

Greater Sonoran Desert Region. I: 1–532. 2002; DePriest in Annual Rev. Microbiol. 58: 273–301. 2004; Summerfield & Eaton-Rye in New Phytol. 170: 597–607. 2006). The most frequently cited *Roccellina* paper is probably that by Lohtander & al. (in Lichenologist 30: 341–350. 1998) which discusses species concepts and dispersal strategies using *Roccellina capensis* as a model taxon.

*Roccellaria* currently comprises a single species and was also introduced by Darbishire (in Ber. Deutsch. Bot. Ges. 15: 6. 1897) who named the species *R. intricata*, based on *Roccella intricata*, citing the earlier *Roccella mollis* as a synonym. *Roccellaria mollis*, as the species is now known, is endemic to the South American west coast from central Chile to Peru. It grows near the sea usually on the twigs of various shrubs or on the spines of cacti but also on rocks and cliffs by the sea. It is a little known and rarely cited species. It has been used a few times in chemical literature dealing with lichen components and in the last 40 years cited only twice (Takahata & al. in J. Org. Chem. 60: 5628–5633. 1995; D'Onofrio & al. in Chem. Commun. 2: 185–186. 1998).

In the ongoing, major work with phylogenetic relationships within the family *Roccellaceae* it has become evident that the genus *Roccellina* has to be emended to include some species originally described in other genera (Tehler & Irestedt, in prep). This study currently includes seventy-two nucleotide sequences of the nuclear large subunit ribosomal RNA gene (LSU) and the second largest RNA polymerase subunit (RPB2) newly obtained from 49 *Roccellaceae* taxa. The incontrovertible results from both parsimony and bayesian phylogenetic analyses make *Roccellina* para-

phyletic since *Roccellaria mollis* is nested inside *Roccellina*. Thus we propose to merge *Roccellina* and *Roccellaria*. The obvious procedure would be to include *Roccellaria* in *Roccellina* and recombine the species *Roccellaria mollis* to *Roccellina mollis*. Both *Roccellina* and *Roccellaria* were described by Darbishire. However, *Roccellaria* was described one year prior to *Roccellina* together with the main list of new and old *Roccellaceae* genera simultaneously published by Darbishire (in Ber. Deutsch. Bot. Ges. 15: 2–10. 1897). *Roccellina* was added to the list by Darbishire only the following year 1898 (in Ber. Deutsch. Bot. Ges. 16: 6–16. 1898). Consequently, the name *Roccellaria* takes priority over *Roccellina* if united. However, as is evident from the above, *Roccellaria* comprises only a single currently accepted name whereas the much better known and generally recognised genus *Roccellina* embraces 27 names in current use. Therefore, to avoid the disadvantageous nomenclatural changes (Art. 14.1) that the recombination of nearly 30 well established *Roccellina* names would incur I propose the conservation of the latter name against *Roccellaria*. The proposed rejection of this last name will cause the loss of the little known name *Roccellaria mollis*, a point endemic to the South American west coast. However, *Roccellina* is one of the largest, one of the most widely distributed, and one of the most well known genera in the family *Roccellaceae*. The advantages of rejecting *Roccellaria* in favour of *Roccellina* are obvious.

Another minor disadvantage but still worth mentioning is the fact that the name *Roccellaria* is also found, although as a synonym, for a mollusc in the zoological nomenclature (*Roccellaria* Schaufuss, 1869).

## (1757) Proposal to conserve the name *Psilocybe* (*Basidiomycota*) with a conserved type

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- (1757) *Psilocybe* (Fr.) P. Kumm., Führer Pilzk. 21: 71. 1871 (*Agaricus* “trib.” *Psilocybe* Fr., Syst. Mycol. 1: 289. 1821), *nom. cons. prop.*  
 Typus: *Psilocybe semilanceata* (Fr.) P. Kumm. (“*semilanceolata*”) (*Agaricus semilanceatus* Fr., Observ. Mycol. 2: 178. 1818), *typ. cons. prop.*

The genus *Psilocybe*, as it is currently, generally circumscribed, is one of the most famous mushroom genera known. Its acclaim stems from the production of the neurotropic, psychoactive tryptamine, psilocybin (4-phosphoryloxy-*N,N*-dimethyltryptamine), notably named after the genus itself (Hofmann & al. in Experimentia 14(3): 107–109.

1958), that causes hallucinations and enhanced psychedelic experiences. In nature, the presence of this substance in *Psilocybe*, and the few other agaric genera where it also occurs, is linked to bluing after bruising or aging that makes the otherwise rather indistinct brownish mushrooms easier to characterize (Benedict & Tyler in Lloydia 30: 149–157. 1967). Historically, neurotropic *Psilocybe* species played a central role in religious ceremonies conducted by shamans in Mexico and were important enough in some cultures, such as the Aztecs, to be named *teonanácatl* or “divine flesh”. However, most present day usage of *Psilocybe* is as a recreational drug worldwide, and the mushrooms are either harvested from nature or grown indoors for personal use or sold as street drugs. This has led to listings of psilocybin and allied chemicals (e.g., psilocin, baeocystin, norbaeocystin) and occasionally named species, e.g., *Psilocybe cubensis*, as restricted or regulated drugs in several countries, and to widespread usage among aficionados. Hence, the generic name *Psilocybe* or its namesakes, psilocybin and psilocin, are virtually synonymous with “magic mushrooms”, having been linked to archaeology, anthropology, religion, alternate life styles, forensic science, law enforcement, laws and regulations, etc. As a result, over 90% of all scientific, forensic, pharmacological and popular literature, and web sites are focussed on the drug producing species, while only a few scholarly articles (e.g., Boekhout & al. in Mycol. Res. 106: 1251–1261. 2002) are primarily concerned with non-hallucinogenic species. For example, as of September 2006, the Office on Drugs and Crime of the United Nations legal library ([http://www.unodc.org/unodc/legal\\_library/search\\_legal\\_library.html](http://www.unodc.org/unodc/legal_library/search_legal_library.html)) contained over 175 documents specifically mentioning hallucinogenic *Psilocybe* species, and PubMed (<http://www.pubmed.com>) listed 84 publications on *Psilocybe*, primarily on hallucinogenic taxa.

*Psilocybe montana* (Pers.) P. Kumm. (= *Agaricus montanus* Pers.: Fr.), a common moss inhabiting, non-hallucinogenic species, has been accepted as lectotype by most modern day taxonomists (e.g., Guzmán, *Psilocybe*: 65. 1983; Kühner, *Hymenomyces*. *Agaric*: 899. 1980; Legon & al., *Checklist Brit. Irish Basidiomycota*: 248. 2005; May & Wood, *Fung. Australia* 2A: 144. 1997; Noordeloos, *Flora Agaric*. Neerl. 4: 27. 1999; Pegler, *Agaric*. *Flora Lesser Antilles*: 510. 1983; Singer, *Agaric*. *Mod. Tax.*, ed. 4: 565. 1986; Watling & Gregory, *Brit. Fung. Flora* 5: 30. 1987). Undoubtedly Donk's detailed discussion on agaric names and their types (in *Beih. Nova Hedwigia* 5: 255. 1962) based upon his earlier suggestion (in *Bull. Jard. Bot. Buitenzorg*, ser. 3, 17: 341–347. 1949) influenced acceptance of this typification, although it turns out not to be the earliest (see below). Subsequently, Singer (in *Agar. Mod. Tax.*, ed. 3: 536. 1975; ed. 4: 565. 1986) changed his opinion from his earlier listing of *Agaricus semilanceatus* Fr. as type (in *Agaric. Mod. Tax.* ed. 2: 541. 1962), to accept *A. montanus* as type.

Phylogenetic analyses of various members of the *Strophariaceae* Singer & A.H. Sm. in which *Psilocybe* has been classified, has led to the realization that *Psilocybe* is polyphyletic (Matheny & al. in *Mycologia* 98: 984–997. 2007; Moncalvo & al. in *Molec. Phylog. Evol.* 23: 357–400. 2002; Nugent & Saville in *Forensic Sci. Int.* 140: 147–157.

2004; Walther & al. in *Mycol. Res.* 109: 537. 2005; and unpublished data). Most species of the genus congregate into two separate clades. One clade corresponds to the hallucinogenic species, hence psilocybin production is a synapomorphy for those taxa. Unfortunately, *P. montana* does not produce psilocybin and it falls within the other main clade, which when separated generically, leaves the hallucinogenic species without a generic name. As a result we re-examined the lectotypification process to ensure that it met all current technical requirements and discovered that *P. montana* is not acceptable as lectotype because its choice was preceded by an earlier lectotypification that cannot be superseded except by conservation.

The basionym for *Psilocybe* (Fr.) P. Kumm. is universally accepted as *Agaricus* “tribus” *Psilocybe* Fr. (in *Syst. Mycol.* 1: 289. 1821). This follows the acceptable practice outlined in Art. 33.12 and Art. 33 Ex. 7 of the *ICBN* (McNeill & al. in *Regnum Veg.* 146. 2006) for Fries's “tribes” and Kummer's elevation of them to generic rank. Donk (l.c. 1949, 1962) dismissed the lectotypification of *Psilocybe* (Fr.) P. Kumm. by *P. merdaria* (Fr.: Fr.) Ricken (*Blätterpilze Deutschl.*: 251. 1912) by Clements & Shear (*Gen. Fung.*: 350. 1931). He argued that Kummer (l.c.) did not list *Agaricus merdarius* Fr.: Fr. (*Syst. Mycol.* 1: 291. 1821) in *Psilocybe* when the “tribe” was raised to the generic level. Donk (l.c. 1960) further argued that selecting such a type would upset existing classifications as these existed in the 1960's. However, Kummer (l.c.) did not treat *Agaricus merdarius* in any genus in his country's flora, which was more limited in scope than Fries's *Systema mycologicum* coverage. Therefore, it can only be speculated as to where Kummer might have classified it in 1871, had he found *A. merdarius* in Germany. Additionally, Clements & Shear (l.c.) specifically had chosen *P. merdaria* as type of the taxon named *Psilocybe* by Fries, i.e., “*Psilocybe* Fr. *Syst. Myc.* 1: 289. 1821”. Hence, *Agaricus* “tribus” *Psilocybe* Fr.: Fr. remains lectotypified by *P. merdaria* and, therefore, *Psilocybe* (Fr.) P. Kumm., if accepted as being based upon Fries's “tribe” *Psilocybe*, must also be lectotypified by *P. merdaria*. This lectotype cannot be superseded (Art. 9.17) and changed to *P. montana*, except by conservation, and no such proposal has been published.

*Psilocybe merdaria* is also a non-hallucinogenic species, and although it falls in a peripheral group and has a unique anamorph, *Pseudohelicomyces* Valenzuela & Garnica (in *Mycol. Res.* 104: 739. 2000), it is within the same large clade as *P. montana*. Acceptance of the technically correct lectotype, *P. merdaria*, like that of the later proposed lectotype, *P. montana*, still leaves the hallucinogenic species lacking a generic name. Given that it would require conservation even to typify *Psilocybe* by *P. montana*, but that that action would threaten continued usage of the generic name *Psilocybe* for most of the significant species, we propose a novel approach, namely to conserve *Psilocybe* with yet another proposed lectotype, *Agaricus semilanceatus* Fr. (*Observ. Mycol.* 2: 178. 1818). This species had several times been listed as lectotype of *Psilocybe* (first by Singer in *Ann. Mycol.* 34: 340. 1936, and then, e.g., by Horak, *Syn. Gen. Agaric.*: 524–525. 1968; Ito, *Mycol. Fl.*

Japan 2(5): 341. 1959; Singer in Lilloa 22: 504. 1951; l.c. 1962; Singer & Smith in Mycologia 38: 245 & 265. 1946). *Psilocybe semilanceata* produces psilocybin (e.g., Gartz in Z. Mykol. 57: 149–154. 1991) and is a well known, temperate climate, hallucinogenic species known as Liberty Caps. Phylogenetically it falls well within the clade labelled “pschedelia” by Moncalvo & al. (l.c.) that encompassed psilocybin-producing taxa such as *P. cubensis* (Earle) Singer, *P. cyanescens* Wakef., *P. stuntzii* Guzmán & Ott, and *P. subaeruginosa* Clel. Conserving *Psilocybe* with *P. semilanceata* as type would ensure continued usage of the name for the majority of species cited in the literature, and it restores one of the earlier choices of lectotype.

In lectotypifying *Agaricus* “tribus” *Psilocybe*, or *Psilocybe* (Fr.) P. Kumm. by *A. semilanceatus*, several technical points may be noted. Firstly, Fries (l.c. 1821) in the sanctioning work, which contains the protologue for “tribus” *Psilocybe*, did not accept his earlier published species, *A. semilanceatus* Fr. as a distinct species. Instead he treated it as a synonym of form “B” in *A. callosus* Fr. : Fr. (Observ. Mycol. 2: 180. 1818; Syst. Mycol. 1: 292. 1821) within *Agaricus* “tribus” *Psilocybe*. Secondly, Fries (in Syst. Mycol. Index: 41. 1832) later listed, perhaps as a lapsus calami, the synonym *A. semilanceatus* spelled as *A. “semilanceolatus”*. Because it is listed as a synonym (in italics), and not an accepted name, the incorrect spelling is not sanctioned. Later, Kummer (l.c.) when he treated the species, spelled the epithet *P. semilanceolata*, perhaps as a result of Fries’s error. Kummer’s spelling of “*semilanceolata*” is universally “corrected” to “*semilanceata*”, that of its basionym, in all citations, “*semilanceolata*” being correctly taken as an orthographic error, and not a new name. Fries himself (in Epicr.: 231. 1836–1838; Hymen. Europ.: 301. 1874) later corrected the spelling and again accepted his species named *A. semilanceatus* as distinct from *A. callosus*. The name *Agaricus callosus* has had a confusing history and may actually refer to a species of *Panaeolus* (cf. Redhead in Mycologia 77: 174. 1985; Watling & Gregory, l.c.: 36–38), therefore no attempt to resurrect it as *Psilocybe callosa* (Fr.: Fr.) Quél. (Champ. Jura Vosges: 257. 1872), as was done by Guzmán (l.c.: 345), is proposed here.

The primary benefits of this conservation proposal are: stability of usage for an exceedingly well known group of fungi and also elimination of the need for a new generic name and many new combinations. We note that several generic names are available for taxa in the other major clade of residual *Psilocybe*, of which the most important, being the oldest, is *Deconica* (W.G. Sm.) P. Karst. (in Bidrag Kännedom Finlands Natur Folk 32: xxvi. 1879; = *Agaricus* subg. *Deconica* W.G. Sm. in J. Bot. 8: 221. 1870), typified

by *Agaricus physaloides* Bull., which had previously been recognized as a separate genus from *Psilocybe* by Dennis & al. (New Checklist Brit. Agaric. Bolet.: 61. 1960), Horak (Flora Criptog. Tierra del Fuego 11(6): 243. 1979), Orton (in Trans. Brit. Mycol. Soc. 43: 175. 1960) and Singer (l.c.: 508. 1951). Therefore, many of the necessary combinations in *Deconica* have already been published, e.g., *Deconica montana* (Pers.) P.D. Orton (l.c.), *D. inquilina* (Fr.) Romagn. (in Rev. Mycol. Paris 2: 244. 1937), *D. physaloides* (Bull.) Karst. (l.c.: 516), *D. rhombispora* (Britz.) Singer (l.c.: 509. 1951), etc.

*Agaricus semilanceatus* Fr. (l.c. 1818) was in part based specifically upon Figs. 1–3, as segregated from the other unnumbered portions of plate 248 published by Sowerby (Colour. Illus. Engl. Fungi 3: CCXLIX & caption. 1803) under the name *Agaricus semiglobatus*. Notably, Fries (l.c., 1818, 1821, 1836–1838, 1874) consistently and clearly erroneously cited via an initial typographical error, the Sowerby plate number as # 240 on which an ascomycete is depicted. The specimens illustrated in figures 1–3 (pl. 248) were specifically cross-linked to the first documented case of hallucinations as mentioned by Sowerby (l.c.) and also mentioned in the publication cited by him (i.e., Brande in London Med. Phys. J. 11: 41–44. 1799) wherein the intoxication of 5 members of one family in London, October, 1799 was detailed. Figure 3 on plate 248 by Sowerby (l.c.), is hereby selected as lectotype for *Agaricus semilanceatus* Fr. (l.c. 1818).

Failure to conserve a type for *Psilocybe* or *A. “tribus” Psilocybe* technically leaves *P. merdaria* as the correct lectotype, even though no taxonomists in recent decades has accepted this lectotypification. Unfortunately, *P. merdaria*, although within the same large clade as that in which *P. montana* nests, is not typical of it (Moncalvo & al., l.c.) and will itself possibly be placed in a separate genus from *P. montana*. Therefore, it is undesirable for the name *Psilocybe* to be typified by *P. merdaria* regardless of whether or not *P. semilanceata* is conserved as type. Therefore, as an alternative we offer option (B) [not recommended] for debate. This would basically leave the typification as generally, but incorrectly, accepted up until now, and, therefore, involve publication of a new name for the hallucinogenic species currently known as *Psilocybe*.

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 Typus: *Psilocybe montanus* (Pers.: Fr.) P. Kumm. (*Agaricus montanus* Pers.: Fr.), *typ. cons. prop.*