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MYCOLOGICAL HERITAGE OF JOHANN BUXBAUM. 3. FUNGI DESCRIBED IN THE FOURTH "CENTURIA" ISSUE (1733). 1. CLAVARIOID SPECIES

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The present notice continues our acquaintance with the mycological heritage of Johann Christian Buxbaum (1693–1730). A total of 5 "Centuria" (sets of 100 species) under the title "Plantarum minus cognitarum centuria circa Byzantium et in Oriente observatos" were published by the St. Petersburg Academy of Sciences. In the fourth "Centuria" issue we can find descriptions and illustrations of 56 fungal species, among which there are three species of clavarioid fungi considered in the present paper: 1) *Coralloides minor cristata*, 2) *Coralloides clavata, lutea, minor*, 3) *Coralloides lutea, non ramosa, clava rugosa*. The analysis of descriptions and original drawings made it possible to correlate these descriptions with 3 modern taxa: 1) *Clavulina coralloides* (*Basidiomycota*, *Agaricomycetes*, *Cantharellales*, *Hydnaceae*), 2) *Beauveria* cf. *scarabaeidicola* (*Ascomycota*, *Sordariomycetes*, *Hypocreales*, *Clavicipitaceae*), and 3) *Macrotyphula fistulosa/contorta* (*Basidiomycota*, *Agaricomycetes*, *Agaricales*, *Phyllotopsidaceae*). The nomenclature of these taxa is presented and their homogeneity in the light of the modern data is preliminarily estimated.

Keywords: Agaricomycetes, *Beauveria*, botanists of the 18th century, *Clavulina*, cordycipitaceous ascomycetes, drawings of fungi, *Macrotyphula*, morphology, nomenclature

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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, b). A total of 5 "Centuria" (sets of 100 species) under the title "Plantarum minus cognitarum centuria circa Byzantium et in Oriente observatos" were published by the St. Petersburg Academy of Sciences.

In the first "Centuria" issue (1728) we can find descriptions and illustrations of five fungal species: 1) *Agaricus barbatus flavescens* (*Hericium cirrhatum* in modern taxonomy), 2) *Agaricus gelatinosus, parte prona erinaceus* (*Hericium erinaceus*), 3) *Fungus erinaceus parvus in conis Abietis deiectis nascens* (*Auriscalpium vulgare*), 4) *Fungus parvus albus deiectis abietis nascens* (*Baeospora myosura*), 5) *Lycoperdon magnum globosum, pulpa granulata, radice crassa* (*Lycoperdon excipuliforme*). In the second "Centuria" (1728) issue we can find descriptions and illustrations of 8 fungal species: 1) *Agaricus varii coloris, erinaceus* (*Hydnellum ferrugineum* in modern taxonomy), 2) *Agaricus Pectunculi forma, oblongus luteus* (*Tapinella panuoides*), 3) *Lycoperdon stellatum, calyce inverso* (*Geastrum fimbriatum*), 4) *Fungus pileo plicatili, maior* (*Coprinopsis lagopus*), 5) *Fungus parvus pileolo plicatili, cinereus, oris crenatis* (*Parasola* sp.), 6) *Fungus plicatilis omnium minimus, albicans* (*Coprinopsis cordispora* species complex), 7) *Fungus parvus, infundibulum referens* (obviously, *Arrhenia obscurata*), and 8) *Fungus exiguus albicans capitulo, striato* (*Coprinellus disseminatus*). In the third "Centuria" issue (Buxbaum, 1729), there were no fungal species at all, when the coralloid forms here belonged to the marine algae: *Phaeophyceae* (*Chromophyta*) and corallinaceous *Rhodophyta*.

The fourth "Centuria" issue (Buxbaum, 1733), on the contrary, is mainly devoted to fungal species. Wonderful illustrations and descriptions of 56 species we can find here. Since it is not possible to cover all these species in one paper, in this notice we'll restrict ourselves to the clavarioid taxa, which Buxbaum himself designated with the generic epithet *Coralloides*. In total, there are three such species in the fourth "Centuria" issue. The analysis of species descriptions follows here.

1. *Coralloides minor cristata* – p. 39, tab. LXVI, *f.* 1.[1] (Fig. 1, *1*)[2].

"Albi aut violacei coloris oritur in silvis vicinis post pluvias Septembri. An Fungus ramosus cristatus, angustioriums lobis, et crispus. Bocc. Mus.?".

[1] The protologues refer to page, table, and figure (*f*) number of the original description (Buxbaum, 1733).

[2] The references to the figures into the present paper are given in brackets.

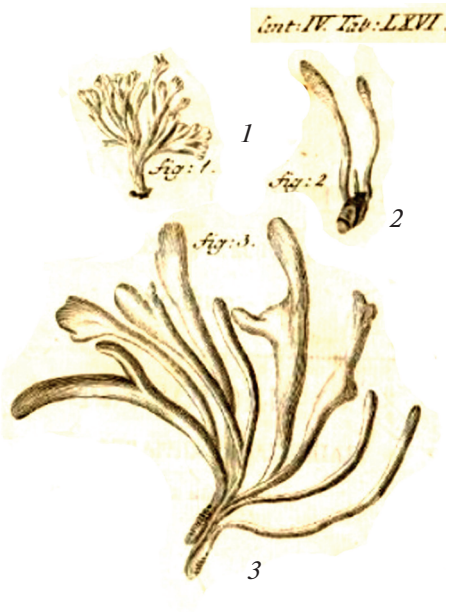

Fig. 1. Engravings from drawings to Buxbaum's "Centuria" IV (Buxbaum, 1733) published within a book tables: *1* – *Coralloides minor cristata* (*Clavulina cristata* in modern taxonomy); *2* – *Coralloides clavata, lutea, minor* (*Beauveria* cf. *scarabaeidicola* in modern taxonomy); *3* – *Coralloides lutea, non ramosa, clava rugosa* (*Macrotyphula fistulosa/contorta* in modern taxonomy).

Current status. Both Buxbaum's drawing and description of the color, general habit, and features of the tips of the coralloid fruiting body, together with mentioned ecological features, make it possible to reliably consider this taxon as *Clavulina coralloides* (*Basidiomycota*, *Agaricomycetes*, *Cantharellales*, *Hydnaceae*).

Post-Linnean synonymy: *Clavulina coralloides* (L.) J. Schröt. in Cohn, Krypt.-Fl. Schlesien 3.1 (25–32): 443, 1888. ≡ *Clavaria coralloides* L., Sp. Pl. 2: 1182, 1753 (sanct. Fr., Syst. Mycol., 1821). = *Ramaria cristata* Holmsk., Beata Ruris Otia Fungis Danicis 1: 92, 1790 (sanct. Fr., Syst. Mycol., 1821). = *Clavaria fimbriata* Pers., Neues Mag. Bot. 1: 117, 1794.

Modern elaboration: Corner (1970).

Note. This is a good polymorphic species rather than a species complex (Olariaga et al., 2009; Bondartseva, Zmitrovich, 2020).

2. *Coralloides clavata, lutea, minor* – p. 39, tab. LXVI, *f.* 2 (Fig. 1, *2*).

"Coralloidea clavata, lutea. Minor ramosa interdum est, qualem figura nostra fistit. Substantia tenera attacta glabra. In arenosis silvis Octobri. An Fungi parvulatei Ophyoglossoidem accedentes Raj. Histor.? An Funguli clavati ex gracili caule paullatim crassiores redditi, ad diigiti minimi fere longitudinem accedented Hofm. Fl. Altors.".

Current status. The description, together with the drawing, which clearly shows a pupated insect at fungus base, refers us to the cordycipitaceous ascomycetes. Buxbaum's reference to ophioglossoid fungus corresponds to the shape of the club, but in the figure, we see a granulose surface, as in the case with cordycipitoid fungi due to stigmata of numerous perithecia. *Cordyceps militaris* (L.) Fr. differs from the described fungus in bright orange stromata. Rather, in this case, we are dealing with *Beauveria* cf. *scarabaeidicola* (*Ascomycota*, *Sordariomycetes*, *Hypocreales*, *Clavicipitaceae*), a pale-yellow and often branched fungus. It is necessary to note that the distributional range of the scarab beetle captures the vicinity of Constantinople, where Buxbaum has collected his material.

Post-Linnean synonymy: *Beauveria scarabaeidicola* (Kobayasi) S.A. Rehner et Kepler in Kepler, Luangsaard, Hywel-Jones, Quandt, Sung, Rehner, Aime, Henkel, Sanjuan, Zare, Chen, Li, Rossman, Spatafora, Shrestha, IMA Fungus 8 (2): 345, 2017. ≡ *Cordyceps scarabaeidicola* Kobayasi [ut '*scarabaeicola*'] in Kobayasi et Shimizu, Bull. Nat. Sci. Mus., Tokyo, B 2 (4): 137, 1976.

Modern elaboration: Kepler et al. (2017).

Note. This is a good species rather than a species complex (Kepler et al., 2017).

3. *Coralloides lutea, non ramosa, clava rugosa* – p. 40, tab. LXVI, *f.* 3 (Fig. 1, *3*).

"Ad Fungos clavatos pertinent, non ramosus; pediculo glabro insidet; clava aspera et inaequalis superficiei; coloris dilute lutei, et consistentiae firmioris. In lignis et truncis arborum rejectis. Autumno".

Current status. As a clue to understanding what fungus was described here would be cosidered the author's mention that this grows on fallen wood, has rather hard consistency and wrinkled surface of the club. There is no doubt that Buxbaum was dealing with *Macrotyphula contorta* (*Basidiomycota*, *Agaricomycetes*, *Agaricales*, *Phyllotopsidaceae*).

Post-Linnean synonymy: *Macrotyphula contorta* (Holmsk.) Rauschert, Feddes Repert. Spec. Nov. Regni Veg. 98 (11–12): 660, 1987. ≡ *Clavaria contorta* Holmsk., Beata Ruris Otia Fungis Danicis 1: 29, 1790.

Modern elaboration: Olariaga et al. (2020).

Note. According to the modern molecular phylogenetic elaboration (Olariaga et al., 2020), the genus *Macrotyphula* R.H. Petersen represents a good lineage incorporated into the *Phyllotopsidaceae*-clade (in contrast to the core *Typhula*-clade, *Typhulaceae*). The modern phylogenetic status of *M. contorta* is unknown and till now it keeps a hypothesis that we dealing with merely a growth form of *M. fistulosa* (Holmsk.) R.H. Petersen, Mycologia 64 (1): 140, 1972.

The following notices are planned to be devoted to a large number of agaricoid fungi described by Buxbaum in the fourth issue of his "Centuria".

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Микологическое наследие Иоганна Буксбаума. 3. Грибы, описанные в четвертой "Центурии" (1733). 1. Клавариоидные и сходные с ними таксоны

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Настоящая заметка продолжает серию статей, посвященных анализу микологического материала, опубликованного крупным отечественным ботаником первой трети XVIII столетия, Иоганном Христианом Буксбаумом (1693–1730) в его "Центуриях" (сотницах). Во четвертой центурии (1733) можно найти описания и иллюстрации 56 видов грибов, из которых в данной заметке рассмотрено три вида, имеющих булавовидные и коралловидные плодовые тела и стромы: 1) *Coralloides minor cristata*; 2) *Coralloides clavata, lutea, minor*; 3) *Coralloides lutea, non ramosa, clava rugosa*. Проведенный анализ описаний и оригинальных рисунков позволил соотнести эти описания с тремя видами высших грибов: 1) *Clavulina coralloides* (*Basidiomycota*, *Agaricomycetes*, *Cantharellales*, *Hydnaceae*); 2) *Beauveria* cf. *scarabaeidicola* (*Ascomycota*, *Sordariomycetes*, *Hypocreales*, *Clavicipitaceae*); 3) *Macrotyphula fistulosa/contorta* (*Basidiomycota*, *Agaricomycetes*, *Agaricales*, *Phyllotopsidaceae*). Представлена номенклатура этих таксонов и предварительно оценена их гомогенность в свете современных данных.

Ключевые слова: агарикомицеты, ботаники XVIII столетия, кордицепсовые аскомицеты, морфология, номенклатура, рисунки грибов, *Beauveria*, *Clavulina*, *Macrotyphula*