 mm wide; hypothecium pale brown (3)	18. P. parvifolia
4:	Squamules 0.1–0.3 mm wide; hypothecium colourless, yellow or with red-brown patches.....	5
5	Hypothecium golden yellow; ascospores 11–20 × 2.5–3.0 µm (4:).....	9. P. foliata
5:	Hypothecium colourless or with red-brown patches; ascospores 9–11 × 2.0–2.5 µm	6. P. confusa
6	Squamules P+ orange; argopsin, pannarin or dechloropannarin present (3:).....	7
6:	Squamules P– ; argopsin, pannarin and dechloropannarin absent	8
7	Squamules pruinose, effuse or forming circular thalli with radiating marginal squamules; zeorin present (6)	4. P. buettneri
7:	Squamules epruinose, effuse; zeorin absent	2. P. albicans

8	Lower and, frequently, upper surface of squamules yellow; xanthonenes present (6:)	5. P. chodatnica	
8:	Lower and upper surface of squamules not yellow; xanthonenes absent		9
9	Ascospores acicular, 25–33 × 0.80–1.25 μm; 3-chlorostenosporic acid present (8:)	7. P. conwayensis	
9:	Ascospores narrowly ellipsoidal, 10–15 × 2–3 μm; furfuraceic acid present	16. P. neofoliata	
10	Thallus crustose, consisting of isidia only (2:)		11
10:	Thallus squamulose		15
11	Lichen substances absent (10:)	10. P. foliatella	
11:	Lichen substances present		12
12	Isidia KC+ red; homosekikaic acid present (11:)	12. P. homosekikaica	
12:	Isidia KC–; homosekikaic acid absent		13
13	Ascospores 10–14 × 3–5 μm; methoxymicareic acid present (12:)	15. P. methoxymicareica	
13:	Ascospores 7–13 × 2–3 μm; furfuraceic acid or atranorin present		14
14	Margin of apothecia with pale fibrils; atranorin and ±zeorin present (13:)	13. P. isidiotyta	
14:	Margin of apothecia lacking fibrils; furfuraceic acid present	11. P. furfuracea	
15	Thallus P– or P+ pale yellow; lacking lichen substances, or atranorin or furfuraceic acid present (10:)		16
15:	Thallus P+ orange; argopsin or derivatives present		18
16	Thallus P+ pale yellow; parvifoliellin and atranorin present (15:)	19. P. rappiana	
16:	Thallus P–; containing furfuraceic acid, or lichen substances absent		17
17	Thallus UV+ blue-white; furfuraceic acid present (16:)	14. P. kiensis	
17:	Thallus UV–; lichen substances absent	8. P. corallina	
18	Squamules rather thick; upper cortex of type 2 (15:)		19
18:	Squamules thin; upper cortex of type 1–2		20
19	Thallus containing argopsin and norargopsin (18:)	20. P. santensis	
19:	Thallus containing phyllopsorin, ±chlorophyllopsorin	17. P. ochroxantha	
20	Thallus containing methyl 2,7-dichloropsoromate and methyl 2,7-dichloronorporsoromate (18:)		
		21. P. swinscowii	
20:	Thallus containing argopsin and chlorophyllopsorin	1. P. africana	

1. *Phyllopsora africana* Timdal & Krog, *Mycotaxon* 77: 64 (2001)

T: where road meets track, along road towards Plaine d’Affouches, above Bras Citron, La Réunion, 20°57’S, 55°25’E, 1996, *H.Krog & E.Timdal RE8/13*; holo: O; iso: UPS.

Illustration: E.Timdal & H.Krog, *op. cit.* 65, fig. 1.

Thallus squamulose, effuse. Prothallus well developed, red-brown. Squamules 0.1–0.4 mm wide, adnate to ascending, isodiametric to somewhat elongate, scattered when young, later occasionally imbricate or contiguous, crenulate to incised, plane to weakly convex, green, glabrous on the upper surface, usually faintly pubescent along the margins. Isidia common, on the margins of squamules, often long, simple to sparingly branched. Upper cortex of type 1–2, 30–50 μm thick. Apothecia common, 0.5–1.5 mm wide, rounded when immature, later irregular in outline, simple to conglomerate, plane to strongly convex, pale to mid-brown, with an indistinct concolorous or darker glabrous margin. Proper exciple pale brown to colourless or with patches of reddish brown pigment. Hypothecium colourless. Ascospores simple, ellipsoidal, 5.5–8.5 × 2.0–2.5 μm. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, P+ orange; containing chlorophyllopsorin (major), argopsin (minor).

Known from north-eastern Qld; rare on the bark of trees in strand vegetation and hinterland rainforest. Also in East Africa and the Mascarene Islands. Map 52.

Qld: between Spring Ck and Charleys Ck, 23 km WSW of Proserpine, *J.A.Elix 21136 & H.Streimann* (CANB); Cape Tribulation, Cape Tribulation Natl Park, 44 km NNE of Mossman, *H.Streimann 45767* (CANB).

This species is characterised by the squamulose thallus with cylindrical, marginal isidia, a type 1–2 upper cortex, pale to medium brown apothecia, usually with a darker, glabrous margin, ellipsoidal ascospores and the presence of chlorophyllopsorin and argopsin.

2. *Phyllopsora albicans* Müll.Arg., *Bull. Soc. Roy. Bot. Belgique* 32: 132 (1893)

T: Terraba [Turrialba], Cartago, Costa Rica, *A.Tonduz s.n.*; holo: G; iso: US [as *Pittier & Durand s.n.*, *Pl. Costaric. Exs.* 5474].

For further synonymy see Swinscow & Krog (1981).

Illustrations: T.D.V.Swinscow & H.Krog, *Lichenologist* 13: 225, fig. 21 (1981); E.Timdal & H.Krog, *Mycotaxon* 77: 65, fig. 2 (2001).

Thallus squamulose, effuse. Prothallus usually well developed, red-brown. Squamules 0.3–1.0 mm wide, ascending, elongate, often imbricate, incised to deeply divided, plane to weakly convex; upper side pale green to mid-green, glabrous, epruinose; margin concolorous with the upper side, sometimes finely pubescent; isidia absent. Lacinules common, growing from the lobe tips. Upper cortex of type 1, 25–60 µm thick. Apothecia rare, to 1.5 mm wide, rounded, solitary to slightly conglomerate, weakly to moderately convex, reddish brown, with an indistinct darker margin. Proper exciple reddish brown throughout. Hymenium pale brown. Hypothecium pale brown to brown. Ascospores simple, narrowly ellipsoidal to fusiform or bacilliform, 8.0–12.5 × 2.5–3.5 µm. Pycnidia not seen.

Chemistry: Cortex K–, P–; medulla K–, P+ orange; containing argopsin (major), ±pannarin (major), ±norargopsin (minor).

Common in north-eastern Qld, on bark in lowland and montane rainforest at altitudes of 100–950 m; also in Central America, East Africa, the Mascarene Islands, the Philippines and Taiwan. Map 53.

Qld: Blue Water Ck, Old Mill Rd, Lannercost State Forest, 39 km WSW of Ingham, *J.A.Elix 15580 & H.Streimann* (CANB); Cooroo L.A., 16 km WNW of Innisfail, *J.A.Elix 16694 & H.Streimann* (CANB); Mount Spec State Forest, Paluma Ra., 6 km W of Paluma, *J.A.Elix 20240 & H.Streimann* (CANB); Big Tableland, 26 km S of Cooktown, *H.Streimann 46292* (CANB).

Phyllopsora albicans is characterised by the comparatively large, ±ascending squamules, numerous lacinules developing from the lobe tips, the absence of isidia and the presence of argopsin in the medulla. It can be confused with *P. buettneri*, but that species contains zeorin and pannarin, argopsin or dechloropannarin, and it differs morphologically in forming larger, pruinose squamules and ±circular thalli with radiating, marginal squamules.

3. *Phyllopsora breviuscula* (Nyl.) Müll.Arg., *Bull. Herb. Boissier* 2, App. 1: 45 (1894)

Lecidea breviuscula Nyl., *Ann. Sci. Nat., Bot.*, sér. 4, 19: 339 (1863); *Psora breviuscula* (Nyl.) Müll.Arg., *Flora* 65: 483 (1882); *Phyllopsora parvifolia* (Pers.) Müll.Arg. var. *breviuscula* (Nyl.) Brako, *Mycotaxon* 35: 15 (1989). T: Monte Verde, Cuba, *C.Wright*; lecto: H-NYL 20557, *fide* T.D.V.Swinscow & H.Krog, *Lichenologist* 13: 225 (1981); isolecto: BM, O (*Lich. Cub.* 181).

For further synonymy see Swinscow & Krog (1981) and Brako (1991).

Illustrations: T.D.V.Swinscow & H.Krog, *Lichenologist* 13: 226, fig. 22 (1981); L.Brako, *Fl. Neotropica Monogr.* 55: 6, fig. 1d (1991); E.Timdal & H.Krog, *Mycotaxon* 77: 71, fig. 4 (2001).

Thallus squamulose, effuse or forming incomplete circular patches. Prothallus thick, reddish brown. Squamules 0.5–1.0 mm wide, adnate, elongate, contiguous or partly imbricate, soon becoming deeply divided, distinctly convex, green or often with brown patches, glabrous above, pubescent along the margin; isidia and lacinules absent. Upper cortex of type 1–2, 30–70 µm thick. Apothecia common, to 2 mm diam., rounded in outline, solitary or conglomerate, plane to moderately convex, medium brown, with a paler glabrous often indistinct margin. Proper exciple pale brown or with deeper brown patches. Epihymenium medium brown. Hypothecium pale brown in lower parts, medium brown above. Ascospores simple, rather broadly ellipsoidal to fusiform, 9.5–13.0 × 3.5–5.0 µm. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV–; no lichen substances detected.

Known from bark in coastal and hinterland forests in eastern Qld; also in North, Central and South America, Africa and the Mascarene Islands. Map 54.

Qld: Brisbane, 1887, *F.M.Bailey s.n.* (G); Toowoomba, *C.H.Hartmann s.n.* (FH, M, UPS); Jinda Track to Wallaman Falls, Girringun Natl Park, 50 km W of Ingham, *J.A.Elix 38075* (CANB).

This species is characterised by the comparatively broad squamules, the thick, reddish brown prothallus and the absence of lacinules, isidia and lichen compounds. It can be confused with some sparingly lacinulate forms of *P. foliata*, but the latter has longer and narrower ascospores ($11\text{--}20 \times 2\text{--}3 \mu\text{m}$).

4. *Phyllopsora buettneri* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* 4: 396 (1926)

Psora buettneri Müll.Arg., *Bot. Jahrb. Syst.* 15: 506 (1893). T: Bismarcksburg, Togo, 1890, *Dr Büttner*; holo: G; iso: BM.

For further synonymy see Brako (1991).

Illustrations: L.Brako, *Fl. Neotropica Monogr.* 55: 31, fig. 17a (1991); T.D.V.Swinscow & H.Krog, *Lichenologist* 13: 227, fig. 23 (1981); E.Timdal & H.Krog, *Mycotaxon* 77: 71, fig. 5 (2001).

Thallus squamulose, effuse or circular, with radiating marginal squamules. Prothallus usually well developed, reddish brown. Squamules 0.3–1.0 mm wide, adnate or ascending, elongate, incised or deeply divided, plane to weakly convex; upper side pale to medium green, glabrous or pruinose in the inner part, distinctly pruinose towards the lobe ends; margin pale, pubescent; isidia absent. Lacinules common, growing from the tips of ascending squamules, mainly in the inner part of the thallus. Upper cortex of type 1–2, 30–70 μm thick. Apothecia rare, 1.0–1.5 mm wide, rounded, solitary to conglomerate, convex and immarginate even when immature, dark reddish brown, with an indistinct concolorous margin. Proper exciple brown in the inner part, dark reddish brown at the rim. Hymenium red-brown. Hypothecium pale to medium brown. Ascospores simple, narrowly fusiform, $6\text{--}15 \times 2\text{--}3 \mu\text{m}$. Pycnidia partly immersed, dark red-brown. Conidia bacilliform, $9\text{--}10 \times c. 1 \mu\text{m}$.

Chemistry: Cortex K–, P–; medulla K–, P+ orange; occurs in three chemical races: 1, containing zeorin (major), argopsin (major), norargopsin (minor); 2, containing zeorin (major), pannarin (major), \pm dechloropannarin (minor); and 3, containing zeorin (major), dechloropannarin (major), \pm pannarin (minor or trace).

Common on bark in eastern Qld and north-eastern N.S.W.; in lowland and montane rainforest at 100–950 m. This Palaeotropical and subtropical species is also known from Africa, the Mascarene Islands, Papua New Guinea, the Philippines, Norfolk Island and Tahiti. Map 55.

Qld: Koolaroo Ck, Hellhole Gorge, Carnarvon Natl Park, 93 km NNW of Injune, *J.A.Elix 34155* (CANB); near Flutter Ck, Pine Mountain State Forest, 24 km SSW of Calliope, *J.A.Elix 34789* (CANB); Thompson Rd, Edmonton, 9 km S of Cairns, *J.A.Elix 17619* & *H.Streimann* (CANB). N.S.W.: Bruxner Park, 9 km NW of Coffs Harbour, *J.A.Elix 3500* (CANB).

Phyllopsora buettneri is characterised by \pm circular thalli with radiating, marginal squamules, the relatively large, \pm ascending squamules with a pruinose upper surface, numerous lacinules developing from the lobe tips, the absence of isidia and the presence of zeorin together with pannarin, argopsin or dechloropannarin.

5. *Phyllopsora chodatnica* Elix, *Australas. Lichenol.* 59: 23 (2006)

T: Blencoe Ck, Cardwell Ra., 48 km NW of Cardwell, Qld, $18^{\circ}03'S$, $145^{\circ}39'E$, on mossy trunk in Lauraceae-Syzygium-Prunus-dominated forest, 17 June 1986, *J.A.Elix 20109* & *H.Streimann*; holo: BRI; iso: CANB.

Illustrations: J.A.Elix, *op. cit.* 59: 27, figs 1, 2.

Thallus squamulose, effuse. Prothallus usually well developed, pale red-brown. Squamules 0.3–0.5 mm wide, ascending or not, elongate, to 1.0–1.5 mm long, often imbricate, incised to deeply divided, plane to weakly convex; upper side pale green to \pm intense yellow-green or orange-yellow, glabrous, epruinose; margin concolorous with the upper surface, sometimes finely pubescent, lacking isidia. Lacinules common, growing from the squamule tips, 0.05–0.15 mm wide; lower surface partly yellow. Upper cortex of type 1, 25–60 μm thick. Apothecia rare, 0.8–1.5 mm wide, rounded or somewhat irregular at the margins, solitary to slightly conglomerate, weakly to moderately convex, reddish brown, with an indistinct darker margin. Proper exciple reddish brown. Epithymenium deep golden yellow. Hymenium pale yellow-brown. Hypothecium medium to dark red-brown. Ascospores simple, narrowly ellipsoidal, $7\text{--}11 \times 2\text{--}3 \mu\text{m}$. Pycnidia not seen. Fig. 3B.

Chemistry: Cortex K+ pale yellow; medulla K+ pale yellow, C+ faint orange, KC-, P+ pale yellow; containing chodatol (major), 5,7-dichloro-3-O-methylnorlichexanthone (minor), 2,5,7-trichloro-3-O-methylnorlichexanthone (minor), di-O-methylthiophanic acid (minor), 3-O-methylthiophanic acid (trace), isoarthothelin (trace), \pm demethylchodatol (trace).

Endemic to eastern Qld and north-eastern N.S.W.; grows on the bark of montane rainforest trees at elevations of 800–1250 m. Map 56.

Qld: Mount Spec State Forest, Paluma Ra., 6 km W of Paluma, *J.A.Elix 20242* & *H.Streimann* (CANB); Crediton State Forest, 20 km SSW of Finch Hatton, *J.A.Elix 21023* & *H.Streimann* (CANB). N.S.W.: Mars Rd, Mount Hyland Nature Reserve, 33 km NW of Dorrigo, *H.Streimann 60620* (CANB).

Phyllopsora chodatol is characterised by the rather large, yellow, \pm ascending squamules, numerous lacinules growing from the lobe tips, the absence of isidia and the presence of a chemosyndrome of xanthonol based on chodatol and 2,5,7-trichloro-3-O-methylnorlichexanthone. These compounds are responsible for the yellow colouration of the upper cortex and the lower surface of the squamules.

6. *Phyllopsora confusa* Swinscow & Krog, *Lichenologist* 13: 229 (1981)

T: 2 km N of Irangi Forest Stn, in damp deciduous forest near River Ena, Mt Kenya, Kirinyaga District, Central Province, Kenya, 00°20'S, 37°38'E, alt. 2000 m, Feb. 1972, *H.Krog* & *T.D.V.Swinscow K48/177*; holo: O.

Illustrations: T.D.V.Swinscow & H.Krog, *op. cit.* 230 (1981); E.Timdal & H.Krog, *Mycotaxon* 77: 75, fig. 7 (2001).

Thallus squamulose, effuse. Prothallus thin but often well developed, white to partly reddish brown. Squamules small, 0.1–0.3 mm wide, narrow, ascending, lacinulate, imbricate, plane to weakly convex, mid-green, glabrous or finely pubescent along the margin; isidia absent. Lacinules coralloid. Upper cortex of type 2, 15–20 μ m thick. Apothecia scattered, to 3 mm diam., rounded to irregular in outline, solitary, plane to moderately convex, pale to medium brown, with an indistinct usually paler glabrous margin. Proper exciple, hymenium and hypothecium colourless or patchily reddish brown. Epihymenium colourless. Ascospores simple, narrowly ellipsoidal to short-bacilliform, 9–11 \times 2.0–2.5 μ m. Pycnidia not seen.

Chemistry: Cortex and medulla K-, C-, KC-, P-; no lichen substances detected.

Known from bark in rainforest in eastern Qld. Common in North, Central and South America, Africa, the Mascarene Islands and Norfolk Island. Map 57.

Qld: Violet Ck, Carnarvon Natl Park, 93 km NNW of Injune, *J.A.Elix 34142* (CANB).

This species is characterised by narrow squamules, \pm coralloid lacinules, medium-sized ascospores and the absence of lichen substances.

7. *Phyllopsora conwayensis* Elix, *Australas. Lichenol.* 59: 24 (2006)

T: Conway State Forest, 18 km E of Proserpine, Qld, 20°21'S, 148°45'E, on tree trunk in lowland rainforest, 28 June 1986, *J.A.Elix 20190* & *H.Streimann*; holo: BRI; iso: B, CANB.

Illustrations: J.A.Elix, *op. cit.* 28, figs 3, 4.

Thallus squamulose, effuse. Prothallus usually well developed, white to red-brown. Squamules small, to 0.5 mm long, 0.13–0.25 mm wide, not ascending, contiguous to imbricate, plane to weakly convex; upper side off-white to yellow or pale tan, epruinose; margin concolorous with the upper side, sometimes finely pubescent; isidia absent. Lacinules common, growing from the margins, 0.05–0.10 mm wide, not proliferating. Upper cortex of type 2, 15–25 μ m thick. Apothecia common, 0.25–1.50 mm wide, rounded or somewhat irregular at the margins, solitary to conglomerate, moderately convex, pale pink to pale orange or orange-brown, with an indistinct paler margin. Proper exciple pale orange. Hymenium colourless to pale yellow. Hypothecium pale yellow. Ascospores simple, acicular, 25–33 \times 0.80–1.25 μ m. Pycnidia not seen. Fig. 3C.

Chemistry: Cortex and medulla K-, C-, KC-, P-; containing 3-chlorostenosporic acid (major), 3-chloroperlatolic acid (minor), 3-chlorodivartic acid (minor), \pm perlatolic acid (trace).

Known only from the type locality in north-eastern Qld. Map 58.

Characterised by the lacinulate upper surface, acicular ascospores and the distinctive medullary chemistry.

8. *Phyllopsora corallina* (Eschw.) Müll.Arg., *Bot. Jahrb. Syst.* 20: 264 (1894)

Lecidea corallina Eschw., in C.F.P. von Martius, *Fl. Bras. Enum. Pl.* 1(1): 256 (1833). T: Bahia, Brazil, C.F.P. von Martius; holo: M; iso: G, H.

For further synonymy see Brako (1991).

Illustration: E.Timdal & H.Krog, *Mycotaxon* 77: 75, fig. 8 (2001).

Thallus squamulose, effuse. Prothallus indistinct to well developed in part, white to red-brown. Squamules 0.1–0.5 mm wide, adnate to ascending, isodiametric to elongate, scattered when young, later often contiguous or imbricate, crenulate to incised, plane to weakly convex, medium green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common on squamule margins, subglobose to cylindrical, simple to rarely branched. Upper cortex of type 2, 15–25 µm thick. Apothecia rather common, to 1.5 mm wide, rounded when young, later irregular in outline, mostly solitary, plane to moderately convex, pale to medium brown, with an indistinct slightly paler glabrous to slightly pubescent margin. Proper exciple colourless to pale brown. Epithymenium colourless. Hypothecium colourless to pale brown. Ascospores simple, narrowly ellipsoidal to short-bacilliform, 6.5–14.5 × 2.0–2.5 µm. Conidia bacilliform, 5–10 × 1 µm.

Chemistry: Cortex and medulla K–, C–, KC–, P–; no lichen substances detected.

Occurs on bark and on moist rocks in rainforest and coastal forest in northern N.T. and north-eastern Qld; pantropical. Map 59.

N.T.: Berry Springs Nature Park, 47 km S of Darwin, *J.A.Elix* 37348 (CANB). Qld: Jourama Falls, Paluma Range Natl Park, 23 km S of Ingham, *J.A.Elix* 37218 (CANB); Tully River Falls, 49 km NW of Tully, *J.A.Elix* 37440 (CANB).

Phyllopsora corallina is characterised by the comparatively small to medium-sized squamules, the presence of marginal, subglobose to cylindrical, simple to rarely branched isidia and the absence of lichen substances.

9. *Phyllopsora foliata* (Stirt.) Zahlbr., *Cat. Lich. Univ.* 4: 397 (1926) var. **foliata**

Lecidea foliata Stirt., *Trans. & Proc. Roy. Soc. Victoria* 17: 71 (1881). T: Brisbane, Qld, *F.M.Bailey* 156; lecto: GLAM n.v., *vide* R.W.Rogers, *Austrobaileya* 1: 504 (1982); isolecto: BRI.

Lecidea foliata var. *atrovirens* C.Knight, in J.Shirley, *Proc. Roy. Soc. Queensland* 6: 166 (1889); *Phyllopsora foliata* var. *atrovirens* (C.Knight) Zahlbr., *Cat. Lich. Univ.* 4: 397 (1926). T: locality unknown, Qld, *F.M.Bailey* 13; holo: BRI.

Thallus squamulose to subfoliose; subfoliose thalli to more than 3 cm wide. Prothallus thick, usually well developed, white. Squamules small, 0.1–0.3 mm wide, ±compressed and forming a ±placodioid crust, lacinulate, imbricate, plane to convex, pale yellow to yellow-brown or pale green, glabrous or finely pubescent along the margins; isidia absent. Lacinules imbricate, ±coralloid. Upper cortex of type 2, 15–20 µm thick. Apothecia common, rounded to irregular, ±conglomerate, 0.6–1.4 mm wide, plane to moderately convex, tan to reddish brown or orange-pink, with a paler margin that is reduced or excluded in convex apothecia. Proper exciple colourless. Epithymenium colourless. Hypothecium straw-yellow to golden yellow. Ascospores simple, narrowly ellipsoidal to fusiform, 11–20 × 2–3 µm. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, KC–, P–; no lichen substances detected.

Common on bark and moist rocks in rainforest and coastal forest in eastern Qld, N.S.W. and eastern Vic. Also on Lord Howe Island and Norfolk Island. Map 60.

Qld: Mount Windsor Tableland, 38 km NW of Mossman, *J.A.Elix* 16536 & *H.Streimann* (CANB); Mt Timberwah, 37 km SE of Gympie, *J.A.Elix* 35578 (CANB). N.S.W.: Robertson, *H.Streimann* 47175 (CANB). Vic.: Bemm River Scenic Reserve, 45 km E of Orbost, *J.A.Elix* 38665 (CANB).

This lichen is characterised by the upper cortex of type 2, tan to reddish brown or orange-pink apothecia with paler margins, a prominent, white prothallus, long, narrowly ellipsoidal to fusiform ascospores and the absence of lichen substances. It has longer ascospores than *P. confusa* (8–11 µm), and the squamules are compressed, forming a ±placodioid thallus (ascending in *P. confusa*).

10. *Phyllopsora foliatella* Elix, *Australas. Lichenol.* 58: 11 (2006)

Psora foliata var. *subcorallina* Müll.Arg., *Flora* 65: 483 (1882); *Lecidea foliata* var. *subcorallina* (Müll.Arg.) Shirley, *Proc. Roy. Soc. Queensland* 6: 166 (1889); *Phyllopsora foliata* var. *subcorallina* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* 4: 397 (1926). T: Toowoomba, Qld, C.H.Hartmann; lecto: G, *vide* J.A.Elix, *loc. cit.*

Thallus crustose to areolate, effuse, formed by the prothallus and 1) partly by minute round to irregular areolae, ±closely contiguous and sometimes appearing as a continuous crust and 2) partly by isidia developing directly from the prothallus; isidia usually dominating. Prothallus indistinct to well developed, white to pale reddish brown. Areolae c. 0.05–0.10 mm wide, adnate, ±isodiametric, mostly slightly convex, pale yellow to yellow-brown or green, glabrous or rarely pubescent along the margins. Isidia usually abundant, moderately thick, subglobose to cylindrical, medium to dark green, often with a yellow or brown tinge, glabrous, simple to branched or occasionally coralloid. Upper cortex of type 2, 5–15 µm thick. Apothecia rare, 0.6–1.2 mm diam., rounded to irregular, plane to moderately convex, ±conglomerate, tan to reddish brown or orange-pink, with a paler margin that is reduced or excluded in convex apothecia. Proper exciple yellow. Epithemium colourless. Hypothecium yellow to yellow-brown. Ascospores simple, narrowly ellipsoidal to fusiform, 8–14 × 2–3 µm. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV–; no lichen substances detected.

Known from northern N.T., eastern Qld and N.S.W.; common on the bark of various trees and on moist rocks in rainforest and coastal forest. Also on Lord Howe Island and Norfolk Island. Map 61.

N.T.: Wangi Falls, Litchfield Natl Park, 74 km SW of Batchelor, *J.A.Elix 38047* (CANB). Qld: Wilsons Beach, 17 km SE of Proserpine, *J.A.Elix 20996* & *H.Streimann* (CANB); Ninney Pt, Bingil Bay, 20 km NE of Tully, *H.Streimann 45490* (CANB). N.S.W.: Cotton-Bimbang Natl Park, 70 km E of Walcha, *J.A.Elix 36302* (CANB); Maxwells Rd, Nadgee State Forest, 41 km SSW of Eden, *H.Streimann 61609* (CANB).

Phyllopsora foliatella is characterised by the crustose to areolate thallus, copious isidia and the absence of lichen substances.

11. *Phyllopsora furfuracea* (Pers.) Zahlbr., in H.G.A.Engler & K.A.E.Prantl, *Nat. Pflanzenfam.*, 1, 1: 138 (1905)

Lecidea furfuracea Pers., in C.Gaudichaud, *Voy. Uranie, Bot.* 192 (1827). T: ‘Marianna Island’ [Northern Mariana Is.], C.Gaudichaud; lecto: PC, *vide* L.Brako, *Fl. Neotropica Monogr.* 55: 46 (1991).

For further synonymy see Brako (1991).

Illustrations: T.D.V.Swincow & H.Krog, *Lichenologist* 13: 232, fig. 26 (1981), as *P. haemophaea*; L.Brako, *op. cit.* 45, fig. 19d; E.Timdal & H.Krog, *Mycotaxon* 77: 79, fig. 10 (2001).

Thallus crustose to areolate, effuse, formed by the prothallus and 1) partly by minute round to irregular areolae, ±contiguous and sometimes appearing as a continuous crust and 2) partly by isidia developing directly from the prothallus; isidia usually dominating. Prothallus indistinct to well developed, white to reddish brown. Areolae c. 0.05–0.10 mm wide, adnate, ±isodiametric, plane to weakly convex, medium to dark green, glabrous or rarely pubescent along the margins. Isidia usually abundant, moderately thick, subglobose to cylindrical, medium to dark green, often with a brown tinge, glabrous, simple to branched or sometimes coralloid, often curved, decumbent to ascending. Upper cortex of type 2, 5–15 µm thick. Apothecia common, to 2 mm wide, irregular in outline, usually conglomerate, convex, pale brown to dark reddish brown, immarginate or with an indistinct often slightly paler glabrous or pubescent (especially when young) margin. Proper exciple pale brown. Epithemium pale brown. Hymenium colourless. Hypothecium pale brown in the lower part, reddish brown above. Ascospores simple, narrowly ellipsoidal, 7–13 × 2–3 µm. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV+ blue-white; containing furfuraceic acid (also known as haemophaein or furfuracein).

Occurs in eastern Qld and south-eastern N.S.W., on the bark of various trees and on moist rocks in rainforest or coastal forest. This pantropical species is also known from North, Central and South America, Africa, the Mascarene Islands, South and East Asia, the western Pacific (including Lord Howe Island) and Papua New Guinea. Map 62.

Qld: Charleys Ck, 18 km NNE of Proserpine, *J.A.Elix 21002 & H.Streimann* (CANB); Mount Spec State Forest, Paluma Ra., 6 km W of Paluma, *H.Streimann 37019* (CANB). N.S.W.: Misty Mountain Rd, Currowan State Forest, 23 km NW of Batemans Bay, *H.Streimann 37876* (CANB).

This species is characterised by the crustose to areolate thallus, copious isidia and the presence of furfuraceic acid.

12. *Phyllopsora homosekikaica* Elix, *Australas. Lichenol.* 59: 25 (2006)

T: Mount Spec State Forest, Paluma Ra., 6 km W of Paluma, Qld, 19°01'S, 146°09'E, on sapling in Lauraceae-*Syzygium*-dominated forest, 18 June 1986, *J.A.Elix 20241 & H.Streimann*; holo: BRI; iso: CANB, HO, O.

Illustrations: J.A.Elix, *op. cit.* 28, figs 5, 6.

Thallus crustose, formed by the prothallus and by isidia developing directly from the prothallus; isidia dominating. Prothallus well developed, white to reddish brown or black. Isidia abundant, to 0.8 mm tall, 30–80 µm wide, pale to dark green, often with a brown tinge, glabrous, simple to branched or sometimes coralloid, subcylindrical, often curved, decumbent to ascending. Apothecia common, 1–2 mm wide, ±round to irregular in outline, ±conglomerate, convex, pale brown to dark cinnamon-brown, immarginate or with an indistinct or often slightly darker margin that is paler or pubescent when young. Proper exciple brown to brown-black. Epithymenium pale brown. Hypothecium reddish brown in the lower part, golden yellow above. Ascospores simple, narrowly ellipsoidal, 7–11 × 2–3 µm. Pycnidia not seen. Fig. 3D.

Chemistry: Cortex and medulla K–, C–, KC+ red, P–; containing homosekikaic acid (major), hyperhomosekikaic acid (major).

This endemic species is rare in eastern Qld; grows on the bark of trees in rainforest and coastal forest. Map 63.

Qld: Conway State Forest, 18 km E of Proserpine, *J.A.Elix 20203 & H.Streimann* (CANB).

Phyllopsora homosekikaica is characterised by the crustose to areolate thallus, copious isidia and the presence of homosekikaic and hyperhomosekikaic acids.

13. *Phyllopsora isidiotyla* (Vain.) Riddle, *Mycologia* 15: 81 (1923)

Lecidea isidiotyla Vain., *Étud. Class. Lich. Brésil* 2: 49 (1890). T: Lafayette, Minas Gerais, Brazil, 1885, *E.A.Vainio, Lich. Bras. Exs. No. 222*; holo: TUR-V 22634; iso: BM, M, UPS, ZT.

Illustration: L.Brako, *Fl. Neotropica Monogr.* 55: 45, fig. 19f (1991).

Thallus crustose to areolate or subsquamulose, effuse, formed by the prothallus and by minute granular to irregular areolae and by isidia developing directly from the prothallus; isidia usually dominating. Prothallus well developed, white to pale reddish brown. Areolae c. 0.05–0.10 mm wide, granular to elongate, plane to weakly convex, dark green or pale to dark brown, ±delicately fibrillose. Isidia usually abundant, thin, irregularly cylindrical and finely branched. Upper cortex of type 1, 5–10 µm thick. Apothecia common, 0.5–1.0 mm wide, ±rounded to irregular in outline, scattered, solitary, concave to slightly convex, yellow-brown; margin raised, usually paler than the disc, pubescent, with abundant pale projecting fibrils. Proper exciple yellow-brown to pale at the margin. Epithymenium yellow-brown to red-brown. Hymenium yellow-brown. Hypothecium yellow-brown to red-brown. Ascospores simple, ellipsoidal to short-fusiform, 7.5–12.5 × 2.0–3.5 µm. Pycnidia uncommon, superficial, tan to yellow-brown. Conidia bacilliform, straight, 11–12 × 0.5–1.0 µm.

Chemistry: Cortex and medulla K⁻, C⁻, KC⁻, P⁻; containing atranorin (minor or trace), \pm zeorin (minor).

Rare on the bark of trees in monsoon vine forest in northern N.T. Also known from North, Central and South America. Map 64.

N.T.: 19 km ENE of Jabiru, Arnhem Land, *H.Streimann 42195* (CANB).

Characterised by the areolae to 0.1 mm wide, the dominant, irregularly cylindrical, finely branched isidia, abundant pale fibrils on the margins of the apothecia and by the presence of atranorin and zeorin.

14. *Phyllopsora kiiensis* (Vain.) Gotth.Schneider, *Biblioth. Lichenol.* 13: 177 (1980)

Lecidea kiiensis Vain., *Bot. Mag. (Tokyo)* 35: 67 (1921). T: Kii Prov., Japan, on *Ilex rotunda*, 30 Dec. 1911, *Yasuda 268*; holotype: TUR-V n.v.

Illustration: E.Timdal & H.Krog, *Mycotaxon* 77: 79, fig. 12 (2001).

Thallus effuse, squamulose. Prothallus well developed, white to red-brown. Squamules 0.1–0.5 mm wide, adnate to ascending, isodiametric to slightly elongate, scattered when young, later often contiguous or imbricate, crenulate to incised, plane to weakly convex, medium green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common on squamule margins, cylindrical, simple or branched. Upper cortex of type 2, 15–30 μ m thick. Apothecia rather common, to 2.0 mm wide, rounded when young, later irregular in outline, usually conglomerate, plane to moderately convex, pale to mid-brown, with an indistinct slightly paler glabrous to faintly pubescent margin. Proper exciple pale brown to colourless. Epihymenium colourless. Hypothecium pale brown to yellow-brown. Ascospores simple, narrowly ellipsoidal to short-bacilliform, 6.5–11.5 \times 2.0–3.0 μ m. Pycnidia not seen.

Chemistry: Cortex and medulla K⁻, C⁻, KC⁻, P⁻, UV⁺ blue-white; containing furfuraceic acid (also known as haemophaein, furfuracein).

Occurs in eastern Qld and N.S.W.; on the bark of various trees in rainforest or coastal forest. Also in East Africa and Japan. Map 65.

Qld: Lannercost State Forest, 30 km W of Ingham, *J.A.Elix 38259* (CANB); Yamanie Section, Girringun Natl Park, 14 km WNW of Abergowrie, *J.A.Elix 38481* (CANB). N.S.W.: Long Beach, 3 km E of Batemans Bay, *J.A.Elix 2939* (CANB).

This species is characterised by the squamulose thallus with comparatively small to medium-sized squamules, marginal, cylindrical, simple or branched isidia and by the presence of furfuraceic acid.

15. *Phyllopsora methoxymicareica* Elix, *Australas. Lichenol.* 59: 25 (2006)

T: Clyde Mtn, 20 km SE of Braidwood, N.S.W., 35°35'S, 149°57'E, on base of *Eucalyptus viminalis* in wet-sclerophyll forest, 14 Feb. 1989, *J.A.Elix 22773*; holotype: CANB.

Illustrations: J.A.Elix, *op. cit.* 29, figs 7, 8.

Thallus crustose, formed by prothallus and by isidia developing directly from the prothallus; isidia dominating. Prothallus well developed, white to reddish brown. Isidia abundant, 0.1–0.2 mm tall, 15–20 μ m thick, subcylindrical, pale green, often with a brown tinge, glabrous, branched and densely coralloid, often curved, decumbent or ascending. Apothecia common, 0.5–1.2 mm wide, \pm round to irregular in outline, solitary or conglomerate; disc plane to weakly convex, pale yellow-orange to pale tan or orange-brown, with a paler margin in young apothecia, becoming immarginate. Proper exciple pale yellow-orange. Epihymenium orange-brown. Hypothecium pale brown in the lower part, orange-brown above. Ascospores simple, narrowly ellipsoidal, 10–14 \times 3–5 μ m. Pycnidia not seen. Fig. 4A.

Chemistry: Cortex and medulla K⁻, C⁻, KC⁻, P⁻; containing methoxymicareic acid (major), hydroxymicareic acid (trace).

Known only from the type locality in south-eastern N.S.W. Map 66.

Phyllopsora methoxymicareica is characterised by the dominant isidia, the comparatively broad, ellipsoidal ascospores and the unique medullary chemistry. In overall morphology this species closely resembles densely isidiate forms of *P. furfuracea*. However, the latter has narrowly ellipsoidal ascospores ($7\text{--}13 \times 2\text{--}3 \mu\text{m}$), and it contains furfuraceic acid.

16. *Phyllopsora neofoliata* Elix, *Australas. Lichenol.* 59: 26 (2006)

T: Max Nicholls Track, Lord Howe Is., $31^{\circ}31'08''\text{S}$, $159^{\circ}03'03''\text{E}$, on tree in lowland forest, 20 June 1992, *J.A.Elix* 32714; holotype: CANB.

Illustrations: J.A.Elix, *op. cit.* 29, figs 9, 10.

Thallus squamulose, effuse, to 5 cm wide. Prothallus well developed, white. Squamules 0.3–0.8 mm wide, adnate at first, isodiametric, plane to weakly convex, crenate-incised to digitate-incised, imbricate, later ascending, lacking isidia but becoming lacinulate. Upper surface yellow-green to pale green, glossy or often becoming finely pubescent along the squamule margins. Lacinules common, growing from the lobe apices or margins, initially subglobose, becoming elongate and \pm imbricate. Upper cortex of type 2, 5–15 μm thick. Apothecia common, 0.5–1.5 mm wide, solitary or conglomerate; disc plane to convex, pale yellow-orange to pale tan or orange-brown, \pm darker in the centre, immarginate or with a distinctly paler margin that is pubescent at least in some immature apothecia. Proper exciple pale orange-tan. Epihymenium golden yellow. Hypothecium intensely golden yellow. Ascospores simple, narrowly ellipsoidal, $10\text{--}15 \times 2\text{--}3 \mu\text{m}$. Pycnidia not seen. Plate 9.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV+ blue-white; containing furfuraceic acid (major), \pm physodic acid (minor or trace).

Known from rainforest and coastal forest in eastern Qld, N.S.W. and Lord Howe Island. Map 67.

Qld: Bloomfield R., 56 km N of Mossman, *H.Streimann* 45710 *p.p.* (CANB). N.S.W.: Saltwater, E of Taree, *J.A.Elix* 3993 (CANB); Misty Mountain Rd, Currowan State Forest, 23 km NW of Batemans Bay, *J.A.Elix* 22750 (CANB).

Phyllopsora neofoliata is characterised by the squamulose thallus and the presence of lacinules and furfuraceic acid. It resembles *P. foliata*, but it can be distinguished by the shorter ascospores (10–15 μm cf. 11–18 μm long), the non-proliferating lacinules (these densely proliferating and imbricate in *P. foliata*), and the presence of furfuraceic acid (*P. foliata* lacks lichen substances).

17. *Phyllopsora ochroxantha* (Nyl.) Zahlbr., *Cat. Lich. Univ.* 10: 377 (1939)

Lecidea ochroxantha Nyl., *Ann. Sci. Nat., Bot.*, sér. 4, 11: 223 (1859). T: Campolicans, Bolivia, 1847, Weddell; lecto: H-NYL 20489, *vide* T.D.V.Swincow & H.Krog, *Lichenologist* 13: 243 (1981).

For further synonymy see Brako (1991).

Illustration: L.Brako, *Fl. Neotropica Monogr.* 55: 6, fig. 1f (1991).

Thallus squamulose, effuse. Prothallus indistinct to well developed in part, white to red-brown. Squamules 0.3–1.0 mm wide, adnate to ascending, isodiametric to elongate, scattered when young, later often contiguous or imbricate, crenulate to incised, plane to weakly convex, medium green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common, laminal or marginal, globose to cylindrical, simple, rarely branched. Upper cortex of type 2, 15–25 μm thick. Apothecia rather common, to 1.5 mm wide, rounded when young, becoming irregular in outline, mostly solitary, plane to moderately convex, pale to mid-brown, with an indistinct darker glabrous to slightly pubescent margin. Ascospores simple, narrowly ellipsoidal, $6.5\text{--}12.0 \times 2.5\text{--}3.5 \mu\text{m}$. Pycnidia not seen.

Chemistry: Cortex and medulla K–, C–, P+ orange; containing phyllopsorin (major), chlorophyllopsorin (minor), argopsin (trace), pannarin (trace), methyl 2,7-dichloropsoromate (trace).

Very rare on bark in strand vegetation in north-eastern Qld; also in North, Central and South America. Map 68.

Qld: between Spring Ck and Charleys Ck, 23 km WSW of Proserpine, *J.A.Elix 21136* & *H.Streimann* (CANB); Cape Tribulation, Cape Tribulation Natl Park, 44 km NNE of Mossman, *H.Streimann 45767* (CANB).

This lichen is characterised by the medium-sized, adnate to ascending squamules, the dense, laminal or marginal, globose to cylindrical isidia and by the presence of phyllopsorin and chlorophyllopsorin.

18. *Phyllopsora parvifolia* (Pers.) Müll.Arg., *Bull. Herb. Boissier* 2, App. 1: 90 (1894) var. *parvifolia*

Lecidea parvifolia Pers., in C.Gaudichaud, *Voy. Uranie Bot.* 192 (1827). T: Rio de Janeiro, Brazil, C.Gaudichaud; holo: PC n.v.; iso: BM, G.

For further synonymy see Brako (1991).

Illustration: L.Brako, *Fl. Neotropica Monogr.* 55: 9, fig. 3c (1991).

Thallus squamulose to subfoliose; subfoliose thalli to more than 10 cm wide. Prothallus thick, usually well developed, white to reddish brown. Squamules minute, 0.5–1.0 mm wide, ±compressed and adnate to slightly ascending, forming a ±placodioid thallus, imbricate, plane to convex, lacinulate, yellow-green, green or pale green, glabrous or finely pubescent along the margins; isidia absent. Lacinules imbricate, ±densely coralloid. Upper cortex of type 1–2, 30–60 µm thick. Apothecia common, 0.5–1.5 mm diam., crowded, rounded to irregular in outline, plane to convex, tan to reddish brown; margin concolorous with the disc or darker, smooth or distinctly pubescent. Proper exciple pale brown. Epithymenium colourless. Hypothecium pale brown. Ascospores simple, rarely 1-septate, narrowly ellipsoidal to short-fusiform, 8–13 × 2–3 µm. Pycnidia common, tan, partly immersed in the thallus. Conidia bacilliform, straight, c. 9 × 1 µm.

Chemistry: Cortex and medulla K–, C–, KC–, P–, UV–; no lichen substances detected.

Occurs on the bark of trees in rainforest and coastal forest in eastern Qld and N.S.W. Also in North, Central and South America and on islands in the Pacific Ocean (New Caledonia, the Hawaiian Islands, Tahiti and Juan Fernández). Map 69.

Qld: Blencoe Ck, Cardwell Ra., 48 km NW of Cardwell, *J.A.Elix 20110* (CANB); Lowood, 1890, *F.R.M.Wilson* (H). N.S.W.: between Majors Ck and Araluen, Braidwood area, *W.A.Weber & D.McVean L-47095* (COLO).

Phyllopsora parvifolia is characterised by the upper cortex of type 1–2, tan to reddish brown apothecia with a darker margin, the prominent white to red-brown prothallus, ellipsoidal to fusiform ascospores and the absence of lichen substances. It has larger squamules than *P. foliata* (0.5–1.0 cf. 0.3–0.8 mm), shorter ascospores (8–13 cf. 11–20 µm) and a pale brown hypothecium (straw-yellow to golden yellow in *P. foliata*).

19. *Phyllopsora rappiana* (Brako) Elix, *Australas. Lichenol.* 58: 6 (2006)

Phyllopsora corallina var. *rappiana* Brako, *Fl. Neotropica Monogr.* 55: 42 (1991). T: Myakka River State Park, Sarasota Co., Florida, U.S.A., 16 Aug. 1985, *L.Brako 8229*; holo: NY; iso: CANB.

Thallus squamulose, effuse. Prothallus indistinct to partly well developed, white to red-brown. Squamules 0.1–0.5 mm wide, adnate to ascending, isodiametric to elongate, scattered when young, later often contiguous or imbricate, crenulate to incised, plane to weakly convex, mid-green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common, laminal or marginal, globose to cylindrical, usually simple, rarely branched. Upper cortex of type 2, 15–25 µm thick. Apothecia rather common, 0.5–1.5 mm wide, rounded when young, later irregular in outline, mostly solitary, plane to moderately convex, pale to mid-brown, with an indistinct darker glabrous to slightly pubescent margin. Proper exciple colourless to pale brown, ±with patches of reddish brown pigment. Epithymenium colourless. Hypothecium pale yellow-brown. Ascospores simple, narrowly ellipsoidal, 6.5–10.0 × 2.5–3.5 µm. Pycnidia not seen.

Chemistry: Cortex and medulla K+ pale yellow, C-, P+ pale yellow; containing atranorin (major), parvifoliellin (major).

Occurs in northern N.T., eastern Qld and N.S.W., on bark in monsoon and coastal forest. Also known from North, Central and South America. Map 70.

N.T.: Charles Darwin Natl Park, Winnellie, 6 km E of Darwin, *J.A.Elix 36870* (CANB); 19 km ENE of Jabiru, Arnhem Land, *H.Streimann 42219* (CANB). Qld: Conway State Forest, 18 km ENE of Proserpine, *J.A.Elix 20201* & *H.Streimann* (CANB). N.S.W.: Buckenbowra R. estuary, 7.5 km W of Batemans Bay, *J.A.Elix 23341* (CANB).

This species is characterised by the squamulose thallus with rather small to medium-sized squamules, the laminal or marginal, globose to cylindrical, simple or rarely branched isidia and by the presence of atranorin and parvifoliellin.

20. *Phyllopsora santensis* (Tuck.) Swinscow & Krog, *Lichenologist* 13: 236 (1981)

Lecidea santensis Tuck., *Amer. J. Arts Sci.*, ser. 2, 25: 428 (1858). T: Santee Canal, Berkeley Co., South Carolina, U.S.A., 1849, *H.W.Ravenel 182*; holo: FH-TUCK *n.v.*

For further synonymy see Brako (1991) and Swinscow & Krog (1981).

Illustrations: T.D.V.Swinscow & H.Krog, *op. cit.* 237, fig. 30; L.Brako, *Fl. Neotropica Monogr.* 55: 11, fig. 5a, b (1991).

Thallus squamulose, effuse. Prothallus indistinct to partly well developed, white to red-brown. Squamules 0.3–1.0 mm wide, adnate to ascending, isodiametric to elongate, scattered when young, later often contiguous or imbricate, crenulate to incised, plane to weakly convex, medium green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common, laminal or marginal, globose to cylindrical, usually simple, rarely branched. Upper cortex of type 2, 15–25 μm thick. Apothecia rather common, 0.8–1.5 mm wide, rounded when young, later irregular in outline, mostly solitary, plane to moderately convex, pale to mid-brown, with an indistinct darker glabrous to slightly pubescent margin. Proper exciple pale brown, tinged red in patches. Epihymenium and hypothecium colourless. Ascospores simple, narrowly ellipsoidal to fusiform, 7–13 \times 2.5–3.0 μm . Pycnidia common, partly immersed in the thallus, tan, yellow-brown or orange-brown. Conidia bacilliform, 11–14 \times 1.0–1.5 μm .

Chemistry: Cortex and medulla K-, C-, P+ orange; containing argopsin (major), norargopsin (minor), atranorin (minor).

This species is rare on bark in monsoon vine forest in the N.T.; also in North and Central America and in Asia. Map 71.

N.T.: Florence Falls, Litchfield Natl Park, 27 km WSW of Batchelor, *J.A.Elix 27542*, *H.T.Lumbsch* & *H.Streimann* (CANB).

Phyllopsora santensis is characterised by the squamulose thallus with medium-sized, adnate to ascending squamules, dense laminal or marginal, globose to cylindrical, simple to rarely branched isidia and by the presence of argopsin and norargopsin.

21. *Phyllopsora swinscowii* Timdal & Krog, *Mycotaxon* 77: 88 (2001)

T: along the path from Plaine Champagne towards Piton de la Petite Rivière Noire, Black R., Mauritius, 20°25'S, 57°25'E, 1991, *H.Krog* & *E.Timdal MAU9/50*; holo: O.

Illustration: E.Timdal & H.Krog, *op. cit.* 65, fig. 1.

Thallus squamulose, effuse. Prothallus well developed, red-brown. Squamules 0.3–0.8 mm wide, adnate to ascending, isodiametric to somewhat elongate, scattered when young, later sometimes contiguous or imbricate, crenulate to incised, plane to weakly convex, green, glabrous on the upper side, usually faintly pubescent along the margins. Isidia common, marginal on the squamules, thin to moderately thick, often long, simple to sparingly branched. Upper cortex of type 1–2, 20–40 μm thick. Apothecia common, 0.5–1.5 mm wide, rounded when young, later irregular in outline, mostly solitary, plane to strongly convex, mid-brown to dark brown, with an indistinct concolorous pubescent or glabrous margin.

Proper exciple colourless to pale brown. Epithymenium and hypothecium colourless. Ascospores simple, narrowly ellipsoidal, $6.0\text{--}9.5 \times 2.0\text{--}2.5 \mu\text{m}$. Pycnidia not seen.

Chemistry: Medulla K⁻, C⁻, P⁺ orange; containing methyl 2,7-dichloropsoromate (major), methyl 2,7-dichloronorpсорomate (major).

Occurs on bark in montane rainforest and coastal forest in eastern Qld; also in South America, East Africa and Mauritius. Map 72.

Qld: Christmas Pocket, 16 km NW of Kuranda, *J.A.Elix 17574* & *H.Streimann* (CANB); Rocky Ck, 4 km NE of Nambour, *J.A.Elix 35503* (CANB).

Phyllopsora swinscowii is characterised by the squamulose thallus with medium-sized squamules, the presence of elongate-cylindrical, usually simple isidia at the margins of the squamules and methyl 2,7-dichloropsoromate and methyl 2,7-dichloronorpсорomate in the medulla.

Doubtful and Excluded Names

Phyllopsora canoumbrina (Vain.) Brako, *Mycotaxon* 35: 12 (1989)

Reported from Queensland as *P. parvifolia* var. *subgranulosa* (Tuck.) Müll.Arg. by J.Müller (*Bot. Jahrb. Syst.* 20: 264, 1894). However, no material has been seen, and the report is almost certainly erroneous.

Phyllopsora parvifolia var. *fibrillifera* (Nyl.) Müll.Arg., *Bull. Soc. Roy. Bot. Belgique* 32: 131 (1893)

Lecidea parvifolia var. *fibrillifera* Nyl., *Ann. Sci. Nat., Bot.*, sér. 4, 15: 47 (1861). T: New Caledonia, *E.Vieillard 1790*; holo: H-NYL 20528.

Reported from Australia by J.Müller (*loc. cit.*). However, the type material is fragmentary and in poor condition, and it could not be identified with certainty (Swinscow & Krog, 1981; Brako, 1991). TLC demonstrated the presence of fatty acids, but these have not been observed in any of the Australian *Phyllopsora* specimens examined.

Phyllopsora parvifolia var. *granulosa* (Müll.Arg.) Müll.Arg., *Bot. Jahrb. Syst.* 20: 264 (1894)

Psora parvifolia var. *granulosa* Müll.Arg., *Flora* 65: 327 (1882); *Lecidea parvifolia* var. *granulosa* (Müll.Arg.) Shirley, *Proc. Roy. Soc. Queensland* 6: 166 (1889). T: Java, [Indonesia], *F.W.Junghuhn*; holo: G; iso: L.

Shirley (1889) reported this taxon from Toowoomba, Queensland. However, the type material is fragmentary and in poor condition, and it could not be identified with certainty (Swinscow & Krog, 1981; Brako, 1991). The specimen is probably referable to *P. confusa* Swinscow & Krog.

Phyllopsora subhyalina (Stirt.) Zahlbr., *Cat. Lich. Univ.* 4: 401 (1926)

Lecidea subhyalina Stirt., *Trans. & Proc. Roy. Soc. Victoria* 17: 77 (1881). T: Waterloo, Gippsland, Vic., *H.Paton*; holo: BM.

Thallus white, thin, ±minutely squamulose. Prothallus absent. Apothecia 0.5–1.0 mm wide, translucent golden yellow, plane at first and scarcely marginate, becoming convex to almost globular; proper margin excluded. Exciple colourless, lacking fibrils; hypothecium colourless, gelatinised. Ascospores simple, broadly ellipsoidal to ovate, $12\text{--}20 \times 6\text{--}9 \mu\text{m}$. No lichen substances detected.

This anomalous species cannot be accommodated in *Phyllopsora*.

3. PHYSCIDIA

Physcidia Tuck., *Proc. Amer. Acad. Arts Sci.* 5: 399 (1862); a derivative of *Physcia* because of their superficial resemblance. *Physcia* originated from the Greek *physké*, used to describe the large intestine, a sausage or a blister and referring to thalli with hollow lobes (effectively a misnomer since species such as '*Physcia physodes*' [= *Hypogymnia physodes*] are no longer included in the genus).

Lecto: *P. wrightii* (Tuck.) Tuck.

Thallus squamulose or foliose. Squamules 0.1–1.0 mm wide, or lobes 1–3 mm wide. Isidia present or absent; lacinules and soredia absent. Upper cortex 10–50 μm thick, of types 1 or 1–2. Photobiont a unicellular green alga (*Pseudochlorella*); cells 5–15 μm diam., forming a continuous layer. Medulla usually well developed, 60–450 μm thick, of \pm densely irregularly interwoven non-amyloid thick-walled hyphae, frequently containing lichen substances. Lower cortex absent. Prothallus present or absent. Apothecia biatorine or zeorine, sessile, simple or aggregated, attached laminally to the lobes; disc \pm round, plane to convex, whitish, pale brown to dark brown. Proper exciple composed of conglutinated radially orientated hyphae, pale tan to brown; usually surrounded by a thalline sheath that appears \pm crenulate, so that the apothecium can be pseudolecaneorine. Epihymenium indistinct or a thin gelatinous layer with slight pigmentation, K–. Hymenium colourless, 20–60 μm thick, amyloid. Hypothecium colourless. Paraphyses 1.5–2.5 μm thick, not or only slightly thickened at the apex. Asci clavate, with a distinct amyloid apical dome, an axial mass and ocular chamber. Ascospores simple or 1–3-septate, filiform or bacilliform, colourless, 15–40 \times 1.2–3.0 μm , thin-walled. Conidiomata pycnidial, 0.1–0.3 mm wide, immersed or raised in small corticate warts, occasionally in groups of 2–4; outer wall tan to reddish brown; ostiole flesh-coloured or with a distinct reddish tinge; conidiogenous cells enteroblastic, cylindrical to flask-shaped, arising directly from pycnidial wall cells, of type III (*sensu* G.Vobis, 1980). Conidia bacilliform to filiform, straight or curved, 10–30 \times 0.5–1.2 μm .

A pantropical genus, currently containing seven species, one of which occurs in Australia. These lichens are found in tropical forests where they grow primarily on bark, but also on decorticated wood and overgrowing bryophytes.

G.Vobis, Bau und Entwicklung der Flechten-Pycnidien und ihrer Conidien, *Biblioth. Lichenol.* 14: 1–141 (1980); K.Kalb & J.A.Elix, The lichen genus *Physcidia*, *Biblioth. Lichenol.* 57: 265–296 (1995).

***Physcidia australasica* Kalb & Elix, *Biblioth. Lichenol.* 57: 281 (1995)**

T: Dicks Tableland, c. 10 km SE of Eungella, c. 60 km W of Mackay, Qld, in rainforest with *Toona australis*, *Stenocarpus sinuatus* and *Archontophoenix cunninghamiana*, 29 Aug. 1992, K. & A.Kalb 26640; holo: CANB.

Thallus foliose, orbicular to irregular, loosely attached, lobate, to 6 cm wide, on a white byssoid prothallus. Lobes 0.3–1.0 mm wide, anisotomically branched, plane to convex, often separate at the \pm concave rounded and flabellate apices, contiguous in the centre or throughout. Upper surface greenish to green-grey or yellow-brown, isidiate. Isidia laminal, very sparse to abundant, cylindrical, constricted at the base, simple or branched, 0.2–3.0 mm tall, 0.1–0.2 mm wide. Upper cortex 25–50 μm thick; algal layer 25–50 μm thick; medulla 120–250 μm thick, colourless. Lower surface ecorticate, whitish at the lobe tips, pale brown towards the centre. Apothecia usually present, 0.5–1.5 mm wide, laminal, scattered, \pm round in outline, constricted at the base; disc initially plane, then weakly convex, whitish, pale pink, pale brown or brown, when young always surrounded by \pm crenulate thalline lobules that dissipate with age. Ascospores 1–3-septate, filiform, 23–37 \times 1.8–2.0 μm . Pycnidia laminal, pale pink to brownish, c. 0.2 mm wide, wart-like to partly immersed, sometimes several becoming confluent. Conidia straight or slightly curved, 18–23 \times 1.0–1.2 μm . Plate 10.

Chemistry: Medulla K+ pale yellow, C+ red, KC+ red, P+ yellow; containing divaricatic acid (major), alectorialic acid (minor), nordivaricatic acid (trace).

Occurs on the bark of trees in hinterland rainforest in north-eastern Qld; also in Papua New Guinea. Map 73.

Qld: Kirrima State Forest, Cardwell Ra., 24 km WNW of Cardwell, *J.A.Elix 15709* & *H.Streimann* (CANB); Mount Windsor Tableland, 45 km NW of Mossman, *J.A.Elix 16441* & *H.Streimann* (CANB); Koombooloomba Dam road, 23 km SE of Ravenshoe, *H.Streimann 28936* (CANB, H, US).

This species is characterised by the foliose thallus with cylindrical isidia, the narrow, elongate, 1–3-septate ascospores and by the presence of divaricatic and alectorialic acids.

4. TRICLINUM

Triclinum Fée, *Essai Crypt. Écorc.* 147 (1825); from the Latin *triclinium* (a three-sided couch), in reference to the three thalline layers: upper surface, hypothallus and prothallus.

Type: *T. cinchonarum* Fée

Squamacidia Brako, *Mycotaxon* 35: 6 (1989). T: *S. janeirensis* (Müll.Arg.) Brako [= *T. cinchonarum* var. *janeirensis* (Müll.Arg.) Elix]

Thallus squamulose. Squamules 0.2–0.5 (–1.0) mm wide, rounded to elongate and incised, grey-green, plane to convex, ascending or not, with isidia or soredia. Upper cortex 20–60 µm thick, of type 1, consisting of anticlinally thick-walled hyphae with narrow cylindrical lumina, containing lichen substances. Photobiont a unicellular green alga; cells 5–15 µm diam., forming a continuous layer. Medulla poorly developed, of loosely woven non-amyloid hyphae, containing lichen substances, white to off-white, straw-yellow, yellow-orange or scarlet. Lower cortex absent; squamules attached to the hypothallus by branched rhizoids. Prothallus white to black. Apothecia biatorine, sessile, solitary or aggregated, laminal on the squamules; disc ±round, plane to convex, pale brown to orange-brown or dark reddish brown. Proper exciple cup-shaped, composed of hyphae with broad lumina at the margin, containing refractile granules, K–. Epihymenium indistinct. Hymenium colourless, c. 80 µm thick, amyloid. Hypothecium pale brown, K–. Paraphyses 1.5–2.0 µm wide, slightly thickened at the apex. Asci elongate-clavate, with a well-developed tholus and a paler narrow conical axial mass. Ascospores simple or 2–3-septate, filiform, colourless, smooth-walled, 24–40 × 0.8–2.5 µm. Conidiomata pycnidial, immersed or superficial, spherical; outer wall tan to reddish brown; ostiole pale to brown; conidiogenous cells enteroblastic, cylindrical to flask-shaped, arising directly from pycnidial wall cells, or in groups of 2 or 3 at the tips of short conidiophores that arise from the wall cells. Conidia bacilliform, straight, 9–15 × 0.5–1.0 µm.

Triclinum is a pantropical and subtropical genus of two species, one of which occurs in Australia. These lichens grow on bark in coastal forest and rainforest.

L.Brako, Reevaluation of the genus *Phyllopsora*, with taxonomic notes and introduction of *Squamacidia*, gen. nov., *Mycotaxon* 35: 1–19 (1989); L.Brako, *Phyllopsora* (Bacidiaceae), *Fl. Neotropica Monogr.* 55: 1–66 (1991); P.M.Jørgensen, Conspectus familiae Pannariaceae (Ascomycetes lichenosae), *Ilicifolia* 4: 1–78 (2003); J.A.Elix, Additional lichen records from Australia. 56, *Australas. Lichenol.* 58: 4–13 (2006); J.A.Elix, Additional lichen records from Australia. 62, *Australas. Lichenol.* 60: 6–12 (2007); A.Aptroot, W.Saipunkaew, H.J.M.Sipman, L.B.Sparrius & P.A.Wolseley, New lichens from Thailand, mainly microlichens from Chiang Mai, *Fungal Diversity* 24: 75–134 (2007).

***Triclinum cinchonarum* Fée, *Essai Crypt. Écorc.* 148 (1825)**

Psoroma cinchonarum (Fée) Müll.Arg., *Flora* 68: 516 (1885). T: Peru, ad corticem truncorum et ramorum annosorum *Cinchonae lancifoliae*, *J.C.Mutis*; lecto: the illustration in A.L.A.Fée, *Essai Crypt. Écorc.* tab. 33, fig. 4 (1825), *vide* P.M.Jørgensen, *Ilicifolia* 4: 76 (2003).

Physcidia endococcinea Zahlbr., *Denkschr. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl.* 83: 159 (1909); *Squamacidia janeirensis* (Müll.Arg.) Brako var. *endococcinea* (Zahlbr.) Brako, *Mycotaxon* 35: 10 (1989). T: Itaipericira, near Barra Mansa, São Paulo, Brazil, 9 June 1901, *Schiffner*; holotype: W.

Squamules 0.3–0.5 (–1.0) mm wide, elongate and incised, plane, contiguous or imbricate, adnate to ascending. Upper surface glabrous, pubescent along the margins. Prothallus white. Isidia cylindrical; soredia absent. Photobiont cells 10–15 µm diam. Apothecia common, 0.5–2.5 mm wide; margin raised, paler than the disc. Ascospores 24–40 × 2.0–2.5 µm. Pycnidia not seen in Australian specimens.

The two Australian varieties are separated by thallus chemistry.

Medulla straw-yellow to orange-yellow or scarlet; secalononic acid A present
..... **a. *T. cinchonarum* var. *cinchonarum***
Medulla whitish; secalononic acid A absent **b. *T. cinchonarum* var. *janeirensis***

a. *Triclinum cinchonarum* Fée var. *cinchonarum*

Medulla straw-yellow to orange-yellow or scarlet.

Chemistry: Cortex and medulla K⁺ pale yellow to yellow-brown, C⁻, P⁻ or P⁺ orange-red; containing atranorin (major, minor or trace), lobaric acid (major), secalononic acid A (major), norlobaric acid (minor), furfuraceic acid (minor), unknown pigment (minor), ±fumarprotocetraric acid (major).

Known from north-eastern Qld; rare on the bark of trees in coastal and hinterland rainforest. Also in Central and South America. Map 74.

Qld: Conway State Forest, 18 km E of Proserpine, *J.A.Elix 20780 & H.Streimann* (CANB).

Triclinum cinchonarum var. *cinchonarum* is characterised by the pigmented medulla and the presence of lobaric acid and secalononic acid A, ±fumarprotocetraric acid.

b. *Triclinum cinchonarum* Fée var. *janeirensis* (Müll.Arg.) Elix, *Fl. Australia* 57: 651 (2009)

Thalloidimia janeirensis Müll.Arg., *Hedwigia* 31: 280 (1892); *Squamacidia janeirensis* (Müll.Arg.) Brako var. *janeirensis*, *Mycotaxon* 35: 8 (1989). T: Rio de Janeiro, Brazil, *Portella s.n.*; holotype: BM; isotype: G.

Illustrations: L.Brako, *op. cit.* 5, fig. 2C; 7, figs 3A–E, as *Squamacidia janeirensis*.

Medulla white to off-white.

Chemistry: Cortex and medulla K⁺ pale yellow-brown or K⁻, C⁻, P⁺ orange-red or P⁻; containing lobaric acid (major), norlobaric acid (minor), ±fumarprotocetraric acid (major).

This variety is known from northern N.S.W. where it is rare on the bark of trees in hinterland rainforest. Common in Central and South America and in East Asia. Map 75.

N.S.W.: Robinsons Knob Trail, New England Natl Park, 72 km E of Armidale, *A.W.Archer P967* (CANB); track to Wrights Lookout, New England Natl Park, 72 km E of Armidale, *H.Streimann 47847* (B, CANB).

This variety is characterised by the white or off-white medulla and the presence of lobaric acid and ±fumarprotocetraric acids.