

Key to the *Byssoloma* species (lichenised *Ascomycota*, *Pilocarpaceae*) known from Macaronesia

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Abstract: A key to the 11 species of *Byssoloma* known from Macaronesia is provided. Short notes on substrata, distribution in Macaronesia and worldwide, as well as relevant literature references are added.

Zusammenfassung: Die 11 bisher aus Makaronesien bekannten *Byssoloma*-Arten werden geschlüsselt. Kurze Angaben über die Substrate, die Verbreitung in Makaronesien und weltweit, sowie relevante Literaturangaben werden beigelegt.

The genus *Byssoloma* is characterised by a $\pm$ byssoid exciple, an amyloid tubular structure in the ascus apex (*Byssoloma*-type sensu HAFELLNER 1984), and mostly pyriform conidia (LÜCKING 2008). It comprises 59 species (LÜCKING, pers.com.), most of which occur on leaves in the tropics.

During examination of *Byssoloma* collections from the island of Madeira (BREUSS 2012, 2013, 2014) species descriptions and keys widely distributed in the literature have been used. As a result, a compilation of Macaronesian species is herewith presented.

Currently 11 species of *Byssoloma* are known from Macaronesia, two of which (*Byssoloma kalbii* SÉRUS. and *B. laurisilvae* BREUSS) seem to be endemic to Madeira because they had not been recorded from anywhere else.

Key to the *Byssoloma* species of Macaronesia

- 1 Spores 11–20-septate, 40–70 μ m long, tapering towards one end; apothecial margin smooth or finely pulverulent and shortly byssoid 2
- 1* Spores 3–7-septate, shorter 3
- 2 Apothecial discs brownish grey to dark brown or blackish, often with olive or bluish tinge; hypothecium brownish to orange brown, 100–160 μ m thick; pycnidia pale orange or bluish to blackish blue *B. kakouettae*
- 2* Apothecial discs yellowish to ochre; hypothecium 35–50 μ m thick, colourless; pycnidia white *B. laurisilvae*

- 3 Apothecia very small, usually less than 0.3 mm diam., apothecial margin byssoid but indistinct and disappearing in old apothecia 4
- 3* Apothecia larger, 0.3–0.6(–0.8) mm diam., apothecial margin byssoid or smooth, usually distinct..... 6
- 4 Apothecia tiny, 0.05–0.1 mm; margin very thin; pycnidia abundant, globose, whitish to bluish grey, N+ red; mature ascospores unknown ***B. diderichii***
- 4* Apothecia 0.1–0.3(–0.4) mm..... 5
- 5 Apothecia 0.15–0.2(–0.3) mm; discs almost white when young, becoming brownish when old; excipulum thin, almost absent in old apothecia; ascospores 3-septate; pycnidia abundant, globose, sessile, white or pale brownish..... ***B. kalbii***
- 5* Apothecia 0.1–0.3(–0.4) mm; discs at first chamois or rose-orange, soon brown orange to dark brown, with violet tinge; margin thin, disappearing in old apothecia, with colourless or brown crystals; ascospores 3-septate; pycnidia rare, globose, sessil, brown..... ***B. croceum***
- 6 Apothecial margin smooth or shortly byssoid..... 7
- 6* Apothecial margin distinctly byssoid (composed of free hyphae), but sometimes thin or becoming excluded in old apothecia..... 8
- 7 Apothecial margin with a compact appearance due to a gelatinous matrix embedding the hyphae, without crystals, thin but distinct, pale grey; discs dark brown and often with a purplish tinge; ascospores 3-septate ***B. marginatum***
- 7* Apothecial margin smooth or shortly byssoid; excipulum composed of short hyphae at the margin, inner part paraplectenchymatous (composed of polyhedral brown cells); apothecial discs variable in colour (bluish grey to blackish when young, becoming brown or greenish grey when mature, sometimes with a piebald mixture of these colours), margin usually paler than the disc in old apothecia; ascospores 3–5(–7)-septate..... ***B. llimonae***
- 8 Apothecial margin comparatively thin but distinct, barely spreading laterally over the thallus surface; excipulum and epihymenium inspersed with crystals ***B. maderense***
- 8* Apothecial margin thick, spreading laterally over the thallus surface; excipulum and epihymenium without crystals..... 9
- 9 Apothecial discs pure black; thallus at least marginally dispersed into rounded patches; apothecial margin pure white ***B. subdiscordans***
- 9* Apothecial discs brownish grey to dark brown; thallus continuous or effuse; apothecial margin chamois-coloured 10

- 10 Ascospores 3-septate, $10\text{--}18 \times 2.5\text{--}4\ \mu\text{m}$ ***B. leucoblepharum***
 10* Ascospores 5(–7)-septate, $18\text{--}28 \times 3.5\text{--}5.5\ \mu\text{m}$ ***B. vezdanum***

Species list

***Byssoloma croceum* SÉRUS. & PUNTILLO**

Substrata: Leaves, bark. – Distribution in Macaronesia: Canary Islands, Madeira. – World distribution: Macaronesia, Italy (Calabria). – Reference: SÉRUSIAUX (1998).

***Byssoloma diderichii* SÉRUS.**

Substratum: Leaves. – Distribution in Macaronesia: Madeira. – World distribution: Macaronesia, France. – Reference: SÉRUSIAUX (1998).

***Byssoloma kakouettae* (SÉRUS.) LÜCKING & SÉRUS.**

≡ *Bapalmuia kakouettae* SÉRUS.,

= *Byssoloma aptrootii* SÉRUS.

Substrata: Leaves, bark. – Distribution in Macaronesia: Canary Islands, Madeira. – World distribution: Macaronesia, France (Pyrenees), Italy (Campania). – References: SÉRUSIAUX (1993, 1996, 1998), ETAYO (1998), SÉRUSIAUX et al. (2002), BREUSS (2014).

***Byssoloma kalbii* SÉRUS.**

Substratum: Fern leaves. – Distribution in Macaronesia: Madeira. – World distribution: Madeira. – Reference: SÉRUSIAUX (1996).

***Byssoloma laurisilvae* BREUSS**

Substratum: Leaves. – Distribution in Macaronesia: Madeira. – World distribution: Madeira. – References: BREUSS (2013, 2014).

***Byssoloma leucoblepharum* (NYL.) VAIN.**

Substrata: Leaves, bark. – Distribution in Macaronesia: Azores, Canary Islands, Madeira. – World distribution: pantropical, subtropical-temperate. – References: TAVARES (1952), SANTESSON (1952), HERNÁNDEZ-PADRÓN et al. (1987), APTROOT (1989), ARVIDSSON (1990), ETAYO (1996, 1998), SÉRUSIAUX (1996), PIŠÚT (2009), SCHUMM & APTROOT (2013) (belongs to *B. maderense*), BREUSS (2014, 2016).

***Byssoloma llimonae* SÉRUS., GÓMEZ-BOLEA, LONGÁN & LÜCKING**

Substrata: Bark, leaves. – Distribution in Macaronesia: Canary Islands, Madeira. – World distribution: Macaronesia, Spain. – References: SÉRUSIAUX et al. (2002), BREUSS (2014).

***Byssoloma maderense* BREUSS**

Substrata: Leaves, bark. – Distribution in Macaronesia: Azores, Canary Islands, Madeira.

World distribution: Macaronesia, southeastern USA, mediterranean and suboceanic Eurasia. – References: BREUSS (2014, 2016).

***Byssoloma marginatum* (ARNOLD) SÉRUS.**

= *Tapellaria similis* KALB

Substrata: Leaves, bark. – Distribution in Macaronesia: Azores, Canary Islands, Madeira. – World distribution: cosmopolitan. – References: KALB & HAFELLNER (1992), ETAYO (1996, 1998), SÉRUSIAUX (1996), BERGER & APTROOT (2002), BOOM & ERTZ (2002).

***Byssoloma subdiscordans* (NYL.) P. JAMES**

= *B. rotuliforme* (MÜLL.ARG.) R. SANT.

Substrata: Leaves, rarely bark. – Distribution in Macaronesia: Azores, Canary Islands, Madeira. – World distribution: cosmopolitan. – References: TAVARES (1952), SANTESSON (1952), CHAMPION (1976), FOLLMANN & HERNÁNDEZ-PADRÓN (1978), PURVIS & JAMES (1993), ETAYO (1998), SÉRUSIAUX (1996), PIŠÚT (2009), SCHUMM & APTROOT (2013).

***Byssoloma vezdanum* SÉRUS.**

Substrata: Bark, mosses over bark. – Distribution in Macaronesia: Madeira. – World distribution: pantropical. – References: BREUSS (2012, 2014).

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