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Е.А. Давыдов<sup>1,2</sup>  
 Л.А. Конорева<sup>3,4</sup>  
 М.П. Андреев<sup>4</sup>  
 И.С. Жданов<sup>5</sup>  
 А.А. Добрыш<sup>4</sup>

E.A. Davydov  
 L.A. Konoreva  
 M.P. Andreev  
 I.S. Zhdanov  
 A.A. Dobrysh

## ADDITIONS TO THE LICHEN BIOTA OF THE ALTAI MOUNTAINS (SIBERIA). IV

### ДОПОЛНЕНИЯ К ВИДОВОМУ СОСТАВУ ЛИШАЙНИКОВ АЛТАЙСКОЙ ГОРНОЙ СТРАНЫ. IV

**Summary.** Based on the results of field trips in 1994–2012, new data on distribution of 30 rare and noteworthy lichens from the Altai Mountains in southern Siberia, East Kazakhstan and North-West China are presented. The following species are new for certain regions which follow them in parenthesis: *Protoparmelia cupreobadia* (Russia and Kazakhstan), *Rhizocarpon effiguratum*, *Rh. pusillum*, *Rinodina parasitica*, and *Sporastatia polyspora* (Kazakhstan and the Altai Mts.), *Alectoria sarmentosa*, *Rhizocarpon subgeminatum*, *Rimularia insularis*, and *Umbilicaria cinereorufescens* (Kazakhstan), *Miriquidica lulensis* and *M. plumbeoatra* (West and South Siberia), *Miriquidica deusta*, *Rhizocarpon effiguratum*, and *Toninia alutacea* (West Siberia), *Pilophorus dovrensis* and *Catillaria erysiboides* (South Siberia), *Arthonia apatetica*, *Lecanora cadubriae*, *L. phaeostigma*, *Micarea peliocarpa*, and *M. turfosa* (Altai Mts.), *Arthrorhaphis citrinella*, *Bacidia beckhausii*, *Chrysothrix chlorina*, *Epilichen scabrosus*, and *Lecanora fuscescens* (Altaisky krai), *Cladonia foliacea* (Altai Republic), and *Sticta limbata* (Xinjiang). New localities for the protected species, *Graphis scripta* and *Sticta limbata*, are presented. Species from the genera *Aspicilia*, *Miriquidica*, and *Lecidea* were recognized as a possible “host”-species for the parasitic lichen *Rhizocarpon pusillum*.

**Key words:** new records, lichen, Russia, Kazakhstan, China, Asia, Altai, parasitic lichens, *Miriquidica*, *Micarea*, *Rhizocarpon*, *Lecanora*.

**Аннотация.** В работе представлены флористические находки лишайников Алтая в пределах Южной Сибири, Восточного Казахстана и Северо-Западного Китая, сделанные во время полевых исследований в 1994–2012 годах. Из 30 включенных в сообщение видов, *Protoparmelia cupreobadia* впервые приводится для России и Казахстана; *Rhizocarpon effiguratum*, *Rh. pusillum*, *Rinodina parasitica* и *Sporastatia polyspora* – для Казахстана и Алтая в целом; *Alectoria sarmentosa*, *Rhizocarpon subgeminatum*, *Rimularia insularis* и *Umbilicaria cinereorufescens* – для Казахстана; *Miriquidica lulensis* и *M. plumbeoatra* – для Западной и Южной Сибири; *Miriquidica deusta*, *Rhizocarpon effiguratum* и *Toninia alutacea* – для Западной Сибири; *Pilophorus dovrensis* и *Catillaria erysiboides* – для Южной Сибири; *Arthonia apatetica*, *Lecanora cadubriae*, *L. phaeostigma*, *Micarea peliocarpa* и *M. turfosa* – для Алтая в целом; *Arthrorhaphis citrinella*, *Bacidia beckhausii*, *Chrysothrix chlorina*, *Epilichen scabrosus* и *Lecanora fuscescens* – для Алтайского края; *Cladonia foliacea* – для Республики Алтай; *Sticta limbata* – для Синьцзяна. Даются новые местонахождения охраняемых видов *Graphis scripta* и *Sticta limbata*. Виды из родов *Aspicilia*, *Miriquidica* и *Lecidea* выявлены как возможные хозяева паразитического лишайника *Rhizocarpon pusillum*.

**Ключевые слова:** флористические находки, лишайники, Россия, Казахстан, Китай, Азия, Алтай, паразитические лишайники, *Miriquidica*, *Micarea*, *Rhizocarpon*, *Lecanora*.

This paper continues the series of publications started by E.A. Davydov (2004), Davydov et al. (2007), and Davydov & Printzen (2012a, b) on the lichen flora of the Altai Mts. Herbarium speci-

<sup>1</sup>Altai State University, Lenina Ave. 61; 656049, Barnaul, Russia; e-mail: eadavydov@yandex.ru

<sup>2</sup>Tigirek State Natural Reserve, Nikitina str. 111; 656049, Barnaul, Russia

<sup>3</sup>Polar-Alpine Botanical Garden-Institute, Kola Science Center, Russian Academy of Sciences; 184250, Kirovsk, Russia

<sup>4</sup>V.L. Komarov Botanical Institute Russian Academy of Sciences, Prof. Popova str., 2; 197376, St. Petersburg, Russia

<sup>5</sup>Losiny Ostrov National Park, Poperechny Prosek, 1g; 107113, Moscow, Russia

<sup>1</sup>Алтайский государственный университет, пр-т Ленина, 61; 656049, Барнаул, Россия

<sup>2</sup>Тигирекский государственный заповедник, ул. Никитина, 111, 656049, Барнаул, Россия

<sup>3</sup>Полярно-альпийский ботанический сад-институт им. Н.А. Аврорина КНЦ РАН; 184250, Кировск, Россия

<sup>4</sup>Ботанический институт им. В.Л. Комарова РАН, ул. Проф. Попова, 2; 197376, Санкт-Петербург, Россия

<sup>5</sup>Национальный парк «Лосиный остров», Попереchnый просек, д. 1 «Г»; 107113, Москва, Россия

mens collected by the first author during 1994–2012 composed the material for this study. There was no special focus on any systematical or ecological group of lichens, and all epilithic, epiphytic, epigeic and parasitic lichens not recorded previously for the Altai Mts. or its administrative subdivisions are included. Morphological and anatomical characters were analyzed by applying standard light microscopical methods. Full label data of the examined specimens are provided for every species. Altitudes are indicated in meters above sea level. The name of the collector E.A. Davydov is contracted to ED. Voucher specimens are deposited in the herbaria ALTB, LE, FR and PE.

*Alectoria sarmentosa* (Ach.) Ach.

An arctic-alpine species known from many locations in Eurasia, North and South America (Thomson, 1984; Urbanavichus, 2010). It was reported for the Altai Republic by Sedelnikova (1990) and is also known from the Khangai in Mongolia (Biazrov et al., 1989). In the Altai Mts, it grows on wood, twigs of shrubs, or on soiled stones. New for Kazakhstan and Altaisky krai.

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, headwaters of Bolshoy Tigirek River at 11,5 km N of Tigirek settlement and 3 km SE of Razrabotnaya Mt., 51°02'53" N, 83°00'27" E, alt. 1540–1600 m, mountain tundra, on wood, 21 VII 2012, ED 7328 (ALTB); **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, Katunsky range, ca. 28,5 km E from the Archaty settlement, right bank of the Bukhtarminskoye Reservoir, *Larix sibirica* – *Pinus sibirica* forest with *Vaccinium vitis-idaea*, 49°16'23" N, 86°57'08" E, alt. 2150 m, on soil with rotten wood, 30 VIII 2012, ED 7295 (ALTB); same district, Yuzhny Altay range 21 km S from Uryl' settlement, at the headwaters of the left junction of the Kara-Kaba River, 49°04'16.2" N, 86°16'03.1" E, alt. 2230 m, yernik, amidst the *Betula nana* branches, 6 IX 2012, ED 7294 (ALTB); same place, 49°03'27" N, 86°16'31" E, alt. 2400 m, yernik, amidst the *Betula nana* branches, 6 IX 2012, ED 7296 (ALTB).

*Arthonia apatetica* (A. Massal.) Th. Fr.

This inconspicuous boreal species has been reported from Europe, Asia and North America (Brodo, 1995; Santesson et al. 2004; Urbanavichus, 2010; Wirth, 1995). It is often confused with closely

related *Arthonia* species such as *A. exilis* (Flörke) Anzi and *A. muscigena* Th. Fr. (Coppins, 1983, 1989). It has been reported for Siberia (Sedelnikova, Taran, 2000) and Mongolia (Khentey: Hauck, Javkhlan, 2006) but is new for the Altai Mts.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, S bank of Tal'menie Lake, left bank of Ozyornaia River, slope with NW exposition, 49°48' N, 85°49' E, alt. 1516 m, *Pinus sibirica* – *Picea obovata* forest, on bark of *Sorbus sibirica*, 15 VII 2000, ED 6984 (ALTB).

*Arthrorhaphis citrinella* (Ach.) Poelt

An almost cosmopolitan species reported for Russia from the Arctic (Vrangel I., Yamal, Taimyr, Yakutia, Novosibirskie Is.), Murmansk region, Karelia, Komi Republic, Leningrad region, Central Russia, Ural, Siberia (Baikal, Pribaikalie, Krasnoyarsk territory), Chukotka, Far East (Andreev et al., 1996; Fadeeva et al., 2007; Handbook ..., 2008; Kuznetsova et al., 2007; Urbanavichus, Urbanavichene, 2004; Urbanavichus, 2010; Urbanavichus et al., 2008).

The species is characterized by a granular-areolate, sorediate, greenish gray-yellow to lemon-yellow thallus, flat black apothecia, as well as needle-shaped spores of 7–12 cells, with an elongate tail. It grows on sandy soil, sometimes parasitic on *Baeomyces rufus*.

It was reported for the Altai Mts. from Mongolia, and also occurs in Khangai (Golubkova, 1981; Schubert, Klement, 1971). New for Russian Altai (Altaisky krai).

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, 13 km S from the community of Tigirek, near the headwaters of the Irkutka River, 51°02'24" N, 83°01'12" E, alt. 1675 m, vegetation islands (*Juniperus* sp., *Bergenia crassifolia*, *Salix* sp.) among stonefield and rocks, 27 VII 2011, ED 7094 (ALTB).

*Bacidia beckhausii* Körb.

This inconspicuous species, widespread in the boreal and temperate zone and recently reported by Davydov & Printzen (2012a) from the Altai Mts. (Altai Republic, Ust'-Kansky district) was also found in Altaisky krai.

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, right bank of the Belaya River, 7 km upstream to the mouth of the Berlozhia River, 50°57' N, 83°03' E, alt. 717 m,

*Abies sibirica* – high grasses forest, on lignum, 7 VII 2006, ED 6982 (ALTB), Altai Republic, Ust'-Kansky district, Katunsky range, E bank of Nizhne-Multinskoe Lake near the headwater of Multa River, 50°01' N, 85°51' E, alt. 1627 m, *Pinus sibirica* – *Larix sibirica* forest, on bark of *Lonicera altaica*, 2 VII 2000, ED 7063 (ALTB).

***Catillaria erysiboides* (Nyl.) Th. Fr.**

This boreal Holarctic species with a scattered distribution was found in Russia in Karelia, Komi Republic, Ural, West Siberia (Tyumen Region) and South of the Far East (Fadeeva et al., 2007; Handbook ..., 1998; Paukov, Mikhailova, 2011; Urbanavichus, 2010), growing on wood and bark of coniferous trees. It seems more widely distributed within the boreal zone, but may have been overlooked due to its small size. This species different from the closely related *Catillaria nigroclavata* (Nyl.) Schuler by its light-coloured apothecia, as well as by the morphology of the spores, one cell always being larger than the other. *Puttea exsequens* (Nyl.) Printzen & Davydov is also externally similar but is characterized by unicellular ascospores. New for South Siberia.

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, right bank of the Belaya River, 7 km upstream to the mouth of the Berlozhia River, 50°57' N, 83°03' E, alt. 717 m, *Abies sibirica* – high grasses forest, on wood, 7 VII 2006, ED 6983 (ALTB).

***Chrysothrix chlorina* (Ach.) J.R. Laundon**  
[TLC: vulpinic a., calicin & zeorin]

This bipolar species is characterized by a thick, bright yellow, often areolate, powdery thallus. It grows mainly on siliceous rocks. The presence of vulpinic acid and zeorin distinguishes it from other species of the genus *Chrysothrix* and from sterile thalli of *Psilolechia lucida* (Ach.) M. Choisy. The species was reported for the Russian and Mongolian Altai (Golubkova, 1981; Sedelnikova, 1990). It is a widespread species which, in the Altai Mts., occurs both on rock (common) and bark (rare). It is reported here as new for the West Altai (Altaisky krai).

Specimens examined: **Russia**, Altaisky krai, Soloneshensky district, Bashchelaksky range, valley of Shinok River, downstream of the waterfall, 51°21.27' N, 84°34.06' E, alt. 1035 m, mixed forest (*Picea obovata*, *Abies sibirica*, *Betula pendula*, *Salix* sp., *Sorbus sibirica*, *Populus tremula*, and *Pinus*

*sibirica*), on a cliff near the River, 29 VI 2003, ED 6096 (ALTB); same locality, on bark of *Picea obovata*, 29 VI 2003, ED 6097 (ALTB).

***Cladonia foliacea* (Huds.) Schaer.**

The species is known from Europe, Macaronesia, South and West Asia and North Africa, but in Russia it is restricted to the European part and South Ural (Urbanavichus, 2010). It was also reported from Kazakhstan including Kazakhstani Altai (Andreeva, 1978) and Mongolia (Khangai: Biazrov, 1989). More recently, it was recorded from Siberia (Davydov, 2001) and included to the Red Data Book of the Altaisky krai (Davydov, Skatchko, 2006). It was difficult to differentiate this species from the closely related *C. convoluta* (Lam.) Anders, which has recently been synonymized with *C. foliacea* (Pino-Bodas et al., 2010). G.P. Urbanavichus (2010) points out that all records of *C. foliacea* from Siberia may probably be erroneous. However, T. Ahti has revised our material from the Altai and reports it also from southern Yakutia based on his unpublished records. New for Altai Republic.

Specimens examined: **Russia**, Altaisky krai, Kur'insky district, Kolyvansky range at 2 km W of the community of Podpalattsy, 51°14' N, 82°45' E, alt. 500–600 m, 16 VI 1994, ED 1399 (ALTB); Charyshsky district, 5 km upstream of Tulata River from the community of Ust-Tulatinka, Mochnataya mountain, [51°24' N, 83°25' E, alt. 500 m], pine forest, among stones and mosses, on soil, 17 VI 2002, Tsareva E.N., Tsareva T.V. (ALTB No. 179); Altai Republic, Ongudaysky district, right bank of Chuya River at 15 km upstream from its junction to the Katun' River, 50°24'31" N, 86°52'35" E, alt. 850 m, on soil in mountain steppe, 9 VII 2012, ED 7329 (ALTB).

***Epilichen scabrosus* (Ach.) Clem. ex Hafellner**

This arctic-alpine species is known in Eurasia and North America as a parasite on the thallus of *Baeomyces* sp. It is characterized by small, areolate, green or greenish-yellow thalli, black, plane apothecia and 2-celled brown spores. The species was recorded for the West Siberia by Davydov (2004), based on a collection from the Katunsky range (Altai Republic). It is reported here as new for West Altai (Altaisky krai).

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, 12 km S from the community of Tigirek, watershed of the Bol'shoi Tigirek and Malyi Tigirek Rivers, subal-

pine meadow, rocks, 51°02'24" N, 83°01'12" E, alt. 1675 m, on *Baeomyces placophyllus*, 27 IX 2011, ED 7097 (ALTB).

***Graphis scripta* (L.) Ach.**

*Graphis scripta* is widespread throughout the temperate zone of the Northern Hemisphere (Staiger, 2002). It is distributed in Russia throughout the forest zone and in the forest belt of mountains (Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). Nevertheless, the species is rare in West Altai and is the only crustose species included to the Red Data Book of the Altaisky krai (Davydov, Skatchko, 2006). The second locality in Altaisky krai is formally reported here. At both localities, the species was observed on few tree trunks only. In contrast, it is common in the taiga forest near the Teletskoye Lake.

Specimens examined: **Russia**, Altaisky krai, Krasnoshchokovsky district, Tigireksky range at 1,5 S from the settlement of Tigirek, Chainaya Mt., 51°07'28,9" N, 83°01'45,5" E, alt. 637 m, *Abies sibirica* – *Populus tremula* oldgrown forest, on *Abies sibirica*, 8 III 2009, ED 7116; same place, on *Sorbus sibirica*, ED 7117 (ALTB); Charyshsky district, Bashchelaksky range at 6 km NE of the community of Bol'shoi Bashchelak, Grebnyukha Mt., 51°35' N, 84°01' E, alt. 900 m, on bark of *Abies sibirica*, 17 VII 1996, ED 1874, 1875 (ALTB); Altai Republic, Turochaksky district, Chulyshman tableland, right bank of the Chulyshman River near its junction to the Teletskoye Lake, taiga forest, bark of *Abies sibirica*, 22 IX 2007, ED 7330 (ALTB).

***Lecanora cadubriae* (A. Massal.) Hedl.**

This circumboreal species was previously reported for Russia from Murmansk, Leningrad, Moscow regions, Karelia, Komi Republic, Tatarstan (Volzhsko-Kamsky preserve), Yamalo-Nenetsky, Hanty-Mansiysky regions, Caucasus (Teberda preserve), Ural, Siberia (Baikalskiy preserve), Kamchatka (Kronotsky preserve) (Fadeeva et al., 2007; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004) where it occurs on the bark of conifers, as well as on wood. The species characterized by a granular grayish-whitish thallus, small apothecia (0.2–0.6 mm diam.), with a brownish to blackish-brown, plane to strongly convex disc, and single-celled, narrowly ellipsoidal spores 8–11×3–4 μm; the thallus and thalline exciple are Pd+ orange, K+ yellow changing to orange or red. New for Altai Mts.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, SW bank of Tal'menie Lake, left bank of Khariuzovka River, taiga forest (*Abies sibirica*, *Larix sibirica*, *Pinus sibirica*) on bark of *Abies sibirica*, 49°49' N, 85°48' E, alt. 1516–1800 m, 14 VII 2000, ED 7791 (ALTB).

***Lecanora fuscescens* (Sommerf.) Nyl.**

This circumboreal biatorine species is characterized by broadly ellipsoid ascospores and the presence of fumarprotocetraric and lobaric acids. It may be confused with *L. boligera* (Norman ex Th. Fr.) Hedl. and *L. cadubriae*. The former is chemically identical to *L. fuscescens*, but differs by its broadly ellipsoid ascospores, capitate paraphyses and often biatorine appearance of the apothecia. The latter is readily distinguished by the presence of the norstictic acid chemosyndrome and narrowly ellipsoid ascospores (Edwards et al., 2009; Lichen ..., 2004). *Lecanora fuscescens* is widely distributed in arctic and boreal regions of Russia (Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004), is known from Mongolia (Khangai: Biazrov et al., 1989) and was reported for the Altai by Sedelnikova (1990). New for the West Altai (Altaisky krai).

Specimens examined: **Russia**, Altaisky krai, Zmeinogorsky district, Tigireksky range, left bank of Belaya River opposite the mouth of the Irkutka River, 50°56'49" N, 82°57'50" E, alt. 1043 m, *Abies sibirica* dominated mountain taiga relict forest (Chern'), on bark of *Sorbus sibirica*, 15 VII 2005, ED 7051 (ALTB).

***Lecanora phaeostigma* (Körb.) Almb.**

This Eurasian boreal species has been reported for Russia from the Murmansk region, Karelia, Komi Republic, Moscow and Samara regions, Ural, Tatarstan, Siberia (Baikal, Tyumen region) (Fadeeva et al., 2007; Kataeva et al., 2005; Kortschikov, 2006; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004; Vasykov, Kaneev, 2006). It has also been reported for Mongolia (Khangai: Biazrov et al., 1989). The species has whitish-gray thallus with brownish to brownish-black apothecia (0.8 mm in diameter), ellipsoidal spores 8–15×3–5 μm; the thallus is K+ yellow changing to brown. New for the Altai Mts.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky Katunsky range, SW bank of Tal'menie Lake, left bank of Khariuzovka River,

taiga forest (*Abies sibirica*, *Larix sibirica*, and *Pinus sibirica*), on bark of *Abies sibirica*, 49°49' N, 85°48' E, alt. 1516–1800 m, 14 VII 2000, ED 7792 (ALTB).

*Micarea denigrata* (Fr.) Hedl.

[TLC: gyrophoric a.]

This species occurs in Europe, Asia, North America and Australia (Czarnota, 2007). In Russia it is widespread in the forest zone and in the forest belt of the mountains, where it grows on bark and wood of deciduous and coniferous trees (Handbook ..., 1998; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). The species is characterized by numerous convex variously coloured apothecia, 1–2 celled spores, and by the presence of gyrophoric acid. Common in forest belt of the Altai Mts. (Davydov, 2001; Sedelnikova, 1990).

Specimens examined: **Russia**, Altaysky krai, Zmeinogorsky district, Tigireksky range, near the headwaters of Babiy Kluch River at the divide with the Irkutka River, 51°02' N, 82°58' E, alt. 1500 m, timberline, on lignum, 13 VII 2005, ED 6985 (ALTB). Tigireksky range, valley of Bolshaya Uskuchevka River between Bugryshikha and Andreevsky, 51°11'19.3" N, 82°48'30.6" E, alt. 450 m, *Abies sibirica* forest on NE-facing slope, on *Abies sibirica*, 25 VI 2003, Ch. Printzen 8332 (FR); Altai Republic, Ust'-Kansky district, between the villages Tog-Altai and Cherny Anuy, 51°21'24.0" N, 83°34'06.0" E, alt. 670 m, forest of *Picea obovata* along creek, base of dead *Salix*, 29 VI 2003, Ch. Printzen 8639 (FR); same locality, 51°21'21.4" N, 83°33'50.2" E, alt. 1020 m, on base of *Salix*, Ch. Printzen 8654 (FR); same district, Katunsky range, E bank of Nizhne-Multinskoe Lake near the headwater of Multa River, 50°01' N, 85°51' E, alt. 1627 m, margin of the forest, on lignum, 2 VII 2000, ED 7066 (ALTB); same range, right bank of Multa River near it's flows into Srednemultinskoie Lake, 49°57.5' N, 85°51' E, alt. 1700 m, moss-yernik bog, on lignum, 3 VII 2000, ED 7067 (ALTB); Ongudaysky district, at 10 km E of Ust'-Kan at left bank of Yabagan River, marginal part of the fog, 50°56' N, 84°54' E, alt. 1057 m, on bark of *Salix* sp., 30 VI 2003, ED 6768 (ALTB).

*Micarea melaena* (Nyl.) Hedl.

Common in the boreal zone of the Holarctic and often found in Europe, Asia, North America, Australia, Antarctica (Czarnota, 2007). In Russia, it

is distributed from Arctic to steppe areas in the plains and mountains (Andreev et al., 1996; Handbook ..., 1998; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). Reported for Mongolia (Biazrov et al., 1989; Golubkova, 1981; Schubert, Klement, 1971), Kazakhstan (Andreeva, 1983) and China (Xinjiang: Abbas et al., 2001). It was reported for the Altai Mts. by Sedelnikova (1990) as very rare, but seems to be more common in the region.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, at the junction of the Khazinikha and Ioldo Rivers, 49°53' N, 86°04' E, alt. 1800 m, *Pinus sibirica* – *Vaccinium* forest, on lignum of stump, 22 VII 2000, ED 7064 (ALTB).

*Micarea peliocarpa* (Anzi) Coppins & R. Sant.

The species occurs in Europe, Asia, Africa, North America, Australia and New Zealand (Czarnota, 2007). In Russia it has a scattered distribution and occurs in the arctic, boreal and nemoral zones, as well as in the mountains; it inhabits bark and wood, rarely soil, mosses and rocks (Handbook ..., 1998; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). It is reported for Mongolia from Khentey (Hauck, Javkhlan, 2006). The species characterized by flat to strongly convex, variously coloured, but mostly gray-black or light gray apothecia, sometimes gathered into a bunch, with an olive or blue-green epithecium and oblong-fusiform, mostly 4-celled, but sometimes 2–6-celled spores; it has two types of pycnidia and the thallus reacts C+ red. It is a new record for the Altai Mts. and is probably common in South Siberia, but has been overlooked by researchers.

Specimens examined: **Russia**, Altai Republic, Ust'-Kansky district, Katunsky range, E bank of Nizhne-Multinskoe Lake near the headwater of Multa River, 50°01' N, 85°51' E, alt. 1627 m, margin of the forest, on lignum, 2 VII 2000, ED 7068 (ALTB); same range, between the villages Tog-Altai and Cherny Anuy, 51°21'21.4" N, 84°33'50.2" E, alt. 1020 m, forest of *Picea obovata* along creek, on wood of dead trunk, 29 VI 2003, Ch. Printzen 8657 (FR).

*Micarea turfosa* (A. Massal.) Du Rietz

This arctic-alpine species with a bipolar distribution (Europe, Asia, North America, South America, Antarctica) (Czarnota, 2007) occurs in Russia in the Arctic, Murmansk, Leningrad, Tver and Ni-

zhniy Novgorod regions, Komi Republic, Nenetsky territory, Ural, West and East Siberia, Chukotka, Magadan region (Handbook ..., 1998; Kuznetsova et al., 2007; Notov et al., 2011; Sharapova, 2001; Urbanavichus, 2010; Urbanavichus et al., 2008; Urbanavichus, Urbanavichene, 2004). It grows on peat cushions. It has numerous black apothecia, often confluent in bunches and bulging, with red-brown spots present in the hypothecium; spores are oblong-oval, 1–4-celled. New for the Altai Mts.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, right bank of Multa River near it's flows into Sredne-multinskoie Lake, 49°57.5' N, 85°51' E, alt. 1700 m, moss-yernik bog, on mosses and soil, 3 VII 2000, ED 7073 (ALTB).

*Miriquidica deusta* (Stenh.) Hertel & Rambold

A bipolar, mainly arctic-alpine species which occurs on silicates in open habitats, also found on boulders and rocks in the lowlands of temperate regions. It was known previously in Arctic (Kola Peninsula, Novaya Zemlya, Taimyr, Chukotka, Alaska, Canada and Greenland), Fennoscandia, Leningrad Region, Estonia, in the mountains of Central and Southern Europe, Central Asia (Kazakhstan Altai, Mongolia, Nepal) and North (Nevada, Mexico) and South America (Venezuela); in the Southern Hemisphere it is known in Australia and New Zealand (Andreev, 2004). The taxon is probably rather widely distributed in mountain areas of South Siberia and Central Asia, but is not mentioned because of the poor investigation of the region. The species is characterized by a rather thin, brown, usually dispersed thallus, flat to convex, glossy areoles with thick epinecral layer, a black continuous hypothallus, wide flat sessile, adpressed to subimmersed apothecia, a colourless hypothecium and rather small spores. It can be distinguished from *Miriquidica garovaglii* (Schaer.) Hertel & Rambold by the flatter, thinner and more dispersed areoles on a black hypothallus, by the negative reactions with *K* and *P*, and by the smaller ascospores. It is distinguished from *Lecidea atrobrunnea* (Ramond ex Lam. & DC.) Schaer. by the negative medullary reaction with *I*, and from *L. paupercula* Th. Fr. by the colourless hypothecium and negative reaction with *P*.

The species was found in the alpine belt of the Altai Mts. in stone fields on rocks. New for West Siberia.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, upper reaches of the Ak-Kem River, right bank,

50°05'15.6" N, 86°37'39.3" E, alt. 2482 m, 7 VIII 2009, ED 7191 (ALTB); same place, 50°04'08.9" N, 86°40'37.2" E, alt. 2718 m, 8 VIII 2009, ED 7213 (ALTB); same place, 50°01'58.9" N, 86°26'05.8" E, alt. 2381 m, 14 VIII 2009, ED 7192 (ALTB); same place, 50°00'01.1" N, 86°28'32.9" E, alt. 2764 m, 16 VIII 2009, ED 7194, 7197, 7202, 7799 (ALTB); same place, 50°00'28.9" N, 86°27'52.4" E, alt. 2621 m, 19 VIII 2009, ED 7196 (ALTB); same place, 50°01'04.6" N, 86°27'02.8" E, alt. 2627 m, 20 VIII 2009, ED 7198 (ALTB).

*Miriquidica lulensis* (Helb.) Hertel & Rambold

A widespread in the Arctic (Iceland, Jan Mayen I, Spitsbergen, Franz Josef Land, Kola Peninsula, Novaya Zemlya, Taimyr, Severnaya Zemlya, Chukotka, Arctic Canada, Greenland) occurring in exposed habitats on hard siliceous rocks and boulders enriched in iron. It also occurs in the mountains of North, Central and Eastern Europe (Andreev, 2004). In Russia it has been collected in the Arctic and in Karelia. It is characterized by very small [ca. 0.5–1(1.5) cm diam.], rounded, light-grey thallus edged by a black hypothallus, small plane apothecia with a thin evanescent margin, and a *K*+ red reaction (norstictic acid). Hence it could be confused with *Lecidea lapicida* (Ach.) Ach. var. *pantherina* Ach., but this has more flat and angular areolae and an amyloid medulla. The species was found in alpine belt of the Altai Mts. in stone fields on rocks. New for West and South Siberia.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, watershed between the Ak-Kem and Kucherla Rivers, 50°00'33.5" N, 86°27'09.4" E, alt. 2605 m, 19 VIII 2009, ED 7199 (ALTB).

*Miriquidica plumbeoatra* (Vain.)

Schwab & Rambold

Probably a boreal-montane circumpolar species. It grows in the temperate zone on siliceous rocks in more or less moist habitats near rivers and waterfalls. It is known from Fennoscandia including the Kola Peninsula and Karelia, and from North America. In Russia it has also been collected in Kamchatka, and was erroneously reported for Buryatia (Andreev, 2004; Urbanavichene, 1998). It is characterized by a dark-grey thallus, darker in places of iron granule concentration, by the completely immersed and adpressed apothecia with a very thin or evanescent margin, an excipulum with a dark-brown

inner part, a reddish-brown hypothecium and by the absence of lichen substances. The species was found in the alpine belt of the Altai Mts. in stone fields on rocks. New for West and South Siberia.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, upper reaches of the Ak-Kem River, right bank, 50°05'15.6" N, 86°37'39.3" E, alt. 2482 m, 7 VIII 2009, ED 7200 (ALTB).

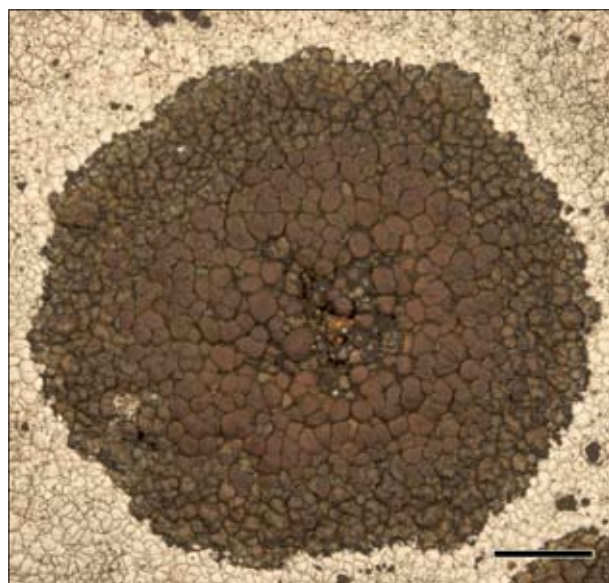
#### *Pilophorus dovrensis* (Nyl.) Timdal

This arctic-alpine species grows on the siliceous rocks in Svalbard, North Europe, North America (incl. Greenland) (Foucard, 2001; Øvstedal et al., 2009). It was reported for Russia from the Arctic (Novaya Zemlya, Severnaya Zemlya, Chukotka), Murmansk region (Melekhin, 2011) and North of Siberia (Putorana Plateau) (Zhurbenko, Triebel, 2005). The species is distinguished by the absence of pseudopodetia, the presence of cephalodia with *Nostoc* or *Stigonema*, the pale greenish-gray areolate thallus, black, convex to hemispherical apothecia, and simple colourless spores (15–17×5–7 µm). New for South Siberia.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, upper reaches of the Ak-Kem River, right bank, 49°59'15.6" N, 86°35'09.3" E, alt. 2686 m, stone fields and rocks, on stone, 9 VIII 2009, ED 6997 (ALTB).

#### *Protoparmelia cupreobadia* (Nyl.) Poelt

This alpine species was previously reported from Europe, Mongolia, Pakistan and North America (Cogt, 1995; Poelt, Grube, 1992; Poelt, Leuckert, 1991). The record of *Protoparmelia atriseda* (Fr.) R. Sant. et V. Wirth for the Altai Mts. (Davydov, 2001) refers to *P. cupreobadia* (Zhdanov, 2011). Both *Protoparmelia atriseda* and *P. cupreobadia* belong to the section *Phaeonora*, which includes species with curved and thread-like conidia, containing of norstictic acid and associating with crustose lichens at least at young stages. Both species initially grow on thalli of *Rhizocarpon*. Nevertheless, thallus morphology of the species is significantly different. *Protoparmelia cupreobadia* is characterized by a large thallus up to 10 cm diam., with a distinct margin, plane, contiguous areoles with a black fringe of prothallus, radially elongated marginal areoles, and large apothecia up to 3 mm diam (Fig. 1); in contrast, *P. atriseda* is recognized by the smaller thallus up to 4 cm in diameter with a rather indistinct



**Fig. 1.** Habit of *Protoparmelia cupreobadia* (a wet thallus). Scale 1 cm.

margin, strongly convex to hemispherical, rather scattered areoles that are not radially elongate at the margin, and small, up to 1 mm diam. apothecia. The information on two specimens of *Protoparmelia cupreobadia* collected in 1990 in the Altai Mts. (Russia) by P.L. Nimis are entered into the herbarial database of TSB (No 15817, 17877) and it is on this data that the species was reported by G.P. Urbanavichus (2010) for Russia. This material has not been examined. The species is common within the study area on stones, boulders in stonefields in alpine belt and near the timberline. New for Russia and Kazakhstan.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, watershed between the Ak-Kem and Kucherla Rivers, stone fields and rocks, 50°01'59" N, 86°26'06" E, alt. 2381 m, 14 VIII 2009, ED 7288 (ALTB, LE); same place, 50°00'01" N, 86°28'33" E, alt. 2764 m, 16 VIII 2009, ED 7289 (LE); same place, 50°00'38" N, 86°27'44" E, alt. 2699 m, 18 VIII 2009, ED 7290 (LE); **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, headwaters of the Bukhtarma River, right bank, SE slope of the Muzdy-Bulak Mt. (3050 m), high mountain tundra, stones, 49°14'13" N, 87°14'42" E, alt. 2710 m, 1 IX 2012, ED 7286 (ALTB).

#### *Rhizocarpon effiguratum* (Anzi) Th. Fr.

This species is known from Europe, Asia and North America (incl. Greenland) (Øvstedal et al., 2009). In Russia it occurs in the Subpolar and North Ural, Buryatia (Dzherginsky district), Za-

baikalie territory, Magadan region (Handbook ..., 2003; Kharpukhaeva, Urbanavichus, 2006; Makryi, 2002). *Rhizocarpon effiguratum* is characterized by small thalli, up to 3 cm diam., with plane to strongly convex, yellow to yellowish-green areoles, and brown, 2-celled ascospores. The species is locally common in the alpine belt of the Altai Mts in open communities on stones near the upper limit of lichen vegetation and occurs on siliceous rocks. It was reported for the Mongolian Altai (Golubkova, 1981; Schubert, Klement, 1971) but is new for West Siberia and Kazakhstan.

Selected specimens examined: **Russia**, Altai Republic Ust'-Koksinsky district, Katunsky range upper reaches of the Ak-Kem River, right bank, stone fields and rocks, 50°05'15.6" N, 86°37'39.3" E, alt. 2482 m, 7 VIII 2009, ED 7042, 7050 (ALTB); same place, 50°04'08.9" N, 86°40'37.2" E, alt. 2718 m, 8 VIII 2009, ED 7015 (ALTB); same place, 49°59'08.3" N, 86°34'55.5" E, alt. 2687 m, 9 VIII 2009, ED 7013, 7014, 7041, 7043 (ALTB); same range, watershed between the Ak-Kem and Kucherala Rivers, stone fields and rocks, 49°58'15.2" N, 86°28'58.4" E, alt. 2850 m, 13 VIII 2009, ED 6964, 6970, 7012 (ALTB); same place, 50°01'16.9" N, 86°26'55.4" E, alt. 2650 m, 15 VIII 2009 ED 7047 (ALTB); same place, 50°00'57.2" N, 86°27'09.8" E, alt. 2605 m, 15 VIII 2009, ED 7040, 7046, 7048 (ALTB); same place, 50°00'01.1" N, 86°28'32.9" E, alt. 2764 m, 16 VIII 2009, ED 6960 (ALTB); same place, 50°02'37.1" N, 86°27'34.9" E, alt. 2720 m, 18 VIII 2009, ED 7045 (ALTB); same place, 50°00'37.8" N, 86°27'44.2" E, alt. 2699 m, 18 VIII 2009 ED 6973, 7044, 7049 (ALTB); same place, 50°01'04.6" N, 86°27'02.8" E, alt. 2627 m, 20 VIII 2009, ED 6965 (ALTB). **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, Tarbagatai range (Altai) 49°14'00.4" N, 86°29'37.4" E, alt. 2324 m, 15 IX 2011, ED 7059 (ALTB); same district, Yuzhnyi Altai range, 49°03'50.5" N, 86°21'54.7" E, alt. 2735 m, 10 IX 2011, ED 7058 (ALTB).

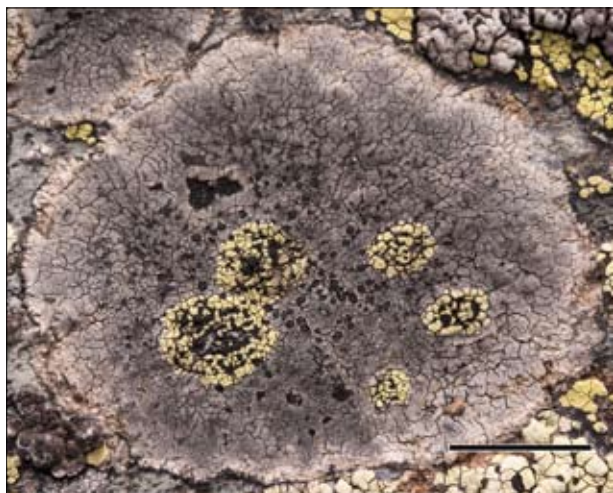
#### *Rhizocarpon pusillum* Runemark

A small parasitic lichen with a bipolar distribution (Eurasia, North America, New Zealand) (Foucard, 2001; Øvstedal et al., 2009), known in Russia from the Arctic (Polar Ural, Novosibirskiy Is., Vrangely Is.) and East Siberia (Handbook ..., 2003; Urbanavichus, 2010). In the Altai, the species is locally common on non-calciferous rocks in the alpine zone as a parasite on *Sporostatia testudinea*



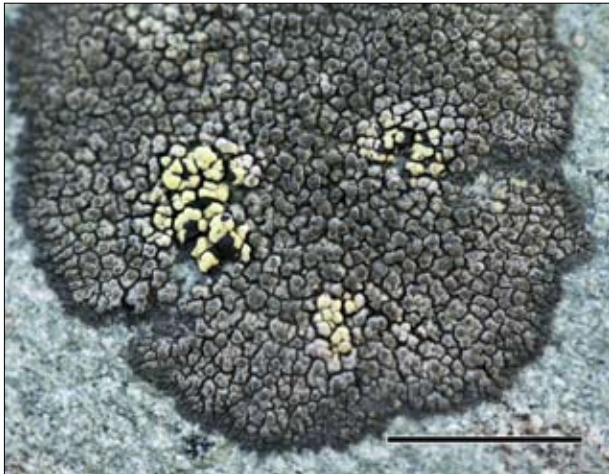
**Fig. 2.** *Rhizocarpon pusillum* growing on *Sporostatia testudinea*. Scale 1 cm.

(**Fig. 2**) and *S. polyspora* (**Fig. 3**). These species were also mentioned as "host"-species in other regions (Poelt, 1990; Rambold, Triebel, 1992). In addition, well-developed thalli of *Rhizocarpon pusillum* were also collected once by us on *Aspicilia* cf. *marshiginensis* (**Fig. 4**), *Miriquidica deusta* (**Fig. 5**) and *Lecidea* sp. Several species of parasitic *Rhizocarpon* have been described from different "host"-species (see Poelt, 1990). However, it is known that lichenicolous species of lichens are less host specific than lichenicolous fungi; only about 1/3 of parasitic lichen species in Russia have their "host"-species belonging to only a single genus, whereas 2/3 can parasitize lichens from different genera (Zhurbenko, 2008). The specimens from *Aspicilia*, *Miriquidica* and *Lecidea* all have the morphology, ascospore number, size and septation, as well as spot reactions typical for *Rhizocarpon pusillum*. Freelifving thalli have never been observed in the Altai. New for West and South Siberia and Kazakhstan.



**Fig. 3.** *Rhizocarpon pusillum* growing on *Sporostatia polyspora*. Scale 1 cm.





**Fig. 4.** *Rhizocarpon pusillum* growing on *Aspicilia* cf. *mashiginensis*. Scale 1 cm.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, upper reaches of the Ak-Kem River, right bank, stone fields and rocks, on *Sporostatia polyspora*, 49°57'23.3" N, 86°29'14.5" E, alt. 2895 m, 12 VIII 2009, ED 7146 (ALTB); same range, watershed between the Ak-Kem and Kucherla Rivers, on *Sporostatia testudinea*, 49°58'15.2" N, 86°28'58.4" E, alt. 2850 m, 13 VIII 2009, ED 7160 (ALTB); same place, 50°01'16.9" N, 86°26'55.4" E, alt. 2650 m, stone fields and rocks on *Sporostatia testudinea*, 15 VIII 2009, ED 6962 (ALTB); same place, on *Sporostatia testudinea*, 50°00'01.1" N, 86°28'32.9" E, alt. 2764 m, 16 VIII 2009, ED 7159 (ALTB); same place, 50°02'22" N, 86°27'00.2" E, alt. 2484 m, on *Aspicilia* cf. *mashiginensis*, 16 VIII 2009 ED 7261 (ALTB); same place, 50°00'37.8" N, 86°27'44.2" E, alt. 2699, on *Sporostatia testudinea*, 18 VIII 2009, ED 6956 (ALTB); same place, on *Sporostatia polyspora*, 50°01'11" N, 86°26'16.5" E, alt. 2497 m, 20 VIII 2009, ED 7158 (ALTB). **Kazakhstan** Vostochno-Kazakhstanskaia oblast', Katon-Kara-



**Fig. 5.** *Rhizocarpon pusillum* growing on *Miriquidica deusta*. Scale 1 cm.

gaisky district, Yuzhnyi Altai range, 49°03'50.5" N, 86°21'54.7" E, alt. 2735 m, on *Sporostatia polyspora*, 10 IX 2011, ED 7057 (ALTB); same range, 49°01'25.5" N, 86°08'36.1" E, alt. 2572 m, on *Sporostatia polyspora*, 13 IX 2011, ED 7056 (ALTB); same district, headwaters of the Bukhtarma River, right bank, SE slope of the Muzdy-Bulak Mt. (3050 m), high mountain tundra, stones, 49°13'53" N, 87°14'10" E, alt. 2680 m, on *Sporostatia testudinea*, 31 VIII 2012, ED 7280 (ALTB).

#### *Rhizocarpon subgeminatum* Eitner

This circumpolar species (Øvstedal et al., 2009) was reported for Russia from the Arctic, the Murmansk region, Karelia, Komi Republic, Ural, Siberia (Saiany Mts, Stanovoye Nagorye Uplands, Baikal and Pribaikalie), Buryatia, Far East (Bastak preserve) (Fadeeva et al., 2007; Handbook ..., 2003; Makryi, 2002; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). In Mongolia it was reported from Khubsugul and Khangai (Golubkova, 1981). The species grows on the siliceous rocks in the open places. It was reported for the Altai by Sedelnikova (1990) as a rare species. It seems more widely distributed in the Altai than previously assumed. New for Kazakhstan.

Specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, middle course of the Ioldo River, stone fields and rocks, 49°51'52.4" N, 86°05'36.9" E, alt. 1629 m, 24 VIII 2008, ED 7157 (ALTB); same range, upper reaches of the Ak-Kem River, right bank, stone fields and rocks, 49°59'15.6" N, 86°35'09.3" E, alt. 2686 m, 9 VIII 2009, ED 7188, 7189 (ALTB); same place, 49°59'08.3" N, 86°34'55.5" E, alt. 2687 m, 9 VIII 2009 ED 7187 (ALTB). **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, Listvyaga range, left bank of the River Yazevka, north of the village Yazevka, 49°30'23.7" N, 86°16'58.9" E, alt. 1463 m, on stone, 16 IX 2011, ED 7009 (ALTB).

#### *Rimularia insularis* (Nyl.) Rambold & Hertel

This is a suboceanic, almost cosmopolitan, parasitic lichen species that forms patches on the thalli of species of the "*Lecanora rupicola*"-group and *L. bicincta* (Andreev, 2008; Hertel, Rambold, 1990; Rambold, Triebel, 1992). In Russia it occurs in the Murmansk Region (Khibiny Mts.), Karelia, Leningrad Region (Hogland I.), Caucasus, Polar Ural, Altai, South Baikal, Yakutia, and Chukotka

(Andreev, 2008; Zhurbenko, 2009). It was reported for the Altai from the Altaisky krai by Davydov (2001). It is common on *Lecanora bicincta* (Fig. 6) in stonefields above timberline. New for Kazakhstan.

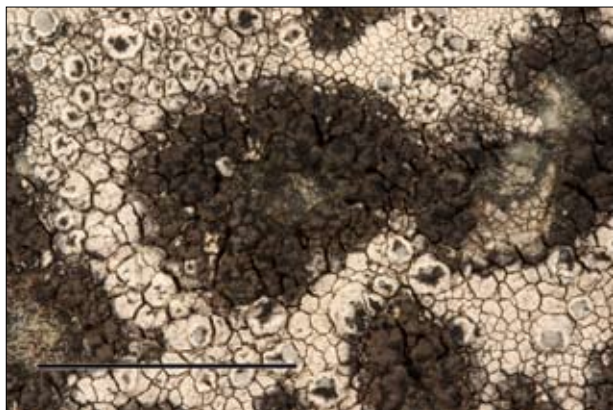


Fig. 6. *Rimularia insularis* growing on *Lecanora bicincta*. Scale 1 cm.

Specimens examined: **Russia**, Altaisky krai, Charyshsky district, Korgonsky range, left bank of Gorelyi Korgon River at 8 km upstream from its mouth, S slope, stonefields, 51°02' N, 83°46' E, 1400 m, 27 VI 1998, ED 1847, 2230; **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, Yuzhny Altay range, 21 km S from Uryl' settlement, at the headwaters of the left junction of the Kara-Kaba River, 49°04'16'' N, 86°16'03'' E, alt. 2230 m, stonefields, yernik (*Betula nana*), on thallus of *Lecanora bicincta*, 6 IX 2012, ED 7303 (ALTB); same district, Ukok tableland headwaters of the Bukhtarma River, right bank, S slope of the Muzdy-Bulak Mt. (3050 m), 49°13'18'' N, 87°13'38'' E, alt. 2460 m, high mountain tundra, rocks, on thallus of *Lecanora bicincta*, 1 IX 2012, ED 7285 (ALTB).

#### *Rinodina parasitica* H. Mayrhofer & Poelt

This is an arctic-alpine parasitic species on lichens growing on siliceous rocks in Eurasia, Greenland and North America (Foucard, 2001). It was previously reported for Asia from Siberia (Krasnoyarsk territory and Pribaikalie, Putoransky and Baikalsky preserves) (Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004) and Mongolia: Khangai (Biazrov, 2010). It is characterized by a thick, granular-warty, dark reddish-brown thallus with numerous lecanorine apothecia, spores of the *Physcia*-type, a reddish-brown epihymenium, colourless hypothecium to 75 µm in height, and the absence of secondary metabolites. New for the Altai Mts. and Kazakhstan.

Specimens examined: **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagaisky district, Tarbagatai (Yuzhnyi Altai), to the south of Uryl', 49°09'02.1'' N, 86°11'24.8'' E, alt. 2614 m, southern slope near the top, stones scatterings among the mountain tundra, on lichens, 14 IX 2011, ED 7011 (ALTB).

#### *Sporastatia polyspora* (Nyl.) Grummann

This arctic-alpine species occurs in Europe, Asia and North and South America, and was reported in Russia from the Arctic, Caucasus, South Siberia, and Far East (Golubkova, 1988; Urbanavichus, 2010). It is reported here as new for the Altai Mts. and Kazakhstan where it is common in high mountains on boulders in stonefields or on rocks.

Selected specimens examined: **Russia**, Altai Republic, Ust'-Koksinsky district, Katunsky range, upper reaches of the Ioldo River, stonefields and rocks, 49°49'30'' N, 86°12'18.5'' E, alt. 2112 m, 17 VIII 2008, ED 7163 (ALTB); same range, the watershed between the Ak-Kem and Kucherla Rivers, stone fields and rocks, 50°01'16.9'' N, 86°26'55.4'' E, alt. 2650 m, 15 VIII 2009, ED 7164 (ALTB); same locality, 50°00'01.1'' N, 86°28'32.9'' E, alt. 2764 m, 16 VIII 2009, ED 7162; **Kazakhstan**, Vostochno-Kazakhstanskaia oblast' Katon-Karagaisky district, Yuzhnyi Altai range, headwaters of the Kara-Kaba River, mountain tundra, stonefields, 49°03'50.5'' N, 86°21'54.7'' E, alt. 2735 m, 10 IX 2011, ED 7075a (ALTB); same locality, 49°01'25.5'' N, 86°08'36.1'' E, alt. 2572 m, 13 IX 2011, ED 7056a (ALTB).

#### *Sticta limbata* (Sm.) Ach.

This species has a scattered distribution in Europe, Asia, Africa, North America, Australia and Oceania (Galloway, 2001). In Russia it is occurs in South Siberia (Altai Mts., Schoria Mts, Krasnoyarsk territory), Khabarovsk territory, Sakhalin I. (Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). It was recently reported for the Altaisky krai (Davydov, 2004) where it is included in the Red Data Book (Davydov, Skatchko, 2006), and represented by few small thalli. In the new location cited below, the species was found only on two phorophytes (both *Salix* sp.) and represented by only 5–10 small suppressed thalli, 1–3 cm in diameter. It has also been reported for Hubei Prov. in China (Chen et al., 1989). New for Xinjiang (Chinese Altai).

Specimens examined: **Russia**, Altaisky krai, Charyshsky district, western part of Korgonsky range, the valley of Sentelek River at 8 km up-

stream from the Pokrovka settlement, 51°04'46" N, 83°39'31" E, alt. 1020 m, *Abies sibirica* – *Betula pendula* mountain forest, on bark of *Salix* sp. 23 VI 2007. **China**, Xinjiang, Mongol'sky Altai range, west part of Korumtytau Mts, valley of right tributary of Yelt-gol from the mountain situated in 5 km of the Barytumsuktau peak to the mouth, 47°56'15" N, 88°58'03" E, alt. 1550 m, s. m. 24 VII 2007, ED 6638 (ALTB, PE); same range, west part of Korumtytau Mts, valley of right tributary of Yelt-gol from the mountain situated in 5 km of the Barytumsuktau peak to the mouth, *Larix sibirica* – *Picea obovata* forest on a steep slope (granitoids), 47°52'11" N, 88°56'50" E, alt. 1465 m, 25 VII 2007, ED 6631 (ALTB, PE).

#### *Toninia alutacea* (Anzi) Jatta

This species is widespread on calciferous rocks in the Northern Hemisphere, growing mainly in mountainous areas (Timdal, 1991). In Russia it was reported from the Caucasus, East Siberia (Yakutia) and South Siberia (Dzherginsky preserve) (Handbook ..., 2003; Urbanavichus, 2010; Urbanavichus, Urbanavichene, 2004). Narrowly fusiform, 4-celled ascospores distinguish this species from the closely related *Toninia candida* (Weber) Th. Fr., *T. diffracta* (A. Massal.) Zahlbr. and *T. rosulata* (Anzi) H. Olivier, which have 2-celled, broadly fusiform ascospores. The species has previously been reported for the Mongolian Altai (Schubert, Klement, 1971) but is new to West Siberia.

Specimens examined: **Russia**, Altaisky krai, Soloneshensky district, Bashchelaksky range, valley of Shinok River, downstream of the waterfall, forest with *Picea obovata*, *Abies sibirica*, *Betula pendula*, *Salix* sp., *Sorbus sibirica*, *Populus tremula*, and *Pinus sibirica*, on stone, 51°21.27' N, 84°34.06' E, alt. 1035 m, 29 VI 2003, ED 6925 (ALTB).

#### *Umbilicaria cinereorufescens* (Schaer.) Frey

Literature reports of this species from Russia must be considered with care because Golubkova & Savicz (1978) did not clearly distinguish the species from *U. vellea* (L.) Hoffm. The latter has long, light-coloured, branched rhizomorphs in addition to short, black, simple rhizomorphs bearing multicellular thalloconidia that are characteristic for both species. We are able to confirm the occurrence of this species at a few localities in the Russian Arctic, Kamchatka Peninsula and South Siberia (Davydov, Zhurbenko, 2008; Davydov et al., 2011a, b), but it may have been overlooked elsewhere. For the Russian

part of the Altai, the species was reported by Wei & Jiang (1993), based on the herbarium material from COLO. The species was also reported for Mongolia from Khangai (Biazrov, 1986). New for Kazakhstan.

**Russia**, Altai Republic, Kosh-Agachsky district, Ukok tableland, Tyoplyi Klyuch Pass., *Betula nana* shrubs, stones on boulders, 49°25' N, 88°02' E, alt. 2500–2800 m, on boulders, 20 VII 1998, ED 651 (ALTB); same tableland, left bank of Ak-Alakha River at 1 km downstream from its junction with Kalguty River, N and E slopes, rocks not far from river bank, 49°23' N, 87°38' E, alt. 2200 m, N exposed rocks, 23 VII 1998, ED 5555 (ALTB); same tableland, left bank of Zhumaly River near its headwaters, on N slopes 49°28' N, 88°02' E, 2400–2700 m, mountain tundra, boulders, 30 VII 1998, ED 5275 (ALTB); same district, Juzhno-Chuisky range, Chagan-Usun River basin near headwaters of Akkol River, it's right bank, mountain slopes with E, NE, N expositions, yernik, on rocks overcrops, 49°50' N, 87°48' E, alt. 2800–3000 m, 29 VIII 1995, ED 5365 (ALTB); Ongudaysky district, Seminsky range at 10 km SW of the community of Elo near the upstream of Uluta River, S part of the Karakobek Mt. *Larix sibirica* – *Pinus sibirica* taiga forest, 50°43.39' N, 85°23.04' E, alt. 1834 m, 1 VII 2003, ED 5448, 5491 (ALTB). **Kazakhstan**, Vostochno-Kazakhstanskaia oblast', Katon-Karagai district, Katunsky range, ca. 28,5 km E from the Archaty settlement, right bank of the Bukhtarminskoye Lake, *Larix sibirica* – *Pinus sibirica* forest, 49°16'23" N, 86°57'08" E, alt. 2150 m, 30 VIII 2012, ED 7270 (ALTB).

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