

FUNGAL HERBARIUM OF THE KOMAROV BOTANICAL INSTITUTE RAS. X. TYPES OF *BOLETALES* TAXA

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Received June 15, 2022; revised August 10, 2022; accepted August 31, 2022

Information on type specimens of taxa belonging to the order *Boletales* loaned in the Mycological Herbarium of the Komarov Botanical Institute of the Russian Academy of Sciences is presented. A total of 97 specimens belonging to 35 species and 19 intraspecific taxa have been revealed in course of the inventarisation of collections. The history of replenishment of the collection can be divided into three periods. The first period (1930–1940) is related to stay and work of R. Singer in Russia (collections from Altay). The second one (1950–1970) is associated with activities of B.P. Vasilkov (mainly collections of intraspecific taxa of *Boletus edulis* from different regions of the former USSR) and L.N. Vasilyeva (collections from the Far East). The third period (from 2010 to the present time) is associated with contemporary researches of the mycobiota of the Far East of Russia, and Vietnam. An annotated list of type specimens includes the following information: name, authors, nomenclatural citation, type status, and original label citation. For specimens with handwritten labels, citations of authentic material locality or type locality from the protologue are also given. GenBank numbers are indicated for the holotypes if they are listed on the labels.

Keywords: *Agaricomycetes*, *Basidiomycota*, *Boletaceae*, boletoid fungi, protologues, Singer, Vassiljeva, Vassilkov

DOI: 10.31857/S002636482206006X

INTRODUCTION

The Mycological herbarium of the Komarov Botanical Institute of the Russian Academy of Sciences (BIN RAS) is the largest collection of fungal specimens in Russia (Herbarium Code LE; since 2020, the additional designation F (Fungi) has been introduced for the mycological division of the collection fund). A significant number of papers are dealing with its' collections (Melnik, Svishch, 1976a, 1976b, 1979; Kovalenko, 2000; Morozova, Popov, 2005), including those devoted to the inventory of type specimens stored in the herbarium (Bondartseva, Svishch, 1982; Popov, 2014), and the series “Fungal Herbarium of Komarov Botanical Institute RAS” (Fungal herbarium of Komarov Botanical Institute of the Academy of Sciences USSR) (Melnik, Svishch, 1974; Svishch, 1975a, 1975b; Kanevskaya, Orlova, 1975; Bondartseva et al., 1975; Nezdoyminogo, Svishch, 1975; Pystina, Svishch, 1977; Malysheva, Svishch, 2008; Rebriev et al., 2010), which is continued by the present work. Near 350000 fungal specimens, including more than 5000 type specimens, are now deposited in the herbarium. Type specimens are forever and inextricably linked to scientific names (Turland et al., 2018) and are therefore necessary and irreplaceable in taxonomic treatments and revisions of various taxa. Due to the development of molecular ge-

netic technologies, type collections are of particular importance. Confusing taxonomic problems, especially for taxa with overlapping morphological and/or ecological traits, can be solved with successful isolation and sequencing of some genetic marker and further phylogenetic analysis (Volobuev et al., 2022).

Digitizing of the Mycological herbarium began with specimens belonging to the order *Boletales*. Due to importance of type and authentic materials, an inventory of it was made. Information on the type specimens (actual and presumable) as well as on authentic material stored in LE and citations from the sometimes hardly available protologues will be useful to all researchers involved in the study of *Boletales*.

MATERIALS AND METHODS

The specimen labels were scanned by Epson Perfection 2400 Photo. Necessary information was recorded into Google Sheets. It should be noted that specimens were not studied. Photos of labels and database are available upon request.

The names of the taxa are arranged alphabetically, each accompanied with the following information: a) name of the taxon; b) author(s). According to the Recommendation 46C.2, for names with more than

two authors, the citation restricted to the first author followed by “et al.” (Turland et al., 2018); c) nomenclatural citation; d) herbarium number; e) the full text of the label, provided in original language, including GenBank accession numbers if they are listed on the labels. Information about the collector(s) is given only if the specimen was collected not by the author of the name or if the name was described by several authors. Original labels of exsiccata are given as is; f) status of the type collection given in bold in brackets: I – isotype, IP – isoparatype, IS – isosyntype, H – holotype, P – paratype, S – syntype. Original material is also indicated. Definitions of terms are given in the International code of nomenclature for algae, fungi, and plants (Turland et al., 2018); g) notes including information related to the specimen [inscriptions on label and/or envelope by author or other researchers, notae criticae (abbreviated as NC), etc.]. Additionally, for the specimens with handwritten labels citations of original material or type locality from protologue are provided in original language.

If the original language of nomenclature citation, label or protologue was Russian, an English translation of the text has been enclosed in brackets. Country of origin is given in translation if it was omitted on the original label. For clarity, the geography of records is presented as Krai instead of Territory and Oblast instead of Region. Dates data are written in day/month/year order (e.g. 04.06.1900, 09.1897). The spelling of taxa names are given in accordance with Index Fungorum (2022). Names of authors given in Russian were transliterated by the standard of the US State Department (<http://transliteration.ru/gosdep/>).

RESULTS

Afroboletus vietnamensis T.H.G. Pham et al., *Persoonia* 40: 255, 2018. – LE 311973, “Vietnam, Dak Lak Province, Yok Don National Park, 40 km to the northwest of Buon Ma Thuot city, 12.941306°N, 107.788167°E, evergreen tropical forest on the top of the hill dominated by *Fagaceae*, *Euphorbiaceae*, *Sapindaceae*, *Ebenaceae* and *Meliaceae*, 13.05.2014, A.V. Alexandrova, GenBank: ITS – MH087059, LSU – MH087058” (H). – LE 311972, “Vietnam, Binh Phuoc Province, Bu Gia Map District, Bu Gia Map National Park, 12.204509°N, 107.204415°E, foothill polydominant tropical forest dominated by *Dipterocarpaceae*, *Lythraceae*, *Rubiaceae*, *Theaceae*, *Lauraceae* and *Arecaceae*, 03.05.2013, A.V. Alexandrova” (P).

Baorangia alexandri Svetash. et al., *Persoonia* 40: 265, 2018. – LE 254266, “Россия, Приморский край, Сихотэ-Алинский заповедник, окр. кордона Благодатное (Russia, Primorsky Krai, Sikhote-Alinsky Reserve, vicinities of Blagodatnoye), 44°57'24.0"N, 136°33'35.0"E, лиственный лес с *Quercus mongolica*, на почве (deciduous forest with *Quercus mongolica*, on soil), 19.08.2013, A.E. Kovalenko 13-08-48” (H). – LE 254265, “Россия, Приморский край, Сихотэ-Алинский заповедник, окр. кордона Благодатное (Russia, Primorsky Krai, Sikhote-Alinsky Reserve, vicinities of Blagodatnoye), 44°57'24.0"N, 136°33'35.0"E, лиственный лес с *Quercus mongolica*, на почве (deciduous

forest with *Quercus mongolica*, on soil), 19.08.2013, A.E. Kovalenko 13-08-48” (P).

Boletinus asiaticus Singer, *Revue Mycol.* 3 (4–5): 164, 1938. – LE 17597, “Ad terram. Амурс. обл., Николаевск на Амуре (Russia, Amur Oblast, Nikolayevsk-na-Amure), 09.09.1906, Шестунов (Shestunov), det. 1937” (S). – LE 4455, “№ 362. In Lariceto sibiricae ad terram et ad truncos putridos. Севернее с. Курая, Ойротс. А.О. Алтайского края (Russia, North of Kuray, Oyrotskaya A.O. Altai Krai), 08.1937, Singer et Vasilyeva, det. 09.1937” (S). – LE 4458, “№ 20. ?*Boletus flavidus* Fries. Забайкалье, Нерчинско-Заводского уезда, селение Калчинское, в лесу (Russia, Transbaikalia, Nerchinsko-Zavodskoy Uezd, Kalchinskoye, in forest), 07.1902, Стуков (Stukov), Det. Jacz(evski). – *Boletinus asiaticus* Singer. 1937. Det. Singer” (S).

Note. In the protologue loci classici are listed as follows: “In silvis laricinis (*Larix sibirica*, *L. dahurica*) ad terram nudam, inter herbas et ad truncos. Aestate. In montibus usque ad 2200 m. ascendens. Distrib.: Asia septentrionalis: Regio Tomskiensis (Kravzev); Montes Altaici (Singer et Vasilyeva); Transbaikalia (Stucov); regio Amurensis (Szestunov)”.

B. griseopallidus Vassilkov, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 10: 209, 1955. – LE 4582, “Турус. Прибайкалье, у с. Лиственничного, в смешанном лесу с лиственницей, сосной и др. (Russia, Priбайkalye, vicinities of Listvennichnoye village, in mixed forest with larch, pine, etc.), 20.08.1947, det. 10.02.1953” (H).

Note. On the top of the label inscription in pencil: “*Boletus aeruginascens*”, most probably by B.P. Vasilkov. According to the protologue, locus classicus is given as follows: “Турус. URSS. Sibiria, Cisbaicalia, 20.08.1947, leg. Vasilkov; in Herb. Inst. bot. nom. V.L. Komarovi Ac. Sc. URSS, in Leningrad, conservatur”.

B. oxydabilis Singer, *Revue Mycol.* 3 (4–5): 160, 1938. – LE 17599 (Fig. 1c), “№ 1029. In silva sparsa ad ripam lacus inter gramineas prope *Laricem sibiricam*, *Pinum sibiricam* et *silvestrem*, *Betulam verrucosam*, Телецкое озеро: Яйля (центр Алтайского гос. заповедника) [Russia, Teletskoye Lake: Yailya (the center of Altai State Reserve)], 09.09.1937, det. 10.1937” (S).

Note. Protologue: “In silvis sparsis litoralibus partis mediae lacus Telezkensis Montium Altaicorum, pr. Jaila, ad terram declivem, soli meridionali expositam, in graminosis sub *Laricibus sibiricis*, *Pinisque sibiricis* solitario vel gregatim. Sept. 1937 leg. ipse”.

B. oxydabilis f. *aberrans* Singer, *Revue Mycol.* 3 (4–5): 161, 1938. – LE 17598, “№ 1142. In Abiegno-Pineto mixto inter Gramineas iuxta ripam lacus, Артубаш, Турочакск. айла, Ойротская обл., Алтайск. край (Russia, Artubash, Turochakskaya aila, Oirotskaya obl., Altay Krai), 09.1937, Singer et Vasilyeva” (S).

Note. Protologue: “In silva litoralі partis inferioris lacus Telezkensis Montium Altaicorum, pr. vicum Artubasz, ad terram graminosam, soli meridionali expositam, sub *Pinis sibiricis*, *silvestribus* et *Abietibus sibiricis* solitario, post frigores nocturnos sept. 1937”.



Fig. 1. Noteworthy type specimens of *Boletales*: a – original label of LE 17695 by L.N. Vasilieva with note by Carl B. Wolfe; b – original label of LE 200164 written by E.L. Nezdoyminogo with signature and notes by B.P. Vassilkov; c – original label of LE 17599 by Rolf Singer; d – original label of LE 17650 from *Plantae Australiuralenses* by E.A. Selivanova-Gorodkova with signature of B.P. Vassilkov.

B. suspectabilis Vassilkov, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 8: 114, 1952. – LE 4585, “Тип. Прибайкалье, окр. с. Лиственичного, смешанный лес, под елью (Туре. Russia, Priбайkalye, vicinities of Listvennichnoye village, mixed forest, under the spruce), 31.08.1947, det. 1950” (H).

Note. On the top of the label, note “*Boletus aeruginascens*” in pencil, most probably by B.P. Vassilkov. Protologue: “Typus. URSS, sibiria orientalis, Praebaicalia, 31.08.1947, leg. B.P. Vassilkov; in Herb. Inst. Bot. nom. V.L. Komarovi Ac. Sc. URSS, in Leningrad, conservatur”.

Boletus aurantiacus f. *lebedevae* Vassilkov, Экология и биология растений восточноевропейской лесотундры (Ecology and biology of plants of the East European forest tundra): 57, 1970. – LE 200171, “Коми АССР, окр. ст. Сивая Маска (Russia, Komi Republic, vicinities of Sivaya Maska station), 18.08.1961” (H).

Note. Label is written by E.L. Nezdoyminogo with numerous further corrections by B.P. Vassilkov. In the upper left top of the label inscription “Typus!” by B.P. Vassilkov. Protologue: “Typus. URSS, Cisuralia, 120 km ad meridiem ab opp. Vorkuta, prope stationem “Sivaya Maska” dictam, in

piceeto-betuleto collucato, 18.08.1961, B.P. Vassilkov legit (LE)”.

B. candidissimus T.H.G. Pham et al., *Persoonia* 43: 343, 2019. – LE 315542, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 8 km west of Chu Yang Sin, 12.37958°N, 108.3523°E, on soil in mountain polydominant rainforest with the participation of *Fagaceae*, *Magnoliaceae*, *Theaceae*, *Podocarpaceae*, 01.04.2013, T.H.G. Pham, A.V. Alexandrova Vn13-93, GenBank: ITS – MN511175, *tef1* – MN597967, LSU – MN392934” (H). – LE 315543, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.414833°N, 108.378222°E, on soil in mountain polydominant rainforest with *Fagaceae*, *Magnoliaceae*, *Theaceae*, *Podocarpaceae*, 27.05.2014, T.H.G. Pham, A.V. Alexandrova Vn14-238” (P).

B. edulis f. *arcticus* Vassilkov, Белый гриб (*Porcini* mushroom): 16, 1966. – LE 200148, “Турус. Хибины, вершина горы близ Бот. Сада, лишайниковая тундра (Russia, Chibiny Mts., top of the mountain near Botanical Garden, lichen tundra), 20.08.1946” (H).

Note. Label is written by E.L. Nezdoyminogo. Collection date on the label don’t match with date indicated in the protologue: “URSS, pars europaea, montes Chibinenses,

prope Hortum botanicum Arcto-alpinum, tundra, 700 m s. m., in associatione *Betula nana* + *Vaccinium uliginosum* + *Arctous alpine* + *Cetraria nivalis*, 20.08.1947, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. edulis f. *betulicola* Vassilkov, Белый гриб (Porcini mushroom): 13, 1966. — LE 5129, “Турус. Владимирская область, Вязниковский р-н, у д. Бородино, березовый лес (Russia, Vladimir Oblast, Vyaznikovsky distr., near the Borodino village, birch forest), 22.07.1949” (H).

Note. Label is written by E.L. Nezdoyminogo. Protologue: “URSS, reg. Vladimirskaja, distr. Vjaznikovsky, in viciniis pag. Borodino, in betuleto, 22.07.1949, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. edulis f. *praecox* Vassilkov, Белый гриб (Porcini mushroom): 14, 1966. — LE 5186, “*Boletus edulis* f. *albus* (Pers.) Vassilkov. Турус. Марийская АССР, Йошкар-Олинский район, близ Кундыша. В Pinetum call.-festucosum. (Russia, Mary El Republic, Yoshkar-Ola district, near Kundysh. In Pinetum call. — festucosum.), 16.06.1939” (presumable type?).

Note. Locus classicus in the protologue is given as follows: “URSS, Marijskaja RSSA (Volga media) ripa fl. Kundysh, in Pineto callunoso-festucoso, 16.06.1939, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”. We could not find the specimen with the name *B. edulis* f. *praecox* Vassilkov in herbarium LE. However, there is a specimen named *B. edulis* f. *albus* (Pers.) Vassilkov with original label written by В.П. Васильков. Locality, habitat and date on the label match those in the protologue of *B. edulis* f. *praecox*. We suppose that LE 5186 could be a presumable type of *B. edulis* f. *praecox*.

B. edulis f. *quercicola* Vassilkov, Белый гриб (Porcini mushroom): 12, 1966. — LE 5177, “Турус. Винницкая обл., около с. Селище, в дубняке (Ukraine, Vinnitsa Oblast, vicinities of Selišche village, in oak forest), 30.08.1954” (H).

Note. Label is written by E.L. Nezdoymonogo. Protologue: “URSS, Ucraina, reg. Vinnitzkaja, in viciniis pag. Selitsche, quercetum, 30.08.1954, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. edulis f. *roseipes* Vassilkov et A.P. Vaskovsky, Белый гриб (Porcini mushroom): 16, 1966. — LE 5198, “Турус! Побережье Охотского моря (Russia, coast of the Sea of Okhotsk), 1956, А.П. Васьковский (А.П. Vaskovsky)” (H).

Note. Label is written by E.L. Nezdoyminogo. Collection date on the label don't match with date indicated in the protologue: “Турус. URSS, Oriens Extremus, prov. Ochotensis, Lariceto-betuletum (*Betula ermanii*), 08.1961, А.П. Vaskovsky; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. edulis f. *subaereus* Vassilkov, Белый гриб (Porcini mushroom): 19, 1966. — LE 5197, “Турус! Грузинская ССР, Лагодехский заповедник, буково-грабовый лес (Georgia, Lagodekhi Reserve, beech and hornbeam forest), 06.10.1951” (S). — LE 5194, LE 5195, LE 5196, “Isotypus. Грузинская ССР, Лагодехский заповедник, буково-грабовый лес (Georgia, Lagodekhi Reserve, beech and hornbeam forest), 06.10.1951” (S).

Note. Labels are written by E.L. Nezdoyminogo. Red stickers “Holotypus” (LE 5194) and “Isotypus” (LE 5195; LE 5196) were attached later. Protologue: “Турус. URSS, Transcaucasia, Georgia, Reservatum Lagodehsky, fauces Shromskoje, in fageto-carpineto vetusto, in terra alluviali,

humosa, humida, 6.10.1951, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. edulis f. *tardus* Vassilkov, Белый гриб (Porcini mushroom): 17, 1966. — LE 177067, “Турус! Хибины, у Бот. сада, тундрово-альпийская зона (Russia, Khibiny, near the Botanical garden, tundra-alpine zone), 25.08.1946” (H).

Note. Label is written by E.L. Nezdoyminogo. Protologue: “Турус. URSS, pars europaea, montes Chibinenses, prope Hortum botanicum Arcto-alpinum, tundra, 700 m., in associatione *Betula nana* + *Vaccinium uliginosum* + *Arctous alpine* + *Cetraria nivalis*, 25.08.1946, В.П. Васильков; in Inst. bot. Sc. URSS (Leningrad) conservatur”.

B. fusipes Fr., Hymenomyc. Eur.: 500, 1874. — “Rabenh. exs. n. 712. In Europa australi”. ≡ *Boletus fusipes* Heufl. in Rabenhorst's Fungi europ. exsicc.: no. 712, 1865 nom. inval., Art. 38.1a (Shenzhen). — LE 4795, LE 4796, “In sylvis alpinis e Pino Cembra et Abiete excelsa mixtis e profundis *Hylocomium splendens* et *Schreberi* caespitibus inter *Vaccinium Myrtillum*. 12.08.1864 in Tulfeser Bery Vallis Oeni prope Oenipontum, alt. circa 4500 m” (I).

B. percandidus Vassilkov, Советская ботаника (Sovetskaya botanika) 2: 27, 1944. — LE 3113, “Марийская АССР, у Сурка, в Bet.-Pin. molinios. (с подлеском из *Tremula*) [Russia, Mary El, near Surok, in Bet.-Pin. molinios. (with *Tremula* in undergrowth)], 08.09.1939” (S). — LE 3112, “Марийская АССР, у Сурка, в Bet. — Pin. molinios (с осиновым подлеском) [Russia, Mary El, near Surok, in Bet.-Pin. molinios. (with aspen undergrowth)], 26.08.1939, det. 14.02.1954” (S).

Note. Name on label of LE 3112 is “*Krombolzia versipellis* (Fr.) Karst. f. *percandida* (Vassilk.) Vassilk.” written by unknown person. In the upper right top of the label inscription “Турус!” by В.П. Васильков, also his signature in “Leg./Det.” field. Protologue: “Hab. In Betuleto-Pineto moliniosa (cum *Populo tremula*), in Republica Mari, ad Wolgam mediam, 08–09, 1939”.

B. tomentososquamulosus Lj.N. Vassiljeva, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela spirovykh rasteniy Botanicheskogo instituta AN SSSR) 12: 264, 1959. — LE 17600, “Окрестности Владивостока, Ботанический сад, хвойно-широколиственный лес, под *Abies holophylla* (Russia, vicinities of Vladivostok, Botanical garden, coniferous-broadleaved forest, under *Abies holophylla*), 07.09.1954, det. 20.09.1956” (S or IS). — LE 2968, “Окрестности Владивостока, Ботанический сад, хвойно-широколиственный лес, под *Abies holophylla* (Russia, vicinities of Vladivostok, Botanical garden, coniferous-broadleaved forest, under *Abies holophylla*), 16.08.1955, det. 22.09.1956” (S or IS).

Note. Collection date on the label of LE 17600 don't match with date indicated in the protologue: “USSR, Oriens Extremus, prope Vladivostok in silvis mixtis sub *Abiete holophylla*, 16.08 et 7.09.1955, leg. auctor”.

B. vassilkovii М.М. Nazarova, Микология и фитопатология (Mikologiya i fitopatologiya) 1: 186, 1967. — LE 17601, “Турус. СССР, Дальний Восток, Приморский край, Шкотовский р-н, г. Хулаза, на почве в ельнике папоротниковом (Russia, Far East, Primorskiy Krai, Shkotovo District, Hualaza mountain, on the soil in a fern-fir forest), 19.08.1964, det. 1966” (H).

Note. Protologue: “Typus. URSS, Oriens Extremus, regio Primorskensis, distr. Schkotovo, in declivi boreali montis Chualaza (brachia australia montium Sichote-Aliny) 650 m s.m., in silva e *Picea jezoensis*, *Abiete nephrolepide*, *Pino koraiensi*, *Betula ermanii*, 19.08.1964, M.M. Nazarova; in Herb. Inst. Bot. nom. V.L. Komarovii Acad. Sci. URSS (LE) conservatur; isotypus in Herb. Biolog.-Terr. Inst. Orientis Extremi Sect. Sibiricae Acad. Sci. URSS (VLA) conservatur”.

Coniophora atrocinerea P. Karst. in Thümen, Mycoth. univers.: no. 1806, 1881. — LE 22390, “de Thümen, Mycotheca universalis. 1806. Fennia: Mustiala, ad ligna pinea. Oct. 1880. leg. Prof. P.A. Karsten” (S).

Erythrophylloporus flammans O.V. Morozova et al., Sydowia 72: 281, 2020. — LE 312491, “Vietnam, Binh Phuoc Province, Bu Gia Map District, Bu Gia Map National Park, environs of ranger station 2, along road to Bu Gia Map, 12.192028°N, 107.2045°E, in semievergreen tropical forests with *Fagaceae* (*Lithocarpus* spp.) and *Dipterocarpaceae*, on soil, 30.11.2018, O.V. Morozova 56VN18, GenBank: ITS — MT298114, *tef1* — MT293596” (H). — LE 312492, “Vietnam, Binh Phuoc Province, Bu Gia Map District, Bu Gia Map National Park, environs of ranger station 2, along road to Bu Gia Map, 12.192028°N, 107.2045°E, in semievergreen tropical forests with *Fagaceae* (*Lithocarpus* spp.) and *Dipterocarpaceae*, on soil, 25.11.2017, E.S. Popov” (P). — LE 312521, “Vietnam, Binh Phuoc Province, Bu Gia Map District, Bu Gia Map National Park, environs of ranger station 2, path to Dak Ca River, 12.201083°N, 107.204333°E, in semievergreen tropical forests with *Fagaceae* (*Lithocarpus* spp.) and *Dipterocarpaceae*, on soil, 22.05.2011, O.V. Morozova 63VN11” (P).

Fistulinella aurantioflava T.H.G. Pham et al., Persoonia 46: 465, 2021. — LE 315616, “Vietnam, Dak Lak Province, Kon Ka Kinh National Park, 14.217129°N, 108.310132°E, 1220 m, on soil in a tropical mountain polydominant soil forest with the participation of representatives of the families *Myrtaceae*, *Meliaceae*, *Anacardiaceae*, *Fagaceae* and *Theaceae*, 16.05.2016, A.V. Alexandrova Vn16-32, GenBank: ITS — MW784159, *LSU* — MW760388, *mtSSU* — MW776411” (H). — LE 315617, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, 12.421139°N, 108.373722°E, 1196 m, on the trail in the mountain primary evergreen polydominant tropical forest, on soil, 28.05.2014, A.V. Alexandrova, T.H.G. Pham Vn14-276” (P).

F. olivaceoalba T.H.G. Pham et al., Persoonia 41: 361, 2018. — LE 312004, “Vietnam, Lam Dong Prov., Lac Duong Dist., Bidoup-Nui Ba National Park, Hon Giao Ranger St., path to Hon Giao Mt, 12.192222°N, 108.711111°E, upper montane mossy evergreen broad leaf forest, on soil and on the base of tree, 26.05.2014, O.V. Morozova, GenBank: ITS — MH733592, *tef1α* — MH718344, *LSU* — MH718396” (H).

Gomphidius sibiricus Singer, Revue Mycol. 3 (4–5): 174, 1938. — LE 17632, “In *Pinetis sibiricae* mixtis, 400 m alt, Телецкое озеро, Алтайский край (Russia, Teletskoye Lake, Altay Krai), 02.09.1937, Singer et Vasilyeva” (S).

Note: annotation label by O.K. Miller with dimensions of spores and trama hyphae is attached with name *Chroogomphus sibiricus* (Singer) O.K. Miller, date 12.05.1970. Protologue: “In *Abieteti-Pinetis* sub *Pino sibirica*, raro, solitario, ad terram nudam cum *Ixoc. sibirico*. Sept. Ad ripam lacus Telezkensis (Altai). Leg. Singer et Vasilyeva”.

Gyroporus punctatus Lj.N. Vassiljeva, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 6: 193, 1950. — LE 17636, “Приморский край, заповедник “Кедровая падь” (Russia, Primorsky Krai, “Kedrovaya Pad” Reserve), Quercetum, 14.08.1946, det. 12.1947” (presumable original material).

Note. Collection date on the label don't match with date indicated in the protologue: “Statio. USSR: Extremus Oriens, prope Primorskaja, in querceto. 15.08.1946. Leg. auctor”.

Hortiboletus rupicapreus Svetash. et al., Sydowia 74: 228, 2021. — LE 312677, “Vietnam, Gia Lai Province, Mang Yang District, Kon Ka Kinh National Park, A Yun, 14.219917°N, 108.325667°E, 1200 m, in tropical mountain forest dominated by trees of *Anacardiaceae*, *Fagaceae*, *Meliaceae*, *Myrtaceae*, *Theaceae*, ridges on slopes, on soil, 18.05.2016, A.V. Alexandrova Vn16-64, GenBank: ITS — MW784161, *LSU* — MW760391, *tef1* — MZ424894” (H). — LE 312678, “Vietnam Gia Lai Province, Mang Yang District, Kon Ka Kinh National Park, A Yun, 14.205189°N, 108.316311°E, 1000 m, in pine plantations of *Pinus kesiya* with some *Fagaceae*, on soil, 15.03.2016, A.V. Alexandrova Vn16-28” (P).

Ixocomus abietinus Lj.N. Vassiljeva, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 12: 263, 1959. — LE 17649, “Окрестности Владивостока, Седанка, дубняк, под *Fraxinus* и *Maackia* (Russia, vicinities of Vladivostok, Sedanka, oak forest, under *Fraxinus* and *Maackia*), 03.08.1954, det. 25.09.1956” (S or IS). — LE 4550, “Окрестности Владивостока, Ботанический сад, хвойно-широколиственный лес, под *Abies holophylla* (Russia, vicinities of Vladivostok, Botanical garden, coniferous-broadleaved forest, under *Abies holophylla*), 16.08.1955, det. 25.09.1956” (may constitute a part of the original material not cited in the protologue).

Note. Protologue: “URSS, Oriens Extremus, australis prope Vladivostok in quercetis et silvis mixtis sub *Abiete holophylla*, 07–09 1948–1955, leg. auctor”; “Собран автором в окрестностях Владивостока близ Седанки 19.07.1948, 03 и 28.08, 07.09.1954, близ Океанской 02.09.1954 и на склоне к р. Лянчихэ 17.08.1955 (Collected by the author in the environs of Vladivostok near Sedanka 19.07.1948, 03 and 28.08, 07.09.1954, near Okeanskaya 02.09.1954 and on the slope toward the river Lyanchikhe 17.09.1955)”.

I. australiuralensis Vassilkov, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 10: 210, 1955. — LE 17650 (Fig. 1d), “Тип! № 490. Южный Урал, Башкирский Гос. Заповедник (57°43'–58°12' в.д. от Гр., 53°15'–53°30' с.ш.), бассейн верхнего течения р. Белой, Южный Крак. Меридионально вытянутый гребень г. Алакбар (Type! Russia, Southern Urals, Bashkir State Reserve, 57°43'–58°12'E, 53°15'–53°30'N, the upper Belaya River basin, Southern Kraka Ridge, the meridionally elongated ridge of the Alakbar mountain), h. 780 m, сосновое редколесье (pine sparse forest), бл. оп. 221, 18.08.1946, Е. Селиванова-Городкова (E. Selivanova-Gorodkova)” (H).

Note. Collection date on the label don't match with date indicated in the protologue: "Typus. URSS, Ural australis, reservatum in Bashkiriya, systema cursus superioris fluminis Belaja, mons Alacbar, 780 m altus supra maris fastigium, 18.07.1946, E.A. Selivanova-Gorodkova legit; in Herb. Inst. botan. nom. V.L. Komarovii Ac. Sc. URSS, Leningrad, conservatur".

I. elegans f. *badius* Singer, Revue Mycol. 3 (2): 40, 1938 nom. inval., Art. 39.1 (Shenzhen). — LE 4698, "№ 511. In Lariceto Чуйские Альпы, Алтай (Russia, Chuyskie Alpy, Altai Krai), 08.1937, Singer et Vasilyeva" (original material). — LE 17804, "№ 593. In Lariceto, Чуйские Альпы, Алтай (Russia, Chuyskie Alpy, Altai Krai), 08.1937, Singer et Vasilyeva" (original material). — LE 4700. "№ 511a In Laricetiis sib., 1800–2000 m, Октуру = Akturu, Чуйские Альпы, Алтайский край (Russia, Akturu, Chuyskie Alpy, Altai Krai), 02–03.08.1937, Singer et Vasilyeva" (original material).

Note. Name on labels of LE 4698 and LE 17804 is indicated as "*Ixocomus elegans* (Schum.) Quél." written by R. Singer. On LE 4698 NC by T. Ahti: "Syntype of *Ixocomus grevillei* f. *badius* Singer Rev. Mycol. 3: 40. 1938 = *Suillus clintonius* (Peck) Kuntze, sel. and det. by Teuvo Ahti 1993 in Korhonen et al., *Karstenia* 33: 3. 1993". There are NC on every specimen: "*Suillus clinotinius* (Peck) Kuntze", see *Karstenia* 33: 1–9. 1993. Det. Mauri Korhonen et Teuvo Ahti 1993, Botanical Museum, Helsinki (H)". Protologue: "Cette forme est plus abondante dans l'Altaï".

I. sibiricus Singer, Revue Mycol. 3: 46, 1938. — LE 17803, "Sub *Pinibus sibirici*, Чуйские Альпы. Алтай (Russia, Chuyskie Alpy, Altai Krai), 08.1937, Singer et Vasilyeva" (S). — LE 4611, "№ 551. Sub *Pinis sibiricus* 2100 alt. Чуйские Альпы, Алтай (Russia, Chuyskie Alpy, Altai), 08.1937, Singer et Vasilyeva" (S). — LE 4612, "№ 1125. In silva acerosa, Арту-баш, Телецкое озеро, Ойротия (Russia, Artubash, Teletskoe Lake, Oirotiya — modern Altai Krai), 09.1937, Singer et Vasilyeva" (S).

Note: On the LE 17803 NC: "A.E. Kovalenko Lectotypus 27.01.1999". On the top of the label of all specimens inscription by V.P. Vasilkov "*Ixocomus americanus* (Peck) Vassilkov var. *sibiricus* (Sing.) Vass. 20.09.1952, опр. Васильков (Det. Vasilkov)". Protologue: "In *Pineis (cembrae)* regionis montanea montium altaicarum, interdum in planitiem descendens, plerumque inter Bryophyla et gregatim crescens, rarius solitario. Julio-septembri. Telezkoje Oz., Czuiskie Alpy (400–2200 m s.m.)".

Krombholzia aurantiaca f. *intermedia* Vassilkov, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 11: 138, 1956. — LE 3093, "Марийская АССР, у Шелангера (Russia, Mari El Republic, vicinities of Shelanger), в Pic.-Til.-Tremul., по краю посеки (at the edge of the cut), 22.08.1939" (original material).

Note. Name on label is "*Boletus versipellis* Fr." is written by unknown person. In the upper part of the label inscription "*Krombholzia aurantiaca* f. *intermedia* Vass. f. nova, typus! 14.02.1954, det. В.П. Васильков (signature)". Protologue: "В еловых и смешанных с елью лесах Марийской АССР (In spruce and mixed with spruce forests of the Mari El Republic)".

K. extremorientalis Lj.N. Vassiljeva, Ботанические материалы Отдела споровых растений Ботанического ин-

ститута АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 6: 191, 1950. — LE 17652, "Прим. край, заповедник "Кедровая падь" (Russia, Primorsky Krai, "Kedrovaya Pad'" Reserve), Quercetum, 07.09.1945, det. 12.1947" (S).

Note. Protologue: "Statio. USSR: Extremus Oriens australis, prope Vladivostok et prope Primorskaja, in quercetis. 08–09 1945–1946. Leg. auctor".

K. oxydabilis Singer, Revue Mycol. 3: 189, 1938. — LE 17656, "№ 979. In prato sub *Betula* Яйля, Алтайский запов. (Russia, Yaylya, Altaisky Reserve), 09.1937, Зингер и Васильева (Singer et Vasilyeva), det. 06.1938" (original material).

Note. Standard red sticker "Holotypus!" was glued much later. Comment by Gilber Lannoy, December 1996 with microstructures dimensions inserted. Protologue: "Nous trouvons cette espece dans le pres au voisinage de bouleaux".

K. rotundifoliae Singer, Revue Mycol. Paris 3: 190, 1938. — LE 3146, "№ 534. *Betuletum rotundifoliae*, альпийская зона западнее Актуры в Чуйских Альпах, Алтайский кр. (Russia, alpine zone to the west of Aktura in the Chuisky Alps, Altai Krai), 23.08.1937, det. 11.04.1938" (original material).

Note. Inscription "Typus" belongs to V.P. Vassilkov. Protologue: "Zone subalpine et alpine de l'Altaï, exclusivement avec *Betula rotundifolia*". Neotype: PC 2615 designated by Lannoy, Estadès (1995).

K. scabra f. *albida* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 371, 1956. — LE 3196, on the original envelope only "*Bol. scaber* f. *albida*, Кивач, Васильков (Kivach, signature of V.P. Vasilkov)". Note by V.P. Vasilkov enclosed: "*Boletus scaber* var. *белый*, слегка гряз.-желт., не v. *cand.* (white, slightly dirt-yellow, not var. *candida*), Карело-Финск. ССР, окр. Кивач, березово-елов. лес (Russia, Karelia, vicinities of Kivach, birch-spruce forest), 29.07.1951" (S).

Note. Protologue: "Встречен в Карельской АССР, в окр. Кивача в березово-еловом лесу (не сыром), 29.07.1951, известен и из средней полосы Европейской части СССР [Found in Karelian ASSR, around Kivach, in a birch-spruce forest (not damp), 29.07.1951, also known from the middle part of the European part of the USSR]".

K. scabra f. *cinnamomea* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 370, 1956. — LE 3135, on the original envelope only "*Kr. scabra* f. *cinnamomea*, *Boletus scabra*, Кивач, Васильков (Kivach; signature of V.P. Vasilkov)". Note by V.P. Vasilkov enclosed: "*Boletus scaber* var. *scaber*, Карело-Финск. ССР, окр. Кивач, сосново-березов. лес (Russia, Karelia, vicinities of Kivach, pine-birch forest), 28.07.1951" (S). — LE 3144, the specimen is kept in later standard non-original envelope with label "*Krombholzia scabra* f. *cinnamomea* Vassilk." written by unknown person. Note by V.P. Vasilkov enclosed: "*Bol. scaber*, Хибины, Бот. сад, березовый лес с елью, черникой, *Solidago* (Russia, Murmansk Oblast, Khibiny, Botanical garden, birch forest with spruce, blueberry, *Solidago*), 27.08.1946" (S). — LE 3149, "Марийская АССР, у Сурка (Russia, Mari El Republic, vicinities of Shelanger), в Bet.-Pinet-callunos, 26.08.1939" (S).

Note. Name on label of LE 3149 is "*Boletus scaber*", written by unknown person. In the upper part of the label in-

scription by V.P. Vasilkov “f. *subrufescens*, f. *cinnamomea*”. Protologue: “Встречен в Хибинах, Карельской АССР и Марийской АССР, в июле – августе (Found in the Khibiny, Karelian ASSR, and Mari ASSR, in July–August)”.

K. scabra f. *lignicola* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 371, 1956. – LE 3138, on the original envelope only inscription by V.P. Vasilkov “*Krombh. scabra* f. *lignicola*, Ленингр. обл., Николаева (Russia, Leningrad Oblast, Nikolayeva)”. Note by T.N. Nikolayeva enclosed: “Ленобласть, Павловский р-н, ст. “Поселок”, лес по р. Оредеж, на пне осины (Russia, Leningrad Oblast, Pavlovsky District, Poselok station, forest along the Oredezh River, on an aspen stump), 03.09.1949” (H).

Note. Protologue: “Встречен однажды Т.Л. Николаевой в Ленинградской области близ ст. Поселок, в лесу по р. Оредеж, на пне осины (It was once met by T.L. Nikolayeva in the Leningrad Oblast, near Poselok station, in the forest along the Oredezh River, on an aspen stump), 03.09.1949”.

K. scabra f. *media* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 371, 1956. – LE 3143, “Марийская АССР, у Сурка, смешанный лес в припойменном лесу по Кундышу (Russia, Mari El Republic, near Surok, mixed forest in the floodplain forest along the Kundysh), 19.08.1939” (H).

Note. Name on label is “*Boletus scaber*”, label is written by unknown person, and further “f. *media*” by V.P. Vasilkov was added. Protologue: “Встречен однажды на пересохших болотцах с березой и вейником – *Calamagrostis lanceolata* – в покрове, в Марийской АССР (Среднее Поволжье), в августе (Found once on dried bogs with birch and reedgrass (*Calamagrostis lanceolata*) in the cover, in the Mari Autonomous Soviet Socialist Republic (Central Volga Region), in August)”.

K. scabra f. *squamulosa* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 372, 1956. – LE 3165, “Марийская АССР, долина Кундыша, в ольшанике на перегнойной почве (Russia, Mari El Republic, Kundysh valley, in alder forest on humus soil), 27.09.1938” (H).

Note. Name on label is “*Boletus scaber* v. *candida*”, label is written by unknown person, further “v. *candida*” was strikethrough and “f. *squamulosa*” by V.P. Vasilkov was added. Protologue: “Встречен однажды в Марийской АССР, в долине р. М. Кундыша, в ольшанике (имелась ли береза?), на перегнойной почве (собранные грибы были уже несколько переросшими и отчасти подсохшими) [Found once in the Mari Autonomous Soviet Socialist Republic, in the valley of the M. Kundysh River, in an alder forest (was there a birch?), on the humus soil (the mushrooms collected were already somewhat overgrown and partly dried out)], 27.09.1938”.

K. scabra f. *versicolor* Vassilkov, Труды Ботанического института им. В.Л. Комарова (Trudy Botanicheskogo instituta im. V.L. Komarova) 10: 373, 1956. – LE 211462, on the original envelope only inscription by V.P. Vasilkov “*Boletus* (Krombh.) f. *versicolor*, Хибины, Васильков (Russia, Khibiny, signature of V.P. Vasilkov)” (H).

Note. Protologue: “Встречен однажды в березовом (*Betula tortuosa*) лесу со сфагномом, близ Ботанического сада в Хибинах (Found once in the birch (*Betula tortuosa*)

forest with sphagnum, near the Botanical Garden in Khibiny)”.

K. scabra var. *roseo fracta* Singer, Ann. Mycol. 40 (1/2): 36, 1942. – LE 3105, “In Pineto sphagnoso sub *Betula*, Колчаново (Russia, Leningrad Oblast, Kolchanovo), 14.07.1938, Freindling et Singer” (presumably original material). – LE 3190, “Татария (Russia, Republic of Tatarstan), 1938, Васильева (Vasilyeva)” (presumably original material).

Name on the envelope of LE 3105 is “*Krombholzia suboxydabilis* Sing. ad int.”, in the bottom part of the envelope inscription “*Boletus oxydabilis* f. *roseo fracta*” by V.P. Vasilkov and his signature. Name on label of LE 3190 is “*Krombholzia scabra* (Bull.) Fr. var. *subnivea* Sing.”, label is written by R. Singer. In the upper part of the label pencil inscription “f. *rotundifolia*” by V.P. Vasilkov. Note written by Vasilyeva enclosed “676. *Krombholzia scabra* var. *subnivea*. ТР (Татарская Республика) (Republic of Tatarstan), Betuleto-Pinetum sphagnorum, Васильева (signature of Vasilyeva), det. Singer”. Protologue: “Die von mir untersuchten Exemplare, von var. *roseo fracta* waren bei Leningrad ziemlich klein, dunkel, nicht weich und hatten eine Huthaut vom Typ der *K. oxydabilis*: die Exemplare aus Tatarien waren gross wie *K. oxydabilis*”.

Leccinum arctoi Vassilkov, Новости систематики низших растений (Novosti sistematiki nizshikh rasteniy) 15: 84, 1978. – LE 200164 (Fig. 1b), “Тупус. Чукотский полуостров, Ларино, склон сопки, почти лишенной растительности (Russia, Chukchi Peninsula, Larino, a hillside almost without vegetation), 14.08.1962, В.А. Гаврилюк (V.A. Gavriilyuk)” (H). – LE 200165, “Камчатка, бер. зал. Корфа бл. пос. Култушное, г. Пипи-ви-Хаи (Russia, Kamchatka, coast of Korf Bay, near the Kultushnoe settlement, Pipi-vi-Hai mountain), 07.08.1960, Гаврилюк (Gavriilyuk)” (P). – LE 200169, “Камчатка, бер. зал. Корфа бл. пос. Култушное (Russia, Kamchatka, coast of Korf Bay, near the Kultushnoe settlement), 12.08.1960, Гаврилюк (Gavriilyuk)” (P). – LE 200168, “Камчатка, бер. зал. Корфа бл. пос. Култушное (Russia, Kamchatka, coast of Korf Bay, near the Kultushnoe settlement), 01.09.1960, Катенин (Katenin)” (P). – LE 200167, “Камчатка, побереж. залива Корфа, окр. с. Култушного, на гари среди *Arctous alpina* (Russia, Kamchatka, coast of Korf Bay, vicinities the Kultushnoe settlement, on burned ground among *Arctous alpina*), 09.1960, В.В. Василькова (V.V. Vasilkova)” (P).

Note. Protologue: “Тупус. URSS, Czukotka, ad litora Oceani Pacifici, prope pagum Larino, ad declive lapidosum monticuli inter fruticulos sparsos *Arctoi alpinae* (L.) Niedertz, 14.08.1962, V.A. Gavriilyuk (LE)”.

Merulius pseudomolluscus Parmasto, Scripta Mycol. (Tartu) 2: 212, 1962. – LE 22489, “Corticiaceae URSS II. 141. *Leucogyrophana pseudomollusca* (Parm.) Parm. Ad caudicem *Piceae abietis* prolapsum in alneto humido. RPSS Estonia, distr. Jogeva, Puurmannii. 01.10.1957. Leg et det. E. Parmasto. TAA 7 561” (IP). – LE 22488, “Corticiaceae URSS II. 142. *Leucogyrophana pseudomollusca* (Parm.) Parm. Ad caudicem *Laricis sibiricae* prolapsum putridum in solve mixta. Regio Krasnoarsk, Badzhei. 06.09.1958. Leg et det. E. Parmasto. TAA 9 743” (IP).

Paxillus atraetopus Kalchbr. in Thümen, Flora, Regensburg 61: 87, 1878. – LE 4336, “Promont. bonae spei: in stipitibus truncorum arborum caesiorum, in dumetis montis

“Boschberg” pr. Somerset-East. Febr. 1876. (no. 1216.). Leg. P. Mac Owan et Tuck” (I).

P. polychrous Singer, Revue Mycol. 2 (4): 226, 1937. — LE 17686, “In silva acerosa (*Piceetum*), долина р. Лабы (Russia, Caucasus, valley of the Laba River), h. 1200 m, 14.08.1936, Л.Н. Васильева (L.N. Vasilyeva), det. 02.1937” (S).

Note. Protologue: “Ad terram in silvis acerosis (*Pinus*, *Picea*) et ad truncos putridos *Pinis silvestris*. Saepe 2 vel 3 exemplaria connata sunt. Ad stationem Grafskaja in ditionen Voronegescia, pars meridionalis europaea URSS et in Casca occidentali, in valli Laba flum. Alt. 1200 m. supr. mar. — Aestate”.

Phylloporus lariceti Singer, Revue Mycol. 3 (3): 170, 1938. — LE 4885, “№ 985. Яйля, Алтайский Гос. Заповедник (Russia, Yailya, Altaisky State Reserve), in *Laricis sibiricae* inter herbas, 09.09.1937, Singer et Vasilyeva, det. 10.1937” (S). — “№985а. Яйля, Алтайский Гос. Заповедник (Russia, Yailya, Altaisky State Reserve), sub *Larix sibirica*, 09.09.1937, Singer” (S).

Note. In the LE 4885 note enclosed: “Studied in Wu et al. (2020)”. In the bottom part of labels inscription by V.P. Vasilkov “*Boletinus lariceti* (Sing.) Vassilk.”. Protologue: “In Laricetis sibiricae puris vel mixtis, graminosis, Septembr, Jaila, ad lacum Telezkensem in Montibus Altaicia Sibiriae, U.R.S.S. Leg. Vasilyeva et Singer”.

Porphyrellus atrobrunneus Lj.N. Vassiljeva, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 6: 192, 1950. — LE 17695 (Fig. 1a), “Приморский край, запов. Кедровая Падь (Russia, Primorsky Krai, “Kedrovaya Pad” Reserve), Quercetum, 06.09.1945, det. 12.1947” (S).

Note by Carl B. Wolfe (The University of Tennessee): “*Porphyrellus atrobrunneus* Vassiljeva, 24.04.1978”. Protologue: “Statio. USSR: Extremus Oriens australis, prope Vladivostok et prope Primorskaja, in quercetis. 08–09 1945–1947. Leg. auctor”; “Собран автором в окрестностях Владивостока и в заповеднике Кедровая Падь (collected by the author in vicinity of Vladivostok and in “Kedrovaya Pad” Reserve), 09.1945 и 08.1946”.

Suillus gastroflavus Zvyagina et al., Persoonia 42: 465, 2019. — LE F-335193, “Россия, Магаданская область, Тенькинский р-н, база Оротук (Мекс), 62.030888°N, 148.650594°E, редколесье лиственничное кустарничково-зеленомошное, рядом *Betula middendorffii*, почва (Russia, Magadan Oblast, Ten'insky district, Orotuk station, 62.03089° N, 148.65059°E, on soil in mixed forests with *Larix cajanderi* and *Betula middendorffii*), 25.08.1995, N.V. Sinelnikova MAG 1339” (P). — LE F-335194, “Россия, Магаданская область, Среднеканский р-н, пос. Сеймчан, 62.833886°N, 152.431259°E, ивовая низина в разреженном березово-лиственничном лесу, почва (Magadan Oblast, Srednekansky district, vicinity of Seimchan village, meadow of Kolyma river, 62.83388°N, 152.43129°E, on soil in wet mixed forests with *Larix cajanderi*, *Betula platyphylla*, *Salix* spp.), 28.08.2018, N.A. Sazanova MAG 5122” (P).

S. praetermissus Zvyagina et Svetash., Persoonia 46: 509, 2021. — LE 312659, “Russian Federation, Respublika Altay, Turochakskiy Rayon, vicinities of Yaylyu, cordon Chelyush, mixed delta forest with *Alnus viridis* subsp. *fruticosa*, *Betula*

sp., *Larix sibirica*, *Pinus sibirica*, *P. sylvestris*, *Salix* sp., 28.08.2018, T. Svetasheva, GenBank: ITS — MW432521” (H). — LE 312652, “Russian Federation, Tomskaya Oblast, Orlovka edge of the transit bog, under *Pinus sibirica*, 22.08.2018, T. Svetasheva et A. Dahlberg” (P). — LE 312660, “Russian Federation, Khanty-Mansiyskiy Avtonomnyy Okrug, Surgutskiy Rayon, Surgutskoe polesye, mesotrophic swamp, 20.07.2010, E. Zvyagina” (P). — LE 312653, “Russian Federation, Khanty-Mansiyskiy Avtonomnyy Okrug, Nefteyuganskiy Rayon, Efremovskoe mestorozhdenie, mixed forest with *Betula pendula* and *Pinus sibirica*, 19.08.2019, E. Zvyagina” (P). — LE 312654, “Russian Federation, Khanty-Mansiyskiy Avtonomnyy Okrug, Khanty-Mansiyskiy Rayon, Gornopravdinsk village vicinities, mixed forest with *Abies sibirica*, *Picea abies* and *Pinus sibirica*, 21.08.2009, A. Baykalova” (P). — LE 312655, “Russian Federation, Respublika Altay, Turochakskiy Rayon, Yaylu village, Ydyp river, mixed forests with *Betula* sp., *Abies sibirica* and *Pinus sibirica*, 15.08.2008, A.E. Kovalenko” (P). — LE 235742, “Монголия, Селенгинский аймаг, Мандал сум, биостанция Монгольского Государственного Университета “Конин Нуга”, урочище Сансте (Mongolia, Selenga aimag, Mandal sum, “Konin Nuga” biostation of the Mongolian State University, Sanste tract), 49°09'00"N, 107°18'00"E, темнохвойный лес на вершине сопки на почве (dark coniferous forest on top of the hill on the ground), 29.07.2008, A.V. Alexandrova” (P).

Tylophilus subotsuensis T.H.G. Pham et al., Persoonia 45: 397, 2020. — LE 312534, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.42656°N, 108.36633°E, 985 m, in middle montane evergreen broad leaf forest, on soil, 18.05.2014, A.V. Alexandrova, T.H.G. Pham Vn14-96, GenBank: ITS — MW009074, *tef1* — MW014268, LSU — MB837493” (H). — LE 312525, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.39497°N, 108.34823°E, 1000 m in middle montane evergreen mixed riparian forest on soil, 22.03.2013, A.V. Alexandrova, T.H.G. Pham Vn13-24” (P). — LE 312526, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.39497°N, 108.34823°E, 1000 m, in middle montane evergreen mixed riparian forest, on soil, 21.03.2013, A.V. Alexandrova, T.H.G. Pham Vn13-11” (P). — LE 312527, “Vietnam, Gia Lai Province, K' Bang District, Son Lang Commune, Kon Chu Rang Nature Reserve, 14.50042°N, 108.56338°E, 1000 m in middle montane evergreen mixed forest on soil, 06.04.2013, A.V. Alexandrova Vn16-140” (P). — LE 312528, “Vietnam, Lam Dong Province, Bao Lam District, Loe Bae Forestry, 11.74449°N, 107.70647°E, 1006 m, on soil in lower montane evergreen broadleaf forest (*Magnoliaceae*, *Myrtaceae*, *Theaceae*, *Lauraceae*, *Fagaceae*, *Annonaceae*), 06.04.2013, A.V. Alexandrova, T.H.G. Pham Vn13-109” (P).

Veloporphyrellus vulpinus T.H.G. Pham et al., Persoonia 43: 417, 2019. — LE 315544, “Vietnam, Lam Dong Province, Lac Duong District, Bidoup-Nui Ba National Park, vicinities of Giang Ly, 12.18061°N, 108.68442°E, in middle montane mixed forest with the participation of *Pinus kempffii* and *P. dalatensis*, on soil and dead wood, 25.05.2014, O.V. Morozova, GenBank: ITS — MN511177, *tef1* — MN597966, LSU — MN511170” (H). — LE 315545, “Vietnam, Lam Dong Province, Lac Duong District, Bidoup-Nui Ba National Park, vicinities of Giang Ly, 12.18440°N,

108.68988°E, in middle montane mixed forest with the participation of *Pinus kempfii* and *P. dalatensis*, on soil, 23.05.2014, O.V. Morozova 209VN14” (P). — LE 315546, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.40856°N, 108.38856°E, in mountain polydominant rainforest with the participation of *Pinus kempfii*, on soil, 21.05.2014, A.V. Alexandrova Vn14-177” (P). — LE 315547, “Vietnam, Dak Lak Province, Krong Bong District, Chu Yang Sin National Park, Krong Kmar, 7 km northwest of Chu Yang Sin Mt, 12.40856°N, 108.38856°E, in mountain polydominant rainforest with the participation of *Pinus kempfii*, on soil, 21.05.2014, A.V. Alexandrova Vn14132” (P). — LE 315549, “Vietnam, Lam Dong Province, Lac Duong District, Bidoup-Nui Ba National Park, vicinities of Giang Ly, 12.18042°N, 108.68610°E, in middle montane mixed forest with the participation of *Pinus kempfii* and *P. dalatensis*, on soil, 02.06.2010, E.S. Popov” (P).

Xerocomus chostensis Vassilkov, Ботанические материалы Отдела споровых растений Ботанического института АН СССР (Botanicheskie materialy Otdela sporovykh rasteniy Botanicheskogo instituta AN SSSR) 10: 211, 1955. — LE 17723, “Турус! Краснодарский кр., Хостинский зап-к, широколиственный лес с самшитом (Russia, Krasnodar Krai, Khostinsky Reserve, broad-leaved forest with boxwood), 16.09.1948” (S).

Note. Label is written by E.L. Nezdoyminogo. NC by B.P. Vasilkov “*Xerocomus chostensis* Vassilkov = *Phylloporus rhodoxanthus* subsp. *europaeus* Singer”. Protologue: “Турус. URSS, Caucasus, litus maris Nigri (Ponti Euxini), prope Chosta (inde nomen), in nemore reservati Caucasi, 14–16.09.1948 ipse legi; in Herb. Inst. botan. nom. V.L. Komarovii Ac. Sc. URSS, Leningrad, conservatur”.

X. subtomentosus f. *squarrosus* A.N. Petrov, Микология и фитопатология (Mikologiya i fitopatologiya) 17 (1): 44, 1983. — LE 4991, “Турус! Иркутская обл., Слюдянский р-н, окр. ст. Маритуй, сопка Китай-Гора, (ю.-з. берег оз. Байкал), горелый лес (осина + береза + лиственница + ольха), на подстилке (Russia, Irkutsk Oblast, Slyudyanka district, vicinity of Maritui station, Kitay-Gora hillock [south-west shore of Lake Baikal], burnt forest (aspen + birch + larch + alder), on litter], 19.07.1981, det. 05.1982” (H).

Note. Protologue: “URSS, regio Irkutensis, distr. Sljudjanensis, in vicinities stationis Marituj, monticulus Kitaj-Gora dictus, in populeto usto, in stramento, 19.07.1981, A.N. Petrov; in herbario Instituti Botanici Acad. Sci. URSS (LE) conservatur”.

DISCUSSION

The mycological herbarium of the Komarov Botanical Institute (LE) contains 97 type specimens of 35 species and 19 intraspecific taxa of the order *Boletales*.

The history of type herbarium replenishment can be tentatively divided into three main periods. The first (1930–1940) is related to the work of the outstanding mycologist Rolf Singer at the Komarov Botanical Institute in 1934–1941 (Mueller, 1995). During an expedition to Altai in the 1930s, Rolf Singer (together with L.N. Vasilyeva) collected a number of specimens, several of which turn out to be new to science (Singer,

1937, 1938a, 1938b, 1938c, 1942). During the second period (1950–1970) Boris Pavlovich Vasilkov intensely worked on *Boletaceae* (Vasilkov, 1944, 1952, 1955, 1956, 1970, 1978). One of his most important scientific interests was a comprehensive study of edible mushrooms, including the most economically valuable porcini mushrooms. The monograph “Porcini mushroom” (Vasilkov, 1966) became the result of his labour, in which he listed 18 intraspecific taxa (forms), seven of which were new to science (*Boletus edulis* f. *arcticus*, *B. edulis* f. *betulicola*, etc.). During the same period, Lyubov Nikolayevna Vasilyeva, who moved to the Far East in 1943 and founded one of the largest mycological schools there, was also active. Mycological herbarium LE contains authentic material for five names by her authorship (Vasilyeva 1950, 1959). The third period (from 2010 to the present) is associated mostly with active mycological researches carried out in Vietnam and Russian Far East. A joint team of mycologists from Komarov Botanical Institute, Moscow State University and Vietnam – Russia Tropical science and technology research Center described 8 species new to science (Crous et al., 2018a, 2018b, 2019a, 2019b, 2020, 2021; Haelewaters et al., 2020; Lebeuf et al., 2021).

We suppose that not all type material of *Boletales* was revealed. According to the literature, type specimens of several taxa described by R. Singer on material from Altai can be kept in LE (*Ixocomus elegans* f. *griseoloporus*, *I. flavus* f. *caerulescens*). The same refers to collection gathered by K.A. Benua (Benois) during the Yakutsk Complex Expedition of Academy of Sciences in 1925–1930. L.A. Lebedeva described several new taxa on this material (Lebedeva, 1928), but their validity and concordance of the Benua’s specimens kept in LE to protologues require a separate special study.

The authors are very grateful to S.Yu. Bolshakov (BIN RAS, St. Petersburg) for the selecting and adjusting the label scanning software and to reviewers for many valuable remarks that significantly improved the manuscript. The work was supported by the institutional research project of the Komarov Botanical Institute [“Herbarium collections of the BIN RAS (history, conservation, research and replenishment)”, № 122011900032-7)] and by the Russian Foundation for Basic Research, project № 20-04-00349 a.

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Х. Типовые образцы таксонов порядка *Boletales*

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Представлена информация о типовых образцах таксонов порядка *Boletales*, хранящихся в Микологическом гербарии Ботанического института им. В.Л. Комарова РАН. В ходе инвентаризации коллекций выявлено 97 образцов для 35 видов и 19 внутривидовых таксонов. Историю пополнения коллекции можно разделить на три периода. Первый период (1930–1940 гг.) относится к пребыванию и работе Р. Зингера в России (сборы с Алтая). Второй (1950–1970 гг.) связан с деятельностью Б.П. Василькова (в основном сборы внутривидовых таксонов *Boletus edulis* из разных регионов бывшего СССР) и Л.Н. Васильевой (сборы с Дальнего Востока). Третий период (с 2010 г. по настоящее время) связан с современными исследованиями микобиоты Дальнего Востока России и Вьетнама. Составлен аннотированный список типовых образцов, который включает следующую информацию: название, авторов, номенклатурную цитату, статус типа и цитату оригинальной этикетки. Для образцов с рукописными этикетками также приведены ссылки на местонахождение подлинного материала или местонахождение типа из протолога. Для голотипов указывается номер GenBank, если они указаны на этикетках.

Ключевые слова: болетовые грибы, Васильева, Васильков, Зингер, протологи, *Agaricomycetes*, *Basidiomycota*, *Boletaceae*