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БИОРАЗНООБРАЗИЕ, СИСТЕМАТИКА, ЭКОЛОГИЯ

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NEW SPECIES OF MACROMYCETES FOR REGIONS OF THE RUSSIAN FAR EAST. 5

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Information is given on 53 species of macromycetes (*Ascomycota*, *Basidiomycota*), first documented in the Russian Far East (11 species) or in its administrative regions (Amur, Jewish Autonomous, Magadan, and Sakhalin Oblast, Khabarovsk and Primorskiy Krai). For some poorly known species, notes on the peculiarities of their distribution and ecology are given. The identification of *Pluteus hibbettii* and *Rhizopogon laricinus* was confirmed by molecular genetic methods. The cited material is stored in mycological herbaria of ABGI (Blagoveshchensk), LE (St. Petersburg), MAG (Magadan), SVER (Ekaterinburg), TOB (Tobolsk), and VLA (Vladivostok).

Keywords: ascomycetes, basidiomycetes, biodiversity, fungal distribution, morphological and molecular genetic identification, rare species, Russia

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INTRODUCTION

The paper is a fifth in the series of publications devoted to the new finds of macrofungi in the regions of the Russian Far East (Rebriev et al., 2020, 2021, 2022, 2023). The data contained in these publications are deposited on the GBIF resource (Rebriev et al., 2024).

Annotations about localities, habitats, substrates, specimen herbarium numbers, collectors and determiners as well as notes on rarity and peculiar features of some species are provided.

MATERIALS AND METHODS

The material was collected and identified by Anna V. Bogacheva (abbreviated as AB), Nadezhda V. Bukharova (NB), Elena A. Erofeeva (EE), Vladimir I. Kapitonov (VK), Natalia A. Kochunova (NK), Ekaterina F. Malysheva (EM),

Yury A. Rebriev (YuR), Nina A. Sazanova (NS), Anton G. Shiryaev (AS), Elena A. Zvyagina (EZ) and others, as indicated in the text. If the specimen was collected and determined by the same specialist, such notes as "coll. and det." are omitted in the text. The taxa names are actualized in accordance with the Index Fungorum database (2024).

The specimens examined are deposited in ABGI (Blagoveshchensk), LE-F (Saint Petersburg), MAG (Magadan), SVER (Ekaterinburg), TOB (Tobolsk) and VLA (Vladivostok) herbaria.

The novelty of the listed species for the Russian Far East was checked against existing literature, including the checklists of Bolshakov et al. (2021, 2022) and the electronic resource of the Global Biodiversity Information Facility (GBIF).

The identification was carried out mainly by morphological methods. The identification of *Pluteus hibbettii* and *Rhizopogon laricinus* was confirmed by molecular genetic methods.

Preparation for molecular analyses of the strains was performed by sampling a small piece of mycelium from the advancing zone of the colonies using Thermo Scientific Phire Plant Direct PCR Kit. For DNA extraction from voucher, small fragments of dried basidiomata were used. The procedure of DNA extraction completely corresponded to the manufacturer's protocol of the Phytosorb Kit (ZAO Syntol, Russia). The procedures of amplification and sequencing of ITS fragment were performed with a standard pair of primers ITS1f-ITS4b (White et al., 1990; Gardes, Bruns, 1993). Sanger sequencing was carried out at the Center for collective use of scientific equipment "Cellular and molecular technology of studying plants and fungi" (Komarov Botanical Institute of the Russian Academy of Sciences, St. Petersburg) and the Youth Molecular Genetic Laboratory of Yugra State University.

RESULTS

Ascomycota

Neolectales

Neolecta irregularis (Peck) Korf et J.K. Rogers – new for Jewish Autonomous Oblast.

Specimen examined: *Jewish Autonomous Oblast*: Bastak Nature Reserve, 49.0743°N, 133.0703°E, deciduous forest, on litter, 12.09.2022, coll. E.S. Lonkina, det. AB (VLA D-4606).

Pezizales

Helvella pezizoides Afzel. – new for Primorskiy Krai.

Specimens examined: *Primorskiy Krai*: Vladivostok city, territory of the Botanical Garden-Institute, artificial plantings, 43.1327°N, 131.5936°E, deciduous forest, on soil, 27.07.1990, coll. E.M. Bulakh, det. AB (VLA D-4462); ibid., on dead wood, 28.04.2023, coll. Yu.V. Dochevoy, det. AB (VLA D-4637).

Pachyella violaceonigra (Rehm) Pfister – new for the Russian Far East.

Specimen examined: *Primorskiy Krai*: Partizanskiy District, railway station "94 km", Tigrovaya river, 43. 1116°N, 132. 5343°E, deciduous forest, on dead wood, 04.11.2023, coll. Yu.V. Dochevoy, det. AB (VLA D-4676).

Peziza ostracoderma Korf – new for the Russian Far East.

Specimen examined: *Primorskiy Krai*: Khasanskiy District, vicinity of Kravtsovka village, 43.3648°N, 131.6418°E, coniferous-deciduous forest, on soil in fireplace, 17.08.2018, AB (VLA D-4420).

Basidiomycota

Agaricales

Armillaria cepistipes Velen. – new for Khabarovsk Krai.

Specimens examined: *Khabarovsk Krai*: Khabarovskiy District, Khekhtsirskiy Zakaznik, Elka river basin, 48.2868°N, 135.3389°E, mixed forest, on stumps and fallen trees, 14.08.2017, EE (VLA M-26229); Nanayskiy District, Anyuysky National Park, middle part of the Anyui river, 49.3750°N, 137.7117°E, riverside, clearing near the house, on litter, solitary, in a small group, 25.08.2010, EE (VLA M-23376; fig. 1a); Verkhnebureinskiy District, vicinity of Sofiysk village, lower reaches of the Samyr river, 52.2618°N, 134.1493°E, clearing in a mixed forest, on *Betula* sp. logs and on litter nearby, caespitose, 04.09.2013, EE (VLA M-24301).

Notes: The specimen VLA M-23376 was pointed in Erofeeva, Bulakh, 2015 as *A. mellea* (Vahl) P. Kumm.

Cheimonophyllum haedinum (Berk. et M.A. Curtis) Valade et P.-A. Moreau – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, left bank of the Riflyanka river, 46.1024°N, 142.2012°E, *Abies-Picea*-dominated forest with *Betula* sp., *Alnus* sp. and *Sorbus* sp., on the bark of trunk of *Abies* sp., 06.08.2023, NK (ABGI 2332/170107).

Chlorophyllum olivieri (Barla) Vellinga – new for Khabarovsk Krai.

Specimen examined: *Khabarovsk Krai*: Khabarovskiy District, Khekhtsirskiy Zakaznik, valley of the Malye Chirki river, 48.2497°N, 135.0092°E, mixed forest, on soil, near the anthill, 16.09.2017, EE (VLA M-26233).

Clitopilopsis hirneola (Fr.) Kühner – new for Magadan Oblast.

Specimens examined: *Magadan Oblast*: Olskiy District, Zavyalov Island, right bank of the Rassvet river, 59.0780°N, 150.6275°E, old-burnt hill with *Pinus pumila*, on soil among *Polytrichum* mosses, 27.07.2021, coll. E.V. Zheludeva, det. NS (MAG 5917); cape Nyklya, 1-st observation deck, seaside slope, 59.5801°N, 151.1857°E, side of the road, sparse thickets of *P. pumila* with spots of *Salix sphenophylla*, on sandy soil, 31.08.2023, NS (MAG 6049; Fig. 1, b).

Cortinarius clarobrunneus (H. Lindstr. et Melot) Niskanen, Kytöv. et Liimat. – new for the Russian Far East.

Specimen examined: *Magadan Oblast*: vicinity of Magadan city, 17th km of the federal road Kolyma, 59.6783°N, 150.9128°E, planting of *Pinus sylvestris*, on soil, 30.08.2022, NS (MAG 6045).

C. evernius (Fr.) Fr. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Khasynskiy District, federal road Kolyma, Yablonovyy pass, 60.6139°N, 151.5852°E, moist saddle along the edge of *Larix cajanderi* forest, among mosses, 22.08.2016, NS (MAG 5423).

C. gossypinus H. Lindstr. – new for the Russian Far East.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, upper part of the Kolyma river, Orotuk station, tract "Ryabinovy Island" in the floodplain of the Kolyma river, 62.0582°N, 148.6044°E, dead *Salix schwerinii* forest, on soil, 28.08.2015, coll. N.V. Sinelnikova, det. NS (MAG 4346).

Notes: The species is associated with *Salix* and bears an external resemblance to *C. hemitrichus*, which is associated with *Betula*.

C. rubellus Cooke – new for the Russian Far East.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, right bank of the Moguchi river, 46.0929°N, 142.1901°E, *Abies-Picea*-dominated forest with *Betula* sp., on soil, 10.08.2023, NK (ABGI 2336/170111).

C. tabularis (Fr.) Fr. – new for Magadan Oblast.

Fig. 1. Fruiting bodies of some rare species of macromycetes: a – *Armillaria cepistipes* VLA M-23376 (photo by E. Erofeeva); b – *Clitopilopsis hirneola* MAG 6049 (photo by N. Sazanova); c – *Inocybe alpigenes* MAG 5952 (photo by N. Sazanova); d – *Laccaria amethysteo-occidentalis* MAG 5764 (photo by N. Sazanova); e – *Mycena meliigena* VLA M-28063 (photo by E. Erofeeva); f – *Pluteus hibbettii* LE F-347543 (photo by O. Morozova).

Specimen examined: *Magadan Oblast*: Susumanskiy District, Magadan Nature Reserve, Momontai Lake area, 63.7330°N, 148.1204°E, *Larix cajanderi* forest with *Betula exilis* shrubs and lichens, on soil, 06.08.2018, coll. E.A. Andriyanova, det. NS (MAG 5363).

Entoloma formosum (Fr.) Noordel. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: vicinity of Magadan city, coast of the Okhotsk Sea, hiking trail to Mount Stone Crown, 59.5105°N, 150.7054°E, wet habitat near a stream, *Larix cajanderi* forest, on soil among mosses, 18.08.2012, NS (MAG 5953).

Infundibulicybe squamulosa (Pers.) Harmaja – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, right bank of the Moguchi river, 46.0887°N, 142.1933°E, *Abies-Picea*-dominated forest with *Betula* sp., *Alnus* sp. and *Sorbus* sp., on litter, 07.08.2023, NK (ABGI 2330/170110).

Inocybe alpigenes (E. Horak) Bon – new for the Russian Far East.

Specimen examined: *Magadan Oblast*: Olskiy District, Zavyalov Island, left bank of the Rassvet Bay, 59.0835°N, 150.6223°E, spotted shrub tundra with *Salix sphenophylla* and *Dryas ajanensis*, on soil, 25.07.2021, NS (MAG 5952; Fig. 1, c).

Notes: This is a holarctic subalpine and subarctic species, known in the Russian Federation from Buryatia (Bolshakov et al., 2021). It differs from similar species in its fibrous-silky cap and microscopic characteristics.

Laccaria amethysteo-occidentalis G.M. Muell. – new for the Russian Far East.

Specimens examined: *Magadan Oblast*: Khasynskiy District, 152nd km of the federal road Kolyma, 60.5952°N, 151.5619°E, southern gravelly slope of a hill with steppe formation, next to *Larix cajanderi*, 12.08.2015, NS (MAG 4381, MAG 4382); Olskiy District, coast of the Okhotsk Sea, Yansky Estuary, 59.7389°N, 149.4054°E, sparse thickets of *Pinus pumila* on the border with a seaside meadow, on sandy soil, together with *Sabuloglossum arenarium*, 05.08.2017, NS (MAG 5764; fig. 1d); ibid., 05.09.2023, NS (MAG 6102).

Notes: This Asian-North American species, associated with conifers, has a richer color and more oval spores than *L. amethystina*. It is known in the Russian Federation from Altai (Gorbunova, Chubarova, 2008).

Lepiota brunneoincarnata Chodat et C. Martín – new for Khabarovsk Krai.

Specimen examined: *Khabarovsk Krai*: Khabarovskiy District, Khekhtsirskiy Zakaznik, valley of the Malye Chirki river, 48.2497°N, 135.0092°E, mixed forest, on litter, near roadside, 14.09.2018, EE (VLA M-26580).

Notes: The fruiting body emits the odour of chocolate candies.

Mycena meliigena (Berk. et Cooke) Sacc. – new for Jewish Autonomous Oblast.

Specimen examined: *Jewish Autonomous Oblast*: Birobidzhan city, bank of the Bira river, 48.7925°N, 132.8940°E, arborescent *Salix* sp. thickets, on the bark of a damaged *Salix* sp. trunk, among moss and lichens, after heavy continuous rain, 03.07.2021, EE (VLA M-28063; fig. 1e).

M. rubromarginata (Fr.) P. Kumm. – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, right bank of the Moguchi river, 46.0887°N, 142.1933°E, *Abies-Picea*-dominated forest with *Betula* sp., on litter, 09.08.2023, NK (ABGI 2295/170109).

Pluteus hibbettii Justo, E.F. Malysheva et Bulyonkova – new for the Russian Far East.

Specimen examined: *Primorskiy Krai*: Ussuriyskiy Urban Okrug, vicinity of Gorno-Tayozhnoye village, Arboretum of the Gornotayozhnaya Research Station, 43.6936°N, 132.1528°E, mixed forest, on well-decayed wood of a coniferous tree, 28.08.2021, coll. O. Morozova, det. EM (LE F-347543; ITS GenBank PP575008; Fig. 1, f).

Notes: The species was described recently based on specimens from the USA, Japan and central Siberia (Novosibirsk district) (Justo et al., 2014). The studied collection is the second record in the Russian Federation.

Simocybe haustellaris (Fr.) Watling – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, upper part of the Kolyma river, Orotuk station, 62.0206°N, 148.6282°E, floodplain of the Kolyma river, on a pile of deciduous trees, 31.07.2011, NS (MAG 5544).

Tricholoma frondosae Kalamees et Shchukin – new for Khabarovsk Krai.

Specimens examined: *Khabarovsk Krai*: Nanayskiy District, Anyuysky National Park, lower reaches of the Anyui river, 49.2987°N, 136.5148°E, *Quercus mongolica* forest with *Populus tremula*, on soil, 21.09.2012, EE (VLA M-24454); Verkhnebureinskiy District, Chegdomyn town, park, 51.1314°N, 133.0444°E, sparse forest of *Betula platyphylla* with *P. tremula*, on soil among the grass, 04.10.2009, EE (VLA M-22335; Fig. 2, a).

Notes: The specimen VLA M-24454 was reported in Erofeeva, Bulakh (2015) as *T. equestre* (L.) P. Kumm.

Tubaria furfuracea (Pers.) Gillet – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Olskiy District, Zavyalov Island, Rassvet Bay, 59.0761°N, 150.6488°E, forest of *Betula lanata* along Malaya Rechka stream, on rotten wood debris on soil, 22.07.2021, NS (MAG 5919).

Amylocorticiales

Amylocorticium subincarnatum (Peck) Pouzar – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Svobodnenskiy District, vicinity of Yukhta-3 village, 51.4825°N, 128.1612°E, young *Betula* sp. forest with single trees of *Pinus*, on fallen decorticated trunk of *P. sylvestris*, 04.08.2022, VK (TOB1820135; Fig. 2, b).

Amyloxenasma lloydii (Liberta) Hjortstam et Ryvarden – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, upper part of Kolyma river, Malyy Chubukalah brook valley, 62.0488°N, 148.7709°E, *Larix* sp. dominated forest with *Pinus pumila* and *Betula middendorffii*, on fallen wood of *P. pumila*, 01.09.2005, AS (SVER(F) 24083).

Anomoporia kamtschatica (Parmasto) Bondartseva – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Srednekanskiy Disrtict, 18 km east of Balygychan village, 63.9052°N, 154. 4263°E, *Pinus pumila* bushes, on dead fallen branch of *P. pumila*, 07.08.2008, coll. O.S. Nikitin, det. AS (SVER(F) 24099).

Atheliales

Athelia epiphylla Pers. – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Selemdzhinskiy District, Nora Nature Reserve, left bank of the valley of the Burunda river, 52.5436°N, 130.0367°E, forest of *Pinus sylvestris* with *Betula* sp. and *Populus tremula*, on dead trunk of *P. tremula*, 27.06.2022, NK (ABGI 2059/170106).

Auriculariales

Endoperplexa enodulosa (Hauerslev) P. Roberts – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Olskiy District, Magadan Nature Reserve, Kava-Chelomdzhinskiy section, cordon Moldot, 60.0184°N, 148.0366°E, mixed forest, on fallen dead trank of *Pinus pumila*, 03.08.2008, coll. O.S. Nikitin, det. AS (SVER(F) 24090).

Boletales

Rhizopogon laricinus Y. Miyamoto et T.C. Maximov – new for the Russian Far East.

Specimen examined: *Magadan Oblast*: Olskiy District, Kavinskaya Valley Nature Protected Area, interfluve of the Olochan and Burgali rivers, 59.5833°N, 147.5000°E, in soil, 19.08.2017, coll. NS, det. EZ (MAG 5057, LE F-350980; ITS GenBank PP501190).

Notes: This species was described from Sakha Republic (Miyamoto et al., 2019). There are several indications of findings of cf. *Rhizopogon laricinus* in the GBIF (Vasar et al., 2022; PlutoF. Global soil...), but none of them are confirmed by basidiomata finds. It is the only *Rhizopogon* species in the world that is obligately associated with *Larix*.

Cantharellales

Sistotrema resinicystidium Hallenb. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Olskiy District, Magadan Nature Reserve, Kava-Chelomdzhinskiy section, cordon Moldot, 60.0183°N,

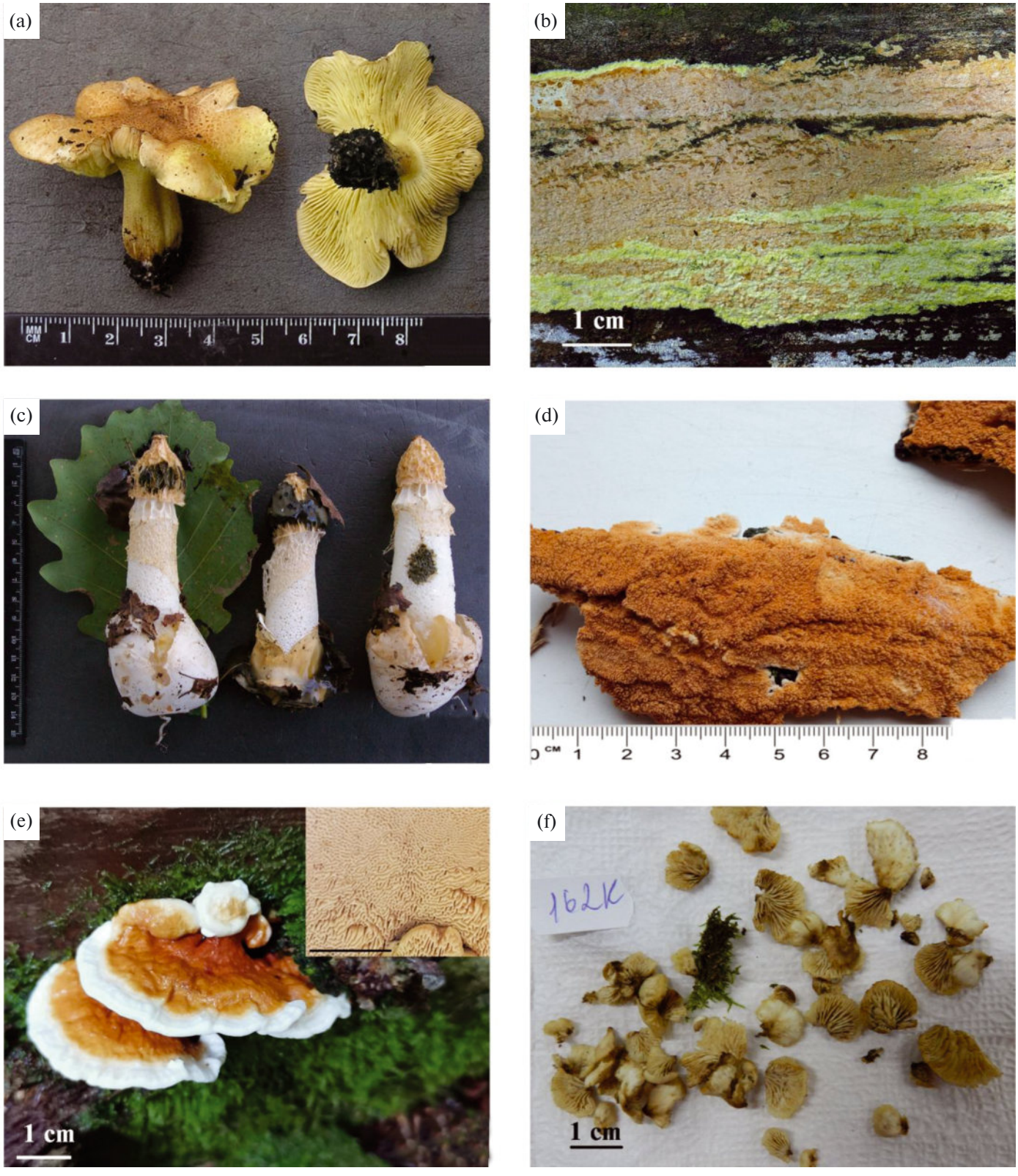

Fig. 2. Fruiting bodies of some rare species of macromycetes: a – *Tricholoma frondosae* VLA M-22335 (photo by E. Erofeeva); b – *Amylocorticium subincarnatum* TOB1820135 (photo by V. Kapitonov); c – *Phallus sibiricus* VLA M-24264 (photo by E. Erofeeva); d – *Steccherinum robustius* ABGI 2112/170103 (photo by N. Kochunova); e – *Heterobasidion orientale* VLA M-28273 (photo by N. Bukharova); f – *Lentinellus flabelliformis* ABGI 2301/170108 (photo by N. Kochunova).

148.0362°E, *Larix* sp. dominated forest, on a dead fruiting body of *Fomitopsis* sp. growing on a fallen mossy trunk of *Larix cajanderi*, 23.08.2008, coll. O.S. Nikitin, det. AS (SVER(F) 24077).

Tulasnella pallida Bres. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Olskiy District, Magadan Nature Reserve, Olskiy section, Cape Alevina, 58.8391°N, 151.3492°E, bushes with *Salix arctica*, *S. sphenophylla*, *Betula exilis*, *Duschekia fruticosa*, on fallen branch of *D. fruticosa*, 26.08.2008, coll. O.S. Nikitin, det. AS (SVER(F) 24081).

Corticiales

Corticium confine Bourdot et Galzin – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Blagoveshchenskiy District, Blagoveshchensk city, Komsomolskiy park, 50.2597°N, 127.4949°E, hardwood plantations, on a dead branch of *Betula davurica*, 09.09.2022, coll. E. Vorobyova, det. NK (ABGI 2216/170105).

Filobasidiales

Syzygospora mycophaga (M.P. Christ.) Hauerslev – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, upper part of Kolyma river, Malyy Chubukalah brook valley, 62.0483°N, 148.7710°E, *Larix* sp. dominated forest with *Pinus pumila*, on fruiting bodies of *Amylocorticiellum molle* grows on a dead branch of *P. pumila*, 01.09.2005, AS (SVER(F) 24095).

Hymenochaetales

Subulicium lautum (H.S. Jacks.) Hjortstam et Ryvarden – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Khasynskiy District, Olskoe plateau, Yablonovyy pass, 60.6159°N, 151.5868°E, dryad tundra with *Pinus pumila*, on dead branch of *P. pumila*, 09.09.2005, AS (SVER(F) 24079).

Tubulicrinis chaetophorus (Höhn.) Donk – new for the Russian Far East.

Specimen examined: *Khabarovsk Krai*: Komsomolskiy District, Komsomolsk Nature Reserve, vicinity of the Kamennaya pad' cordon, 50.7434°N, 137.3805°E, *Abies-Larix* forest, on a dead conifer trunk, 21.07.2022, NK (ABGI 2171/170102).

T. medius (Bourdot et Galzin) Oberw. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Srednekanskiy Disrtict, 18 km east of Balygychan village, 63.9052°N, 154. 4263°E, *Pinus pumila* bushes, on dead fallen branch of *P. pumila*, 07.08.2008, coll. O.S. Nikitin, det. AS (SVER(F) 24084).

Jaapiales

Jaapia argillacea Bres. – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, Orotuk station, upper Kolyma river, 62.0509°N, 148.6443°E, forest with *Larix cajanderi*, *Pinus pumila* and *Betula middendorffii*, on dead branch of *P. pumila*, 05.09.2005, AS (SVER(F) 24080).

Phallales

Phallus sibiricus (Lavrov) Rebriev [=*P. ultraduplicatus* X-D Yu, Wei Lv, Shu-Xia Lv, Xu-Hui Chen, Qin Wang] – new for Amur Oblast, Jewish Autonomous Oblast, Khabarovsk Krai, and Sakhalin Oblast.

Specimens examined: *Amur Oblast*: Blagoveshchenskiy District, Blagoveshchensk city, 2nd km of Ignatievskoe highway, 50.3197°N, 127.4808°E, *Quercus mongolica* and *Betula davurica* plantations, on soil, 18.09.2017, NK (ABGI 691/170104); vicinity of Gryaznushka village, 50.6612°N, 127.4772°E, *Q. mongolica* forest, on soil, 25.08.2003, coll. NK, det. YuR (VLA M-18306); forest tract "Mukhinka", 50.5561°N, 127.6468°E, forest of *Q. mongolica* and *Alnus* sp. with *Ulmus* sp., on soil, near the streamlet, 05.09.2003, coll. NK, det. YuR (VLA M-18307); Zeyskiy District, vicinity of Zeya town, south-eastern slope towards the Zeya river valley, 53.7640°N, 127.2979°E, forest of *Larix* sp. and *Betula* sp., on soil, 09.08.1958, coll. L.N. Vasilyeva, det. YuR (VLA M-18137); ibid., on the slope, 53.7618°N, 127.2926°E, forest of *Betula* sp. with *Q. mongolica*, on soil, 11.08.1958, coll. L.N. Vasilyeva, det. YuR (VLA M-18142); *Jewish Autonomous Oblast*: Birobidzhanskiy District, 16th km of Birshosse road, 48.7020°N, 132.8139°E, deciduous forest (*Q. mongolica*, *Betula* spp., *Populus tremula*), on soil, 11.09.2013, coll. EE, det. YuR and EE (VLA M-24264; fig. 2c); *Khabarovsk Krai*: Khabarovskiy District, Bolshekhekhtsirsky Nature Reserve, Bykova river valley, 48.2716°N, 134.8305°E, broad-leaved forest, on soil, 01.09.1983, coll. E.M. Bulakh, det. YuR (VLA M-21122); vicinity of Voronezh village, 48.6026°N, 135.0493°E, deciduous forest, on soil, 01.09.2018, coll. S.P. Prokopiev, det. YuR and EE (VLA M-26748); ibid., 48.6026°N, 135.0493°E, deciduous forest, on litter with numerous woody remains, 11.08.2017, coll. S.P. Prokopiev, det. YuR and EE (VLA M-26512); Komsomolskiy District, Komsomolsk Nature Reserve, Namek (Oxyan) brook basin, 50.7570°N, 137.6539°E, *Q. mongolica* forest, on soil, 20.08.1985, coll. E.M. Bulakh, det. YuR (VLA M-18147); Nanayskiy District, Anyuysky National Park, lower reaches of the Anyui river, 49.2879°N, 136.5343°E, *Alnus* sp. forest, on soil, 05.08.2010, coll. EE, det. YuR and EE (VLA M-22780); *Sakhalin Oblast*: Sakhalin Island, Dolinskiy District, vicinity of Dolinsk town, 47.3244°N, 142.8283°E, *Picea* sp.-*Abies* sp. forest, on soil, 09.09.1990, coll. E.M. Bulakh, det. YuR (VLA M-18139).

Notes: Some of these specimens have previously been included in regional checklists (Nazarova, Vasilyeva, 1974; Azbukina et al., 1986; Azbukina et al., 1989; Azbukina et al., 1998; Bulakh, Bukharova, 2018; Kochunova, 2019) as *Dictyophora duplicata* (Bosc) E. Fisch. (VLA M-18137 (with incorrect annotation), VLA M-18142, VLA M-18147 (with incorrect geographic location), VLA M-18307, VLA M-21122, VLA M-22780 (with erroneous specimen number and incorrect annotation), VLA M-24264 (with incorrect annotation)) and as *Phallus impudicus* f. *togatus* (Kalchbr.) Quél. (ABGI 691/170104).

Polyporales

Cystidiopostia pileata (Parmasto) B.K. Cui, L.L. Shen et Y.C. Dai – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, slope of the left bank of the Riflyanka river, 46.1051°N, 142.2003°E, floodplain forest, on dead wood of *Alnus* sp., 06.08.2023, NB (VLA M-28258).

Notes: This is the third report of this species in the Russian Federation, which was previously known here from the Primorskiy Krai and Jewish Autonomous Oblast (Parmasto, 1980; Erofeeva et al., 2021).

Phanerochaete velutina (DC.) P. Karst. – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Blagoveshchenskiy District, 3.2 km southwest of Novinka village, 50.6225°N, 127.6202°E, *Betula davurica*-dominated forest with *Quercus mongolica*, on fallen trunk of *Q. mongolica*, 04.08.2023, VK (TOB2000467).

Phlebia acerina Peck – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Kunashir Island, Kurils Nature Reserve, vicinities of Dubovoye village, 43.7963°N, 145.5042°E, *Quercus*-dominated forest, on dead wood of *Alnus* sp., 25.08.2016, coll. E.M. Bulakh, det. NB (VLA M-25204).

Neoantrodia leucaena (Y.C. Dai et Niemelä) Audet – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Svobodnenskiy District, 6.8 km northeast of Yukhta village, 51.5585°N, 128.2133°E, *Betula dauurica*-dominated forest with *Quercus mongolica* and *Populus tremula*, on fallen decorticated trunk of *P. tremula*, 02.06.2023, VK (TOB1920436).

Steccherinum aurantilaetum (Corner) Bernicchia et Gorjón – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, near the coast, 46.0736°N, 142.1892°E, *Salix* sp. forest, on dead trunk of *Salix* sp., 04.08.2023, NB (VLA M-28226).

Notes: This is a rare East-Asian species that is easily recognized by its bright orange effused-reflexed basidiomata. It was previously known in the Russian Federation only from the Primorskiy Krai, Khabarovsk Krai and Jewish Autonomous Oblast (Bukharova, 2021).

S. robustius (J. Erikss. et S. Lundell) J. Erikss. – new for Khabarovsk Krai.

Specimen examined: *Khabarovsk Krai*: Komsomolskiy District, Komsomolsk-on-Amur city, Silinskiy les Natural Monument, vicinity of the visitor center of the Komsomolsk Nature Reserve, 50.5680°N, 137.0476°E,

mixed forest, on dead trunks of *Prunus padus*, 18.07.2022, NK (ABGI 2112/170103; Fig. 2, d).

Russulales

Aleurocystidiellum subcruentatum (Berk. et M.A. Curtis) P.A. Lemke – new for Sakhalin Oblast.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, mouth of the Moguchi river, 46.0928°N, 142.1999°E, *Abies-Picea* forest, on trunk of *Picea* sp., 09.08.2023, NB (VLA M-28318).

Heterobasidion orientale Tokuda, T. Hatt. et Y.C. Dai – new for Sakhalin Oblast.

Specimens examined: *Sakhalin Oblast*: Kunashir Island, Kurils Nature Reserve, ecological trail "Stolbovskaya", 44.0085°N, 145.7021°E, *Abies-Picea* forest, on stump of *Abies* sp., 24.08.2016, coll. E.M. Bulakh, det. NB (VLA M-25100, 27040); Sakhalin Island, Crillon Peninsula, Aniva Bay, right bank of the Moguchi river, 46.0929°N, 142.1901°E, *Abies-Picea* forest with *Saza curulensis*, on a broken trunk of *Abies* sp., 05.08.2023, NB (VLA M-28248); ibid., *Abies-Picea* forest, on dead wood of *Abies* sp., 10.08.2023, NB (VLA M-28326, 28327); ibid., 46.0928°N, 142.1999°E, *Abies-Picea* forest with *Saza curulensis*, on dead trunk of *Picea* sp., 09.08.2023, NB (VLA M-28308, 28319); ibid., 46.0936°N, 142.1882°E, *Abies-Picea* forest with *S. curulensis*, on dead trunk of *Abies* sp., 07.08.2023, NB (VLA M-28286, 28273; fig. 2e); ibid., 46.0977°N, 142.1658°E, *Abies-Picea* forest, on dead wood of *Abies* sp., 08.08.2023, NB (VLA M-28304); Shikotan Island, Zakaznik "Malye Kurily", southwestern slope of Mount Shikotan, 43.7978°N, 146.7429°E, *Abies-Picea* forest, on dead wood of *Abies* sp., 25.08.2019, coll. E.M. Bulakh, det. NB (VLA M-27130, 27357).

Notes: This is an East-Asian species that is characterized by sessile to effused-reflexed basidiomata covered by a thin crust, reddish brown pileus with a marginal white zone and regular to labyrinthiform pores (Tokuda et al., 2009). This species is considered within the *Heterobasidion insulare*-complex. In the Russian Federation it is widely distributed in the south of the Far East and known from the Primorskiy Krai, Khabarovsk Krai and Jewish Autonomous Oblast (Bukharova, Zmitrovich, 2014; Erofeeva, Bukharova, 2018; Bukharova et al., 2021).

Lentinellus flabelliformis (Bolton) S. Ito – new for the Russian Far East.

Specimen examined: *Sakhalin Oblast*: Sakhalin Island, Crillon Peninsula, Aniva Bay, right bank of the Moguchi river, 46.0887°N, 142.1933°E, *Abies-Picea* forest with *Betula* sp., on the bark of *Abies* sp. trunk, 09.08.2023, NK (ABGI 2301/170108; Fig. 2, f).

Thelephorales

Tomentella lilacinogrisea Wakef. (=*Tomentella neobourdotii* M.J. Larsen) – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Svobodnenskiy District, vicinity of Yukhta-3 village, 51.4790°N, 128.1577°E, *Pinus sylvestris*-dominated forest with *Populus tremula* and *Betula davurica*, on fallen trunk of *Populus tremula*, 03.08.2023, VK (TOB2000226).

Trechisporales

Litschauerella clematidis (Bourdot et Galzin) J. Erikss. et Ryvarden – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: Tenkinskiy District, Orotuk station, upper Kolyma river, 62.0509°N, 148.6443°E, forest with *Larix cajanderi*, *Pinus pumila* and *Betula middendorffii*, on dead branch of *P. pumila*, 05.09.2005, AS (SVER(F) 24088).

Sertulicium niveocremeum (Höhn. et Litsch.) Spirin et K.H. Larss. – new for Amur Oblast.

Specimen examined: *Amur Oblast*: Svobodnenskiy District, 9 km northwest of Zheltoyarovo village, 51.5739°N, 128.3244°E, *Betula davurica*-dominated forest with *Quercus mongolica*, on fallen trunk of *Q. mongolica*, 01.06.2023, VK (TOB1920207).

Subulicystidium perlongisporum Boidin et Gilles – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: vicinity of Magadan city, Nagaevskaya hill, 59.5681°N, 150.7523°E, forest with *Betula lanata*, on fallen dead trank of *B. lanata*, 10.09.2007, coll. O.S. Nikitin, det AS (SVER(F) 24075).

Trechispora byssinella (Bourdot) Liberta – new for Magadan Oblast.

Specimen examined: *Magadan Oblast*: vicinity of Magadan city, Nagaevskaya hill, 59.5698°N, 150.7622°E, forest with *Betula lanata* and *Pinus pumila*, on dead branch of *P. pumila*, 11.09.2005, AS (SVER(F) 24096).

DISCUSSION

A total of 77 records of 53 species of macromycetes are reported as new for administrative units of the Russian Far East or the whole region. Four species belong to the *Ascomycota* (*Neolectales* and *Pezizales*), and 49 – to the *Basidiomycota* (*Agaricales*, *Amylocorticiales*, *Atheliales*, *Auriculariales*, *Boletales*, *Cantharellales*, *Corticiales*, *Filobasidiales*, *Hymenochaetales*, *Jaapiales*, *Phallales*, *Polyporales*, *Russulales*, *Thelephorales* and *Trechisporales*). Eleven species (*Cortinarius clarobrunneus*, *C. gossypinus*, *C. rubellus*, *Inocybe alpigenes*, *Laccaria amethysteo-occidentalis*, *Lentinellus flabelliformis*, *Pachyella violaceonigra*, *Peziza ostracoderma*, *Pluteus hibbettii*, *Rhizopogon laricinus*, *Tubulicrinis chaetophorus*) are reported for the first time for the Russian Far East.

The distribution of new records of macromycetes within the regions is as follows:

1 – Primorskiy Krai;
3 – Jewish Autonomous Oblast;
6 – Khabarovsk Krai;
8 – Amur Oblast;
9 – Sakhalin Oblast;
11 – Russian Far East;
18 – Magadan Oblast.

The studies on fungal diversity in the Far Eastern regions of Russia to be continued.

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Новые для регионов Российского Дальнего Востока виды макромицетов. 5

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Приведены сведения о 53 видах базидиальных и сумчатых макромицетов, впервые отмеченных на Дальнем Востоке России (11 видов) или в его регионах (Амурской, Еврейской автономной, Магаданской и Сахалинской областях, Приморском и Хабаровском краях). Для некоторых малоизвестных видов даны примечания об особенностях их распространения и экологии. Идентификация двух видов (*Pluteus hibbettii, Rhizopogon laricinus*) подтверждена молекулярно-генетическими данными. Цитируемый материал хранится в микологических гербариях ABGI (Благовещенск), LE (Санкт-Петербург), MAG (Магадан), SVER (Екатеринбург), TOB (Тобольск), VLA (Владивосток).

Ключевые слова: аскомицеты, биоразнообразие, базидиомицеты, морфологические и молекулярно-генетические методы идентификации, распространение грибов, редкие виды, Россия