

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

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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

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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).

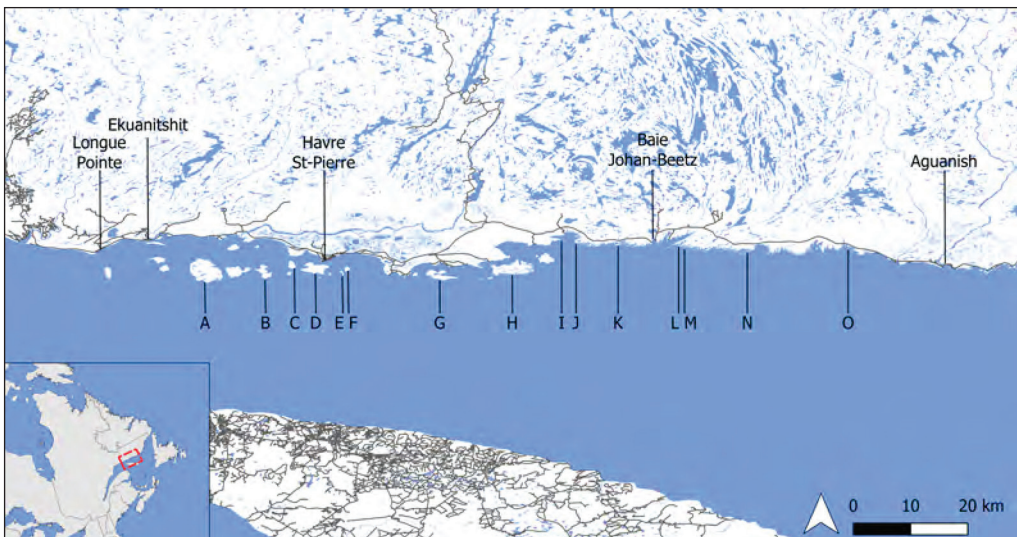


Figure 2. Map of Mingan Archipelago National Park Reserve with names of the islands and sectors where lichens were sampled. From west to east: (A) La Grande, (B) Niapiskau, (C) Fantôme, (D) Du Havre, (E) Petite Marteau, (F) Grosse Marteau, (G) Saint-Charles, (H) La Chasse, (I) Sauvage, (J) Corneille, (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 coniois*, *Chaenotheca gracilentia*, *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

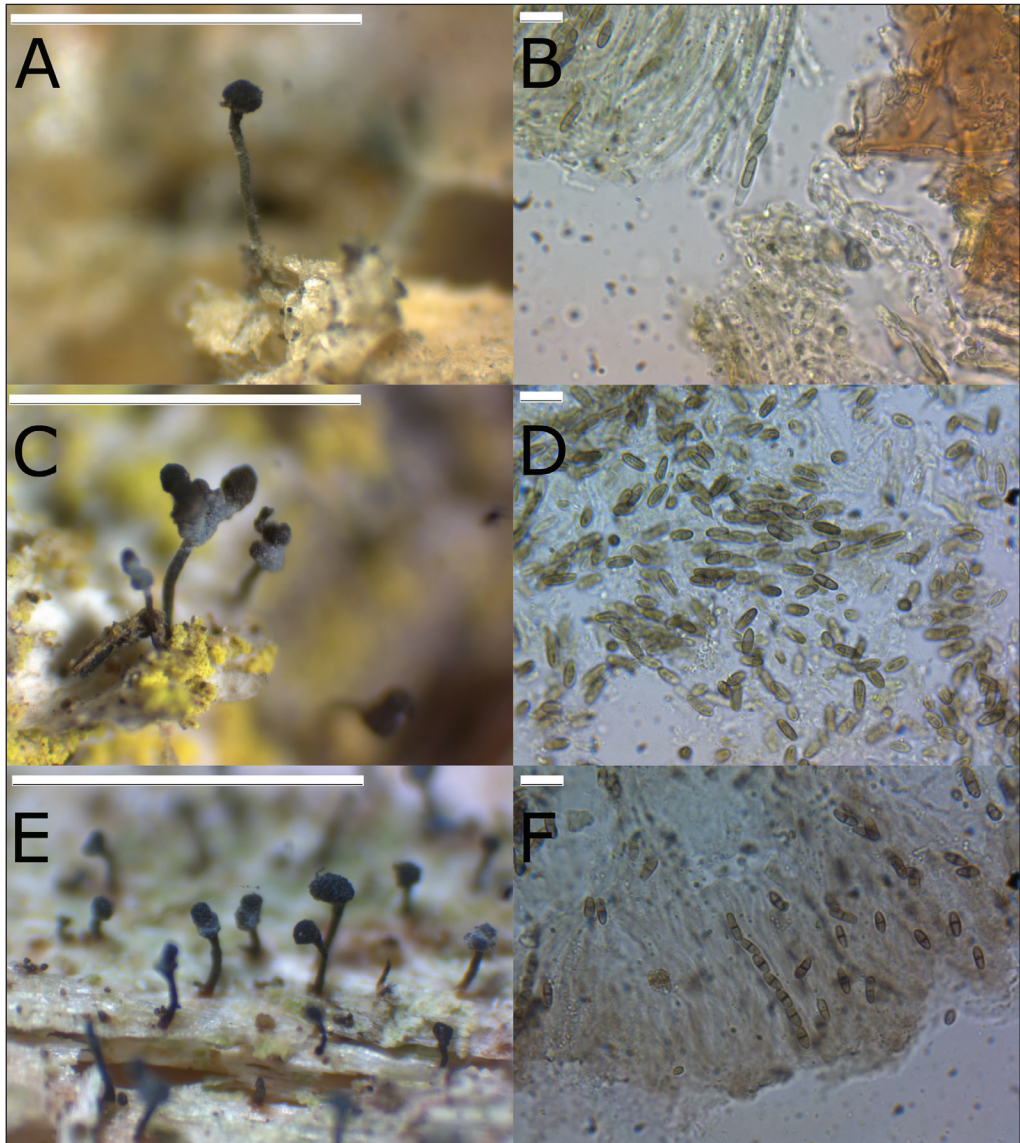


Figure 3. Rare *Chaenothecopsis* species in Québec. A, B: *C. asperopoda* apothecium and 1-septate spores in ascus (QFA 640881); C, D: *C. consociata* apothecia lichenicolous on the thallus of *Chaenotheca chrysocephala* and 1-septate spores (QFA 641717); and E, F: *C. nigra* apothecia and 1-septate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

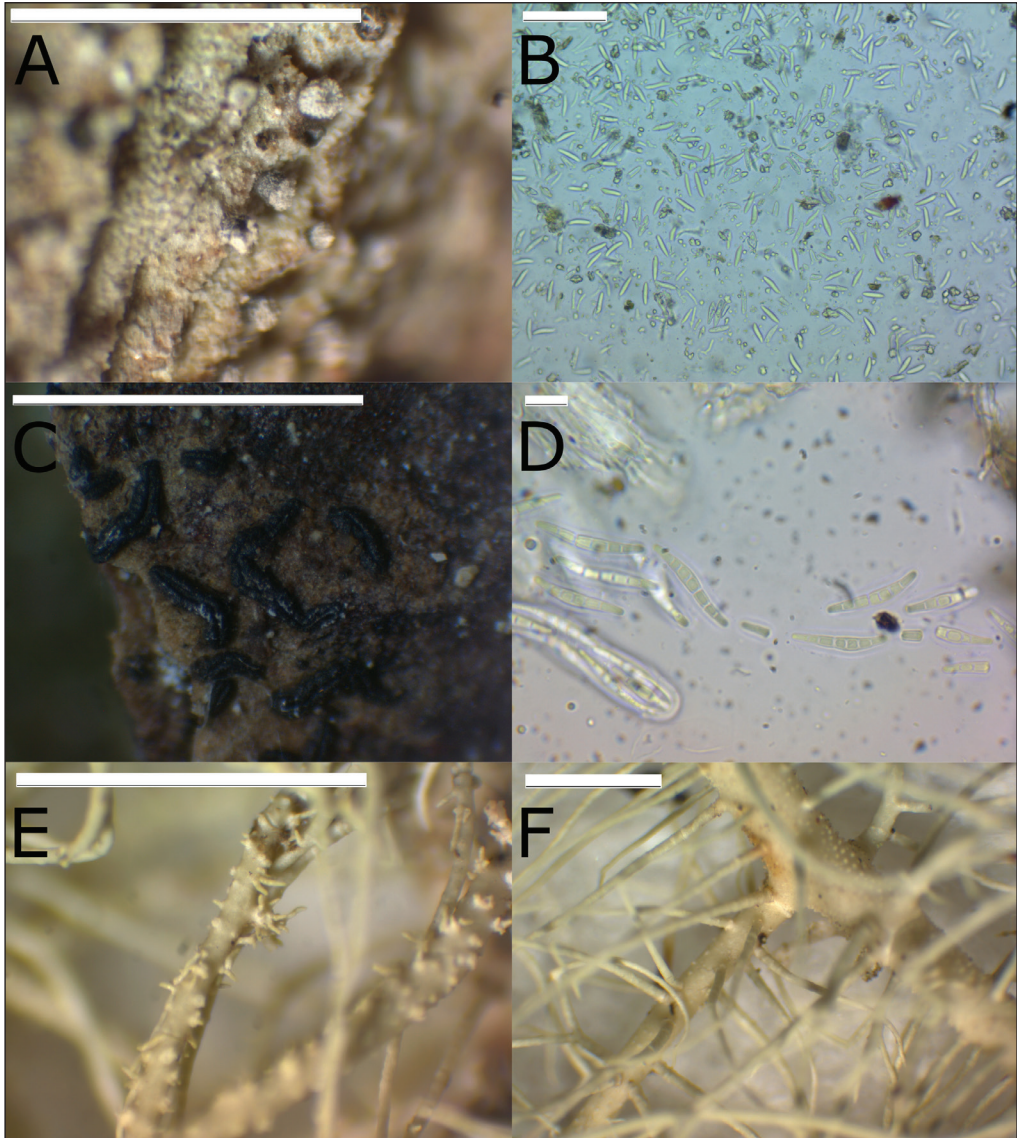


Figure 4. First published occurrence with an associated, digitized voucher in Québec. A, B: *Lecanactis abietina* raised pycnidia with white pruina, and long conidia (specimen with no apothecia) (QFA 647019); C, D: *Opegrapha vulgata* lirellate apothecia and 4-7-septate spores with cylindrical cells (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 μ m in B; and 10 μ m 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 (Schaeerer) 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 & Tønsgberg – 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 gracilentia (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 Nád. – Corticolous on conifer snag. La Chasse 2021: *QFA* 637550.

Chaenotheca obscura (Merr.) Nád. – 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 Nád. – 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. *gracilis*, *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 symphycharpa (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 albofuscens*** 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 \pm 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 \pm 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.) Šliwa, Zhao Xin, & Lumbsch – Saxicolous on granitic rock. Watshishou 2008: *QFA* 646442, 646443, 646459.

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

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

Myriolecis straminea (Ach.) Šliwa, 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 mahuensis 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 Fűrnr. – 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, & Söchting – Saxicolous on granitic rock. Watshishou 2008: *QFA* 646458.

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

Polycauliona verruculifera (Vainio) Arup, Frödén, & Söchting – 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 soreliata* (Vainio) Kondr. & Kärnefelt – Saxicolous on granitic rock. Niapiskau 1977: *QFA* 329893, 353835.
- Sarea resiniae* (Fr.) Kuntze – Resiniculous 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. ex 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.