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Publication Information
McCune, Bruce; Arup, Ulf; Breuss, Othmar; Di Meglio, Elisa; Di Meglio, Joseph; Esslinger, Theodore L.; . . . and Walton, James. "Biodiversity and Ecology of Lichens of Kenai Fjords National Park, Alaska". Plant and Fungal Systematics, 65(2), 586-619. https://doi.org/10.35535/pfsyst-2020-0032

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Biodiversity and ecology of lichens of Kenai Fjords National Park, Alaska

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Abstract. We inventoried lichens in Kenai Fjords National Park in Alaska, USA. We assembled the known information on occurrence and ecology of lichens in this park by combining field, herbarium, and literature studies. Our results provide baseline data on lichen occurrence that may be used in resource condition assessments, vulnerability assessments, long-term ecological monitoring, and resource management. We report a total of 616 taxa of lichenized fungi from the Park, plus an additional five subspecies and three varieties, all of which are new additions to the National Park Service database for this park unit. An additional five species of nonlichenized lichenicolous fungi are reported here. Eight non-lichenized fungi that are traditionally treated with lichens are also included, most of these associated with bark of particular host species. Four taxa new to North America are reported here (Arctomia delicatula var. acutior, Aspicilia dudinensis, Myriospora myochroa, and Ochrolechia bahusiensis), along with 44 species new to Alaska. Numerous species have been confirmed using ITS barcoding sequences. Also several records assigned to the genus level are reported, many of those are likely new species.

Key words: biological inventory, Kenai Peninsula, lichenized fungi, North America

Introduction

Lichens are a major component of the biodiversity and function of high latitude ecosystems. Lichens are highly sensitive to environmental conditions, including airborne contaminants, substrate chemistry, and climate (Root et al. 2014). Such attributes make them useful indicators of species richness (Bergamini et al. 2005) and air quality, including the estimation of critical loads (Geiser & Neitlich 2007; Geiser et al. 2010). Although an ecologically important and conspicuous component of the vegetation in Alaska (e.g., Joly et al. 2003; Nelson et al. 2013, 2015), lichens are a poorly known component of Kenai Fjords National Park (KEFJ or ‘Kenai Fjords’). Located in the northern Gulf of Alaska, in western Prince William Sound, this park is managed by the National Park Service (NPS). Ecosystems in this region of south-central Alaska face an uncertain future of climate change effects, including effects on forest and riparian health (Werner et al. 2006; Ruess et al. 2009; Sherriff et al. 2011) and potential new resource development (Montgomery et al. 2003; Szumigala et al. 2010; Hite & Stone 2013). In Kenai Fjords, gold was discovered in 1918 in areas that would later become park land (Lanik et al. 2018). Mining activity, centered primarily on the Nuka Bay historic mining district, peaked in the 1930s (Richter 1970). The effects of mining are still felt today, and include both the mitigation of abandoned mines on park land, and the potential for future mineral development on non-federally owned lands (inholdings) within the park (Lanik et al. 2018). Documenting biodiversity is a first step in conserving biodiversity. This was the goal of this first comprehensive inventory of the lichens of Kenai Fjords.
Krog (1968) sampled intensively in southeast Alaska and extreme western Alaska. She reported many interesting finds from the Aleutian Islands and the Bering Strait region, but made relatively few collections near Kenai Fjords and apparently none within the Park. The nearby sites that she visited were Marathon Mountain, west of Seward (elevations 62–900 m) and Seward, on the east and west sides of Resurrection Bay and in the forested area behind Seward Sanatorium, near sea level (Krog 1968, p. 27). Some of Krog’s collections from Alaska have not been accessioned or fully identified, but are stored in Oslo (O; E. Timdal pers. comm. 2016), so at present we cannot provide a full accounting of her specimens from near Seward. A partial database of her collections provided by Einar Timdal, however, shows 17 specimens from Marathon Mountain and 22 specimens from Seward, all macrolichens.

Walton et al. (2014) sampled epiphytic lichens in mature forest stands in Kenai Fjords National Park in 2012 and 2013 at 11, 0.38 ha plots (Appendix 2) using the standard Forest Inventory and Analysis protocol (USDA 2010). In addition, they collected specimens opportunistically in a range of other habitats and on other substrates. Their results have been summarized separately (92 lichen taxa; Walton et al. 2014), and the epiphyte data were included in studies of epiphytic lichen communities in relation to climate (Smith et al. 2017, 2020). We incorporated these plot records into our database and their findings are integrated with ours in this paper.

The most comprehensive studies of lichen diversity near Kenai Fjords National Park are McCune et al. (2018) from Katmai and Lake Clark National Parks, Spribille et al. (2010) from Klondike Gold Rush National Historic Park, and forthcoming studies from Glacier Bay National Park (Spribille et al. 2020). North and east of the study area Stehn et al. (2015) compiled a list of lichens of the Denali National Park region. In addition, Thomson (1984, 1997) included numerous records from the Kenai Peninsula, with some dots on his maps appearing near Seward. Farther south along the coast, Brodo and coauthors have critically examined numerous genera from Haida Gwaii in British Columbia (e.g., Brodo 1995, 2010; Brodo & Ahti 1996; Brodo & Santesson 1997).

We assembled a group of lichenologists to inventory lichens at Kenai Fjords National Park with the goals of (i) expanding the list of species known to occur in the park; (ii) compiling a reference collection of voucher specimens and associated habitat data; and (iii) compiling the associated geospatial data into a geodatabase.

Some of the results of this study have already been reported elsewhere (Fryday & Tønsberg 2015; Tønsberg 2016; Knudsen & Kocoureková 2017; McCune 2018; McCune et al. 2019) and more are forthcoming. The purpose of the current publication is to present a comprehensive treatment of the lichens of Kenai Fjords National Park, bridging a gap in our knowledge of the lichen flora in south-central Alaska.

Study area

Kenai Fjords National Park (Fig. 1) was established in 1980 through the Alaska National Interest Land Conservation Act (ANILCA) for the purpose of maintaining ‘unimpaired the scenic and environmental integrity of the Harding Icefield, its outflowing glaciers, and coastal fjords and islands in their natural state (ANILCA 1980). Situated on Alaska’s Kenai Peninsula, the park spans an area reaching from Resurrection Bay in the northeast to the Grewingk-Yalik Glacier Complex in the southwest. The Kenai Mountains form the western boundary of the park, with elevations ranging from sea level to 1996 m.

The climate is subpolar oceanic (Köppen-Geiger climate zone Cfc; Peel et al. 2007), implying a temperate climate without a dry season and with a cold summer. Only one long-term weather station exists near the Park, in the town of Seward, near sea level. Mean annual temperature at Seward, Alaska is 2.2°C, and total annual precipitation is 1712 mm (Seward 8 NW, AK, elevation 125 m; 1981–2010; https://www.ncdc.noaa.gov/enced-web/data/tools/normals).

The bedrock of Kenai Fjords consists primarily of the Valdez Group, consisting of Upper Cretaceous sandstone, siltstone, shale and minor conglomerate (Lanik et al. 2018). Areas of pillow basalt interbed with clastic sedimentary rocks. The southern and western portion of the park includes the McHugh Complex, consisting late Jurassic to Early Cretaceous rock, including greywacke, conglomerate, basalt, chert, gabbro, ultralutonic rocks (e.g., granite), and limestone (Lanik et al. 2018). Surficial rocks in the park are dominated by metamorphosed sedimentary and granitic rocks. Calcareous rocks are rare and inaccessible.

The park has experienced three major intervals of glacial expansion in the late Holocene. Glacial advances occurred 3,600 years BP, in 600 A.D., and during the Little Ice Age (1300–1850 A.D.; Calkin et al. 2001). As of 2005, glacier cover in the park was 2,074 km², roughly 1,800 km² of which was taken up by the Harding Icefield (Loso et al. 2014). Recent deglaciation has exposed large areas that have been colonized by tall shrubs, primarily Sitka alder (Alnus viridis ssp. sinuata) and willow (Salix sitchensis) (Boggs et al. 2008). Alpine tundra grows on the higher ice-free ridges, transitioning to ericaceous heaths and Tsuga mertensiana krummholz in the subalpine. Towering rock walls along the ocean are cut by steep chutes and fringed with mature Sitka spruce (Picea sitchensis) and/or mountain hemlock (Tsuga mertensiana), and tall shrubs. Steep-sided glacial valleys penetrate from the mountains to the sea. The cold, wet climate results without a dry season and with a cold summer.

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poplar (*Populus balsamifera*) in some riparian areas. The 1964, the Great Alaska Earthquake (magnitude 9.2) resulted in 1.0–2.5 m of subsidence along the Kenai Fjords coastline, along with numerous landslides, widespread flooding and salt water incursion into previously forested areas (Lanik et al. 2018). Dead standing trees (‘ghost forests’) now occupy low-lying areas in the North and West Arm of Nuka Bay (Beauty Bay) and in McCarty Fjord (James Lagoon). Low-elevation mature and old-growth coniferous forest covers roughly 16% of the park, while tall shrubs, primarily alder, occupy roughly one quarter of the landscape (Boggs et al. 2008).

**Materials and methods**

We evaluated existing collections by NPS personnel for Kenai Fjords and surroundings; identified habitat and taxon gaps in the data; and conducted field inventories to fill gaps. In addition, we reviewed the existing literature, and to the extent possible, the specimens supporting that literature. Although Kenai Fjords National Park is close to the city of Anchorage, most of it is inaccessible except by seaworthy boats and helicopter. The area of the Park close to the town of Seward probably has incidental collections by a number of lichenologists, though we have found only two of these by searching online collection databases. Near the town of Seward, only the Exit Glacier area is within the National Park. Indeed, that is the only area of the park that has frequent visitors.

We used subjective judgment to focus new surveys in areas where high diversity was expected. This method attempts to maximize rapid discovery of species diversity and is relatively cost-effective, but sacrifices park-level quantitative inference. Field observers and laboratory examiners included diverse taxonomic specialists in an effort to maximize the reliability and representativeness of important taxonomic groups. Data sources, including literature and new observations, are summarized in Table 1. Our sampling design met the following criteria: (i) sampling occurred across an elevation gradient, from sea level to alpine, (ii) sampling occurred in a range of habitats, and (iii) voucher specimens were collected at each site, except for common macrolichens, unless precluded by low population size. Geologic maps, landcover maps and satellite imagery were used to identify accessible areas meeting those criteria.
We chose to try to maximize species discovery rates rather than using a fixed area, fixed time, or otherwise equal effort among sites. The tradeoff for that choice is that the rigorous statistical comparisons of diversity are then impossible, because diversity estimates and community statistics are strongly affected by sample area and effort (e.g., McCune & Grace 2002, p. 27). While corrections to equal effort can be attempted, they all require tenuous assumptions with unknown effects on the conclusions.

In 2015, sites at Kenai Fjords (Appendix 1) were visited by boat by McCune, Rosentreter, Schultz, Tønsberg, and Walton. In addition, the team explored the Exit Glacier area near Seward by foot. Each collector focused on particular groups of lichens. Other authors contributed by examining specimens within their specialty. In addition to the sites visited by this group, we include many collections made by Walton and Hutten as part of their preliminary survey of lichens and bryophytes in the Park (Walton et al. 2014).

Locality information – Detailed locality information is given for the group sites (Appendix 1) and for specimens of particular interest. Other locality data are available from the first author or the NPS Southwest Alaska Network office in Anchorage (Park abbreviations: Table 2).

Abundance ratings – Abundance ratings are based on our experience and limited sampling. Abundance ratings are necessarily subjective and not given when there is little basis for doing so. For example, a single occurrence of an inconspicuous species may represent an overlooked common species or a truly rare species. The more conspicuous a species, the easier it is to state an abundance.

Noteworthy collections are listed individually. When one specimen is cited, all specimens of that species are cited, unless otherwise noted. When summarized verbally without citing individual specimens, we applied the following frequency classes:

- very common (> 40 collections)
- common (10–40 collections)
- occasional (3–9 collections)
- uncommon to rare (1–2 collections)

Supplemental data such as anatomical details are reported for collections where the additional information may be helpful in either confirming unusual records or where the observations conflict or augment existing descriptions.

Chemistry is reported when thin-layer chromatography (TLC) results were available and the information was considered significant by us, either in separating the species from its relatives, in validating the species report, or in supplementing the known information about a species. In general, TLC protocols followed methods of Culberson & Kristinsson (1970), Culberson (1972), and the later modification by Culberson & Johnson (1982). All three solvent systems were used (A, B’ and C) in most cases by Tønsberg. McCune used B’ and C for Lecideaceae s.l. and Cladonia, A and B’ for Umbilicaria, and A and C for most other genera.

DNA sequences were obtained for selected critical specimens and for many collections in particular groups, especially Lecideaceae, Teloschistaceae, Stereocaulon, and Umbilicaria. Various protocols were followed, differing by laboratory, as described in previous publications by various authors of this paper (e.g., Arup et al. 2015; Miadlikowska et al. 2018; McCune et al. 2019).

In each case where we report DNA sequences, the following procedure was generally used (with some variations) to place our specimens into the context of existing sequences. After an initial comparison with existing sequences using BLASTn, we created an alignment containing our new sequences and relevant existing sequences and several outgroup sequences. Sequences were aligned with MAFFT in Geneious (Kearse et al. 2012) using default settings (Auto algorithm selection), then adjusted manually when necessary. We then constructed phylogenetic trees, initially with neighbor joining methods to help refine the selection of sequences, then realignment and maximum likelihood analysis with 500 or 1000 bootstrap runs with the PhyML plugin (Guindon et al. 2010) to Geneious. We used PhyML with default settings.

### Table 1. Lichen data sources for Kenai Fjords National Park. Numbers of collections include only those identified to species. Appendix 2 lists the number of collections by each collector in the park. No prior records existed in NPLichen and NPSpecies databases (Bennett & Wetmore 2005; IRMA 2017).

| Source | Collections | Identified by | Notes |
|--------|-------------|---------------|-------|
| Lichen team, 2015 and 2016 | 1900 | Group Walton, Hutten | Access database for all new observations transferred to NPS |
| NPS FIA-style plots and associated incidental observations | 382 | Walton, Hutten | NPS plot contributions to data set for Smith et al. (2017, 2019); includes primarily epiphytic macrolichens in 0.38 hectare circular plots. |
| NPS nunatak monitoring (Miller et al. 2006, App. 1) | 24 | T. Goward & C. Björk | Specimens entered in database, but not seen by us. Vouchers in ALA |
| Consortium of North American Lichen Herbaria (CNALH) | 2 | Barbara Lachelt | No prior records with ‘Kenai Fjords’ in the locality field; two records with ‘Exit Glacier’ (accessed July 2017) |
| **Totals** | **2398** | | |

### Table 2. Abbreviations of commonly used references.

| Abbreviation | Reference |
|--------------|-----------|
| FIA | Forest Inventory and Analysis, plots installed by James Walton and Martin Hutten in 2012 |
| Katmai | Katmai National Park and Preserve |
| Kenai Fjords | Kenai Fjords National Park |
| Lake Clark | Lake Clark National Park and Preserve |
| NPLichen | Database of lichens in the U.S. national parks (www.nbia.gov/nplichen; NPLichen 2011) |
| NPS | National Park Service |
settings and GTR model with optimizations for topology, length, and rate. We considered bootstrap values of 75% or better as a supported branch.

The primary set of voucher specimens is housed at the NPS herbarium in Anchorage and in Fairbanks, Alaska (ALA), with portions of the collection housed at institutional herbaria of the authors while still under study (usually by the collector) or through loan agreements between institutions and the NPS. Individual collections were compiled in a Microsoft Access database that was then imported and archived into the NPS database. These data are available from the NPS on request.

For the most part, generic placement follows the most recent North American checklist (Esslinger 2019). Exceptions include cetrarioid lichens (Divakar et al. 2017) and cases where generic splits are not well supported by the data, insufficiently studied, or where authors have treated only some of the species from our region, making our species difficult to assign to genera in a consistent way. In these incomplete cases, we have retained a broader generic concept. Examples include Aspicilia and its segregates Circinaria and Sagedia, Lecanora and its segregates including Glaucomaria, Lecanoropsis, Protoparmeliopsis, and parts of Teloschistacaeae. Verrucaria determinations are by Breuss unless otherwise noted.

In most cases, material identified only to genus or tentatively to genus is omitted from the following list. We do, however, include some relatively distinctive specimens that could not be assigned to species, hoping to improve the chance that they might be included in future treatments of the genus.

**Results and discussion**

We recorded a total of 625 taxa of lichenized fungi from within or immediately adjacent to Kenai Fjords National Park (Table 3). This total includes 617 lichenized species, plus an additional five subspecies and three varieties. We did not attempt to represent nonlichenized, lichenicolous fungi, but recorded five of those. An additional eight species are apparently nonlichenized and nonlichenicolous, but traditionally treated with lichens. Four records of lichens are questionable including historical reports where a formerly broad species concept has narrowed substantially, creating uncertainty for existing records from Kenai Fjords.

In addition to the reports from Kenai Fjords, we include in a separate section at the end of the list of taxa, supplemental information for 14 taxa from nearby Katmai and Lake Clark National Parks, beyond that provided by McCune et al. (2018).

One species, Acarospora toensbergii, was described from our collections in the study area as new (Knudsen & Kocourková 2017) and two, Biatora troendelagica and Jamesiella scotica, were reported as new to North America, in previous papers (Tønsberg 2016; Tønsberg & Printzen 2018).

**New to North America**

| Species                        |
|--------------------------------|
| Arctomia delicatula var. acutior |
| Aspicilia dudinensis           |
| Myriospora myochroa            |
| Ochrolechia bahusiensis        |

**New to Alaska**

Forty six species are new to Alaska, based on comparison of our results with an unpublished list for Alaska (Spribille et al. in prep.) and other recent publications not included in that compilation.

| Species                        |
|--------------------------------|
| Arthonia lapidicola            |
| Arthonia ruana                 |
| Aspicilia berntii              |
| Aspicilia intermutans          |
| Aspicilia laevata              |
| Aspicilia simoënsis            |
| Bacidia friesiana              |
| Bacidia scopulicola            |
| Bacidina inundata              |
| Biatora nobilis               |
| Chaenothecopsis debilis        |
| Cliostomum tenerum             |
| Cryptodiscus gloeocapsa        |
| Cryptothele permiscens         |
| Ephebe multispora              |
| Ephebe solida                  |
| Fuscopannaria aurita           |
| Fuscopannaria cheiroloba       |
| Gyalideopsis muscicola         |
| Halecania viridescens          |
| Lecanora aitema                |
| Lecanora stanislai             |
| Lecidea sarcogynoides          |
| Micarea anterior               |
| Micarea botryoides             |
| Moelleropsis nebulosa          |
| Phaeophyscia pusilloides       |
| Porpidia hydrophila            |
| Psilolechia leprosa            |

**Table 3.** Symbols and number of taxa reported for different kinds of records.

| Number of records | Symbol in list | Type of record                                                                 |
|-------------------|----------------|--------------------------------------------------------------------------------|
| 616               | none           | Lichenized, accepted name, accepted record from within or immediately adjacent  |
|                   |                | to Kenai Fjords National Park                                                  |
| 5                 | none           | Additional subspecies where two or more                                       |
|                   |                | from one species                                                               |
| 3                 | none           | Additional varieties where two or more                                         |
|                   |                | from one species                                                               |
| 5                 | †              | Nonlichenized, lichenicolous species                                           |
| 8                 | ††             | Nonlichenized, nonlichenicolous species, but traditionally treated with       |
|                   |                | lichens                                                                        |
| 2                 | ?              | Uncertain record                                                               |
| 2                 | ×              | Name valid, but probably not at Kenai Fjords                                   |
Pyrenopsis haemaleella
Pyrenopsis phaeococca
Pyrenopsis reducta
Pyrenopsis sanguinea
Racodium rupestrae
Rhizocarpon bolanderi
Rhizocarpon cinereonigrum
Rhizocarpon intersitum
Rhizocarpon subpostumum
Scytinium aquale
Scytinium tantale
Stenocybe pullatula
Thelotrema petractoides
Thelotrema suecicum
Verrucaria dolosa
Verrucaria florkeana

Rare species in Alaska

Of the 64 lichen species currently listed as “rare” by the Alaska Center for Conservation Science (AKNHP 2015), we found 20% (13) in Kenai Fjords National Park. The list clearly needs to be updated, based on much lichenological work in Alaska since the list was created. No federally listed lichens are present in Alaska, but we presume this reflects the difficulties of the federal listing process for lichens and our lack of information rather than the occurrence of rare lichens (Allen et al. 2019).

Potential factors influencing lichen biodiversity

Compared to the interior side of the Kenai Peninsula and to Katmai and Lake Clark National Parks, Kenai Fjords has a distinctly oceanic climate and a corresponding floristic composition. We recorded a lichen biota with a mix of arctic-alpine, boreal, and coastal elements. The Beringian element, which is evident on the Seward Peninsula and Aleutian Islands (e.g., Krog 1968; McCune 2008), was not found at Kenai Fjords.

Slope bogs with rock outcrops provide a distinctive habitat rich in lichen species. These support Tsuga mertensiana, ericaceous shrubs, and Sphagnum with boggy slopes and ledges. Moist organic mats are colonized by lichens such as Dibaeis baeomyces and many species of Cladonia.

Similar to Katmai and Lake Clark National Parks (McCune et al. 2018), alpine sites are species rich, but lack many genera or species associated with interior alpine sites, such as Dactylina, Hypogymnia, and Rinodina.

Nitrophilous species (e.g., Caloplaca, Polycalytrium, and Xanthoria) were sparse and very local, presumably associated with manuring by birds and other animals. We also encountered very few calciphiles, owing to the predominantly acidic rocks.

Much of the park has been heavily glaciated; in fact, much of the mountain mass is covered by a continuous ice sheet. The ice is penetrated by a number of nunataks (isolated peaks or ridge surrounded by extensive persistent icefield). Although access to these is very difficult, we did manage to sample two nunataks, as well as a few other subalpine and alpine sites. Whether or not these modern nunataks were ice free during the last glacial period is unknown. Vegetation sampling on modern nunataks (Miller et al. 2006) revealed a number of rare and disjunct vascular plant species. While that work listed a number of lichen species, it did not attempt a detailed inventory of lichens. In any event, we made an effort to include nunataks because of the possibility that they might be long-term refugia for alpine species. Given the uncertainties in the glacial history of the alpine sites and the small number that we visited, we cannot make firm conclusions regarding the biogeographic importance of nunataks, but we can say that numerous species were found at the alpine sites that were not recorded elsewhere, as described in the list of taxa.

Annotated list of taxa

The following list of taxa is annotated by substrate, frequency of occurrence, taxonomic notes, and type of record (Table 3).

**Acarospora toensbergii** B. Knudsen & Kocourk. – Exit Glacier Campground, near Exit Glacier Creek, on rock marking path between campsites, Tønsberg 45624 (holotype), Schulz 16936; near Harding Icefield Trail, ridge above Exit Glacier, alpine tundra with scattered low shrubs and metasedimentary outcrops, in rivulet on flushed boulders of metamorphic sedimentary rock, Schulz 16928 (HB). See Knudsen & Kocourková (2017).

†† **Agyrium rufum** (Pers.) Fr. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on decorticate Populus twigs, McCune 35957.

**Alectoria nigricans** (Ach.) Nyl. – National Park Service weather station, McArthur Ridge, on alpine sod, McCune 36984; rocky alpine tundra northeast of Coleman Bay, on mineral soil, Walton 19459; Skilak nunatak within Harding Icefield, on rock, McCune 36819, on moss over rock, McCune 36837b, 36838; on alpine sod, northwest slope, McCune 36846; Marathon Mt. (Krog 1968).

**Alectoria ochroleuca** (Hoffm.) A. Massal. – National Park Service weather station, McArthur Ridge, on soil, Walton 19465; Skilak nunatak within Harding Icefield, on moss over rock, McCune 36837a.

**Alectoria sarmentosa** (Ach.) Ach. – Common at low elevations on bark and wood of conifers, also on Alnus.

**Allantoparmelia alpicola** (Th. Fr.) Essl. – National Park Service weather station, McArthur Ridge, on rock, McCune 36953, 36978, Walton 19461.

**Allantoparmelia alpinella** (Vainio) Essl. – National Park Service weather station, McArthur Ridge, on mineral soil, Walton 19459; Skilak nunatak within Harding Icefield, on rock, dry talus, McCune 36824a, 36823, 36877.

**Ameleiella andreaeicola** Fryday & Coppins – Coleman Bay, above northeast end, off Aialik Bay, on thin layer of soil and on Andreaea on top of boulder, Tønsberg 45483; near Harding Icefield Trail, ridge above Exit Glacier, on Andreaea on boulder, Tønsberg 45590, 45572 (with Tingiopsis isidiatum), 45571a.

**Amygdalaria consentiens** (Nyl.) Hertel, Brodo & Mas. Inoue – Alpine lake system on Harris Peninsula, on rock, N-facing talus, McCune 37000 (unusual in being the stictic acid...
chemotype and in having reddish-brown apothecia; TLC and determination by I. M. Brodo, 2016).

**Amygdalaria continua** Brodo & Hertel – East side of Harris Bay, steep chasm, on granite, McCune 36245.

**Amygdalaria elegantior** (H. Magn.) Hertel & Brodo – Bear Glacier nunatak, on rock, McCune 36935; Harding Icefield Trail, lower slope, on rock, McCune 36479.

**Amygdalaria haidensis** Brodo & Hertel – East side of Harris Bay, steep chasm, on sheltered granite wall, McCune 36254.

**Amygdalaria panaeola** (Ach.) Hertel & Brodo – Harding Icefield Trail, lower slope, on rock, McCune 36480; National Park Service weather station, McArthur Ridge, on rock, McCune 36969; Skilak nunatak within Harding Icefield, on rock, dry talus, McCune 36820.

**Amygdalaria pelobothryon** (Wahlenb.) Norman – Occasional on rock in mesic habitats, often on shorelines.

**Amygdalaria subdissectens** (Nyl.) Mas. Inoue & Brodo – Alpine lake system on Harris Peninsula, on north-facing rock wall, McCune 37006.

**Arctotomiella var. acutior** (Nyl.) Hemsseen – Near mouth of creek at north end of James Lagoon, on Salix alaxensis, Schultz 16836, Tønsberg 45337; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus, McCune 33948; on sloping trunk of Alnus incana, Tønsberg 44993; on Alnus incana, Schultz 16697a; north of Exit Glacier Visitor Center, on trunk of Alnus in Populus grove, Tønsberg 45056 (with Tønsbergia leucococca); west shore of Beauty Bay, on wood, Rosentreter 19031; Verdant Cove, north side at shoreline, on moss on sloping face of boulder, Tønsberg 45447 (with Gyalideopsis musciicola). Ascospores needle-like, 51–63 × 3.5–4.5 µm, indistinctly 8-celled, no amyloid cap; proper exciple thin, composed of isodiametric cells; hymenium I+ blue. Specimens from (mossy) bark with oliveaceous colour and ascospores not exceeding 5 µm in width are formally referred to var. acutior. The taxonomic status of this variety and distinction from the typical variety are based on rather subtle differences in thallus colour, ascospore size, and substrate preference (Henssen 1969).

**Arctotarmelminia incuria** (Pers.) Hale – National Park Service weather station, McArthur Ridge, on rock, McCune 36967, Walton 19466.

**Arthonia spp.** – Numerous collections representing species other than those listed below are on loan to Curtis Björk. These collections are from bark of Alnus, Elliotia, Oplopanax, and Picea.

**Arthonia arthonioides** (Ach.) A. L. Sm. – Near pond at north end of Three Hole Bay off Aialik Bay, on Alnus, Schultz 16921c.

**Arthonia lapidicola** (Taylor) Branth & Rostrup – West shore of Beauty Bay, on noncalcareous metasedimentary rock, exposed, Schultz 16746a. Ascospores exclusively 2-celled, sulfofilar, 10–16 × 3.5–4.5 µm, asci broadly clavate, hymenium c. 35 µm high, upper hymenium and excipulum brownish, in KOH turning paler and dirty olive; photobiont chlorococcoid; morphology generally agreeing with published accounts (e.g., McCune 2017), though ascospores slightly narrower in this case. New to Alaska.

**Arthonia phaeobaea** (Norman) Norman – North arm of spit across James Lagoon, on rock, boulder on beach, McCune 36171, 36172, Schultz 16849b, 16847, 16846, 16851a.

**Arthonia ruana** A. Massal. – North of Harris Bay, near opening to Northwestern Lagoon, on Alnus bark, McCune 36214; North of Pilot Harbor on North Arm of Nuka Bay, on Alnus bark, McCune 36084.

† **Arthrorhaphis aeruginosa** R. Sant. & Tønsberg – Northeast end of Harris Bay, edge of estuary, on Cladonia growing on vertical, ± mossy wall of huge boulder, Tønsberg 45412.

**Arthrorhaphis alpina** (Schaerer) R. Sant. – Coleman Bay, above northeast end, off Aialik Bay, on the underside of rock, Rosentreter 19196.

**Arthrorhaphis citrinella** (Ach.) Poelt – National Park Service weather station, McArthur Ridge, on alpine sod, McCune 36961; peninsula into Three Hole Bay off Aialik Bay, on bryophytes over rock, McCune 36337; Skilak nunatak within Harding Icefield, on Placynthiella and tundra sod, McCune 36908 (sterile, ID uncertain).

**Aspicilia aquatica** Körber s.l. – Bay on east side and south end of McCarty Fjord, on granite, coastal rocks, exposed, Schultz 16809; Crater Bay off of Harris Bay, on rock, streamside granite, McCune 36264; Harding Icefield Trail, lower slope, on shaded rock, McCune 36458a.

**Aspicilia berntii** A. Nordin, Tibell & Owe-Larss. – Coleman Bay, above northeast end, off Aialik Bay, on rock, McCune 36300a.

**Aspicilia cinerea** (L.) Körber s.l. – Northeast end of Harris Bay, edge of estuary, on rock, McCune 36242 (sporaeim and ascospores not found).

**Aspicilia dudinensis** (H. Magn.) Oxner – North of Exit Glacier Visitor Center, on rock, semi-shaded boulder, McCune 36017. An ITS sequence (GenBank MN906265) places it with *A. dudinensis* from northern Sweden in phylogenetic analysis (T. Wheeler, unpubl. data). This rarely reported species, apparently new to North America, is included in keys by Foucard (2001, p. 81). He described it as follows: ‘Thallus pale to dark gray-brown (K ± yellow), to 10 cm, areolate (to 0.5 mm), very thin, fertile areoles to 0.3 mm thick. Apothecia to 0.5 mm, black with concave disc and dark gray edge. Exiciple to 50 µm, I+ dark blue. Hymenium 65–80(–100) µm. Paraphyses moniliform. Spires 15–18 × 8.5–11 µm. On crystalline slate. Torne Lappmark, very rare. Can be recognized by the elevated apothecia with concave disc and with an edge at least on the outside thallus colored.’ Our sequenced specimen has a pale whitish gray thallus that is deeply cracked-areolate, with somewhat raised apothecia like low volcanoes with slightly concave slopes. Fertile areoles have 1–4 blackish disks with a grayish excipular rings. Cortex POL–, medulla POL+, epithecium olive, POL–; paraphyses moniliform, ascospores small for *Aspicilia*, 15–17.5 × 9.5–11 µm, pycnidia not found; TLC: stictic acid (minor).

**Aspicilia gibbosa** (Ach.) A. Nordin, S. Savić & Tibell – Near Harding Icefield Trail en route to high cliffs, on rock, Rosentreter 19239.

**Aspicilia aff. indissimilis** (H. Magn.) Räsänen – Exit Glacier Campground, near Exit Glacier Creek, on rock, river cobble, McCune 36431; north of Exit Glacier Visitor Center, on rock, shaded boulder in woods, McCune 36003. ITS sequences for both specimens (GenBank MN906277, MN906264) fell in phylogenetic tree in an unnamed clade near *A. indissimilis* (T. Wheeler, unpubl.).

**Aspicilia aff. intermutans** (Nyl.) Arnold – Exit Glacier Campground, near Exit Glacier Creek, on cobble, McCune 36432; ascospores too large for *A. cinerea*; spermatia not found; an ITS sequence for this specimen (GenBank MN906278) and for ‘*Aspicilia cf. intermutans*’ from Katmai National Park (34103, McCune et al. 2018), fell near *Aspicilia epipylota* in phylogenetic analysis (T. Wheeler, unpubl.).

**Aspicilia laeava** (Ach.) Arnold – Crater Bay off of Harris Bay, on granite, upland, McCune 36268.
Aspicilia simoënsis Räsänen – Harding Icefield Trail, lower slope, on rock, McCune 36482 (mature apothecia and spermatia not found; thallus granular sorediate). An ITS sequence places the specimen with A. simoënsis in phylogenetic analysis (T. Wheeler, unpubl.).

Aspilidium myriini (Fr.) Hafellner. – Bay on east side and south end of McCarty Fjord, on exposed coastal granite, Schultz 16813. Thallus pale grayish-cream, K+ red needles, ephymenium olivaceous, HCl+ greenish, ascospores 19–23 × 11–12 µm, apothecia black, immersed, eventually fusing and up to 2 mm, disc then roughened.

Athallia holocarpa (Hoffmann) Arup, Frödén & Søchting – Northeast end of Harris Bay, edge of estuary, on rock, McCune 36228.

Athallia pyracea (Ah.) Arup, Frödén & Sochting – North arm of spit across James Lagoon, on Picea twig, McCune 36160.

Bacidia arceutina (Ah.) Arnold – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus incana, Schultz 16698a (with Stenocybe pullatula).

Bacidia circumspecta (Nyel. ex Vainio) Malme – Near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36146; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35977c.

Bacidia friesiana (Hepp) Körber – Near mouth of creek at north end of James Lagoon, on bark, Rosentretter 19090 (det. McCune); west shore of Beauty Bay, on Sambucus in beach meadow, Tønsberg 45096 (det. Ekman & Tønsberg).

Bacidia scopulicola (Nyel.) A. L. Sm. – West shore of Beauty Bay, on noncalcareous metasedimentary rock, steep, shaded, Schultz 16747.

Bacidia subincompta (Nyel.) Arnold – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35952, 35946; Schultz 16713.

Bacidia sp. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35977a. Apothecia reddish-brown to dark brown, emerging from a brown-black gelatinous crust; exciple edge orange brown, radiate, section POL--; ephymenium orange brown, K-- darkening; hypothecium hyaline to faintly brownish; paraphyses sparingly branched; ascospores strongly sigmoid, 7–8-septate, 34–35 × 2.5 µm, spiraled in the ascus; growing with Stenocybe pullatula and Bacidia circumspecta. The ascospores are much like those of Scolicosporum unbrinum (McCune 2017), but the deep reddish-brown pigments in the apotheciae are unlike that species.

Bacidia inunodata (Fr.) Vězda – North of Pilot Harbor on North Arm of Nuka Bay, on creekside rock, McCune 36089a.

Baemomyces rufus (Hudson) Rebent. Occasional on moss and soil over rock, stabilized sand, and alpine sod, Tønsberg 45408, McCune 36995. TLC: stictic acid with satellites; in some paraphyses tips strongly thickened; uppermost excipular hyphae with isodiametric cells; ascospores 0–1-septate, 9.5–14.5 × 2.5–5 µm.

Bellemerea alpina (Sommerf.) Clauzade & Cl. Roux – Exit Glacier Campground, near Exit Glacier Creek, on rock, river cobbles, McCune 36426; near Harding Icefield Trail, ridge above Exit Glacier, on rock, McCune 36376.

Bellemerea cinereoerufescens (Ah.) Clauzade & Cl. Roux – Skilak nunatak within Harding Icefield, on rock, dry talus slope, McCune 36879.

Bellemerea subsorediza (Lyng) R. Sant. – Bear Glacier nunatak, on rock, McCune 36930; near Harding Icefield Trail, ridge above Exit Glacier, on rock, McCune 36406, Tønsberg 45566, 45570 (TLC: norstictic (major) and connorstictic acids, probable zeorin); Skilak nunatak within Harding Icefield, on rock on ridge, McCune 36903.

Biotarea alaskana Printzen & Tønsberg – West shore of Beauty Bay, on bryophytes on Alnus, McCune 36047 (ITS sequence, GenBank MN906267); near mouth of creek at north end of James Lagoon, on moss on Salix alaxensis, Schultz 16838. The ITS sequence for McCune 36047 differs in two and three positions from the two existing sequences for this taxon in GenBank (KF650957, KF650958).

Biotarea albohyalina (Nyel.) Bagl. & Carestia – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Salix, Tønsberg 45202b (with Caloplaica atro-sanguinea); on trunks of Alnus incana, Tønsberg 44926 (pycnidia present but no apothecia; conidia to 56 × 2 µm). North of Exit Glacier Visitor Center, on Salix, Tønsberg 45035, 45036; on base of Oplopanax horridus, Tønsberg 45041.

Biotarea beckhausii (Körber) Tuck. – Near mouth of creek at north end of James Lagoon, on wood, exposed snag, Schultz 16820. Thallus whitish; apothecia blackish, strongly convex, exciple distinct below, ephymenium dirty grayish brown, C--; spores needle-like, septate, −16 × 1.5–2 µm; subhymenium very thick, hyaline; algal cells large.

Biotarea efflorescens (Hedl.) Räsänen – Occasional on Alnus and Picea. TLC: argopsin (major), norargopsin.

Biotarea ementiens (Nyel.) Printzen – Skilak nunatak, on alpine sod in damp depression, McCune 36854. The ITS sequence of this blue-gray sterile crust (GenBank MN906282) differed in 12 positions from sequence of Kanz & Printzen 5440 (BG) (GenBank KF650962). These two specimens comprised a clade with 100% bootstrap support with no supported sister relationships (McCune, maximum likelihood analysis).

Biotarea flavopunctata (Tønsberg) Hinteregger & Printzen – Exit Glacier Campground, near Exit Glacier Creek, on Alnus viridis, Tønsberg 45608.

Biotarea hypophaea Printzen & Tønsberg – Near North Arm Nuka Bay Public Use Cabin, on twigs on Picea stichensis at forest edge, Tønsberg 45182; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44958; north of Exit Glacier Visitor Center, on trunk of Alnus, Tønsberg 45059. TLC: argopsin.

Biotarea kodiakensis Printzen & Tønsberg – Common on wood and bark or moss over those substrates.

Biotarea meiocarpa (Nyel.) Arnold – Near Harding Icefield Trail, ridge above Exit Glacier, on soil in snowbed, Tønsberg 45579. TLC: nil; thallus greyish white, apothecia brown; some paraphyses tips strongly thickened; uppermost excipular hyphae with isodiametric cells; ascospores 0–1-septate, 9.5–14.5 × 2.5–5 µm.

Biotarea meiocarpa var. taconensis (Printzen & Tønsberg) Printzen & Tønsberg – West of Resurrection River and north of Exit Glacier Road, on Populus balsamifera, mossy mid trunk, on bark but also creeping onto epiphytic mosses, Schultz 16959 (ascospores simple, ellipsoid, 11.5–14 × 4.5–5.5 µm, paraphyses tips distinctly widened, excipular hyphae lumina widened); near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus balsamifera, Schultz 16714.

Biotarea nobilis Printzen & Tønsberg – Near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36139a; west shore of Beauty Bay, on Picea twig, McCune 36041.

Biotarea pallens (Kullhm) Printzen – West of Resurrection River and north of Exit Glacier Road, on trunk of dead Alnus incana, Tønsberg 45667b, on live Alnus, Tønsberg 45638a. Apothecia minute (to 0.2 mm diam.), pale, pruinose, aggregated; ascospores 3-septate, 12–16 × 2–3 µm.
Biotora rufidula (Graewe) S. Ekman & Printzen – North arm of spit across James Lagoon, on moss at base of Picea sitchensis on exposed knob for the most part surrounded by sea, Tønsberg 45371.

Biotora subduplex (Nyl.) Printzen – North arm of spit across James Lagoon, on branch of Picea sitchensis on exposed knob, Tønsberg 45357; peninsula into Three Hole Bay off Aialik Bay, on Tsuga, McCune 36438; west of Resurrection River and north of Exit Glacier Road, on Populus bark, McCune 36488, Schultz 16958d.

Biotora toensbergii Holien & Printzen – Occasional on Alnus bark, less often on Salix. TLC: argopsin.

Biotora troendelagica Holien & Printzen – Peninsula into Three Hole Bay off Aialik Bay, on wood, twig of dwarf Tsuga mertensiana, Tønsberg 45500; Verdant Cove, north side at shoreline, on wood, snag of Picea sitchensis, Tønsberg 45452. TLC: divaricate acid. Recently reported as new to North America (Tønsberg & Printzen 2018).

Biotora vaccinicolca (Tønsberg) Printzen – Occasional on Alnus, less often on Picea, floodplains. TLC: gyrophoric acid.

Biotora vernalis (L.) Fr. – Peninsula into Three Hole Bay off Aialik Bay, on decaying moss, Schultz 16914b. Apothecial section pale throughout, excipular hyphae elongated with ± cylindrical hyphae; ascospores simple to 4-celled, narrowly fusiform, 19.5–29.5 × 3.5–6 µm.

Biotora sp. 1 – Verdant Cove, north side at shoreline, on bryophytes over rock, McCune 36281. The apothecia are similar in appearance to Mycobilimbia, including apothecia with a strongly constricted base. Although the ITS sequence (GenBank MN906273) places it in Biotora, and a supported sister relationship to a supported clade with B. chrysantha and B. vernalis, morphologically the specimen does not match those species. The anatomical structure is, however, similar to B. vernalis (C. Printzen, pers. comm. 2017). A specimen nearly identical in morphology and anatomy is also known from western Montana (see more detailed description in McCune 2017, vol. 2, p. 80).

Biotora sp. 2 – North of Pilot Harbor on North Arm of Nuka Bay, on shoreline rock, McCune 36068. The ITS sequence (GenBank MN906269) for this specimen falls in the supported main clade for Biotora, but had no supported relationships with other taxa in that clade (McCune, maximum likelihood analysis). The specimen has the general appearance of a Lecidea or Carbonea, with a dark pigmentation of the apothecia that is unusual for Biotora: The apothecia are black with margin soon turned under, and the thallus is thin, gray, and areolate. The upper hymenium is blue green; exciple blue green black throughout with pigment in dense spots; hypothecium dark brown; spores simple, 12.5–15 × 3 µm; apothecial section POL–; hymenium I+ deep blue, medulla I–, exciple I–, tholus I+ blue.

Biotioridium delitescens (Arnold) Hafellner – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus, Schultz 16712. Scarce, few strongly convex, seemingly immarginate, pale apothecia among Fuscopannaria, asci clavate with gelatinous cap, polysporous, ascospores small, spheroid.

Bryobolimbia diapensiae (Th. Fr.) Fryday, Printzen & S. Ekman – Skilak nunatak within Harding Icefield, on dry bryophytes, McCune 36851.

Bryobolimbia hypnorum (Th. Fr.) Fryday, Printzen & S. Ekman – Near Harding Icefield Trail, ridge above Exit Glacier, on moss over rock, Schultz 16932b.

Bryocalon divergens (Ach.) Kärnfelt – National Park Service weather station, McArthur Ridge, on soil and alpine sod, McCune 36965, Walton 19449.

Bryoria americana (Mot.) Holien – Common on bark and wood, mainly of conifers. Most specimens are P+ but some anomalous collections are P-. Both P+ and P- specimens fell in the same strongly supported clade (ITS sequences for P+ specimen McCune 36408, and for P- specimens McCune 36357 and 36135; GenBank MN906268, MN906275, MN906270) (McCune, maximum likelihood analysis). We include Alectoria seipaecea Motyka here, based on Krog collections. The type (O) of that species is from Marathon Mountain near Seward (Brodo & Hawksworth 1977).

Bryoria bicolor (Ehrh.) Brodo & D. Hawksw. – Occasional on bark, rock, or moss over bark or rock.

× Bryoria capillaris (Ach.) Brodo & D. Hawksw. Apparently B. capillaris s.str. does not occur in North America (Velmala et al. 2014). We refer North American specimens of B. capillaris to B. pseudofuscescens, as explained under that species.

Bryoria cervinula Mot. ex Brodo & D. Hawksw. – Bear Cove, on Picea sitchensis branch, Walton 18261; Crater Bay North, on Picea sitchensis branch, Walton 18032. Spot tests for both were K–, KC–, P+ orange-red.

Bryoria fuscescens (Gyelnik) Brodo & D. Hawksw. – FIA plot, Square Bay North, on Picea sitchensis bole, Walton 18000; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Schultz 16687, Rosentreter 19005, 19007; near mouth of creek at north end of James Lagoon, Rosentreter 19098.

Bryoria glabra (Mot.) Brodo & D. Hawksw. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35966, 35967.

Bryoria pseudofuscescens (Gyelnik) Brodo & D. Hawksw. – Alectorialic acid chemotype: near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Picea twigs, Rosentreter 19016; west shore of Beauty Bay, on Picea bark, McCune 36049. According to phylogenetic reconstructions (Velmala et al. 2014) the American B. capillaris separates from European B. capillaris, with the former reassigned to B. pikei. The data of Velmala et al. (2014) show that North American B. pikei (including American ‘B. capillaris’), B. pseudofuscescens, and B. friabilis could all be treated as the same species, showing almost no variation with a 3-locus data set, yet a new species, B. inactiva, was described within that clade. A different view that is supported by the data (but not taken by those authors) is that all four belong to a single species, and that the chemotypes might be given a single species, and that the chemotypes might be given a single chemotype: B. pseudofuscescens.

Bryoria tenuis (E. Dahl) Brodo & D. Hawksw. – Near mouth of creek at north end of James Lagoon, on wood, conifer snag, McCune 36134; west shore of Beauty Bay, on the ground, Rosentreter 19044. Assignment of these collections to B. tenuis was based purely on morphology. Other specimens with anomalous appearance were sequenced and appear not to belong to B. tenuis s.str. (see under Bryoria sp. 1 and sp. 2).

Bryoria trichodes (Michaux) Brodo & D. Hawksw. – Bear Cove, on Picea sitchensis branch, Walton 18265.

Bryoria sp. 1 (undescribed, section Divaricateae) – North end of Harris Bay, near opening to Northwestern Lagoon, on
Bryoria

Buellia disciformis (Wahlenb.) Th. Fr. (= Buellia coniops Buellia aethalea (Ach.) Th. Fr. s.l. – Near Harding Icefield Trail, ridge above Exit Glacier, on rock, McCune 36405. Spores not found.

Buellia coniops (Wahlenb.) Th. Fr. (= Amandinea coniops (Wahlenb.) M. Choisy ex Scheid. & H. Mayrhofer) – Crazy Bay off of Harris Bay, on streamside granite, McCune 36262; seashore rocks 1–3 m above high tide line, Tønsberg 45444; east side of Harris Bay, steep chasm, on boulder just above high tide line, McCune 36252; northeast end of Harris Bay, edge of estuary, on rock, McCune 36241; north arm of spit across James Lagoon, on metasedimentary rock, Schultz 16852.

Buellia disciformis (Fr.) M. Choisy ex Scheid. & H. Mayrhofer – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44980 (TLC: atranorin, trace of unknown), with Myrionora albidaula; west of Resurrection River and north of Exit Glacier Road, on trunks of Alnus incana in swamp, Tønsberg 45363a (TLC: atranorin).

Buellia erubescens Arnold – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Schultz 16692.

Buellia griseovirens (Turner & Borrer ex Sm.) Almb. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44981; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on horizontal face of trunk of leaning Alnus, Tønsberg 45005; west of Resurrection River and north of Exit Glacier Road, on trunks of Alnus incana in swamp, Tønsberg 45648a. TLC: atranorin, norstictic acid.

Bunodophoron melanocarpum (Sw.) Wedin – North Arm Nuka Bay Public Use Cabin, on Picea, at base of old spruce, shaded, Schultz 16805.

Caliciopsis calicioides (Ell. & Ev.) Fitzp. – West of Resurrection River and north of Exit Glacier Road, on bark, Populus, McCune 36489.

Calicium glauceum Ach. – Near mouth of creek at north end of James Lagoon, on wood, conifer snag, McCune 36154; west shore of Beauty Bay, on snag, McCune 36038, Schultz 16757.

Caloplaca atrorosea (G. Murr.) Lamb – Common on bark of Alnus, Populus, and Salix.

Caloplaca borealis (Vainio) Poelt – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Tønsberg 44961; north of Pilot Harbor on North Arm of Nuka Bay, on Alnus, Tønsberg 45129, 45150.

Caloplaca exsecuta (Nyl.) Dalla Torre & Sarnth. – Exit Glacier Campground, near Exit Glacier Creek, on cobbles, McCune 36427.

Caloplaca litoricola Brodo – Bay on east side and south end of McCarty Fjord, on creekside rock, McCune 36114; north of Pilot Harbor on North Arm of Nuka Bay, on shoreline rock, McCune 36067, Schultz 16769; Verdant Cove, north side at shoreline, on rock, splash zone just above high tide line, McCune 36285.

Caloplaca nivalis (Körber) Th. Fr. – Harding Icefield Trail, lower slope, on moss over rock, McCune 36460.

Caloplaca sorocarpa (Vainio) Zahrlnr. – Exit Glacier Campground, near Exit Glacier Creek, on Alnus viridis, Tønsberg 45612; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Tønsberg 44960, 44913, 45014; south of Exit Glacier Visitor Center, on Alnus, Tønsberg 45632; west of Resurrection River and north of Exit Glacier Road, on dead trunk of Alnus, Tønsberg 56784.

Caloplaca torneònsis H. Magn. – Harding Icefield Trail, on moss over rock, Tønsberg 45574, 45582.

Calvitimela armeniaca (DC.) Hafellner – Skilak nunatak within Harding Icefield, on dry talus, McCune 36825. Confirmed with ITS sequence (GenBank MN906274), but spot tests unusual: cortex K+ orange, P–; medulla K–, P–.

Calvitimela melaleuca (Sommerf.) R. Sant. – Skilak nunatak within Harding Icefield, on rock, damp depression, McCune 36870. Ascospores not seen but the ITS sequence (GenBank MN906284) fell in a supported clade with three other specimens of C. melaleuca (KR303640, KR303641, KR303642) (McCune, maximum likelihood analysis). Note, however, that ITS sequences of C. melaleuca specimens fell in two supported clades, as found by Bendiksy et al. (2015).

Candelariella canadensis H. Magn. – Near Harding Icefield Trail, ridge above Exit Glacier, on moss and detritus over rock, McCune 36366.

Candelariella sp. – North arm of spit across James Lagoon, on wood, exposed snag of Picea sitchensis, Tønsberg 45389 in part.

Carbonea vorticosa (Flörke) Hertel – Near pond at north end of Three Hole Bay off Aialik Bay, on shoreline boulders, McCune 36352.

Carbonea sp. 1 – East side of Harris Bay, steep chasm, on rock, sheltered granite wall, McCune 36253. Distinct thallus, beige, areolate; epithecium bluegreen blueblack, K–; exciple very dark, blue green black, K–; hypothecium dark violet brown, K+ violet (strong); thallus spot tests negative but UV+ weakly whitish; medulla I–; ascospores narrowly ellipsoid, 13–14 × 3.2–4.2 μm.

Carbonea sp. 2 – National Park Service weather station, McArthur Ridge, apparently parasitizing the parasitic lichen Miriquidica inastria (McCune 36988a) on rock, talus in small ravine, McCune 36988b. Apothecia black, exciple edge green black, dark brown within; ascospores 11.5–12 × 5–5.5 μm.

Catapyrenium daedaleum (Kremp.) Stein – Near Harding Icefield Trail, ridge above Exit Glacier, on soil over vertical rock outcrop, Walton 19579.

Cattillaria chalybea (Borrer) A. Massal. – North arm of spit across James Lagoon, on rock, boulder on beach, McCune 36169, Schultz 16849c.

Cattillaria sp. – Bay on east side and south end of McCarty Fjord, rocky granitic shoreline boulders, parasitic (?) on juvenile Pyrenopsis, Schultz 16814, 16815b. Apothecia 0.08–0.12(–0.16) mm, black, hymenium ~35 μm high,
hypothecium pale, paraphyses branched, apical cell distinctly widened and with brown pigmented cap, ascospores 8 in ascus, 2-celled, 7–8.5 × 2.5–3 µm.

Cetraria atropurpurea (Schaeer) Vézda & Poelt – West of Resurrection River and north of Exit Glacier Road, on Populus balsamifera, mid trunk, Schultz 16958c. Ascospores 8 in ascus, 2-celled, proper excape blackish, pale inside, disc blackish red, hypothecium pale brown, hymenium not inspersed; paraphyses with brown cap.

Cetraria aculeata (Schreber) Fr. – National Park Service weather station, McArthur Ridge, on alpine sod, McCune 36986; northwest Lagoon Beach, on sand in full sun, Walton 18124.

Cetraria commixta (Nyl.) Th. Fr. – Coleman Bay, above north-east end, off Aialik Bay, on granite, McCune 36297. Conidia 5–7 × 1 µm, bottle shaped; elongate pycnidia sparse.

Cetraria delisei (Bory ex Schærr) Nyl. – Skilak nunatak within Harding Icefiel, on alpine sod, seepy, below snow patch, McCune 36853; NPS weather station, McArthur Ridge, shaded base of rock outcrop, Walton 19473.

Cetraria ericetorum subsp. reticulata (Rässänen) Kärnefelt – Near Harding Icefield Trail, ridge above Exit Glacier, on soil, Schultz 16923b; Coleman Bay, on boulder, Walton 18248 (medulla P+ orange); northwest Lagoon Beach, on sand, Walton 18129 (medulla P–).

Cetraria islandica subsp. crispiformis (Rässänen) Kärnefelt – Occasional on soil, sea level to alpine tundra.

Cetraria islandica (L.) Ach. subsp. islandica – Alpine lake system on Harris Peninsula, on soil, Walton 19427; near Harding Icefield Trail, ridge above Exit Glacier, on soil, Schultz 16923c; peninsula into Three Hole Bay off Aialik Bay, on soil, Rosentreter 19212; Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36863.

Cetraria muricata (Ach.) Eckfeldt – Marathon Mountain (Krog 1968).

Cetraria kamezatica Savicz – National Park Service weather station, McArthur Ridge, on moss over soil, Walton 19458; Skilak nunatak within Harding Icefield, on soil, Walton 19422.

Cetraria laevigata Rass. – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 19427.

Cetraria nigricans Nyl. – Occasional on soil, subalpine to alpine.

Cetraria pinastri (Scop.) Gray – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus bark, Rosentreter 19002.

Chaenotheca furfuracea (L.) Tibell – Crater Bay South, on soil, hollow in roots and rocks, Walton 18057.

† Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell – Crater Bay North, on Picea branch, Hutton 16400.

Chrysothrix chrysophthalma (P. James) P. James & J. R. Laundon – Near pond at north end of Three Hole Bay off Aialik Bay, on wood inside hollow trunk of Picea sitchensis, Tonsberg 45529; west shore of Beauty Bay, on trunk of Picea sitchensis, Tonsberg 45073.

Cladonia albolingua Brodo & Ahti – On Tsuga branch, FIA plot Square Bay South, Walton 18009; west shore of Beauty Bay, on moss over rock, Rosentreter 19027. Not tested with TLC but the bases of the podetia are somewhat melanotic and the thallus is UV+, and thus presumably with the cryptochlorophaeic acid group.

Cladonia amaurocraea (Flórke) Schaeer – Crater Bay South, on moss over boulder, Walton 18076; NPS weather station, McArthur Ridge, on soil, Walton 19491, 19419; northwest Lagoon Beach, full sun, mesic, on mineral soil over sand, Walton 18122; Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36867.

Cladonia arbuscula (Wallr.) Flotow – Occasional on soil, rock, and alpine sod. McCune 36897. TLC: usnic and fumarprotocetraric acids.

Cladonia bacillaris Genth. – South of Exit Glacier Visitor Center, on soil, Rosentreter 19294 (thallus P–, K–, UV–, mostly simple podetia with red apothecia). This taxon is often treated as a subspecies of C. macilenta, but the two have quite different distributions in the Pacific Northwest. Keeping them as separate species facilitates tracking differences in distribution and abundance. In the Pacific Northwest, Cladonia macilenta is largely restricted to coastal areas, while C. bacillaris s.str. has a much wider distribution, including continental climates, but is relatively rare in the coastal Pacific Northwest (Goward 1999 as C. macilenta chemotypes, McCune & Geiser 2009). Distributional differences between chemotypes are also present in Finland (Stenroos et al. 2016).

Cladonia bellidiflora (Ach.) Schærr – Common on soil over rock, soil, alpine sod, and Picea trunks. The squamatic acid chemotype is most frequent, while the thamnolic acid chemotype (e.g., Walton 17876) is relatively rare.

Cladonia borealis S. Stenroos – Exit Glacier Campground, near Exit Glacier Creek, in moss over mineral soil, Walton 19379, 19399, Schultz 16945s; NPS weather station, McArthur Ridge, on soil on vertical N-facing rock outcrop, Walton 19446.

Cladonia carneola (Fr.) Fr. – Occasional on bark, wood, and soil. In one specimen on rotten log. Tonsberg 45382 hosted a lichenicolous fungus, possibly Lichenosticta alcicornaria (see Diederich 1996, p. 68).

Cladonia chlorophaea (Flórke ex Sommerl.) Sprengel – Occasional on soil and bark.

Cladonia ciliata Stirton var. ciliata – Coleman Bay, over north-east end, off Aialik Bay, on rock, top of boulder, McCune 36311; Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36857.

Cladonia ciliata var. tenuis (Flórke) Ahti – Alpine lake system on Harris Peninsula, on soil, Walton 19429. Thallus KC+ yellow, P+ yellow to orange, main stem < 1 mm, branching in twos.

Cladonia coccifera (L.) Willd. – Crater Bay South, on moss over rock, Walton 18055; Skilak nunatak within Harding Icefield, on alpine sod, southwest slope, McCune 36850. TLC: usnic acid, zeorin, and unknown terpenoid; north-west Lagoon Beach, on soil over sand, Walton 18120. TLC: usnic and isousnic acids and zeorin; podetia with detachable microsquamules.

Cladonia coniocraea (Flórke) Sprengel (including C. ochlochlora Flórke morphotypes) – Common on bark and wood.

Cladonia cornuta (L.) Hoffm. – FIA plot, North Arm Nuka Bay, on conifer bark, Walton 17881 (P+ orange red, K–; small collection and weird growth form, with cups, possibly C. cornuta subsp. greenlandica (A. E. Dahl) Ahti); NPS weather station, McArthur Ridge, on sheltered base of rock outcrop, Walton 19472; west shore of Beauty Bay, on soil, Walton 19500.

Cladonia crispa (Ach.) Flotow var. crispa – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 19508; N end of Harris Bay, near opening to Northwestern Lagoon, on soil, Walton 19505; NPS weather station, McArthur Ridge, on soil and moss, Walton 19453, 19470; northwest Lagoon Beach, on sand, Walton 18121.
Cladonia crispat var. cetrariformis (Delise) Vainio – Skilak nunatak within Harding Icefield, on soil, pocket on top of boulder, McCune 36809.

Cladonia ecmocyna Leighton – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36438, Rosentreter 19228; near Harding Icefield Trail, ridge above Exit Glacier, on moist mineral soil, Walton 196516; rocky alpine tundra northeast of Coleman Bay, on soil, Walton 19478.

Cladonia fimbrata (L.) Fr. – Occasional on bark, wood, and organic matter.

Cladonia gracilis subsp. gracilis (L.) Fr. – Occasional on bark, wood, and organic matter.

Cladonia maxima Nyl. – Harding Icefield Trail, lower ridge above Exit Glacier, on soil.

Cladonia macrophyllodes C. mitis – Near Harding Icefield, near Exit Glacier Creek, on soil, Walton 194509, Walton 19387.

Cladonia gracilis subsp. turbinata (Ach.) Ahti – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 194509, Walton 19387.

Cladonia kaneswskii Oxner – Occasional on soil and moss over rock. Alpine lake system on Harris Peninsula, on soil near lakeshore, Walton 194735; near Harding Icefield Trail, ridge above Exit Glacier, on soil and moss over rock, McCune 36389 (TLC: usnic acid only); near Harding Icefield Trail, ridge above Exit Glacier, on soil, Walton 193853; peninsula into Three Hole Bay off Aialik Bay, on soil, McCune 36332, 36339, Rosentreter 19215; rocky alpine tundra northeast of Coleman Bay, on soil, Walton 19428. The podetia are P+, including the tips.

Cladonia luteoalba Wheldon & A. Wilson – Near Harding Icefield Trail en route to high cliffs, on soil in the alpine, Tonsberg 45557 (TLC: usnic acid, zeorin, possibly fatty acid(s), unidentified terpenoids); Winsnesenski Glacier nunatak, on soil, Walton 19622.

Cladonia macroceras (Delise) Hav. – Near Harding Icefield Trail, ridge above Exit Glacier, on soil and moss over rock, McCune 36388. This specimen had podetia with melanotic bases; medulla P+ orange, UV–, K+ brown (TLC: fumarprotocetraric and protocetraric acids).

Cladonia macrophyllodes Nyl. – Harding Icefield Trail, lower slope, on soil, McCune 36456.

Cladonia maxima (Asah.) Ahti – Crater Bay North, on boulder, Walton 18049; Crater Bay South, on boulder, Walton 18056; Exit Glacier Campground, near Exit Glacier Creek, on soil, Schultz 19645a, Rosentreter 19275; NPS weather station, McArthur Ridge, on N-facing sheltered nook of rock outcrop, Walton 19424.

Cladonia mitis Sandst. – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36441, 36444 (TLC: usnic acid only; rangiformic acid is often present in C. mitis but can be absent or difficult to detect, see Goward 1999, Stenroos et al. 2016); on ground, Walton 19493 (no TLC data). Piercey-Normore et al. (2010) recommended C. mitis to be treated as C. arbuscula subsp. mitis, and this is often followed; however, we kept C. arbuscula and C. mitis at the species level to facilitate tracking differences in distribution and abundance for these difficult taxa. Furthermore, the phylogenies shown by Piercey-Normore et al. (2010) showed reciprocal monophyly of C. mitis and C. arbuscula with ITS data, but the pattern loses support with the addition of beta tubulin sequences. Pending more data on the problem, it seems prudent to keep tracking these two at the species level.

Cladonia norvegica Tønsberg & Holien – N end of Harris Bay, near opening to Northwestern Lagoon, on organic matter, Rosentreter 19147.

Cladonia cf. novochlorophora (Sipman) Ahti & Brodo – Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36858. This specimen is C. pyxidata-like, having broad cups and coarse propagules, but is UV+ and with very short cups and unusual chemistry (homoseki-acid only) suggesting C. novochlorophora. The ITS sequence (GenBank MN906283), though short, indicates no strong affinity to any species in GenBank and fell outside the clade of C. novochlorophora.

Cladonia pyxidata (L.) Hoffm. – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36436a, Schultz 16945b, Rosentreter 19283; NPS weather station, McArthur Ridge, on N-facing vertical moss mat over rock, Walton 19430; northwest Lagoon Beach, full sun, on sand, Walton 18128.

Cladonia pleurota (Flörke) Schaerer – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 19280, 19284.

Cladonia psyllidum (L.) Hoffm. – FIA plot on Three Hole Bay, on soil, Walton 18231; near Harding Icefield Trail, Rosentreter 19251, Walton 19397; Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36682 (TLC: fumarprotocetraric acid).

Cladonia rangiferina (L.) F. H. Wigg. – Common on soil.

Cladonia scabriuscula (Delise) Nyl. – West of Resurrection River and north of Exit Glacier Road, on soil, Rosentreter 19301, Walton 19417; west shore of Beauty Bay, on moss over rock, Rosentreter 19029.

Cladonia singularis S. Hammer – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36443.

Cladonia squamosa Hoffm. – Common on Picea trunks, snags, rotten wood, moss over rock, and less often on soil. All UV+ chemotype.

Cladonia stellaris (Opiz) Pouzar & Vězda – National Park Service weather station, McArthur Ridge, on soil, Walton 19469. Presence of this species illustrates a biogeographic contrast with Haída Gwaii, where many species of more continental climates, such as C. amaurocreae, C. mitis, and C. stellaris were absent (Brodo & Ahti 1996), while others such as C. cartiosa, C. cenoea, and C. deformis, were not found at either Haída Gwaii or Kenai Fjords. All of these species are present in Katmai National Park (McCune et al. 2018).

Cladonia straminia (Sommerf.) Flörke – Northeast end of Harris Bay, edge of estuary, on moss on boulder on rocky beach, Tonsberg 45416, 45420, TLC: usnic, didymic, and squamatic acids, unidentified pigment.

Cladonia stricta (Nyl.) Nyl. – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36442, Walton 19404, 19391; Skilak nunatak within Harding Icefield, on alpine sod, McCune 36872, 36916.

Cladonia stygia (Fr.) Ruoss – National Park Service weather station, McArthur Ridge, on soil and at base of rock outcrop, Walton 19447, 19467.

Cladonia subfurcata (Nyl.) Arnold – Skilak nunatak within Harding Icefield, on alpine sod, northwest slope, McCune 36911.
Cladonia sulphurina (Michaux) Fr. – Exit Glacier Campground, near Exit Glacier Creek, on ground, Walton 19507; N end of Harris Bay, near opening to Northwestern Lagoon, on soil and organic matter, Rosentreter 19146, Walton 19506; west shore of Beauty Bay, on wood, Rosentreter 19058.

Cladonia unibractea Tønsberg & Ahti – Occasional on bark and wood.

Cladonia uncialis (L.) F. H. Wigg. – Common on soil, rock, moss over rock, and alpine sod. McCune 36390 (TLC: usnic and squamatic acids); McCune 36890 (TLC: usnic acid only).

Cladonia verruculosa (Vainio) Ahti – Exit Glacier Campground, near Exit Glacier Creek, on soil, McCune 36436b; NPS weather station, McArthur Ridge, on soil, Walton 19471; northwest Lagoon Beach, on soil, Walton 18141; west shore of Beauty Bay, on rotten wood, Rosentreter 19060.

Cladonia verticillata (Hoffm.) Degel. – Alpine lake system on Harris Peninsula, on soil, Walton 19432; Exit Glacier Campground, near Exit Glacier Creek, on soil, Rosentreter 19279.

Cladonia sp. – Bear Glacier nunatak, on moss over rock in snowmelt stream, McCune 36931. This specimen, from an unusual semi-aquatic habitat, consisted only of squamales that were tightly imbricate, suberect, P+ orange, and UV−. The ITS sequence, while short (GenBank MN906285) indicates affinity with C. verticillata/macrophylloides group (R. Pino Badas, pers. comm. 2017).

Climostomum leprosum (Räsanen) Holien & Tønsberg – Near pond on north end of Three Hole Bay off Aialik Bay, on wood inside hollow trunk of Picea stitchensis, Tønsberg 45529. TLC: atranorin, caperatic acid.

Climostomum tenerum (Nyl.) Coppins & S. Ekman – East side of Harris Bay, steep chasm, on granite wall, McCune 36535, Tønsberg 45432. TLC: atranorin, usnic acid, zeorin, terpenoids, stictic acid, unidentified pigment.

Colococcum pocillarum (Cumm.) Brodo – Occasional on bark and wood, Alnus and Picea, in two cases on rock. We expected to find C. maritimum Brodo on rock but did not. In addition to substrate, that species differs from C. pocillarum in being esorediate.

Collema fecundum Degel. (syn: Blennothallia fecunda (Degel.) Otárola, P. M. Jørg. & Wedin) – East side of Harris Bay, steep chasm, on granite wall, McCune 36255, Tønsberg 45432. TLC: atranorin, usnic acid, zeorin, terpenoids, stictic acid, unidentified pigment.

Coccocentrum pocillarum (Cumm.) Degel. – Massive vertical cliff plunging into ocean, within salt spray zone, Camera Cliff, 59.8762°N, 149.6378°W, Hutton 16235b; with numerous small apothecia; ascospores brown, 3–5-septate to submuriform, 15–19 × 5–7.5 µm.

Dendriscosticta wrightii (Tuck.) B. Moncada & Lücking – West side of Beauty Bay, on alpine sod in damp depression, McCune 36855, Walton 19437.

† Dactylospora sp. – Site Lake, on Pertussaria cf. papyrea, Hutton 16235b; near Harding Icefield Trail, ridge above Exit Glacier, on soil in snowbed, Tønsberg 45581; with numerous small apothecia; ascospores mostly non-septate, some thinly 1-septate, 15.5–20 × 7.8–10 µm.

Dendriscosticta wrightii (Tuck.) B. Moncada & Lücking – West side of Beauty Bay, on alpine sod in damp depression, McCune 36855, Walton 19437.

† Coptidiscus cf. gloeocapsa (Nitschke ex Arnold) Baloch, Gildenstam & Wedin – North end of Harris Bay, near opening to Northwestern Lagoon, on moss between root branches of fallen Picea, Tønsberg 45398.

Cryptothecia granuliforme (Nyl.) Henssen – Harding Icefield Trail, lower slope, on rock, McCune 36470; peninsula into Three Hole Bay off Aialik Bay, on granite, steep, relatively exposed boulder, Schulz 16916a.

Cryptotheca permiscens (Nyl.) Th. Fr. – Northeast end of Harris Bay, edge of estuary, on granite, north side of large exposed granitic boulder, Schulz 16877; north of Pilot Harbor on North Arm of Nuka Bay, on noncalcareaous metasedimentary shoreline rock, Schulz 16780 p.p.

Cystocoleus ehenus (Dillwyn) Thwaites – Northeast end of Harris Bay, edge of estuary, on moss over rock, Rosentreter 19156; west shore of Beauty Bay, on Picea, shaded mid trunk, Schulz 16763.

Dactylina ramulosa (Hook.) Tuck. – Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36855, Walton 19437.

† Dactylorina sp. – Site Lake, on Pertussaria cf. papyrea, Hutton 16235b; near Harding Icefield Trail, ridge above Exit Glacier, on soil in snowbed, Tønsberg 45581; with numerous small apothecia; ascospores brown, 3–5-septate to submuriform, 15–19 × 5–7.5 µm.

Dendriscosticta wrightii (Tuck.) B. Moncada & Lücking – West side of Beauty Bay, on alpine sod in damp depression, McCune 36855, Walton 19437.

† Dactylospora sp. – Site Lake, on Pertussaria cf. papyrea, Hutton 16235b; near Harding Icefield Trail, ridge above Exit Glacier, on soil in snowbed, Tønsberg 45581; with numerous small apothecia; ascospores mostly non-septate, some thinly 1-septate, 15.5–20 × 7.8–10 µm.

Dendriscosticta wrightii (Tuck.) B. Moncada & Lücking – West side of Beauty Bay, on alpine sod in damp depression, McCune 36855, Walton 19437.

† Dactylospora sp. – Site Lake, on Pertussaria cf. papyrea, Hutton 16235b; near Harding Icefield Trail, ridge above Exit Glacier, on soil in snowbed, Tønsberg 45581; with numerous small apothecia; ascospores mostly non-septate, some thinly 1-septate, 15.5–20 × 7.8–10 µm.
face, *Schultz 16904c*; east side of Harris Bay, steep chasm, on granite, shaded, seeping wet rock face, *Schultz 16882*.

**Endocarpon pusillum** Hedwig – Camera Cliff, on moist, thin organic material, *Hutton 16354*.

**Ephebe hispidula** (Ach.) Horw. – Crater Bay off of Harris Bay, on moss over rock, *Rosentreter 19170*.

**Ephebe lanata** (L.) Vainio – Common on rock, shorelines, submerged, periodically inundated, or in seepage. Although this species is normally associated with freshwater seepage and bodies of water, some of the sites regularly receive saltwater spray.

**Ephebe multispora** (Å. E. Dahl) Henssen – Coleman Bay, above

**Fuscidea intercincta** (Norman) Schmull – Occasional on bark of *Harris Bay, steep chasm, on granite, steep, relatively exposed, wet rock face, *Schultz 16887*; marginal lobes enlarged, pale grayish brown.

× **Fuscopannaria confusa** (P. M. Jorg.) P. M. Jorg. – Specimens from Kenai Fjords originally identified as this were all reassigned to other *Fuscopannaria* species after ITS sequences (M. Schultz, unpubl.) fell outside the well supported clade containing the many sequences of Norwegian *F. confusa* in GenBank.

**Fuscopannaria aurita** P. M. Jorg. – Near Harding Icefield Trail, ridge above Exit Glacier, on moss and detritus over rock, *McCune 36367b, 36368*.

**Fuscopannaria cheiroloba** (Müll. Arg.) P. M. Jorg. – East side of Harris Bay, steep chasm, on granite, steep, relatively exposed, wet rock face, *Schultz 16897*.

**Fuscopannaria convexa** P. M. Jorg. – Locally common on *Populus* bark in Exit Glacier Campground and floodplain of Resurrection River and Exit Glacier Creek; Verdant Cove, north side at shoreline, on granite, shaded edge of steep rock face, *Schultz 16897*.

**Fuscopannaria laceratula** (Hue) P. M. Jorg. – Headland between two arms of Coleman Bay, on moss on metamorphic rock, *Schultz 16912b; on trunk of *Picea sitchensis, Tonsberg 45495; near North Arm Nuka Bay Public Use Cabin, on *Picea, Schultz 16895; on *Alnus* bole, *Walton 17874; Verdant Cove, north side at shoreline, on rock, *McCune 36284, Schultz 16895; Bear Cove, on *Picea sitchensis* branches, *Walton 18254*.

**Fuscopannaria leucostictoides** (Ohlsson) P. M. Jorg. – East side of Harris Bay, steep chasm, on moss over rock, *Rosentreter 19162; near mouth of creek at north end of James Lagoon, on *Salix, Tonsberg 45495; near mouth of creek at north end of James Lagoon, on *Salix, Tonsberg 45338; on *Picea* branch, *Walton 17935*.

**Fuscopannaria alaskana** P. M. Jorg. & Tonsberg – Headland between two arms of Coleman Bay, on moss on seashore boulder, *Tonsberg 45494; near mouth of creek at north end of James Lagoon, on *Salix, Tonsberg 45338; on *Picea* branch, *Walton 17935*.
Like *F. praetermissa* the margins become conspicuously whitish, terpenoid crystals perhaps present, but material was probably not yet old enough to show it clearly.

**Graphis scripta** (L.) Ach. – Occasional on *Alnus* bark.

**Gyalectaria diluta** (Björk et al.) Schmitt et al. – Near North Arm Nuka Bay Public Use Cabin, on conk on snag of *Picea sitchensis*, *Tonsberg* 45221; near pond at north end of Three Hole Bay off Aialik Bay, *Tonsberg* 45541; west shore of Beauty Bay, on *Alnus viridis*, *Tonsberg* 45086.

**Gyalideopsis epicorticis** (Funk) Lücking & Back – Near North Arm Nuka Bay Public Use Cabin, on shaded *Picea* twigs at creek, *Schultz* 16786, *Tonsberg* 45192; west shore of Beauty Bay, on *Alnus viridis* just above beach, *Tonsberg* 45085; near pond at north end of Three Hole Bay off Aialik Bay, on *Picea* twigs, *Schultz* 16919a.

**Gyalideopsis muscicola** P. James & Vězda – Headland between two arms of Coleman Bay, on moss on upper side of flat boulder on seashore rocks, *Tonsberg* 45492; North Arm Nuka Bay Public Use Cabin, on twigs of *Picea sitchensis*, *Tonsberg* 45203a; Verdant Cove, north side at shoreline, on moss on sloping face of boulder, *Tonsberg* 45446 (fertile); northeast end of Harris Bay, edge of estuary, on moss on granite, north side of large exposed boulder, *Schultz* 16873.

**Gyalideopsis piceicola** (Nyl.) Vězda – Occasional on *Picea* twigs, once on *Sambucus*, at low elevation.

**Halecania viridescens** Coppins & P. James – North arm of spit across James Lagoon, on moss at base of *Picea sitchensis*, *Tonsberg* 45365, 45372, 45376, 45377. TLC: argopsin, usually with gracilenta unknown.

**Hydropunctaria muscicola** (Wahlenb.) C. Keller, Gueidan & Thüis s.l. – Common on shoreline rock by ocean. Host to *Verrucaria epimaura*. One of the newly segregated species may be involved (*H. orae* Orange or *H. aractina* (Wahlenb.) Orange, see Orange 2012); no molecular study has been done yet on North American specimens.

**Hydropunctaria scabra** (Vězda) C. Keller, Gueidan & Thüis – Bay on east side and south end of McCarty Fjord, on granite, coastal rocks flushed by fresh water, relatively exposed, *Schultz* 16810; north of Pilot Harbor on North Arm of Nuka Bay, on shoreline rocks, moist quartz vein, *Schultz* 16778; on noncalcareous metasedimentary rock, flushed pebbles, *Schultz* 16776 (ascospores 14.5–16.5(17.5) × 7–8.5 µm, thallus with black basal layer).

**Hypogymnia apinata** Goward & McCune – Common on bark and wood of both conifers and hardwoods.

**Hypogymnia berti** (Lyng. Ahti) Ahti – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on bark, *Alnus*, *McCune* 35961, 35999.

**Hypogymnia canadensis** Goward & McCune – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, *McCune* 35960, *Rosentreter* 19008. An ITS sequence of *McCune* 35960 (GenBank MN906261) was identical to two other *H. canadensis* from the Kenai Peninsula, Alaska, outside the Park (*Tonsina* Creek, old floodplain *Picea* forest, *McCune* 30702, OSC, GenBank MN906263; Primrose Creek, open *Picea* forest, *McCune* 30720, GenBank MG692821).

**Hypogymnia duplicata** (Ach.) Rassad. – Fire Cove FIA plot, on conifer branches, *Walton* 18150, 19083; plot TSME 002, 59.46070°N 150.38243°W, *Tsuga mertensiana* woodland and open sloping peatland above high tide line, on *Picea sitchensis* branch, *Walton* 17987; previously reported from KEFJ by Walton et al. (2014).

**Hypogymnia enteromorpha** (Ach.) Nyl. – North end of Harris Bay, near opening to Northwestern Lagoon, on *Picea*, *McCune* 36185, 36218.

**Hypogymnia hultenii** (Degel.) Krog – Common on conifers, less often on hardwoods and shrubs.

**Hypogymnia lophyrea** (Ach.) Krog – Common on conifers, less often on hardwoods and shrubs; previously reported from KEFJ by Walton et al. (2014).

**Hypogymnia oceania** Goward – North end of Harris Bay, near opening to Northwestern Lagoon, on bark, *Rosentreter* 19140; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, *McCune* 35973; west shore of Beauty Bay, on bark, *Rosentreter* 19049.

**Hypogymnia physisodes** (L.) Nyl. – Occasional on both hardwoods and conifers.

**Hypogymnia tubulosa** (Schaerer) Hav. – Occasional on both hardwoods and conifers.

**Hypogymnia vitata** (Ach.) Parrique – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus* bark, *Rosentreter* 18892; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus* bark, *Rosentreter* 18991; west shore of Beauty Bay, on *Picea* bark, *McCune* 36051, 36056, *Rosentreter* 19054.

**Icamadophila ericetorum** (L.) Zahlbr. – Occasional on rotting wood and organic matter.

**Ionaspis lacustris** (With.) Lutzoni – Coleman Bay, north-east end, off Aialik Bay, on rock, *McCune* 36301; north of Pilot Harbor on North Arm of Nuka Bay, on creekside rock, *McCune* 36089b. It proved difficult to assign many *Ionaspis* and *Hymenelia* specimens to species, either on morphological or molecular basis. See McCune et al. (2018) for a summary of the problem.

**Ionaspis lavata** H. Magn. – Coleman Bay, above northeast end, off Aialik Bay, on rock in creek bed, *McCune* 36313b, *Schultz* 16908b (rose, with gray brown *Ionaspis oroda*); Crater Bay off of Harris Bay, on streamside granite, *McCune* 36258.

**Ionaspis oroda** (Ach.) Th. Fr. ex Stein – Coleman Bay, above northeast end, off Aialik Bay, on rock in creek bed, *McCune* 36313a (but K+ violet hymenium not seen); *Schultz* 16908a (with Trentepohlia, hymenium c. 80 µm high, ephymenium pale, N–); Crater Bay off of Harris Bay, on streamside granite, *McCune* 36259 (morph with cream-colored thallus); alpine lake system on Harris Peninsula, on rock, submerged in small lake, *McCune* 37009 (gray morph; see McCune et al. (2018) for placement in phylogenetic tree based on ITS sequence).

**Ionaspis suaveolens** (Fr.) Th. Fr. ex Stein – Near Harding Icefield Trail, ridge above Exit Glacier, on metasedimentary rock, on flushed boulders, *Schultz* 16928b.

**Jamesiella anastomosans** (P. James & Vězda) Lücking, Sérus. & Vězda – North arm of spit across James Lagoon, on moss at base of *Picea sitchensis*, *Tonsberg* 45364; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus incana*, *Tonsberg* 44946, 45652b, 45676; west shore of Beauty Bay, on twigs of *Picea sitchensis*, *Tonsberg* 45109; near North Arm Nuka Bay Public Use Cabin, on trunk of old *Picea*, shaded, *Schultz* 16796a; near
pond at north end of Three Hole Bay off Aialik Bay, on Picea twigs, Schultz 16919e.

**Jamesiella scotica** (P. James) Lücking, Sérus. & Vězda – Coleman Bay, on moss (Paraleucoeryum longifolium), Tønsberg 45475 (with Arthrophiles aeruginosa and Massalongia carnosa, first reported in North America by Tønsberg (2016) on the basis of this specimen); near Harding Icefield Trail, ridge above Exit Glacier, on Massalongia, Rosentreter 19246.

**Jamesiella sp.** – Near mouth of creek at north end of James Lagoon, on driftwood on upper beach; Tønsberg 45287. Similar to *Jamesiella scotica*, but hypophores colourless; possibly a form of *J. anastomosans*.

**Japewia subaurifera** Muhr & Tønsberg – Common on *Alnus*, also on Salix and Picea.

**Japewia tornoënsis** (Nyl.) Tønsberg – Common on *Alnus*, Picea, and Tsuga.

**Koerberiella unbonata** T. Wheeler ined. – Exit Glacier Campground, near Exit Glacier Creek, on cobbles, McCune 36422, 36423. The species differs from *Koerberiella winnemana* and *Bellemerea* species by the conspicuously umbonate apothecia. The thallus is C+ red; ascospores were not found.

**Lecanactis abietina** (Ach.) Körber – West shore of Beauty Bay, on trunk of *Picea sitchensis*, Tønsberg 45071 (TLC of thallus with pycnidia: lecanoric acid).

**Lecanora aitena** (Ach.) Hepp – West shore of Beauty Bay, on *Sambucus* on beach meadow, Tønsberg 45097; floodplain of Resurrection River, on *Alnus*, Tønsberg 44917, 44956; north of Pilot Harbor on North Arm of Nuka Bay, on *Alnus* bark, Tønsberg 44133 (all det. Arup 2018).

**Lecanora cf. cenisia** Ach. – East side of Harris Bay, steep chasm, on deeply shaded rock facing overhang, Tønsberg 45427 (det. Arup 2018; TLC by Tønsberg: atranorin and gangaleoidin).

**Lecanora chloroleplosa** (Vainio) H. Magn. – Harding Icefield Trail, lower slope, on rock, McCune 36469 (ITS sequence GenBank: MN906279).

**Lecanora excludens** Malme (syn. *L. septentrionalis* H. Magn. according to Brodo et al. 2019) – Occasional on bark of *Alnus* and *Salix*; north of Exit Glacier Visitor Center, Tønsberg 45033, 45035; west of Resurrection River and north of Exit Glacier Road, on trunks of dead *Alnus incana*, Tønsberg 45678; all det. U. Arup. This species was recently reported for North America from Alaska, Idaho, and Oregon (Brodo et al. 2019). That *L. excludens* and *L. septentrionalis* seem to be the same species is here supported by comparing the ITS sequence with Genbank accession MK541647 of *L. excludens* from Norway with sequences of *L. septentrionalis* from both Norway and Alaska that are all identical or near identical. Anatomically, samples from Norway and Alaska also appear very similar. Typical are the small K-soluble crystals in the epithecium and amphithecium. The abundance of crystals does vary in both structures but they are usually present to some extent. The ecology in Alaska and Scandinavia seems also to be the same, growing on *Alnus* (but also *Salix* in Alaska) at the base of mountains.

**Lecanora expallens** Ach. – East side of Harris Bay, on huge, somewhat overhanging cliff in steep chasm, Tønsberg 45428 (TLC: usnic and thiophanic acids, unidentified xanthone (trace), zeorin, terpenoids (traces), atranorin (trace); north arm of spit across James Lagoon, on bark in shaded cavity in soil bank, Tønsberg 45347 (TLC: usnic and thiophanic acids, zeorin); north of Pilot Harbor on North Arm of Nuka Bay, on overhanging rock, Tønsberg 45164 (TLC: usnic and thiophanic acids, expallens-unknown sensu Tønsberg (1992), zeorin, and terpenoids); west shore of Beauty Bay, on trunk of *Picea sitchensis*, Tønsberg 45072 (TLC: usnic and thiophanic acids, expallens-unknown, zeorin).

**Lecanora intricata** (Ach.) Ach. – Crater Bay off of Harris Bay, on streamside granite, McCune 36267.

**Lecanora leptacina** Sommerf. – Coleman Bay, above northeast end, off Aialik Bay, on soil and *Andreaea* on top of boulder, Tønsberg 45481 (disk blackish with whitish pruina, TLC: usnic acid (major), isousnic acid, zeorin, traces of terpenoids); near Harding Icefield Trail, ridge above Exit Glacier, on moss over rock, Tønsberg 45571c, 45573, 45575a; near NPS weather station, McArthur Ridge, on crustose lichens and *Andreaea* over talus in small ravine, McCune 36990 (ITS sequence: GenBank MN906287). This rarely reported, mainly near northern species has recently been found in the Oregon Cascade Range on the shore of a montane lake (Lane Co., Waldo Lake, peninsula on northwest shore, on lichens on volcanic rock, McCune 36192b).

**Lecanora muralis** (Schreber) Rabenh. – FIAPlot Peat_1_20120829, on rock, Hatten 16203; Verdant Cove, north side at shoreline, on rock, McCune 36283.

**Lecanora polytopra** (Hoffm.) Rabenh. – Occasional on rock, near sea level to alpine.

**Lecanora pringlei** (Tuck.) Lamb – East side of Harris Bay, steep chasm, on slightly overhanging rock wall, Tønsberg 45433.

**Lecanora pulicaris** (Pers.) Ach. – Near mouth of creek at north end of James Lagoon, on *Salix* bark, McCune 36151; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of *Alnus incana*, Tønsberg 45024 (det. Arup 2018); west of Resurrection River and north of Exit Glacier Road, on trunks of dead *Alnus incana*, Tønsberg 45686 (det. Arup 2018).

**Lecanora rugosella** Zahlbr. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, McCune 35979, 35982.

**Lecanora salicicola** H. Magn. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, McCune 35993. This occurrence of a species that normally is absent in hyperoceanic climates reflects the increasing tendency of boreal and montane species to approach the coast farther north; see also comments under *Cladonia stellaris*.

**Lecanora stanislai** Gwuz-Krzem., Lukbek, Malik & Kukwa – Exit Glacier Campground, near Exit Glacier Creek, on *Alnus viridis*, Tønsberg 45611 (ver. M. Kukwa 2019); near mouth of creek at north end of James Lagoon, on *Salix* in *Salix alaskana* –Alnus thicket, Tønsberg 45321. This recently described species (Gwuz-Krzeminska et al. 2017) has a very thin leporese thallus and contains usnic acid and zeorin. The second specimen is unusual as the thallus seems to be delimited. However, this one is quite young and the delimited thallus can be caused by the structure of bark.

**Lecanora sulphurea** (Hoffm.) Ach. – North of Pilot Harbor on North Arm of Nuka Bay, on rock just above high tide line, McCune 36071.

**Lecanora symmicta** (Ach.) Ach. – North end of Harris Bay, near opening to Northwestern Lagoon, on *Alnus* bark, McCune 36215; near mouth of creek at north end of James Lagoon, on *Alnus* twigs, Schultz 16823; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, McCune 35991, 35992, Schultz 16691.

**Lecanora sp.** (L. symmicta group) – Near mouth of creek at north end of James Lagoon, on wood, conifer snag, McCune 36136. ITS sequence GenBank: MN906271. TLC: usnic acid (trace), unknown xanthone. The specimen has black lichenine to marginless apothecia and a cream-colored thallus,
Table 4. Names and chemotypes within *Lepraria neglecta* sensu Lendemer (2013) for Kenai Fjords. See the annotated list entry for *L. alpina* for our rationale for continuing to recognize names within *L. neglecta* group. As there are more and more examples of *Lepraria* species that are similar in chemistry and morphology (e.g., *L. incana* in Europe and *L. pacifica* in North America), but do not belong to the same species, we consider the taxon names to be provisional assignments to species based on lichen substances.

| Taxon                               | Diagnostic substances                                                                 | Representative specimens and notes                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| *Lepraria neglecta*-type, granules with pseudocortex and with no or only few projecting hyphae |                                                                                          |                                                                                                      |
| *Lepraria alpina*                   | atranorin, porphyric acid, ± fatty acids                                               | Near Harding Icefield Trail on route to high cliffs, on moss, *Rosentreter 19244*, alpine lake system on Harris Peninsula, on granitic rock, *McCune 36994*, 36999 |
| *Lepraria neglecta* s.str.          | alectorialic acid + 2–3 satellites probably including barbatolic acid                  | Not found at Kenai Fjords                                                                          |
| *Lepraria neglecta* s.l. (morphologically different from *L. caesioalba*, but with similar chemistry) | atranorin, fumarprotocetraric acid and fatty acid (in some specimens identified as angardianic/roccellic acid) | Common on moss and soil over rock; Crater Bay off of Harris Bay, on moss over rock, *Rosentreter 19166*; north of Pilot Harbor on North Arm of Nuka Bay, on moss on steep coastal rock just above rocky beach, *Tønsberg 45128*; Coleman Bay, above northeast end, off Aialik Bay, on soil rich in humus on top of boulder on seashore rocks above high tide line *Tønsberg 45474*, over moss on sloping face on top of boulder near creek, *Tønsberg 45480*, on thin layer of soil and *Andreaea* on top of boulder, *Tønsberg 45482* |
| *Lepraria svalbardensis*             | atranorin (major), stictic acid (major) + satellites, angardianic/roccellic acid        | Coleman Bay, above northeast end, off Aialik Bay, steep, cascading creek, on moss on rock with a thin layer of soil near creek, *Tønsberg 45479* |
| Thallus not of *L. neglecta* type, granules without a pseudocortex and often with projecting hyphae |                                                                                          |                                                                                                      |
| *Lepraria aff. borealis*             | atranorin, jackinic/rangiformic acid                                                   | Near mouth of creek at north end of James Lagoon, over moss, lichens and bark on Salix, *Tønsberg 45344*, chemistry is that of *L. borealis*, which has been said to have a morphology of the *neglecta* type (Lohtander 1994) |
| *Lepraria aff. caesioalba* I         | atranorin, fumarprotocetraric acid, angardianic/roccellic acid, ± unidentified fatty acid (trace) | West shore of Beauty Bay, on trunk of *Picea stichensis* just inland from beach meadow, *Tønsberg 45124*; Crater Bay off of Harris Bay, on slightly overhanging rock wall just uphill from rocky beach, *Tønsberg 45441* |
| *Lepraria aff. caesioalba* II        | atranorin, fumarprotocetraric acid, fatty acid (probably jackinic/rangiformic acid)     | Northeast end of Harris Bay, edge of estuary, over moss on steep, somewhat overhanging face of boulder on rocky beach, *Tønsberg 45419*, 45422 |
| *Lepraria* unnamed                   | atranorin, stictic acid + satellites including norstictic acid, angardianic/roccellic acid | Near Harding Icefield Trail, ridge above Exit Glacier, tericolous on sun-exposed overhang along trail, *Tønsberg 45560b*, b |
| *Lepraria* unnamed                   | psoromic acid + satellite, porphyric acid                                             | North of Exit Glacier Visitor Center, *Alnus – Populus* forest, lower slopes with scattered shady noncalcareous metasedimentary boulders and outcrops, over moss on overhanging rock wall, *Tønsberg 45062* |

ascospores 12–16 × 4.4–5.3 μm; ephymenium granular, POL+. Phylogenetic reconstruction by Arup (unpubl.) showed that this species belongs to the *symnicta* clade, perhaps even in a narrow sense. However, this group is not well understood and more taxa may be present within it. Closest to the sequence of this specimen are two sequences from GenBank named *L. confusa*, one from North America (GU480093) and one from Scotland (GU480120), but these are not *L. confusa* in a strict sense.

*Lecanora zosterae* (Ach.) Nyl. – Near mouth of creek at north end of James Lagoon, on wood, exposed snag, *Schultz 16819*.

*Lecidea atrobrunnea* (Lam. & DC.) Schäerer – *Skilak* nunatak within Harding Icefield, on rock on ridge, *McCune 36902* (TLC: 2’-O-methylperlatolic acid). Although abundant in much of western North America, the species appears to be rather rare in the study area.

*Lecidea lactea* Flörke ex Schäerer – Exit Glacier Campground, near Exit Glacier Creek, on river cobble, *McCune 36419*; *Skilak* nunatak within Harding Icefield, on rock on ridge, *McCune 36909* (but excrete I– (LM) and medulla I+ weak violet (DM)).

*Lecidea lapicida* (Ach.) Ach. – Occasional on rock, sea level to alpine.

*Lecidea cf. melaphanoides* Nyl. – Ridge above Exit Glacier, on flushed boulders, metasedimentary rock, *Schultz 16928e*. Identification uncertain: thallus areolate, distinctly epilithic, medulla I–, K–, C–, apothecia black, disc not unbonate, proper margin thin, black, dark reddish-brown even in thin sections, hypothecium reddish-brown, extending downwards as stipe, ephymenium grayish brown, paraphyses conglutinated, terminal cells only slightly widened, not moniliform, K–; asci *Lecidea* type (or similar), not *Teloschistes* type, ascospores 8 in ascus, ellipsoid, 10–13.5 × 5–6 μm, sometimes somewhat bean-shaped, not halonate.

*Lecidea plana* (J. Lahm) Nyl. – Bear Glacier nunatak, on rock, *McCune 36922* (TLC: planaic or confluentic acid).

*Lecidea pruenaubila* Nyl. – Exit Glacier Campground, near Exit Glacier Creek, on river cobble, *McCune 36420, 36433*; near Harding Icefield Trail, ridge above Exit Glacier, on rock, *McCune 36371*; north of Exit Glacier Visitor Center, on rock, *McCune 36009*, TLC: stictic acid.

*Lecidea praeterrissa* Tønsberg – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of *Alnus incana*, *Tønsberg 44928*.

*Lecidea protabacina* Nyl. – *Skilak* nunatak within Harding Icefield, on rock, dry talus, *McCune 36831b, 36880* (TLC: stictic acid).
Lecidea roseotincta Coppins & Tønsberg – Occasional on Alnus and Salix bark.

Lecidea sarcogynoides Körber – Skilak nunatak within Harding Icefield, on rock on ridge, McCune 36904, 36905 (McCune 2017). Apparently rare in North America; previously reported from southeastern Canada and Pennsylvania by McMullin and Lendemer (2013); see range map in Hertel (2006) and description and key in McCune (2017, p. 353).

Lecidea sp. – Bear Glacier nunatak, on rock, McCune 36923.

Leciophysma saximontanum McCune & Schultz (Rutstr.) Goeth. Schneider & Hertel – Harding Icefield Trail en route to high cliffs, on organic soil, Rosentreter 19231, Tønsberg 45556; near Harding Icefield Trail, ridge above Exit Glacier, on soil over rock, McCune 36378; Skilak nunatak within Harding Icefield, on soil, McCune 36080, 36884.

Leciophysis saximonatanum (T. Sprib., P. M. Jorg. & M. Schultz) P. M. Jorg., Wedin & S. Ekman – On Populus balsamifera, mid trunk; north of Exit Glacier Visitor Center, Schultz 16752; north of Exit Glacier Visitor Center, Schultz 16731b; west of Resurrection River and north of Exit Glacier Road, Schultz 16958b.

Lepraria neglecta (Ach.) Hafellner – Occasional on organic matter, mosses, soil over rock, and alpine sod.

Lepraria athabasca (Nyl.) Hafellner – Common on both hardwoods and conifers, including both strains I and II (the strains with different fatty acid profiles; numerous specimens with TLC by Tønsberg).

Lepraria panysa (Ach.) Hafellner – FIA plot Lake 201310829, on moss, Hutten 16235a (thallus UV+ white, C-, P-, K- or slightly brownish, KC- or weak).

Lepraria albicans (Th. Fr.) Lendemer & Hodkinson – Harding Icefield Trail, lower slope, on rock, McCune 36463 (Lamb chemotype III).

Lepraria alpina (de Lesd.) Tretiach & Baruffo – McCune 36464 (Lamb chemotype III).

Lepraria aff. borealis Loht. & Tønsberg – Part of Lepraria neglecta s.l., see Table 4. Occasional on rock and bark as well as on mosses or soil over those substrates.

Lepraria eburnea J. R. Laundon – Near pond at north end of Three Hole Bay off Aialik Bay, on wood inside hollow trunk of Tsuga, Tønsberg 45532, on bark on rim of cavity formed by hollow trunk of Tsuga, Tønsberg 45533 (TLC: alectoroidal acid with satellite, protocetraric acid).

Lepraria elobata Tønsberg – East side of Harris Bay, steep chasm, on deeply shaded rock facing overhang, Tønsberg 45425; north arm of spit across James Lagoon, on hanging roots in shaded cavity in soil bank, Tønsberg 45436 (TLC of both: atranorin, zeorin, stictic acid with satellites).

Lepraria finkii (Hue) R. C. Harris – Crater Bay off of Harris Bay, on moss on vertical, deeply shaded face of boulder, Tønsberg 45438; north arm of spit across James Lagoon, on shaded root of Picea stichensis, Tønsberg 45531; on soil, Tønsberg 45350 (TLC of both: atranorin, stictic acid with satellites, zeorin).

Lepraria rigidula (B. de Lesd.) Tønsberg – West shore of Beauty Bay, on trunk of Picea stichensis, Tønsberg 45123. TLC: atranorin, nephosteranic (major), unidentified fatty acids.

Lepraria svalbardensis Tønsberg – Part of Lepraria neglecta s.l., see Table 4.

Lepraria torii Pérez-Ortega & T. Sprib. – Near pond at north end of Three Hole Bay off Aialik Bay, on wood inside hollow trunk of Tsuga, Tønsberg 45531a; Verdant Cove, hill above, on bark of root in cavity under Tsuga, Tønsberg 45462; west shore of Beauty Bay, on bark in shallow cavity at base of Picea, Tønsberg 45075.

Lepraria voualii (Hue) R. C. Harris – Near Harding Icefield Trail, ridge above Exit Glacier, on moss and detritus under overhang, Tønsberg 45389 (TLC: six substances including pannaric acid-6-methylster, 4-oxypannaric acid-6-methylster); west shore of Beauty Bay, on moss on overhanging schistose rock wall on seashore, Tønsberg 45069 (TLC: pannaric acid-6-methylster, 4-oxypannaric acid-6-methylster, unidentified dienobenzofuran).

Leptogium cookii D. F. Stone, F. Anderson & J. W. Hinds – Near mouth of creek at north end of James Lagoon, on Salix, Tønsberg 45342 (ITS sequence, GenBank MN906301); on Populus balsamifera, Schultz 16702a. The ITS sequence fell in a supported clade with specimens named L. burnetiae, L. hirsutum, and L. compactum, but the sequence is not a close match with any other sequences in GenBank.

Leptogium compactum D. F. Stone, F. Anderson & J. W. Hinds – Near Exit Glacier Road, floodplain of Resurrection River, on Populus, McCune 35944 (det. D. Stone 2016), Rosentreter 19015.

Leptogium cf. burnetiae C. W. Dodge – Near Exit Glacier, on Populus tremuloides, Tønsberg 45019a (GenBank MN906301); on Populus balsamifera, Schultz 1672a. The ITS sequence fell in a supported clade with specimens named L. burnetiae, L. hirsutum, and L. compactum, but the sequence is not a close match with any other sequences in GenBank.

Leptogium pyriforme Dickson – Exit Glacier Campground, near Exit Glacier Creek, on Populus balsamifera, McCune 36449 (L. saturninum s.str., det. Stone 2016); Rosentreter 19268; near mouth of creek at north end of...
James Lagoon, on Salix bark, Rosentreter 19101; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus balsamifera, Schulz 16702b; on Alnus bark, Rosentreter 18994; west of Resurrection River and north of Exit Glacier Road, on Populus bark, Rosentreter 19306; on Alnus bark, Rosentreter 19305. As shown by Stone et al. (2016) and confirmed by us, L. saturninum is polyphyletic, even after four new species were segregated, leaving two main clades of L. saturninum. The specimen we sequenced (Schulz 16702b) falls in the clade with the Scottish epitype (Stone et al. 2016, p. 415) and is presumed to be L. saturninum s.str.

† Lichenodiplis sp. – Skilak nunatak within Harding Icefield, on saxicolous lichen (gray unknown crust), dry talus slope, McCune 36881.

Lichenomphalia umbellifera (L.: Fr.) Redhead, Lutzoni, Moncalvo & Vilgalys – Crater Bay South, on moderately decayed wood, Walton 18072; FIA plot at Chance Cove, on decayed wood, Walton 19065.

Lichinodium ahlneri Henssen – Near North Arm Nuka Bay Public Use Cabin, on Picea twig, McCune 36109, Rosentreter 19076, Schulz 16785, 16799, Tønsberg 45197; near pond at north end of Three Hole Bay off Aialik Bay, on Picea twigs, Schulz 16919c.

Lichinodium canadense Henssen – Crater Bay off of Harris Bay, on dead moss near creek just uplift from rocky beach, Tønsberg 45439; peninsula into Three Hole Bay off Aialik Bay, on twigs of dwarf Tsuga mertensiana, Tønsberg 45507a.

Lichinodium sirophioides Nyl. – West shore of Beauty Bay, on noncalcareous metasedimentary rock, Schulz 16762, on Picea, shaded mid trunk, Schulz 16765.

Lobaria anomalata (Brodo & Ahti) T. Sprib. & McCune – Occasional on bark and wood, both hardwoods and conifers.

Lobaria hollii (Tuck.) Zahlbr. – Occasional, mainly on Populus, also on Alnus and Salix.

Lobaria linita (Ach.) Rabenh. – Common on mossy rock, alpine sod, and tree trunks, from sea level to alpine.

Lobaria oregana (Tuck.) Müll. Arg. – Occasional on bark and wood, both hardwoods and conifers.

Lobaria pulmonaria (L.) Hoffm. – Occasional on bark and wood, both hardwoods and conifers.

Lobaria scrobiculata (Scop.) DC. – Occasional on bark and wood, both hardwoods and conifers. Krog (1968) discussed variation in the spot tests. P- specimens are identified in her collections as ‘Lobaria alaskana’, apparently an unpublished name. She concluded that ‘because of the chemical instability of this species, no attempt has been made to separate the different chemical strains.’

Lopadium disciforme (Flotow) Kull. – Occasional on conifer bark.

Lopadium pezizoides (Ach.) Körber – FIAplot Lake_20120829, on thin mineral soil, Huutten 16234; Skilak nunatak within Harding Icefield, on moss over rock, McCune 36836; Verdant Cove, north side at shoreline, on moss on trunk of Picea sitchensis, Tønsberg 45453.

Loxospora elatina (Ach.) A. Massal. – Hill above Verdant Cove, on trunk of Tsuga in old-growth forest, Tønsberg 45461. TLC: thamnolic acid, 1-ellatic acid (trace).

Loxosporopsis corallifera Brodo, Henssen & Imshaug – Common on both hardwoods and conifers near sea level.

Massalongia carnosa (Dickson) Körber – Occasional on moss over rock.

Mastodia tessellata (Hook. f. & Harv.) Hook. f. & Harv. – Bay on east side and south end of McCarty Fjord, on shoreline granite outcrop, McCune 36130b, Schulz 16818; near pond at north end of Three Hole Bay off Aialik Bay, on seaside rock, Rosentreter 19227; north arm of spit across James Lagoon, on boulder on tidal flat, McCune 36175b, Schulz 16853 (GenBank MN952977), Tønsberg 45383.

Megalaria brodoana S. Ekman & Tønsberg – Bay on east side and south end of McCarty Fjord, on Alnus just above rocky beach, Tønsberg 45268b (fertile, but juvenile, no ascii or spores); near pond at north end of Three Hole Bay off Aialik Bay, Tønsberg 45521, 45537; peninsula into Three Hole Bay off Aialik Bay, on twigs of dwarf Tsuga mertensiana, Tønsberg 45304a (sterile).

Megalospora aff. tuberculosa (Fée) Simpan – Near pond at north end of Three Hole Bay off Aialik Bay, on Alnus, Tønsberg 45517.

Melanelia agnata (Nyl.) Thell – Exit Glacier Campground, near Exit Glacier Creek, on river cobble, McCune 36430 (det. Esslinger 2016).

Melanelia hepatitis (Ach.) Thell – Occasional at high elevations, mainly on rock, also on alpine sod.

Melanohalea exasperatula (De Not.) O. Blanco et al. – North arm of spit across James Lagoon, on Vaccinium twigs, Walton 19541; north arm of spit across James Lagoon, on hardwood bark, Walton 19551.

Melanohalea multispora (A. Schneider) O. Blanco et al. – Exit Glacier Campground, near Exit Glacier Creek, on Alnus bark, Rosentreter 19271; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus incana twigs, Schulz 16690; west of Resurrection River and north of Exit Glacier Road, on Alnus, Schulz 16962a.

Melanohalea olivacea (L.) O. Blanco et al. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on hardwood bark, Walton 19553 (det. Esslinger 2016).

Micarea anterior (Nyl.) Hedl. – West of Resurrection River and north of Exit Glacier Road, on hard wood of snag, Schulz 16961.

Micarea botryoides (Nyl.) Coppins – Near pond at north end of Three Hole Bay off Aialik Bay, on bark, sheltered Tsuga base, McCune 36355; on wood inside hollow trunk of Tsuga, Tønsberg 45531b (M. aff. botryoides; sterile, with stalked, branched pycnidia; pycnidal wall K+ brown, not K+ green as in typical M. botryoides).

Micarea cinerea (Schaerer) Hedl. – Near North Arm Nuka Bay Public Use Cabin, on trunk of Picea sitchensis, Tønsberg 45188, 45208; on Alnus Tønsberg 45235; north of Pilot Harbor on North Arm of Nuka Bay, on Alnus viridis, Tønsberg 45145. TLC: gyrophoric acid (major), 5-O-methylisic acid (submajor), lecanoric acid (trace), or with gyrophoric acid as the only major substance.

Micarea denigrata (Fr.) Hedl. – Near pond at north end of Three Hole Bay off Aialik Bay, on wood, base of conifer snag, McCune 36358; north of Pilot Harbor on North Arm of Nuka Bay, on wood, soft conifer snag, McCune 36091; west shore of Beauty Bay, on beach log, McCune 36029 (with pycnidia only).

Micarea incrassata Hedl. – National Park Service weather station, McArthur Ridge, on alpine sod, McCune 36059, 36962.

Micarea lignaria (Ach.) Hedl. – North of Pilot Harbor on North Arm of Nuka Bay, on shoreline rocks, Schulz 16777 (ascospores fusiform (2)4–6-celled, hypothecium pale, ephymenium blue green, hymenium C–); north of Pilot Harbor on North Arm of Nuka Bay, on overhanging rock facing sea, Tønsberg 45165 (TLC: argopsin; ascospores 4–7-septate, 19–26 × 5 µm).
Micarea misella (Nyl.) Hedl. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus wood, McCune 35955.

Micarea peliocaarpa (Anzi) Copp. & R. Sant. – Occasional on bark and rotten wood. In one case, Tønsberg 45147. TLC showed gyrophoric (major) and possibly 5-O-methylhiasic acids; apothecia greyish brown and many ascosporae too large for typical M. peliocaarpa: (16)19–25 × 4–4.5 µm. This material requires more study.

Micarea prasina Fr. s.l. – North of Pilot Harbor on North Arm of Nuka Bay, on Alnus viridis, Tønsberg 45146.

Micarea prasineula (Jatta) I. M. Lamb – Near pond at north end of Three Hole Bay off Aialik Bay, on mossy root, Tønsberg 45526 (TLC: gyrophoric (major) and lecanoric acids); northwest Lagoon Beach, on decorticate Picea sitchensis branch, Walton 16111.

Micarea synnotheoides (Nyl.) Copp. – West of Resurrection River and north of Exit Glacier Road, on trunks of Alnus incana in swamp, Tønsberg 45638a, b.

Micarea turfosa (A. Massal.) Du Rietz – Peninsula into Three Hole Bay off Aialik Bay, slope bog with scattered Tsuga mertensiana and granitic outcrops, on decaying moss, Schultz 16914d.

Micarea xanthonica Copp. & Tønsberg – Near pond at north end of Three Hole Bay off Aialik Bay, on bark, rotten base of Thuja, McCune 36362.

Miriquiryca atrofulva (Sommerf.) A. J. Schwab & Rambold – North of Exit Glacier Visitor Center, on rock, semi-shaded boulder, McCune 36008 (TLC: stictic acid); Skilak nunatak within Harding Icefield, on rock, dry talus, McCune 36041.

Miriquiryca gyrizans Fryday – National Park Service weather station, McArthur Ridge, on rock, talus in small ravine, McCune 36089, 36990b; near Harding Icefield Trail, ridge above Exit Glacier, on rock, stones in flat area with late snow, McCune 36309 (TLC: miriquidic acid). This distinctive, recently described species has an umbonate to gyrose disk and K+ magenta exciple (Spribille et al. 2020).

Miriquiryca instrata (Nyl.) Divak et al. – Harding Icefield Trail, ridge above Exit Glacier, on rock, dry talus, McCune 36821.

Miriquiryca nigroleprosa (Vainio) Hertl & Rambold – Coleman Bay; northeast end, off Aialik Bay, on rock, McCune 36010.

Miriquiryca subplumba (Anzi) Cl. Roux – Skilak nunatak within Harding Icefield, on rock, dry talus, McCune 36831b, 36883.

Moelleropsis nebulosa (Hoffm.) Geyeln. – Crater Bay off of Harris Bay, on moss on granite, steep mossy rock face, Schultz 16888 (thallus corticate, cellular inside; photobiont Nostoc).

Montanella panniformis (Nyl.) Divak et al. – Harding Icefield Trail, ridge above Exit Glacier, on rock, McCune 36373.

Montanella sorediata (Oxner) Divak et al. – Harding Icefield Trail, lower slope, on rock, McCune 36459, Walton 19561; Harding Icefield Trail en route to high cliffs, on vertical face of outcrop, Walton 19537.

Mycobilimbia epixanthoides (Nyl.) Vittik. et al. – Near Harding Icefield Trail, ridge above Exit Glacier, on moss and detritus on ± overhanging face of boulder, Tønsberg 45358 (leprose, richly fertile; thallus C–).

Mycoblastus tetrameria (De Not.) Vittik., Ahti, Kuusinen, Lommi & T. Ulvinen – Near Harding Icefield Trail, ridge above Exit Glacier, on ground in snowbed, Tønsberg 45580 (TLC: nil; ascosporae 3-septate, 14–18 × 5–5.5 µm); near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Populus base, McCune 35953; north of Exit Glacier Visitor Center, on moss at base of Populus tremuloides, Tønsberg 45040; west shore of Beauty Bay, on organic matter, Rosenreuter 19034.

Mycochlados affinis (Schaerer) Schauer – Occasional on wood, moss over rock, and bark, both conifers and hardwoods.

Mycochlados caesius (Coppens & P. James) Tønsberg – Common, mainly on Alnus, also on Picea. TLC of many specimens: perlaticolic acid.

Mycochlados sanguinarius (L.) Norman – Common on bark, wood, moss over rock, and detritus.

Myrchoidea rufofusca (Anzi) Printzen, T. Sprib. & Tønsberg – Near Harding Icefield Trail, ridge above Exit Glacier, on twig, ericaceous shrub, McCune 36410, Tønsberg 45585 (TLC: various xanthones).

Myriolecis dispersa group – Exit Glacier Campground, near Exit Glacier Creek, on cyanobacteria and Tingiopsidium on rock, McCune 36428; northeast end of Harris Bay, edge of estuary, on side of large exposed granitic boulder, Schultz 16870a.

Myriolecis cf. contractula (Nyl.) Śliwa, Zhao Xin & Lumbsch – Crater Bay off of Harris Bay, on seashore rocks 1–3 m above high tide line, Tønsberg 45443 (TLC: gyrophoric, unidentified xanthones); forming small, rounded, slightly lobate, richly fertile patches to a few mm diam. on the thallus of Buellia (Amandinea) coniops.

Myriolecis sp. (Lecanora sp. 5 of Brodo 2010) – North arm of spit across James Lagoon, on rock influenced by sea spray, McCune 36170, Schultz 16842, 16850.

Myironora albidula (Willey) R. C. Harris – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus incana, Tønsberg 44980, 44999; west of Resurrection River and north of Exit Glacier Road, on Alnus incana, Tønsberg 45635, 45647b, 45660c (TLC: five fatty acids (strain I); thallus distinctly zoned).

Myriorysopa myochroa (M. Westb.) K. Knudsen & Arcadia – West shore of Beauty Bay, on exposed noncalcareous metasedimentary rock, steep, flushed or sprayed boulders directly on beach, Schultz 16749a. The species occurred with Lecanora fujiansis, thus salt influence seems clear. Similar in morphology to M. smaragdula, M. myochroa was separated from that species as in the key couplets in Westberg et al. (2011) and Purvis et al. (2018, p. 110). New to North America, previously known from coastal Fennoscandia and U.K.

Myriorysopa smaragdula (Wahlenb. ex Ach.) Någeli ex Uloth – Headland between two arms of Coleman Bay, on rock, damp metasedimentary cliffs, McCune 36323; north of Pilot Harbor on North Arm of Nuka Bay, on shoreline rock above high tide line, McCune 36082.

†† Naeterocybe punctiformis (Schrani) R. C. Harris – Near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36147; west shore of Beauty Bay, on Alnus bark, McCune 36043 (both det. Breuss 2016).

Nepheroma arcticum (L.) Torres. – Near Harding Icefield Trail en route to high cliffs, on tundra soil, Rosenreuter 19234; near Harding Icefield Trail, ridge above Exit Glacier, on ground, Walton 19496; Marathon Mt. (Krog 1968).

Nepheroma bellum (Sprengel) Tuck. – Occasional on both hardwoods and conifers.
Nephroma expallidum (Nyl.) Nyl. – Marathon Mt. (Krog 1968); Wosnesenski Glacier nunatak, Walton 19621.

Nephroma helveticum Ach. – Occasional on both hardwoods and conifers.

Nephroma isidiosum (Nyl.) Gyzelnik – Occasional on bark of Salix and Alnus.

Nephroma laevigatum (Nyl.) Nyl. – Seward (Krog 1968).

Nephroma parile (Ach.) Ach. – Common on both hardwoods and conifers.

Nephroma resupinatum (L.) Ach. – Occasional on Salix, Picea, and rotten wood.

Nephromopsis chlorophylla (Willd.) Divakar, Crespo & Lumbsch (= Cetraria chlorophylla) – Occasional on conifer and Alnus twigs, wood and bark.

Nephromopsis cucullata (Bellardi) Divakar, Crespo & Lumbsch (= Cetraria cucullata) – Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36865.

Nephromopsis nivalis (L.) Divakar, Crespo & Lumbsch (= Cetraria nivalis) – Skilak nunatak within Harding Icefield, on alpine sod, northwest slope, McCune 36898.

Ochrolechia alaskana (Vers.) Kukwa – Skilak nunatak within Harding Icefield, on moss over rock, dry talus, McCune 36833.

Ochrolechia androgyna (Hoffm.) Arnold – North arm of spit across James Lagoon, on trunk of Picea sitchensiana, Tønsberg 45360b (TLC: gyrohoric (major), lecanoronic, and fatty acids).

Ochrolechia balsiensis H. Magn. – Hill above Verdant Cove, on trunk of huge Picea in old-growth forest, Tønsberg 45459 (TLC: gyrohoric (major), lecanoronic, and 2–3 fatty acids (in the murolic acid complex). Thallus white, very thin; apparently new to North America.

Ochrolechia cooperi T. Sprib. – Near pond at north end of Three Hole Bay off Aialik Bay, on trunk of Tsuga mertensiana, Tønsberg 45528a (TLC: gyrohoric (major) and lecanoronic acids; one aposphecium, but not very well developed); on base of Picea sitchensis, Tønsberg 45534 (TLC: gyrohoric (major) and lecanoronic acids); peninsula into Three Hole Bay off Aialik Bay, on trunk of Tsuga mertensiana, Tønsberg 45512 (this specimen also cited by Spribille et al. (2020); TLC: gyrohoric (major) and lecanoronic acids; isidiolate, sterile), Tønsberg 45513. The recently described species is distinctive in having coralloid isidia (Spribille et al. 2020).

Ochrolechia frigida (Sw.) Lyngc – Occasional at high elevations on soil, organic matter, rock, and other lichens.

Ochrolechia juvencalis Brodo – North end of Harris Bay, near opening to Northwestern Lagoon, on twigs of mostly young Picea sitchensis, Tønsberg 45394 (TLC: gyrohoric (major) and variolaric (possible trace) acids); near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36138; west of Resurrection River and north of Exit Glacier Road, on Picea bark, Rosentreter 19297.

Ochrolechia cf. laevigata (Räsänen) Vers. Vergeby ex Brodo – Near mouth of creek at north end of James Lagoon, on Salix in Salix-Alnus thicket, Tønsberg 45309 (TLC: gyrohoric acid); near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Tønsberg 44989a (TLC: gyrohoric acid).

Ochrolechia mahuensis Räsänen – Occasional on Alnus and Picea. TLC of all specimens by Tønsberg: gyrohoric acid (major) with lecanoronic acid.

Ochrolechia oregonensis H. Magn. – Common on bark and wood, both conifers and hardwoods.

Ochrolechia subplicans subsp. hultenii (Erichsen) Brodo – Northeast end of Harris Bay, edge of estuary, on rock, McCune 36229; NPS weather station, McArthur Ridge, on rock, McCune 36945; north of Pilot Harbor on North Arm of Nuka Bay, on rock just above high tide line, McCune 36072, 36073; north side of Verdant Cove, on shoreline granite, McCune 36270, Tønsberg 45443a (TLC: gyrohoric and variolaric acids, and an unknown, probably alectoronic acid). Although our observations along the Pacific coast generally agree with Brodo’s (1968) conclusion that subsp. hultenii occurs on coastal rocks while subsp. subplicans typically occurs on well-elevated ridges along the coast south to Oregon, we found only subsp. hultenii in Kenai Fjords, and in both habitats.

Ochrolechia szataläensis Vers. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, Tønsberg 45008, 45010 (TLC: variolaric acid).

Ochrolechia tartarea (L.) A. Massal. – Northeast end of Harris Bay, edge of estuary, on rock, McCune 36232.

Ochrolechia xanthostoma (Sommer.) K. Schmitz & Lumbsch – Fairly common on various substrates, including Alnus bark, Salix bark, Picea branches and trunks, decayed or hard decorticate wood, tree bases, shoreline rock above high tide line.

Ochrolechia sp. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44936 (TLC: gyrohoric, lecanoronic and variolaric acids); near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on sloping trunk of Alnus incana in floodplain, Tønsberg 44989c (TLC: gyrohoric (major), lecanoronic (tr.), and variolaric acids, atranorin (tr.). This material is sterile and sorediate. It has the same chemistry as O. alaskana and O. aegrea, but these are terricolous (rarely saxicolous) and saxicolous, respectively, according to Kukwa (2011) and accepted by Brodo (2016), but Kukwa (2011, p. 32) cited a corticolous specimen of ‘O. androgyna D’ from Norway as O. alaskana. The specimens from Kenai Fjords may represent the sorediate counterpart of O. juvencalis, a corticolous species with variolaric acid, or they may be a new species. The ITS sequence for Tønsberg 44936 (GenBank MN906300) supports the hypothesis that it may be the sorediate counterpart to O. juvencalis, but that species is represented by only one sequence in GenBank.

Ophioparma ventosa (L.) Norman – National Park Service weather station, McArthur Ridge, on rock, McCune 36949.

Orphiopora moriopsis (A. Massal.) D. Hawksw. – Skilak nunatak within Harding Icefield, on rock on ridge, McCune 36907; on dry talus, McCune 36830.

Paliella schizochromatica (Pérez-Ort., T. Sprib. & Printzen) Rodr. Flakus & Printzen – North end of Harris Bay, near opening to Northwestern Lagoon, on Alnus bark, McCune 36216; near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36140, 36141.

Parmelia hygrophila Goward & Ahit – Northeast end of Harris Bay, edge of estuary, on boulder, Walton 19542; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35965, 35998; on Picea, Rosentreter 19022; on Populus, Rosentreter 18895; west shore of Beauty Bay, on Picea twig, McCune 36062.

Parmelia omphalodes (L.) Ach. – National Park Service weather station, McArthur Ridge, on sheltered rock, McCune 36981, Walton 19455; Skilak nunatak within Harding Icefield, on lichens over rock, dry talus, McCune 36816.

Parmelia pseudosulcata Gyzelnik – Occasional on bark and wood of conifers.
Parmelia saxatilis (L.) Ach. – Common on bark, wood, and rock.

Parmelia squarrosa Hale – West shore of Beauty Bay, on bark, Rosentreter 19057.

Parmelia sulcata Taylor – FIA plot at Square Bay South, in litterfall, Walton 18013; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on Alnus, McCune 35988; west shore of Beauty Bay, on bark, Rosentreter 19055.

Parmeliella parvula P. M. Jorg. – Near mouth of creek at north end of James Lagoon, on Salix, Tønsberg 45336; near North Arm Nuka Bay Public Use Cabin, on Picea twigs and trunk, Schultz 16788, 16798, Tønsberg 45199, 45206; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44953; west shore of Beauty Bay, on Picea, Schultz 16761.

Parmeliella triptophylla (Ach.) Müll. Arg. – Occasional on rock, moss over rock, and Populus bark, from sea level to alpine.

Parmeliopsis ambiguus (Wulfen) Nyl. – West of Resurrection River and north of Exit Glacier Road, on bark, Walton 19407.

Parmeliopsis hyperopta (Ach.) Arnold – Occasional on bark and wood of both conifers and hardwoods.

Peltigera aphthosa (L.) Willd. – Exit Glacier Campground, near Exit Glacier Creek, on soil, Rosentreter 19277; near Harding Icefield Trail, ridge above Exit Glacier, on soil, Walton 19403; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on soil, Rosentreter 19899; Skilak nunatak within Harding Icefield, on soil in rock crevice, northwest slope, McCune 36892.

Peltigera britannica (Gyelnik) Holt.-Hartw. & Tønsberg – Common on soil, moss, rotten wood, and mossy rock, including both the chloromorph, free-living cyanomorph, and composite thallii.

Peltigera collina (Ach.) Schrader – Common on tree, shrubs, and mossy rock.

Peltigera didactyla (With.) J. R. Laundon – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 19512; near Harding Icefield Trail, ridge above Exit Glacier, on soil, Walton 19418; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on soil, Rosentreter 19293. TLC: fumarprotocetraric acid.

Peltigera extenuata (Vainio) Losjak – Occasional on mossy rock and soil.

Peltigera hymenina (Ach.) Delise – Crater Bay South, on moss over boulder, Walton 18071.

Peltigera kirstinssonii vitik. – North of Exit Glacier Visitor Center, on semi-shaded boulder, McCune 36012, 36013.

Peltigera lepidophora (Nyl. ex Vainio) Bitter – Exit Glacier Campground, near Exit Glacier Creek, on soil, Walton 19381; Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36859.

Peltigera leucophlebia (Nyl.) Gyelnik – Occasional on moss over rock, soil, and tree bases.

Peltigera malacea (Ach.) Funck – Occasional on moss over rock, near sea level to alpine.

Peltigera membranacea (Ach.) Nyl. – Occasional on mineral soil and organic matter.

Peltigera neopolydactyla (Gyelnik) Gyelnik s.l. – Occasional on forest floor, humic soil, moss over wood, tree bases.

Peltigera polydactylon (Neck.) Hoffm. – Reported by Krog (1968) from Marathon Mt. and Seward, but because of the broad species concept at that time, the material must be re-examined.
35954; on trunks of *Alnus* on floodplain, *Tonsberg* 45015; north of Exit Glacier Visitor Center, on bark, *Populus*, McCune 36024b, *Tonsberg* 45026, 45034; west of Resurrection River and north of Exit Glacier Road, on *Populus balsamifera* bark, McCune 36484.

**Pertusaria subambigens** Dibben – North arm of spit across James Lagoon, on *Picea* twig, McCune 36161.

**Pertusaria suboculata** Brodo & Dibben – Alpine lake system on Harris Peninsula, on dead plants in snow accumulation area, McCune 36997; NPS weather station, McCune 36960; near pond at north end of Three Hole Bay off Aialik Bay, on base of *Elliottia pyrolophila*, *Tonsberg* 45272a, 45498; hill above Verdant Cove, on bark at base of *Elliottia pyrolophila* in old forest, *Tonsberg* 45455. Similar to *P. glaucoma* but with trace to minor amounts of fumarprotocetraric acid and with medulla of thalline margin of apothecia P+ orange.

†† **Phaeocalicium populneum** (Brond. ex Duby) A. F. W. Schmidt – Exit Glacier Campground, near Exit Glacier floodplain, on *Populus* twig, McCune 36453.

**Phaeophyscia decolor** (Kashiw.) Essl. – Near Harding Icefield Trail en route to high cliffs, on vertical face of rock outcrop, Walton 19540; north of Exit Glacier Visitor Center, on top of mossy boulder, Schultz 16736b; south of Exit Glacier Visitor Center, on rock, Rosentreter 19286a.

**Phaeophyscia pusilloides** (Zahlbr.) Essl. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on rock, Walton 19552.

**Phaeophyscia sciastra** (Ach.) Moberg – Harding Icefield Trail en route to high cliffs, on vertical face of rock outcrop, Walton 19540.

**Phaeorrhiza nimbosa** (Fr.) H. Mayrh. & Poelt – Near Harding Icefield Trail en route to high cliffs, on tundra soil, Rosentreter 19243.

**Phylliscum demangeonii** (Moug. & Mont.) Nyl. – Occasional on rock, sheltered or exposed.

**Phylliscum tenue** Hensssen – Near Harding Icefield Trail, ridge above glacier, Schulz 16933. The Kenai material matches samples from Oregon (Schultz 16422, 16423). Previously reported from Alaska by Thomson and Ahti (1994). The thallus is small squamulose and thus intermediate between typical *Phylliscum* and *Pyrenopsis*. The presence of true paraphyses and asci with rounded tips suggest that *Phylliscum tenue* is closer to *Pyrenopsis* (as are perhaps all members of the *Phylliscum macrosporum* group).

**Physcia alnophila** (Vainio) Lohtander et al. – Occasional on hardwoods at low elevations.

**Physcia caesia** (Hoffm.) Fürn. – Common on rock, including near shoreline.

**Physcia dubia** (Hoffm.) Lettau – Verdant Cove, north side at shoreline, on rock, McCune 36277a (very small but lower cortex distinctly prosoplectenchymatous, medulla K-, labriform soralia sparse and not on all thalli).

**Physcionia grumosa** Kashiw. & Poelt – West of Resurrection River and north of Exit Glacier Road, on *Populus* bark, McCune 36491b.

**Physcionia perisidiosa** (Erichsen) Moberg – Occasional on *Populus* bark. Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, Walton 19564; north of Exit Glacier Visitor Center, McCune 36026 (ITS sequence KY990721, see Esslinger et al. 2017); west of Resurrection River and north of Exit Glacier Road, McCune 36491a (ITS sequence KY990722, see Esslinger et al. 2017).

**Picoclia ochrophora** (Nyl.) Hafellner – Near Park entrance on Exit Glacier River, floodplain of Resurrection River, on trunk of *Alnus incana*, *Tonsberg* 45021a (with *Buella griseovirens*). This species is very widespread, being known from western North America south and east to Florida, with most North American records from the Great Plains (numerous records by C. Morse in KANU). Most species in the genus are tropical. Given that distribution, this occurrence in a cold oceanic climate is quite surprising and deserves more study.

**Pilophoropsis acicularis** (Ach.) Th. Fr. – Occasional on rock at low elevations. *Tonsberg* 45246 (TLC: atranorin, zeorin, and porphyrilic acid); *Tonsberg* 45430 (TLC: atranorin, zeorin, unknown in Rf classes A7 B’7 C7, unknown A2 B’2 C2). Both cited specimens were verified as *P. acicularis* with DNA sequences by *R. Pino-Bodas* (pers. comm., 2018).

**Pilophoropsis clavatus** Th. Fr. – Occasional on rock at low elevations, often shaded. Confirmed with ITS sequence by *R. Pino-Bodas* (pers. comm.) of *McCune* 36289.

**Pilophoropsis nigricaulis** Sató – Common on rock, near sea level to alpine, often in areas of snow accumulation. Confirmed with ITS sequences by *R. Pino-Bodas* of *McCune* 37004 and 36251 and *Tonsberg* 45418 (R. Pino-Bodas, pers. comm.).

**Pilophorus segregation** Krog – East side of Harris Bay, steep chasm, on granite, *Tonsberg* 45429, confirmed with DNA sequence by *R. Pino-Bodas* (pers. comm., 2018).

**Pilophorus sp.** – Northeast end of Harris Bay, edge of estuary, on rock, *Tonsberg* 45418 (in part, with *P. nigricaulis*). This forthcoming species is similar in many ways to *P. nigricaulis* and occurs with it in some of the same habitats (R. Pino-Bodas, unpubl.).

**Placopsis ciliata** (Nyl.) Räsänen – Headland between two arms of Coleman Bay, on vertical wall of boulder facing sea, *Tonsberg* 45485a; spat across James Lagoon, on loose rocks on sloping dune face, Schultz 16858, *Tonsberg* 45392, 45393.

**Placopsis gelida** (L.) Lindsay s.l. – Northwest Lagoon Beach, on rock, *Hutten* 16166; spat across James Lagoon, on metam sedimentary rock, Schultz 16859.

**Placopsis lombii** Hertel & V. Wirth – Common on rock at low elevations. TLC: 5-O-methylhyalascic (major), gyrophoric, and lecanoric (trace) acids.

**Placyniella icmalea** (Ach.) Coppins & P. James – Near mouth of creek at north end of James Lagoon, on driftwood on upper part of beach, *Tonsberg* 45287 (TLC: gyrophoric and 5-O-methylhyalascic acids).

**Placyniella sp.** – Near mouth of creek at north end of James Lagoon, on driftwood on upper part of beach, *Tonsberg* 45287 (TLC: gyrophoric acid with satellites); *Tonsberg* 45277 (TLC: nil). This sorediate species is not *P. dasaea* but could not be assigned to a known species.

**Placyniis asterophorum** (Ach.) Trevisan – Exit Glacier Campground, near Exit Glacier Creek, on cobbles, Schultz 16926a, 16942b; near Harding Icefield Trail, ridge above Exit Glacier, on vertical metam sedimentary rock, on flushed boulders, Schultz 16927b, 16928a.

**Placyniis flabellosum** (Tuck.) Zahlbr. – Near Harding Icefield Trail, ridge above Exit Glacier, on metam sedimentary rock, Schultz 16931.

**Platismatia glauca** (L.) Culb. & C. Culb. – Common on bark and wood, both hardwoods and conifers.

**Platismatia herrei** (Imshaug) Culb. & C. Culb. – Occasional on *Picea* bark.

**Platismatia lacunosa** (Ach.) Culb. & C. Culb. – Common on bark and wood, less often on rock, sea level to subalpine.
Platismatia norvegica (Lyng.) Culb. & C. Culb. – Common on bark and wood, usually on conifers.

Polycantha candelaria (L.) Frödén, Arup & Sochting (= Xanthoria candelaria) – Occasional on bark and wood in locally nutrient enriched habitats.

Polycantha spp. – North arm of spit across James Lagoon, on wood, exposed snag of Picea sitchensis, Tønsberg 45389. The material consists of two probably undescribed species. One sample is like Walton 18670 from Katmai National Park (McCune et al. 2018) and is morphologically very similar to Athallia holocarpa. It grows on wood but belongs in Polycantha. The second part of Tønsberg 45389 has a bright yellow thallus similar to Candelariella and is similar to specimens from Haida Gwaii, B. C. (Brodo 29931, CANL) and is similar to Candelariella.

Polychidium dendriscum (Arnold) Knoph & Hertel – Peninsula into Three Hole Bay off Aialik Bay, slope bog with scattered Tsuga mertensiana and granitic outcrops, on debris, Schultz 16914c.

Polychidium discrimum (Nyl.) Henssen – West shore of Beauty Bay, bark of Alnus viridis just above beach, Tønsberg 45087.

Polychidium muscicola (Sw.) Gray – Occasional on moss over rock.

Porina sp. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of Alnus incana, Tønsberg 44932.

Poroclyphus cocodes (Flot.) Körb. – Near pond at north end of Three Hole Bay off Aialik Bay, exposed shoreline boulders, metasedimentary rock, Schultz 16918c.

Porpidia carlottiana Gowan – East side of Harris Bay, steep chasm, on granite by creek, McCune 36248 (TLC: 2′-O-methylsuperphyllic and glaucophaeic acids); near pond at north end of Three Hole Bay off Aialik Bay, on rock near creek, McCune 36364 (TLC: 2′-O-methylsuperphyllic acid).

Porpidia contraponenda (Arnold) Knoph & Hertel – Peninsula into Three Hole Bay off Aialik Bay, on granite, McCune 36327 (TLC: methyl 2′-O-methylmycorrhizellin); west shore of Beauty Bay, on shaded rock, McCune 36065 (uncertain ID; TLC: nil).

Porpidia crustulata (Ach.) Hertel & Knoph – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on cobble, McCune 36001 (TLC: nil), 36000b.

Porpidia flavocaulerescens (Hornem.) Hertel & A. J. Schwab – Bay on east side and south end of McCarty Fjord, on granite boulder, McCune 36129 (TLC: nil); NPS weather station, McArthur Ridge, on rock, McCune 36944; Skilak nunatak within Harding Icefield, on dry talus, McCune 36827b.

Porpidia hydrophila (Fr.) Hertel & A. J. Schwab – Coleman Bay, above northeast end, off Aialik Bay, on submerged metal-rich rock in creek, Schultz 16909 (uncertain ID; Rosenreiter 19197 det. Schultz).

Porpidia ochrolemma (Vainio) Brodo & R. Sant. – East side of Harris Bay, steep chasm, on granite by creek, McCune 36247 (TLC: nil).

Porpidia soredizodes (Lamy ex Nyl.) J. R. Laundon – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on rock, cobble, McCune 36000c.

Porpidia thomsonii Gowan – Common on rock, near sea level to alpine; TLC: stictic acid or nil.

Porpidia tuberculosa (Sm.) Hertel & Knoph – Coleman Bay, above northeast end, off Aialik Bay, on rock in creek bed, McCune 36312 (TLC: atranorin, confluentic and 2′-O-methylvimorophyllinic acids); Exit Glacier Campground, near Exit Glacier Creek, on river cobble, McCune 36446 (TLC: confluentic acid).

Protonicaea limosa (Ach.) Hafellner – Occasional on soil or organic debris, low elevations to alpine.

Protopannaria pezioides (Weber) P. M. Jorg. & S. Ekman – Common on soil over rock, detritus, moss over mineral soil, or moss over rock or nutrient.

Protoparmelia badia (Hoffm.) Hafellner – Rocky alpine tundra northeast of Coleman Bay, on rock, McCune 37015.

Protoparmelia ochrocoeca (Nyl.) P. M. Jorg, Rambold & Hertel – West of Resurrection River and north of Exit Glacier Road, on trunks of dead Alnus incana, Tønsberg 45652c, 45666; west shore of Beauty Bay, on shaded trunk of Picea sitchensis, Tønsberg 45114.

Protostichocolea sp. – Peninsula into Three Hole Bay off Aialik Bay, slope bog with scattered Tsuga mertensiana and granitic outcrops, on debris, Schultz 16914c.

Psudepheina minusculea (Nyl. ex Arnold) Brodo & D. Hawksw. – National Park Service weather station, McArthur Ridge, on rock, McCune 36940; spit across James Lagoon, on metasedimentary rock, Schultz 16860.

Psudepheina pubescens (L.) M. Choisy – Rocky alpine tundra northeast of Coleman Bay, on rock, Walton 19483; Skilak nunatak within Harding Icefield, on rock, McCune 36818.

Psuedoecyllaria citrina (Gyeln.) Lücking, Moncada & S. Stenroos – Near mouth of creek at north end of James Lagoon, on Salix bark, McCune 36153, 36155, Tønsberg 45306, 45324, Walton 17958; North Arm Nuka Bay Public Use Cabin, on trunk of old Picea, Schultz 16792. This species is the most common representative of the P. crocata group both in western North America and coastal southern Alaska. Former collections of P. crocata were reassigned based on the key in Lücking et al. (2017).

Psuedoecyllaria mallota (Tuck.) H. Magn. – Near North Arm Nuka Bay Public Use Cabin, on twigs of Picea sitchensis on dry of dry riverbed, Tønsberg 45203b.

Psilolechia leprosa Copps & Purvis – West shore of Beauty Bay, on overhanging schistose rock wall on seashore, Tønsberg 45064 (TLC: gyrophoric and porphyrilic acids, unidentified terpenoid; richly fertile); Schultz 16748. New to Alaska.

Psora nipponica (Zahlbr.) Goth. Schneider – Harding Icefield Trail, ridge above Exit Glacier, in crack of vertical cliff face, Walton 19384.

Psoroma hypnorum (Vahl) Gray – Common on moss over bark, rock, or soil.

Psoroma tenue Henssen – Exit Glacier Campground, near Exit Glacier Creek, on moss on rocks marking path between campsites, Tønsberg 45421 (TLC: porphyrilic acid).

Pyrenopsis furfuracea (Nyl.) Th. Fr. – Near Harding Icefield Trail, ridge above Exit Glacier, alpine tundra, on soil among moss, Schultz 16925, also on metasedimentary rock, Schultz 16934, Schultz 16935b. Several specimens from low altitude moist rock sites are morphologically transitional to the closely related P. haematina, requiring further studies: Schultz 16890b; Schultz 16876c.

Pyrenopsis haematina (Nyl.) Blomb. & Forss. – Occasional on wet rock at low altitudes: Schultz 16779; Schultz 16885a; Schultz 16886a; Schultz 16891; Schultz 16899; Schultz 16917a.

Pyrenopsis haemalea (Nyl.) Blomb. & Forss. – Occasional on wet rock from lower to higher altitudes, Schultz 16878, 16894b, 16904b, 16916c, 16927a, 16940.

Pyrenopsis reducra Th. Fr. – North of Pilot Harbor on North Arm of Nuka Bay, on noncalcareous metasedimentary shoreline rock, Schultz 16780 p.p.; Harding Icefield Trail, Schultz...
16950. The material fits well with Scandinavian material matching the holotype of *P. reducta* (UPS), a still poorly understood species with small-sized, irregularly shaped areoles and one to several minute apothecia with open discs surrounded by thin, slightly elevated thalline margin. *Pyrenopsis reducta* was previously reported from North America (California) by Hutton et al. (2013).

**Pyrenopsis sanguinea** Anzi – Occasional on rock from low to higher elevations, apparently at slightly drier sites than *P. haematina*. Harding Icefield Trail, lower slope, on metasedimentary rock, *Schultz 16951*, *16952a*, *16954a*; near Harding Icefield Trail, ridge above Exit Glacier, on exposed metasedimentary boulders at base, *Schultz 16932a*. Superficially very similar to closely related *Pyrenopsis phaeococca* and *P. reducta* as well as *P. haematina*. *Pyrenopsis phaeococca* is not confirmed from Kenai NP, but fertile material from Glacier Bay NP collected by A. Fryday matches very well syntypes preserved in FH and BM.

**Pyrenopsis sp.** – East side of Harris Bay, steep chasm, granitic cliffs and boulders at base of rocky chute, *Schultz 16868b*, peninsula into Three Hole Bay off Aialik Bay, on steep granitic boulders, *Schultz 16916c*. This material matches sequenced samples from Katmai and Lake Clark National Parks (see below) that represent an undescribed species in the *P. sanguinea* aggregate.

**Racodium rupestr**e Pers. – Northwest Lagoon Beach, on rock, beneath overhang of boulder, *Walton 18104*; peninsula into Three Hole Bay off Aialik Bay, on twigs of dwarf *Tsuga mertensis*, *Tonsberg 45507b*. First reported for Alaska from Kenai Fjords by Walton et al. (2014).

**Ramalina farinacea** (L.) Ach. – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Picea* bark, *Rosentreter 19018*; north arm of spit across James Lagoon, on *Picea* twigs, *Rosentreter 19130*; Verdant Cove, north side at shoreline, on *Picea* bark, *Rosentreter 19178*; Seward (Krog 1968).

**Ramalina roesleri** (Hochst. ex Schaerer) Hae – FLA plot at Verdant Cove, on *Picea sitchensis* twig, *Walton 18203*; Verdant Cove, north side at shoreline, on *Picea* bark, *Rosentreter 19179*; Exit Glacier Campground, on *Populas* bark, *Rosentreter 19260*; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on thin twigs of *Picea × lutizia* *Schultz 16717*.

**Ramboldia cinnabarina** (Sommerf.) Kalb, Lumbsch & Elix – West of Resurrection River and north of Exit Glacier Road, on trunk of *Alnus incana*, *Tonsberg 45641*, 45662.

**Ramboldia goyardiana** (T. Sprib. & Hauck) Kalb, Lumbsch & Elix – North arm of spit across James Lagoon, on *Picea* twig, *McCune 36163*.

**Ramboldia subcinabarina** (Tønsberg) Kalb, Lumbsch & Elix – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on trunks of *Alnus incana*, *Tonsberg 44924*, 44952, 44979; north of Exit Glacier Visitor Center, on trunk of *Alnus*, *Tonsberg 45050*, 45051.

**Rhizocarpon alpicola** (Anzi) Rabenh. – Bear Glacier nunatak, on rock, *McCune 36927* (sterile); NPS weather station, McArthur Ridge, on rock, *McCune 36968*.

**Rhizocarpon bolanderi** (Tuck.) Herre – Harding Icefield Trail, lower slope, on rock, *McCune 36468*; near Harding Icefield Trail, ridge above Exit Glacier, on rock, *McCune 36377*. TLC of both specimens: stictic acid.

**Rhizocarpon cinereumgram* Vainio – Harding Icefield Trail, lower slope, on rock, *McCune 36483* (TLC: stictic acid).

**Rhizocarpon copelandii** (Körber) Th. Fr. – Skilak nunatak within Harding Icefield, on dry talus, *McCune 36828*, 36875.

**Rhizocarpon eupetraeoides** (Nyl.) Blomb. & Forss. – Skilak nunatak within Harding Icefield, on dry talus, *McCune 36813*, 36921. The latter specimen fits the species in all respects but has K– apothecial section.

**Rhizocarpon ferax** H. Magn. – Northeast end of Harris Bay, edge of estuary, on rock, *McCune 36239*; Harding Icefield Trail, ridge above Exit Glacier, on rock, *McCune 36402b*.

**Rhizocarpon giminatum** Körber – North of Exit Glacier Visitor Center, on semi-shaded boulder, *McCune 36016*.

**Rhizocarpon geographicum** (L.) DC. – Occasional on rock, near sea level to alpine.

**Rhizocarpon grande** (Flörke ex Flotow) Arnold – Verdant Cove, north side at shoreline, on shoreline granite, *McCune 36271*.

**Rhizocarpon hensseniae** Brodo – Occasional on rock, near sea level to alpine.

**Rhizocarpon hochstetteri** (Körber) Vainio – Bay on east side and south end of McCarty Fjord, on creekside rock, *McCune 36118*; Exit Glacier Campground, near Exit Glacier Creek, on river cobbles, *McCune 36418*; northeast end of Harris Bay, edge of estuary, on rock, *McCune 36236*.

**Rhizocarpon intersitum** Arnold – Coleman Bay, northeast end, off Aialik Bay, on rock, *McCune 36302* (stictic acid chemo-type, treated as *R. diversisporum* by some authors).

**Rhizocarpon jemtlandicum** (Malme) Malme – Occasional on rock, near sea level to alpine.

**Rhizocarpon lavatum** (Fr.) Hazsl. – Crater Bay off of Harris Bay, on streamsides granite, *McCune 36263*.

**Rhizocarpon aff. lavatum** – East side of Harris Bay, steep chasm, on sheltered granite, *McCune 36246*. The same species is also present in Lake Clark N.P.: Shoulder of mountain overlooking Tuxedni Bay, alpine tundra with noncalcareous outcrops and shrub thickets; on pebbles, *Tonsberg 44252b* (GenBank MN906298). ITS sequences for the two cited specimens are nearly identical but do not fit *R. lavatum* (E. Timdal pers. comm., 2019).

**Rhizocarpon lecanorinum** Anders – Coleman Bay, northeast end, off Aialik Bay, on rock, *McCune 36309*.

**Rhizocarpon polycarpum** (Hepp) Th. Fr. – Bear Glacier nunatak, on rock, *McCune 36936*; spit across James Lagoon, on beach cobbles, *McCune 36183*.

**Rhizocarpon postumum** (Nyl.) Arnold – Headland between two arms of Coleman Bay, on rock, damp metasedimentary cliffs, *McCune 36320b*.

**Rhizocarpon quinonum** McCune, Timdal & Bendiksby – Bear Glacier nunatak, on rock, *McCune 36918*, 36919. As in the original collections (McCune et al. 2016), no mature apothecia were found.

**Rhizocarpon riparium** Räsänen – Exit Glacier Campground, near Exit Glacier Creek, on river cobbles, *McCune 36416*, 36417; near Harding Icefield Trail, ridge above Exit Glacier, on rock, *McCune 36402a*.

**Rhizocarpon riparium** subsp. *lindsayanum* (Räsänen) J. W. Thomson – National Park Service weather station, McArthur Ridge, on rock, *McCune 36952*.

**Rhizocarpon saanaëne** Räsänen – Verdant Cove, north side at shoreline, on shoreline granite, *McCune 36272*.

**Rhizocarpon subpostumum** (Nyl.) Arnold – National Park Service weather station, McArthur Ridge, on rock, *McCune 36979*.

**Rhizocarpon sp. 1** – Coleman Bay, above northeast end, off Aialik Bay, on rock in creek bed, *McCune 36314*. The specimen belongs to the *Rhizocarpon badioatrum* group but has umbonate apothecia; thallus brown, areolate; apothecial section POL–, K–, streaming droplets in K; excipule edge
bluegreen black, grading to nearly hyaline within; hypothecium very pale brown; paraphyses ± even, not capitulate, about 2 μm diam; ascospores dark, 1-septate, 30–40 × 12–17 μm, 8 in ascus. The superficial cells of the umbo are blackish green, contrasting with the orange brown ephymenium. Very similar material has been seen in the subalpine of Siskiyous Mountains of northern California (McCune 2017, as Rhizocarpon sp.).

**Rhizocarpon sp.** 2 – Exit Glacier Campground, near Exit Glacier Creek, on river cobble, McCune 36429. This yellow, sterile, specimen appears to have schizidia.

**Rimularia limborina** Nyl. – Skilak nunatak within Harding Icefield, on rock, dry talus, McCune 36814.

**Rinodina disjuncta** Sheard & Tønsberg – Occasional on bark and mossy bark.

**Rinodina efflorescens** Malme – North of Exit Glacier Visitor Center, on trunk of *Alnus* in stand of *Populus*, Tønsberg 45048, 45060; west of Resurrection River and north of Exit Glacier Road, on *Parmelia sulcata* on trunk of dead *Alnus*, Tønsberg 45659.

**Rinodina laevigata** (Ach.) Malme – Exit Glacier Campground, near Exit Glacier Creek, on *Rinodina viridis*, Tønsberg 45616.

**Rinodina ninaeae** (Ach.) Körber – Skilak nunatak within Harding Icefield, on alpine sod in damp depression, McCune 36864.

**Rinodina oregana** H. Magn. – North of Exit Glacier Visitor Center, on *Populus*, McCune 36024a; on *Salix*, Tønsberg 45030. See Sheard et al. (2014) for notes on the disjunct status of Alaskan populations.

**Rinodina pallidescens** Sheard & Tønsberg – Common at low elevations, mostly on *Alnus*, also on *Salix* and *Picea*.

**Rinodina septentrionalis** Malme – Exit Glacier Campground, near Exit Glacier Creek, on *Populus balsamifera*, McCune 36452b, 36452c.

**Rinodina sheardi** Tønsberg – North of Exit Glacier Visitor Center, on *Populus balsamifera*, Tønsberg 45028 (fertile); west of Resurrection River and north of Exit Glacier Road, on dead moss on *Populus* bark, McCune 36492; on *Alnus incana*, Tønsberg 45670; west shore of Beauty Bay, on trunk of *Picea sitchensis*, Tønsberg 45125.

**Rinodina subparvata** (Nylo) Zahlbr. – Occasional on *Alnus* and *Picea* at low elevations.

**Rinodina trevisanii** (Hepp) Körber – North arm of spit across James Lagoon, on moss at base of *Picea sitchensis*, Tønsberg 45368.

**Ropaloспорa hiberna** (P. James & Poelt) Tønsberg – East side of Harris Bay, steep chasm, on slightly overhanging rock wall in chasm, Tønsberg 45431 (TLC: gyrophoric acid, two fatty acids).

**Ropaloспорa viridis** (Tønsberg) Tønsberg – Near pond at north end of Three Hole Bay off Aialik Bay, on trunk of *Picea sitchensis*, Tønsberg 45523, 45524; on *Alnus*, Tønsberg 45518. TLC (all tested): perlatolic acid with satellite.

**Ropaloспорa sp.** – National Park Service weather station, McArthur Ridge, on rock, McCune 36946. Thallus pale greenish gray, distinct, rimose-areolate to thinly areolate where thallus is sparse; prothallus dark brown, visible on the thallus margin and among the areoles where they are sparse; soredia and isidia lacking; apothecia to about 1 mm diam, black, flat to slightly convex, margin distinct, rather persistent, blackish or somewhat grayer than disk; epithecium brown, mostly POL– to weakly POL+, K–; hypothecium hyaline to pale brown, K–; exciple edge dark brown, brown within, POL+, with no algae, K–; paraphyses simple, tips small, < 2.5 μm; hymenial gelatin K+/B; ascus wall K+/B, tholus K+/B; ascospores narrowly fusiform, Bacida-like, 3–7 septate, about 37 × 4 μm, 8 in ascus; thallus UV+ weakly whitish, P–; TLC: NL: ITS sequence GenBank: MN906286: NCBI blast is closest to the morphologically different *Ropaloспорa lagubris* (GenBank KY266893), but differing in 33 positions.

**Rostania occultata** (Bagl.) Otlora, P. M. Jorg. & Wedin – Exit Glacier Campground, near Exit Glacier Creek, on *Alnus*, Schultz 16943; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus incana*, Schultz 16696, 16697b; west of Resurrection River and north of Exit Glacier Road, on *Alnus* in swamp, Tønsberg 45685.

**Rostania occultata var. populinum** (Th. Fr.) Perlmutter & Rivas Plata – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Populus* bark, Rosentreter 19023.

**Rusavskia sorediata** (Vainio) S. Y. Kondr. & Kärnefelt – South of Exit Glacier Visitor Center, on moss over rock, Rosentreter 19288.

**Schaereria corticola** Muhr & Tønsberg – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus incana*, Tønsberg 44935, 44936, 44940, 44984.

**Schaereria endocyanea** (Stirt) Hertel & Goth. Schneider – Alpine lake system on Harris Peninsula, on boulder, McCune 37002.

**Schaereria fuscocinerea** (Nylo) Claouzade & Cl. Roux – Bear Glacier nunatak, on rock, McCune 36920.

†† **Sclerococcom attendendum** (Nylo) Ertz & Diederich (= *Dactyloспорa attendenda* (Nylo) Arnold) – National Park Service weather station, McArthur Ridge, on rock, McCune 36993b.

† **Sclerococcom parasiticum** (Flörke) Ertz & Diederich (= *Dactyloспорa parasitica* (Flörke ex Sprengel) Zopf) – Verdant Cove, north side at shoreline, on *Pilophorus acicularis*, Tønsberg 45450. The apothecia have a violet pigment that is K+ brown; spores 11–13 × 4–5 μm. According to Triebel (1989), *S. attendendum*, which has been reported from *Pilophorus*, has a brown (not violet) pigment.

**Scoliciosпорum umbirrinum** (Ach.) Arnold – Near North Arm Nuka Bay Public Use Cabin, on twigs on *Picea sitchensis*, Tønsberg 45186; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, Schultz 44915, 45033; on *Picea* twigs, Schultz 16716; west shore of Beauty Bay, on *Sambucus* in beach meadow, Tønsberg 45100.

**Scytinium aquale** (Arnold) Otlora, P. M. Jorg. & Wedin – North of Exit Glacier Visitor Center, on rock, shaded boulder in woods, McCune 36002b (many minute apothecia but ascospores not found).

**Scytinium cellulosum** (P. M. Jorg.) Otlora, P. M. Jorg. & Wedin – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Picea sitchensis*, Tønsberg 45186; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus incana*, Tønsberg 44935, 44936, 44940, 44984. According to Triebel (1989), *S. attendendum*, which has been reported from *Pilophorus*, has a brown (not violet) pigment.

**Scytinium imbricatum** (Th. Fr.) Ertz & Diederich – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus incana*, Tønsberg 44940.

**Scytinium lichenoides** (L.) Otlora, P. M. Jorg. & Wedin s.l. – Harding Icefield Trail, lower slope, on moss over rock, McCune 36474; northwest Lagoon Beach FIA plot, on moist bedrock, *Hutton 16158*; Verdant Cove, north side at shoreline, on moss on seashore rock above high tide.
Scytinium subtile (Schrad.) Otálora, P. M. Jørg., & Wedin – Exit Glacier Campground, near Exit Glacier Creek, on bark, *Populus*, Rosentreter 19035

Scytinium tereiscusculum (Wallr.) Otálora, P. M. Jørg., & Wedin – Exit Glacier Campground, near Exit Glacier Creek, on *Populus balsamifera*, *McCune* 36452a; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on moss and soil, on mossy ground among *Peligiera*, Schlutz 16728 (fertile).

Sclerotinia subtilis

Sphaerophorus tuckermanii (Hudson) Vainio – Occasional on *Sphaerophorus fragilis* (L.) Ach. – Occasional on soil and alpine sod.

Solorina crocea

Siphula ceratites

Scytinium teretiusculum (Wallr.) Otálora, P. M. Jørg., & Wedin – Peninsula into Three Hole Bay off *Spilonema revertens* Wedin, Högnabba & Goward – *Sphaerophorus venerabilis* (††)

Steineropsis alaskana (Körber) Körber – North of Pilot Harbor McCune 36385

Staurothele clopima (Wahlenb.) Th. Fr. – Occasional on soil or alpine sod, low elevations to alpine.

Staurothele clavata (L.) Ach. – Occasional on soil and alpine sod.

*Sphaerophorus fragilis* (L.) Pers. – National Park Service weather station, McArthur Ridge, rock crevice, *McCune* 36950. Some specimens have an I+ violet medulla but with morphology similar to *S. fragilis*. We obtained an ITS sequence for one of these (Skilak Nunatak, *McCune* 36815, GenBank: MN906281) and it fell in a weakly supported clade with *S. fragilis* (AY256766, AY256767) suggesting that the morphology is more reliable than the iodine reaction in this case

*Sphaerophorus globosus* (Hudson) Vainio – Occasional on moss or soil over rock and alpine sod.

*Sphaerophorus tuckermanii* Räsänen – Common at low elevations on conifer bark, less often on wood or hardwoods.

*Sphaerophorus venerabilis* Wedin, Högnabba & Goward – Occasional on bark of conifers and hardwoods at low elevations.

*Spilonema revertens* Nyl. – Peninsula into Three Hole Bay off *Aialik Bay*, on *McCune* 36340. Verdant Cove, north side at shoreline, on granite, Schlutz 16898; Rosentreter 19174.

*Sporobolus polyporus* (Nyl.) Grummann – Near Harding Icefield Trail, ridge above Exit Glacier, on rock, *McCune* 36372; Skilak nunatak within Harding Icefield, on dry talus, *McCune* 36826.

*Sporodicyon cruentum* (Körber) Körber – North of Pilot Harbor on North Arm of *Nuka Bay*, on creekside rock, *McCune* 36088.

*Staurotele clopina* (Wahlenb.) Th. Fr. – Harding Icefield Trail, ridge above Exit Glacier, on rock in stream, *McCune* 36385, 36386 (det. Breuss 2016), Schlutz 16928d.

*Staurotele sp.* – Exit Glacier Campground, near Exit Glacier Creek, floodplain forest with cobble openings, quartz vein in metasedimentary rock, Schlutz 16942a. Thallus dark brown, very thin, indistinctly areolate, with fringed dark prothallus when young; perithecia sessile in small areoles, hemispherical, c. 300 µm; involucrum blackening, exciple otherwise pale; ascospores hyaline to pale brownish, eumuriform, ellipsoid, ~23–25.5 × 10–13 µm, 1–2 per ascus; hymenial algae ellipsoid, 5.5–7.5 × 3–3.5 µm. In Morse and Ladd (2019) it keys to *S. arctica* though the ascospores are too small, perhaps not fully developed.

Steineropsis alaskana T. Spribille & Muggia – Headland between two arms of Coleman Bay, on steep face of seaward rock, Tonsberg 45486.

†† *Stenocybe clavata* Tibell – Peninsula into Three Hole Bay off *Aialik Bay*, on *Tsuga*, *McCune* 36350.

†† *Stenocybe flexuosa* Selva & Tibell – West shore of Beauty Bay, on *Picea* bark, *McCune* 36063.

†† *Stenocybe pullulata* (Ach.) Stein – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus* twigs, *McCune* 35995, 35977b; on *Alnus incana*, Schlutz 16698b.

*Stereocaulon alpinum* Laurer ex Funck – Exit Glacier Campground, near Exit Glacier Creek, on soil, *McCune* 36411; Harding Icefield Trail, lower slope, on moss over rock, *McCune* 36476; north of Exit Glacier Visitor Center, on mossy rock, *McCune* 36014, 36015; Skilak nunatak within Harding Icefield, on alpine sod, *McCune* 36900.

*Stereocaulon arenarium* (Savicz) Lamb – Harding Icefield Trail, ridge above Exit Glacier, on moss and soil over rock, *McCune* 36398; Skilak nunatak within Harding Icefield, on gravelly soil, *McCune* 36852; Double Glacier nunatak, Walton 19573; TLC of all specimens: porphyric acid and atranorin.

*Stereocaulon areolatum* *McCune*, E. Di Meglio & Tønsberg – Harding Icefield Trail, ridge above Exit Glacier, on rock, stones in flat area with late snow, *McCune* 36370. See *McCune* et al. (2019) for more information.

*Stereocaulon botryosum* Ach. – Skilak nunatak within Harding Icefield, on alpine sod, northwest slope, *McCune* 36899 (TLC: porphyric acid and atranorin).

*Stereocaulon cephaloerostatum* *McCune*, E. Di Meglio & Tønsberg – East side of Harris Bay, steep chasm, on granite, *McCune* 36244; northeast end of Coleman Bay, on granite, *McCune* 36298. See *McCune* et al. (2019) for more information.

*Stereocaulon fecundum* *McCune*, E. Di Meglio & Tønsberg – Verdant Cove, north side at shoreline, on rock, *McCune* 36276; bay on east side and south end of McCarty Fjord, on creekside rock, *McCune* 36117. See *McCune* et al. (2019) for more information.

*Stereocaulon groenlandicum* (E. Dahl) Lamb – Northeast end of Harris Bay, edge of estuary, on rock, tightly attached, *McCune* 36238; Harding Icefield Trail, ridge above Exit Glacier, on tundra sod, *McCune* 36363 (thallus S+ red indicating miriquidic acid; Alphandary & *McCune* 2013). To perform the S test, an acetone extract on a glass slide is painted with 0.5% sulfuric acid, let dry for 10 minutes, then gently heated over a flame for a few seconds or in an oven (100°C for 15 minutes). Hold against a white background. Miriquidic acid gives a violet or purple reaction. Negative reactions are usually just slightly charred blackish.

*Stereocaulon intermediate* (Savicz) H. Magnus. – Bay on east side and south end of McCarty Fjord, on shoreline granite boulder, *McCune* 36126; northeast end of Harris Bay, edge of estuary, on rock, tightly attached, *McCune* 36222.

*Stereocaulon leucoaphaepsis* (Nyl.) P. James & Purvis s.str. – East side of Harris Bay, steep chasm, on boulder, *McCune* 36249. See phylogenetic tree in *McCune* et al. (2019).

*Stereocaulon niveale* (Follmann) Fryday – Alpine lake system on Harris Peninsula, on rock, N-facing rocky tundra with seasonal seepage, *McCune* 37008 (*McCune* et al. 2019).

*Stereocaulon paschale* (McCune, E. Di Meglio & Tønsberg) Follmann – Telephone creek on Harris Peninsula, *McCune* 35977. See *McCune* et al. (2019) for more information.

*Stereocaulon plicatile* (Leighton) Fryday & Coppins – National Park Service weather station, McArthur Ridge, on talus in small ravine, *McCune* 36987. Also known from Katmai National Park (McCune et al. 2018, 2019).
**Stereocaulon rivilorum** H. Magn. – Bear Glacier nunatak, on moss over rock in snowmelt stream, *McCune* 36593; Wosnesenski Glacier nunatak, on soil, *Walton* 19576; Petrof Glacier nunatak, on rock, *Walton* 19568. TLC of all specimens: perlatolic and aniziac acids. The population at Bear Glacier nunatak was unusual in being almost completely submerged in what appeared to be a perennial snowmelt stream. One specimen, *Walton* 19568, has the morphology of *S. subcoralloides* but chemistry of *S. rivilorum* and thus needs verification.

**Stereocaulon saviczii** Du Rietz – Bay on east side and south end of McCarty Fjord, on granite boulder, *McCune* 36120, *Walton* 19401; N end of Harris Bay, near opening to North-western Lagoon, on rock, *Rosentreter* 19143, *Walton* 19389; northeast end of Harris Bay, edge of estuary, on vertical, ± mossy wall of huge boulder, *Tønsberg* 45413; on boulder, *Tønsberg* 45421, 45424; Petrof Glacier nunatak, on boulder, *Walton* 19569. All collections were near sea level, except *S. sterile* (Savicz) Lamb, ex Krog – National Park Range (B. McCune, unpubl. data) – a small, poorly developed colony but with typical elongate phyllocladia.

**Stereocaulon spathuliferum** Fr. – Exit Glacier Campground, near rock crevices, and alpine sod. *McCune* 36077 (TLC: atranorin, stictic acid ± trace norstictic acid); *McCarty Fjord*, on trunk of *Alnus alaskana* thicket, *Alnus alaskana* thicket, near outlet of James Lagoon, on shaded soil bank, *Tønsberg* 45349. This *S. spathuliferum* is a segregate of *S. sasakii* suboceanic distribution and has been known as *S. sasakii var. tomentosoides* Lamb, but treated as a chemotype of *S. tomentosum* by *McCune* and Geiser (2009). In contrast the P+ orange (stictic acid) chemotype is typical of *S. tomentosum*. Ongoing molecular studies have revealed a more complex structure in the *S. tomentosum* group than acknowledged by the current taxonomy (B. *McCune*, unpubl. data).

**Stereocaulon tomentosum** Pers. – Fairly frequent on rock, sea level to subalpine. TLC: atranorin, stictic acid ± trace norstictic acid, rarely with atranorin only; always with *Stigonema* as cyanobiont; extremely variable in thallus morphology, ranging from very dense, hard cushions with no stalks visible to quite open branching with exposed stalks, but with very little variation in ITS and nuLSU regions.

**Sticta tsugae** (Hoffm.) Ach. s.l. – Near mouth of creek at north end of James Lagoon, on *Salix alaxensis*, Rosentreter 19118, *Schultz* 16825; west shore of Beauty Bay, on *Picea*, *Schultz* 16766.

**Sticta sp.** – Near mouth of creek at north end of James Lagoon, on *Alnus in Salix alaxensis – Alnus* thicket, *Tønsberg* 45304; north arm of spit across James Lagoon, on shaded soil bank, *Tønsberg* 45349. This *Sticta* is a segregate of *S. fuliginosa* that is previously known from outside of North America. It is distinguishable by DNA sequences and morphology (J. Di Meglio et al., unpubl. manuscript). It is easily mistaken for *S. sylvatica*. The species was also found in material from Lake Clark National Park previously identified as *S. fuliginosa* (Near Chinitna Bay, on *Trichophorum cespitosum* from beach meadow, *Tønsberg* 44233).

**Stigmidiurn sp.** – North of Exit Glacier Visitor Center, on *Aspicilia* on rock, *McCune* 36006c (spores 1-septate, elongate, hyaline 8/ascus).

**Szczawinska tsugae** A. Funk – Bay on east side and south end of McCarty Fjord, on *Alnus* just above rocky beach, *Tønsberg* 45273; near North Arm Nuka Bay Public Use Cabin, on twigs and trunk of, *Picea*, *McCune* 36108; *Schultz* 16787, 16796b; *Tønsberg* 45194; near pond at north end of Three Hole Bay off Aialik Bay, on *Picea* twigs, *Schultz* 16919b (with *Lichinodium ahnierti*).

**Tetramelas chloroleucus** (Körber) A. Nordin – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, *McCune* 35590.

**Tetramelas insignis** (Nägeli) Kalb – Near Harding Icefield Trail, ridge above Exit Glacier, on alpine sod, *McCune* 36392.

**Tetramelas triphragmioides** (Anzi) A. Nordin & Tibell – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus*, *McCune* 35976.

**Thamnolia subaliformis** (Ehrh.) Culb. – Occasional on soil, rock crevices, and alpine sod.

**Thamnolia vermicularis** (Sw.) Ach. ex Schærer – Skilak nunatak within Harding Icefield, on alpine sod, *McCune* 36839b (growing mixed with *T. subaliformis*). The traditional distinction between *T. subaliformis* and *T. vermicularis* was not supported by a global analysis by Omut-Brännström et al. (2017, 2018), but three clades do exist; see also Leavitt et al. (2016).

**Theilignia lignyota** (Wahlenb.) P. M. Jørg. & Henssen – Occasional on rock by freshwater and seashores.

**Theletrema pectinata** P. M. Jørg. & Brodo – West shore of Beauty Bay, on *Alnus* bark, *McCune* 36046; near outlet of pond at north end of Three Hole Bay off Aialik Bay, on *Alnus* in *Alnus* thicket, *Schultz* 16921b.
**Thelotrema suecicum** (H. Magn.) P. James – Bay on east side and south end of McCarty Fjord, on *Alnus* just above rocky beach, Tonsberg 45268a; near North Arm Nuka Bay Public Use Cabin, on *Alnus*, Tonsberg 45236 (ascospores 7-septate, 30–40 × 8–15 um); near pond at north end of Three Hole Bay off Aialik Bay, Tonsberg 45336, 45541; north of Pilot Harbor on North Arm of Nuka Bay, on *Alnus viridis*, Tønsberg 45142; west of beauty of Bay, on *Alnus viridis*, Tønsberg 45078.

**Aff. Thelotrema sp.** – West shore of Beauty Bay, on tiny twigs of *Picea sitchensis*, Tonsberg 45108 (with *Biatora rudifida* and *Gyalideopsis piceicola*). This specimen differs markedly from *Thelotrema dissimilis* in having a strongly coralloid growth form with pale greenish to pale tan, anastomosing branches. More study is needed.

**Tingiopsidium elaeinum** (Turner ex Sm. & Sow.) M. Choisy – Crater Bay on east side and south end of McCarty Fjord, on granite, *McCune* 36121; *NPS* weather station, McCarthur Ridge, on rock, *McCune* 36972; spit across James Lagoon, on beach cobbles, *McCune* 36176.

**Tingiopsidium elaeinum** (Wahlenb. ex Ach.) Hafellner & T. Sprib. – Occasional on rock, low elevations to alpine.

**Tingiopsidium isidiatum** (Degel.) Hafellner & T. Sprib. – Occasional on rock, dry talus to damp streamside rock.

**Toensbergia leucococca** (Ach.) Hoffm. – Common on rock, *McCune* 36321; partly black dotted, film-like, and thin; ascospores < 12 µm. Previously reported from Adak Island (Talbot et al. 2014).

**Trapelia coarctata** (Turner ex Sm. & Sow.) M. Choisy – Craber Bay off of Harris Bay, on streamside granite, *McCune* 36260; headland between two arms of Coleman Bay, on rock near creek, *McCune* 36325; on damp metastemidial cliffs, *McCune* 36319.

**Trapelia corticola** Coppens & P. James – Headland between two arms of Coleman Bay, on moss on seashore rocks, *Tonsberg* 45487, 45488, 45491. The soralia are the typical pale brownish yellow. In two of these the species co-occurs with a trapezioid, green species with a distinct, continuous thallus and much larger soralia, perhaps *Trapeliopsis pseudogranulosa* (anthraquinone deficient form). Also in *Tonsberg* 45488 are hyphophores of *Gyalideopsis piceicola* on the moss.

**Trapeliopsis granulosa** (Hoffm.) Lumbsch – Occasional on soil, moss, and plant detritus, low elevations to alpine.

**Trapeliopsis pseudogranulosa** Coppens & P. James – Near North Arm Nuka Bay Public Use Cabin, on huge trunk of *Picea sitchensis*, *Tonsberg* 45237 (TLC: gyrophoric acid (major), lecanoric acid; fertile); near pond at north end of Three Hole Bay, on bark, base of *Picea*, *McCune* 36093.

**Tremolecia atrata** (Ach.) Hertel – Occasional on granite and metal-rich rock, near sea level to alpine.

**Umbilicaria angulata** Tuck. – Occasional on rock, near sea level to subalpine; previously reported from KFJ by Walton et al. (2014).

**Umbilicaria arctica** (Ach.) Nyl. – National Park Service weather station, McCarthur Ridge, on rock, *McCune* 36973; Skilak nunatak within Harding Icefield, on rock, *McCune* 36886.

**Umbilicaria cylindrica** (L.) Delise ex Duby – Occasional on rock, near sea level to alpine.

**Umbilicaria deusta** (L.) Baumg. – Occasional on rock, near sea level to alpine.

**Umbilicaria herrei** Frey – Spit across James Lagoon, on beach cobbles, *McCune* 36180.

**Umbilicaria hyperborea** (Ach.) Hoffm. – Common on rock, near sea level to alpine. The typical morph is common, with brown lower surface and rugose upper surface, but mixed in these populations are forms with a black lower surface (but lacking thalloconidia and not sooty) and a form with upper surface nearly smooth.

**Umbilicaria multistriata** *McCune* – Harding Icefield Trail, lower slope, on rock, *McCune* 36465; Skilak nunatak within Harding Icefield, on rock, outcrop knob, *McCune* 36873 (see *McCune* 2018).

**Umbilicaria polyphylla** (L.) Fr. – Spit across James Lagoon, on metastemidial rock, *Schultz* 16857.

**Umbilicaria polyrhiza** (L.) Baumg. – Skilak nunatak within Harding Icefield, on rock, *McCune* 36842.

**Umbilicaria vellea** (L.) Hoffm. s.l. – Seward (Krog 1968).

**Umbilicaria virginis** Schaerer – Spit across James Lagoon, on metastemidial rock, *Schultz* 16856.

**Usnea diplotypus** Vainio – Exit Glacier Campground, near creek, on *Picea* twigs, *Rosentreter* 19257.

**Usnea lapponea** Vainio – Exit Glacier Campground, near creek, on *Populus* bark, *Walton* 19571; near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on *Alnus* bark, *Rosentreter* 19004.

**Usnea longissima** Ach. – Crater Bay South, on conifer branch, *Walton* 19078. TLC:-barbatic acid with trace of norbarbatic acid.

**Usnea pacificana** P. Halonen – West shore of Beauty Bay, on bark, *Rosentreter* 19053 (det. *McCune* 2016).

**Usnea scabrata** Nyl. – FIA plot at Verdant Cove, on *Picea sitchensis* twig, *Walton* 18201, 18202; reported as *U. filipendula* by Walton et al. (2014).

**Verrucaria dimarsica** Erichsen – North of Pilot Harbor on North Arm of Nuka Bay, on noncalcareous metastemidial rock, upper intertidal, *Schultz* 16775 (det. *Schultz* 2016). This taxon belongs to the *V erichsenii* group, and has the following characteristics: exciple pale at the base; thallus partly black dotted, film-like, and thin; ascospores < 12 µm long. Previously reported from Adak Island (Talbot et al. 1997).

**Verrucaria dolosa** Hepp – Near Park entrance on Exit Glacier Road, floodplain of Resurrection River, on cobbles, *McCune* 36000a.

**Verrucaria epimaura** Brodo – North arm of spit across James Lagoon, on *Hydropunctaria* on boulder on beach, *McCune* 36166b, *Schultz* 16843c; Verdant Cove, north side at shoreline, on *Hydropunctaria* on shoreline granite, *McCune* 36275.

? **Verrucaria erichsenii** Zschacke – North arm of spit across James Lagoon, on granite, flushed by sea water, *Schultz* 16845b (det. *Schultz* 2016).

**Verrucaria floerkeana** Dalla Torre & Samth – North of Exit Glacier Visitor Center, on semi-shaded boulder, *McCune* 36006a.

**Verrucaria fusca** auct. – Headland between two arms of Coleman Bay, on damp metastemidial cliffs, *McCune* 36321.

**Verrucaria halophila** (Nyl.) in Branth & Rostr. (= *V. haliozae* auct.) – North of Pilot Harbor on North Arm of Nuka Bay, on noncalcareous metastemidial rock, upper intertidal, *Schultz* 16774 (det. *Schultz* 2016); thallus olive brown, smooth, not dotted, algae in vertical rows, perithecia prominent, exciple base pale, ascospores 6.5–8.5 × 4.5–5 µm. This
species has previously been reported from North America as *V. halizoa* Leighton or ‘auct.’ (see synonymy in Santesson et al. 2004), e.g., Brodo & Santesson (1997), Brodo (2016), McCune (2017).

*Verrucaria* cf. *invenusta* H. Magn. – West shore of Beauty Bay, on shaded rock, McCune 36064 (with poor thallus).

*Verrucaria margacea* (Wahlenb.) Gueidan & Thüs – North (Stirt.) T. Sprib. – West of Resurrection River and nearby national parks (McCune et al. 2018). The following records supplement previous reports from and Lake Clark National Parks.

Addendum to previous reports from Katmai and Lake Clark National Parks

The following records supplement previous reports from nearby national parks (McCune et al. 2018).

*Aspicilia cinerea* (L.) Körber s.l. – Katmai National Park: shoreline of Naknek Lake, peninsula northeast of Brooks Camp, *Tonsberg* 42709 (sorediate, fertile; containing atranorin and three xanthones). ITS sequence (GenBank MN906291) falls in no supported species group, despite about 260 Lepraria sequences available. The closest matches were Lepraria sp. EF619557, Czech Republic, Bayerova 3893B (PRA), and as part of NORBOL, the Norwegian barcode of life network: OLICH3770 BL_L_98944.

*Porpidia* sp. 1 – Lake Clark National Park: summit of Slope Mountain, overlooking Tuxedni Channel, on loose rocks on bare soil, *Tonsberg* 44162a. Similar to *Porpidia* conraponenda but containing porphyrilic and stictic acids. We are not aware of previous reports of porphyrilic acid from North American species of *Porpidia*, but this substance is easily overlooked on TLC plates. The ITS sequence (GenBank MN954401) is very close to three specimens in GenBank from Tierra del Fuego, Chile: KX12029, KX12030, KX12031, all identified as ‘*Porpidia* sp.’

*Porpidia* sp. 2 – Katmai National Park: north end of ridge west of Contact Creek, *Tonsberg* 42889. The ITS sequence

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*Porpidia* sp. 2 – Katmai National Park: north end of ridge west of Contact Creek, *Tonsberg* 42889. The ITS sequence
Anzi – McCune et al. (2018) adopted *Pyrenopsis sanguinea* (Tuck.) Tuck. – Among several specimens collectively reported as *Pyrenopsis sanguinea* (s.l.) by McCune et al. (2018), more detailed studies revealed that McCune 32769 from Naknek Lake northeast of Brooks Camp is morphologically indistinguishable from syntypes of *P. phaeococca* in BM and FH. DNA work on this and other material has not yet been finished. Confirmation of the remaining material of *Pyrenopsis sanguinea* requires further studies (see below).

*Pyrenopsis sanguinea* Anzi – McCune et al. (2018) adopted a broad concept for this central European taxon for an aggregate comprising *P. sanguinea* s.str. and the very similar *P. phaeococca* earlier reported from NE North America and the Scandinavian *P. reducta*, *P. impolita*, and conspecific *P. subfulginea*. However, molecular data suggest that there are several lineages assignable to distinct species in this complex. While part of the Katmai/Lake Clark material seems to represent a yet undescribed taxon (see below), *P. sanguinea* s.str. cannot be confirmed, but does occur in Kenai NP (see main list). McCune 33537 from shore of Lake Clark, west of Hatchet Point differs in thallus and hymenial features and therefore is kept here as s.l., and the final placement remaining to be solved.

*Pyrenopsis sanguinea* sp. 1 – Among the material listed by McCune et al. (2018) as *Pyrenopsis sanguinea* Anzi the following specimens turned out to belong to an undescribed species: McCune 34101, ridge west of Contact Creek, McCune 34017, north side of Mirror Lake, Rosentreter 18855, 18856, 18869 and Tønsberg 44252a all from Tuxedni Bay. The thallus is small squamulose with somewhat tessellate surface and numerous semi-immersed apothecia. A specimen from Glacier Bay NP (Fryday 10346) possibly belongs here as well. The species also occurs in Kenai NP (see main list).

*Sticta* sp. 1, Clade C (J. Di Meglio pers. comm. 2020) – Lake Clark National Park, Near Chimina Ranger Station on north side of Chimina Bay, Tønsberg 44228, 44294 (unpubl. ITS sequence and det. by J. Di Meglio 2019).

*Xylographa vermicularis* T. Sprith – Lake Clark National Park: bay on SW side of Portage Lake, on ± hard wood of *Picea glauca* on slope facing lake, Tønsberg 43918 (TLC: stictic and confrisic acids, the latter missing or in low concentrations in one split of this specimen). Two ITS sequences (GenBank MN906296, MN906297) from different part of the same specimens, but similar morphologies – both sequences essentially identical.

Acknowledgements

We contribute this paper in honor of our friend and colleague, the illustrious Philippe Clerc, whose critical work on *Usnea* has enlightened us all and established an excellent basis for future studies of one of the most difficult genera of all. We thank the National Park Service in Anchorage and Chris Lauer in the Cooperative Ecosystem Studies Unit in Seattle for sponsoring this project under Cooperative Agreement H8W07110001 with Oregon State University. We thank Heidi Lie Andersen, Elve Arvebakk, Astri Botnen, Irwin Brodo, Karen Dillman, Alan Fryday, Per Magnus Jorgensen, Martin Kukwa, Helmut Mayrhofer, Leena Myllys, Raquel Pino-Bodas, Christian Printzen, Toby Spribile, Daphne Stone, Einar Timdal, and Tim Wheeler for providing identifications, advice, and specimens for comparison; and Irwin Brodo and James Lendemer for constructive criticism of the manuscript. Leon Rogers and Dongling Niu assisted with thin-layer chromatography and DNA extraction, PCR, and sequencing. Additional and substantial molecular work was performed by Michelle Wiseman at the Plant Clinic at Oregon State University and Louise Lindblom of the University of Bergen. Einar Timdal provided information on Krog’s specimens and data from Alaska. Tim Wheeler helped to place *Aspicilia* ITS sequences using his unpublished data. We thank Capt. Melissa Knight and first mate J.P. for facilitating the field work from the research vessel M/V Serac.

Supplementary electronic material

| Table | Description |
|-------|-------------|
| Table S1 | Collecting sites in Kenai Fjords National Park visited in summer 2015 (McCune, Rosentreter, Schultz, Tønsberg & Walton) and 2016 (McCune & Walton). Download file |
| Table S2 | FIA-style plot characteristics at Kenai Fjords National Park (data by Walton and Hutten) sampled in 2012 and 2013. Download file |
| Table S3 | New GenBank accession numbers. Park codes: KATM = Katmai, KEFJ = Kenai Fjords, LACL = Lake Clark. Download file |

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