ISSN (online) 2331-7612

AMANITACEAE

www.amanitaceaethejournal.org

volume 1, number 2, pp. 1-6 effectively published May 30, 2015

Nomenclatural changes in *Amanita*. II

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Abstract — Eight nomenclatural novelties (new names and new combinations) are proposed in *Amanita*: *A. albopulverulenta*, *A. congolensis, A. flaccida*, *A. lavendula*, *A. neomurina*, *A. neoneglecta*, *A. persicina*, and *A. reidiana.* The plate associated with the protolog of *A. nivalis* is the name's sole syntype and must be the lectotype of *A. nivalis*. The improperly designated neotype of *A. nivalis* is proposed as an epitype of that species. A lectotype is proposed for *A. mappa* var. *lavendula*.

Key words — *Amanitaceae,* Australia, Europe, North America

Introduction

This paper is the second in a small group dedicated to nomenclatural matters in *Amanita* (Tulloss 2000).

In recent years, morphological and molecular studies (e.g., Geml et al. 2008, 2010; Wolfe et al. 2012; Hughes et al. 2013) have indicated that several taxa originally described at the rank of form or variety should be recognized as species. Examination of the literature has found some names are illegitimate and require replacement. Typification of two species is revisited.

Materials and methods

Herbarium codes are taken from (Thiers 2015). Authorial citations follow Kirk and Ansell (2015). References to the International Code of Nomenclature for Algae, Fungi and Plants (ICN) are to the "Melbourne Code" (McNeill et al. 2012). Journal name abbreviations follow the Botanico-Periodicum-Huntianum (BPH*Online*) < http://fmhibd.library.cmu.edu/fmi/iwp/cgi?-open >.

New names and new combinations

1. ***Amanita albopulverulenta*** (Beeli) Tulloss comb. nov.

MycoBank: MB 516637

Basionym: *Amanitopsis albopulverulenta* Beeli, 1935. Fl. Champ. Congo 1: 23, pl. 4 (fig. 3).

Holotype: BR.

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≡*Amanita albopulverulenta* (Beeli) Tai nom. inval., 1979. Syll. Fung. Sinicorum (Peking): 373. [Lacking full and direct reference to basionym (per Index Fung. 5(2): 41). ICN §41.5. Misapplied.]

NOTES — This species may belong in the provisional *Amanita* series *Farinosae* (Tulloss and Yang 2015) based on the protolog, which includes a reproduction of the watercolor of Mme. Goossens. In series *Farinosae*, *A. albopulverulenta* is distinguished, at least, by its apparent lack of pigment and the reported narrowness and small size of its spores (Tulloss 2015d).

2. ***Amanita congolensis*** (Beeli) Tulloss, B. E. Wolfe, K. W. Hughes, Kudzma, & Arora comb. nov.

MYCOBANK: MB 807617
GENBANK: HQ539736, HQ539840, HQ539947, HQ540047, KR919753-KR919755, KR919767

BASIONYM: *Amanita rubescens* var. *congolensis* Beeli, 1935. Fl. Champ. Congo 1: 20, pl. 3 (fig. 4).

HOLOTYPE: BR.

NOTES — The strong orange staining and rather narrow spores of this species segregate it from all named rubescent taxa worldwide (Tulloss 2015f). In a single gene (nrLSU) alignment, the present species is genetically distant from members of clades representing rubescent taxa that until recently were widely attributed to *A. rubescens* Pers. : Fr. (Persoon 1797) or *A. flavorubens* (Berk. & Mont.) Sacc. (Saccardo 1887)—pairwise genetic difference falls in the range 2.22 - 4.66% in a grouping of taxa with infrataxon genetic difference dominantly in the range 0.0 - 0.6% (unpub. data). The 101 sequences used in the alignment represented as many as 17 named or provisionally named, apparently genetically distinct taxa from Africa, Europe, and North America.

3. ***Amanita flaccida*** (D. A. Reid) Tulloss comb. nov.

MYCOBANK: MB 811625

BASIONYM: *Amanita umbrinolutea* var. *flaccida* D. A. Reid, 1987. Notes Roy. Bot. Gard. Edinburgh 44: 517.

Holotype: K

NOTES — Our argument for an elevation to species rank is entirely based on the protolog of *A. umbrinolutes* var. *flaccida*, a type study of the present taxon (Tulloss 2015b), and a study of several geographically distributed collections of *A. umbrinolutea* var. *umbrinolutea* (Tulloss 2015c). The spores of the two species are very much the same shape; however, the spores of *A. umbrinolutea* can be significantly larger than those of the present species. Other differences between the present taxon and *A. umbrinolutea* include the former's flaccid, non-zonate pileus which lacks a reddish tint and has a diameter greater than the stipe length; and a universal veil with an unusually pigmented ("red-brown") exterior surface. Genetic data for *A. flaccida* are not available at present.

4. ***Amanita lavendula*** (Coker) Tulloss, K. W. Hughes, Rodrig. Cayc., & Kudzma comb. nov.

MYCOBANK: MB 807618
GENBANK: JF313658, KP866163, KP877537-KP877559, KR865979

BASIONYM: *Amanita mappa* var. *lavendula* Coker, 1917. *J. Elisha Mitchell Scient. Soc.* 33(1-2): 39, pl. 22-23, 64.

≡*Amanita citrina* var. *lavendula* (Coker) Sartory & L. Maire, 1922. *Compend. Hymenomyc., Amanita*: 25.
≡*Amanita porphyria* var. *lavendula* (Coker) L. Krieg., 1927. *Mycologia* 19: 309.
≡*Amanita citrina* f. *lavendula* (Coker) Veselý, 1933. *Ann. Mycol.* 31(4): 239.
≡*Amanita brunnescens* f. *lavendula* (Coker) E.-J. Gilbert nom. inval., 1941. *Iconogr. Mycol. (Milan)* 27 Suppl. 1 (2-3): 336. [Not accepted by author in original publication. ICN §36.1(a)]

LECTOTYPE: proposed herein and registered on MycoBank—U.S.A., North Carolina, Orange Co., Chapel Hill, Battle's Branch, short distance above first bridge, woods, 27.x.1914 H. R. Totten s.n. [W. C. Coker 1432] (NCU, good annotation, photo included in protolog, spore print available, unambiguous mention of lavender in annotation). Also note discussion of Tulloss (2005: 480, note 7).

NOTES — The epithet "*lavendula*" is the first to be attached to a North American taxon in the group of taxa that has been repeatedly, incorrectly determined as *A. citrina* in North America. The name *A. citrina* f. *lavendula* was incorrectly applied to a hybrid "swarm" represented by citrinoid material from eastern North America (Hughes et al. 2013). Continued work on this material turned up a set of three taxa that all can turn a purplish color (lavender to deep amethyst) under near freezing temperatures (e.g., below 2°C). Further publication on this group is planned by Hughes, Tulloss, and others.

5. ***Amanita neomurina*** Tulloss nom. nov.

MycoBank: MB 516660

Basionym: *Amanita murina* Sacc., nom. illeg., 1891. *Syll. Fung.* 9: 2. [Posterior homonym. ICN §53.1]

≡*Agaricus murinus* Cooke & Massee in Cooke nom. illeg., 1889. *Grevillea* 18: 1. [Posterior homonym. ICN §53.1]

non *Amanita murina* Bertillon in Dechambre, 1866. *Dict. Encycl. Sci. Médic.*: 496.

≡*Agaricus murinus* Roques nom. illeg., 1841. *Hist. Champ. Commest. Vénén.*: 359.

≡*Amanita murina* (Roques) Gillet, 1874. *Hyménomyc....champ. croiss. France*: 50. [Superfluous combination.]

≡*Amanitopsis murina* (Roques) Dumée, 1902. *Bull. Soc. Mycol. France* 18: 110.

non *Agaricus murinus* Batsch, 1783. *Elench. Fung.* 1: 115.

≡*Agaricus murinus* Batsch : Fr., 1821. *Syst. Mycol.* 1: 115.

Selected illustration: Cooke. 1889. *Grevillea* 18: pl. 174.

Revision: Pegler. 1965. *Austral. J. Bot.* 13: 340, fig. 1/5.

Revision & lectotypification: Reid. 1980. *Austral. J. Bot., Suppl. Ser.* 8: 40, figs. 25(a-g), 76-77, 97.

Lectotype: K(M) 190640

Etymology: The original epithet refers to the mouse gray cap color of the fungus. The familiar original epithet is preserved within the new name.

Notes — A replacement was required for an illegitimate name that has long been in common use in Australian literature. Wood (1997) and Reid (1980) revised two (disjunct) sets of material in their descriptions of this species. The biometric components of the methodologies of Wood and Reid are incompatible with each other as well as with the methods of Tulloss (e.g., Tulloss 2015e, Tulloss and Rodríguez-Caycedo 2011). Consequently, it is not possible to judge whether the two sets of material studied are contaxic without an additional pair of revisions.

6. ***Amanita neoneglecta*** Tulloss nom. nov.

MycoBank: MB 516638

Basionym: *Amanita neglecta* Murrill nom. illeg., 1955. *Mycologia* 47: 427. [Posterior homonym. ICN §53.1]

non *Amanita neglecta* Boedijn, 1951. *Sydowia* 5: 324, fig. 4(2).

Type study: Jenkins. 1979. *Mycotaxon* 10: 183.

Holotype: **U.S.A.**: FLORIDA — Alachua Co. - Gainesville, 16.ix.1950 W. A. Murrill F 32887 (FLAS).

Etymology: In his brief protolog, Murrill provides no clear motivation for saying this species is neglected (*neglectus*). The original epithet is preserved within the new name.

Notes — A replacement was required for an illegitimate name that applies to an apparently infrequently collected North American taxon.

7. ***Amanita persicina*** (Dav. T. Jenkins) Tulloss & Geml comb. nov.

MycoBank: MB 807939
GenBank: EU071826, EU071827, EU071828, EU071831, EU071832, EU071859, EU071861, EU071862, EU071877, EU071886, EU071887, EU071888, EU071891, EU071892, EU071926, EU071963, EU071964, EU071965, EU071968, EU071969, EU071995

Basionym: *Amanita muscaria* var. *persicina* Dav. T. Jenkins, 1977. *Biblioth. Mycol.* 57: 59, pl. 7, 30.

Holotype: Jenkins 671 in herb. David T. Jenkins, University of Alabama, Birmingham.

Notes — Geml et al. (2008) provide a phylogeny that supports the segregation of *A. muscaria* var. *persicina* at species rank (Geml et al. 2008 fig. 1, clade marked "IV SE U.S.") from *A. muscaria* and from the North American cluster of color variants to which the following names apply: *A. muscaria* subsp. *flavivolvata* Singer (Singer 1958), *A. muscaria* var. *guessowii* Veselý (Veselý 1933), *A. muscaria* var. *alba* (Peck) Peck (Peck 1893), and (possibly) *A. chrysoblema* G. F. Atk. in Kauffman (Kauffman 1918).

Hilton and Clancy (1988) used the name "*Amanita persicina* (ined.)" for an Australian fungus from Jarrah forest but failed to meet then existing requirements for publication of the name. Davison et al. (2013) identified the species of the Hilton and Clancy paper as *A. fibrillopes* O. K. Mill. (Miller 1992).

8. ***Amanita reidiana*** Tulloss nom. nov.

MycoBank: MB 807619

Basionym: *Amanita submembranacea* var. *bispora* D. A. Reid, 1987. *Notes Roy. Bot. Gard. Edinburgh* 44: 514.

≡*Amanita castaneogrisea* Contu nom. inval., 1998. *Micol. Veg. Medit.* 12(2): 146. [Lacking full and direct reference to name being replaced. ICN §41.5]

Selected illustration: Tulloss. 2000a. *Boll. Gruppo Micol. G. Bresadola* 43(2): fig. 9.

Type study: Tulloss. 1994. *Mycotaxon* 62: 371-373.

Holotype: K

Etymology: In honor of Dr. Derek A. Reid.

Notes — In the 1994 type study cited above, Tulloss demonstrated morphological differentiation of the present taxon from *A. submembranacea* and indicated that he planned to propose a new name. Shortly thereafter, Contu, citing (Tulloss 1994), proposed a name, but did not fulfill requirements for valid publication (above). It seems appropriate to honor Reid, especially since a previous attempt to do so—*Amanita reidii* Eicker & Greuning (Eicker et al. 1993)—appears to have resulted in creation of a taxonomic synonym of *A. marmorata* Cleland & E.-J. Gilbert (Gilbert 1941).[1]

Proposal of lectotype and epitype

9. *Amanita nivalis* Grev., 1822. *Scot. Cryptog. Fl.* 1(4): pl. 18.

MycoBank: MB 177200
GenBank: AF024466

Neotypification: Watling. 1985. *Agarica* 6(12): 331, fig. 1(A-E). [Inappropriate designation because original material exists—Greville's plate in the protolog of the species. ICN §9.2-9.3, §9.7, §9.11-9.13]

Lectotype: Because neither Watling (1985) nor anyone since has found specimens of original material of *Amanita nivalis*, the plate of the protolog (Greville. 1822. Scot. Cryptog. Fl. 1(4): pl. 18.) should be designated as lectotype; and that is proposed here. This lectotype is registered on MycoBank.

Epitype: Watling's proposed "neotype"—8.ix.1984 R. Watling 17489 (E)—is here proposed as epitype of *Amanita nivalis* and has been registered as such on MycoBank. Iso-epitypes are deposited, at least, in L (0053705), NY (01937400), and RET (042-5, fragments).

Notes — Watling's "neotype" was reported as a rather copious collection—supporting distribution of duplicates to herbaria on at least two continents. The collection was gathered on a site mentioned in the protolog. Watling provides a macroscopic description of the material and reports on the ecology and apparent altitude limitations of the taxon. Tulloss provided an illustrated revision of microanatomy of the former "neotype" in (Tulloss and Moses 1995). Weiss et al. (1998) posted a 631 bp nrLSU fragment beginning 55± characters from the 5′ end of the locus. The sequence was derived from the Leiden iso-epitype. Watling 17489 is thus deserving of epitype status.

Acknowledgments

We extend our sincere gratitude to those persons serving during the last three decades as curators and curation assistants and associates of herbaria mentioned in this article. We thank Mrs. Mary Tulloss, Roosevelt, New Jersey, for her assistance in preparing this paper for publication.

1. Originally proposed by Tulloss on morphological grounds, this synonymy has now been supported as the result of sequencing nrITS and nrLSU of Australian material of *A. marmorata* (GenBank KP757874-KP757875). These sequences were found to be essentially identical (unpub. data) to previous sequences from South African material of *A. reidii* (GenBank AY325824 - nrITS) and Hawaiian material of *A. marmorata* subsp. *myrtacearum* O. K. Mill., Hemmes & G. Wong (O. K. Miller et al. 1996) (GenBank HQ539709 - nrLSU). See (Tulloss 2015a).

Reviewers

We are grateful to Drs. Joost Stalpers and Else C. Vellinga, who reviewed this article prior to its publication.

Literature cited

Batsch, A. J. G. C. 1783. *Elenchus fungorum*. (Halae Magdeburgicae, J. J. Gebauer). [i-vii], [1-2]-184, pl. 1-12.

Beeli, M. 1935. *Flore iconographique des champignons du Congo. Amanita*. (Jard. Bot. État, Bruxelles): 27 pp. + 4 pls.

Bertillon. 1866. Amanites in *Dict. Encycl. Sci. Médicales*. DeChambre, ed. (V. Masson et fils, Paris). 1(3): 491-511.

Boedijn, K. B. 1951. Notes on Indonesian fungi. The genus *Amanita*. *Sydowia* 5: 317-327.

Coker, W. C. 1917. The amanitas of the eastern United States. *J. Elisha Mitchell Sci. Soc.* 33: i + 1-88.

Contu, M. 1998. ["1997"] Appunti sul genere *Amanita* - VI. Due nuove specie nella sezione *Vaginatae*. *Micol. Veg. Medit*. 12(2): 136-147.

Cooke, M. C. 1889. New Australian fungi. *Grevillea* 18 (fasc. 85): 1-8.

Davison, E. M., L. E. McGurk, N. L. Bougher, K. Syme and E. L. J. Watkin. 2013. *Amanita lesueurii* and *A. wadjukiorum* (Basidiomycota), two new species from Western Australia, and an expanded description of *A. fibrillopes*. *Nuytsia* 23: 489-606.

Dumée, P. 1902. Nécessité de réviser le genre *Amanita*. *Bull. Soc. Mycol. France* 18: 101-110.

Eicker, A., J.V. van Greuning and D. A. Reid. 1993. *Amanita reidii*—a new species from South Africa. *Mycotaxon* 47: 433-437.

Fries, E. M. 1821. *Systema mycologicum, sistens fungorum ordines, genera et species, huc usque cognitas, quas ad normam methodi naturalis determinavit, disposuit atque descripsit* 1. (Gryphiswaldiae, Lund). 520 pp.

Geml, J., R. E. Tulloss, G. A. Laursen, N. A. Sazanova and D. L. Taylor. 2008. Evidence for strong inter- and intracontinental phylogeographic structure in *Amanita muscaria*, a wind-dispersed ectomycorrhizal basidiomycete. *Molec. Phylog. Evol.* 48: 694-701.

Geml, J., R. E. Tulloss, G. A. Laursen, N. A. Sazanova and D. L. Taylor. 2010. Phylogeographic analyses of a boreal-temperate ectomycorrhizal basidiomycete, *Amanita muscaria*, suggest forest refugia in Alaska during the last glacial maximum. *in* Habel, J. C. and R. Assman, eds. *Relict species. Phylogeography and conservation biology*: 173-186.

Gilbert, E.-J. 1940-41. *Amanitaceae*. *Iconogr. Micol. (Milan)* 27 & suppls.: xx+427 pp., 73 pl.

Gillet, C. C. 1874. *Les hyménomycètes ou description de tous les champignons (fungi) qui croissent en France avec l'indication de leurs propriétés utiles ou vénéneuses*. (Ch. Thomas, Alençon). vii+828 pp.

Greville, R. K. 1822 ["1823"]. *Scottish cryptogamic flora* 1 (Edinburgh): pl. 1-60, with accompanying texts.

Hilton, R. N. and S. Clancy. 1988. *Larger fungi of the Jarrah Forest*. Conservation Council of Western Australia Res. Publ. 2: i-iv, 1-24.

Hughes, K. W., R. H. Petersen, D. J. Lodge, S. E. Bergemann, K. Baumgartner, R. E. Tulloss, E. Lickey and J. Cifuentes. 2013. Evolutionary consequences of putative intra- and interspecific hybridization in agaric fungi. *Mycologia* 105: 1577-1594.

Jenkins, D. T. 1977. A taxonomic and nomenclatural study of the genus *Amanita* section *Amanita* for North America. *Biblioth. Mycol.* 57: 1-126.

Jenkins, D. T. 1979. A study of *Amanita* types III. Taxa described by W. A. Murrill. *Mycotaxon* 10: 175-200.

Kauffman, C. H. 1918. *Agaricaceae* of Michigan. *Michigan Geol. Biol. Survey Publ., Biol. Ser. 5* 26: vol I—xxvii+924 pp.; vol. II—10 pp., 162 pl. [Reprinted by Johnson Reprint Corp., New York, 1965-67.]

Kirk, P. M. and A. E. Ansell. 2015 [mutable text]. Authors of fungal names. in *Index Fungorum*. < http://www.indexfungorum.org/FungalNameAuthors.pdf > accessed 2 February 2015.

Krieger, L. C. C. 1927. New or otherwise interesting *Agaricaceae* from the United States and Canada. *Mycologia* 19: 308-314, pl. 31-36.

McNeil, J., F. R. Barrie, W. R. Buck, V. Demoulin, W. Greuter, D. L. Hawksworth, P. S. Herendeen, S. Knapp, K. Marhold, J. Prado, W. F. Prud'homme van Reine, G. F. Smith, J. H. Wiersema and W. J. Turland. 2012. *International Code of Nomenclature for Algae, Fungi and Plants*. Koeltz Books. < http://www.iapt-taxon.org/nomen/main.php?page=title >.

Miller, O. K., 1992 ["1991"]. New species of *Amanita* from Western Australia. *Canad. J. Bot.* 69: 2692-2703.

Miller, O. K., D. E. Hemmes and G. Wong. 1996. *Amanita marmorata* subsp. *myrtacearum*—a new subspecies in *Amanita* section *Phalloideae* from Hawaii. *Mycologia* 88: 140-145.

Murrill, W. A. 1955. A new species of *Amanita* from Florida. *Mycologia* 67: 427.

Neville, P. and S. Poumarat. 2004. *Amaniteae*. 1. *Fungi Europaei* 9: 1-1119.

Peck, C. H. 1893 ["1892"]. Report of the State Botanist 1892. *Rep. N. Y. St. Mus.* 46: ca. 133.

Pegler, D. N. 1965. Studies on Australasian Agaricales. *Austral. J. Bot.* 13: 323-356.

AMANITACEAE

Persoon, C. H. 1797. *Tentamen dispositionis methodicae fungorum in classes, ordines genera et familias*. (Lipsiae). iv+76 pp., 4 pl.

Reid, D. A. 1980. A monograph of the Australian species of *Amanita* Pers. ex Hook. (Fungi). *Austral. J. Bot., Suppl. Ser. 8*: 1-96.

Reid, D. A. 1987. New or interesting records of British hymenomycetes VII. *Notes Roy. Bot. Gard. Edinburgh* 44(3): 503-540.

Roques, J. 1841. *Histoire des champignons commestibles et vénéneux*, 2nd ed. (Fortin, Masson & Cie., Paris) 483 pp. [Pagination *per* Neville and Poumarat (2004).]

Saccardo, P. A. 1887. Sylloge hymenomycetum. vol. I. Agaricineae. *Sylloge fungorum omnium hucusque cognitorum* 5: 1-1146.

Saccardo, P. A. 1891. *Sylloge Fungorum* 9: 1-1141. [Pagination *per* Neville and Poumarat (2004).]

Singer, R. 1958. ["1957"] Fungi mexicani, series prima--Agaricales. *Sydowia* 11(1-6): 354-374.

Sartory, A. and L. Maire. 1922. *Compendium Hymenomycetum* 1 (*Amanita*:): 1-448.

Tai, F. L. 1979. *Sylloge Fungorum Sinicorum*. (Science Press, China).

Thiers, B. M. 2015 [mutable text]. *Index herbariorum*. < http://sciweb.nybg.org/science2/IndexHerbariorum.asp > accessed 2 February 2015.

Tulloss, R. E. 1994. Type studies in *Amanita* section *Vaginatae* I: Some taxa described in this century (studies 1-23) with notes on description of spores and refractive hyphae in *Amanita*. *Mycotaxon* 52: 305-396.

Tulloss, R. E. 2000. Nomenclatural changes in *Amanita*. *Mycotaxon* 75: 329-332.

Tulloss, R. E. 2000a. Note sulla metodologia per lo studio del genere Amanita (Agaricales). *Boll. Gruppo Micol. G. Bresadola* 43(2): 41-58.

Tulloss, R. E. 2005. *Amaniteae*: *Amanita, Limacella, & Torrendia*. *Mycotaxon* 92: 469-496. [book review]

Tulloss, R. E. 2015a [mutable text]. *Amanita marmorata*. in Tulloss, R. E. and Z. L.Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?Amanita+marmorata > accessed 6 February 2015.

Tulloss, R. E. 2015b [mutable text]. *Amanita flaccida*. in Tulloss, R. E. and Z. L.Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?Amanita+flaccida > accessed 11 February 2015.

Tulloss, R. E. 2015c [mutable text]. *Amanita umbrinolutea*. in Tulloss, R. E. and Z. L.Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?Amanita+umbrinolutea > accessed 11 February 2015.

Tulloss, R. E. 2015d [mutable text]. *Amanita albopulverulenta*. in Tulloss, R. E. and Z. L.Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?Amanita+albopulverulenta > accessed February 26, 2015.

Tulloss, R. E. 2015e [mutable text]. Meaning of certain biometric variables & how to define a range. in Tulloss, R. E. and Z. L.Yang, eds. < http://www.amanitaceae.org?How+To's&howto=8 > accessed 2 February 2015.

Tulloss, R. E. 2015f [mutable text]. *Amanita congolensis*. in Tulloss, R. E. and Z. L.Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?Amanita+congolensis > accessed 2 February 2015.

Tulloss, R. E. and E. Moses. 1995. *Amanita populiphila*—a new species from the central United States. *Mycotaxon* 53: 455-466.

Tulloss, R. E. and C. Rodríguez-Caycedo. 2011. *Amanita* workshop, 6th ed. (amanitabear.com and amanitaceae.org, Roosevelt, New Jersey). 36 pp.

Tulloss, R. E. and Z. L. Yang. 2015. Series *Farinosae*. in Tulloss, R. E. and Z. L. Yang, eds. *Amanitaceae* studies. < http://www.amanitaceae.org?series+Farinosae > accessed March 1, 2015.

Veselý, R. 1933. Revisio critica *Amanitarum* europaearum. *Ann. Mycol.* 31: 209-298.

Watling, R. 1985. Observations of *Amanita nivalis* Greville. *Agarica* 6(12): 327-335.

Weiss, M., Z. L. Yang and F. Oberwinkler. 1998. Molecular phylogenetic studies in the genus *Amanita*. *Canad. J. Bot.* 76: 1170-1179.

Wolfe, B. E., R. E. Tulloss and A. Pringle. 2012. The irreversible loss of a decomposition pathway marks the single origin of an ectomycorrhizal symbiosis. *PLoS ONE* 7(7): e39597. doi:10.1371/journal.pone.0039597

Wood, A. E. 1997. Studies in the genus *Amanita* (Agaricales) in Australia. *Austral. Syst. Bot.* 10: 723-854.