Checklist of Lichens and Associated Fungi from Mingan Archipelago National Park Reserve, Québec, Canada

Philip Bell-Doyon[1,*]

Abstract - This first annotated checklist of the lichens and associated fungi from Mingan Archipelago National Park Reserve (Québec, Canada) was compiled with the aim of enhancing the ecological knowledge from this regional biodiversity hotspot. I collected specimens in 2021 and 2022 and reviewed previous records based on vouchers deposited at the Louis-Marie Herbarium. A total of 257 species belonging to 96 genera are reported for the protected area, 3 of which represent the first published occurrence with an associated, digitized voucher for the province of Québec: *Lecanactis abietina*, *Opegrapha vulgata*, and *Usnea diplotypus*. This work highlights that Mingan Archipelago National Park Reserve has the potential to be recognized as an area of high lichen diversity in northeastern North America.

Introduction

Lichens and associated fungi are a diverse group of organisms, with 5823 species in 805 genera listed in North America north of Mexico (Esslinger 2021) and new species described every year (e.g., Curtis and Lendemer 2022, Di Meglio and Goward 2023, McCune and Conway 2022). Associated fungi refer to non-lichenized fungi that have traditionally been treated by lichen specialists due to their dependence upon or resemblance to lichens (Diederich et al. 2018, Esslinger 2021). Lichens can be described as stable symbiotic associations between a main mycobiont (mostly Ascomycota) and 1 or more photobionts (green algae, cyanobacteria, or both) which produce a distinct morphology (Brodo et al. 2001, Spribille et al. 2022). However, the lichen concept has expanded and can be considered a miniature ecosystem with a large microbial community coexisting within lichen thalli along with the main symbionts (Allen and Lendemer 2022, Grimm et al. 2021, Hawksworth and Grube 2020).

Ecologically, lichen communities have been proposed to be reliable indicators of ecological continuity (Selva 2003, Tibell 1992, Wiersma and McMullin 2022), biodiversity conservation value (Malíček et al. 2019, Miller et al. 2020), and atmospheric pollution (Hawksworth and Rose 1970, McMullin et al. 2017a, Richardson 1988, Will-Wolf et al. 2015). Lichens also provide camouflage and shelter for insects (Miranda-González et al. 2023, Pettersson et al. 1995), nesting material for birds (most notably hummingbirds; Baicich and Harrison 2005, Hansell 1996), and winter food for *Rangifer tarandus* (L.) (Caribou) (Webber et al. 2022). Furthermore, lichens produce over a thousand unique secondary chemical compounds in addition to their primary metabolites (Stocker-Wörgötter 2008), some of which

[1]Department of Biology, Université Laval, Québec, QC G1V 0A6, Canada. [*]Corresponding author: philip.bell-doyon.1@ulaval.ca.

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have bioactive properties used in traditional medicine (Crawford 2019) and potential pharmaceutical applications (Ranković 2019, Solárová et al. 2020).

Lichen surveys have historically been limited in Canada generally, and Québec more specifically, compared to assessments of vascular plants and bryophytes. This scarcity of studies may be partly explained by the comparatively small number of lichen specialists. Annotated checklists of verified and publicly accessible vouchers with associated metadata are important to assess trends in species distribution and thus enable the understanding of environmental change on populations and diversity (Jetz et al. 2019). In Mingan Archipelago National Park Reserve, lichen sampling has been conducted sporadically by park employees and botanists, mainly in the calcareous and granitic maritime tundra habitats as part of wider floristic surveys (Grondin and Melançon 1980, Grondin et al. 1980, Marcotte 1982). Most of these early collections were identified by either Irwin M. Brodo or Pak Yau Wong from the Canadian Museum of Nature. Lists have been kept up to date by Parks Canada employees but never published.

This contribution presents the first annotated checklist from a site on the North Shore of the Gulf of St-Lawrence Region. The specific goals of the study were to: (1) survey intact forest ecosystems in Mingan Archipelago National Park Reserve, with a focus on calicioid lichens and fungi; (2) deposit vouchers of all species encountered in publicly accessible herbaria; (3) confirm previously recorded species; and (4) highlight species that are rare and those that represent major range extensions.

Field-site Description

Mingan Archipelago National Park Reserve is one of 3 terrestrial protected areas managed by Parks Canada in the province of Québec. The islands are distributed up to 10 km offshore along a 150-km segment of the northern coastline of the Gulf of St. Lawrence, between the towns of Longue-Pointe (50°13'14"N, 64°12'29"W) and Aguanish (50°13'20"N, 62°05'10"W). To the west, the archipelago is composed of some 30 calcareous islands while, to the east, it includes >1000 smaller granitic islands. Vegetation varies from maritime tundra with arctic-alpine communities on the most exposed terrain to intact forest ecosystem (Watson et al. 2018) in sheltered bays, with bogs and small lakes on the largest islands (Fig. 1). Many rare vascular plants endemic to the Gulf of St-Lawrence or with widely disjunct distributions occur in calcareous habitats (Pelletier and Couillard 1987). Forests are largely dominated by *Abies balsamea* (L.) Mill. (Balsam Fir), co-occurring with *Betula papyrifera* Marshall (Paper Birch), *Picea glauca* (Moench) Voss (White Spruce), and *Picea mariana* (Mill.) Britton, Sterns, and Poggenb. (Black Spruce). Natural disturbance is driven by windthrows, while firewood was harvested on some of the islands closest to shore and villages, especially before Road 138 connecting the communities established along the northern shore of the St. Lawrence was built all the way up to Havre Saint-Pierre in 1976 (Couillard and Grondin 1983). An ongoing *Choristoneura fumiferana* (Clemens) (Spruce Budworm) outbreak in the archipelago has been monitored since 2019 by the Québec Ministry of Natural Resources and Parks Canada.

Methods

I concentrated my survey in intact forest ecosystems on the 2 largest islands, namely La Grande and La Chasse (Fig. 2) using a meander sampling strategy (McMullin 2015, Selva 2003), inspired by the floristic habitat methodology (Newmaster et al. 2005), which involves moving between microhabitats of interest without plot restrictions. I specifically targeted previously under-sampled groups of lichens such as calicioids and sterile crusts. For each sample, I characterized macrohabitat and microhabitat and took a GPS point. Following collection, I dehydrated specimens at 38 °C for 72 h, then froze them at -20 °C for 5 days. I identified the specimens using stereo- and compound microscopes along with books, identification keys, and monographs of reference (Brodo 2016; Brodo et al. 2001; Diederich et al. 2022; Lendemer 2013; McCune 2017a, b; Selva 2013, 2014). To aid in identification, I performed spot tests using sodium hypochlorite, potassium hydroxide 10%, and p-phenylenediamine in 70% ethanol and used Lugol's solution for staining asci (Brodo et al. 2001). I consistently performed thin-layer chromatography (TLC) in solvent system C following Orange et al. (2010) on sterile crusts and other lichens with overlapping morphological characters. All specimens were deposited as vouchers at Louis-Marie Herbarium (QFA) with selected duplicates deposited in the Canadian Museum of Nature (CANL). I took photographs of the samples using a Tucsen Photonics ISH1000 camera (Fuzhou, China) plugged into the ocular of a stereomicroscope and compound microscope.

Figure 1. Main habitat types in Mingan Archipelago National Park Reserve. Top-left: intact forest ecosystem in a sheltered bay. Top-right: shoreline and adjacent calcareous maritime tundra. Bottom-left: open wetland covered by low ericaceous shrubs and *Cladonia* spp., with scattered trees. Bottom-right: large stump in closed forest near the shoreline.

I first compiled files provided by Parks Canada into a single checklist of lichen species and updated synonyms following Esslinger (2021). Many listed species collected by park employees had been kept in a Parks Canada warehouse rather than deposited in publicly available collections. Following an official inquiry, 280 samples were donated by Parks Canada to the Louis-Marie Herbarium (QFA) so they could be reviewed and integrated into the public collection. Additionally, I located, reviewed, and added to the list previously digitized records of additional species available on the Consortium of North American Lichen Herbaria (CNALH 2023). For each species, I reviewed up to 3 specimens, except when they had already been identified or reviewed by eminent lichenologists, namely Irwin M. Brodo, R. Troy McMullin, and Jolanta Miadlikowska. Once all specimens had been identified with vouchers deposited in the collection at QFA, I checked the digitized occurrences of every listed species on the Consortium of North American Lichen Herbaria (CNALH 2023) to determine which might represent range extensions. For these, I checked additional online databases from Canadensys (2023), the New York Botanical Garden (2023), the Canadian Museum of Nature (2023), and the Global Biodiversity Information Facility (2023) for further records. Additionally, I reviewed recent literature on lichen distribution in northeastern North America to acknowledge yet undigitized occurrences (Bell-Doyon et al. 2021; McMullin 2018, 2019; McMullin et al. 2017b, 2021; Paquette and McMullin 2020; Paquette et al. 2019; Selva 2010, 2013, 2014).

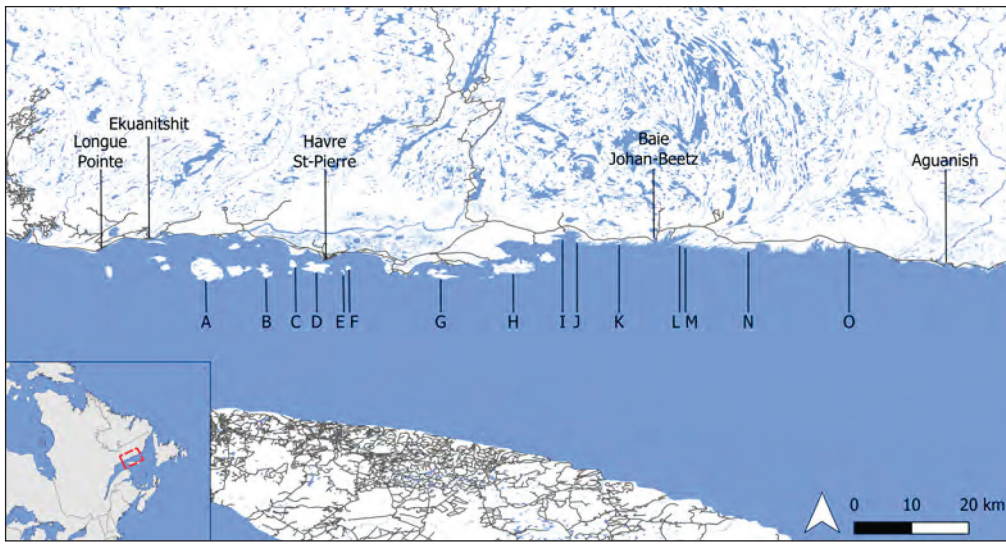

Figure 2. Map of Mingan Archipelago National Park Reserve with names of the islands and sectors where lichens were sampled. From west to east: (A) La Grande, (B) Niapiskau, (C) Fantôme, (D) Du Havre, (E) Petite Marteau, (F) Grosse Marteau, (G) Saint-Charles, (H) La Chasse, (I) Sauvage, (J) Corneille, (K) Tanguay, (L) Johan-Beetz, (M) Watshishou, (N) Pontbriand, and (O) Jalobert. The bedrock is calcareous in A–H and granitic in I–O. Inset map shows the general location in eastern Canada.

Results

A total of 257 species of lichens and associated fungi belonging to 96 genera, identified from 703 determinations in 546 vouchers were documented from Mingan Archipelago National Park Reserve (Appendix 1 contains the annotated list with species names and authorities; for full metadata in Darwin Core format, see Supplemental File 1, available online at http://www.eaglehill.us/NENAonline/suppl-files/n30-3-M2045-Bell-Doyon-s1, and for BioOne subscribers, at https://www.doi.org/10.1656/N2045.s1). Eighteen species were either non-lichenized or lichenicolous fungi, and 28 were calicioids, including 13 non-lichenized calicioids. Eighty-three (32%) species had previously been identified by one of the 3 lichenologists named above and were therefore not reviewed as part of this work. Another 62 (24%) determinations had been performed by various professionals and students and were confirmed by the present author. Finally, the remaining 112 (44%) species were found during the current sampling campaign or via revision of existing collections. Among the most interesting finds in the current sampling were *Chaenothecopsis asperopoda* (Fig. 3A, B), *C. consociata* (Fig. 3C, D), *C. nigra* (Fig. 3E, F), which are rare calicioids, and *Lecanactis abietina* (Fig. 4A, B), *Opegrapha vulgata* (Fig. 4C, D), and *Usnea diplotypus* (Fig. 4E, F), which represent the first published records of these species for the province of Québec. Another 5 species collected as part of the study only had a single previous occurrence with an associated voucher in the province: *Amandinea coniops*, *Chaenotheca gracilenta*, *C. laevigata*, *Lepraria vouauxii*, and *Platismatia norvegica*. Six additional species that had been identified by Irwin M. Brodo in the 1980s have not been refound and remain the only known occurrences from the province: *Arthonia lapidicola*, *Farnoldia jurana*, *Rinodina archaea*, *R. bischoffii*, *R. calcigena*, and *Staurothele monicae*.

Discussion

Lichens are an important component of terrestrial ecosystems' function and biodiversity, especially at higher latitudes (Asplund and Wardle 2017, Nash 2008), although they have been relatively little surveyed compared to bryophytes and vascular plants. In northeastern North America, only a handful of sites have been thoroughly surveyed for lichens, including macrolichens, microlichens, lichenicolous fungi, sterile crusts, and calicioids (e.g., McMullin et al. 2017b, Seaward et al. 2017). Now with 257 confirmed species with corresponding vouchers, Mingan Archipelago National Park Reserve is highlighted as a highly probable lichen diversity hotspot in the Gulf of St. Lawrence Region. Old-growth associated species such as lichenicolous *Chaenothecopsis* spp. on *Chaenotheca* hosts suggest a high degree of ecological continuity of the forests on the islands (Selva 2003). The combination of calcareous and granitic substrates, with arctic–alpine habitats at sea level, an oceanic climate, intact forest ecosystems, and open bogs makes up a potent mix for lichen diversity in the archipelago. Indeed, rare species for the east coast have been found, including *Platismatia norvegica*, which is known from the islands

of Newfoundland and Cape Breton but with only a handful of records elsewhere, including a single one in Québec collected in 1979 further down the coast towards Labrador. Noteworthy is also *Hypogymnia pulverata*, the discovery of which was so exciting on the east coast a few years ago that every collection has had its own published note (McMullin 2016, McMullin et al. 2014). Other species with few collections in the province such as *Lepraria elobata*, *L. vouauxii*, and many calicioids

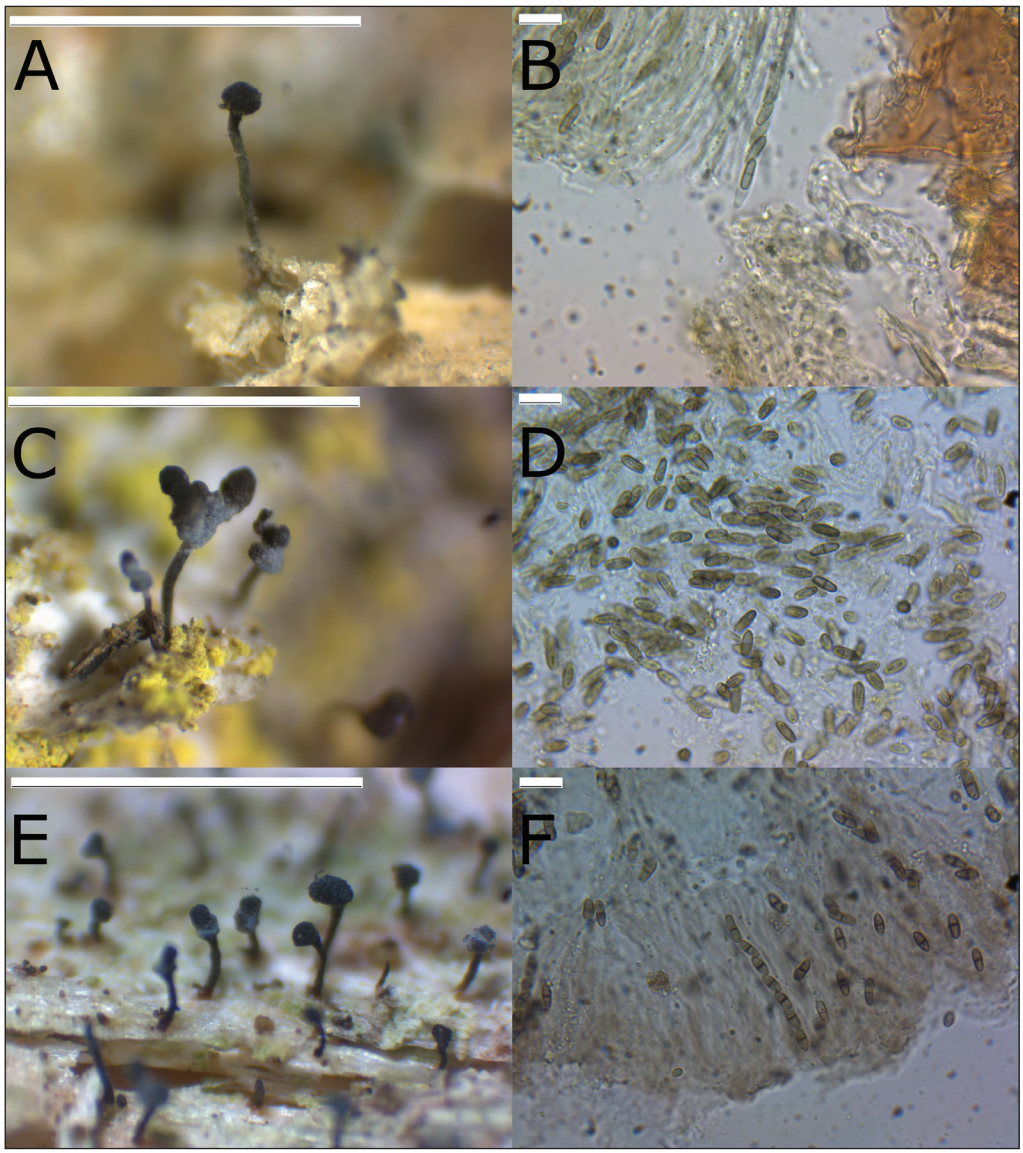

Figure 3. Rare *Chaenothecopsis* species in Québec. A, B: *C. asperopoda* apothecium and 1-septate spores in ascus (QFA 640881); C, D: *C. consociata* apothecia lichenicolous on the thallus of *Chaenotheca chrysocephala* and 1-septate spores (QFA 641717); and E, F: *C. nigra* apothecia and 1-septate spores in ascus (QFA 641703). Scale bars are 2 mm in A, C, and E and 10 µm in B, D, and F.

are most likely overlooked, either because they are small and inconspicuous or because they require TLC to be accurately identified (Lendemer 2013; Selva 2010, 2013, 2014). The limited number of species belonging to common and diverse saxicolous genera such as *Rhizocarpon* is likely a consequence of sampling bias, with an early emphasis on macrolichens and a recent focus on forest ecosystem

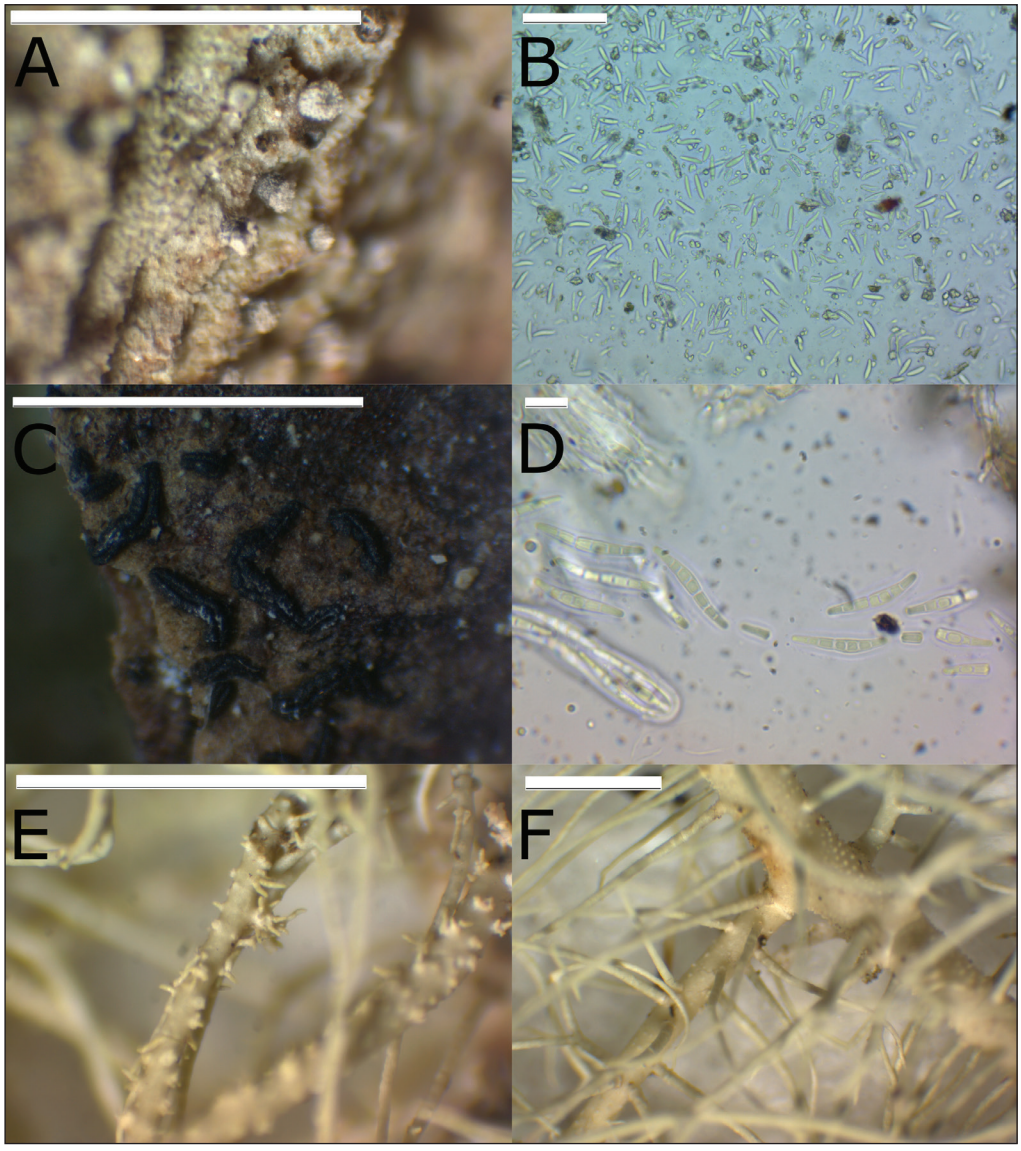

Figure 4. First published occurrence with an associated, digitized voucher in Québec. A, B: *Lecanactis abietina* raised pycnidia with white pruina, and long conidia (specimen with no apothecia) (QFA 647019); C, D: *Opegrapha vulgata* lirellate apothecia and 4-7-septate spores with cylindrical cells (QFA 643934); and E–F: *Usnea diplotypus* with anisotomic-dichotomous branching and punctiform soralia with clusters of isidiomorphs (QFA 643113). Scale bars are 2 mm in A, C, E, and F; 50 µm in B; and 10 µm in D.

rather than maritime tundra. More sampling is needed to expand the list and assess general trends in rarity and distribution.

The assessment of lichen richness and distribution in the province of Québec is currently limited by low sampling effort and exacerbated by past sampling for which vouchers have not been deposited in public herbaria. Consequently, the occurrence of many species reported in the literature cannot be independently reviewed and confirmed. Further limitations include vouchers (often low-quality material) which had been annotated with "cf." (i.e., low confidence in the determination) by the determiner, but were later uploaded to online databases without mentioning the original "cf." annotation. This might induce errors in species checklists if online data are taken for granted without reviewing the physical vouchers and its original annotations. Also noteworthy is the fact that accessory, admixed secondary species identified in vouchers are often left out of online databases, even though they can be high-quality material of rare species. Therefore, it is necessary to review the physical vouchers to build accurate and complete species lists. This contribution highlights Mingan Archipelago National Park Reserve as an area of high lichen richness in northeastern North America and provides a step towards a comprehensive annotated list for the lichens of Québec

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Appendix 1. Annotated checklist. In the annotated list below, names ***in bold italics*** have been identified either as part of the current sampling campaign, added from previously collected specimens, or revised from misidentifications in previous collections. Names *in underlined italics* had been identified before and were confirmed as part of this work, while names only *in italics* had previously been identified by either Irwin M. Brodo, R. Troy McMullin, or Jolanta Miadlikowska, and are therefore trusted to be accurate determinations. Names preceded by ⬩ are non-lichenized fungi and lichenicolous fungi. Species for which thin-layer chromatography was systematically run have a note on the substances identified. Species are listed alphabetically, and records are listed chronologically by year of sampling and location, then by QFA acquisition numbers (also in italics). Herbarium acquisition numbers were favored to collection numbers mainly for consistency. Indeed, while many people from many organizations have collected with many different collection numbering systems, all vouchers have been deposited at QFA. The Louis-Marie Herbarium preserves the largest lichen collection in Québec and has been curated by the Laval University since 1852.

Agonimia gelatinosa (Ach.) Brand & Diederich – Terricolous/bryicolous in calcareous tundra. Petite Marteau 1980: *QFA 422735*.

⬩***Agyrium rufum*** (Pers.) Fr. – Lignicolous on *Picea mariana*. La Chasse 2021: *QFA 639057*.

Alectoria ochroleuca (Hoffm.) Massal. – Terricolous in calcareous tundra. Grosse Marteau 1976: *QFA 290781*, *290782*, *290783*, *290784*.

Alectoria sarmentosa (Ach.) Ach. – Corticolous on *Abies balsamea* and *Picea glauca*. Grosse Marteau 1976: *QFA 290786*, *330059*. Niapiskau 1977: *QFA 329839*, *329847*, *329853*, *329854*. La Chasse 2021: *QFA 639960*, *643923*. La Grande 2022: *QFA 643108*, *647014*.

Amandinea coniops (Wahlenb.) Choisy ex Scheid. & Mayrhofer – Saxicolous on granitic rock. Watshishou 2008: *QFA 646398*.

Amandinea punctata (Hoffm.) Coppins & Scheid. – Corticolous on deciduous shrub. Petite Marteau 1980: *QFA 419965*.

Anaptychia crinalis (Schaerer) Vězda – Saxicolous on calcareous rock. Fantôme 1969: *QFA 484870*. Grosse Marteau 1969: *QFA 484871*; 1976: *QFA 290726*. La Chasse 2021: *QFA 639058*.

Arctoparmelia centrifuga (L.) Hale – Saxicolous on granitic rock. Jalobert 2005: *QFA 646400*. Corneille 2008: *QFA 646399*. Pontbriand 2008: *QFA 646401*.

Arthonia lapidicola (Taylor) Branth & Rostrup – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329860*.

⬩***Arthophacopsis parmeliarum*** Hafellner – Lichenicolous on *Parmelia squarrosa*. La Chasse 2021: *QFA 639065*.

Athallia holocarpa (Hoffm.) Arup, Frödén, & Søchting – Corticolous on deciduous shrub. Petite Marteau 1980: *QFA 420003*.

Biatora helvola Körber ex Hellbom – Corticolous on conifer. Grosse Marteau 1976: *QFA 290752*. Petite Marteau 1979: *QFA 422055*.

Biatora pycnidiata Printzen & Tønsberg – Corticolous on *Larix laricina* (Du Roi.) K. Koch. (Eastern Larch or Tamarack) and *Picea glauca*. La Grande 2022: *QFA 643928*, *647023*. TLC: argopsin.

Biatora vernalis (L.) Fr. – Corticolous/bryicolous on *Abies balsamea* and *Picea glauca*, and lignicolous on *P. mariana*. La Chasse 2021: *QFA 643106*. La Grande 2022: *QFA 643926*, *643936*.

Bilimbia lobulata (Sommerf.) Hafellner & Coppins – Bryicolous on calcareous rocks. La Chasse 2021: *QFA 639059*.

Bilimbia sabuletorum (Schreber) Arnold – Terricolous in calcareous tundra. Saint-Charles 1990: *QFA 382088*.

Bryobilimbia ahlesii (Körber) Fryday, Printzen, & Ekman – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329912*.

Bryoria americana (Motyka) Holien – Corticolous on *Abies balsamea* and *Picea glauca*, and lignicolous on *P. mariana*. Grosse Marteau 1976: *QFA 290791*, *330074*. Niapiskau 1977: *QFA 329850*, *329874*. Petite Marteau 1980: *QFA 419916*, *419924*, *419935*, *419938*, *419940*. La Chasse 2021: *QFA 637547*, *643106*, *643919*, *643923*. La Grande 2022: *QFA 643125*, *643148*, *643932*. TLC: atranorin with fumarprotocetraric acid.

Bryoria bicolor (Ehrh.) Brodo & Hawksw. – Terricolous in granitic tundra. Pontbriand 2008: *QFA 646402*.

Bryoria furcellata (Fr.) Brodo & Hawksw. – Corticolous on *Picea mariana*. Saint-Charles 1990: *QFA 382004*.

Bryoria fuscescens (Gyelnik) Brodo & Hawksw. – Corticolous on *Picea glauca*. Grosse Marteau 1976: *QFA 290789*, *290790*. Petite Marteau 1980: *QFA 419894*, *419895*, *419899*, *419913*. La Chasse 2021: *QFA 637545*.

Bryoria glabra (Motyka) Brodo & Hawksw. – Corticolous on conifer. Petite Marteau 1980: *QFA 419901*.

Bryoria nadvornikiana (Gyelnik) Brodo & Hawksw. – Corticolous on conifer. Petite Marteau 1980: *QFA 419904*.

Bryoria nitidula (Th. Fr.) Brodo & Hawksw. – Terricolous in granitic tundra. Pontbriand 2008: *QFA 646403*. Watshishou 2008: *QFA 646404*.

Bryoria pseudofuscescens (Gyelnik) Brodo & Hawksw. – Corticolous on conifer. Petite Marteau 1980: *QFA 419885*, *419886*.

Bryoria trichodes (Michaux) Brodo & Hawksw. – Corticolous on *Picea glauca* and *P. mariana*. Grosse Marteau 1976: *QFA 330060*, *330062*, *330076*, *330100*. Niapiskau 1977: *QFA 329849*, *329861*. Petite Marteau 1980: *QFA 419913*, *419918*, *419925*, *419932*, *419937*, *419939*. La Chasse 2021: *QFA 637546*, *637548*, *639962*.

Buellia erubescens Arnold – Corticolous on *Abies balsamea* and *Alnus* sp., and lignicolous. Petite Marteau 1980: *QFA 419973*, *419974*, *419975*, *419976*.

Calicium abietinum Pers. – Lignicolous on *Picea glauca* and *P. mariana*. La Chasse 2021: *QFA 637522*, *643106*.

Calicium glaucellum Ach. – Lignicolous on *Abies balsamea* and corticolous on *Picea mariana*. La Chasse 2021: *QFA 637521*, *639073*. La Grande 2022: *QFA 641714*, *641724*.

Calicium salicinum Pers. – Corticolous on conifer snag. La Chasse 2021: *QFA 637550*.

Calicium trabinellum (Ach.) Ach. – Lignicolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 637512*, *637521*, *637526*, *639069*, *639074*, *639075*. La Grande 2022: *QFA 641724*.

Candelariella aurella (Hoffm.) Zahlbr. – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329909*, *353836*.

Candelariella vitellina (Hoffm.) Müll. Arg. – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646405*.

Cetraria aculeata (Schreber) Fr. – Terricolous in calcareous tundra. Petite Marteau 1979: *QFA 421568*.

Cetraria ericetorum Opiz – Terricolous in calcareous tundra. Niapiskau 1969: *QFA 153247*.

Cetraria islandica (L.) Ach. – Terricolous in calcareous tundra. Niapiskau 1969: *QFA 484877*, *484890*; 1977: *QFA 329885*. Grosse Marteau 1976: *QFA 290799*. Jalobert 2005: *QFA 646406*. Corneille 2008: *QFA 645070*. Pontbriand 2008: *QFA 645071*. Notes: including subspp. *crispiformis* and *islandica*.

Cetraria laevigata Rass. – Terricolous in granitic tundra. Corneille 2008: *QFA 646407*.

Cetraria muricata (Ach.) Eckfeldt – Saxicolous on granitic rock and terricolous in granitic tundra. Pontbriand 2008: *QFA 645068*. Watshishou 2008: *QFA 646408*, *646409*.

Cetrariella delisei (Schaerer) Kärnefelt & Thell – Saxicolous on granitic rock. Watshishou 2008: *QFA 646410*.

Chaenotheca brunneola (Ach.) Müll. Arg. – Lignicolous on *Abies balsamea* and *Picea glauca*, and corticolous on *P. mariana*. La Chasse 2021: *QFA 637517*, *637518*, *637519*, *637523*, *637526*, *637551*, *639069*, *639070*, *639075*. La Grande 2022: *QFA 641699*, *641702*, *641704*, *641708*, *641709*, *641711*, *641714*, *641715*, *641716*, *641719*, *641723*, *643129*.

Chaenotheca chrysocephala (Ach.) Th. Fr. – Lignicolous on *Abies balsamea* and *Picea glauca*, resinicolous on *P. glauca*, and corticolous on *Betula papyrifera* and *Picea glauca*. La Chasse 2021: *QFA 637511*, *637516*, *637520*, *637522*, *637523*. La Grande 2022: *QFA 641700*, *641702*, *641708*, *641711*, *641714*, *641717*, *641723*, *641725*.

Chaenotheca ferruginea (Turner *ex* Sm.) Mig. – Lignicolous on *Picea glauca*. La Chasse 2021: *QFA 637515*.

Chaenotheca furfuracea (L.) Tibell – Corticolous on *Picea glauca*. La Chasse 2021: *QFA 637527*. La Grande 2022: *QFA 641701*, *641712*.

Chaenotheca gracilenta (Ach.) Mattsson & Middelb. – Corticolous on *Picea glauca*. La Grande 2022: *QFA 641718*.

Chaenotheca hispidula (Ach.) Zahlbr. – Corticolous on *Picea glauca*. La Grande 2022: *QFA 641712*.

Chaenotheca laevigata Nádv. – Corticolous on conifer snag. La Chasse 2021: *QFA 637550*.

Chaenotheca obscura (Merr.) Nádv. – Fungicolous on *Trichaptum abietinum* on *Abies balsamea*. La Chasse 2021: *QFA 637513*.

Chaenotheca stemonea (Ach.) Müll. Arg. – Corticolous on *Betula papyrifera* and *Picea glauca*, and resinicolous on *P. glauca*. La Chasse 2021: *QFA 637530*, *637531*. La Grande 2022: *QFA 641726*.

Chaenotheca trichialis (Ach.) Th. Fr. – Lignicolous and corticolous on *Picea glauca*. La Chasse 2021: *QFA 637524*, *637553*. La Grande 2022: *QFA 641707*, *641727*.

Chaenotheca xyloxena Nádv. – Lignicolous on *Abies balsamea*, *Betula papyrifera*, and *Picea glauca*. La Chasse 2021: *QFA 637528*, *637529*, *637549*.

♦***Chaenothecopsis asperopoda*** Titov – Resinicolous on *Picea glauca*. La Grande 2022: *QFA 640881*.

♦***Chaenothecopsis consociata*** (Nádv.) Schmidt – Lichenicolous on *Chaenotheca chrysocephala*. La Grande 2022: *QFA 641717*.

♦***Chaenothecopsis nana*** Tibell – Corticolous on *Picea glauca*. La Chasse 2021: *QFA 637553*.

♦***Chaenothecopsis nigra*** Tibell – Lignicolous on conifer snag. La Grande 2022: *QFA 641703* (stet. S.B. Selva).

♦***Chaenothecopsis pusilla*** (Ach.) Schmidt – Lignicolous on conifer snag. La Chasse 2021: *QFA 637516*, *639075*. La Grande 2022: *QFA 641700*, *641725*.

♦***Chaenothecopsis pusiola*** (Ach.) Vainio – Lichenicolous on *Chaenotheca brunneola* and *C. xyloxena*. La Chasse 2021: *QFA 637528*, *637549*. La Grande 2022: *QFA 641709*.

♦***Chaenothecopsis savonica*** (Räsänen) Tibell – Lignicolous on conifer snag. La Grande 2022: *QFA 641728*.

♦***Chaenothecopsis viridireagens*** (Nádv.) Schmidt – Lichenicolous on *Chaenotheca stemonea*. La Chasse 2021: *QFA 637530*.

Cladonia amaurocraea (Flörke) Schaerer – Terricolous in calcareous tundra. Niapiskau 1977: *QFA 329878*.

Cladonia arbuscula (Wallr.) Flotow – Terricolous in calcareous and granitic tundra. Niapiskau 1969: *QFA 168525*, *484881*, *484882*. Pontbriand 2008: *QFA 646411*. TLC: usnic and protocetraric acids.

Cladonia bacilliformis (Nyl.) Sarnth. – Terricolous in calcareous tundra. Petite Marteau 1980: *QFA 420454*.

Cladonia bellidiflora (Ach.) Schaerer – Terricolous in granitic tundra. Sauvage 2005: *QFA 646412*. Pontbriand 2008: *QFA 646416*.

Cladonia borealis Stenroos – Saxicolous on granitic rock. Sauvage 2005: *QFA 646414*. Corneille 2008: *QFA 646413*, *646415*. TLC: barbatic and usnic acids.

Cladonia boryi Tuck. – Terricolous in calcareous tundra. Niapiskau 1977: *QFA 329875*, *329892*.

Cladonia botrytes (Hagen) Willd. – Lignicolous and terricolous in granitic and calcareous tundra. Grosse Marteau 1976: *QFA 330113*. Petite Marteau 1980: *QFA 420891*. Jalobert 2008: *QFA 645098*.

Cladonia carneola (Fr.) Fr. – Lignicolous in calcareous tundra. Petite Marteau 1980: *QFA 420466*, *420467*.

Cladonia cenotea (Ach.) Schaerer – Lignicolous in calcareous tundra. Niapiskau 1977: *QFA 329858*, *329863*. Petite Marteau 1980: *QFA 421138*.

Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel – Terricolous and lignicolous in calcareous tundra. Grosse Marteau 1976: *QFA 290821*, *290822*, *290823*.

Cladonia coccifera (L.) Willd. – Terricolous in calcareous and granitic tundra. Grosse Marteau 1976: *QFA 290824*. Pontbriand 2008: *QFA 646416*. TLC: zeorin with usnic acid.

Cladonia coniocraea (Flörke) Sprengel – Lignicolous and corticolous. Grosse Marteau 1976: *QFA 290718*. Niapiskau 1977: *QFA 329839*. Petite Marteau 1979: *QFA 420727*; 1980: *QFA 420624*, *420625*, *420626*, *420627*.

Cladonia cornuta (L.) Hoffm. – Terricolous in granitic tundra. Pontbriand 2008: *QFA 645103*. Watshishou 2008: *QFA 645101*.

Cladonia crispata (Ach.) Flotow – Terricolous in calcareous tundra. Niapiskau 1977: *QFA 329864*.

Cladonia cristatella Tuck. – Lignicolous in calcareous tundra and terricolous in granitic tundra. Petite Marteau 1980: *QFA 420891*. Jalobert 2007: *QFA 645104*.

Cladonia deformis (L.) Hoffm. – Lignicolous in calcareous tundra. Petite Marteau 1980: *QFA 420960*.

Cladonia digitata (L.) Hoffm. – Terricolous and lignicolous. Niapiskau 1977: *QFA 329855*. Petite Marteau 1980: *QFA 420939*.

Cladonia ecmocyna Leighton – Terricolous. Grosse Marteau 1976: *QFA 290829*, *290830*.

Cladonia fimbriata (L.) Fr. – Lignicolous. Petite Marteau 1980: *QFA 420960*.

Cladonia floerkeana (Fr.) Flörke – Saxicolous on granitic rock. Sauvage 2005: *QFA 646417*. Pontbriand 2008: *QFA 646418*. TLC: barbatic acid.

Cladonia furcata (Hudson) Schrader – Terricolous in calcareous tundra. Petite Marteau 1980: *QFA 421302*.

Cladonia gracilis (L.) Willd. – Terricolous in calcareous and granitic tundra. Niapiskau 1969: *QFA 484866*. Saint-Charles 1969: *QFA 484845*. Grosse Marteau 1976: *QFA 290832*, *290837*. Corneille 2008: *QFA 646421*. Pontbriand 2008: *QFA 646420*. Watshishou 2008: *QFA 646419*, *646422*. La Chasse 2021: *QFA 639056*. *Notes*: including subspp. g*racilis*, *elongata*, *turbinata*, and *vulnerata*.

Cladonia grayi Merr. ex Sandst. – Lignicolous. Petite Marteau 1980: *QFA 421064*.

Cladonia maxima (Asahina) Ahti – Terricolous on the forest floor. Niapiskau 1977: *QFA 329884*. Petite Marteau 1980: *QFA 421100*. Tanguay 2005: *QFA 645122*. TLC: fumarprotocetraric and protocetraric acids.

Cladonia merochlorophaea Asahina – Lignicolous. Grosse Marteau 1976: *QFA 290718*.

Cladonia mitis Sandst. – Terricolous in granitic tundra. Pontbriand 2008: *QFA 646423*. TLC: usnic acid with an unknown substance.

Cladonia multiformis Merr. – Terricolous. Niapiskau 1969: *QFA 484846*. Grosse Marteau 1976: *QFA 290717*. Petite Marteau 1979: *QFA 420977*.

Cladonia ochrochlora Flörke – Lignicolous and terricolous. Niapiskau 1977: *QFA 329865*, *329887*. Petite Marteau 1980: *QFA 420939*, *421137*, *421138*, *421165*.

Cladonia pleurota (Flörke) Schaerer – Lignicolous. Petite Marteau 1980: *QFA 421165*.

Cladonia pocillum (Ach.) Rich. – Terricolous. Niapiskau 1969: *QFA 484848*. Saint-Charles 1969: *QFA 484849*.

Cladonia pyxidata (L.) Hoffm. – Terricolous and lignicolous. Grosse Marteau 1976: *QFA 290889*. Niapiskau 1977: *QFA 329877*. Petite Marteau 1980: *QFA 421204*.

Cladonia rangiferina (L.) Wigg. – Terricolous. Niapiskau 1969: *QFA 521360*.

Cladonia rei Schaerer – Terricolous in granitic tundra. Corneille 2008: *QFA 645141*. TLC: homosekikaic acid.

Cladonia scabriuscula (Delise) Nyl. Terricolous in calcareous tundra. Grosse Marteau 1976: *QFA 290765*.

Cladonia squamosa Hoffm. – Terricolous in granitic tundra. Watshishou 2008: *QFA 645147*.

Cladonia stellaris (Opiz) Pouzar & Vězda – Terricolous. Niapiskau 1977: *QFA 329883*.

Cladonia stygia (Fr.) Ruoss – Terricolous in granitic tundra. Sauvage 2005: *QFA 646426*. Corneille 2008: *QFA 646428*. Pontbriand 2008: *QFA 646427*.

Cladonia subfurcata (Nyl.) Arnold – Terricolous in granitic tundra. Johan-Beetz 2005: *QFA 646429*.

Cladonia sulphurina (Michaux) Fr. – Terricolous and lignicolous. Petite Marteau 1980: *QFA 421481*, *421482*, *421487*.

Cladonia symphycarpa (Flörke) Fr. – Saxicolous on granitic rock and terricolous in granitic tundra. Corneille 2008: *QFA 646432*. Pontbriand 2008: *QFA 646430*. Watshishou 2008: *QFA 646431*, *646433*. TLC: atranorin with ± norstictic, ± cf. psoromic, and ± protocetraric acids.

Cladonia terrae-novae Ahti – Terricolous in granitic tundra. Corneille 2008: *QFA 646434*. TLC: atranorin with perlatolic acid.

Cladonia trassii Ahti – Terricolous in granitic tundra. Watshishou 2008: *QFA 646435*, *646436*.

Cladonia turgida Ehrh. ex Hoffm. – Terricolous. Grosse Marteau 1976: *QFA 290768*. Niapiskau 1977: *QFA 329890*.

Cladonia uncialis (L.) Wigg. – Terricolous. Niapiskau 1969: *QFA 188357*, *512401*; 1977: *QFA 329866*. Grosse Marteau 1976: *QFA 290770*.

Cliostomum griffithii (Sm.) Coppins – Lignicolous on driftwood and conifer snag, and corticolous on *Picea glauca*. Petite Marteau 1980: *QFA 421563*, *421564*. La Chasse 2021: *QFA 639072*, *643921*. La Grande 2022: *QFA 643931*, *643937*. TLC: no substances detected.

Cliostomum leprosum (Räsänen) Holien & Tønsberg – Corticolous on *Picea glauca*. La Grande 2022: *QFA 647027*. TLC: atranorin with usnic acid.

♦***Cyphobasidium hypogymniicola*** (Diederich & Ahti) Millanes, Diederich, & Wedin – Lichenicolous on *Hypogymnia physodes*. La Chasse 2021: *QFA 639065*.

Dermatocarpon miniatum (L.) Mann – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329897*.

Diplotomma alboatrum (Hoffm.) Flotow – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 353836*.

Dolichousnea longissima (Ach.) Articus – Corticolous on *Abies balsamea, Picea glauca*, and *P. mariana*. La Chasse 2021: *QFA 643919*. La Grande 2022: *QFA 643108*, *643134*, *643932*, *647014*.

Enchylium bachmanianum (Fink) Otálora, Jørg., & Wedin – Terricolous among mosses. Niapiskau 1977: *QFA 329900*. Petite Marteau 1980: *QFA 421574*, *421576*, *422230*.

Enchylium tenax (Sw.) Gray – Terricolous among mosses. Grosse Marteau 1976: *QFA 290771*.

Evernia mesomorpha Nyl. – Corticolous on *Abies balsamea*. Du Havre 1978: *QFA 219382*. Petite Marteau 1980: *QFA 421709*.

Farnoldia jurana (Schaerer) Hertel – Saxicolous on calcareous rock. Petite Marteau 1980: *QFA 176692*.

Flavocetraria nivalis (L.) Kärnefelt & Thell – Terricolous in calcareous tundra. Niapiskau 1969: *QFA 484879*.

Gowardia nigricans (Ach.) Halonen, Myllys, Velmala, & Hyvärinen – Terricolous in granitic and calcareous tundra. Petite Marteau 1980: *QFA 419798*. Pontbriand 2008: *QFA 645176*.

Hypogymnia austerodes (Nyl.) Räsänen – Corticolous on *Picea glauca*. La Chasse 2021: *QFA 637545*.

Hypogymnia bitteri (Lynge) Ahti – Corticolous on *Abies balsamea*. La Chasse 2021: *QFA 637543*.

Hypogymnia incurvoides Rass. – Corticolous on *Abies balsamea*. La Chasse 2021: *QFA 637544*.

Hypogymnia physodes (L.) Nyl. – Corticolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 637544*. La Grande 2022: *QFA 647016*.

Hypogymnia pulverata (Nyl. ex Crombie) Elix – Corticolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 639960*, *639961*. La Grande 2022: *QFA 643136*.

Hypogymnia tubulosa (Schaerer) Hav. – Corticolous on *Abies balsamea* and lignicolous on conifer snag. La Chasse 2021: *QFA 637532*, *637537*, *637544*.

Hypogymnia vittata (Ach.) Parrique – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643110*. TLC: physodic and 3-hydroxyphysodic acids.

Icmadophila ericetorum (L.) Zahlbr. – Lignicolous on conifer stump. Grosse Marteau 1976: *QFA 290777*. La Chasse 2021: *QFA 639071*.

Imshaugia aleurites (Ach.) Meyer – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643926*.

Lasallia papulosa (Ach.) Llano – Saxicolous on granitic rock. Corneille 2008: *QFA 646437*.

Lathagrium fuscovirens (With.) Otálora, Jørg., & Wedin – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329905*.

Lecanactis abietina (Ach.) Körber – Corticolous on *Picea glauca*. La Grande 2022: *QFA 647019*. TLC: lecanoric and schizopeltic acids.

Lecanora boligera (Norman ex Th. Fr.) Hedl. – Corticolous on deciduous shrub. Grosse Marteau 1976: *QFA 290779*.

Lecanora cenisia Ach. – Saxicolous on granitic rock. Watshishou 2008: *QFA 646438*.

Lecanora circumborealis Brodo & Vitik – Corticolous on conifer. Petite Marteau 1980: *QFA 421923*.

Lecanora epibryon (Ach.) Ach. – Bryicolous in calcareous tundra. Niapiskau 1977: *QFA 329840*.

Lecanora orae-frigidae Sant. – Lignicolous on driftwood. La Chasse 2021: *QFA 643922*, *643924*. TLC: atranorin and zeorin with cf. thiophanic acid and 2 unknown substances.

Lecanora polytropa (Ehrh.) Rabenh. – Saxicolous on granitic rock. Niapiskau 1977: *QFA 353834*, *353835*.

Lecanora pulicaris (Pers.) Ach. – Corticolous on conifer. Grosse Marteau 1976: *QFA 290757*, *290759*, *290760*.

Lecanora symmicta (Ach.) Ach. – Lignicolous and corticolous on conifer. Petite Marteau 1980: *QFA 304371*, *421974*, *421975*, *421976*, *421978*, *421980*. La Chasse 2021: *QFA 639074*.

Lecanora xylophila Hue – Lignicolous. Niapiskau 1977: *QFA 329902*. Petite Marteau 1980: *QFA 421934*.

Lecidea albofuscescens Nyl. – Lignicolous and corticolous on *Betula papyrifera*. Petite Marteau 1980: *QFA 421992*. La Grande 2022: *QFA 647020*.

Lecidea berengeriana (Massal.) Th. Fr. – Terricolous. Grosse Marteau 1976: *QFA 290751*. Niapiskau 1977: *QFA 329894*.

Lecidea turgidula Fr. – Corticolous on deciduous shrub. Petite Marteau 1980: *QFA 422085*.

Lecidella stigmatea (Ach.) Hertel & Leuckert – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329895*, *329909*.

Lepra borealis (Erichsen) Schmitt, Hodk., & Lumbsch – Corticolous on *Betula papyrifera* and *Picea glauca*. La Grande 2022: *QFA 643932*, *647020*. TLC: fumarprotocetraric acid.

Lepra ophthalmiza (Nyl.) Hafellner – Corticolous on *Abies balsamea*, *Betula papyrifera*, and *Picea glauca*. La Chasse 2021: *QFA 647012*. La Grande 2022: *QFA 647015*, *647021*. TLC: 2 unknown fatty acids running low.

Lepraria elobata Tønsberg – Corticolous on *Betula papyrifera* and *Picea glauca*. La Chasse 2021: *QFA 639959*. La Grande 2022: *QFA 643116*, *643138*. TLC: atranorin and zeorin with roccellic/angardianic, stictic, constictic, and cryptostictic acids.

Lepraria finkii (de Lesd.) Harris – Terricolous, bryicolous, saxicolous on calcareous rock, lignicolous on conifer snag, and corticolous on *Picea glauca* and *Sorbus americana*. La Grande 2022: *QFA 643115*, *643117*, *643123*, *643124*, *643130*, *643131*, *643133*, *643137*, *643140*, *643934*. TLC: atranorin and zeorin with stictic acid aggregate and ± roccellic/angardianic acid.

Lepraria humida Slav.-Bayr. & Orange – Saxicolous on granitic rock. La Grande 2022: *QFA 643132*. TLC: atranorin with jackinic/rangiformic acid.

Lepraria jackii Tønsberg – Corticolous on *Abies balsamea*, *Larix laricina*, and *Picea glauca*, and lignicolous on *Abies balsamea*. La Grande 2022: *QFA 643111*, *643112*, *643114*, *643119*, *643121*, *643122*, *643126*, *643127*, *643128*, *643129*, *643139*, *643144*, *643145*, *643146*, *643930*, *643940*, *643941*, *643943*. TLC: atranorin with roccellic/angardianic and jackinic/rangiformic acids.

Lepraria neglecta (Nyl.) Erichsen – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643107*. TLC: atranorin with fumarprotocetraric, roccellic/angardianic, and jackinic/rangiformic acids.

Lepraria torii Pérez-Ortega & Spribille – Corticolous on *Picea glauca* and *P. mariana*, and lignicolous on *Abies balsamea*. La Chasse 2021: *QFA 639958*. La Grande 2022: *QFA 643109*, *643120*, *643927*, *643929*, *643930*. TLC: fumarprotocetraric, roccellic/angardianic, and ± jackinic/rangiformic acids.

Lepraria vouauxii (Hue) Harris – Terricolous in a calcareous cliff. La Grande 2022: *QFA 647024*. TLC: dibenzofurans.

Lobaria pulmonaria (L.) Hoffm. – Corticolous on *Betula papyrifera*, *Picea glauca*, and *P. mariana*. La Chasse 2021: *QFA 637541*, *639060*, *643920*.

Lobaria scrobiculata (Scop.) DC. – Corticolous on *Sorbus americana*. La Chasse 2021: *QFA 637536*.

Lopadium disciforme (Flotow) Kullhem – Corticolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 639960*. La Grande 2022: *QFA 643928*, *643936*.

Loxospora elatina (Ach.) Massal. – Lignicolous on *Abies balsamea*, *Larix laricina*, and *Picea glauca*. La Chasse 2021: *QFA 639069*. La Grande 2022: *QFA 647022*, *647023*, *647026*. TLC: thamnolic acid.

Melanelia hepatizon (Ach.) Thell – Saxicolous on granitic rock. Jalobert 2005: *QFA 646441*. Corneille 2008: *QFA 646440*. Pontbriand 2008: *QFA 646439*. Watshishou 2008: *QFA 646454*. TLC: stictic acid.

Menegazzia terebrata (Hoffm.) Massal. – Corticolous on conifer. Grosse Marteau 1976: *QFA 290745*.

Micarea prasina Fr. – Corticolous *Abies balsamea* and *Picea glauca*, and lignicolous on conifer snag. La Grande 2022: *QFA 643927*, *643929*, *643934*, *643936*, *643941*, *643943*. TLC: micareic acid.

Mycobilimbia pilularis (Körber) Hafellner & Türk – Bryicolous and corticolous on *Picea glauca*. Petite Marteau 1980: *QFA 419866*. La Chasse 2021: *QFA 639055*.

Mycoblastus sanguinarioides Kantvilas – Corticolous on *Abies balsamea*. La Chasse 2021: *QFA 637534*. TLC: atranorin with bourgeanic acid.

Mycoblastus sanguinarius (L.) Norman – Corticolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 639067*. La Grande 2022: *QFA 643932*. TLC: atranorin with rangiformic acid.

♦***Mycocalicium subtile*** (Pers.) Szatala – Lignicolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 637552*. La Grande 2022: *QFA 641713*, *641728*.

Myriolecis contractula (Nyl.) Śliwa, Zhao Xin, & Lumbsch – Saxicolous on granitic rock. Watshishou 2008: *QFA 646442*, *646443*, *646459*.

Myriolecis crenulata (Hooker) Śliwa, Zhao Xin, & Lumbsch – Saxicolous on calcareous rock. Petite Marteau 1980: *QFA 423004*.

Myriolecis dispersa (Pers.) Śliwa, Zhao Xin, & Lumbsch – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329841*, *329844*, *329895*, *329909*, *353836*.

Myriolecis straminea (Ach.) Śliwa, Zhao Xin, & Lumbsch – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646444*.

Nephroma arcticum (L.) Torss. – Terricolous. Saint-Charles 1969: *QFA 484861*. Niapiskau 1977: *QFA 329857*, *329882*.

Nephroma bellum (Sprengel) Tuck. – Corticolous. Petite Marteau 1980: *QFA 426697*.

Nephroma resupinatum (L.) Ach. – Corticolous on *Prunus virginiana* L. (Chokecherry). La Chasse 2021: *QFA 637539*.

Nesolechia oxyspora (Tul.) Massal. – Lichenicolous on *Platismatia glauca*. La Chasse 2021: *QFA 639062*. La Grande 2022: *QFA 643942*.

Ochrolechia androgyna (Hoffm.) Arnold – Corticolous on *Picea glauca*, bryicolous, and terricolous. Petite Marteau 1980: *QFA 259610*, *259611*, *422327*. La Grande 2022: *QFA 643925*. TLC: gyrophoric acid with an unknown fatty acid.

Ochrolechia arborea (Kreyer) Almb. – Corticolous on *Abies balsamea*, *Larix laricina*, and *Picea glauca*. La Chasse 2021: *QFA 639961*. La Grande 2022: *QFA 643926*, *647015*, *647022*, *647023*. TLC: gyrophoric acid.

Ochrolechia frigida (Sw.) Lynge – Lignicolous on driftwood. La Chasse 2021: *QFA 639068*.

Ochrolechia mahluensis Räsänen – Corticolous on *Abies balsamea*. La Chasse 2021: *QFA 639054*. TLC: gyrophoric acid.

Opegrapha vulgata Ach. – Corticolous on *Picea glauca*. La Grande 2022: *QFA 643934*.

Parmelia omphalodes (L.) Ach. – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646445*, *646446*.

Parmelia saxatilis (L.) Ach. – Saxicolous on granitic rock and corticolous. Petite Marteau 1980: *QFA 422477*. Watshishou 2008: *QFA 646447*.

Parmelia squarrosa Hale – Corticolous on *Abies balsamea*, *Betula papyrifera*, *Picea glauca* and *P. mariana*, and lignicolous on *P. mariana*. Grosse Marteau 1976: *QFA 330120*. La Chasse 2021: *QFA 637538*, *637547*, *637548*, *637513*, *637532*, *637540*, *637545*, *637546*, *639061*, *639062*, *639065*, *643106*, *643920*, *643923*. La Grande 2022: *QFA 643136*, *643142*, *643926*.

Parmelia sulcata Taylor – Corticolous on *Abies balsamea*, *Betula papyrifera*, and *Picea glauca*. Grosse Marteau 1976: *QFA 330120*. Niapiskau 1977: *QFA 329867*. La Chasse 2021: *QFA 637544*, *637546*, *639061*.

Parmeliopsis ambigua (Wulfen) Nyl. – Lignicolous on conifer snag and driftwood. La Chasse 2021: *QFA 637537*, *647013*.

Parmeliopsis hyperopta (Ach.) Arnold – Lignicolous on conifer snag and driftwood. Petite Marteau 1980: *QFA 421064*. La Chasse 2021: *QFA 637537*, *647013*.

Peltigera aphthosa (L.) Willd. – Terricolous among mosses. Grosse Marteau 1976: *QFA 330083*, *330111*. Niapiskau 1977: *QFA 329880*, *329881*, *329889*. La Chasse 2021: *QFA 639056*.

Peltigera degenii Gyelnik – Terricolous among mosses. Grosse Marteau 1976: *QFA 290738*. Petite Marteau 1980: *QFA 419488*, *452035*.

Peltigera didactyla (With.) Laundon – Terricolous among mosses. Petite Marteau 1980: *QFA 419645*, *419647*, *419652*.

Peltigera elisabethae Gyelnik – Terricolous among mosses and in granitic tundra. Grosse Marteau 1976: *QFA 290733*. Pontbriand 2008: *QFA 646449*. Watshishou 2008: *QFA 646448*. TLC: zeorin with tenuiorin and other triterpenes.

Peltigera leucophlebia (Nyl.) Gyelnik – Terricolous among mosses. Petite Marteau 1980: *QFA 419541*.

Peltigera membranacea (Ach.) Nyl. – Terricolous. Grosse Marteau 1976: *QFA 330084*.

Peltigera neckeri Hepp *ex*. Müll. Arg. – Terricolous. Petite Marteau 1980: *QFA 419556*, *419557*, *419558*.

Peltigera neopolydactyla (Gyelnik) Gyelnik – Terricolous among mosses. Grosse Marteau 1976: *QFA 330082*. Niapiskau 1977: *QFA 329851*. Petite Marteau 1980: *QFA 419567*, *452038*.

Peltigera praetextata (Flörke ex Sommerf.) Zopf – Terricolous. Grosse Marteau 1976: *QFA 290764*, *330066*. Petite Marteau 1979: *QFA 419547*, *419553*, *419561*; 1980: *QFA 419472*, *419476*, *419477*, *419550*.

Peltigera polydactylon (Necker) Hoffm. – Terricolous among mosses. La Chasse 2021: *QFA 639063*, *639066*.

Peltigera ponojensis Gyelnik – Terricolous in granitic tundra. Pontbriand 2008: *QFA 646450*.

Peltigera rufescens (Weiss) Humb. – Terricolous among mosses. Grosse Marteau 1976: *QFA 290733*, *290735*, *290736*.

Peltigera scabrosa Th. Fr. – Terricolous. Grosse Marteau 1976: *QFA 290737*.

Pertusaria consocians Dibben – Lignicolous on *Picea glauca* and corticolous on *Populus balsamifera* L. (Balsam Poplar). La Grande 2022: *QFA 643933*, *647018*. TLC: stictic acid.

♦***Phaeocalicium compressulum*** (Nyl. ex Vainio) Schmidt – Corticolous on *Alnus incana* ssp. *rugosa* (Du Roi) R.T. Clausen (Speckled Alder) and *Alnus viridis* ssp. *crispa* (Aiton) Turrill (Mountain Alder). La Grande 2022: *QFA 641705*, *641706*.

♦***Phaeocalicium matthewsianum*** Selva & Tibell – Corticolous on *Betula papyrifera*. La Chasse 2021: *QFA 637514*. La Grande 2022: *QFA 641710*.

Phaeophyscia ciliata (Hoffm.) Moberg – Terricolous in granitic tundra. Watshishou 2008: *QFA 646451*.

Phaeophyscia orbicularis (Necker) Moberg – Saxicolous on calcareous rock. Grosse Marteau 1976: *QFA 290725*, *290730*. Niapiskau 1977: *QFA 329891*.

Phaeophyscia sciastra (Ach.) Moberg – Saxicolous on calcareous and granitic rocks. Grosse Marteau 1976: *QFA 290725*, *290726*, *290729*, *290734*. Niapiskau 1977: *QFA 329895*. Jalobert 2005: *QFA 646452*. Watshishou 2008 : *QFA 646453*.

Physcia adscendens (Fr.) Olivier – Saxicolous on calcareous rock. Grosse Marteau 1976: *QFA 290729*, *290730*. Niapiskau 1977: *QFA 329868*, *329869*, *329886*, *329895*.

Physcia caesia (Hoffm.) Hampe ex Fürnr. – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329843*, *329845*, *329860*, *329895*, *329906*.

Physcia phaea (Tuck.) Thomson – Saxicolous on granitic rock. Watshishou 2008: *QFA 646454*.

Physcia tenella (Scop.) DC. – Saxicolous on granitic rock. Watshishou 2008: *QFA 646455*, *646456*, *646457*.

Physconia muscigena (Ach.) Poelt – Saxicolous on calcareous rock. Grosse Marteau 1976: *QFA 290726*. Niapiskau 1977: *QFA 329868*. La Chasse 2021: *QFA 639058*.

Placynthium nigrum (Hudson) Gray – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329907*. Petite Marteau 1980: *QFA 442329*.

Platismatia glauca (L.) Culb. & Culb. – Corticolous on *Abies balsamea* and *Picea glauca*. La Chasse 2021: *QFA 637533*, *639062*. La Grande 2022: *QFA 640877*, *643136*, *643942*, *647014*.

Platismatia norvegica (Lynge) Culb. & Culb. – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643148*.

Polyblastia hyperborea Th. Fr. – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329911*.

Polycauliona candelaria (L.) Arup, Frödén, & Søchting – Saxicolous on granitic rock. Watshishou 2008: *QFA 646458*.

Polycauliona polycarpa (Hoffm.) Arup, Frödén, & Søchting – Saxicolous on calcareous rock and corticolous on conifer. Grosse Marteau 1976: *QFA 290714*, *290715*. Saint-Charles 1990: *QFA 382108*.

Polycauliona verruculifera (Vainio) Arup, Frödén, & Søchting – Saxicolous on granitic rock. Watshishou 2008: *QFA 646459*, *646460*.

Porpidia macrocarpa (DC.) Hertel & Schwab – Saxicolous on granitic rock. La Grande 2022: *QFA 643939*.

Protoblastenia rupestris (Scop.) Steiner – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 353836*.

Protopannaria pezizoides (Weber) Jørg & Ekman – Terricolous. Grosse Marteau 1976: *QFA 290743*. Petite Marteau 1980: *QFA 422404*.

Psoroma hypnorum (Vahl) Gray – Terricolous. Niapiskau 1977: *QFA 329879*.

Ramalina dilacerata (Hoffm.) Hoffm. – Corticolous on *Abies balsamea*. Du Havre 1978: *QFA 220485*, *220503*, *220505*, *220506*. Grande Île 1978: *QFA 220513*. Petite Marteau 1980: *QFA 421729*.

Ramalina farinacea (L.) Ach. – Corticolous on *Picea glauca*. La Chasse 2021: *QFA 637548*. La Grande 2022: *QFA 647016*. TLC: hypoprotocetraric and usnic acids.

Ramalina roesleri (Hochst. ex Schaerer) Hue – Corticolous on *Abies balsamea* and *Picea glauca*. Petite Marteau 1979: *QFA 421731*, *421747*. La Chasse 2021: *QFA 637513*, *637542*, *637548*, *639055*. La Grande 2022: *QFA 647016*.

Ramboldia cinnabarina (Sommerf.) Kalb, Lumbsch, & Elix – Corticolous *Betula papyrifera* and conifer. Grosse Marteau 1976: *QFA 290749*. Petite Marteau 1980: *QFA 422012*, *422013*, *422014*, *422015*.

Rhizocarpon geminatum Körber – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646461*.

Rhizocarpon geographicum (L.) DC. – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646461*, *646462*. Watshishou 2008: *QFA 646463*.

Rhizocarpon grande (Flörke ex Flotow) Arnold – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646462*. Watshishou 2008: *QFA 646463*.

Ricasolia quercizans (Michaux) Stitzenb. – Corticolous on *Picea glauca*. Niapiskau 1977: *QFA 329859*. La Grande 2022: *QFA 643936*, *647017*.

Rinodina archaea (Ach.) Arnold – Corticolous on conifer. Grosse Marteau 1976: *QFA 290719*.

Rinodina bischoffii (Hepp) Massal. – Saxicolous on calcareous rock. Grosse Marteau 1976: *QFA 290758*. Niapiskau 1977: *QFA 329903*, *329907*.

Rinodina calcigena (Th. Fr.) Lynge – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329842*, *329895*.

Rinodina turfacea (Wahlenb.) Körber – Terricolous in calcareous tundra. Niapiskau 1977: *QFA 329873*. Petite Marteau 1980: *QFA 422851*.

Ropalospora viridis (Tønsberg) Tønsberg – Corticolous on *Abies balsamea*. La Chasse 2021: *QFA 639960*.

Rusavskia elegans (Link) Kondr. & Kärnefelt – Saxicolous on calcareous rock and corticolous. Fantôme 1969: *QFA 484811*. Grosse Marteau 1976: *QFA 290719*, *290726*, *290730*. Niapiskau 1977: *QFA 329843*, *329845*, *329862*, *329868*, *329895*, *329905*, *329906*, *329910*, *353836*. Petite Marteau 1980: *QFA 442329*. Pontbriand 2008: *QFA 646464*.

Rusavskia sorediata (Vainio) Kondr. & Kärnefelt – Saxicolous on granitic rock. Niapiskau 1977: *QFA 329893*, *353835*.

♦***Sarea resinae*** (Fr.) Kuntze – Resinicolous on *Picea glauca*. La Grande 2022: *QFA 643935*.

Scytinium lichenoides (L.) Otálora, Jørg., & Wedin – Terricolous in calcareous tundra. Petite Marteau 1980: *QFA 422230*.

Solorina saccata (L.) Ach. – Terricolous on a calcareous cliff edge. La Grande 2022: *QFA 643141*.

Sphaerophorus fragilis (L.) Pers. - Saxicolous on granitic rock. Jalobert 2005: *QFA 646466*. Corneille 2008: *QFA 646465*. Pontbriand 2008: *QFA 646446*.

Sphaerophorus globosus (Hudson) Vainio – Terricolous in granitic tundra. Niapiskau 1969: *QFA 484804*. Watshishou 2008: *QFA 646467*.

Staurothele monicae (Zahlbr.) Wetmore – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329896*, *329901*, *329904*.

♦***Stenocybe flexuosa*** Selva & Tibell – Corticolous on *Picea glauca*. La Grande 2022: *QFA 641720*.

♦***Stenocybe major*** Nyl. ex Körber – Corticolous on *Abies balsamea*. Petite Marteau 1980: *QFA 419974*. La Chasse 2021: *QFA 637525*.

Stereocaulon alpinum Laurer *ex* Funck – Terricolous in granitic tundra. Watshishou 2008: *QFA 646468*. TLC: atranorin with lobaric acid.

Stereocaulon paschale (L.) Hoffm. – Terricolous in granitic tundra. Sauvage 2005: *QFA 646470*. Tanguay 2005: *QFA 646469*. Watshishou 2008: *QFA 646471*. TLC: atranorin with lobaric acid.

Trapeliopsis granulosa (Hoffm.) Lumbsch – Terricolous on a conifer stump. La Chasse 2021: *QFA 639064*.

♦***Tremella coppinsii*** Diederich & Marson – Lichenicolous on *Platismatia glauca*. La Chasse 2021: *QFA 637533*.

Tuckermannopsis americana (Sprengel) Hale – Corticolous on *Abies balsamea*. Grosse Marteau 1976: *QFA 330091*, *330092*. Niapiskau 1977: *QFA 329876*. La Chasse 2021: *QFA 639061*.

Tuckermannopsis orbata (Nyl.) Lai – Corticolous on conifers. Petite Marteau 1980: *QFA 072933*, *184067*, *188374*.

Tuckermannopsis sepincola (Ehrh.) Hale – Lignicolous on driftwood and corticolous on conifers. Grosse Marteau 1976: *QFA 290808*. Petite Marteau 1980: *QFA 420175*. Pontbriand 2008: *QFA 645252*.

Umbilicaria deusta (L.) Baumg. – Saxicolous on granitic rock. Pontbriand 2008: *QFA 646472*.

Umbilicaria hyperborea (Ach.) Hoffm. – Saxicolous on granitic rock. Corneille 2008: *QFA 646473*. Watshishou 2008: *QFA 646463*. La Chasse 2021: *QFA 637535*.

Umbilicaria muhlenbergii (Ach.) Tuck. – Saxicolous on granitic rock. Corneille 2008: *QFA 646474*. Pontbriand 2008: *QFA 646475*. TLC: gyrophoric acid.

Umbilicaria vellea (L.) Ach. – Saxicolous on granitic rock. Sauvage 2005: *QFA 646477*. Pontbriand 2008: *QFA 646476*. Watshishou 2008: *QFA 646478*.

Usnea dasopoga (Ach.) Nyl. – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643118*, *643125*, *643134*, *643135*, *643142*, *643143*, *643147*, *643149*, *643926*. TLC: usnic and salazinic acids.

Usnea diplotypus Vainio – Corticolous on *Abies balsamea*. La Grande 2022: *QFA 643113*. TLC: usnic and salazinic acids.

Verrucaria calkinsiana Servít – Saxicolous on calcareous rock. Petite Marteau 1980: *QFA 423004*.

Verrucaria ceuthocarpa Wahlenb. – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329908*.

Verrucaria muralis Ach. – Saxicolous on calcareous rock. La Grande 2022: *QFA 643938*.

Vulpicida pinastri (Scop.) Mattsson & Lai – Lignicolous on conifer snag and corticolous on *Betula papyrifera*. Grosse Marteau 1976: *QFA 290807*. Niapiskau 1977: *QFA 329852*. La Chasse 2021: *QFA 637537*. La Grande 2022: *QFA 647020*.

Xanthocarpia lactea (Massal.) Massal. – Saxicolous on calcareous rock. Niapiskau 1977: *QFA 329841*.

Xanthoparmelia conspersa (Ehrh. e*x* Ach.) Hale – Saxicolous on granitic rock. Sauvage 2005: *QFA 646479*. TLC: stictic, norstictic, and usnic acids.

Xanthoparmelia viriduloumbrina (Gyelnik) Lendemer – Saxicolous on granitic rock. Watshishou 2008: *QFA 646480*. TLC: usnic and salazinic acids.

Xylographa opegraphella Nyl. – Lignicolous. Petite Marteau 1980: *QFA 419973*.