

Elaphomyces bucholtzii



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***Elaphomyces bucholtzii* Saitta, A. Paz, E. Otsing & Tedersoo, sp. nov.**

Etymology. Dedicated to the Estonian mycologist Feodor Vladimirovic Bucholtz, for his contribution on taxonomy of hypogeous fungi.

Classification — *Ophiocordycipitaceae*, *Hypocreales*, *Hypocreomycetidae*, *Sordariomycetes*.

Ascomata globose, 2–5 cm diam. **Peridial surface** with obtuse warts of various heights, pale yellow-brown, irregular at the base. Warts formed by very intertwined, sinuous, thick-walled hyphae, yellow pigmented, joined together by a series of layers of parallel hyphae, with very short segments, thin-walled, almost hyaline, guttulate. Base of the warts with transitional hyphae to the peridium. **Peridium** thick, distinctly marbled, forming elliptical irregular spots, paler on the outer part, darker in the middle towards gleba, lightly purple with cerebriform appearance, originating by the intense pigmentation in the walls of some hyphae. Peridium consisting of narrow hyphae, 2.2–4.5 µm wide, sinuous, interlaced with slight thickenings, slightly pigmented on the walls of the hypha towards the surface of the ascoma, accentuating towards the gleba, irregularly intercalated by layers of hyphae pigmented in all structures that intersect, giving the marmorised effect. **Asci** subglobose, 35–55 × 40–65 µm, with (1–)3–4(–5) spores. **Spores** globose, 21–25(–28) µm diam, ornamented by curved canes, 1.4–2.2 µm high, apices confluent and forming small irregular meshes.

Typus. ESTONIA, Viru-Jaagupi, Vinni, mixed forest of *Corylus avellana*, *Quercus robur* and *Tilia cordata*, 108 m asl, 59.291956, 26.434087, 9 Sept. 2016, *E. Otsing* (holotype TU 126183; ITS sequence GenBank MK685345, isotype in herb. pers. A. Paz, IC09091627, MycoBank MB832926).

Additional materials examined. ESTONIA, Polli, mixed forest of *Q. robur*, *Picea abies*, *T. cordata*, *C. avellana*, 76 m asl, 30 Aug. 2016, *E. Otsing* (TV126157, UDB032813, IC30081623); Pugriisa, mixed forest of *T. cordata*, *Q. robur*, *C. avellana*, *P. abies*, *Betula pendula*, *Salix caprea*, 78 m asl, 31 Aug. 2016, *E. Otsing* (TV126165, UDB032814, IC31081615); Järni, mixed forest of *T. cordata*, *Q. robur*, *C. avellana*, 129 m asl, 9 Sept. 2016, *E. Otsing* (TV126187, UDB032816, IC09091628). – NORWAY, Oppedgård, mixed forest of *Quercus* sp. and *C. avellana*, 110 m asl, 13 Oct. 2011, *A. Molia* (AM153, IC13111117).

Colour illustrations. *Elaphomyces bucholtzii*, habitat. Ascomata; ascospores, asci. Scale bars = 10 µm (ascospores and asci), 10 mm (ascomata).

Notes — Macroscopically *Elaphomyces bucholtzii* closely resembles the *E. muricatus* group, being differentiated by the variable height of its cortex warts. Moreover, a section of the peridium is marbled, forming ellipsoidal (of cerebriform aspect) patches on a purple background, unlike the *E. muricatus* group that has a peridium marmorised in circles on a light background (white-cream), and the spores are decorated by thick, very curved sticks that usually form loops. A recently described European species *E. barrioi* (Paz et al. 2017) has a marmorised peridium in red-purple tones forming small ellipses, on a vinous background, a dark brown gleba with red tones and smaller spores than *E. bucholtzii*. Another species of the group is *E. decipiens*, but its cortex presents flat warts that are slightly oxidised after manipulation, a purple vinous peridium with cream-white veins arranged radially outward from the ascoma (Paz et al. 2017). *Elaphomyces violaceoniger* has a dark violet peridium and some spores decorated with canes that are joined at maturity by drawing plaits, that clearly distinguishes this species from all the others in the *E. muricatus* group (Paz et al. 2017). Macroscopically *Elaphomyces bucholtzii* can be placed in sect. *Elaphomyces* subsect. *Muricati*.

Phylogenetically *E. bucholtzii* is distinct from other species but grouped with two specimens: one from Spain, deposited as *Elaphomyces* sp. LM34 (GenBank KM576395), and one from the USA originally identified as *E. cf. decipiens* SE-2015 (GenBank KT275644). Analysing the percentage of similarity index of *E. bucholtzii* with other species of sect. *Muricati*, we obtained 95.24 % of similarity with *E. barrioi*; 92.87 % with *E. quercicola*; 92.71 % with *E. muricatus*; 91.65 % with *E. violaceoniger* and 91.64 % with *E. decipiens*.

Phylogenetic analyses were carried out online at <http://phylogeny.lirmm.fr/> (Dereeper et al. 2008). Multiple sequence alignments were carried out with MUSCLE v. 3.7 (Edgar 2004). Phylogenetics analysis with the maximum likelihood (ML) was performed with PHyML v. 3.0 (Guindon et al. 2010). Trees were constructed using TreeDyn v. 198.3 (Chevenet et al. 2006) and edited with Adobe Photoshop and Inkscape v. 0.91 (<https://inkscape.org/fr/>). The alignment and tree are deposited in TreeBASE (stud S25226).

Alessandro Saitta, Department of Agricultural, Food and Forest Sciences, University of Palermo, Viale delle Scienze, Palermo, 90128, Italy; e-mail: alessandro.saitta@unipa.it

Leho Tedersoo & Eveli Otsing, Department of Botany, Institute of Ecology and Earth Sciences, University of Tartu, 40 Lai St., 51005 Tartu, Estonia; e-mail: leho.tedersoo@ut.ee & eveli.otsing@gmail.com

Aurelia Paz-Conde, Agropacio Micologica Berguedana, carrera Vall-Ter 791, apto. correos 6, 17455, Girona, Spain; e-mail: ita-paz@hotmail.com