





Fungal Planet 721 – 13 July 2018

***Baorangia alexandri* Svetash., Simonini & Vizzini, sp. nov.**

*Etymology.* Named in honour of the collector of the species, the Russian mycologist Alexander Kovalenko, for his important contributions to the study of *Agaricales* and *Boletales* in Russia.

Classification — *Boletaceae*, *Boletales*, *Agaricomycetes*.

*Pileus* 40–100 mm diam, at first hemispherical, then convex to almost flat; surface dry, velutinous when young, almost smooth and shining with age, carmine red, pinkish red to dark pink, slowly turning blue when injured; pileus margin involute, then relaxed, slightly lobate, sharp. *Hymenophore* surface from concave to flat or only slightly convex, bright yellow, dark blue indigo when injured, then dingy orange-yellow or olive; tubes at the beginning decurrent, very short (1–2 mm), then slowly well-developed, up to 7 mm in length, sinuate adherent to the stipe; pores small, round or slightly angular. *Stipe* 30–70 × 10–25 mm, usually shorter than pileus width, stout, more or less cylindrical or clavate with enlarged lower part, often tapered to the base, yellow at the apex, below carmine-red, usually without reticulum but sometimes with a very thin reticulation at the very apex, dotted with reddish granules throughout its lower part or only in the middle part; surface slowly turning blue when injured. *Context* yellow, slowly turning blue. *Odour* and *taste* indistinct. *Spore-print* olive-brown. *Spores* ( $n = 54$ , one collection)  $(8-9.5-10.5(-11.5) \times (3.5-4-4.5(-5) \mu\text{m})$ ,  $Q = 2.35-2.67$ ,  $Q_m = 2.51$ ,  $V_m = 81$ , slightly oblong to ventricose in face view; in profile view somewhat inequilateral to oblong, and showing a shallow suprahilar depression; nearly hyaline to pale dingy ochraceous when mounted in potassium hydroxide solution (3% KOH), with smooth surface. *Basidia*  $25.5-30.5 \times 8-9.5 \mu\text{m}$ , mostly 4-spored. *Hymenophoral (tube) trama* divergent and gelatinous, of the 'boletus-type'. *Cheilocystidia* fusiform, hyaline,  $47-55 \times 9.5-10.5 \mu\text{m}$ . *Pleurocystidia* fusiform, hyaline,  $47-61.5 \times 10-12 \mu\text{m}$ . *Pileipellis* a trichoderm of interwoven hyphae, from suberect to prostrate, not gelatinised, smooth, hyaline or weak yellow in 3% KOH; terminal elements  $(17-33-67.5(-78) \times (6-6.5-10(-13) \mu\text{m})$ . *Caulohyphenium* a layer of sterile elements, cylindrical to inflated, often forming chains,  $17.5-25 \times 4-11.5 \mu\text{m}$ , hyaline to yellowish, with scattered basidia. *Clamp connections* absent.

*Habit, Habitat & Distribution* — Solitary or in small groups, in deciduous forests with *Quercus mongolica*, undergrowth of *Corylus heterophylla* and *Lespedeza bicolor*. Rare, so far known only from a single station in Asiatic Russia.

*Typus.* RUSSIA, Primorsky Krai, Sikhote-Alin Nature Reserve, deciduous forest with *Quercus mongolica* (*Fagaceae*), N44°57'24" E136°33'35", 19 Aug. 2013, A. Kovalenko (holotype LE 254266, ITS and LSU sequences GenBank MH043611 and MH036169, MycoBank MB 825173).

*Colour illustrations.* Russia, Sikhote-Alin Nature Reserve, deciduous forest with *Quercus mongolica*, where the holotype was collected (photo by O. Morosova); basidiomata (photo by A. Kovalenko); spores, basidia, elements of the pileipellis, cheilocystidia, pleurocystidia and caulocystidia (all from the holotype, photos by T. Svetasheva). Microscopic elements observed in 3% KOH. Scale bars = 20 mm (basidiomata), 10  $\mu\text{m}$  (microscopic elements).

*Additional material examined.* ***Baorangia alexandri***. RUSSIA, Primorsky Krai, Sikhote-Alin Nature Reserve, vic. of Blagodatnoye, deciduous forest with *Quercus mongolica*, 19 Aug. 2013, A. Kovalenko, LE 254265, ITS and LSU sequences GenBank MH043612 and MH036170. ***Baorangia emileorum***. ITALY, Lazio, Latina, wood of Valle Fredda, loc. S. Martino, Priverno, in a mixed broadleaved wood with *Quercus suber*, *Q. ilex* and *Q. cerris*, under *Q. cerris*, N41°72'379" E12°32'175", 17 Nov. 2012, A. Vizzini, GS 10213, ITS and LSU sequences GenBank MH043613 and MH036171; Liguria, Savona, Borgio Verezzi, under *Q. ilex*, 13 Nov. 2014, A. Vizzini, TO HG131114, ITS and LSU sequences GenBank MH043617 and MH036175; Sardinia, Parco del Sulcis, Nuxis (CA), Monte Tiriccu, loc. Arcu su Fixi, under *Q. ilex*, 17 Oct. 2015, A. Tatti, TO HG171015, ITS and LSU sequences GenBank MH043615 and MH036173; *ibid.*, 19 Oct. 2015, A. Tatti, TO HG191015, ITS and LSU sequences GenBank MH043614 and MH036172. — PORTUGAL, Madeira Island, Levada do Furado, near Ribeiro Frio, on the slope under the path, under *Quercus* sp., 26 Sept. 2015, J. Borovička, PRM 934960, ITS and LSU sequences GenBank MH043616 and MH036174. ***Lanmaoa fragrans***. ITALY, Piemonte, Torino, Venaria Reale, Parco Naturale La Mandria, under *Q. robur*, 6 Oct. 2002, A. Vizzini, TO HG061002, LSU sequence GenBank MH036176.

*Notes* — GS refers to the personal herbarium of G. Simonini. The phylogenetic hypotheses were constructed using the Maximum likelihood (ML) approach (RAxML v. 7.3.2, Stamatakis 2006). Based on the ITS and LSU analyses, the two collections of *Baorangia alexandri* represent a new species. *Baorangia alexandri* clusters sister ( $bs = 57\%$ ) to *B. pseudocalopus* (the type species of the genus) in the ITS analysis and, with low support, to a clade consisting of *B. emileorum* and *B. pseudocalopus* and two *Baorangia* sp. (GenBank KF112355 and KF112356) in the LSU analysis.

*Baorangia pseudocalopus*, so far known from China, Japan (Wu et al. 2016) and India, is the phylogenetically closest species to *B. alexandri* according to the ITS analysis. However, morphologically it is quite different, since its basidiome exhibits not so bright colours, pileus shows predominantly grey, pale reddish grey, light brown or pinkish brown colours, stipe is slightly paler, spores are slightly bigger ( $9-12.5 \times 4-5 \mu\text{m}$ ) and less elongated, hyphae of pileipellis are coloured in brown or yellowish brown tinges. *Baorangia bicolor* and *B. emileorum* (the orthographically correct species epithet for *emilii*, Parra et al. 2017) are morphologically quite similar to *B. alexandri*. Since *B. bicolor* was firstly interpreted in a wide sense including some cryptic species, it is currently problematic to separate some morphological features which distinguish strictly *B. bicolor* from its relatives. Probably the only distinguishing character (besides the genetic one) is the geographical distribution: until now *B. bicolor* is known only from North America (Bessette et al. 2010, 2016). *Baorangia emileorum* is characterised by a more massive and fleshy basidiome than *B. alexandri*, with stouter stipe and more decurrent hymenophore, pileus margin more irregular and undulate, colouration of pileus and stipe surface with usually brighter tints of red: purplish red, carmine red, garnet red, currant red; its spores are statistically longer and narrower,  $Q = (2.7-2.8-3.4(-3.6))$  (according to Muñoz 2005),  $Q = 2.65-3.27$  based on our observations on 132 spores from 4 collections; *B. emileorum* is until now only known from the Mediterranean area (France, Greece, Italy, Portugal (Madeira) and Spain) (Muñoz 2005 and pers. obs.).

For supplementary information see GenBank.

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