



# New records to the lichen biota of Russia, 1 – Sakhalin Region, with new records for the Russian Far East and the Asian part of Russia

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Manuscript received: 18.12.2019

Review completed: 19.01.2020

Accepted for publication: 25.05.2020

Published online: 04.06.2020

## ABSTRACT

For the first time, 39 species of lichens are presented for Sakhalin Region (Sakhalin, Iturup and Kunashir Islands) including *Carbonicola myrmecina*, *Cbaenotheca hispidula*, *Micarea nigella*, *Placynthiella oligotropha*, *Polycauliona phlogina* and *Porpidia hydrophila* – new to the Russian Far East; *Alyxoria culmigena*, *Caloplaca stillicidiorum*, *Cladonia borealis*, *C. gracilis* ssp. *turbinata*, *C. stygia*, *Lecidella carpathica*, *Rhizocarpon exspallescens* and *R. superficiale* – new for Southern part of the Russian Far East; 19 species are reported for the first time for Sakhalin, six – for Iturup Island, and one – for Kunashir Island. For each species, the general distribution, habitat, and taxonomy, indicating differences from related species and location are presented. 14 species were excluded from the lichen list of Sakhalin Region predominantly from Kunashir Island. All specimens of *Pseudocyphellaria crocata* published from the Russian Far East were re-identified as *P. perpetua*.

**Keywords:** new records, lichens, taxonomy, distribution, Asian Russia, Far East, Sakhalin Region, Sakhalin Island, Iturup Island, Kunashir Island

## РЕЗЮМЕ

Конорева Л.А., Чесноков С.В., Яковченко Л.С., Омуро Й., Давыдов Е.А. Новые находки для лишенобиоты России, 1 – Сахалинская область, с новыми находками для российского Дальнего Востока и азиатской части России. Впервые для лишенофлоры Сахалинской области (о-ва Сахалин, Итуруп и Кунашир) приведено 39 видов, среди них *Carbonicola myrmecina*, *Cbaenotheca hispidula*, *Micarea nigella*, *Placynthiella oligotropha*, *Polycauliona phlogina* и *Porpidia hydrophila* – новые виды для Дальнего Востока России; *Alyxoria culmigena*, *Caloplaca stillicidiorum*, *Cladonia borealis*, *C. gracilis* ssp. *turbinata*, *C. stygia*, *Lecidella carpathica*, *Rhizocarpon exspallescens* and *R. superficiale* – новые виды для юга российского Дальнего Востока; 19 видов впервые приведены для о. Сахалин, 6 – для о. Итуруп и 1 – для о. Кунашир. Для каждого вида представлены общее распространение, местообитания, таксономия с указанием отличий от близких видов и местонахождения. Из списка лишайников Сахалинской области исключены 14 видов, в основном по материалам с о. Кунашир (10 видов). Все опубликованные с Дальнего Востока образцы *Pseudocyphellaria crocata* переопределены как *P. perpetua*.

**Ключевые слова:** новые находки, лишайники, таксономия, распространение, Азиатская Россия, Дальний Восток, Сахалинская область, остров Сахалин, остров Итуруп, остров Кунашир

Thirty nine lichen species are reported as new to Sakhalin Region (Sakhalin and Kurily Islands) basing on field explorations, as well as taxonomic revisions of herbarium materials. Six species are new to Far East, 8 – to Southern part of the Russian Far East, 19 – to Sakhalin Island, 6 – to Iturup Island and 1 – to Kunashir Island. As a result of the revision of herbarium collections, 14 species were excluded from the lichen list of the Sakhalin Region.

### Abbreviations adopted:

**RFE** = Far Eastern Federal District; **Amu** = Amur Region; **Chu** = Chukotka Autonomous Area; **Jew** = Jewish Autonomous Region; **Kam** = Kamchatka Territory; **Kha** = Khabarovsk Territory; **Mag** = Magadan Region; **Pri** = Primorye Territory; **Yak** = Republic of Sakha (Yakutia).

**SIB** = Siberian Federal District; **Bai** = Trans-Baikal Territory; **Bur** = Republic of Buryatia; **Irk** = Irkutsk Region; **Kra** = Krasnoyarsk Territory.

## ANAMYLOPSORACEAE Lumbsch & Lunke

### *Anamylopsora pulcherrima* (Vain.) Timdal

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits rocks. In other regions it also occurs on both calciferous and siliceous rocks. It is widely distributed in the mountains and aridic regions; **RFE:** **Pri** and **Kha** (Tchabanenko 2002, Yakovchenko et al. 2013), **Amu** (Pchelkin 2008). It is reported for the first time for Sakhalin.

**Taxonomical notes.** *Anamylopsora* Timdal is the monotypic genus with the only species. This species was excluded from the genus *Psora* Hoffm. by Timdal (1984) owing to presence of non-amyloid tholus and hymenial gelatin as well as different type of upper cortex and pycnidia and also absence of antraquinones in hymenium (Timdal 1991).

**Examined specimens (new records).** Sakhalin Island, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 46°59'48.8"N 142°50'06.8"E, alt. 977 m, rocks, on stone, 28.06.2017, leg. S.V. Chesnokov (231).

**ARTHONIACEAE Rchb.*****Arthonia punctiformis* Ach.****Contributor:** Liudmila Konoreva

**Distribution and habitat.** Found on bark of *Caragana arborescens* and *Populus maximowiczii*. In other regions it also occurs on smooth bark of a wide range of trees and shrubs, often on twigs. It is widely distributed from the boreal to temperate regions; **RFE: Kam** (Himmelbrant et al. 2014, 2019), **Pri** (Skirina 2010, 2015b). It is reported for the first time for Sakhalin.

**Taxonomical notes.** This species belongs to the genus *Arthonia* described by E. Acharius in 1806. It includes over 250 species with *Trentepohlia* as photobiont and rounded asci. *A. punctiformis* is distinguished from similar *A. radiata* (Pers.) Ach. by the less conspicuous, apparently non-lichenized thallus and rarely branched, shallower apothecia.

**Examined specimens (new records).** Sakhalin Island, Yuzhno-Sakhalinsk, Sakhalin Botanical Garden, 46°56'40.1"N 142°45'46.7"E, alt. 135 m, riparian secondary forest with *Larix leptolepis*, on bark of *Caragana arborescens*, 07.05.2017, leg. L.A. Konoreva (1); *ibid.*, 46°56'36.3"N 142°46'01.7"E, alt. 96 m, stream bank with *Alnus hirsuta* and *Populus maximowiczii*, on bark of *Populus maximowiczii*, 07.05.2017, leg. L.A. Konoreva (17).

**CARBONICOLACEAE Bendiksby & Timdal*****Carbonicola myrmecina* (Ach.) Bendiksby & Timdal****Contributor:** Liudmila Konoreva

**Distribution and habitat.** Found on burnt tree trunk. In other regions it also occurs on bark of burnt wood and rarely on bark of coniferous trees. It is scattered distributed from the boreal to temperate zones; **RFE: Yak** (Galanina 2016) and **SIB: Bai** (Yakovchenko 2009). It is reported for the first time for the Russian Far East.

**Taxonomical notes.** Species of the genus *Carbonicola* were belonging to *Hypocenomyce* M. Choisy until 2013 and then combined to the new genus described by M. Bendiksby & E. Timdal (2013) basing of brown, convex apothecia; a pale exciple composed of entirely conglutinated hyphae; a brown epihymenium lacking amorphous substances; asci with a deeply amyloid tube; and in the main secondary chemistry consisting of compounds of the colensoic acid complex. The authors inscribe three species in this genus including *C. myrmecina* ( $\equiv$  *Hypocenomyce castaneocinerea* (Räsänen) Timdal). From the closely related *C. antracophila* (Nyl.) Bendiksby & Timdal *C. myrmecina* differs by the uniform coloring of thalline squamules (without a pale margin) and by chemistry (*Carbonicola myrmecina* contains colensoic acid complex, whereas *C. antracophila* – fumarprotocetraric and protocetraric acids).

**Examined specimens (new records).** Sakhalin Island, Tomarinsky district, Krasnogorsky Reserve, vicinity of Ainskoe Lake, 48°30'42.9"N 142°00'26.8"E, alt. 6 m, *Larix* forest near of road, on a burnt tree trunk, 15.05.2017, leg. L.A. Konoreva (153).

**CLADONIACEAE Zenker*****Cladonia borealis* S. Stenroos****Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits soil. In other regions it occurs on soil, rock outcrops, rarely on peat and rotten wood. It is widely distributed from the Arctic to boreal zones, and in the mountains; **RFE: Kam** (Himmelbrant et al. 2014, 2019). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes.** For a long time *Cladonia borealis* was not distinguished from *C. coccifera* (L.) Willd., but in 1989 it was

described by S. Stenroos (1989) as a separate species. According to phylogenetic analysis (Stenroos et al. 2002) *C. borealis* is not closely related to *C. coccifera* and *C. pleurota* (Flörke) Schaer. In the herbarium, this species never produces crystal needles on the surface. Thus, old specimens of *C. borealis* differ from *C. coccifera*, *C. pleurota* and *C. diversa* Asperges by the chemistry (detected by TLC). Fresh specimens are distinguishable by more smoothly corticated podetia.

**Examined specimens (new records).** Sakhalin Island, Tomarinsky district, Krasnogorsky Reserve, road between Ainskoe Lake and the sea, 48°27'29.1"N 142°03'06.2"E, alt. 4 m, sea shore with mixed grass meadow, on soil, 13.05.2017, leg. S.V. Chesnokov (24).

***Cladonia gracilis* ssp. *turbinata* (Ach.) Ahti****Contributor:** Liudmila Konoreva

**Distribution and habitat.** Inhabits bark of *Picea* sp. In other regions it occurs on soil in forest (dry to mesic conditions), rock outcrops, bog hummocks and rotten wood. It is widely distributed from the Arctic to temperate regions; **RFE: Kam** (Himmelbrant et al. 2014, 2019). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes.** It is a polymorphic species with a lot of intraspecific taxa. This subspecies is the most widespread in *C. gracilis* (L.) Willd. It is characterized by wide scyphi (to 1 cm in diameter) and absence of subulate podetia. From *Cladonia phyllophora* Hoffm. it differs by absence of arachnoid cortex of podetia and from *C. cervicornis* (Ach.) Flot. – by absence of proliferation of scyphi (Ahti 1980).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, vicinity of Vyselkovo Lake, 46°34'07.3"N 143°15'08.2"E, alt. 9 m, *Picea-Larix* forest on the edge of the swamp, on bark of *Picea* sp., 25.05.2017, leg. L.A. Konoreva (257).

***Cladonia stygia* (Fr.) Ruoss****Contributors:** Evgeny A. Davydov & Sergey Chesnokov

**Distribution and habitat.** Inhabits soil. In other regions it occurs on soils in tundra, wet bogs and upland woodland; widely distributed from the Arctic to forest zone, in the mountain, alpine and forest belts; **RFE: Kam** (Himmelbrant et al. 2014, 2019) and **Mag** (Zheludeva 2017). It is reported for the first time for Southern part of the Russian Far East.

**Taxonomical notes.** This species belongs to *Cladonia arbuscula* group that is characterized by absence of cortex on podetia and its numerous branching. This species is closely related to *Cladonia rangiferina* (L.) F.H. Wigg. but distinguished by black podetial base, with starkly contrasting scattered white areoles and red pycnidial gel (Ahti & Stenroos 2013).

**Examined specimens (new records).** Sakhalin Island, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 47°00'18.8"N 142°50'29.1"E, alt. 1030 m, boulders in *Pinus pumila* thickets, on soil, 28.06.2017, leg. S.V. Chesnokov (240); Korsakovsky District, Maiorskaya Mt., 2.65 km NW Izvestkovyi Settlement, the headwaters of the Znamenka River, 46°54'13"N 142°55'30"E, alt. 920 m, SE slope, near the top, thickets of *Pinus pumila*, 6.08.2019, leg. E.A. Davydov (18051); Smirnyhovskiy District, Vaida Mt., N slope, the headwaters of the Vitnitsa River, left bank, 47 km to E from the Smirnyh Settlement, 49°52'50"N 143°28'04"E, alt. 680 m, mountain tundra, on soil, 11.08.2019, leg. E.A. Davydov (18052).

**COLLEMATACEAE Zenker*****Scytinium subtile* (Schrad.) Otálora et al.****Contributor:** Liudmila Konoreva

**Distribution and habitat.** Inhabits bark of *Salix* sp. In other regions it prefers rotten wood of old, usually

fallen trees, stumps, polypore fungi, and plant debris on the ground. It is scattered distributed from the Arctic to temperate regions, **RFE: Pri** (Chabanenko 2002) and **Chu** (Andreev et al. 1996). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The genus *Scytinium* (Ach.) Gray was resurrected by Otálora et al. (2014). Currently this genus includes some small-sized species from large genus *Leptogium* (Ach.) Gray with pseudocortex instead true cortex. The most characteristic trait of *Scytinium subtile* is the globular, fisheye-like apothecia, which readily differs it from the larger *S. tenuissimum* (Dickson) Otálora et al. which has larger, urceolate apothecia and marginally lacerated squamules (Jørgensen 2007).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, vicinity of Vyselkovoe Lake, 46°34'15.8"N 143°15'30.2"E, alt. 11 m, *Salix* forest near the road, on bark of *Salix* sp., 25.05.2017, leg. L.A. Konoreva (248).

### CONIOCYBACEAE Rchb.

#### *Chaenotheca hispidula* (Ach.) Zahlbr.

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on bark of rotten *Abies sachalinensis*. In other regions it also occurs on bark of old *Quercus* spp., *Alnus* spp. and *Salix* spp. in shaded conditions. It is scattered distributed in temperate areas; **SIB: Bur** (Kharpuksheva 2017) and **Kra** (Zhdanov 2014). It is reported for the first time for the Russian Far East.

**Taxonomical notes.** It is characterized by the rather short yellow-pruinose ascospores, the large globose spores and by having *Trentepohlia* as photobiont (Tibell 1999).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, vicinity of Vyselkovoe Lake, 46°33'56.8"N 143°16'50.5"E, alt. 19 m, *Picea-Abies* forest with *Ledum* sp., on bark of rotten *Abies sachalinensis*, 25.05.2017, leg. S.V. Chesnokov (120).

### FUSCIDEACEAE Hafellner

#### *Fuscidea austera* (Nyl.) P. James

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits rock. In other regions it occurs on sheltered vertical siliceous rocks. It is scattered distributed in the Arctic and in alpine belt in mountains; **RFE: Pri** (Cherdantseva et al. 2013). It is reported for the first time for Sakhalin.

**Taxonomical notes.** It is characterized by large (up to 2 (–3.5) mm wide), sessile, markedly constricted at the base, often conglomerate apothecia which take on a distinctive red-brown when moistened with flexuous margins, often convoluted and proliferous. Medulla I-, UV-. Divaricatic acid presents in apothecia only. Closely related *F. taeniarum* (Malme) V. Wirth & Yezda is considering as a morph of *F. austera* with discrete and non-pruinose apothecia because it is linked with typical *F. austera* through transitional stages (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Makarovsky District, Zhdanko Ridge, 48°05'25"N 142°31'52"E, alt. 440 m, rock NW exposition, near the watershed among meadow communities, on top of stone, 14.08.2019. leg. E.A. Davydov (18015, 18018).

#### *Fuscidea submollis* Mas. Inoue

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Found on rock. In other regions it occurs on siliceous rocks. It is scattered distributed in the mountain in alpine belt. This record is the third in

Russia. Previously, the species was discovered in **SIB: Bai** (Chesnokov et al. 2018) and **RFE: Pri** (Yakovchenko et al. 2019). It is reported for the first time for Sakhalin.

**Taxonomical notes.** It differs from closely related *Fuscidea mollis* (Wahlenb.) V. Wirth & Vězda by appressed apothecia, verrucose-areolate thallus and amyloid medulla.

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, Maiorskaya Mt., 2.9 km NW Izvestkovyi Settlement, the headwaters of the Znamenka River, 46°54'24"N 142°55'40"E, alt. 960 m, near the top, rock pillar, on rocks 06.08.2019, leg. E.A. Davydov (18001).

### LECANOGRAPHACEAE Ertz et al.

#### *Alyxoria culmigena* (Libert) Ertz

**Contributors:** Liudmila Konoreva & Sergey Chesnokov

**Distribution and habitat.** Inhabits bark of *Picea* sp. and *Taxus cuspidata* in coniferous forest. In other regions it also occurs on bark, wood, rarely occurs on sandstone, often in shaded conditions. It is widely distributed in boreal and temperate regions; **RFE: Kam** (Neshataeva et al. 2005). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes:** The species was belonging to the genus *Opegrapha* Ach. until recently. The genus *Alyxoria* Ach. was reinstated by Ertz and Tehler (2011) basing on phylogenetic studies to accommodate the species of *Opegrapha varia* group characterized by *Varia*-type ascus. Moreover, species of this group have epruinose to pruinose ascospores with usually exposed hymenial disc. *Alyxoria culmigena* is distinguished from closely related species of this group by transversely 3-septate ascospores, the wall is not swollen at the septa (*Subelevata*-type) and erythrin and lecanoric acid as thallus compounds (Joshi et al. 2015).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, Arakul' River, 300 m to east of Vyselki tract, 46°34'19"N 143°14'03.6"E, alt. 9 m, *Picea-Abies-Larix* forest with *Ilex* sp., on bark of *Picea* sp., 25.05.2017, leg. L.A. Konoreva (260); *ibid.*, vicinity of Busse Lake, 46°34'06.7"N 143°18'04.3"E, alt. 19 m, *Abies-Picea* forest with *Larix* sp. and *Taxus cuspidata*, on bark of *Taxus cuspidata*, 26.05.2017, leg. S.V. Chesnokov (128).

### LECANORACEAE Körb.

#### *Lecanora cinereofusca* H. Magn.

**Contributors:** Liudmila Konoreva & Sergey Chesnokov

**Distribution and habitat.** Inhabits bark of *Sorbus* sp. and *Abies sachalinensis*. In other regions it occurs on bark of *Betula* spp. and *Salix* spp. It is scattered distributed in the forest zone; **RFE: Pri** (Chabanenko 2002, Skirina 2015b). It is reported for the first time for Sakhalin and Iturup Islands.

**Taxonomical notes.** This species belongs to *Lecanora subfusca* group. It is characterized by the presence of pannarin, immersed young apothecia with reddish disc and strongly crenulate to partly disappearing apothecial margin (Maliček 2014). *Lecanora pulicaris* (Pers.) Ach. differs by a smooth apothecial margin, sessile apothecia and presence of fumarprotocetraric acid.

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, 44°43'40.3"N 147°19'41.2"E, alt. 67 m, *Salix-Betula* forest with *Saxa kurilensis* along the old road, on bark of *Salix* sp. 16.08.2017, leg. L.A. Konoreva (643); Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, between Vyselkovoe Lake and Laguna Busse, 46°33'31.1"N 143°16'55.5"E, alt. 12 m, *Abies-Larix-Picea* forest swamped, on



bark of *Abies sachalinensis*, 26.05.2017, leg. S.V. Chesnokov (125); *ibid.*, vicinity of Busse Lake, 46°34'07"N 143°18'44.8"E, alt. 20 m, *Abies–Picea* forest with *Larix* sp. and *Pinus pumila*, on bark of *Sorbus* sp., 24.05.2017, leg. L.A. Konoreva (242).

### *Lecanora polytropa* (Ehrh. ex Hoffm.) Rabenh.

**Contributors:** Evgeny A. Davydov, Lidia Yakovchenko & Sergey Chesnokov

**Distribution and habitat.** Inhabits siliceous rocks. In other regions it occurs on siliceous rocks and walls and worked timber. It is widely distributed from the Arctic to temperate regions; **RFE:** **Kha** (Yakovchenko et al. 2013, Tchabanenko 2002), **Pri** (Cherdantseva et al. 2013), **Kam** (Himmelbrant et al. 2014, 2019), and **Mag** (Kotlov 1995). It is reported for the first time for Sakhalin.

**Taxonomical notes.** This species belongs to *L. polytropa* group included crustose species with green to yellow thallus containing usnic acid and/or xanthenes, or calycin, and with generally pale yellow, often rather convex apothecia (Smith et al. 2009, Yakovchenko et al. 2019). It differs from the closely related species of *L. intricata* group by inconspicuous to granular thallus consisting of dispersed, convex areoles, not lobed or crenulate; and apothecial discs usually remaining yellowish or yellow-green, never becoming blackish.

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 46°59'48.8"N 142°50'06.8"E, alt. 977 m, rocks, on stone, 28.06.2017, leg. S.V. Chesnokov (231); *ibid.*, Borodavka rock pillar, N and W side, 46°59'27"N 142°50'18"E, alt. 910 m, 08.08.2019, leg. E.A. Davydov (18055); *ibid.*, Korsakovsky District, Maiorskaya Mt., 2.9 km NW Izvestkovyi Settlement, the headwaters of the Znamenka River, 46°54'24"N 142°55'40"E, alt. 960 m, near the top, rock pillar, on stone, 06.08.2019, leg. E.A. Davydov (18057); Makarovsky District, Zhdanko Ridge, 48°05'49"N 142°41'41.5"E, alt. 380 m, rock W exposition, among the *Betula ermanii* forest, on top of stone, 14.08.2019, leg. E.A. Davydov (18056); *ibid.*, 48°05'25"N 142°31'52"E, alt. 440 m, rock NW exposition, near the watershed among meadow communities, on top of stone, 14.08.2019, leg. E.A. Davydov (18058).

### *Lecanora sulphurea* (Hoffm.) Ach.

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits siliceous rock. In other regions occurs on exposed, somewhat nutrient-rich, siliceous rocks and walls. It is scattered distributed in the mountains and in the xeric-supralittoral on the coast; **RFE:** **Kha** (Yakovchenko et al. 2013). It is reported for the first time for Sakhalin.

**Taxonomical notes.** Like the previous one, this species belongs to *L. polytropa* group. It differs from other yellow-green, saxicolous, non-soresiate species (for example *L. atrosulphurea* (Wahlenb.) Ach.) by chemical tests: thallus C–, K± yellow-brown, KC+ yellow, Pd–, UV+ dull orange (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, Borodavka rock pillar, N and W side, 46°59'27"N 142°50'18"E, alt. 910 m, on rocks, 08.08.2019, leg. E.A. Davydov (18094).

### *Lecidella carpathica* Körb.

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Found on stone. In other regions it occurs basic, nutrient-enriched rocks and worked timber, often coastal. It is widely distributed species but probably overlooked; **RFE:** **Chu** (Savicz & Elenkin 1950). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes.** *Lecidella* is separated from *Lecidea* by the non-carbonaceous, brown-black exciple often pale inside, *Lecanora*-type asci and chemistry which includes a preponderance of xanthenes making the thallus react C+ orange. The close related genus *Pyrrhospora* Körb. belongs to the Lecanoraceae on the basis of the ascus structure, even though no thalline exciple is present (necessarily present in *Lecidella* spp.) (Smith et al. 2009). The semi-opaque, bright red-brown hypothecium and interior of the exciple distinguish *L. carpathica* from *L. stigmatea* (Ach.) Hertel & Leuckert. *Buellia spuria* (Schaer.) Anzi resembles *L. carpathica* in habit but has brown, one-septate ascospores.

**Examined specimens (new records).** Sakhalin Island, Smirnyhovsky District, Vaida Mt., N slope, the headwaters of the Vitnitsa River, left bank, 47 km to E from the Smirnyh Settlement, 49°52'49"N 143°28'00"E, alt. 700 m, mountain tundra, on stone, 11.08.2019, leg. E.A. Davydov (18035).

### *Rhizoplaca melanophthalma* (DC.) Leuckert & Poelt

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits siliceous rocks. In other regions it occurs on rocks, usually calcium-low (e.g., basalt, granite, schist), but sometimes on calcium-rich sandstone or even on limestone; usually on exposed and often somewhat nutrient-enriched surfaces. It has a wide distribution from the Arctic to temperate regions, in the mountains, in alpine belt; **RFE:** **Kha** (Yakovchenko et al. 2013), **Kam** (Himmelbrant et al. 2014), and **Jew** (Skirina 2015a). It is reported for the first time for Iturup Island.

**Taxonomical notes.** The genus *Rhizoplaca* Zopf is distinguished from the closely related *Lecanora* Ach. by lacking of distinctly radiating marginal lobes, loose medulla and well-developed lower cortex. From similar species of the genus *Rhizoplaca* with squamulose to umbilicate thallus *R. melanophthalma* is distinguished by distinct bluish black tinges on the margins (in contrast to *R. subdiscrepans* (Nyl.) R. Sant.); upper surface usually relatively deep yellowish green to olive or brownish and absence of cortical substances other than usnic acid (in contrast to *R. chrysolenca* (Sm.) Zopf and *R. subdiscrepans*); absence of terpenoids in the medulla (in contrast to *R. peltata* (Ramond) Leuckert & Poelt) (Ryan 2002).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, 44°43'15.4"N 147°21'15"E, alt. 1 m, rocks on the shore of the Pacific Ocean, on stone, 16.08.2017, leg. S.V. Chesnokov (291).

## LECIDEACEAE Chevall.

### *Amygdalaria panaeola* (Ach.) Hertel & Brodo

**Contributor:** Liudmila Konoreva

**Distribution and habitat.** Inhabits rocks. In other regions it also occurs on siliceous rocks especially near the lakes and sea coasts. It is scatterly distributed in the Arctic and mountains; **RFE:** **Kam** (Himmelbrant et al. 2019), **Chu** (Andreev et al. 1996), **Mag** (Kotlov 1995), **Yak** (Poryadina 2005), **Pri** (Zhdanov 2014, Yakovchenko et al. 2019); **Kha** (Yakovchenko et al. 2013). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The genus *Amygdalaria* Norman includes 14 crustose saxicolous lichens with cephalodia distributed only in Northern Hemisphere. *Amygdalaria panaeola* is distinguished from other species of the genus currently known from Russia by the thallus with soralia.

**Examined specimens (new records).** Sakhalin Island, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 47°00'20.6"N 142°50'24.6"E, alt. 1042 m, boulders in *Pinus pumila* thickets, on stone, 28.06.2017, leg. L.A. Konoreva (508).

***Lecidea lapicida* (Ach.) Ach.**

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits siliceous rocks. In other regions it occurs on siliceous, sometimes iron-rich, rocks. It is widely distributed especially in the Arctic and mountain areas; **RFE: Kha** (Yakovchenko et al. 2013), **Amu** (Pchelkin 2008), **Pri** (Tchabanenko 2002), **Jew** (Skirina 2015a), **Kam** (Hertel & Andreev 2003, Himmelbrant et al. 2014). It is reported for the first time for Sakhalin.

**Taxonomical notes.** Due to black lecideoid apothecia and pale crustose epilithic thallus the representatives of *Lecidea* Ach. might be mistaken with species of *Porpidia* Körb. Comments on the characteristic features of the genus *Porpidia* and differences between these genera are noted in the description of *P. hydrophila*. The main characters are *Lecidea*-type of ascus apices structure and absence of halo in young ascospores. This species belongs to widespread *L. lapicida* group. *L. lapicida* differs from *L. lapicida* var. *pantherina* Ach. only chemically (predominance of norstictic acid in *L. lactea* versus lack of it in *L. lapicida*). From *L. confluens* (Weber) Ach. it differs by absence of confluent acid and paler thallus. *L. lapicida* has the same medulla reactions as *L. praenubila* Nyl. but a paler and not glossy thallus. *Lecidea plana* (J. Lahm) Nyl. differs from *L. lapicida* in having the yellow-grey exciple and I– medulla instead dark green exciple and I+medulla in *L. lapicida* (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, Maiorskaya Mt., 2.9 km NW Izvestkovyi Settlement, the headwaters of the Znamenka River, 46°54'24"N 142°55'40"E, alt. 960 m, near the top, rock pillar, on stone, 06.08.2019, leg. E.A. Davydov (18002).

***Porpidia hydrophila* (Fr.) Hertel & A.J. Schwab**

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits rocks near the headwaters of the river. In other regions it occurs on inundated siliceous rocks by upland streams and lakes. It is scattered distributed in the mountain and in alpine belt; **SIB: Bur** (Kharpuksheva 2013, 2015). It is reported for the first time for the Russian Far East.

**Taxonomical notes.** Genus *Porpidia* is difficult for the identification, and there are a lot of closely related genera distinguished only by structure of ascus apex, for example *Lecidea* s. str. Ascus apices of *Porpidia*-type is characteristic for this genus (it can be seen only in microscope when processing of apothecia cross-section by I). But also there are a lot of saxicolous genera with similar ascus type (for example, *Bellemeria* Hafellner & Cl. Roux, *Clauzadea* Hafellner & Bellem., *Farnoldia* Hertel, *Immersaria* Rambold & Pietschmann, *Koerberiella* Stein etc.). Their differences from the genus *Porpidia* are described in detail in the literature (Rambold 1989, Smith et al. 2009). *Porpidia hydrophila* is mostly distinguished from other species of the genus by thick (up to 25 µm) blue-green epithecium.

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, Maiorskaya Mt., 2.9 km NW Izvestkovyi Settlement, the headwaters of the Znamenka River, 46°54'24"N 142°55'40"E, alt. 960 m, near the top, rock pillar, on stone, 06.08.2019, leg. E. A. Davydov (18027, 18029).

***Porpidia macrocarpa* (DC.) Hertel & A.J. Schwab**

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits siliceous rocks. In other regions it occurs on exposed siliceous rocks and large boulders, less often on pebbles and loose stones, rarely on wood and bark. It is a widely distributed species especially in the mountains; **RFE: Pri** (Cherdantseva et al. 2013, Skirina 2015b), **Kha** (Yakovchenko et al. 2013), **Jew** (Skirina

2015a), **Kam** (Himmelbrant et al. 2014, 2019), and **Mag** (Kotlov 1995). It is reported for the first time for Sakhalin.

**Taxonomical notes.** *P. macrocarpa* is extremely variable species and taxonomical studies (Gowan 1989, Fryday 2005) have separated some distinctive taxa as species (e.g. *P. flavocruentata* Fryday & Buschbom, *P. striata* Fryday, *P. thomsonii* Gowan). *P. macrocarpa* differs from other species of the genus by insignificant thallus and large apothecia (up to 3 mm in diam.) with a thick tumid margin. Apothecia of close related *P. crustulata* (Ach.) Hertel & Knoph are not exceeding of 1.5 mm in diam.; proper margin narrower, non-tumid (<0.05 mm wide) (contrary 0.15–0.2 mm wide exciple in *P. macrocarpa*) (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Smirnyhovsky District, Vaida Mt., NW slope, the headwaters of the Vitnitsa River, left bank, 47 km to E from the Smirnykh Settlement, 49°52'49"N 143°28'00"E, alt. 700 m, karst funnel on the N slope, on stone, N exposure, 11.08.2019, leg. E.A. Davydov (18034).

**MYCOBLASTACEAE Hafellner*****Mycoblastus affinis* (Schaer.) T. Schauer**

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on bark of *Abies sachalinensis*. In other regions it occurs on acidic bark, especially conifer or *Betula* ssp., less frequently overgrowing mosses on rock, rarely directly on rock in well-wooded places. It is scattered distributed from the Arctic to forest zones, in alpine and forest belt in the mountains; **RFE: Kha** (Velikanov & Skirina 2012), **Pri** (Skirina 2015b), and **Kam** (Himmelbrant et al. 2014). It is reported for the first time for Iturup Island.

**Taxonomical notes.** The number of species of genus *Mycoblastus* Norman and its taxonomic position are discussed up to now because of heterogeneity of genus. Some species of this genus may demonstrate affinity with the family Megalariaceae and the genus *Japewia* Tønsberg (Kantvilas 2009). It differs from *M. sanguinarius* (L.) Norman by the pale base to the apothecia and 2-spored asci. The separation of *Mycoblastus affinis* and *M. alpinus* (Fr.) Th. Fr. ex Hellb. needs further study.

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, vicinity of Lesozavodskoy settlement, 44°45'51.2"N 147°11'13.3"E, alt. 10 m, stony lava shore with fir forest, on bark of *Abies sachalinensis*, 14.08.2017, leg. S.V. Chesnokov (266).

**MYCOCALICIACEAE A.F.W. Schmidt*****Chaenothecopsis debilis* (Sm.) Tibell**

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on bark of rotten *Abies sachalinensis*. In other regions it also occurs on dry wood, rarely bark of coniferous and deciduous trees, in open dry plant communities. It is widely distributed from the boreal forests to subtropical zone; the nearest locations in the **RFE: Jew** (Skirina 2015a); **Kam, Kha** and **Pri** (Titov 2006). It is reported for the first time for Sakhalin.

**Taxonomical notes.** It is characterized by 1-septated, smooth, medium-brown spores with distinct septum. Epithecium and excipulum are reddish brown, hypothecium is greenish or brownish, stalk HNO<sub>3</sub>+red-violet. It differs from *Chaenothecopsis transbaikalica* Titov and *C. sanguinea* Tibell by its HNO<sub>3</sub>+red-violet reaction of the stalk; from *C. pusilla* (Ach.) A.F.W. Schmidt – by asci length [*C. debilis* – (35–) 44.6–50.4 (–55) µm, *C. pusilla* – (28.0–) 29.4–38.2 (–40.5) µm] and more contrast septum. Closely related *C. vaimioana* (Nádv.) Tibell is distinguished by the reaction of stalk with HNO<sub>3</sub> (red colored upper layer of stalk intensifying) (Titov 2006).



**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, vicinity of Vyselkovo Lake, 46°33'56.8"N 143°16'50.5"E, alt. 19 m, *Picea–Abies* forest with *Ledum* sp., on bark of rotten *Abies sachalinensis*, 25.05.2017, leg. S.V. Chesnokov (120).

#### PARMELIACEAE Zenker

##### *Hypogymnia subobscura* (Vain.) Poelt

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on soil. In other regions it occurs on soils and mosses on the ground in tundra. It is scatterly distributed in Arctic and in mountains in alpine belt; **RFE:** **Mag** (Korolev & Tolpysheva 1980), **Kam** (Himmelbrant et al. 2014, 2019), **Kha** (Yakovchenko et al. 2013), and **Pri** (Skirina 2015b). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The taxonomical status of this species is defined differently by systematics. Øvstedal et al. (2009) consider this species in scope of *Hypogymnia austro-rodos* (Nyl.) Räsänen. Westberg et al. (2011) designate this species as separated taxa differed in having papillae never breaks up into soralia and by chemistry.

**Examined specimens (new records).** Sakhalin Island, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 46°59'26.8"N 142°50'18.1"E, alt. 909 m, rocks among *Pinus pumila* and *Betula ermanii*, on soil, 28.06.2017, leg. S.V. Chesnokov (243).

##### *Melanelixia glabratula* (Lamy) Sandler & Arup

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits bark of *Abies sachalinensis*. In other regions it occurs on bark of broad-leaved trees, rarely grows on conifers, lignin or on siliceous stones. It is widely distributed in the temperate regions; **RFE:** **Jew** (Skirina 2015a) and **Amu** (Tolpysheva & Zhiryakova 1988). It is reported for the first time for Iturup Island.

**Taxonomical notes.** The brown parmelioid lichens were classified in genus *Melanelia* Essl. up to 2004, when it was revised using molecular methods (Blanco et al. 2004). As a result, the new genus *Melanelixia* O. Blanco was described. At present, it includes 8 species and is characterized by having a pored or fenestrate epicortex, lacking pseudocyphellae and containing lecanoric acid as the primary medullary constituent (Blanco et al. 2004). *M. glabratula* is considered for a long time as intraspecific taxa in *M. fuliginosa* (Fr. ex Duby) O. Blanco et al. and was segregated recently (Arup & Berlin 2011). It differs from *M. fuliginosa* by paler, olivaceous green to brown color and the corticolous habit. It may be confused with indistinctly sorediate specimens of *M. subaurifera* (Nyl.) O. Blanco et al., but is recognized by the presence of orange pigment in patches in medulla (Westberg & Thell 2011a).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, vicinity of Lesozavodskoy settlement, 44°45'51.2"N, 147°11'13.3"E, alt. 10 m, rocky side of lava flow with fir forest, on bark of *Abies sachalinensis*, 14.08.2017, leg. S.V. Chesnokov (265, 266).

##### *Melanohalea exasperata* (De Not.) O. Blanco et al.

**Contributor:** Liudmila Konoreva

**Distribution and habitat.** Found on bark of *Betula ermanii*. In other regions it occurs on acidic bark of broad-leaved trees, sometimes lignum and rocks in well-lit sites. It is widely distributed in the cold and temperate regions, in Asia rarer than in Europe; **RFE:** **Pri** and **Kha** (Tchabanenko 2002, Skirina 2015b). It is reported for the first time for Iturup Island.

**Taxonomical notes.** The genus *Melanohalea* O. Blanco et al. was segregated by Blanco and co-authors (2004) from the

genus *Melanelia* and is characterized by pseudocyphellae, usually on warts or isidial tips, a non-pored epicortex, and a medulla containing depsidones or lacking secondary compounds. Now it includes 19 species. *M. exasperata* is distinguished by broad-based papillae (isidia) on the upper surface of thallus and on the apothecia margins (Westberg & Thell 2011b).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, 44°43'22"N 147°20'53.3"E, alt. 15 m, *Salix–Alnus* forest along the old road, on bark of *Betula ermanii*, 17.08.2017, leg. L.A. Konoreva (665).

##### *Nephromopsis nephromoides* (Nyl.) Ahti & Randlane

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on bark of coniferous trees. In Russia this species was found only in the south of Far East in Primorye Territory (Tchabanenko 2002, Skirina & Skirina 2012, Skirina 2017). It is reported for the first time for Kunashir Island.

**Taxonomical notes.** This species may be confused with *Nephromopsis laii* (A. Thell & Randlane) Saag & A. Thell. which however has small and flat pseudocyphellae situated mainly on the brown coloured ridges of the generally paler lower surface, while pseudocyphellae of *N. nephromoides* are medium to large, flat or concave and developed directly on the surface (Randlane & Saag 2001).

**Examined specimens (new records).** Kunashir Island, Tretyakovo, to the S from Yuzhno-Kurilsk City, on bark of coniferous tree, 20.09.1989, leg. L.I. Bredkina (LE).

#### PHYSICIACEAE Zahlbr.

##### *Physcia caesia* (Hoffm.) Fűrnr.

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits rocks on the sea coast. In other regions it occurs on well-lit, nutrient-rich, basic substrata, including tops of walls, calcareous rocks, rarely on siliceous rocks, especially in coastal districts or boulders in or by upland streams and lake margins, sometimes on timberwork and tree bases. It is widely distributed in all regions; **RFE:** **Pri** (Tchabanenko 2002, Skirina 2015b), **Kha** (Tchabanenko 2002), **Jew** (Skirina 2015a), **Kam** (Himmelbrant et al. 2014, 2019), **Mag** (Kotlov 1995), **Amu** (Pchelkin 2008). It is reported for the first time for Iturup Island.

**Taxonomical notes.** Genus *Physcia* (Schreb.) Michx. includes widely distributed species with rosette-like gray thallus and paraplectinychmatous upper cortex with constantly presence of atranorin (K+ yellow reactions) (Moberg 2002). From *P. dubia* (Hoffm.) Lettau it differs by K+ yellow reaction of medulla (K– in *P. dubia*); from *P. tribacoides* Nyl. – by the characters of soralia (capitate in *P. caesia*) and maculae upper cortex; from *P. subalbinea* Nyl. by capitate soralia (lip-shaped in *P. subalbinea*) (Urbanavichene 2008).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, 44°43'15.4"N 147°21'15"E, alt. 1 m, rocks on the shore of the Pacific Ocean, on stone, 16.08.2017, leg. S.V. Chesnokov (291).

##### *Physcia dubia* (Hoffm.) Lettau

**Contributor:** Liudmila Konoreva

**Distribution and habitat.** Inhabits bark of deciduous tree. In other regions it occurs on non-calcareous rocks and building materials in well-lit, nutrient-rich situations, e.g. roofs, bird-perch stones; occasional on timberwork and bark. It is widely distributed in all regions; **RFE:** **Kam** (Himmelbrant et al. 2014, 2019), **Mag** (Zheludeva 2015), **Pri** (Tchabanenko 2002, Skirina 2015b), **Kha** (Chabanenko 2002, Yakovchenko et al. 2013), **Amu** (Pchelkin 2008). It is reported for the first time for Sakhalin.

**Taxonomical notes.** *Physcia dubia* is a variable species and certain modifications have been recognized as separate species (*P. intermedia* Vain. and *P. teretiuscula* (Ach.) Lyngé) (Moberg 2002). From *P. tenella* (Scop.) DC. it differs by absence of cilia; from *P. tribacia* (Ach.) Nyl. by its multiple dichotomously branching marginal lobes, prosoplectenchymatous upper cortex and characters of soralia; from *P. subalbinea* by K-reaction of the medulla (K+yellow in *P. subalbinea*) (Urbanavichene 2008).

**Examined specimens (new records).** Sakhalin Island, Yuzhno-Sakhalinsk, Sakhalin Botanical Garden, 46°56'40.1"N 142°45'46.7"E, alt. 135 m, floodplain forest with *Larix kurilensis* and *Caragana arborescens*, on bark of *Caragana arborescens*, 07.05.2017, leg. L.A. Konoreva (1).

## PILOCARPACEAE Zahlbr.

### *Micarea nigella* Coppins

**Contributor:** Liudmila Konoreva

**Distribution and habitat.** Found on wood of *Larix kurilensis*. In other regions it occurs on growing wood almost always in rather moist, shaded conditions. Distribution in Russian part of Asia: Caucasus, Republic of Ingushetia (Urbanavichus & Urbanavichene 2017a). It is reported for the first time for the Russian Far East.

**Taxonomical notes.** *Micarea nigella* is similar to *M. contexta* Hedl. but differs by simple smaller spores [*M. contexta* 1-septate and  $7-12 \times 3-4.5 \mu\text{m}$  according to Czarnota (2011)]. No substances detected by HPILC. Spot tests: green color of hymenium and epihymenium in K  $\pm$  green intensifying, N+ red to purplish, HCl+ blue-green ('*Cinereorufa*-green'). Dark purple color of hypothecium in K+ green, N+ red, HCl+ purple ('*Melaena*-red').

**Examined specimens (new records).** Shikotan Island, neighborhood of Malaya Tserkovnaya Bay, 43°43'42"N 146°40'28.4"E, alt. 66 m, *Larix kurilensis* forest with *Sasa kurilensis*, on wood of *Larix kurilensis* Mayr, 13.06.2017, leg. L.A. Konoreva (314).

## RHIZOCARPACEAE M. Choisy & Hafellner

### *Rhizocarpon expallescens* Th. Fr.

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits siliceous rocks. It is a scatterly distributed arcto-alpine species; **RFE:** Chu (Dobrysh & Makarova 1998). It is reported for the first time for Southern part of the Russian Far East.

**Taxonomical notes.** This species belongs to the group of widely distributed genus *Rhizocarpon* Ramond ex DC. with white-gray-brown thallus (without yellow pigment in upper cortex). This species appears to be separated from *R. caeruleoalbum* (Kremp.) Zahlbr. only by the absence of stictic acid in the thallus and K+ purple-red exciple (in contrast, K+ yellow exciple in *R. caeruleoalbum*). From *R. chioneum* (Norman) Th. Fr. it differs in having bright green to blue-black K- epithecium (in contrast K+ purple-red epithecium in *R. chioneum*) (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Makarovskiy District, Zhdanko Ridge, 48°05'25"N 142°31'52"E, alt. 440 m, rock NW exposition, near the watershed among meadow communities, rock SW exposure and NW slope, on top of stone, 14.08.2019. leg. E.A. Davydov (18010, 18017).

### *Rhizocarpon hochstetteri* (Körb.) Vain.

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits exposed siliceous rock. It is widely distributed arcto-alpine species; **RFE:** Kam (Himmelbrant et al. 2014) and Jew (Skirina 2015a). It is reported for the first time for Sakhalin.

**Taxonomical notes.** This species belongs to the group of widely distributed genus *Rhizocarpon* with white-gray-brown thallus (without yellow pigment in upper cortex). Unlike other *Rhizocarpon* species with colourless, one-septate ascospores, those of *R. hochstetteri* are large ( $21-25 \times 8.5-12 \mu\text{m}$ ) and often become brown with maturity. The medulla is I-, (morphologically closely related *R. richardii* (Lamy ex Nyl.) Zahlbr. and *R. polycarpum* (Hepp) Th. Fr. have I+ blue medulla) (Smith et al. 2009). *R. infernum* (Nyl.) Lyngé was included in *R. hochstetteri*, but this name was resurrected by Fryday (2002) for the species which has smaller ascospores ( $17.5-19(-20) \times 8.5-11.0 \mu\text{m}$ ).

**Examined specimens (new records).** Sakhalin Island, Makarovskiy District, Zhdanko Ridge, 48°05'25"N 142°31'52"E, alt. 440 m, rock NW exposition, near the watershed among meadow communities, on stone, 14.08.2019, leg. E.A. Davydov (18036).

### *Rhizocarpon superficiale* (Schaer.) Vain.

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits siliceous rocks. In other regions it occurs on exposed siliceous rocks. It is scatterly distributed arcto-alpine species; **RFE:** Chu (Dobrysh & Makarova 1998) and Yak (Poryadina 2005). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes.** This species belongs to group of widely distributed genus *Rhizocarpon* with yellow pigment in upper cortex. The dark rim of the true exciple is often partly eroded, exposing a paler inner part and imparting a grey-white tone to the apothecial edge. This feature and the smaller ascospores ( $12-20 \times 6-10 \mu\text{m}$ ) differ the species from *R. enpetraeoides* (Nyl.) Blomb. & Forsell (ascospores size:  $22-34 \times 9-17 \mu\text{m}$ ) which can also be K+ red (Smith et al. 2009).

**Examined specimens (new records).** Sakhalin Island, Korsakovskiy District, Maiorskaya Mt., 2.9 km NW Izvestkoviy Settlement, the headwaters of the Znamenka River, 46°54'24"N 142°55'40"E, alt. 960 m, near the top, rock pillar, on stone, 06.08.2019, leg. E. A. Davydov (18024).

## SCOLICIOSPORACEAE Hafellner

### *Scoliciosporum chlorococcum* (Graeme ex Stenh.) Vězda

**Contributors:** Sergey Chesnokov & Liudmila Konoreva

**Distribution and habitat.** Inhabits bark of *Betula* sp., *Alnus* sp., *Salix* sp., wood of stump and bark of *Larix kurilensis* in the various type of forests. In other regions it can also inhabit bark, wood, plant debris and sometimes stone. It has a wide distribution from the Arctic to temperate regions; **RFE:** Amu (Pchelkin 2008), Kha (Yakovchenko et al. 2013), Pri (Skirina 2015b, 2017), Jew (Skirina 2015a), Kam (Himmelbrant et al. 2014, 2019). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The straighter ascospores differ this species from the otherwise similar *Scoliciosporum sarothamni* (Vain.) Vězda and *S. umbrinum* (Ach.) Arnold. Sterile specimens *S. sarothamni* with green thalli can be difficult to separate from more granular forms of *S. chlorococcum* but in such cases the contrasting pale yellow-green, C+ red soralia of *S. sarothamni* from the overall uniform, C- colour of *S. chlorococcum* is diagnostic (Smith et al. 2009). Some sorediose morphs may be referable to the segregate species, *S. gallurae* Vězda & Poelt.

**Examined specimens (new records).** Sakhalin Island, Yuzhno-Sakhalinsk, Sakhalin Botanical Garden, 46°56'41.2"N 142°45'56.0"E, alt. 108 m, grass birch forest, on bark of *Betula alba*, 07.05.2017, leg. S.V. Chesnokov (4); *ibid.*, 46°56'40.1"N 142°45'46.7"E, alt. 135 m, floodplain forest with *Larix kurilensis*,



on bark of *Alnus* sp., 07.05.2017, leg. L.A. Konoreva (5); *ibid.*, 46°56'40.7"N 142°45'53.9"E, alt. 103 m, stream in forest with alder, birch and willow, branch of *Betula* sp., 07.05.2017, leg. L.A. Konoreva (10); *ibid.*, 46°56'41.6"N 142°45'58.2"E, alt. 115 m, *Larix kurilensis* windfall timber near the fence, on bark of *Salix* sp., 07.05.2017, leg. L.A. Konoreva (16); Sakhalin Island, Korsakovsky District, "Laguna Busse" Nature Monument, vicinity of Vyselkovoe Lake, 46°34'12.1"N 143°15'00.5"E, alt. 9 m, *Larix* woodland with *Ledum* sp. on a raised bog, on the stump of *Larix kurilensis*, 25.05.2017, leg. S.V. Chesnokov (115); *ibid.*, 46°34'07.3"N 143°15'08.2"E, alt. 9 m, *Picea-Larix* forest along the edge of the bog, on bark of *Larix kurilensis*, 25.05.2017, leg. S.V. Chesnokov (114).

### *Scoliciosporum intrusum* (Th. Fr.) Hafellner

**Contributors:** Evgeny A. Davydov & Lidia Yakovchenko

**Distribution and habitat.** Inhabits rocks. In other regions it also occurs on granites, calcium-rich stones and bark, sometimes it can inhabit crustose lichens, e.g. *Lecidea* spp., *Rhizocarpon* spp. It is scattered distributed in alpine belt of the mountains; **RFE: Pri** (Skirina 2010, 2017, Zhdanov 2014b). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The new combination *Scoliciosporum intrusum* (Th. Fr.) Hafellner is introduced by Hafellner (2004), *Carbonea intrusa* (Th. Fr.) Rambold & Triebel was synonymised with *S. intrusum*. As already mentioned by Coppins (1983) and Hinds et al. (2002), the habit of *Scoliciosporum intrusum* apothecia is exactly like in other *Scoliciosporum* A. Massal. species. Also the anatomical features of the apothecia i.e., the poorly developed, not carbonized exciple, the hyaline to weakly pigmented hypothecium, the richly branched and anastomosing paraphyses, the shape of the asci, and the construction of the ascial wall fit perfectly with *Scoliciosporum*. Unusual are the unicellular ascospores which may become one-septate with age. A certain tendency of the ascospores to be asymmetric indicates that the ascospores can be regarded as an extreme within the intrageneric continuum of *Scoliciosporum* (Hafellner 2004). Only two obligatorily lichenicolous *Scoliciosporum* species are known, *S. vouauxii* (de Lesd.) Hafellner (Hafellner 2002) and *S. intrusum*. While *S. intrusum* grows on a range of saxicolous crustose lichens inhabiting siliceous rocks, *S. vouauxii* has been found only on *Ramalina* Ach. in Luyken. It might be mistaken with *Micarea subnigrata* (Nyl.) Coppins & H. Kiliias which has a brown epithecium and a micareoid photobiont.

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, Borodavka rock pillar, N and W side, 46°59'27" N, 142°50'18" E, alt. 910 m, 08.08.2019, on rock, leg. E.A. Davydov (18023).

### TELOSCHISTACEAE Zahlbr.

#### *Caloplaca stillicidiorum* (Vahl) Lynge

**Contributor:** Liudmila Konoreva

**Distribution and habitat.** Inhabits wood. In other regions it occurs on plant debris and mosses, exposed wood of roots and rocks in calcareous xerothermic habitats. It is widely distributed from Arctic to aridic regions and in mountains; **RFE: Kam** (Khodosovtsev et al. 2004, Himelbrant et al. 2019). It is reported for the first time for southern part of the Russian Far East.

**Taxonomical notes.** This species belongs to *Caloplaca cerina* group and is distinguished from corticolous *Caloplaca cerina* s.l. by growing on / or near the ground on various substrata such as bryophytes, plant debris, wood, bark of exposed roots (Šoun et al. 2011).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, Iodny vil-

lage, 44°43'23.7"N 147°21'31.5"E, alt. 30 m, abandoned border settlement, on wood, 17.08.2017, leg. L.A. Konoreva (677).

#### *Polycauliona phlogina* (Ach.) Arup et al.

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on wood. In other regions it occurs on bark. There is a strong preference for a high pH, for example, bark of *Ulmus* spp., *Fraxinus* spp., and *Acer* spp. It is probably widely distributed species but needs further research due to difficulties in identification. In Russia, the species was known from the Leningrad Region (Stepanchikova et al. 2015, 2019, Vondrák et al. 2010a) and Krasnodar Territory (Vondrák et al. 2009, 2010b, 2017, Urbanavichus & Urbanavichene 2017b). It is reported for the first time for the Asian part of Russia.

**Taxonomical notes.** *Polycauliona phlogina* is characterized by the mainly sorediate thallus with only occasionally small pale yellow to yellow areoles with contrasting orange-yellow apothecia. Sometimes it is sterile and very pale yellow or grey, and it may be difficult to separate it from an orange-grey form of *Lepraria incana* (L.) Ach. *Leproplaca chryso-deta* (Vain.) J.R. Laundon ex Ahti is another similar taxon that rarely occurs on bark. It differs by more brownish orange colour, leprose thallus, complete absence of areoles and apothecia, and a strong preference for humid places. Also *Flavoplaca flavocitrina* (Nyl.) Arup et al. has been mistaken with *C. phlogina*, but on bark it always has a large portion of the areoles not dissolved into soredia. Sometimes *Coppinsiella ulcerosa* (Coppins & P. James) S. Y. Kondr. & L. Lökös is confused with *P. phlogina*, but it has small greenish grey soralia formed as irregular craters that become more diffuse in old specimens (Arup 2006).

**Examined specimens (new records).** Iturup Island, Ostrovnoy Reserve, neighborhood of Iodny Cape, 44°43'19.6"N 147°21'17.2"E, alt. 5 m, destroyed bridge, on wood, 17.08.2017, leg. S.V. Chesnokov (312).

### TRAPELIACEAE M. Choisy ex Hertel

#### *Placynthiella oligotropha* (J.R. Laundon) Coppins & P. James

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Found on soil. In other regions it occurs on peaty soils and well-rotted lignum in open heathlands and woodland clearings, often around old stumps. It is scattered distributed from the Arctic to temperate regions, in mountains; **SIB: Irk** (Makryi & Lichtva 2005) and **Bur** (Urbanavichene & Urbanavichus 1998, Kharpukhava 2010). It is reported for the first time for the Russian Far East.

**Taxonomical notes.** The species belongs to genus *Placynthiella* Elenkin that included only 5 species in Holarctic. *Placynthiella* differs from the closely related genera *Trapelia* M. Choisy and *Trapeliopsis* Hertel & Gotth., which have the same type of ascus apices structure (*Trapelia*-type), by having a true exciple of brown-walled pseudoparenchymatous cells and paraphyses crowned with a dark brown apical cap (Smith et al. 2009). It differs from other species of genus *Placynthiella* by larger gonocysts (up to 100–300 µm in diam.) which become yellowish when wet (Makarova 2003).

**Examined specimens (new records).** Sakhalin Island, vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 47°00'18.8"N 142°50'29.1"E, alt. 1030 m, boulders in the overgrowth of *Pinus pumila*, on soil, 28.06.2017, leg. S.V. Chesnokov (240).

#### *Sarea difformis* (Fr.) Fr.

**Contributor:** Sergey Chesnokov

**Distribution and habitat.** Inhabits resin on bark of *Abies sachalinensis*. In other regions it occurs on resin of



coniferous trees. It is scattered distributed from the Subarctic to temperate regions; **RFE: Pri** (Chabanenko 2002, Skirina 2015b), **Jew** (Skirina 2015a), **Kam** (Himmelbrant et al. 2019). It is reported for the first time for Sakhalin.

**Taxonomical notes.** It is a saprotrophic fungus with a thallus lacking photobiont. It is characterized by the black plane apothecia with excipulum and multispored asci with small rounded spores (up to 100–200 per ascus).

**Examined specimens (new records).** Sakhalin Island, Korsakovsky District, “Laguna Busse” Nature Monument, vicinity of Vyselkovo Lake, 46°33'57.1"N 143°16'54.7"E, alt. 26 m, *Abies–Picea* forest, on resin on bark of *Abies sachalinensis*, 24.05.2017, leg. S.V. Chesnokov (91).

## UMBILICARIACEAE Chevall.

### *Umbilicaria rossica* (Dombr.) N.S. Golubk.

**Contributors:** Svetlana I. Tchabanenko, Sergey Chesnokov & Evgeny A. Davydov

**Distribution and habitat.** Inhabits siliceous rocks. It is widely distributed in alpine belts of mountains; **RFE: Kha** (Tchabanenko 2002), **Jew** (Skirina 2015a), and **Amu** (Davydov 2017). It is reported for the first time for Sakhalin.

**Taxonomical notes.** The species belongs to the subgenus *Lasallia* (Davydov et al. 2017). It is often confused with *Umbilicaria pennsylvanica* Hoffm., although these species only distantly related. *Umbilicaria rossica* is distinguished by its blackish erect lobulae, wrinkled and pruinose upper surface, subimmersed black pycnidia, finely papillose lower surface, and violet to reddish hymenium.

**Examined specimens (new records).** Sakhalin Island, Schmidt Peninsula, Elizabeth Cape, 54°25'14.78"N 142°42'12.0"E 222 m, stones and boulder outcrops in the NW range, on rock, 15.08.2005, S.I. Tchabanenko (s.n.); Nogliki District, headwaters of Chamgu River, on rock, 17.08.2006, leg. S.I. Tchabanenko (s.n.); vicinity of Yuzhno-Sakhalinsk, Susunaysky Range, Chekhov Peak, 47°00'18.8"N 142°50'29.1"E, alt. 1030 m, boulders in *Pinus pumila* thickets, on stone, 28.06.2017, leg. S.V. Chesnokov (238).

## Excluded taxa:

### *Caloplaca aurantiaca* (Lightf.) Th. Fr.

The specimen mentioned for Kunashir Island by Bredkina and al. (1992) was reidentified as *Caloplaca gordejewii* (Tomin) Oxner. Specimens examined: Kunashir Island. Kuril'sky State Nature Reserve, 35 km to S from Yuzhno-Kuril'sk Sity, Saratovka cordon, on bark of *Sambucus racemosa*, 14.09.1989, L.I. Bredkina (LE).

### *Collema subfurvum* (Müll. Arg.) Degel

The specimen mentioned for Kunashir Island by Bredkina and al. (1992) was reidentified as *Leptogium saturninum* (Dicks.) Nyl. Specimens examined: Kunashir Island. 35 km to N from of Yuzhno-Kuril'sk Sity, Saratovka cordon, on the bark of deciduous tree, 14.09.1989, leg. L.I. Bredkina (LE).

### *Lecidea sphaerella* Hedl. (≡ *Biatora sylvana* Körb)

The specimen was reidentified as *Biatora vernalis* (L.) Fr. Specimens examined: Kunashir Island. Tret'yakovo, to S of Yuzhno-Kuril'sk Sity, bark of *Quercus* sp. 20.09.1989, leg. L.I. Bredkina (LE).

### *Lopadium pezizoideum* (Ach.) Körb.

The specimen mentioned for Kunashir Island by Bredkina and al. (1992) was reidentified as *Lopadium disciforme* (Flot.) Kullh. In the monograph by Tchabanenko (2002), the species is synonymized incorrectly with *Lopadium disciforme* (Flot.) Kullh. Both of these species are given in modern

literature (Smith et al. 2009). Specimens examined: Kunashir Island. Tret'yakovo, in the South part of Island, on bark of coniferous tree, 20.09.1989, leg. L.I. Bredkina (LE).

### *Megalospora atrorubricans* subsp. *sendaiensis* (Räsänen) Sipman

We studied specimen from Kunashir and Shikotan Islands (Insarov & Pchelkin 1988). It is badly damaged by fungi, and hymenium completely destroyed and there are no spores. Therefore, it is impossible to determine it reliably. However, the studied specimens lacks soredia, which is distinguishing characteristic of *Megalospora atrorubricans* subsp. *sendaiensis*. Externally, the specimen looks like a widespread species *Megalospora tuberculosa* (Fée) Sipman. Specimens examined: Kunashir Island. Kuril'sky State Nature Reserve, on bark of *Abies sachalinensis*, 1985, leg. A.V. Pchelkin (herbarium of Kuril'sky State Nature Reserve).

### *Ochrolechia turneri* (Sm.) Hasselrot

The specimen was reidentified as *Ochrolechia yasudae* Vain. It is characterized by the presence of isidia and C+ red reaction of thallus, instead *O. turneri* forming granular soredia and thallus C–. Specimens examined: Kunashir Island. Kuril'sky State Nature Reserve, to S from Yuzhno-Kuril'sk Sity, Tret'yakovo, on bark of *Quercus* sp., 21.09.1989, leg. A.P. Ravinskaya (LE).

### *Parmelina quercina* (Willd.) Hale

Nelson et al. (2012) mentioned, that reports of the distribution of *P. quercina* in the south of the Far East most likely relate to *Parmelina yalungana* (Zahlbr.) P.R. Nelson et Kepler.

### *Phaeophyscia orbicularis* (Neck.) Moberg

The specimen mentioned for Kunashir Island by Bredkina and al. (1992) was reidentified as *Physciella melanochra* (Hue) Essl. due to the presence of a pale lower surface, while *Phaeophyscia orbicularis* characterized by black lower surface. Specimens examined: Kunashir Island. Tret'yakovo, to S from Yuzhno-Kuril'sk Sity, on bark of *Quercus* sp., 20.09.1989, leg. L.I. Bredkina (LE).

### *Pseudocyphellaria crocata* (L.) Vain.

In the herbarium LE, all specimens from the Far East were reidentified as *P. perpetua* McCune & Miadlikowska. According to S.I. Tchabanenko (personal comment), all specimens published by her as *P. crocata*, also apply to *P. perpetua*.

### *Schismatomma pericleum* (Ach.) Branth & Rostr.

The specimens, published by Ezhkin & Galanina (2014), were reidentified as *Lecanographa amylicae* (Ehrh. ex Pers.) Egea & Torrente. Specimens examined: Sakhalin Island, Susunaysky Range, vicinity of Yuzhno-Sakhalinsk Sity, Bol'shevik Mt., foot of the mountain, northwest slope, 46°57.689'N 142°45.786'E, alt. 160 m, mixed forest, on bark of *Alnus glutinosa*, 10.06.2011, leg. A.K. Ezhkin (SAK); *ibid*, Rogatka River, 46°58.010'N 142°46.455'E, alt. 176 m, floodplain forest, on bark of *Alnus glutinosa*, 10.10.2011, leg. A.K. Ezhkin (SAK).

### ? *Thelotrema foveolare* Müll. Arg.

The species was published from Kunashir Island (Insarov & Pchelkin 1988). It is badly damaged by fungi, and hymenium completely destroyed and there are no spores. Therefore, it is impossible to determine it reliably. Specimens examined: Kunashir Island. Kuril'sky State Nature Reserve, on bark of *Abies sachalinensis*, 1985, leg. A.V. Pchelkin

### *Nephromopsis pseudocomplicata* (Asahina) M.J. Lai (≡ *Tuckeneraria pseudocomplicata* (Asahina) Randlane & Saag, ≡ *Cetraria pseudocomplicata* Asahina)

The specimen published by Bredkina et al. (1992) was reidentified as *Nephromopsis nephromoides*. Specimens examined: see *Nephromopsis nephromoides*.

***Umbilicaria pensylvanica* Hoffm.** ( $\equiv$  *Lasallia pensylvanica* (Hoffm.) Llano)

The specimen was reidentified as *Umbilicaria rossica* (Dombr.) N.S. Golubk. Specimens examined: see *U. rossica*.

***Vulpicida tubulosus* (Schaer.) J.-E. Mattsson & M.J. Lai**

We studied specimen *Vulpicida tubulosus* in LE identified by J.-E. Mattsson, but morphology it's more suitable for *Vulpicida juniperinus* (L.) J.-E. Mattsson & M.J. Lai. Specimens examined: Sakhalin Island, by the sea coast near Pil'vo village, 07.1894, leg. L.Ya. Shtenberg (LE).

## ACKNOWLEDGEMENTS

The work was carried out in the frame of the institutional research project "Cryptogamic biota of Pacific Asia: taxonomy, biodiversity, species distribution" of the Botanical Garden-Institute of Far Eastern Branch of the Russian Academy of Sciences (work of S.V. Chesnokov, L.A. Konoreva). The study was partly financially supported by the Russian Foundation for Basic Research (grant no. 19-04-00074, work by L.A. Konoreva and S.V. Chesnokov) and grant of the Russian Foundation for Basic Research and the Japan Society for the Promotion of Science (no. 19-54-50010, work by S.V. Chesnokov, E.A. Davydov, L.S. Yakovchenko and Y. Ohmura).

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