

Short Communications

***Lichenomphalia meridionalis* comb. nov., a common and frequently misidentified species in south-western Europe**

Based on molecular and morphological data (Lutzoni & Vilgalys 1995; Lutzoni 1997; Moncalvo *et al.* 2000), it has been shown that lichenized species of the genus *Omphalina* Quél. (*Tricholomataceae* R. Heim *ex* Pouzar *nov. cons.*) constitute a monophyletic group that should be included in a separate genus *Lichenomphalia* Redhead, Lutzoni, Moncalvo & Vilgalys (Redhead *et al.* 2002). The genus was proposed for eight species with vegetative lichenized thalli ranging from a bulbiliferous (*Botrydina* type) to a squamulose (*Coriscium* type) thallus, with *Coccomyxa* algae (Redhead & Kuyper 1987). Barrasa & Rico (2001) studied in detail four lichenized *Omphalina* species from the Iberian Peninsula: *Lichenomphalia umbellifera* (L.: Fr.) Redhead, Lutzoni, Moncalvo & Vilgalys [as *Omphalina ericetorum* (Fr.) M. Lange *ex* H. E. Bigelow], *L. hudsoniana* (H. S. Jenn.) Redhead, Lutzoni, Moncalvo & Vilgalys [as *O. hudsoniana* (H. S. Jenn.) H. E. Bigelow], *L. velutina* (Quél.) Redhead, Lutzoni, Moncalvo & Vilgalys [as *O. velutina* (Quél.) Quél.] and *L. meridionalis* (as *O. meridionalis*), the last being the new combination proposed here. *Omphalina meridionalis* was originally found in Italy (Contu & La Rocca 1999) and the original description has been revised by Barrasa & Esteve-Raventós (2000) to demonstrate the absence of clamps, a feature that characterizes all lichenized species of *Lichenomphalia*.

Redhead *et al.* (2002) considered *Omphalina meridionalis* to be a probable synonym of *L. velutina*. However, our previous studies (Barrasa & Esteve-Raventós 2000; Barrasa & Rico 2001) revealed that both species can be clearly differentiated by their morphological

characteristics: mainly fresh basidiomata colours (pileus and lamellae), pigment type of pileipellis and spore shape. We therefore consider *L. meridionalis* and *L. velutina* as two different species, with a similar bulbiliferous vegetative thallus, and consequently the new combination *L. meridionalis* is formally proposed here.

Twenty-one fertile specimens of *L. meridionalis* (including type material) and eleven of *L. velutina* from AH, BCC, GDA, IB, LISU and MAF herbaria, have been studied for comparison. The colours of the basidiomata are according to terminology of Munsell (1994). For comparison of spore shape between taxa, we followed the terminology and corresponding length:breadth ratio (l:b) and mean value (l:b mean) as defined by Bas (1969: 321–322).

***Lichenomphalia meridionalis* (Contu & La Rocca) Barrasa, Esteve-Rav. & V. J. Rico comb. nov.**

Omphalina meridionalis Contu & La Rocca, *Fungi non Delineati* 9: 32–33 (1999) (basionym).—*Lichenomphalia meridionalis* (Contu & La Rocca) Barrasa & Esteve-Rav. in Esteve-Raventós, Llistosella & Ortega *comb. inval.*, *Setas de la Península Ibérica e Islas Baleares*: 539 (2007) [Art. 33.2, reference omitted]; type: Italy, Sardinia, Prov. Sassari, M. Limbara, loc. Monte Moroni, zona parafuoco, 10 i 1999, M. Contu (IB 1999/0879—holotype!).

Omphalina hiemalis Barrasa & Esteve-Rav., *Book of Abstracts, XIII Congress of European Mycologists*: 10 (1999) [*inval. ad int.*].

(Fig. 1A)

Selected descriptions and iconography. Barrasa & Esteve-Raventós (2000: 275 desc., 276–277 icon. (figs. 1–2 and 3–7); sub *Omphalina meridionalis*); Barrasa & Rico (2001: 379 desc., 380–381 icon., (figs 5–6); sub *O.*



FIG. 1. Habit. A, *Lichenomphalia meridionalis* (AH 32757); B, *L. velutina* (AH 32758). Scales = 5mm.

meridionalis); Esteve-Raventós *et al.* (2007: 539 desc. and icon.).

Notes. Molecular studies carried out in lichenized and non-lichenized species of ‘omphalinoid’ agarics, revealed that *Lichenomphalia velutina* constitutes a complex and variable taxonomic group, in which more than one species can be recognized (Lutzoni 1997). Accordingly, Redhead *et al.* (2002) recognized *L. grisella* (P. Karst.) Redhead, Lutzoni, Moncalvo & Vilgalys as a different species from *L. velutina*, but considered *L. meridionalis* (sub *Omphalina meridionalis*) to be a probable synonym of *L. velutina*. However, Redhead *et al.* (2002) indicated that maintaining this synonymy and delimitation of both species remains debatable. A number of names and species with bulbiferous lichenized thalli (*Botrydina* type), have been proposed and described: *L. grisella*, *Omphalina rustica* (Fr.) Quél., *sensu* Singer & Cléménçon and *O. pararustica* Cléménçon (*cf.* Singer & Cléménçon 1972; Cléménçon 1982). All of them are now considered as synonyms of *L. velutina*, as was already indicated by Barrasa & Rico (2001). Furthermore, the name *O. rustica* (Fr.) Quél. was also used for non-lichenized species, mainly after Lange (1930). This non-lichenized species [*O. rustica* (Fr.) Quél. *sensu* Lange], has been recently transferred to *Arrhenia* (Redhead *et al.* 2002).

A number of extra-European lichenized taxa that could not be revised in this work (*Omphalina oreades* Singer, *O. defibulata* Singer, *Clitocybe borealis* Bigelow, *C. solumophila* Bigelow and *C. payattensis* Bigelow), have been described from North and South America and included as probable synonyms of *Lichenomphalia velutina* (Redhead *et al.* 2002). Moreover, the possibility that one or more of these names takes priority over *L. meridionalis* cannot be rejected. An exhaustive revision of the type material of all these taxa (including molecular analyses) will be necessary for further studies.

Lichenomphalia meridionalis was described by Contu & La Rocca (1999: 33, tab. XI-B, sub *O. meridionalis*) as a species with pale ochraceous to weakly-whitish pileus, pure

white lamellae and encrusting non-zebroid pileipellis pigments. In agreement with this original description, Barrasa & Rico (2001: 380–381, figs 5–6) clearly distinguish *L. meridionalis* from *L. velutina* (Table 1) by its yellowish red, light brown to reddish yellow pileus (Munsell 1994: 5YR5/6, 5YR5/8, 7.5YR6/4, 7.5YR6/6), white lamellae (Munsell 1994: 5YR8/1, 7.5YR8/1) and encrusting non-zebroid pigments of pileipellis hyphae. *Lichenomphalia velutina* shows a dark grey to grey pileus with brown to light brown tinges (Munsell 1994: N4, N5, N6, 7.5YR4/3, 7.5YR5/3, 7.5YR6/3), dark grey to grey lamellae (Munsell 1994: N4, N5, N6) and an encrusting pigment of pileipellis hyphae forming ‘zebra stripes’. Pigment of pileipellis hyphae is considered a noteworthy character in other groups of agarics [i.e. *Entoloma* (Fr.) P. Kumm. (Noordeloos 1992) and *Cortinariarius* (Pers.) Gray subgenus *Telamonia* (Fr.) Wünsche (Niskanen 2008)]. After an exhaustive revision of fresh and herbarium material from the Iberian Peninsula, Barrasa & Rico (2001) observed that several collections with ochraceous pileus and lamellae had been misidentified as *L. umbellifera* (= *O. pseudoandrosacea* (Bull.) M. M. Moser), *L. velutina* or *Arrhenia rustica* (Fr.) Redhead, Lutzoni, Moncalvo & Vilgalys, and no references to the presence or absence of the lichenized state had been made (see *L. meridionalis* specimens examined).

In agreement with Lutzoni (1997), *L. velutina* constitutes a complex taxonomic group, in which more than one species can be differentiated at the molecular level. In the present work, macroscopic differences between *L. meridionalis* (Fig. 1A) and *L. velutina* (Fig. 1B) are also emphasized (Table 1), and more collections have been studied for a better diagnosis and delimitation of both species. Therefore, it is very important (as in non-lichenized agarics) to use fertile and fresh material for a correct identification. In this way, basidiomata of *L. velutina* (particularly lamellae) becomes light-coloured in dry material, causing frequent confusion with *L. meridionalis*. These macroscopic features together with the microscopic differences observed by Barrasa & Rico (2001), justify

TABLE 1. Principal characters for distinguishing between *Lichenomphalia velutina* and *L. meridionalis*. Pileus and lamellae characters must be observed in fresh basidiomata

	<i>L. velutina</i>	<i>L. meridionalis</i>
Pileus colours	Grey to dark grey, with brown tinges in margin	Yellowish red, light brown to reddish yellow
Lamellae colours	Grey to dark grey	White
Pileipellis hyphae pigmentation	Zebroid encrusting	Slightly encrusting, not zebroid
Spore shape	Ellipsoidal to elongate	Elongate to cylindrical
Spore 1:b mean	1.6	1.9

the separation of both species and the new combination here proposed for the lichenized species *L. meridionalis*.

Fresh specimens examined. Lichenomphalia meridionalis [see also Barrasa & Rico (2001: 381–382)]. **Spain:** *Ávila:* San Martín del Pimpollar, on acid soil among mosses, 15 v 2004, *A. Vargas* (AH 37721, sub *Omphalina meridionalis*). *Jaén:* Santa Elena, on acid soil with *Cistus laurifolius* and *Quercus ilex*, 1 xii 2001, *F. Esteve-Raventós* (AH 29273, sub *O. meridionalis*). *Segovia:* Riaza, La Pinilla, 1443 m, 30TVL6163, on a slope of acid soil among mosses, 16 x 2003, *V. J. Rico, J. M. Barrasa & F. Esteve-Raventós* (AH 32757, sub *O. meridionalis*); Riofrío de Riaza, Puerto de la Quesera, 1700 m, 30TVL6264, on a slope among mosses in heath, 26 x 2002, *J. M. Barrasa & B. Fano* (AH 33747, sub *O. meridionalis*); Fresno de Cantespino, Prado Pinilla, 1050 m, 30TVL5576, on clayed acid soil in open vegetation of *Cistus laurifolius*, *Quercus ilex* and *Quercus pyrenaica*, 9 xi 2003, *J. M. Barrasa* (AH 32764, sub *O. meridionalis*); *ibid.*, 11 x 2003, *J. M. Barrasa & B. Fano* (AH 32760, sub *O. meridionalis*).

L. velutina [see also Barrasa & Esteve-Raventós (2000: 278); Barrasa & Rico (2001: 383)]. **Spain:** *Segovia:* Riaza, La Pinilla, 1443 m, 30TVL6163, on a slope of acid soil among mosses, 16 x 2003, *V. J. Rico, J. M. Barrasa & F. Esteve-Raventós* (AH 32758, sub *Lichenomphalia velutina*).

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REFERENCES

- Barrasa, J. M. & Esteve-Raventós, F. (2000) A re-description of *Omphalina meridionalis*, based on material collected in Spain. *Mycotaxon* **75**: 273–280.
- Barrasa, J. M. & Rico, V. J. (2001) Lichenized species of *Omphalina* (Tricholomataceae) in the Iberian Peninsula. *Lichenologist* **33**: 371–386.
- Bas, C. (1969) Morphology and subdivision of *Amanita* and a monograph of its section *Lepidella*. *Persoonia* **5**: 285–579.
- Cléménçon, H. (1982) Kompendium der Blätterpilze Europäische omphalinoide Tricholomataceae. *Zeitschrift für Mykologie* **48**: 195–237.
- Contu, M. & La Rocca, S. (1999) Fungi della zona mediterranea insulare italiana. *Fungi non Delineati* **9**: 1–48.
- Esteve-Raventós, F., Llistosella, J. & Ortega, A. (2007) *Setas de la Península Ibérica e Islas Baleares*. Madrid: Editorial Jaguar.
- Lange, J. E. (1930) Studies in the agarics of Denmark 8. *Dansk Botanisk Arkiv* **6**: 1–64.
- Lutzoni, F. M. (1997) Phylogeny of lichen- and non-lichen forming omphalinoid mushrooms and the utility of testing for combinability among multiple data sets. *Systematic Biology* **46**: 373–406.
- Lutzoni, F. M. & Vilgalys, R. (1995) *Omphalina* (Basidiomycota, Agaricales) as a model system for the study of coevolution in lichens. *Cryptogamic Botany* **5**: 71–81.
- Moncalvo, J. M., Lutzoni, F. M., Rehner, S. A., Johnson, J. & Vilgalys, R. (2000) Phylogenetic Relationships of agaric fungi based on nuclear large subunit ribosomal DNA sequences. *Systematic Biology* **49**: 278–305.
- Munsell (1994) *Soil Color Charts*. New York: Macbeth Division of Kollmorgen Instruments Corporation.
- Niskanen, T. (2008) *Cortinarius* subgenus *Telamonina* p.p. in North Europe. Helsinki. Academic dissertation Plant Biology. Department of Biological and Environmental Sciences, University of Helsinki.
- Noordeloos, M. E. (1992) *Entoloma s. l. Fungi Europaei vol. 5*. Saronno: Libreria editrice Biella Giovanna.
- Redhead, S. A. & Kuyper, T. W. (1987) Lichenized agarics: taxonomic and nomenclatural riddles. In *Arctic and Alpine Mycology 2* (G. A. Laursen, J. C. Ammirati & S. A. Redhead, eds): 319–348. New York: Plenum Press.
- Redhead, S. A., Lutzoni, F. M., Moncalvo, J. M. & Vilgalys, R. (2002) Phylogeny of agarics: partial systematics solutions for core omphalinoid genera in the Agaricales (euagarics). *Mycotaxon* **83**: 19–57.

Singer, R. & Cléménçon, H. (1972) Notes on some leucosporous and rhodosporous European agarics. *Nova Hedwigia* **23**: 305–351.

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