



FISSURINA ¹

Gintaras Kantvilas ²

Fissurina Fée, *Méth. Lich.*: 35 (1824).

Type: *F. dumastii* Fée

Thallus crustose, with a well-developed cortex of periclinal hyphae; calcium oxalate sometimes present. Photobiont *Trentepohlia*, with cells ellipsoid to subglobose, 8–20 × 6–12 μm, mostly in short chains. Ascomata apothecia, lirelliform, immersed, originating in cracks in the thallus, with a margin of enveloping thalline tissue that sometimes swells to form distinct lips. Disc slit-like, not exposed. Proper exciple not (or rarely very slightly) carbonised, generally poorly developed, sometimes with spinous or warty periphysoids. Hypothecium hyaline, poorly differentiated. Hymenium hyaline, non-amyloid, not inspersed. Asci elongate-clavate, 4–8-spored, of the *Graphis*-type: non-amyloid, with a slightly thickened apex and ± truncate ascoplasm. Paraphyses simple, straight and parallel; apices hyaline, occasionally warty or spinous. Ascospores ovoid to broadly ellipsoid, transversely septate or muriform, hyaline, 1– or 1+ pale blue, with a thick, gelatinous halo; locules round to lens-shaped. Conidiomata unknown. Chemistry: mostly depsidones, especially stictic acid, psoromic acid and related compounds.

A genus of approximately 50–60 species, found mostly on bark (rarely on rocks), especially in tropical and warm temperate latitudes. The combination of the generally non-carbonised exciple, paraphyses and periphysoids with spinous apices, and the broadly ellipsoid, prominently halonate ascospores with round to lens-shaped locules, distinguish it from other lirellate members of the family Graphidaceae. The most closely related genus is *Acanthothecis*, which also has a non-carbonised exciple and paraphyses with spinous apices, but which differs by having an ecorticate thallus, and ellipsoid to oblong ascospores with cylindrical to lens-shaped lumina. The Tasmanian species of the genus are usually best recognised by the swollen lips of the lirellae. Observations and measurements of ascospores should only be made on sections mounted in water, as other media can cause excessive swelling of the halo. Several Tasmanian herbarium collections, including one from rock, remain unidentified.

Key references: Staiger & Kalb (1999); Staiger (2002); Archer (2009); Kantvilas (2010).

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| 1 | Lirellae persistently slit-like, with slightly carbonised lips, seen as a thin black line when viewed at low-power magnification | 2 |
| | Lirellae soon developing markedly swollen lips, entirely non-carbonised | 3 |
| 2(1) | Containing psoromic acid-type compounds; area of thallus around the lirellae P+ yellow
Lacking substances detectable by spot tests or TLC | 1 <i>F. elixii</i>
3 <i>F. nigririmis</i>
var. <i>deficiens</i> |
| 3(1) | Containing stictic acid, albeit in trace amounts
Lacking substances detectable by TLC | 4 <i>F. triticea</i>
2 <i>F. insidiosa</i> |

1 This work can be cited as: Kantvilas G (2023). *Fissurina*, **version 2023:1**. In MF de Salas (Ed.) *Flora of Tasmania Online*. 4 pp. (Tasmanian Herbarium, Tasmanian Museum and Art Gallery: Hobart). <https://flora.tmag.tas.gov.au/lichens/genera/fissurina/> (accessed 21 September 2022).

2 Tasmanian Herbarium, Tasmanian Museum & Art Gallery, PO Box 5058, UTAS LPO, Sandy Bay, TAS 7005, Australia.

1 *Fissurina elixii* (A.W.Archer) A.W.Archer

Telopea 11: 71 (2005); —*Graphis elixii* A.W.Archer, *Australas. Lichenol.* 43: 16 (1998).

Thallus pale olive-grey, glossy, continuous, cracked, 40–100 µm thick, forming irregular, diffuse patches to 60 mm wide; calcium oxalate absent. Lirellae scattered, simple, straight or slightly curved, 0.5–2 mm long, arising as a crack in the thallus, with the cortex turned upwards to form a pair of lips 0.3–0.5 mm wide, gaping a little to reveal the upper edge of the slightly carbonised exciple; disc usually obscured. Exciple in section poorly differentiated from adjacent tissues, laterally and basally 10–20 µm thick, hyaline to yellowish, apically to 40–70 µm thick, brown-black to olive-black, unchanged in K; periphysoids usually numerous, 2.5–4 µm thick, with apices smooth. Hypothecium 10–20 µm thick. Hymenium 80–120 µm thick; asci 6–8-spored, 70–100 × 17–25 µm; paraphyses 1.5–2 µm wide, with apices minutely spinous. Ascospores uniseriate in the ascus when young, later irregularly biseriate, 1+ pale blue when mature, broadly ellipsoid with rounded apices, transversely 3-septate, (15–)16–21.2–26 × 8–9.4–11 µm; halo 1–3 µm thick; locules initially lens-shaped, soon becoming rounded.

Chemistry: 2-methoxypsoromic (major) and 2'-O-demethyl-2-methoxypsoromic (minor); the thallus is generally too thin for reliable spot tests although a P+ yellow reaction can be achieved at the lirellae. On TLC plates, the two compounds appear like psoromic and conpsoromic acids, and their identification relies on HPLC.

Recorded from the trunks of *Anopterus glandulosus* and *Tasmannia lanceolata* in relict stands of *Atherosperma*-dominated rainforest in south-eastern Tasmania. The species is also known from eastern New South Wales where it is apparently uncommon. *Fissurina elixii* is distinguished from the other Tasmanian species of the genus by the presence of psoromic acid-type compounds. The slightly carbonised exciple is very similar to that seen in *F. nigririmis* var. *deficiens*.

Track to Cape Surville, 42°57'S 147°59'E, 150 m, 2009, G. Kantvilas 295/09 (HO); MacGregor Peak summit, 42°59'S 147°57'E, 590 m, 2020, G. Kantvilas 145/20 (HO).

2 *Fissurina insidiosa* C.Knight & Mitt.

Trans. Linn. Soc. London 23: 102 (1860).

Thallus dull grey to dingy olive-grey, glossy, continuous, usually cracked, 20–100 µm thick, forming rather widespreading, usually diffuse patches to c. 10 cm wide; calcium oxalate present. Lirellae scattered, usually very numerous, simple or occasionally furcate, straight, curved or sinuous, to 2.5 mm long, initially arising as a crack in the thallus, with the cortex edges curved upwards to form a pseudo-margin, eventually developing a pair of swollen, pale beige-brown, often cracked and scabrid lips 0.3–0.5(–0.9) mm wide; disc obscured. Exciple in section poorly differentiated from adjacent tissues, 10–30 µm thick, yellow, K+ orange-red; periphysoids very rarely observed, c. 3 µm thick, not warty. Hypothecium 10–20 µm thick. Hymenium 90–120 µm thick; asci (6–)8-spored, 85–110 × 18–25 µm (few intact asci observed); paraphyses 1–1.5 µm wide, with apices not expanded, neither warted nor spinous. Ascospores uniseriate in the ascus when young, 1–, broadly ellipsoid with rounded apices, transversely 3-septate, (13–)14–17.5–22(–25) × 6–7.3–9 µm; halo to 4 µm thick, swelling markedly in K; locules initially lens-shaped, soon becoming rounded.

Chemistry: nil.

A widespread species, recorded from mainland Australia, New Zealand, the Pacific, the Caribbean and India. Common and widespread in western Tasmania in rainforest, where it colonises smooth-barked twigs and young trunks of many tree and shrub species in the understorey. It also persists into later stages of succession and can form extensive thalli on older trees with rough, gnarled bark. It is distinguishable from *F. triticea* only by the absence of lichen compounds. Two collections from north-western Tasmania, from a site subsequently logged in 1981, remain problematical and may represent a distinct taxon. They accord with *F. insidiosa* with respect to general morphology, ecology and thallus chemistry, but have significantly longer and wider ascospores, 20–22.9–28 × 8–9.4–11 µm, with the halo 3–7 µm wide.

Butler Island Camp, Gordon River, 42°34'S 145°41'E, 3 m, 1976, J.M. Gilbert 76/61 (HO); Weindorfers Forest, 41°38'S 145°56'E, 1000 m, 1988, G. Kantvilas 15/88 (BM, HO); Tayatea Road, Spur 14, 41°11'S 145°11'E, 240 m, 1982, G. Kantvilas 267/82 (BM, HO).

3 *Fissurina nigririmis* (Nyl.) Müll.Arg. var. *deficiens* (A.W.Archer) A.W.Archer

Telopea 11: 71 (2005); —*Graphis nigririmis* (Nyl.) Müll.Arg. var. *deficiens* A.W.Archer, *Austral. Syst. Bot.* 14: 264 (2001).

Thallus pale olive-grey, glossy, continuous, unevenly verruculose, mostly 20–70 µm thick, delimited by a black, marginal prothallus; calcium oxalate present. Lirellae scattered, simple or occasionally furcate, straight or curved, to 2 mm long, arising as a crack in the thallus, soon forming prominent, elongate thalline verrucae to c. 0.5 mm thick and to 1.2 mm wide, persistently corticate at the margins, but with the upper edge of the slightly carbonised exciple visible as a thin, grey-black line; disc pale greyish, usually obscured. Exciple in section poorly differentiated from adjacent tissues, laterally and basally c. 10 µm thick, yellowish, K+ orange, apically to 40 µm thick, brown-black, unchanged in K; periphysoids not observed. Hypothecium 10–20 µm thick. Hymenium 90–120 µm thick; asci 8-spored, 80–100 × 17–25 µm; paraphyses 1–1.5 µm wide, with apices minutely warted. Ascospores uniseriate in the ascus when young, I+ pale blue, broadly ellipsoid with rounded apices, transversely 3-septate, 15–19–22 × 9–10.8–13 µm; halo c. 1 µm thick; locules initially lens-shaped, soon becoming rounded.

Chemistry: nil.

Rare in Tasmania where it has been recorded from trunks of *Pomaderris apetala* in relict stands of *Atherosperma*-dominated rainforest in south-eastern Tasmania. The habitat is considered at risk because, as for *F. elixii*, it represents small, relict patches of rainforest in an otherwise fire-prone, sclerophyll-dominated landscape. It also occurs in Victoria where it is likewise uncommon. This species is distinguished from the other Tasmanian species of the genus by the slightly carbonised lirellae that remain slit-like and do not form swollen lips. It is most similar to *F. elixii*, which differs by containing psoromic acid-type compounds.

Bun Hill, Forestier Peninsula, 42°58'S 147°56'E, 320 m, 1989, G. Kantvilas 323/89 (HO); Sandspit River, 42°43'S 147°51'E, 170 m, 2010, G. Kantvilas 95/10 (HO); MacGregor Peak summit, 42°59'S 147°57'E, 590 m, 2020, G. Kantvilas 145/20 (HO).

4 *Fissurina triticea* (Nyl.) Staiger

Biblioth. Lichenol. 85: 156 (2002); —*Graphis triticea* Nyl., *Acta Soc. Sci. Fenn.* 7: 470 (1863).

Identical morphologically and anatomically to *F. insidiosa* except for the slightly larger ascospores, 15–19.3–24(–26) × 6–7.8–10 µm, and the presence of stictic and hypostictic acids, often in very trace amounts; spot tests are generally unreliable although the thicker parts of the thallus in the vicinity of the ascomata can display a P+ orange reaction. The name *F. triticea* is applied with some caution: differences in ascospore size between the two taxa, as cited by other authors, can be misleading because the ascospores vary in size in the course of their development. As in other species of the genus, the halo can swell greatly or be stripped away altogether. This is a widespread pantropical species, reported from mainland Australia and New Zealand. Tasmanian records are mainly from the extensive rainforests of the north-west where the species occurs as an understorey epiphyte on a variety of host trees and shrubs. It appears to be much less common than *F. insidiosa*.

Near Rapid River, 41°16'S 145°19'E, 220 m, 1982, G. Kantvilas 588 (HO); Savage River Pipeline Road, 41°12'S 145°19'E, 410 m, 2003, G. Kantvilas 702/03 (HO); Pieman Road near Huskisson River, 41°44'S 145°29'E, 180 m, 1989, G. Kantvilas 22/89 (HO).

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