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**MYCOLOGICAL HERITAGE OF JOHANN BUXBAUM.
5. FUNGI DESCRIBED IN THE FOURTH “CENTURIA” ISSUE (1733).
3. RUSSULOID SPECIES, THREE ARE TRUE ONES, ONE IN LINNAEAN
MISINTERPRETATION**

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The present notice continues our acquaintance with the mycological heritage of Johann Christian Buxbaum (1693–1730). A total of five “Centuria” (sets of 100 species) under the title “Plantarum minus cognitarum centuria circa Byzantium et in Oriente observatas” were published by the St. Petersburg Academy of Sciences. In the fourth “Centuria” issue we can find descriptions and illustrations of 56 species of fungi, among these three species belonging to the modern genus *Lactarius*, and one species mistakenly associated with *Agaricus* (*Russula*) *integer* by Linnaeus, but actually belonging to *Amanita* cf. *fulva*. The nomenclature of these taxa is presented and their homogeneity and variability in light of the modern data is estimated.

Keywords: *Agaricomycetes*, botanists of the 18th century, drawings of fungi, *Lactarius*, morphology, nomenclature, *Russulaceae*

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The present notice continues our acquaintance with the mycological heritage of Johann Christian Buxbaum (1693–1730), a naturalist who was appreciated by Peter the Great, the first botanist-academician of the Saint Petersburg Academy of Sciences (Zmitrovich, Sytin, 2021a, 2021b, 2021c, 2022).

A total of five of Buxbaum’s “Centuria” (sets of 100 species) were published by the St. Petersburg Academy of Sciences under the title “Plantarum minus cognitarum centuria circa Byzantium et in Oriente observatas” (vols IV and V were compiled post mortem) (Buxbaum, 1728a, 1728b, 1729, 1733, 1740) which well describing and illustrating vascular and cryptogamic plants and fungi associated with various habitats in North Africa, the Eastern Mediterranean, and the South of Russia.

The issue composition is rather stereotypical for the entire series and is quite simple. Species descriptions are given on 40–50 pages (the units, corresponding to modern genera, were arranged more or less alphabetically within the issue, and according to this feature Buxbaum was assigned to a cohort of “alphabetaries” – Sytin et al., 2021), then followed by “Index” and 64–74 tables containing the drawings of plants and fungi. The first volume slightly deviates from such a stereotype, because the main content is prefaced by the author’s foreword, whereas the last volume deviates in

having the “Appendix” with 44 species not included in the basic content.

The fungal descriptions are intermixed with diagnoses of species belonging to other groups of plant organisms. Within the first and second volumes the alphabetical principle is maintained, but already in the fourth volume, compiled after the death of the author, it becomes eroded and, e.g., *Coralloides* we can find at the volume end, after *Agaricus*, *Lycoperdon* and species of vascular plants and mosses placed between them. In the fifth issue, the alphabetic principle is maintained only partially, since some *Fungus* species are interrupted by several taxa of vascular plants and the *Lycoperdon* representatives as well.

The fourth issue contains the largest number of fungal taxa (56 species), and some of them, namely clavarioid (Zmitrovich, Sytin, 2021c) and lentinoid (Zmitrovich, Sytin, 2022), have already been analyzed in our notices.

The fungi having latex-bearing basidiomata (*Lactarius* in modern taxonomy) were well presented in contemporary to Buxbaum herbalists, since they had long attracted the attention of physicians. In particular, they were listed in Löselius (1654, 1703) treatises among his *Fungus vescus* (species numbers I–XVIII, especially V–XI). In the fourth “Centuria” issue, we can find three such species. Besides, one of Buxbaum’s descriptions was erroneously recognized as a russuloid

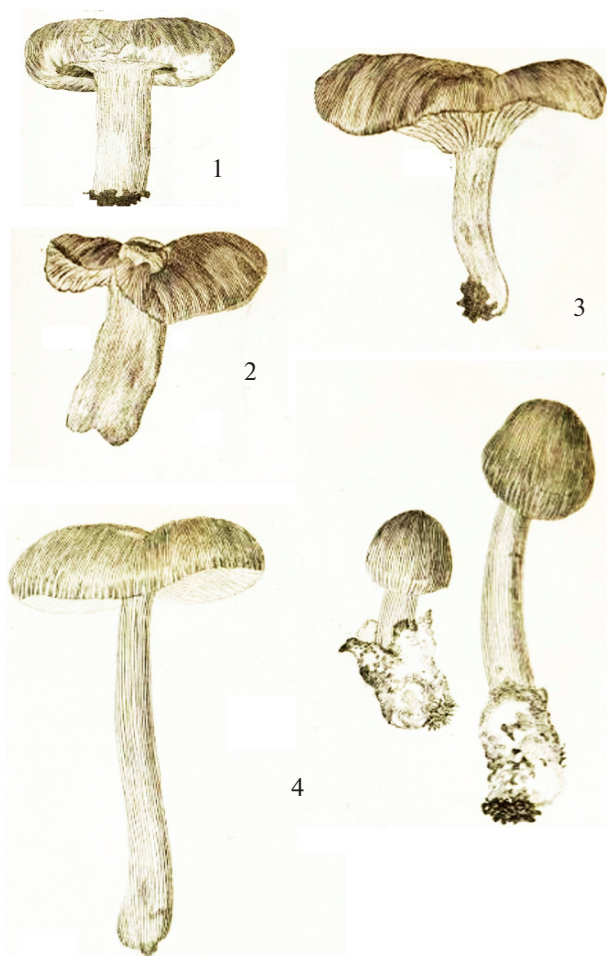


Fig. 1. Engravings from drawings to Buxbaum's "Centuria" IV (Buxbaum, 1733) published within a book tables: 1 – *Fungus umbilicatus, lacte acri turgens, oris villosis* (*Lactarius torminosus* in modern taxonomy); 2 – *Fungus lividus, lacte acre turgens* (*Lactarius trivialis* in modern taxonomy); 3 – *Fungus fuscus, lacte acri turgens* (*Lactarius* cf. *fuliginosus* in modern taxonomy); 4 – *Fungus major, pediculo longo, modice crasso, lamellis albis creberrimis, superne ad margines apparentibus* (*Amanita* cf. *fulva* in modern taxonomy).

agaric by Linnaeus (1753), while an authentic description unequivocally refers to *Amanita* (= *Amanitopsis*) species. This case also will be considered in the present note (the species is marked with asterisk).

1. *Fungus umbilicatus, lacte acri turgens, oris villosis* – p. 10–11, tab. XVI (Fig. 1, 1)¹.

"Totus eleganter rubet, et colorem florum Persicorum fere refert; interdum quoque albicat, succo lacteo acerrimo turget. Orae intro flexae eleganter villosae sunt. Colligitur a Ruthenis et sale conditur, qui tempore jejunii, acteo et oleo adjectis, crudus comeditur. Est Fungus vescu XI Lös. Fl. Pr. Putavi olem esse Fungum piperatum album lacteo succo tur-

¹ The references to the figures into the present paper are given in brackets.

gentum C.B. adhuc juneorem, quia vero Löselius diversum fecit, et diverso nomine patrio recensuit, illi affensum praebere cogor. Plures recenset modo laudatus Löselius Fungorum lacte acri praedictorum species, et nos etiam aliquot observavimus, quorum figurae frequenter. Vna est hastenus species recensia apud Botanicos, quos propter succumbacrem lacteum consudisse vero simile est".

Current status. An elegant morphotype with a rather long stem, fluffy cap and peach-pink tones of the upper side, coupled with a reference to the interpretation of Löselius (1703), without equivocal, indicates belonging to *Lactarius torminosus* (Schaeff.) Pers. (*Basidiomycota, Agaricomycetes, Russulales, Russulaceae*).

Post-Linnean synonymy: *L. torminosus* (Schaeff.) Pers., Tent. Disp. Meth. Fung.: 64, 1797. = *Agaricus torminosus* Schaeff., Fung. Bavar. Palat. Nasc. 4: 7, 1774. = *A. cilicioides* Fr., Syst. Mycol. 1: 63, 1821. = *Lactarius intermedium* Krombh. ex Berk. et Broome, Ann. Mag. Nat. Hist., Ser. 5 (7): 128, 1881. = *L. nordmanensis* A.H. Sm., Brittonia 12: 308, 1960.

Modern elaborations: Hesler, Smith (1979); Kalamees (2011).

Note. It is possible that *L. torminosus* is not a species complex, but rather polymorphic and common in Europe species, but also occurs in North America. Hesler and Smith (1979) made a distinction between *L. torminosus* var. *torminosus* with unchanging, white latex and var. *nordmanensis* (A.H. Sm.) Hesler et A.H. Sm., with white latex changing to yellow shades.

2. *Fungus lividus, lacte acre turgens* – p. 11, tab. XVII, f. 1 (Fig. 1, 2).

"Ex Fungis mediae magnitudinis est; capitulum nunc ex livido purpurascit aut albescit. Lamellae albae, densissimae, angustae; orae parum introflexae. Pediculus pro modulo capituli longior. In silvis nostris frequens Augusto. Videtur esse Fungi vesci V species secunda Lösel. in Fl. Pr. "

Current status. The upper side features and proportions of basidiomata indicate that the Buxbaum's *Fungus lividus*... is corresponded to *Lactarius trivialis* (Fr.) Fr. (*Basidiomycota, Agaricomycetes, Russulales, Russulaceae*).

Post-Linnean synonymy: *L. trivialis* (Fr.) Fr., Epicr. Syst. Mycol.: 337, 1838. = *Agaricus trivialis* Fr., Observ. Mycol. 1: 61, 1815. = *Lactarius trivialis* var. *gracilis* Peck, Ann. Rep. N.Y. St. Mus. Nat. Hist. 38: 120, 1885. = *L. trivialis* var. *maculatus* Peck, Ann. Rep. N.Y. St. Mus. Nat. Hist. 38: 121, 1885. = *L. trivialis* var. *viridilactis* Kauffman, Publ. Mich. Geol. Biol. Surv., Biol. Ser. 5, 26: 101, 1918. = *L. trivialis* var. *minor* J. Blum, Revue Mycol. 31 (1): 106, 1966.

Modern elaborations: Hesler, Smith (1979); Kalamees (2011).

Note. *Lactarius trivialis* in Friesian (1815, 1838) sense is rather a linnean which corresponds to the *Lactarius* subgen. *Piperites* subsect. *Trivialini* of modern authors (Heilmann-Clausen et al., 1998). The colour of the pileus of Buxbaum's taxon (livid-gray with purplish tint) refers rather to the classical European *L. trivialis* s.s.

3. *Fungus fuscus, lacte acri turgens* – p. 11, tab. XVII, f. 2 (Fig. 1, 3).

"Pediculo breviori, et capitulo majore minus circinato praecedente, cum quo lamellis et lacte acri convenit, differt. Fungus piperatus albus, lacteo succo turgens. C.B. saepius etiam occurrit capitulo fusco, sed nostro omnibus partibus major. In silvis Septembri gregatim internum nascitur. Observavi et aliam Fungi piperati speciem in silva Duderoviana lamellis multo latioribus et laxus positis, quam, quia pictor non ad manus erat, negligere coactus sum".

Current status. A less robust stipe in comparison with the previous species, a brown-coloured pileus bearing a white hymenophore, and a gregarious fructification indicate that Buxbaum may have dealt with a representative of *Lactarius* subg. *Plinthogalus*, highly likely, with *Lactarius fuliginosus* (Fr.) Fr. (*Basidiomycota*, *Agaricomycetes*, *Russulales*, *Russulaceae*).

Post-Linnaean synonymy: *L. fuliginosus* (Fr.) Fr., *Epicr. Syst. Mycol.*: 348, 1838. ≡ *Agaricus fuliginosus* Fr., *Syst. Mycol.* 1: 73, 1821. = *Lactarius fuliginosus* var. *major* Fr., *Epicr. Syst. Mycol.*: 348, 1838. = *L. fuliginosus* var. *elongatus* Neuhoff, *Pilze Mitteleuropas* 2b: 35, 1937. = *L. fuliginosus* var. *montanus* Neuhoff, *Pilze Mitteleuropas* 2b: 35, 1937. = *L. fuliginosus* var. *subplumbeus* Neuhoff, *Pilze Mitteleuropas* 2b: 35, 1937. = *L. fuliginosus* var. *clitocyboides* A.H. Sm. et Hesler, *Brittonia* 14: 420, 1962. = *L. fumosoides* A.H. Sm. et Hesler, *Brittonia* 14: 431, 1962. = *L. fumosus* var. *occidentalis* A.H. Sm. et Hesler, *Brittonia* 14: 436, 1962. = *L. fumosus* var. *subalutaceus* A.H. Sm. et Hesler, *Brittonia* 14: 437, 1962.

Modern elaborations: Kalamees (2011); Stubbe, Verbeke (2012).

Note. *L. fuliginosus* s.l. represents two sibling species complex, where *L. fuliginosus* s.s. is associated exclusively with broadleaf trees, whereas *L. picinus* Fr. with conifers, but this putative difference in host specificity needs to be investigated further (Stubbe, Verbeke, 2012).

*4. *Fungus major, pediculo longo, modice crasso, lamellis albis creberrimis, superne ad margines apparentibus* Raj. *Suppl.* — p. 12, tab. XIX (Fig. 1, 4).

“Notas hujus certas tradit Rajus, nempe quod lamellae a margine ad pediculum usque omnes indivisae extendantur, ut non plures fint ad marginem, quam ad pediculum, et quod lamellae etiam ad margines superne adpareant; ita, ut margo striata, seu pectinata videatur. Color pilei est ex rufo fuscus, interdum albicans. E volva erumpit; hinc saepius particulae membranae disruptae in capitulo relinquuntur. Damus hic figuram adulti, et junioris, quando e volva exit. Frequens est in silvis nostris Septembris”.

Current status. The correspondence of this description with *Agaricus integer* L. [≡ *Russula integra* (L.) Fr., *Basidiomycota*, *Agaricomycetes*, *Russulales*, *Russulaceae*] was established by Linnaeus (1753, p. 1171). However, our analysis of Buxbaum's drawing and description shows that in this case we are dealing with a Linnaean misinterpretation of this taxon. Both in the drawing and in the text we can observe a nodulocarpous volva-bearing species. Both the elongated stipe and cap ontogeny also indicate non-russuloid affinity of this taxon. As a matter of fact, Buxbaum's fungus has similarities with *Russula* only in the detached cuticle coupled with the ribbed edge. The affiliation of questioned species to the *Amanita* sect. *Vaginatae* is beyond doubt, and the indication of rufous-brownish cap coloration suggests that Buxbaum may have dealt with the widespread *Amanita fulva* Fr. (*Basidiomycota*, *Agaricomycetes*, *Agaricales*, *Amanitaceae*).

Post-Linnaean synonymy: *A. fulva* Fr., *Observ. Mycol.* 1: 2, 1815. ≡ *Agaricus fulvus* Schaeff., *Fung. Bavar. Palat. Nasc.* 4: 41, 1774. = *Amanitopsis fulva* f. *alba* Courtec., *Miscell. Mycologica*, *Cercle de Mycologie de Mons* 14: 8, 1986.

Modern elaborations: Bas (1969); Malysheva, Kovalenko (2015).

In conclusion, it should be noted that Linnaean misinterpretation has not any nomenclatural consequences, since his basic interpretation of this taxon was different and refers to his own “*Agaricus caulescens, pileo plano-concavo purpureo, lamellis stipiteque albis*” (Linnaeus, 1737) which is better

correlated with *Russula integra*; the holotype is missing (The Linnean Collections, 2022), but sanctioning the name *Agaricus integer* by Fries (1821), definitely, closes further nomenclatural discussions.

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Микологическое наследие Иоганна Буксбаума. 5. Грибы, описанные в четвертой “Центурии” (1733). 3. Руссулоидные виды, три истинных и четвертый, неверно интерпретированный Линнеем

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Статья продолжает знакомство с микологическим наследием Иоганна Христиана Буксбаума (1693–1730), связанным в основном с изданием этим автором “сотниц” видов – “Центурий”. Всего Санкт-Петербургской академией наук было издано 5 центурий (наборов из 100 видов) под названием “Plantarum minus cognitarum centuria circa Byzantium et in Oriente observatas”. В четвертом выпуске “Центурии” можно найти описания и иллюстрации 56 видов грибов, среди которых три вида принадлежат к современному роду *Lactarius*, а один вид был ошибочно ассоциирован Линнеем с *Agaricus (Russula) integer*, но все данные указывают на его принадлежность к *Amanita cf. fulva*. Представлена номенклатура этих таксонов и оценены их гомогенность и вариабельность в свете современных данных.

Ключевые слова: ботаники XVIII в., морфология, номенклатура, рисунки грибов, *Agaricomycetes*, *Lactarius*, *Russulaceae*