BUNODOPHORON

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[From *Flora of Australia* volume 58A (2001)]

Bunodophoron A.Massal., *Mem. Imp. Reale Ist. Veneto Sci.* 10: 76 (1861); probably derived from the Greek *bounos* (a heap or mound) and the suffix *-phorum* (-carrier); referring to the fertile branches which carry the black sooty mazaedia.

Sphaerophorus subg. *Bunodophorus* (A.Massal.) Ohlsson, *in* L.Tibell, *Beih. Nova Hedwigia* 79: 682 (1984).

Type: *B. australe* (Laurer) A.Massal.

Thallus ±dorsiventrally flattened or, in a few species, ±terete. Cortex 45–130 µm thick, composed of thick-walled fused hyphae oriented in various directions; upper surface grey, greyish green or brownish green, rarely almost white; lower surface white (in most species) or yellowish. Apothecia terminal, or (rarely) laminal on the underside of the fertile branches. Ascomatal ontogeny angiocarpic; exciple disintegrating but, usually, enclosing the mazaedium until maturity. Thalline receptacle lost early, or at least partially persisting throughout development. Mazaedia oriented subapically or ventrally. Ascospores globose, very rarely subglobose, 4–21 µm diam., greyish to reddish brown, rarely almost hyaline, with a dark uneven ornamentation consisting of an amorphous substance adhering to the wall after the ascospores have been released from the asci, greenish to greyish in KOH, reddish in HNO_3; ornamentation dissolving in KOH. Pycnidia pale brownish to black. Conidia simple, bacilliform to oblong, rarely slightly obovate, hyaline.

Chemistry: Medulla K– or K+ yellow; C–; P– or P+ yellowish to red, I–. Sphaerophorin (UV+ white) or related substances occur in most species. One or several ß-orcinol depsidones occur in almost all species, and usnic acid-related substances, most commonly isousnic acid, occur in several. A number of dibenzofurans occur frequently, in addition to several unidentified substances.

A genus of c. 30 species, restricted to wet-temperate areas and to montane rainforest in tropical and subtropical areas; 14 species in Australia. Most are epiphytes in the temperate rainforest of the Southern Hemisphere; some also rarely occur on rocks or on the ground. A few species are found in highly oceanic areas in the Northern Hemisphere. Several species have specific ecological requirements, resulting in ±being restricted to certain vascular plant communities (Kantvilas & Wedin, 1992; Wedin, 1995).

M.Wedin, Ascocarp and spore ontogeny of two *Sphaerophorus* species, *Nordic J. Bot.* 10: 539–545 (1990); M.Wedin, Spore ontogeny of *Sphaerophorus diplotypus* and *S. fragilis*, *Syst. Assoc. Special Vol.* 43: 245–251 (1991); G.Kantvilas & M.Wedin, A new species of *Sphaerophorus* (Caliciales) with a revised key to the genus in Tasmania, *Nova Hedwigia* 54: 493–502 (1992); M.Wedin, Taxonomic and distributional notes on the genus *Sphaerophorus* (Caliciales) in the Southern Hemisphere, *Lichenologist* 24: 119–131 (1992); J.A.Elix, D.A.Venables & M.Wedin, New dibenzofurans and depsides from the lichen *Bunodophoron patagonicum*, *Austral. J. Chem.* 47: 1335–1344 (1994); M.Wedin, *Bunodophoron melanocarpum*, comb. nov. (Sphaerophoraceae, Caliciales *s. lat.*), *Mycotaxon* 55: 383–384 (1995).

1 Thallus hollow ..... **3. B. diplotypum**

1: Thallus solid 2

2 Cortex containing isousnic acid as major substance (thallus usually ±yellowish)*(1:)* 3

2: Cortex lacking isousnic acid as major substance (thallus usually not ±yellowish) 4

3 Ascospores grey to dark grey, often with a bluish tinge, 6.5–9.5 (–11) µm diam.; fertile branches with ±coralloid terminal branchlets*(2)* ..... **12. B. ramuliferum**

3: Ascospores brownish grey to reddish brown, 9–13.5 (–16.5) µm diam.; thallus slender, usually not coralloid ..... **10. B. notatum**

4 Medulla containing protocetraric acid (P+ [orange-] red, + faint yellow when in low amounts)*(3:)* 5

4: Medulla lacking protocetraric acid (P– or P+ [yellow-] orange due to stictic acid complex)..... 10

5 Young mazaedia covered by white thalline receptacle*(4)* 6

5: Young mazaedia exposed, not covered by a white thalline receptacle 7

6 Ascospores (12–) 15–18 (–21) µm diam.; mazaedia exposed through a ±round hole in the receptacle*(5)* ..... **14. B. tibellii**

6: Ascospores (7.5–) 11–13.5 (–16.5) µm diam.; mazaedia exposed through irregular cracks in the receptacle ..... **7. B. insigne**

7 Ascospores 5.5–11.5 µm diam.; thallus containing sphaerophorin*(5:)* 8

7: Ascospores 10–14 (–16.5) µm diam.; thallus not containing sphaerophorin 9

8 Thallus basally flattened with narrow subterete slender branches along the margin; supporting branches thicker, subterete, sometimes with short isidioid outgrowths*(7)*..... **2. B. coomerense**

8: Thallus flattened, without differentiated supporting branches, with a few flattened basal sterile branchlets..... **6. B. imshaugii**

9 Main branches crowded and rather richly divided, with major laterals branching in a ±palmate arrangement; margins of branches and ascomata often fringed by small branchlets*(7:)*..... **9. B. murrayi**

9: Main branches sparingly divided, with occasional regularly tapering flattened lateral branchlets; margins of branches smooth and entire; ascomata often fringed by a few regularly tapering branchlets ..... **4. B. flaccidum**

10 Ascomata with prominent hemispherical to conical broadly flaring thalline receptacle; fertile branches basally ±broadly flattened, with subterete or tapering supporting branches carrying apothecia*(4:)* 11

10: Ascomata without very pronounced thalline receptacle; all parts of the thallus ±flattened..... 12

11 Ascospores 7.5–11 µm diam.; thallus greyish to ±brownish green, not or only lightly pruinose; contains sphaerophorin and stictic acid complex*(10)* ..... **8. B. macrocarpum**

11: Ascospores (9.5–) 10.5–13 (–14.5) µm diam.; thallus ±greyish, usually pruinose in younger parts; contains 4-*O*-methylhypoprotocetraric acid..... **13. B. scrobiculatum**

12 Thallus lacking stictic acid complex (P–); ascospores reddish brown, (9–) 10–13.5 (–17.5) µm diam.*(10:)* ..... **11. B. patagonicum**

12: Thallus containing stictic acid complex (P+ [yellow-]orange); ascospores brownish grey, dark grey or hyaline, (5.5–) 6.5–7.5 (–9) µm diam. 13

13 All parts of the thallus slightly flattened, repeatedly branched throughout, lacking isidioid outgrowths*(13:)* ..... **1. B. australe**

13: Supporting branches ±slender, subterete; thallus sparingly branched, often with isidioid outgrowths on upper surface ..... **5. B. formosanum**