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DNA barcoding and morphological observations of three lichenized fungal species from James Ross Island (Antarctic Peninsula)

Abstract. Antarctica seems to many people to be a very remote, isolated, and mysterious place at the end of the world, and its name is hardly mentioned in normal life and conversation. However, considering that it plays a key role in the rapidly warming global climate system and its contribution to the continuing sea-level rise, its importance today is increasing day by day and it can be seen that it is of vital importance for humanity. There is increasing interest in the distribution of terrestrial organisms in Antarctica because of the potential use of biodiversity as a predictor or indicator of climate change. Lichenized fungi cover large areas of Antarctica that are not covered by ice and form precursor organisms that thrive in harsh environments. They are the largest contributors to biomass and diversity. The characteristic features of these organisms can be counted as developing certain protective mechanisms, adapting to temperature and radiation, and surviving even when the amount of water in their body is minimized. On the other hand, lichenized fungi are the most dominant components of Antarctic terrestrial vegetation, and their adaptation to extreme conditions; growth forms, reproduction, adaptation to environmental conditions can also be explained through mechanisms. Because of the lichens, dominant organisms of Antarctica, studying lichen biodiversity is very important. Although around 500 species of lichens were reported from Antarctica, the lichen biodiversity of the continent is far from being fully known; as in the last 5 years of our studies on Antarctic lichens, we and other scientists reported a significant number of undescribed or unreported species. So the lichen biodiversity of Antarctica is not fully known as there are still many undescribed or unreported species on the continent. In this paper, we deal with three lichenized fungal species: *Arthonia glebosa* Tuck., *Lecanora atromarginata* (H. Magn.) Hertel & Rambold and *Lecidea tessellata* Flörke which are common in James Ross Island, using nrITS, mtSSU, and RPB1 sequences. The lichen samples are studied by morphological and anatomical characters. In addition, to determine the phylogenetic positions of the species, we provide nrITS and mtSSU of these 3 species from Antarctica and additionally RPB1 sequences of *Lecidea tessellata*.

Keywords: Antarctica, biodiversity, *Arthonia glebosa*, *Lecanora atromarginata*, *Lecidea tessellata*

1 Introduction

The first collections of lichens from Antarctica were made in the early 1800's. Until the First World War, several national expeditions made significant collections of lichens. Because of the harsh environment and relative inaccessibility, and also the low species diversity compared with other parts of the world, professional lichenologists were not attracted by

Antarctica. The lichen samples were mostly collected by non-specialists such as ecologists or geologists (Øvstedal & Lewis-Smith, 2001).

The terrestrial vegetation of Antarctica is dominated by lichens and mosses which are poikilohydric cryptogams. Today around 500 species of lichens are known from Antarctica, most of them from Antarctic Peninsula, and the number of species decreases gradually towards the continental parts of Antarctica (Øv-

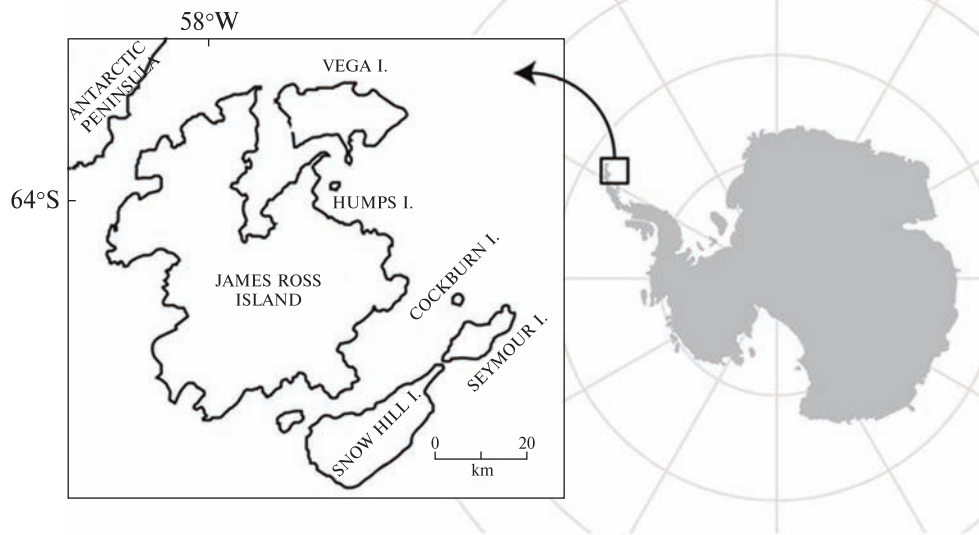


Figure 1. A map showing the James Ross Island in the Antarctic Peninsula

stedal & Lewis-Smith, 2011; Sancho et al., 2019). Unfortunately, today the lichen biodiversity of Antarctica is far from completely and truly known. Especially the publications of Carroll William Dodge between 1938–1973 in which 350 new taxa and 150 new combinations were made from Antarctic collections are discussed harshly and only 39 of these species are currently in use; most of the others were reduced to synonymy (Hertel, 1988; Castello & Nimis, 1995; Fryday, 2011).

Recently, molecular methods are being used more in determining the lichen biodiversity of the Antarctic (Lee et al., 2008; Halıcı et al., 2017; 2018; 2020; 2021). It is important to determine the lichen biodiversity of Antarctica truly, as the organisms can be excellent bio-monitors of climate change and Antarctica is a natural laboratory for these studies (Sancho et al., 2019). In this study, 3 lichenized fungal species (7 samples) which have a wide distribution in James Ross Island located in the northeast of Antarctica (Fig. 1) are studied by morphological, anatomical and molecular methods.

2 Materials and methods

The collecting expedition was realized in James Ross Island in the austral summer of 2017 (January–March).

Lichen samples were collected from 0–100 m altitude (the sites are listed in Appendix 1) by spatula on soil or by chisel and hammer on rock. They were wrapped in toilet paper and put in paper bags. When brought to the Mendel Polar Station, they were left to dry for three days in a room with air flow. The studied samples are stored in the lichen section of ERCH (Erciyes University Herbarium, Turkey).

Morphological examinations were all carried out under a stereo microscope (Leica EZ24). Sections were taken directly under the stereomicroscope by hand and anatomical characters were examined under a light microscope (Leica DM2500). Ascospores were measured in water. In addition, chemical reagents for spot tests were used to identify the species.

2.1 Lichen sampling

Two specimens of *Arthonia glebosa* Tuck.; three specimens of *Lecanora atomarginata* (H. Magn.) Hertel & Rambold and six specimens of *Lecidea tessellata* Flörke. were used for analysis (Appendix 1). We used three gene regions (nrITS, mtSSU, RPB1). For *Arthonia glebosa* the nrITS region was analyzed for both specimens and the mtSSU region only for one. For *Lecanora atomarginata* the nrITS region was ana-

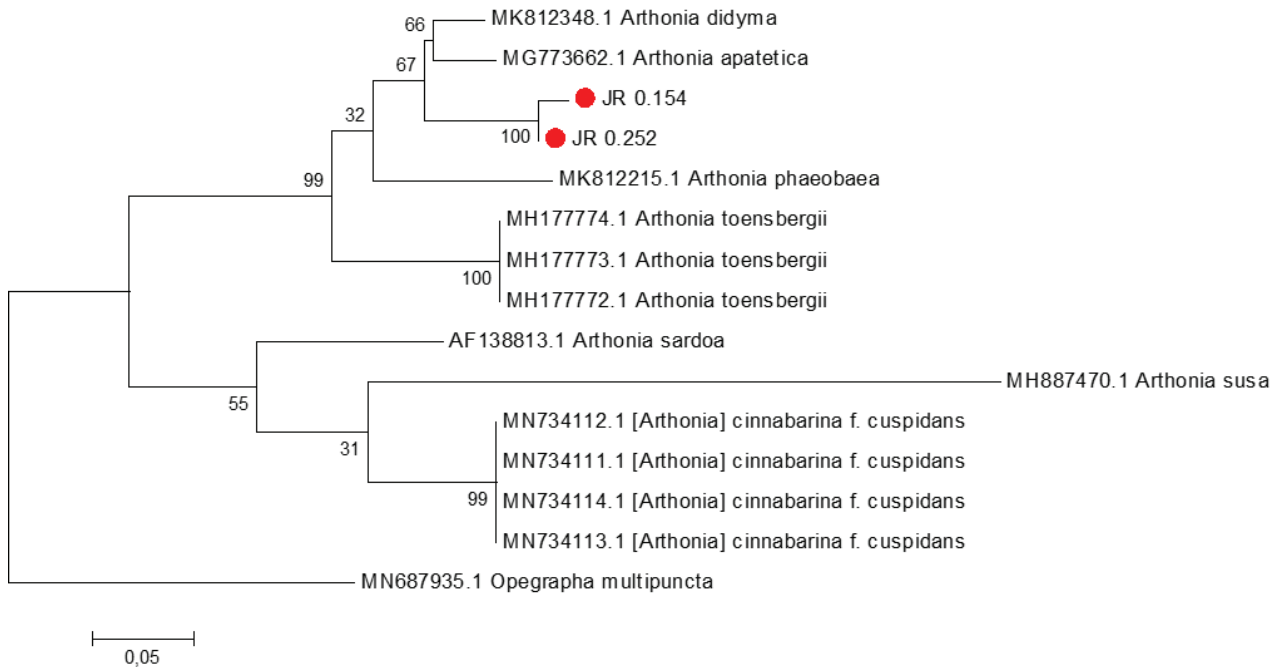


Figure 2. Maximum Likelihood (ML) analysis inferred from nrITS region sequences of the genus *Arthonia*

lyzed for one specimen and the mtSSU region for two specimens. For *Lecidea tessellata* nrITS region was analyzed for all six specimens, the mtSSU region for four specimens and RPB1 region for three specimens.

2.2 DNA isolation, PCR and sequencing

DNeasy Plant Mini Kit (Catalog No: 69104) produced by Qiagen company was used in the DNA isolation. The protocol given in the kit was followed. Amplification of all gene regions (nrITS, mtSSU, RPB1) from the isolated DNA was performed under appropriate PCR conditions. PCR reaction mixture applied for gene regions 5 µl of 200 ng DNA, 5 µl of 10X reaction buffer, 5 µl of 25mM MgCl₂, 5 µl of 25µ dNTPs, 4 µl of 10 µM forward primer, 4 µl of 10 µM reverse primer, 0.5 U of Taq DNA polymerase. PCR reaction was performed by adding 21.5 µl PCR water to complement the total volume to 50 µl for all gene regions (nrITS, mtSSU and RPB1). PCR amplifications of nrITS were performed using fungal-specific primers nrITS4 (TCCTCCGCTTATTGATATGC, White et al., 1990) and nrITS1-F (CTTGGTCATT-

TAGAGGAAGTAA, Gardes & Bruns, 1993). PCR amplifications of mtSSU were performed using fungal-specific primers (mrSSU1-F AGCAGTGAGGAATATTGGTC; mrSSU3-R ATGTGGCACGCTATAGCCC, Zoller et al., 1999) and PCR amplifications of RPB1 were performed using fungal-specific primers RPB1-aFasc (ADTGYYCCYGGYCATT-TYGGT, Hofstetter et al., 2007) and RPB1-cR (CCC GCATNTCRTTRTCCATRTA, Matheny et al., 2002).

PCR amplifications were carried out in a thermal cycler (Blue Rey-Biotech) equipped with a heated lid, in the following conditions for ITS: an initial heating step for 5 min. at 95 °C; 6 cycles with 1:30 min. at 94 °C, 1:30 min. at 55 °C, and 2 min. at 72 °C; and 33 cycles with 1 min. at 94 °C, 1 min. at 52 °C, and 2 min. at 72 °C. A final extension step of 8 min. at 72 °C was added, after which the samples were kept at 4 °C; for mtSSU and RPB1: an initial heating step for 5 min. at 94 °C; 35 cycles with 1 min. at 94 °C, 1 min. at 58 °C, and 1 min. at 72 °C. A final extension step of 10 min. at 72 °C was added, after which the samples were kept at 4 °C.

After the PCR, amplified samples were loaded on a 1% agarose gel with ethidium bromide dye add-

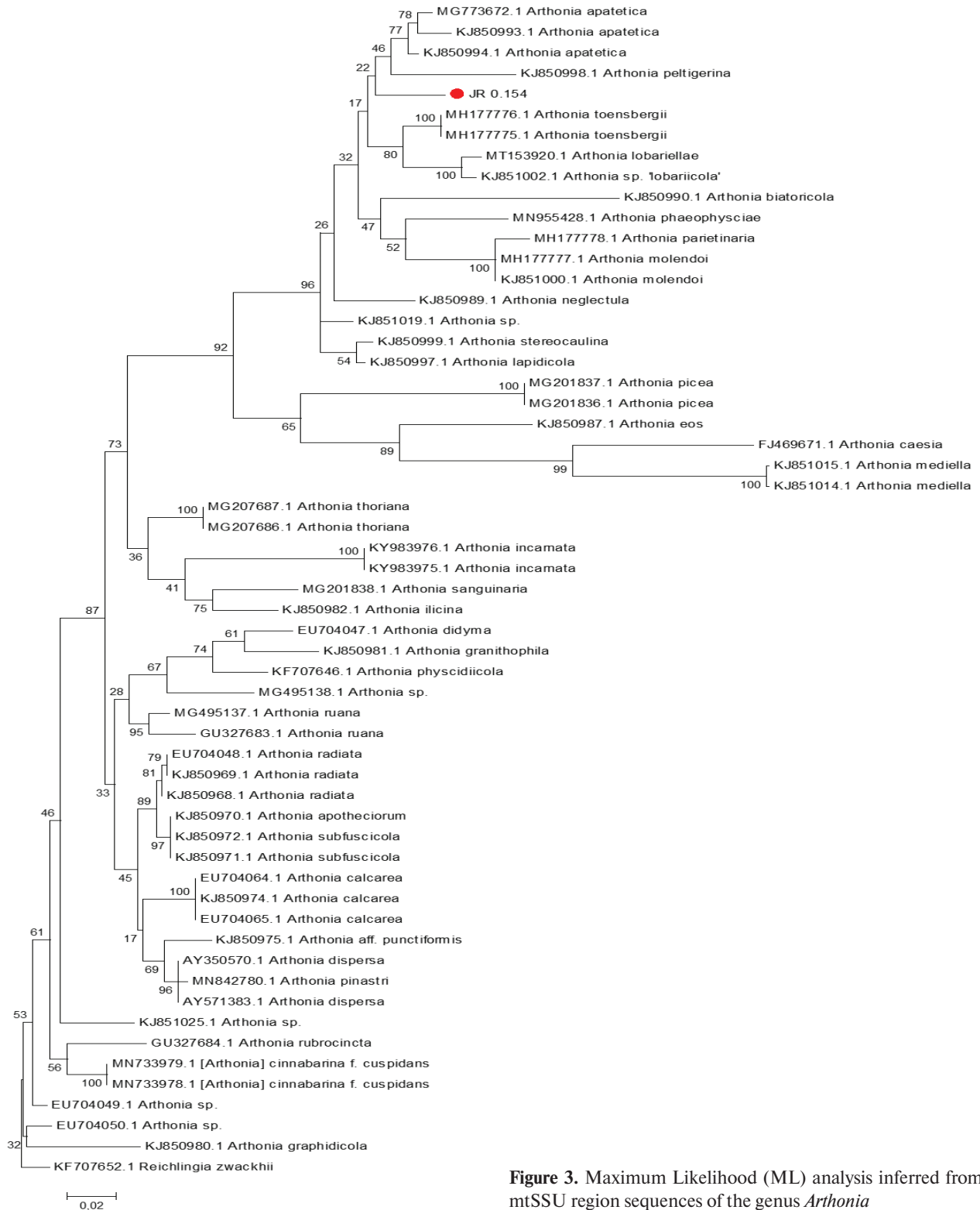


Figure 3. Maximum Likelihood (ML) analysis inferred from mtSSU region sequences of the genus *Arthonia*

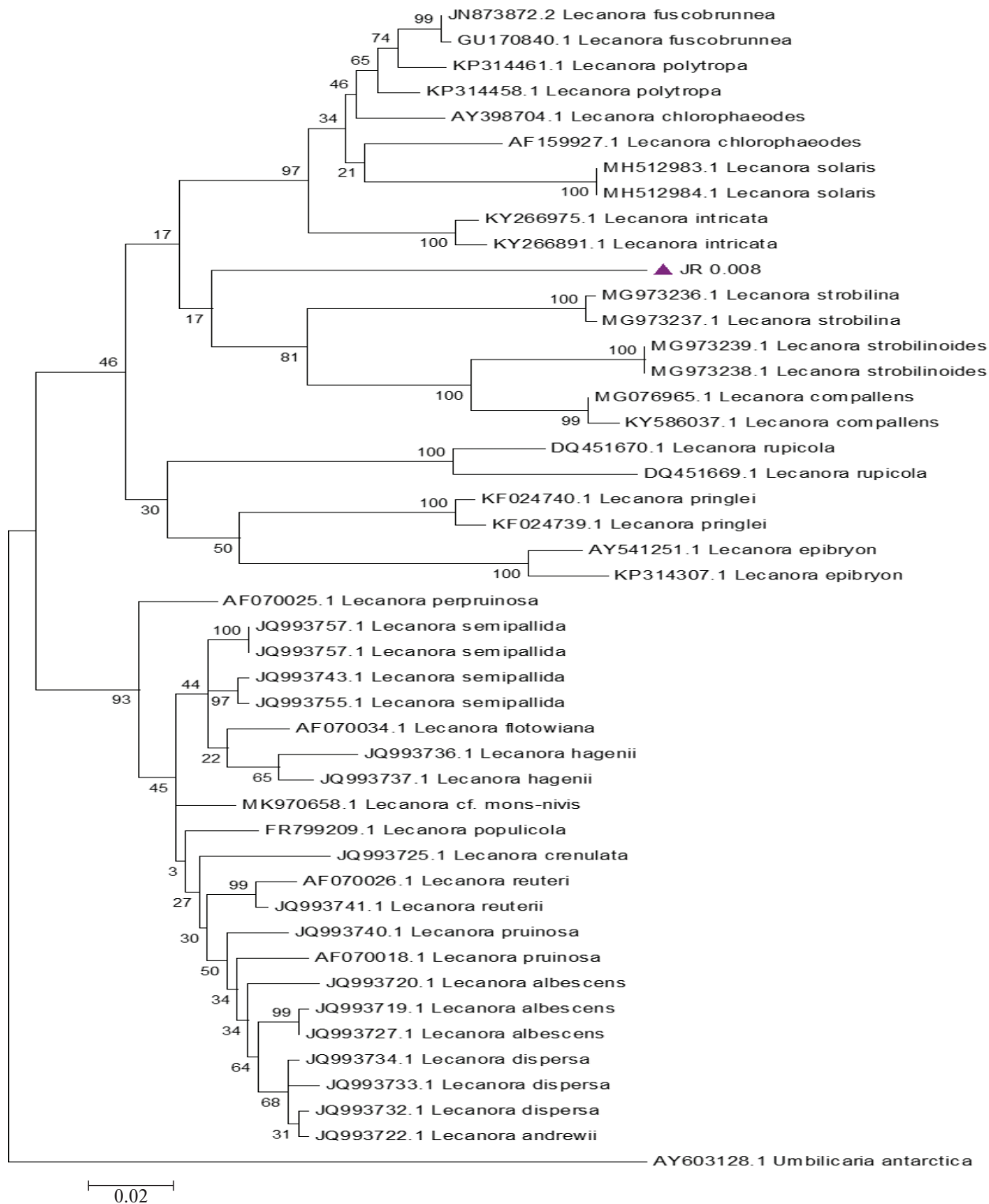


Figure 4. Maximum Likelihood (ML) analysis inferred from nrITS region sequences of the genus *Lecanora*

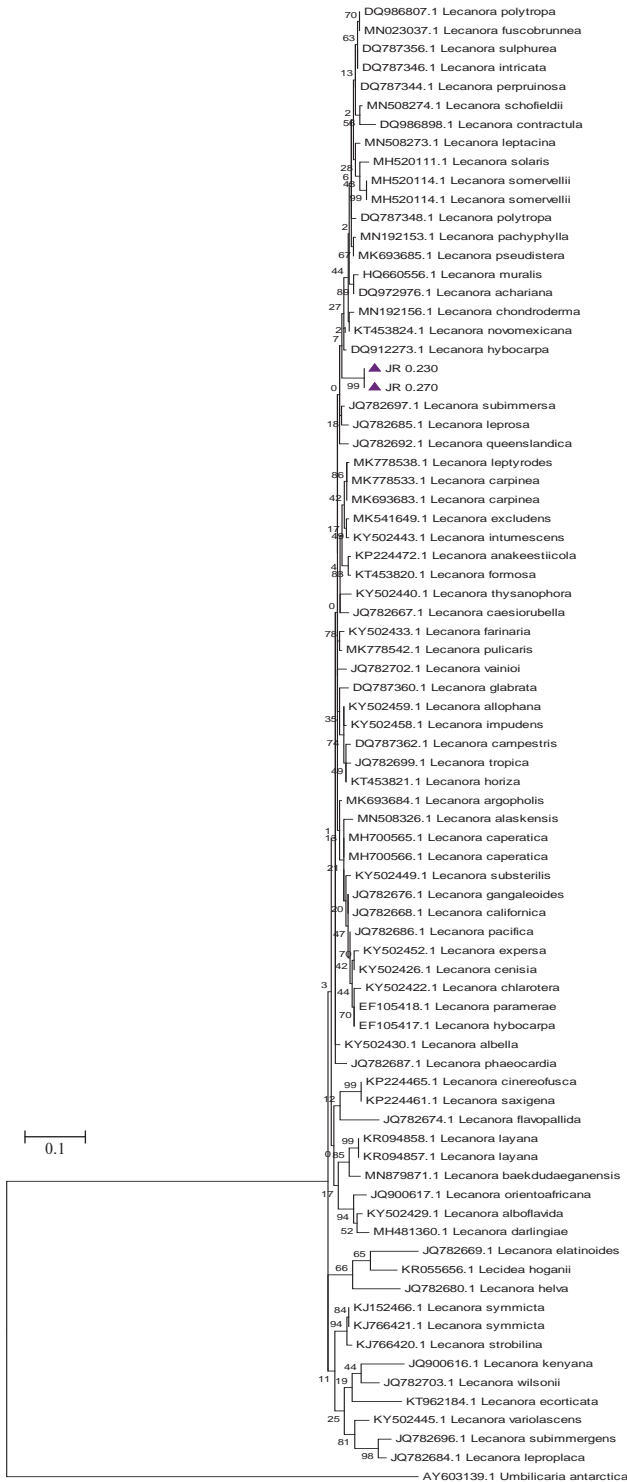


Figure 5. Maximum Likelihood (ML) analysis inferred from mtSSU region sequences of the genus *Lecanora*

ed (5mg/ml) for electrophoretic separation. The DNA bands were detected under UV light at 100 watt after 60 minutes.

2.3 Sequence alignment and phylogenetic analysis

The sequencing was performed by ABI 3730 XL sequencer (applied Biosystem). Possible reading errors were corrected with the Cluster X function of MEGA 6.0 program and the sequences of the species obtained from the research area and the sequences of the genes downloaded from the GenBank (Appendix 2) were analyzed with Mega 6.0 program. The dendrograms were obtained with ML method and Tamura 3-parameter model. Pairwise deletion was applied to gaps in data, and the reliability of the inferred tree was tested by 1000 bootstrap replications for control.

3 Results

3.1 Phylogeny

3.1.1 *Arthonia glebosa* Tuck.

The nrITS alignment comprised 15 accessions with a length of 520 bp (Appendix 2). *Opegrapha multipunctata* MN687935 was used for the outgroup. According to nrITS analyses, both specimens (indicated with circles in Fig. 2), formed a clade with *Arthonia didyma* and *Arthonia apatetica*. There is no data in GenBank for *A. glebosa*. Two Antarctic specimens of *A. glebosa* studied here clearly belong to another clade than other *Arthonia* specimens (Fig. 2).

The mtSSU alignment comprised 57 accessions (Appendix 2) with a length of 818 bp. *Reichlingia zwackhii* (Sandst.) Frisch & G. Thor KF707652 was used as the outgroup. The Antarctic specimen of *A. glebosa* clearly belongs to another clade than the other *Arthonia* specimens (Fig. 3).

3.1.2 *Lecanora atromarginata* (H. Magn.) Hertel & Rambold.

The nrITS alignment comprised 46 accessions with a length of 600 bp, and *Umbilicaria antarctica* AY603128 was used for the outgroup. The mtSSU alignment comprised 81 accessions with a length of 630 bp and

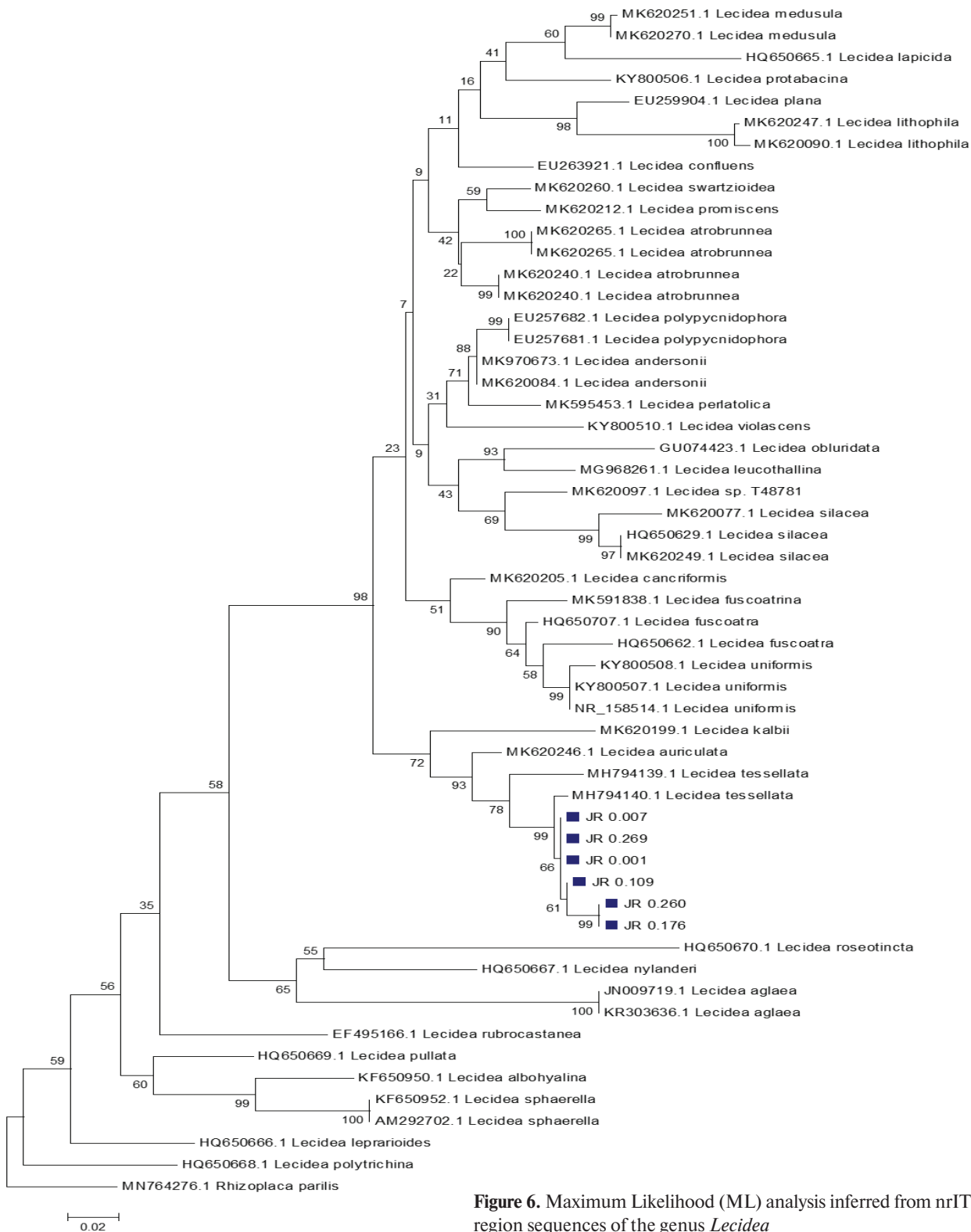


Figure 6. Maximum Likelihood (ML) analysis inferred from nrITS region sequences of the genus *Lecidea*

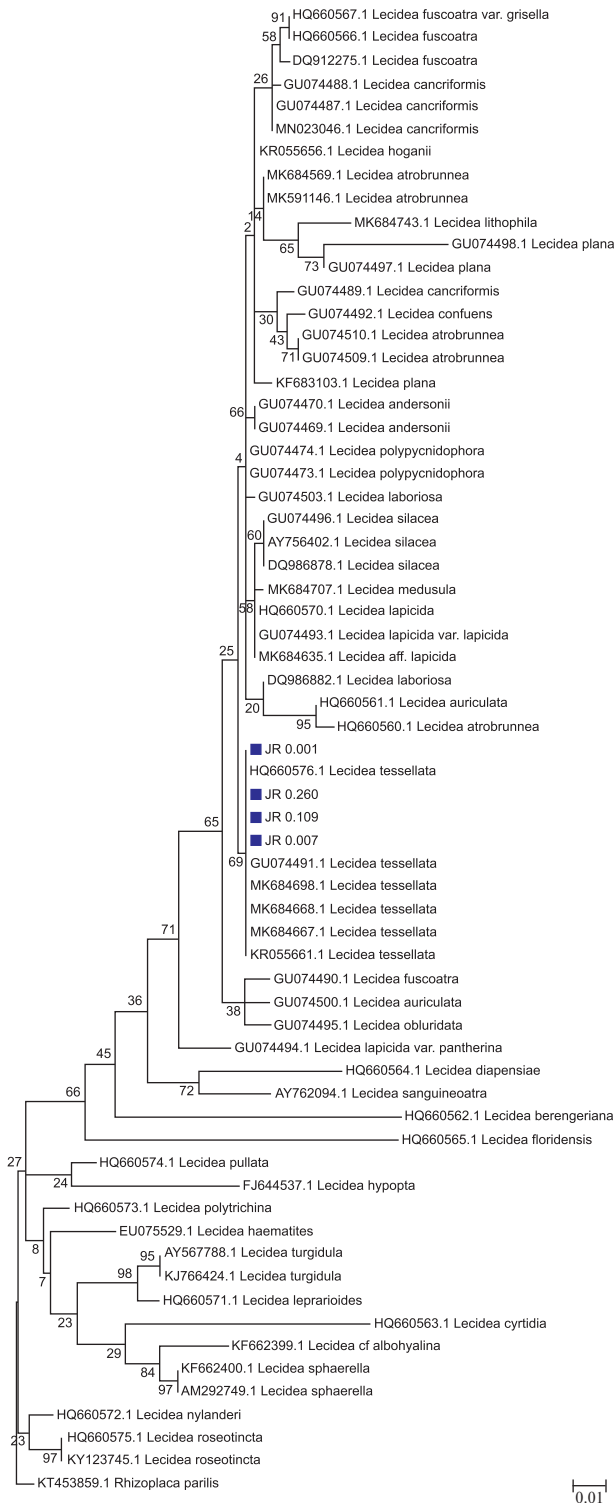


Figure 7. Maximum Likelihood (ML) analysis inferred from mtSSU region sequences of the genus *Lecidea*

Umbilicaria antarctica AY603139 was used as out-group (Appendix 2). According to nrITS and mtSSU analyses of *L. atromarginata* specimens in Fig. 3 and Fig. 4 (triangle), formed a separate clade. There are no data of *L. atromarginata* in GenBank, but three specimens of this species clearly belong to another clade from the other *Lecanora* specimens (Figs. 4, 5).

3.1.3 *Lecidea tessellata* Flörke.

The nrITS alignment comprised 55 accessions with a length of 575 bp, mtSSU alignment comprised 65 accessions with a length of 610 bp and the RPB1 alignment comprised 40 accessions with a length of 755 bp (Appendix 2). *Rhizoplaca parilis* MN764276, KT453859 and KU935393 were used for the outgroups respectively.

According to nrITS, mtSSU and RPB1 analyses of *L. tessellata* specimens in Fig. 6, Fig. 7 and Fig. 8 with square, matched with *L. tessellata* specimens deposited in GenBank. So clearly all these specimens belong to *L. tessellata* (Figs. 6, 7 and 8).

3.2 Morphology and Anatomy

3.2.1 *Arthonia glebosa* Tuck.

Morphology and Anatomy: Thallus squamulose, brown, almost areolate or subeffigurate. Apothecium lecideine, black, usually aggregated, swollen, arcuated, convex, margin excluded, 0.1–0.35 mm (Fig. 9a). Epiphymenium brown or blackish brown, 10–15 µm, N-, K-. Hymenium hyaline, sometimes with a brownish tinge and with oil droplets, 30–55 µm. Hypothecium hyaline or brown, 25–140 µm. Ascus 8-spored, 50 × 20 µm. Ascospores hyaline, ellipsoid to subglobose, usually one septate, when septate, asymmetric, sometimes no septum present in young ascospores, (8–)10–12.5–15(–16) × 4–5 µm (n = 15), ascospore length/width ratio (1.6–)2.14–2.62–3.1(–3.5) µm (n = 15) (Fig. 9b). Paraphyses simple, unbranched, 3 µm. Algae green, chlorococcoid, more or less globose, ~15 µm diam. Thallus K-, C-, KI-, Pd-. Medulla K+ yellow and KI+ blue. Pycnidium not observed.

Examined species: JR 0.154, JR 0.252 (see Appendix 1).

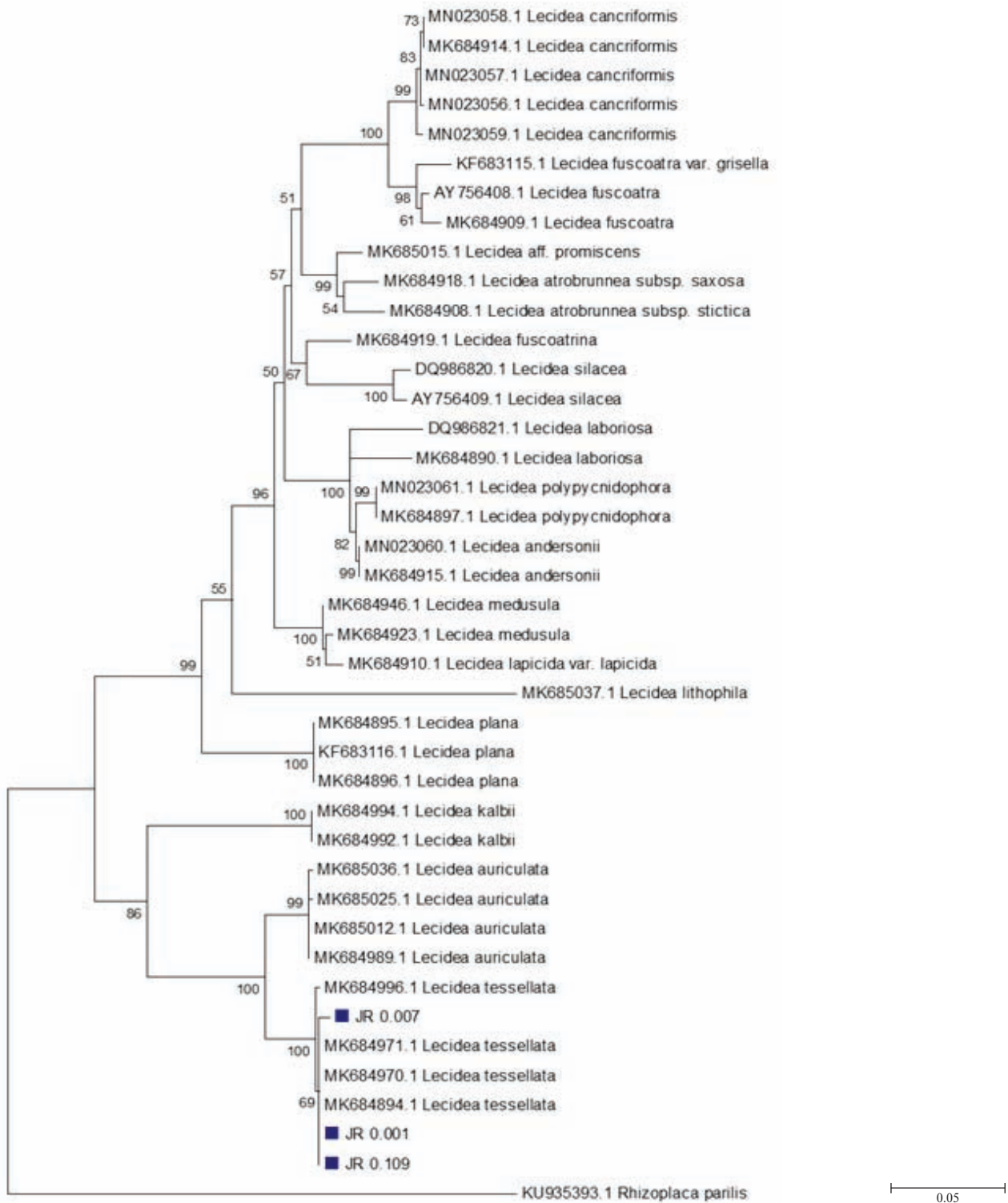


Figure 8. Maximum Likelihood (ML) analysis inferred from RPB1 region sequences of the genus *Lecidea*

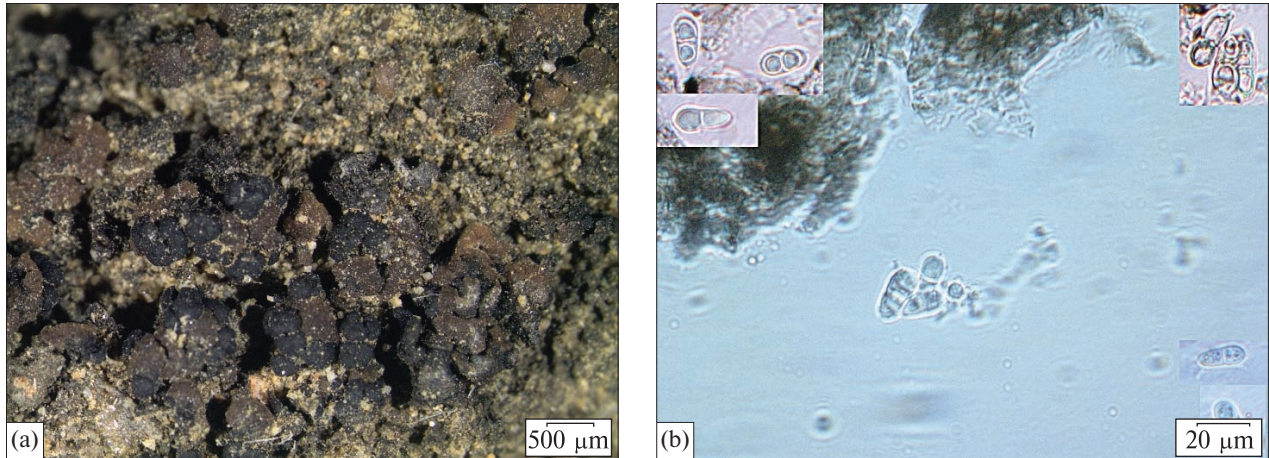


Figure 9. *Arthonia glebosa* Tuck., (a) — thallus and apothecia; (b) — ascospores

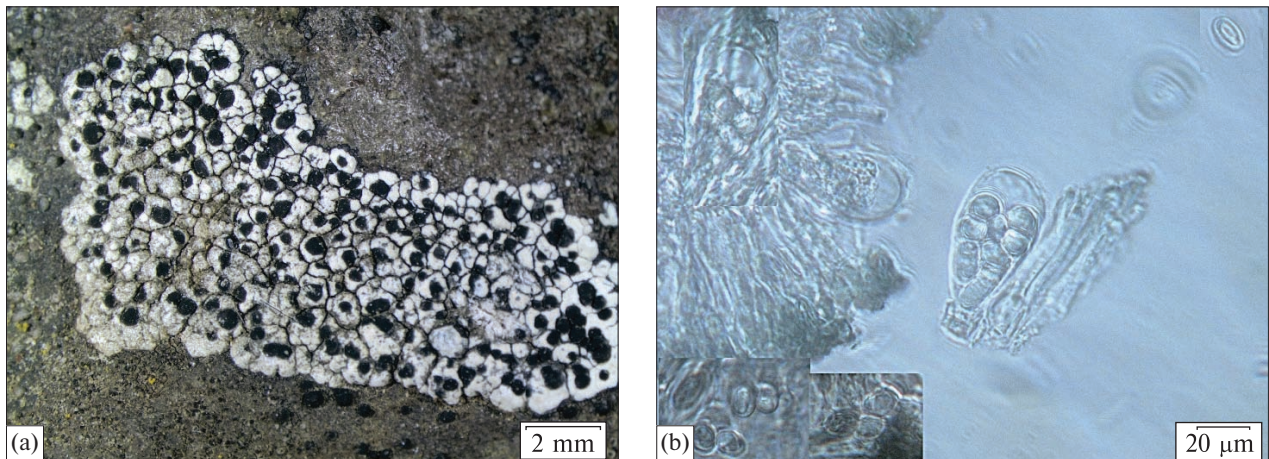


Figure 10. *Lecanora atromarginata* (H. Magn.) Hertel & Rambold, (a) — thallus and apothecia; (b) — ascus and ascospores

Ecology and Distribution: It occurs on soil (Freebury, 2014), on humus (DeBolt & McCune, 1993) and it is very common in dry or cold open habitats (McCune, 1997).

Arthonia glebosa is considered as rare on a global scale (Baldursson et al., 2003). It has been reported from Mongolia (Biazrov & Zhurbenko, 2004), Saskatchewan (Freebury, 2014), Arctic Iceland, Greenland (Kristinsson et al., 2010), USA, Russia (Zhurbenko, 2009), Ecuador (Sklenář et al., 2010), Tibet (Obermayer, 2004), Canada (Williston, 2000), China (Bilichenko, 2021) and South Orkney and James Ross Islands in Antarctic Peninsula (Øvstedal & Lewis-

Smith, 2001). World-wide distribution of *Arthonia glebosa* is indicated by red circle in Figure 12.

3.2.2 *Lecanora atromarginata* (H. Magn.) Hertel & Rambold.

Morphology and Anatomy: Thallus crustose, continuous or dispersed as unregular patches, up to 2 cm. Thallus chalky white or dirty white, rimose-areolate. Prothallus present around the thallus and margins of the areoles, black. Apothecium present, lecideine, roundish to angular, black, epruinose, immersed or subsessile, 0.2–0.55 mm (Fig. 10a). Margin present at the

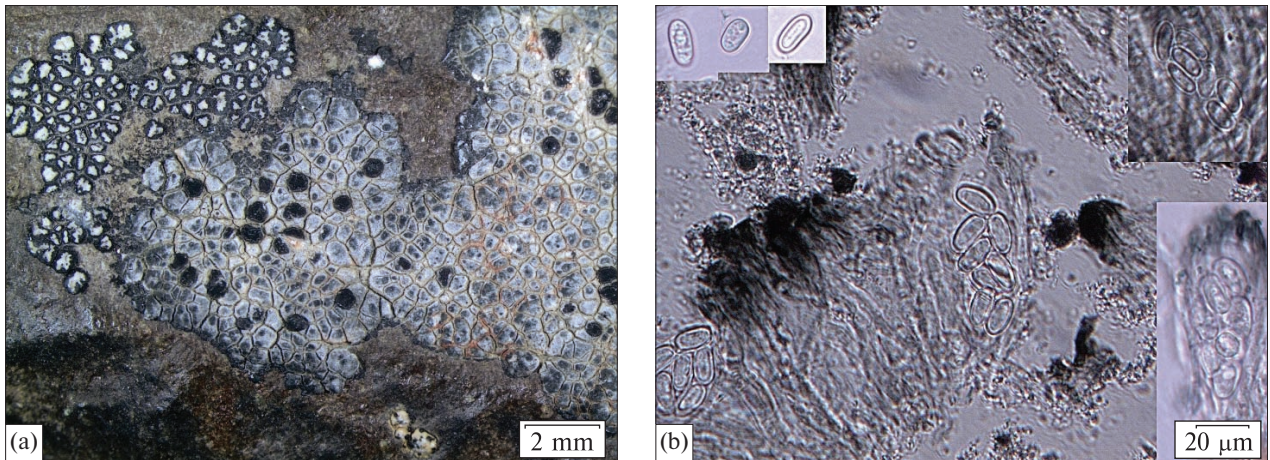


Figure 11. *Lecidea tessellata* Flörke., (a) — thallus with apothecia (the areolate thallus in the upper left belongs to *Lecanora atromarginata* which was detailed above); (b) — ascus and ascospores

young ones, very thick, black, excluded at the old ones. Epithymenium greenish black, 20–60 μm , N-. Hymenium hyaline, 40–100 μm . Hypothecium mostly hyaline, sometimes brownish hyaline, 20–40 μm . Ascus 8-spored, $38 \times 17 \mu\text{m}$. Ascospores simple, hyaline, ellipsoid with oil droplets, $8\text{--}10.5 \times (3\text{--})4.5\text{--}6 \mu\text{m}$ ($n = 20$), l/w ratio $(1.33\text{--})1.67\text{--}2.06\text{--}2.45\text{--}(2.67) \mu\text{m}$ (Fig. 10b). Paraphyses simple, unbranched, tips clavate or almost capitate, 2–4 μm . Algae green, chlorococcoid. Thallus and medulla K+ yellow, C+ yellow or C-, medulla I-. Pycnidium not observed.

Examined species: JR 0.008, JR 0.230, JR 0.270 (Appendix 1).

Ecology and Distribution: *Lecanora atromarginata* occurs on inland rocks at high altitudes in shaded sites. It is usually accompanied by *Rhizocarpon geminatum*, *Staurothele gelida*, *Usnea sphacelata*, *Lecidea tessellata*, *Rhizocarpon disporum* and *Rusavskia elegans* (Śliwa & Olech, 2002; Øvstedal & Lewis-Smith, 2001; Hansen, 2009). On James Ross Island it is usually found with *Lecidea tessellata* which is detailed below.

Lecanora atromarginata has a bipolar distribution and is found in portions of arctic Asia, Europe, Scandinavia, Arctic (Greenland, Svalbard, Canada) and Antarctica, where it occurs on calcareous, siliceous and other base-rich rock at high elevations (Kristinsson et al., 2010; Brinker, 2020). World-wide distribu-

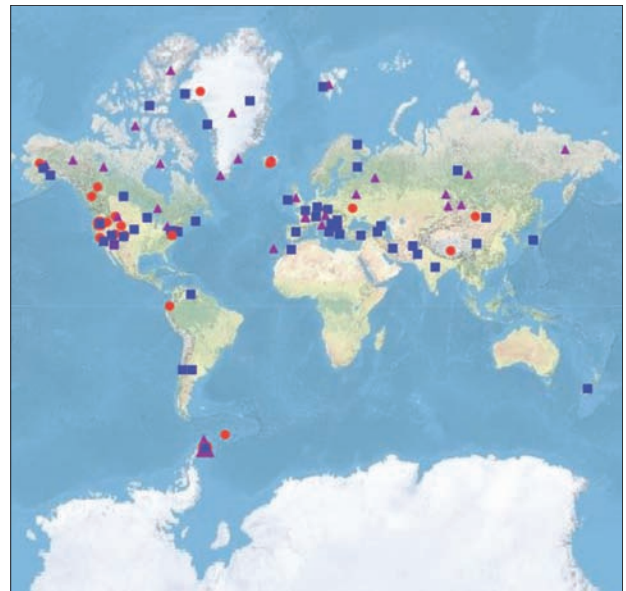


Figure 12. World-wide distribution of examined species (red circles: *Arthonia glebosa* Tuck.; blue squares: *Lecidea tessellata* Flörke; purple triangles: *Lecanora atromarginata* (H. Magn.) Hertel & Rambold.)

tion of *Lecanora atromarginata* is indicated by purple triangle in Figure 12.

3.2.3 *Lecidea tessellata* Flörke.

Morphology and Anatomy: Thallus crustose, well developed, rimose-areolate, sometimes almost subef-

figurate, greyish white, dirty white or ash-grey, centers of the areoles are blackish, sometimes between areoles there are rusty colored patches (Fig. 11a). Areoles contiguous, flat or weakly convex, regular or irregular. Prothallus sometimes present, black, very thin. Apothecium black, sessile or almost immersed, aggregated or dispersed, adnate or appressed, plane, weakly pruinose, roundish or angular, lecideine, (0.2–)0.25–0.4–0.55(–0.7) mm (n = 40). Apothecium margin prominent, black, concolorous with the disc, smooth or fissured especially at mature ones, pruinose or not. Epithemium dark brown or black, 30–100 µm, N+ red, K-. Hymenium hyaline or blue-greenish hyaline, sometimes it has bluish tinge, 55–80 µm. Hypothecium brown or brownish hyaline, 30–110 µm. Asci 8-spored, 34–80 × 8–20 µm. Ascospores hyaline, simple, ellipsoid, almost oblong, (7–)8–8.5–9(–10.5) × (3–)4.5–(–5.5) µm (n = 40) and ascospore length/width ratio (1.4–)1.66–2.12–2.57(–3) µm (n = 40) (Fig. 11b). Paraphyses simple, thin, unbranched, sometimes septate, tips are slightly enlarged 3–5 µm. Pycnidium not observed. Thallus and medulla K- or K+ pale yellow, KI-, I-, C- or C+ yellow, Pd-.

Ecology and Distribution: *Lecidea tessellata* occurs on both calcareous and siliceous rocks (Hansen, 2017) as well as on sandstone (Lendemer, 2010); on basalt (Hansen, 2017) or on granite rocks (Knudsen & Kramer, 2007).

L. tessellata is a bipolar species. It has been reported from America (Mayrhofer et al., 2016), Iran (Moniri & Sipman, 2011), Turkey (Halıcı et al., 2007), Mongolia (Huneck et al., 1984), Armenia (Harutyunyan et al., 2011), Russia (Tarasova et al., 2015), Greenland (Hansen, 2017), Morocco (Egea & Rowe, 1988), Pakistan (Aptroot & Iqbal, 2010), New Zealand (de Lange et al., 2018), India (Upreti et al., 2006), Europe and the Antarctic (Øvstedal & Lewis-Smith, 2004). World-wide distribution of *Lecidea tessellata* is indicated by blue square in Figure 12.

4 Discussion

The lichens are the most dominant organisms of Antarctic terrestrial vegetation and important to understand the terrestrial biota of Antarctic which is under the

effect of global warming. Although around 500 species of lichens were reported from Antarctica, the lichen biodiversity of the continent is far from being fully known; as in the last 5 years of our studies on Antarctic lichens, we and other scientists reported significant number of undescribed or unreported species (Halıcı et al., 2017; 2018; 2020; 2021; Cao et al., 2018; Park et al., 2018; Halıcı & Bartak, 2019; Sancho et al., 2020). In our opinion, if more lichens are examined with molecular techniques, the lichen biota of Antarctic will be known more detailed.

These 3 species detailed here were previously reported from James Ross Island (Øvstedal & Lewis-Smith, 2001; 2004) but they were never DNA-barcoded. According to our molecular studies (Figs. 1–7), the reports of these species are correct. All the specimens collected by us share the similar descriptions provided by Øvstedal and Lewis-Smith (2001; 2004).

It is important to know the accurate checklist of lichens in Antarctica as they can perfectly be used in biomonitoring the climate change in Antarctica (Sancho et al., 2019). As the molecular methods are used in determining the lichen biodiversity of Antarctica, we will have a more accurate checklist of the continent.

Author contributions. MGH — collected the samples from Antarctica; MGH, MK — has same contribution to other parts of study and discussed the results and contributed to the final manuscript.

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Conflicts of Interest. The authors declare no conflict of interest.

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ДНК-штрих-кодування та морфологічні спостереження за трьома ліхенізованими видами грибів з острова Джеймс Росс (Антарктичний півострів)

Реферат. Антарктика багатом видається дуже віддаленим, ізольованим, загадковим місцем в кінці світу, яке не згадують у звичайних розмовах. Однак враховуючи її ключову роль у глобальній кліматичній системі, що швидко нагрівається, і вклад у підйом рівня моря, що досі триває, важливість цього регіону зростає з дня на день. Зростає й інтерес у розподілі наземних організмів, що її населяють, адже використовуючи знання про біорізноманіття, можна передбачити або відслідкувати кліматичні зміни. Ліхенізовані гриби у складі піонерних угруповань покривають великі, вільні від льоду, області Антарктиди, і добре себе почувають у суворох умовах. Їм належить найбільша частка біомаси та різноманіття. Ліхенізовані гриби володіють властивістю виробляти певні захисні механізми, адаптуватися до температури й випромінювання, виживати навіть за мінімальної гідратації. З іншого боку, вони — найбільша група організмів-домінантів антарктичної рослинності, і їх адаптації до екстремальних умов — життєві форми, розмноження, адаптація — теж можна пояснити цими механізмами. Внаслідок того, що лишайники, організми-домінанти Антарктиди, вивчення їх біорізноманіття дуже важливе. Попри те, що з даного регіону відомо близько 500 видів, вважається, що різноманіття лишайників тут відоме далеко не сповна. За останні п'ять років і ми, й інші автори відзначали багато видів, раніше невідомих у регіоні або взагалі неописаних. У цій роботі, з використанням послідовностей nrITS, mtSSU та RPB1, розбирається три ліхенізовані види грибів: *Arthonia glebosa*, Tuck. , *Lecanora atromarginata* (H. Magn.) Hertel & Rambold та *Lecidea tessellata* Flörke, звичайні на острові Джеймс Росс. У зразках лишайників вивчали морфологічні та анатомічні показники. Додатково, для визначення філогенетичного положення, наводяться послідовності nrITS та mtSSU цих трьох видів з Антарктиди та RPB1 — для *Lecidea tessellata*.

Ключові слова: Антарктика, біорізноманіття, *Arthonia glebosa*, *Lecanora atromarginata*, *Lecidea tessellata*

Appendix 1. The sites where lichens were collected

JR 0.154	<i>Arthonia glebosa</i> Tuck.	Antarctica, Antarctic Peninsula, James Ross Island, Vega Island, 63°50'0" S, 57°25'0" W, on soil, alt. 5 m, Leg. M. G. Halıcı
JR 0.252	<i>Arthonia glebosa</i> Tuck.	Antarctica, Antarctic Peninsula, James Ross Island, Solorina Valley, 63°52'39.0" S, 57°46'51.6" W, alt. 2 m., on soil, Leg. M. G. Halıcı
JR 0.008	<i>Lecanora atromarginata</i> (H. Magn.) Hertel & Rambold	Antarctica, Antarctic Peninsula, James Ross Island, SE Tip of Johnson Mesa, 63°49'46.2" S, 57°54'21.6" W, alt. 292 m., on rock, Leg. M. G. Halıcı
JR 0.230, JR 0.270	<i>Lecanora atromarginata</i> (H. Magn.) Hertel & Rambold	Antarctica, Antarctic Peninsula, James Ross Island, Solorina Valley, 63°52'39.0" S, 57°46'51.6" W, alt. 2 m., on soil, Leg. M. G. Halıcı
JR 0.001	<i>Lecidea tessellata</i> Flörke.	Antarctica, Antarctic Peninsula, James Ross Island, "Dirty Valley" 63°48'38.1" S, 57°51'36" W, alt. 92 m., on rock, Leg. M. G. Halıcı
JR 0.007, JR 0.109	<i>Lecidea tessellata</i> Flörke.	Antarctica, Antarctic Peninsula, James Ross Island, "Lachmann Lake", 63°48'36" S, 57°48'29" W, alt. 36 m., on rock, Leg. M. G. Halıcı
JR 0.176, JR 0.260, JR 0.269	<i>Lecidea tessellata</i> Flörke.	Antarctica, Antarctic Peninsula, James Ross Island, Solorina Valley, 63°52'39.0" S, 57°46'51.6" W, alt. 2 m., on soil, Leg. M. G. Halıcı

Appendix 2. mtSSU, nrITS and RPBI sequences used in the analyses; newly produced ones are in bold

Arthonia			
Species	GenBank Number (nrITS)	Country	Year
JR 0.154	MZ502374	Antarctica, James Ross Island	2021
JR 0.252	MZ502376	Antarctica, James Ross Island	2021
<i>Arthonia apatetica</i>	MG773662	the Carpathians	2018
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN734112	Norway	2020
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN734111	Norway	2020
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN734114	Norway	2020
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN734113	Norway	2020
<i>Arthonia didyma</i>	MK812348	Norway	2019
<i>Arthonia phaeobaea</i>	MK812215	Norway	2019
<i>Arthonia sardoa</i>	AF138813	-	1999
<i>Arthonia susa</i>	MH887470	USA	2018
<i>Arthonia toensbergii</i>	MH177774	Norway	2018
<i>Arthonia toensbergii</i>	MH177773	Norway	2018
<i>Arthonia toensbergii</i>	MH177772	Norway	2018
<i>Opegrapha multipuncta</i>	MN687935	United Kingdom	2018
Species	GenBank Number (mtSSU)	Country	Year
JR 0.154	MZ502372	Antarctica, James Ross Island	2021
<i>Arthonia punctiformis</i>	KJ850975	Japan	2014
<i>Arthonia apatetica</i>	MG773672	Carpathians	2020
<i>Arthonia apatetica</i>	KJ850993	Sweden	2014
<i>Arthonia apatetica</i>	KJ850994	Sweden	2014
<i>Arthonia apotheciorum</i>	KJ850970	Sweden	2014
<i>Arthonia biatoricola</i>	KJ850990	Japan	2014
<i>Arthonia caesia</i>	FJ469671	Zambia	2014
<i>Arthonia calcarea</i>	EU704064	France	2014
<i>Arthonia calcarea</i>	KJ850974	Sweden	2014
<i>Arthonia calcarea</i>	EU704065	France	2014
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN733979	Norway	2020
<i>Arthonia cinnabarina</i> f. <i>cuspidans</i>	MN733978	United Kingdom	2020
<i>Arthonia dispersa</i>	AY350750	—	2005
<i>Arthonia dispersa</i>	AY571383	—	2005
<i>Arthonia eos</i>	KJ850987	Japan	2014
<i>Arthonia graphidicola</i>	KJ850981	Sweden	2014
<i>Arthonia graphidicola</i>	KJ850980	Japan	2014
<i>Arthonia ilicina</i>	KJ850982	USA	2014

Species	GenBank Number (mtSSU)	Country	Year
<i>Arthonia incarnata</i>	KY983976	Japan	2017
<i>Arthonia incarnata</i>	KY983975	Japan	2017
<i>Arthonia lapidicola</i>	KJ850997	Sweden	2014
<i>Arthonia lobariellae</i>	MH177776	Norway	2018
<i>Arthonia mediella</i>	KJ851015	Sweden	2014
<i>Arthonia mediella</i>	KJ851014	Sweden	2014
<i>Arthonia molendoi</i>	MH177777	Norway	2018
<i>Arthonia molendoi</i>	KJ851000	Sweden	2014
<i>Arthonia neglectula</i>	KJ850989	Sweden	2014
<i>Arthonia parietinaria</i>	MH177778	Norway	2018
<i>Arthonia peltigerina</i>	KJ850998	Sweden	2014
<i>Arthonia phaeophysciae</i>	MN955428	Japan	2020
<i>Arthonia physcidiicola</i>	KF707646	Uganda	2014
<i>Arthonia picea</i>	MG201837	Japan	2018
<i>Arthonia picea</i>	MG201836	Japan	2018
<i>Arthonia pinastri</i>	MN842780	Italy	2020
<i>Arthonia radiata</i>	EU704048	Belgium	2009
<i>Arthonia radiata</i>	KJ850969	Sweden	2014
<i>Arthonia radiata</i>	KJ850968	Sweden	2014
<i>Arthonia ruana</i>	MG495137	South Korea	2017
<i>Arthonia ruana</i>	GU327683	Germany	2009
<i>Arthonia rubrocincta</i>	GU327684	USA	2009
<i>Arthonia sanguinaria</i>	MG201838	Japan	2017
<i>Arthonia sp.</i>	KJ851019	Sweden	2014
<i>Arthonia sp.</i>	MG495138	South Korea	2017
<i>Arthonia sp.</i>	KJ851025	Uganda	2014
<i>Arthonia sp.</i>	EU704049	Rwanda	2009
<i>Arthonia sp.</i>	EU704050	Florida	2009
<i>Arthonia sp.</i>	MH177775	Norway	2018
<i>Arthonia subfuscicola</i>	KJ850972	Sweden	2014
<i>Arthonia subfuscicola</i>	KJ850971	Sweden	2014
<i>Arthonia thoriana</i>	MG207687	England	2018
<i>Arthonia thoriana</i>	MG207686	England	2018
<i>Arthonia toensbergii</i>	MH177776	Norway	2018
<i>Arthonia toensbergii</i>	MH177775	Norway	2018
<i>Arthonia stereocaulina</i>	KJ850999	Sweden	2014
<i>Reichlingia zwackhii</i>	KF707652	Sweden	2014

<i>Lecanora</i>			
Species	GenBank Number (nrITS)	Country	Year
JR 0.008	MZ502324	Antarctica, James Ross Island	2021
<i>Lecanora albescens</i>	JQ993719	Belgium	2012
<i>Lecanora albescens</i>	JQ993720	Estonia	2012
<i>Lecanora albescens</i>	JQ993727	Poland	2012
<i>Lecanora andrewii</i>	JQ993722	Estonia	2012
<i>Lecanora chlorophaodes</i>	AY398704	Sweden	2003
<i>Lecanora compallens</i>	MG076965	Netherlands	2017
<i>Lecanora compallens</i>	KY586037	Italy	2017
<i>Lecanora crenulata</i>	JQ993725	Poland	2012
<i>Lecanora dispersa</i>	JQ993734	Hungary	2012
<i>Lecanora dispersa</i>	JQ993733	—	2012
<i>Lecanora dispersa</i>	JQ993732	—	2012
<i>Lecanora epibryon</i>	AY541251	Austria	2004
<i>Lecanora epibryon</i>	KP314307	Svalbard	2014
<i>Lecanora flotowiana</i>	AF070034	—	1998
<i>Lecanora fuscobrunnea</i>	JN873872		
<i>Lecanora fuscobrunnea</i>	GU170840		
<i>Lecanora hagenii</i>	JQ993743	Estonia	2012
<i>Lecanora hagenii</i>	JQ993755	Slovakia	2012
<i>Lecanora intricata</i>	KY266975	Antarctica, Victoria Land	2012
<i>Lecanora intricata</i>	KY266891	Norway	2014
<i>Lecanora perpruinosa</i>	AF070025	—	1998
<i>Lecanora polytropa</i>	KP314461	Svalbard	2014
<i>Lecanora polytropa</i>	KP314458	Svalbard	2014
<i>Lecanora pringlei</i>	KF024740	USA	2013
<i>Lecanora pringlei</i>	KF024739	USA	2013
<i>Lecanora pruinosa</i>	JQ993740	Poland	2012
<i>Lecanora pruinosa</i>	AF070018	—	1998
<i>Lecanora reuteri</i>	AF070026	—	1998
<i>Lecanora reuteri</i>	JQ993741	Poland	2012
<i>Lecanora rupicola</i>	DQ451670	Spain	2007
<i>Lecanora rupicola</i>	DQ451669	Spain	2007
<i>Lecanora semipallida</i>	JQ993757	Hungary	2012
<i>Lecanora semipallida</i>	JQ993743	Estonia	2012
<i>Lecanora semipallida</i>	JQ993755	Slovakia	2012
<i>Lecanora solaris</i>	MH512983	Russia	2019

Species	GenBank Number (nrITS)	Country	Year
<i>Lecanora solaris</i>	MH512984	Russia	2019
<i>Lecanora strobilina</i>	MG973236	Spain	2018
<i>Lecanora strobilina</i>	MG973237	Spain	2018
<i>Lecanora strobilinoidea</i>	MG973239	Spain	2018
<i>Lecanora strobilinoidea</i>	MG973238	Spain	2018
<i>Umbilicaria antarctica</i>	AY603128	Antarctica, Lagoon Island	2004
Species	GenBank Number (mtSSU)	Country	Year
JR 0.230	MZ502369	Antarctica, James Ross Island	2021
JR 0.270	MZ502367	Antarctica, James Ross Island	2021
<i>Lecanora achariana</i>	DQ972976	—	2006
<i>Lecanora alaskensis</i>	MN508326	USA	2020
<i>Lecanora albella</i>	KY502430	Austria	2017
<i>Lecanora alboflavida</i>	KY502429	United Kingdom	2017
<i>Lecanora allophana</i>	KY502459	Albania	2017
<i>Lecanora anakeestiicola</i>	KP224472	USA	2015
<i>Lecanora argopholis</i>	MK693684	Ukraine	2019
<i>Lecanora baekdudaeganensis</i>	MN879871	Korea	2020
<i>Lecanora caesiorubella</i>	JQ782667	Australia	2012
<i>Lecanora californica</i>	JQ782668	USA	2012
<i>Lecanora campestris</i>	DQ787362	Sweden	2007
<i>Lecanora caperatica</i>	MH700565	USA	2018
<i>Lecanora caperatica</i>	MH700566	USA	2018
<i>Lecanora carpinea</i>	MK778533	Russia	2019
<i>Lecanora carpinea</i>	MK693683	Ukraine	2019
<i>Lecanora cenisia</i>	KY502426	Romania	2017
<i>Lecanora chlarotera</i>	KY502422	Czech Republic	2017
<i>Lecanora chondroderma</i>	MN192156	China	2019
<i>Lecanora cinereofusca</i>	KP224465	USA	2014
<i>Lecanora darlingiae</i>	MH481360	USA	2019
<i>Lecanora ecorticata</i>	KT962184	United Kingdom	2015
<i>Lecanora elatinoides</i>	JQ782669	Australia	2012
<i>Lecanora excludens</i>	MK541649	Norway	2019
<i>Lecanora exspersa</i>	KY502452	Slovakia	2017
<i>Lecanora farinaria</i>	KY502433	Norway	2017
<i>Lecanora flavopallida</i>	JQ782674	Australia	2012
<i>Lecanora formosa</i>	KT453820	China	2015

Species	GenBank Number (mtSSU)	Country	Year
<i>Lecanora fuscobrunnea</i>	MN023037	Antarctica, Victoria Land	2019
<i>Lecanora gangaleoides</i>	JQ782676	USA	2012
<i>Lecanora glabrata</i>	DQ787360	Sweden	2007
<i>Lecanora helva</i>	JQ782680	Thailand	2012
<i>Lecanora horiza</i>	KT453821	Spain	2015
<i>Lecanora hybocarpa</i>	DQ912273	—	2006
<i>Lecanora hybocarpa</i>	EF105417	Spain	2007
<i>Lecanora impudens</i>	KY502458	Czech Republic	2017
<i>Lecanora intricata</i>	DQ787346	Austria	2007
<i>Lecanora intumescens</i>	KY502443	Ukraine	2017
<i>Lecanora kenyana</i>	JQ900616	Kenya	2012
<i>Lecanora layana</i>	KR094858	USA	2015
<i>Lecanora layana</i>	KR094857	USA	2015
<i>Lecanora leproplaca</i>	JQ782684	Fiji	2012
<i>Lecanora leprosa</i>	JQ782685	Thailand	2012
<i>Lecanora leptacina</i>	MN508273	USA	2019
<i>Lecanora leptyroides</i>	MK778538	Russia	2019
<i>Lecanora muralis</i>	HQ660556	Germany	2010
<i>Lecanora novomexicana</i>	KT453824	USA	2015
<i>Lecanora orientoafricana</i>	JQ900617	Kenya	2012
<i>Lecanora pachyphylla</i>	MN192153	China	2019
<i>Lecanora pacifica</i>	JQ782686	USA	2012
<i>Lecanora paramerae</i>	EF105418	Spain	2007
<i>Lecanora perpruinosa</i>	DQ787344	Austria	2007
<i>Lecanora phaeocardia</i>	JQ782687	Thailand	2012
<i>Lecanora polytropa</i>	DQ986807	—	2006
<i>Lecanora polytropa</i>	DQ787348	Austria	2007
<i>Lecanora pseudistera</i>	MK693685	China	2019
<i>Lecanora pulicaris</i>	MK778542	Russia	2019
<i>Lecanora queenslandica</i>	JQ782692	Australia	2012
<i>Lecanora saxigena</i>	KP224461	USA	2014
<i>Lecanora schofieldii</i>	MN508274	USA	2020
<i>Lecanora solaris</i>	MH520111	Russia	2019
<i>Lecanora somervellii</i>	MH520114	Russia	2019
<i>Lecanora strobilina</i>	KJ766420	—	2006
<i>Lecanora subimmersens</i>	JQ782696	Thailand	2012
<i>Lecanora subimmersa</i>	JQ782697		
<i>Lecanora substerilis</i>	KY502449	Australia	2012

Species	GenBank Number (mtSSU)	Country	Year
<i>Lecanora sulphurea</i>	DQ797356	Ukraine	2017
<i>Lecanora symmicta</i>	KJ152466	Germany	2014
<i>Lecanora symmicta</i>	KJ766421	—	2006
<i>Lecanora thysanophora</i>	KY502440	Czech Republic	2014
<i>Lecanora tropica</i>	JQ782699	Thailand	2012
<i>Lecanora vainioi</i>	JQ782702	Thailand	2012
<i>Lecanora variolascens</i>	KY502445	Austria	2017
<i>Lecanora wilsonii</i>	JQ782703	Australia	2012
<i>Umbilicaria antarctica</i>	AY603139	Antarctica, Lagoon Island	2004
<i>Lecidea</i>			
Species	GenBank Number (nrITS)	Country	Year
JR 0.001	MZ502279	Antarctica, James Ross Island	2021
JR 0.007	MZ502322	Antarctica, James Ross Island	2021
JR 0.109	MZ502373	Antarctica, James Ross Island	2021
JR 0.176	MZ502371	Antarctica, James Ross Island	2021
JR 0.260	MZ502375	Antarctica, James Ross Island	2021
JR 0.269	MZ502377	Antarctica, James Ross Island	2021
<i>Lecidea aglaea</i>	JN009719	Sweden	2011
<i>Lecidea aglaea</i>	KR303636	—	2015
<i>Lecidea albohyalina</i>	KF650950	Sweden	2014
<i>Lecidea andersonii</i>	MK970673	Antarctica, Victoria Land	2019
<i>Lecidea andersonii</i>	MK620084	Antarctica, Dronning Maud Land	2019
<i>Lecidea atrobrunnea</i>	MK620265	Svalbard	2019
<i>Lecidea atrobrunnea</i>	MK620240	Argentina	2019
<i>Lecidea auriculata</i>	MK620246	Argentina	2019
<i>Lecidea cancriformis</i>	MK620205	Argentina	2019
<i>Lecidea confluens</i>	EU263921	Austria	2010
<i>Lecidea fuscoatra</i>	HQ650707	—	2011
<i>Lecidea fuscoatra</i>	HQ650662	—	2011
<i>Lecidea fuscoatrina</i>	MK591838	China	2019
<i>Lecidea kalbii</i>	MK620199	Argentina	2019
<i>Lecidea lapicida</i>	HQ650665	—	2011
<i>Lecidea leprarioides</i>	HQ650666	—	2011
<i>Lecidea leucothallina</i>	MG968261		
<i>Lecidea lithophila</i>	MK620247	Norway	2019
<i>Lecidea lithophila</i>	MK620090	Austria	2019

Species	GenBank Number (nrITS)	Country	Year
<i>Lecidea medusula</i>	MK620251	Austria	2019
<i>Lecidea medusula</i>	MK620270	Norway	2019
<i>Lecidea nylanderii</i>	HQ650667	—	2011
<i>Lecidea obluridata</i>	GU074423	Austria	2009
<i>Lecidea perlatolica</i>	MK595453	China	2019
<i>Lecidea plana</i>	EU259904	Sweden	2007
<i>Lecidea polypycnidophora</i>	EU257682	Antarctica, Victoria Land	2007
<i>Lecidea polypycnidophora</i>	EU257681	Antarctica, Victoria Land	2007
<i>Lecidea polytrichina</i>	HQ650668	—	2011
<i>Lecidea promiscens</i>	MK620212	Argentina	2019
<i>Lecidea protabacina</i>	KY800506	USA	2017
<i>Lecidea pullata</i>	HQ650669	—	2011
<i>Lecidea roseotincta</i>	HQ650670	—	2011
<i>Lecidea rubrocastanea</i>	EF495166	USA	2017
<i>Lecidea silacea</i>	MK620077	Canada	2019
<i>Lecidea silacea</i>	MK620629	Canada	2019
<i>Lecidea silacea</i>	MK620249	Austria	2019
<i>Lecidea</i> sp.	MK620097	Antarctica, Victoria Land	2019
<i>Lecidea sphaerella</i>	KF650952	Czech Republic	2014
<i>Lecidea sphaerella</i>	AM292702	—	2007
<i>Lecidea swartzioidea</i>	MK620260	Austria	2019
<i>Lecidea tessellata</i>	MH794139	China	2017
<i>Lecidea tessellata</i>	MH794140	China	2017
<i>Lecidea uniformis</i>	KY800508	USA	2017
<i>Lecidea uniformis</i>	KY800507	USA	2017
<i>Lecidea uniformis</i>	NR158514	USA	2017
<i>Lecidea violascens</i>	KY800510	USA	2017
<i>Rhizoplaca parilis</i>	MN764276	—	2020
Species	GenBank Number (mtSSU)	Country	Year
JR 0.001	MZ502302	Antarctica, James Ross Island	2021
JR 0.007	MZ502323	Antarctica, James Ross Island	2021
JR 0.109	MZ502324	Antarctica, James Ross Island	2021
JR 0.260	MZ502375	Antarctica, James Ross Island	2021
<i>Lecidea andersonii</i>	GU074470	Antarctica, Dronning Maud Land	2010
<i>Lecidea andersonii</i>	GU074469	Antarctica, Dronning Maud Land	2010
<i>Lecidea atrobrunnea</i>	MK684659	Argentina	2019

Species	GenBank Number (mtSSU)	Country	Year
<i>Lecidea atrobrunnea</i>	MK591146	China	2019
<i>Lecidea atrobrunnea</i>	GU074510	Greenland	2010
<i>Lecidea atrobrunnea</i>	GU074509	Antarctica, South Shetland Islands	2010
<i>Lecidea atrobrunnea</i>	HQ660560	Canada	2011
<i>Lecidea auriculata</i>	HQ660561	USA	2011
<i>Lecidea auriculata</i>	GU074500	Sweden	2010
<i>Lecidea berengeriana</i>	HQ660562	Sweden	2011
<i>Lecidea cancriformis</i>	GU074488	Antarctica, Ross Dependency	2010
<i>Lecidea cancriformis</i>	GU074487	Antarctica, Ross Dependency	2010
<i>Lecidea cancriformis</i>	MN023046	Antarctica, Victoria Land	2019
<i>Lecidea cancriformis</i>	GU074489	Antarctica, Ross Dependency	2010
<i>Lecidea albohyalina</i>	KF662399	Czech Republic	2014
<i>Lecidea confluens</i>	GU074492	Austria	2010
<i>Lecidea diapensiae</i>	HQ660564	Sweden	2011
<i>Lecidea floridensis</i>	HQ660565	USA	2011
<i>Lecidea fuscoatra</i>	HQ660566	Sweden	2011
<i>Lecidea fuscoatra</i>	DQ912275	Austria	2006
<i>Lecidea fuscoatra</i>	GU074490	Sweden	2010
<i>Lecidea fuscoatra</i> var. <i>grisella</i>	HQ660567	Austria	2011
<i>Lecidea haematites</i>	EU075529	Brazil	2008
<i>Lecidea hoganii</i>	KR055656	USA	2015
<i>Lecidea hypopta</i>	FJ644537	USA	2009
<i>Lecidea laboriosa</i>	GU074503	USA	2010
<i>Lecidea laboriosa</i>	DQ986882	—	2006
<i>Lecidea lapicida</i>	MK684635	Argentina	2020
<i>Lecidea lapicida</i>	HQ660570	Canada	2011
<i>Lecidea lapicida</i> var. <i>lapicida</i>	GU074493	Austria	2010
<i>Lecidea lapicida</i> var. <i>pantherina</i>	GU074494	Austria	2010
<i>Lecidea leprarioides</i>	HQ660571	Norway	2011
<i>Lecidea lithophila</i>	MK684743	Austria	2019
<i>Lecidea medusula</i>	MK684707	Argentina	2019
<i>Lecidea nylanderii</i>	HQ660572	USA	2011
<i>Lecidea obluridata</i>	GU074495	Austria	2010
<i>Lecidea plana</i>	GU074498	Sweden	2010
<i>Lecidea plana</i>	GU074497	Sweden	2010
<i>Lecidea plana</i>	KF683103	USA	2014
<i>Lecidea polypycnidophora</i>	GU074474	Antarctica, Mac Robertson Island	2010
<i>Lecidea polypycnidophora</i>	GU074473	Antarctica, Victoria Land	2010

Species	GenBank Number (mtSSU)	Country	Year
<i>Lecidea polytrichina</i>	HQ660573	Sweden	2011
<i>Lecidea pullata</i>	HQ660574	Norway	2011
<i>Lecidea roseotincta</i>	HQ660575	Norway	2011
<i>Lecidea roseotincta</i>	KY123745	USA	2016
<i>Lecidea sanguineoatra</i>	AY762094	Norway	2008
<i>Lecidea silacea</i>	GU074496	Austria	2010
<i>Lecidea silacea</i>	AY756402	Sweden	2008
<i>Lecidea silacea</i>	DQ986878	—	2006
<i>Lecidea sphaerella</i>	KF662400	Czech Republic	2014
<i>Lecidea tessellata</i>	HQ660576	USA	2011
<i>Lecidea tessellata</i>	GU074491	Austria	2010
<i>Lecidea tessellata</i>	MK684698	Argentina	2019
<i>Lecidea tessellata</i>	MK684668	Argentina	2019
<i>Lecidea tessellata</i>	MK684667	Argentina	2019
<i>Lecidea tessellata</i>	KR055661	USA	2015
<i>Lecidea turgidula</i>	AY567788	Sweden	2005
<i>Lecidea turgidula</i>	KJ766424	—	2014
<i>Lecidea sphaerella</i>	AM292749	Slovakia	2007
<i>Rhizoplaca parilis</i>	KT453859	USA	2015
Species	GenBank Number (RPB1)	Country	Year
JR 0.001	MZ515495 (submitted to GenBank)	Antarctica, James Ross Island	2021
JR 0.007	MZ515496 (submitted to GenBank)	Antarctica, James Ross Island	2021
JR 0.109	MZ515497 (submitted to GenBank)	Antarctica, James Ross Island	2021
<i>Lecidea andersonii</i>	MN023060	Antarctica, Victoria Land	2019
<i>Lecidea andersonii</i>	MK684915	Svalbard	2019
<i>Lecidea atrobrunnea</i> subsp. <i>saxosa</i>	MK684918	USA	2019
<i>Lecidea atrobrunnea</i> subsp. <i>stictica</i>	MK684908	Austria	2019
<i>Lecidea auriculata</i>	MK685036	Argentina	2019
<i>Lecidea auriculata</i>	MK685025	Argentina	2019
<i>Lecidea auriculata</i>	MK685012	Argentina	2019
<i>Lecidea auriculata</i>	MK684989	Argentina	2019
<i>Lecidea cancriformis</i>	MN023058	Antarctica, Victoria Land	2019
<i>Lecidea cancriformis</i>	MK684914	Antarctica, Victoria Land	2019
<i>Lecidea cancriformis</i>	MN023057	Antarctica, Victoria Land	2019
<i>Lecidea cancriformis</i>	MN023056	Antarctica, Victoria Land	2019
<i>Lecidea cancriformis</i>	MN023059	Antarctica, Victoria Land	2019

Species	GenBank Number (RPB1)	Country	Year
<i>Lecidea fuscoatra</i>	AY756408	Sweden	2019
<i>Lecidea fuscoatra</i>	MK684909	Austria	2019
<i>Lecidea fuscoatra</i> var. <i>grisella</i>	KF683115	Scotland	2014
<i>Lecidea fuscoatrina</i>	MK684919	USA	2019
<i>Lecidea kalbii</i>	MK684992	Argentina	2019
<i>Lecidea kalbii</i>	MK684994	Argentina	2019
<i>Lecidea laboriosa</i>	DQ986821	—	2006
<i>Lecidea laboriosa</i>	MK684890	USA	2019
<i>Lecidea lapicida</i> var. <i>lapicida</i>	MK684910	Austria	2019
<i>Lecidea lithophila</i>	MK685037	Austria	2019
<i>Lecidea medusula</i>	MK684946	Argentina	2019
<i>Lecidea medusula</i>	MK684923	Argentina	2019
<i>Lecidea plana</i>	MK684895	Sweden	2019
<i>Lecidea plana</i>	KF683116	USA	2013
<i>Lecidea plana</i>	MK684896	Sweden	2019
<i>Lecidea polypycnidophora</i>	MN023061	Antarctica, Victoria Land	2019
<i>Lecidea polypycnidophora</i>	MK684897	Antarctica, Mac Robertson Land	2019
<i>Lecidea promiscens</i>	MK685015	Argentina	2019
<i>Lecidea silacea</i>	DQ986820	—	2006
<i>Lecidea silacea</i>	AY756409	—	2006
<i>Lecidea tessellata</i>	MK684996	Argentina	2019
<i>Lecidea tessellata</i>	MK684971	Argentina	2019
<i>Lecidea tessellata</i>	MK684970	Argentina	2019
<i>Lecidea tessellata</i>	MK684894	Austria	2019
<i>Rhizoplaca parilis</i>	KU935393	USA	2016