
Barssia maroccana

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Barssia maroccana G. Moreno, Manjón, Carlavilla & P. Alvarado, *sp. nov.*

Etymology. From the Berber *Mur N'Akush* ('land of God'), which is presently known as Morocco, the country where this species was collected.

Hypogenous ascomata 1.7–5.3 × 1.5–2.5 cm (measurements taken from herbarium material), irregularly globose or subglobose to elongated and flattened, more or less broadly lobed, reddish brown to dark reddish brown, sometimes with a rounded to irregular apical depression. *Peridium* covered with broad, roughly polygonal dark reddish brown warts; about 140–200 µm thick, formed by pseudo-parenchymatic cells, 12–50 µm diam, thick-walled. The outermost cell layers are reddish and have dark walls, while these become lighter inwards. *Gleba* whitish to pale pinkish, compact or frequently presenting small labyrinth-like cavities, with well-defined sinuous veins, formed by a prosenchymatic structure of interwoven hyphae 8–15 µm diam. Sinuose *paraphyses* not well-defined, 5–7 µm diam. *Asci* clavate to broadly ellipsoid, indehiscent, immersed into the gleba, forming a definite hymenium, hyaline, hardly observable in mature ascomata, 8-spored, 110–130 × 30–50 µm. *Ascospores* ellipsoidal, 29–36 × (16–)18–22 µm, hyaline, smooth, not amyloid or dextrinoid, with an obtuse apex and a large oil droplet (L/l = 1.6–1.7). Smell and taste not recorded.

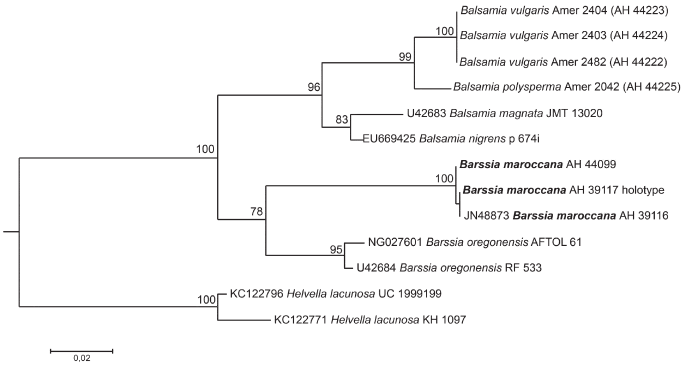
Habitat & Distribution — So far found only under *Cedrus atlantica*, at Ifrane, Morocco, 1 760 m asl.

Typus. Morocco, Azrou, province of Ifrane, *Cedrus atlantica* forest, 18 Nov. 2010, *M.A. Sanz*, *J. Álvarez*, *P. Alvarado & J.L. Manjón* (holotype AH 39117; ITS sequence GenBank KM243649, LSU sequence GenBank KM243655, MycoBank MB809666); Ifrane, *Cedrus atlantica* forest, 18 Nov. 2010, *M.Á. Sanz*, *P. Alvarado & J.L. Manjón*, paratype AH 39116; ibid., AH 44221; Ifrane, *Cedrus atlantica* forest with some *Quercus ilex* species, 1760 m asl, *J.L. Manjón*, *J. Álvarez-Jiménez & M.Á. Sanz*, 21 Feb. 2014, paratype AH 44099 (ITS, LSU sequences GenBank KM243648, KM243654).

Additional specimens examined. *Balsamia vulgaris*: Italy, Reggio Emilia, Regnano, *Quercus* and *Pinus* mixed forest, 450 m asl, 11 Dec. 2005, *A. Montecchi*, Amer 2482 = AH 44222 (ITS, LSU sequences GenBank KM243645, KM243651); Reggio Emilia, Rio delle Viole, *Quercus pubescens* forest, 350 m asl, 9 Dec. 2002, *A. Montecchi*, Amer 2404 = AH 44223 (ITS, LSU sequences GenBank KM243646, KM243652); Reggio Emilia, Montalvo, *Quercus pubescens* forest, 350 m asl, 21 Apr. 2003, *A. Montecchi*, Amer 2403 = AH 44224 (ITS, LSU sequences GenBank KM243647, KM243653). *Balsamia polysperma*: Italy, Reggio Emilia, Monte Duro, *Ostrya* and conifers, 650 m asl, 14 Dec. 1999, *A. Montecchi*, Amer 2042 = AH 44225 (ITS, LSU sequences GenBank KM243650, KM243656).

Notes — *Barssia maroccana* is morphologically characterised by its large and broad spores with obtuse apex, growing under *Cedrus atlantica*. The deviant phylogenetic placement of this lineage was first reported by Alvarado et al. (2011). *Barssia maroccana* is very similar to *Balsamia polysperma*, but the latter has smaller ascomata 0.5–2(–3) cm diam, with narrower ellipsoidal spores, 18–25 × 9–16 µm, L/l = 1.6–1.7, and different ecology (Montecchi & Sarasini 2000). The monotypic genus *Barssia* was created by Gilkey (1925) to accommodate the American species *B. oregonensis*. This species was originally found in Oregon and the Pacific Northwest of the USA (Trappe 1979), but later reports cited it also in Poland (Ławrynowicz & Skirgiełło 1984). *Barssia oregonensis* differs from *B. maroccana* because of its ascomata being excavated with a deep apical depression covered by the peridium, and smaller spores about 24–29 × 14.5–17 µm, L/l = 1.6–1.7, and a different ecology (Ławrynowicz & Skirgiełło 1984). The only other species in the genus, *Barssia yezomontana*, with globose spores (Trappe 1979), was combined into *Barssia* from the monotypic genus *Phymatomyces*. Unfortunately, the type specimen of *P. yezomontanus* was lost in World War II (Gilkey 1961) and it is therefore not possible to confirm this taxonomic decision until this Japanese taxon is recollected.

Gilkey (1925) placed the genus *Barssia* in the family *Tuberaceae*, but later Trappe (1979) transferred it to the family *Balsamiaceae*. Kimbrough et al. (1996) performed an ultrastructural study of *Barssia* and concluded it should be classified within the family *Helvellaceae*. Later Percudani et al. (1999) put *Balsamia* and *Barssia* back into the family *Balsamiaceae*, which was nested within *Helvellaceae*. Macro- and microscopical differences between *Balsamia* and *Barssia* are very subtle. Gilkey (1925) highlights the apical depression observed in *B. oregonensis*, and compares it to the analogous structures present in *Genea*, *Pseudobalsamia* (currently considered a synonym of *Balsamia*), *Pachyphloeus* and *Hydnotrya*. The similarities between *Barssia* and *Balsamia* are also commented on by Montecchi & Sarasini (2000). Glebal chambers, smooth spores under the light microscope, and the presence of paraphyses are shared by both genera. The present molecular data confirm that both genera are monophyletic, with the new species from Morocco being better accommodated within *Barssia*.



Phylogenetic tree of *Helvellaceae* species constructed with a maximum likelihood (ML) analysis of LSU sequences by running RAxML-HPC2 on XSEDE online v. 8.0.24. *Helvella lacunosa* (KC122796 and KC122771) is the outgroup. Bootstrap support values ≥ 75 % are given above branches. The phylogenetic position of *Barssia maroccana* is indicated in **bold**.

Colour illustrations. Morocco, Ifrane, forest of *Cedrus atlantica* where the holotype was collected; ascomata; peridium and gleba; detail of the outermost layer of the peridium with pseudoparenchymatic structure; prosenchymatic gleba, asci and ascospores; ascospores (holotype AH 39117). Scale bars = 1 cm (ascomata), 100 µm (cortex), 20 µm (pseudoparenchymatic and prosenchymatic cells), 10 µm (ascus and spores).

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