

Lichens in Four Newfoundland Provincial Parks: New Provincial Records

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Fieldwork in J. T. Cheeseman, Sandbanks, Jipujjkiei Kuespem, and Fitzgerald's Pond Provincial Parks, Newfoundland, has yielded 133 lichen taxa, of which 15 species are new to the province: *Anisomeridium bifforme*, *Athallia holocarpa*, *Caloplaca borealis*, *Cetrelia olivetorum*, *Cladonia* cf. *rappii*, *Gyalolechia xanthostigmoidea*, *Lecanora straminea*, *Lecidea brunneofusca*, *Micarea globulosella*, *Micarea prasina* (s.l.), *Miriquidica pycnocarpa*, *Pertusaria consocians*, *Toensbergia leucococca*, *Usnea fragiliscens* var. *mollis*, and *Usnea silesiaca*.

Key Words: Lichens; Newfoundland; provincial parks; new record; J. T. Cheeseman; Sandbanks; Jipujjkiei Kuespem; Fitzgerald's Pond

Introduction

The fundamental goals of a protected area system include maintaining biodiversity and natural processes and providing a location for scientific research that may guide management of the broader landscapes that surround the protected areas (Canadian Parks Council Climate Change Working Group 2013). To achieve these goals, it is important to gather information on species that occur within the protected areas and their associated habitats to obtain baseline data on existing natural diversity.

We report the results of a preliminary lichen survey of four provincially managed protected areas (provincial parks) in Newfoundland. This study represents the first survey of lichens in Newfoundland and Labrador provincial parks.

Methods

The survey was conducted in four provincial parks: J. T. Cheeseman Provincial Park, Port-aux-Basques, southwest Newfoundland; Sandbanks Provincial Park, Burgeo, south coast of Newfoundland; Jipujjkiei Kuespem Provincial Park, Bay d'Espoir, southeast Newfoundland; and Fitzgerald's Pond Provincial Park, Argentinia, Avalon Peninsula (Figure 1).

Fieldwork was conducted between 23 June and 4 July 2009, using a floristic habitat sampling method (Newmaster *et al.* 2005) across the widest possible range of habitats. Habitat diversity was broadly assessed using a variety of resources including bedrock geology maps, surficial geology maps, National Topographic System

1:50 000 topographic maps, Earth Observation for Sustainable Development of Forest data, park maps, and communications with local park staff.

Table 1 details the major habitats surveyed in each provincial park. In at least one example of each identified mesohabitat in each park a "structured walkabout" or "intelligent meander" approach provided the freedom to explore lichen-rich sites in greater detail (Selva 1994; McMullin *et al.* 2008). After collecting the more common lichen species throughout the site, specific habitats were examined for specialist lichens. Microhabitats included coarse woody debris, streams, rock outcrops, cliffs, and tree bases. All fieldwork was carried out by J. W. M.

All lichens were identified and prepared for curation using standard herbarium techniques at the Botany and Mycology Section of the New Brunswick Museum (NBM), Saint John, New Brunswick. All voucher specimens have been deposited at the Provincial Museum of Newfoundland and Labrador with a select number of duplicates at NBM.

Given the limited scope and the time constraints on this reconnaissance survey (two days spent in readily accessible areas of each provincial park), search effort was necessarily limited. Only a small number of sites in each park were visited, and sampling at most sites was incomplete. Therefore, our results do not represent a comprehensive survey of lichen biodiversity in any of the four parks.

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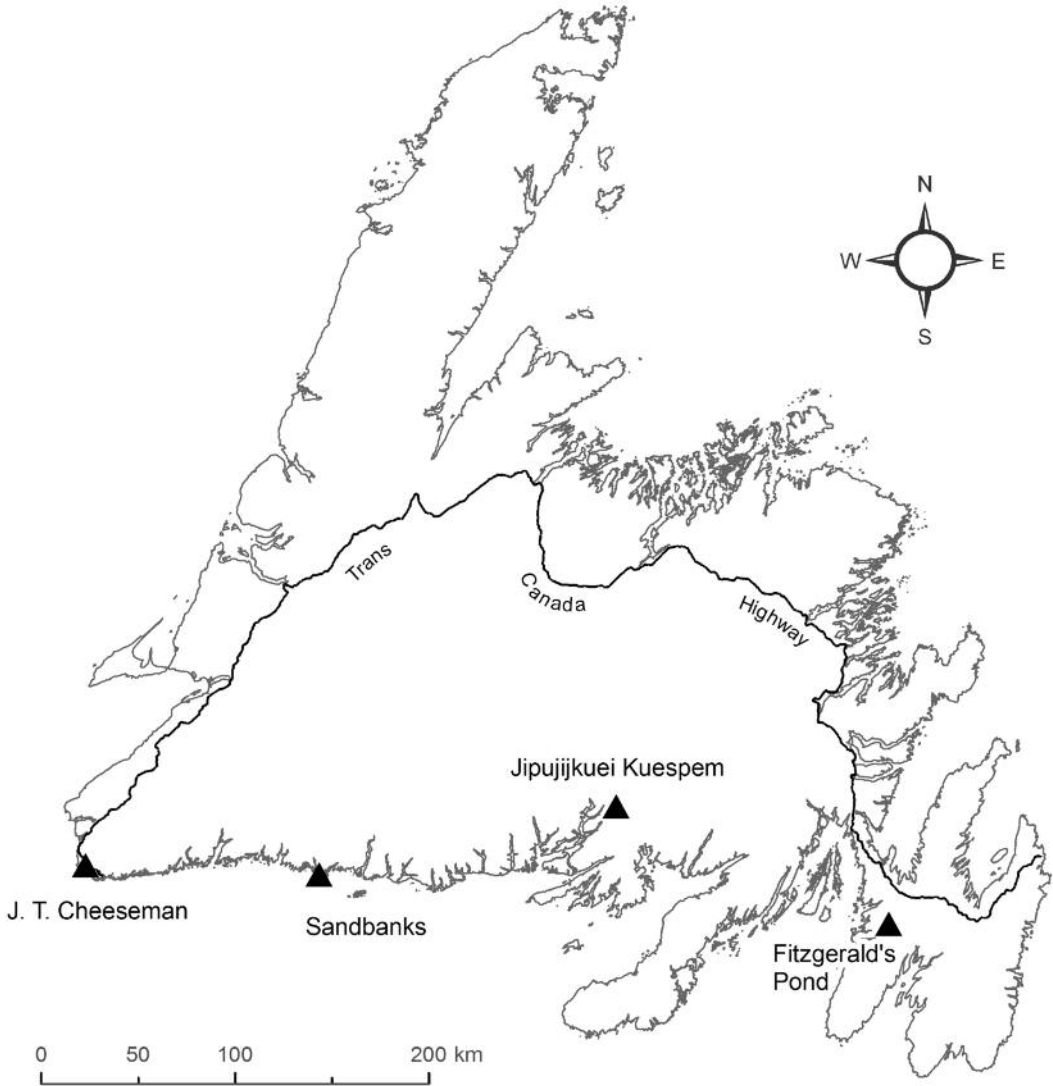


FIGURE 1. Map of Newfoundland showing the four provincial parks sampled for lichen biodiversity.

Results

Our study yielded 133 taxa, which are listed below. For each taxon, we give the habitat and location (Table 1) as well as the collection number of J. W. M. Records preceded by an asterisk are new records for Newfoundland. For each macrolichen, we summarize its status among the study areas using four categories of relative abundance: common (C), moderately common (MC), uncommon (U), and rare (R). These categories are based on the actual number of collections made during the study as well as the authors' knowledge of the relative abundance of macrolichens in Newfoundland. Unpublished records are indicated by the name of the collector followed by the herbarium where the collections are archived. Unpublished

lichen records were provided by a search of the online database of the Consortium of North American Lichen Herbaria (CNALH n.d.) or through personal communication with those who identified particular specimens. For unpublished lichen records, herbaria accession numbers or collection numbers as well as the collection dates are provided. Lichen nomenclature follows Esslinger (2015) for the most part. Herbarium abbreviations follow Holmgren *et al.* (1981). Tree species abbreviations are as follows: bF = Balsam Fir (*Abies balsamea* (L.) Miller), bS = Black Spruce (*Picea mariana* (Miller) Britton, Sterns & Poggenburgh), mA = American Mountain Ash (*Sorbus americana* Marshall), sA = Speckled Alder (*Alnus incana* ssp.), tL = Tamarack (*Larix laricina* (Du Roi)

TABLE 1. Habitats examined for lichen biodiversity in four Newfoundland provincial parks in 2009. Tree species abbreviations are as follows: bF = Balsam Fir (*Abies balsamea* (L.) Miller), bS = Black Spruce (*Picea mariana* (Miller) Britton, Sterns & Poggenburgh), mA = American Mountain Ash (*Sorbus americana* Marshall), sA = Speckled Alder (*Alnus incana* ssp.), tL = Tamarack (*Larix laricina* (Du Roi) K. Koch), wB = Paper Birch (*Betula papyrifera* Marshall), wS = White Spruce (*Picea glauca* (Moench) Voss), yB = Yellow Birch (*Betula alleghaniensis* Britton).

Park and location	Survey date	Habitat	Latitude, °N, longitude, °W	Elevation, m
J. T. Cheeseman				
1A	June 24–25	Mature bF–wS–sA–mA stand	47.626–47.627, 59.271	17–29
1B	June 24–25	bS–bF–tL– <i>Cladonia</i> –Ericaceae– <i>Racomitrium</i> – <i>Betula</i> scrub–heath–bog complex	47.628, 59.243–59.245	39–46
1C	June 25	Conifer–heath scrub on granite outcrop	47.633, 59.258	22–25
1D	June 25	Mature bF–wS–wB–sA stand	47.633, 59.255	16–18
1E	June 25	Mature bS–bF–mM– <i>Dryopteris</i> stand	47.632–47.633, 59.256	14–15
1F	June 25	bS scrub	47.630, 59.268	35–37
1G	June 25	Mature bF–wS stand	47.628, 59.267	9
1H	June 26	<i>Scirpus</i> bog with <i>Cladonia</i> – <i>Sphagnum</i> hummocks	47.630, 59.265	25
Sandbanks				
2A	June 27	Mature wS–bF herb-rich stand	47.603, 57.647–57.648	3–11
2B	June 27	Mature bF–wS herb-rich stand	47.602–47.603, 57.652	2–3
2C	June 27	Ericaceae– <i>Cladonia</i> heath on sand dunes	47.605–47.606, 57.646	7–10
2D	June 27	bF herb-rich stand	47.602–47.603, 57.649–57.650	5–9
2E	June 28	sA–bF–wS scrub on <i>Empetrum</i> – <i>Cladonia</i> –Ericaceae heath-covered sand dunes	47.607–47.609, 57.652–57.654	4–8
2F	June 28	<i>Empetrum</i> – <i>Potentilla</i> granite headland	47.608, 57.656	10–13
2G	June 28	Ericaceae– <i>Racomitrium</i> heath on granite outcrops	47.604, 57.654–57.655	18–42
Jipujijkuei Kuespem				
3A	June 30	Mature bF–yB–wB–wS– <i>Dryopteris</i> stand	47.909–47.910, 55.604–55.606	160–178
3B	July 1	bS–Ericaceae stand	47.906, 55.575	163–165
3C	July 1	<i>Cladonia</i> – <i>Racomitrium</i> –tL heath on rock outcrop	47.905, 55.585	137–142
3D	July 1	Semi-mature bF–tL feathermoss– <i>Sphagnum</i> stand	47.906–47.907, 55.591	141–147
3E	July 1	bF–bS–wB–feathermoss stand	47.917, 55.571–55.572	154–158
3F	July 1	bS scrub–bog/fen	47.904–47.906, 55.586–55.589	134–160
Fitzgerald's Pond				
4A	July 3	Ericaceae– <i>Cladonia</i> –bF–bS–tL scrub	47.332–47.333, 53.746	178–180
4B	July 3	<i>Cladonia</i> –Ericaceae– <i>Racomitrium</i> rocky heath	47.335, 53.744	167–183
4C	July 3	bF–bS–tL–wS Ericaceae– <i>Cladonia</i> complex	47.334, 53.743–53.744	150–169
4D	July 3	Ericaceae– <i>Scirpus</i> – <i>Cladonia</i> –conifer scrub heath	47.332–47.335, 53.745–53.746	178–189
4E	July 4	Mature bF–bS– <i>Sphagnum</i> feathermoss stand	47.331–47.333, 57.743–57.746	164–173
4F	July 4	Mature bF–wB– <i>Dryopteris</i> stand	47.328–47.331, 53.744–53.746	132–157

K. Koch), wB = Paper Birch (*Betula papyrifera* Marshall), wS = White Spruce (*Picea glauca* (Moench) Voss), yB = Yellow Birch (*Betula alleghaniensis* Britton).

Annotated Species List

Alectoria sarmentosa (Ach.) Ach. ssp. *sarmentosa* (C) — Corticolous on dead and live bF branch, dead wB twig, and bS branch. 2D 1090; 3A 1094; 4C 1034; 4E 1114.

Alectoria sarmentosa ssp. *vexillifera* (Nyl.) D. Hawksw. (U) — Terricolous on sandy dune soils. 2C 1170.

**Anisomeridium bifforme* (Borrer) R.C. Harris — Corticolous on yB stem. 3A 1188. This record is noteworthy as a northward extension of a mainly temperate species (Harris 1973).

Arctoparmelia centrifuga (L.) Hale (C) — Saxicolous on granite and schist. 2G 1023; 3C 1194.

Arctoparmelia incurva (Pers.) Hale (U) — Saxicolous on siliceous rock. 4D 1141.

**Athallia holocarpa* (Hoffm.) Arup, Frödén & Søchting — Corticolous on wS branch and on dead bF twig. 2E 1238, 1267A. Grows on various enriched rocks, mortar, concrete and on bark and wood of many tree species. Temperate to boreal–arctic, widespread. Recorded for southeastern Labrador (Thomson 1997). Unpublished Newfoundland records include James C. Lendemmer from the central Avalon Peninsula (NY-00954676, 2007) and from the Great Northern Peninsula (NY-00973015, 2007) and Arthur C. Waghorne from central Newfoundland (NY-00975213, 1894).

Biatora helvola Körb. ex Hellb. — Corticolous on yB stem. 3A 1257B. Printzen and Tønsberg (1999) considered the occurrence of *B. helvola* in North America to be doubtful. Previously, this name was widely applied to most corticolous, non-sorediate *Biatora* specimens with beige to red-brown, convex apothecia. Reports of *B. helvola* for eastern North America are referable mainly to *B. longispora* or *B. pycnidiatia* (Printzen and Tønsberg 2004). In contrast to *B. helvola* s. str., both of these species lack gyrophoric acid in the apothecia and thallus. The three species can also be distinguished on the basis of pycnidial and ascospore characters. Spribille *et al.* (2009) confirmed the presence of *B. helvola* in Alaska. Our collection from the island of Newfoundland and other unpublished records from the neighbouring Maritime Provinces indicate that this species has a bi-coastal distribution in North America. That said, Printzen (2014) found that *B. helvola* as currently circumscribed still appears to be heterogeneous.

Biatora pycnidiatia Printzen & Tønsberg — Corticolous on moss-covered bF stem, wS stem, dead wS branch, and dead bF stem. 1A 1271; 1D 1269; 2A 1251; 2E 1054, 1254B. Corticolous crustose lichen on twigs and trunks of conifers and deciduous trees. Although common in eastern North America, *B. pycnidiatia* was described only recently (Printzen and Tønsberg

2004); the type specimen was collected on bark of *Abies balsamea* near Bay Bulls, south of St. John's, Newfoundland.

Bryoria americana (Motyka) Holien (C); syn. *B. trichodes* subsp. *americana* (Motyka) Brodo & D. Hawksw. — Corticolous on dead bF branch. 1A 1162.

Bryoria furcellata (Fr.) Brodo & D. Hawksw. (C) — Terricolous on sandy soil and corticolous on tL branch. 2C 1195; 3F 1235.

Bryoria fuscescens (Gyeln.) Brodo & D. Hawksw. (MC); syn. *B. lanestris* (Ach.) Brodo & D. Hawksw. — Corticolous on bF branch. 4C 1066.

Bryoria nadvornikiana (Gyeln.) Brodo & D. Hawksw. (U) — Corticolous on dead bF branch. 2D 1077.

Bryoria trichodes (Michx.) Brodo & D. Hawksw. (C) — Corticolous on dead bF stem, dead bF twig, wB stem, and bF stem. 1A 1171; 2A 1095; 3A 1205; 4E 1100.

**Caloplaca borealis* (Vain.) Poelt — Corticolous on dead wS branch. 2E 1254A. Corticolous crustose lichen with a circumboreal distribution and occurring mainly on smooth-barked deciduous trees (Wetmore 2007). Wetmore (2007) noted the presence of *C. borealis* in Newfoundland; however, the collection supporting this record (*I. M. Brodo 8818, MIN-893893, 1966*) is from the Menihek Lake area of western Labrador (Cliff Wetmore, personal communication, 16 July 2013).

Cetraria aculeata (Schreb.) Fr. (MC) — Terricolous on sandy dune and heath duff. 2C 1028, 1195; 4D 1059.

Cetraria islandica subsp. *crispiformis* (Räsänen) Kärnefelt (C) — Terricolous on heath and sandy dune duff. 1B 1107; 1C 1062; 2C 1211; 2E 1116, 1233; 4D 1013.

Cetraria muricata (Ach.) Eckfeldt (MC) — Terricolous on heath duff. 1B 1098, 1121; 3C 1215; 4D 1119.

**Cetrelia olivetorum* (Nyl.) W.L. Culb. & C.F. Culb. (R) — Corticolous on yB stem. 3A 1014. On broad-leaved trees or mossy rocks in temperate and montane forests of the northern hemisphere, particularly in eastern North America, western Europe, and eastern Asia, but also in South America, Africa, and Australia. Unpublished records from the Avalon Peninsula include Stephen R. Clayden (NBM-FL-11529, 2005) and John W. McCarthy (NBM-FL-13547, 2008). The lack of older records may suggest that *C. olivetorum* is a recent colonist in Newfoundland. However, it is somewhat similar in appearance to the very common *Platismatia glauca* and might have been overlooked. In any case, it appears to be restricted to mature *Abies–Picea* forests characterized by a significant component of *Betula alleghaniensis*. *Cladonia amaurocraea* (Flörke) Schaer. (C) — Terricolous on heath duff and among mosses. 1B 1123, 1214; 1C 1144; 2G 1227; 4B 1036.

Cladonia arbuscula (Wallr.) Flot. (C) — Terricolous among mosses on bog, on heath duff on rock and

- sandy soil. 1B 1182; 1C 1210; 2C 1217, 1229; 3F 1213; 4D 1039, 1126. *Cladonia arbuscula* subsp. *mitis* (Sandst.) Ruoss is not considered here as *C. mitis* Sandst. is accepted as a distinct taxon (Brodo et al. 2001; Ahti and McCarthy 2013).
- Cladonia boryi* Tuck. (C) — Terricolous on heath duff and sandy dune soil. 1B 1153; 2C 1146; 3C 1159; 4B 1065.
- Cladonia cenotea* (Ach.) Schaer. (C) — Terricolous on bog, corticolous on bF coarse woody debris on ground. 3F 1074; 4F 1022, 1085; 4E 1225.
- Cladonia chlorophaea* (Flörke ex Sommerf.) Spreng. s. str. (C) — Corticolous on wS stem. 1A 1109.
- Cladonia coccifera* (L.) Willd. (C) — Terricolous on heath duff on rock and soil. 3C 1049; 4B 1038, 1040.
- Cladonia crispata* (Ach.) Flot. (C) — Terricolous on duff on rock and soil, corticolous on bF coarse woody debris. 2E 1224; 3C 1076, 1218; 4D 1051, 1055, 1064, 1088; 4F 1045, 1085.
- Cladonia cristatella* Tuck. (C) — Terricolous on heath duff on soil, corticolous on dead, sloughing bF coarse woody debris. 4D 1106; 4F 1021A.
- Cladonia cyanipes* (Sommerf.) Nyl. (UC) — Terricolous on heath duff on soil. 2C 1104; 3C 1228.
- Cladonia gracilis* (L.) Willd. subsp. *gracilis* (C) — Terricolous on heath duff and among mosses. 1B 1011, 1216; 3C 1190; 4D 1015.
- Cladonia gracilis* subsp. *turbinata* (Ach.) Ahti (R) — Terricolous on heath duff on rock. 4D 1020.
- Cladonia grayi* G. Merr. ex Sandst. (C) — Corticolous on dead bF stem, terricolous on heath duff on rock. 2A 1212; 3E 1031; 4D 1024, 1032.
- Cladonia macilenta* Hoffm. (C) — Corticolous on dead bS and bF coarse woody debris. 3E 1031; 4F 1021B.
- Cladonia maxima* (Asahina) Ahti (C) — Terricolous on sandy dune soils and among mosses. 2C 1083; 2G 1199; 2E 1232.
- Cladonia ochrochlora* Flörke (C) — Terricolous among mosses, corticolous on dead bF, bS, and wS bark and roots. 1A 1061, 1122, 1203; 2A 1148 1158; 2B 1086 1165; 3E 1031; 4E 1507.
- Cladonia rangiferina* (L.) F. H. Wigg. (C) — Terricolous on heath duff, among mosses. 1B 1118; 1F 1026; 2C 1134; 2E 1226; 3B 1157; 4D 1060.
- **Cladonia* cf. *rappii* A. Evans (R) — Terricolous on moss duff in rock crevice. 4B 1071. *Cladonia rappii* s. str. resembles the much more common *C. verticillata*. It differs in possessing a larger number of tiers of centrally proliferating podetial cups, in the often early breakdown and disappearance of its basal squamules and in developing blackened podetial bases spotted with pale senescent areoles. It also differs ecologically. In Atlantic Canada, *C.* cf. *rappii* is confined to oceanic areas mainly in bogs or on peaty soil over rock; *C. verticillata* occurs throughout the region, mainly on mineral soil in habitats such as heathlands, old fields, roadsides, and rocky outcrops.
- Cladonia squamosa* Hoffm. (C) — Terricolous on duff on rock and ground, corticolous on bF and bS, often moss-covered stem. 1A 1124, 1178; 1B 1128, 1160; 1C 1230; 2A 1017, 1197; 2B 1165; 2D 1177; 2G 1135; 3D 1187; 3E 1058; 4D 1033, 1052, 1069; 4E 1225; 4F 1145.
- Cladonia stellaris* (Opiz) Pouzar & Vězda (C) — Terricolous on heath duff. 1B 1140; 2C 1111; 3B 1108; 4D 1048.
- Cladonia straminea* (Sommerf.) Flörke (U); syn. *Cladonia metacorallifera* Asahina — Terricolous on duff in granite rock depression. 2G 1132.
- Cladonia stygia* (Fr.) Ruoss (C) — Terricolous on heath duff. 1B 1092; 2E 1009; 3C 1193; 4D 1041.
- Cladonia terrae-novae* Ahti (C) — Terricolous on heath and forest floor duff. 1F 1184; 1H 1156; 4D 1039, 1075.
- Cladonia uncialis* (L.) F. H. Wigg. (C) — Terricolous on bog and heath duff on soil and rock. 1B 1056, 1204; 2C 1161; 3C 1025, 1149; 4B 1057.
- Cladonia verticillata* (Hoffm.) Schaer. (MC) — Terricolous on heath duff on granite. 2G 1220.
- Cladonia wainioi* Savicz (C) — Terricolous on heath duff. 1B 1125; 3C 1138; 4B 1030.
- Coccocarpia palmicola* (Spreng.) Arv. & D. J. Galloy (U) — Corticolous on bF stem. 4E 1174.
- Degelia plumbea* (Lightf.) P. M. Jørg. & P. James (R) — Corticolous on yB stem. 3A 1198. In 2010, designated as of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2010). This lichen is considered rare in Newfoundland with nine known occurrences in the humid mature forests of the Central Avalon Peninsula and the Bay d'Espoir region of the island's south-east coast.
- Evernia mesomorpha* Nyl. (U) — Corticolous on dead bF and wS branch and twig. 1A 1189; 2A 1166.
- Fuscopannaria ahlneri* (P. M. Jørg.) P. M. Jørg. (U) — Corticolous on yB stem. 3A 1102.
- **Gyalolechia xanthostigmoidea* (Räsänen) Søchting, Frödén & Arup — Corticolous on yB stem. 3A 1257A. First described by Räsänen (1933) as *Placodium xanthostigmoidea* based on corticolous *Betula*, *Abies*, and *Thuja* material from New Brunswick. This species grows on a variety of substrates and is widespread in cool regions of the northern hemisphere (Wetmore 2001). Unpublished records include James C. Lendemer (NY-00965264, 2006; 00974491-00974496, 2007) from the Great Northern Peninsula.
- Graphis scripta* (L.) Ach. — Corticolous on yB stem. 3A 1042.
- Hypogymnia incurvodes* Rass. (C) — Corticolous on bF and bS stem, dead bF stem and dead wB stem. 1E 1152; 2A 1237; 3A 1099; 4E 1063.
- Hypogymnia physodes* (L.) Nyl. (C) — Corticolous on dead bF, wS, and wB twig, branch, and stem; saxicolous on arkose rock. 1B 1073; 2A 1079; 3A 1053; 4A 1155.

- Hypogymnia tubulosa* (Schaer.) Hav. (C) — Corticolous on dead bS, wS, and tL twig and branch. 1B 1150; 2A 1231; 4C 1008.
- Hypogymnia vittata* (Ach.) Parrique (MC) — Corticolous on bF dead branch and live stem. 2A 1087; 4E 1105.
- Icmadophila ericetorum* (L.) Zahlbr. — Terricolous on soil duff and lignicolous on decayed conifer stump. 2G 1273; 3D 1192.
- Imshaugia aleurites* (Ach.) S.L.F. Mey. (C) — Lignicolous on dead decorticate bF stem and branch stub. 4E 1223; 4F 1080.
- Japewia tornoënsis* (Nyl.) Tønberg — Corticolous on tL twig and dead bS branch. 1B 1046B, 1142. Published distribution maps show occurrences of this species in western Labrador (Thomson 1997) and on the Avalon Peninsula (Brodo *et al.* 2001).
- Lasallia papulosa* (Ach.) Llano (C) — Saxicolous on granite. 1B 1219; 2G 1136.
- Lecanora cinereofusca* H. Magn. — Corticolous on dead and live yB branch and stem. 3A 1241A, 1257A, 1261.
- Lecanora dispersa* (Pers.) Sommerf. *s.l.* — Corticolous on wS branch. 2E 1238.
- Lecanora pulicaris* (Pers.) Ach. — Corticolous on dead mA stem. 1D 1253B.
- **Lecanora straminea* Ach. — Saxicolous on granite. 2F 1191. This lichen is often found on bird-enriched coastal rocks, circumpolar in the northern hemisphere. It occurs in southeast Labrador (Thomson 1997; Ryan 1998) and Miquelon (Le Gallo 1952). Unpublished Newfoundland records include James C. Lendemer (NY-00966854, 2007) on limestone/dolostone from the Great Northern Peninsula.
- Lecanora symmicta* (Ach.) Ach. — Corticolous on tL twig, bS branch, and dead wS and bF twigs. 1B 1046A, 1142, 1244; 2A 1079; 2E 1267A, 1267B.
- Lecidea albofuscescens* Nyl. — Corticolous on bF stem. 1A 1240.
- **Lecidea brunneofusca* H. Magn. — Saxicolous. 4A 1275. This lichen grows on granitic rocks and is endemic to northeastern North America (Magnusson 1935; Brodo *et al.* 2001).
- Lichinodium sirosiphoides* Nyl. (U) — Corticolous on bF stem. 4E 1029.
- Lobaria pulmonaria* (L.) Hoffm. (C) — Corticolous on yB stem. 3A 1139.
- Lobaria quercizans* Michx. (U) — Corticolous on yB stem. 3A 1221.
- Lobaria scrobiculata* (Scop.) DC. (MC) — Corticolous on mA stem. 3A 1047.
- Lopadium disciforme* (Flotow) Kullh. — Corticolous on wS and bF stem. 1D 1269; 4E 1239A, 1019; 4F 1247.
- Loxospora cismonica* (Beltram.) Hafellner — Corticolous on bF stem. 1A 1264. All published records for this lichen are from the Avalon Peninsula and eastern Newfoundland (Maass 1980; Brodo *et al.* 2001).
- Loxospora elatina* (Ach.) A. Massal. — Corticolous on dead and live bF stem. 1A 1245, 1248; 4E 1242, 1265, 1270; 4F 1272.
- Loxospora ochrophaea* (Tuck.) R. C. Harris — Corticolous on bF and bS stems. 1A 1256; 1E 1259.
- Melanelixia fuliginosa* (Fr. ex Duby) O. Blanco *et al.* (C) — Corticolous on bF and yB stems. 1A 1181; 3A 1042.
- Menegazzia terebrata* (Hoffm.) A. Massal. (U) — Corticolous on yB stem. 3A 1050. Widespread in temperate northern hemisphere. Found in sheltered, productive *Abies balsamea*–*Betula allegheniensis* forests. Recorded from Fogo Island (Deduke and Piercey-Normore 2013; Piercey-Normore 2013). Unpublished records include James C. Lendemer (NY-00954686, 2007) and Richard C. Harris (NY-00961418, 2007) from *Abies balsamea*–*Picea mariana*–*Betula* forests in the central Avalon Peninsula.
- **Micarea globulosella* (Nyl.) Coppins — Corticolous on bF stem. 4E 1239B. In Canada, this apparently rare, but small and perhaps overlooked, lichen has been recorded for Quebec (Coppins 1983) and Fundy National Park, New Brunswick (Gowan and Brodo 1988). It seems to favour humid, old coniferous forests (Coppins 1983).
- Micarea peliocarpa* (Anzi) Coppins & R. Sant. — Corticolous on dead wS branch. 2E 1054.
- **Micarea prasina* Fr. *s.l.* — Corticolous on dead bF branch and on bF, wS and yB stems. 2A 1262; 2D 1077; 3A 1097B; 4E 1266. This lichen is extremely variable and thin-layer chromatography is required for certain separation from several other *Micarea* species (Coppins 2009). Unpublished records include James C. Lendemer (NY-00954698, 2007) from *Picea mariana*–*Abies balsamea*–*Betula* forests of the central Avalon Peninsula and Arthur C. Wagborne (MIN-18162, 1897) from western Newfoundland.
- **Miriquidica pycnocarpa* (Körb.) M.P. Andreev — Saxicolous. 4A 1275. Found on coarse-grain siliceous rocks, particularly granites. First reported for Canada (Nova Scotia) by MacDonald *et al.* (2011). Unpublished records include William R. Buck (NY-00944256-00944257, 2007) and Richard C. Harris (NY-00961351, 2007) from rocky montane to sub-alpine oceanic heath on the Avalon Peninsula.
- Mycoblastus affinis* (Schaer.) T. Schauer — Corticolous on bF stem. 4E 1239A.
- Mycoblastus caesius* (Coppins & P. James) Tønberg — Corticolous on bF stem. 4E 1239A, 1252.
- Nephroma arcticum* (L.) Torss. (U) — Terricolous on moss-covered rock face. 2D 1131.
- Nephroma laevigatum* Ach. (U) — Corticolous on yB stem. 3A 1202.
- Normandina pulchella* (Borrer) Nyl. (R) — Corticolous on yB stem. 3A 1097A. Recorded in humid coniferous forests in the Avalon Peninsula (COSEWIC 2010). Cosmopolitan, but rarely col-

- lected in Newfoundland. Generally found on mosses and other lichens in humid forests.
- Ochrolechia androgyna* (Hoffm.) Arnold — Corticolous on bF stem. 4E 1268.
- Ochrolechia frigida* (Sw.) Lyngé — Terricolous on duff, corticolous on coarse woody debris. 2G 1258; 4D 1263; 4F 1274.
- Parmelia omphalodes* (L.) Ach. (C) — Saxicolous on granite. 2G 1127.
- Parmelia saxatilis* (L.) Ach. (C) — Saxicolous on exposed bedrock. 1B 1180.
- Parmelia squarrosa* Hale (C) — Corticolous on stems of dead wB, dead and live bF. 1A 1067; 2A 1185; 3A 1183; 4E 1091.
- Parmelia sulcata* Taylor (C) — Saxicolous on coastal granite headland and on arkose rock. 2F 1130; 4D 1010.
- Parmeliella parvula* P.M. Jørg. (U) — Corticolous on bF stem. 4E 1029, 1209. Widespread but scattered in cool temperate regions of both northern and southern hemispheres. In Newfoundland, currently known only from conifers in humid conifer forests of the central Avalon Peninsula (Hinds and Hinds 2007; Jørgensen *et al.* 2009).
- Parmeliella triptophylla* (Ach.) Müll. Arg. (U) — Corticolous on yB stem. 3A 1097A.
- Parmeliopsis ambigua* (Wulfen) Nyl. (U) — Corticolous on bS stem and branch. 3F 1200.
- Parmeliopsis capitata* R.C. Harris ex J.W. Hinds & P.L. Hinds (C) — Corticolous on dead bS and live bF branch. 1B 1179; 4C 1035, 1137.
- Parmeliopsis hyperopta* (Ach.) Arnold (C) — Corticolous on dead bS branch, bS branch and stem, and bF branch. 1B 1142, 1173; 3F 1120, 1200; 4C 1035.
- Peltigera membranacea* (Ach.) Nyl. (MC) — Terricolous on sandy dune. 2A 1103.
- Peltigera neopolydactyla* (Gyeln.) Gyeln. (C) — Corticolous on the base of bF stem. 4F 1101.
- **Pertusaria consocians* Dibben — Corticolous on dead yB branch. 3A 1241B. Endemic to the Appalachian–Great Lakes region of North America (Dibben 1980) including the Maritimes (Gowan and Brodo 1988).
- Pertusaria macounii* (I.M. Lamb) Dibben — Corticolous on dead yB branch. 3A 1241B.
- Pertusaria waghornei* Hulting — Corticolous on yB stem. 3A 1257A. First collected in 1894 by Arthur C. Waghorne at Whitbourne, Avalon Peninsula on trunks of *Betula* sp. (Hulting 1896). Corticolous on hardwoods, west to the Great Lakes Region, and south along the Appalachians (Dibben 1980).
- Phycia tenella* (Scop.) DC. (C) — Corticolous on wS branch and saxicolous on granite. 2E 1238; 2F 1196.
- Platismatia glauca* (L.) W.L. Culb. & C.F. Culb. (C) — Corticolous on dead bF branch, live bF stem, and live bS branch. 1A 1089; 2D 1077; 2A 1222; 3B 1151; 4E 1019.
- Platismatia norvegica* (Lyngé) W.L. Culb. & C.F. Culb. (MC) — Corticolous on dead bF branch and on bF stem. 2A 1175; 3D 1129; 4C 1018; 4E 1093.
- Platismatia tuckermanii* (Oakes) W.L. Culb. & C.F. Culb. (R) — Corticolous on dead tL branch. 3D 1096. Found throughout the Great Lakes–Appalachian region of North America, but rare in Newfoundland (Clayden 2010).
- Polycaulonia polycarpa* (Hoffm.) Frödén, Arup & Söchting (MC) — Corticolous on wS twig and branch. 2C 1115; 2E 1238.
- Porpidia tuberculosa* (Sm.) Hertel & Knoph — Saxicolous. 4A 1275.
- Pseudocyphellaria perpetua* McCune & Miadl. (R) — Corticolous on yB stem. 3A 1188. Known from oceanic and suboceanic regions in North America and the Russian Far East (Miadlikowska *et al.* 2002). Previously recorded from Newfoundland by Högnabba *et al.* (2009).
- Pycnothelia papillaria* Dufour (MC) — Terricolous on ground and on duff on granite. 2G 1250; 3C 1215.
- Pyrenula laevigata* (Pers.) Arnold — Corticolous on yB stem. 3A 1260. First recorded for Newfoundland as *Pyrenula glabrata* (Eckfeldt 1895).
- Pyrrhospora varians* (Ach.) R.C. Harris — Corticolous on bF dead twig. 2E 1267A. The only other Newfoundland records date from the late 19th century and early 20th century (Eckfeldt 1895) as *Biatora varians*, as well as recent collections on *Betula al-leghaniensis* in western Newfoundland (McCarthy *et al.* 2013).
- Ramalina farinacea* (L.) Ach. (C) — Corticolous on bF dead twig. 2A 1147.
- Ramalina roesleri* (Hochst. ex Schaer.) Hue (C) — Corticolous on bF dead branch and twig, wS dead twig, wS twig and branch, bF stem, and tL dead branch. 1G 1169; 2A 1163; 2C 1115; 2E 1238, 1267A; 3E 1154; 4C 1027.
- Rinodina freyi* H. Magn. — Corticolous on wS branch and bF dead twig. 2E 1238, 1267A. One of the most frequently collected *Rinodina* species in North America (Sheard 2010).
- Ropalospora chlorantha* (Tuck.) S. Ekman — Corticolous on bF stem. 1A 1271.
- Scoliciosporum chlorococcum* (Stenh.) Vězda — Corticolous on bF dead twig. 2E 1267B.
- Sphaerophorus fragilis* (L.) Pers. (C) — Saxicolous on granite. 1B 1117.
- Sphaerophorus globosus* (Huds.) Vain. (C) — Corticolous on wS dead stem; terricolous on duff on granite; corticolous on bF dead branch stub, and conifer coarse woody debris on ground. 2A 1168; 2F 1110; 4E 1234, 1225.
- Stereocaulon dactylophyllum* Flörke (MC) — Saxicolous on arkose rock. 4B 1044.
- Stereocaulon vesuvianum* Pers. (C) — Saxicolous on arkose rock. 4B 1016.

Thelotrema lepadinum (Ach.) Ach. — Corticolous on yB stem. 3A 1097A.

Thelotrema suecicum (H. Magn.) P. James — Corticolous on mA dead stem. 1D 1253A. Rarely collected in Newfoundland. Known from southwestern Newfoundland (Esslinger and Egan 1995) and collected by James C. Lendemer (NY-1409400-1409401, 2006) from Gros Morne National Park, western Newfoundland, and by Richard C. Harris (NY-00961422, 00961424; 2007) from the *Abies balsamea*–*Betula alleghaniensis* forests of the central Avalon Peninsula.

**Toensbergia leucococca* (R. Sant.) Bendiksby & Tindal; syn. *Hypocenomyce leucococca* R. Sant. and *Pycnora leucococca* (R. Sant.) R. Sant. — Corticolous on bF branch, bF dead twig and on bS and wS dead branch. 1B 1142; 2E 1054, 1267C; 4C 1035. Reported by Brodo (1991) from the Menihok Lake region of western Labrador. Otherwise, much overlooked and rarely reported for North America (Spribille and Björk 2008). Unpublished records include Teuvo Ahti (H-2501a, 2946, 2968b, 6284b, 7734a, 8802a, 8807a, 8957c, 9047, 9881a; 1956 and 34905a; 1978) throughout Newfoundland.

Trapeliopsis granulosa (Hoffm.) Lumbsch — Terri-colous on duff in granite rock depression. 2G: 1255.

Tuckermannopsis americana (Spreng.) Hale (C) — Corticolous on tL live and dead twig and branch. 1B: 1046A; 3B: 1112; 4C: 1008, 1037.

Tuckermannopsis orbata (Nyl.) M.J. Lai (MC) — Corticolous on bF branch and on bF live and dead twigs. 2E: 1012; 3E: 1201; 4E: 1043.

Umbilicaria muehlenbergii (Ach.) Tuck. (C) — Saxicolous on granite rock. 2G 1176.

Umbilicaria polyphylla (L.) Baumg. (C) — Saxicolous on granite rock. 2G 1167.

Usnea dasopoga (Ach.) Nyl. (C); syn. *U. filipendula* Stirt. — Corticolous on bF dead twig and live wB stem. 1A 1207; 3A 1084A.

**Usnea fragilesceus* var. *mollis* (Vain.) Clerc (U) — Corticolous on wB stem. 3A 1084B; 4F 1133. An unpublished record (as *Usnea fragilesceus* Hav. ex Lynge) is James C. Lendemer (NY-00954691, 2007) on conifer in *Abies balsamea*–*Picea mariana*–*Betula* forests in the central Avalon Peninsula.

Usnea longissima Ach. (MC) — Corticolous on bF dead twig, live and dead branches. 2A 1081; 3A 1208; 4C 1068; 4E 1070.

**Usnea silesiaca* Motyka (MC) — Corticolous on bF dead and live stem, wB stem. 2B 1172; 3A 1078 1084C; 4F 1082, 1113A, 1113B. Unpublished records include Teuvo Ahti (H-6267, 8495; 1956), Stephen R. Clayden (NBM-FL-11683, 2005), I. Mackenzie Lamb (FH-00079189, 1953), and John W. McCarthy (NBM-FL-13542, 13543; 2011; NBM-FL-13545, 13548, 13708; 2008) from the Avalon Peninsula.

Usnea subfloridana Stirt. (UC) — Corticolous on bF dead branch. 1A 1143. Recorded for Newfoundland

by Thomson (2009). Unpublished records include James C. Lendemer (NY-00954827, 00954842, 00954843; 2007) and Teuvo Ahti (H-2665b, 6266, 9188; 1956) from the Avalon Peninsula.

Variolaria pustulata (Brodo & W.L. Culb.) Lendemer, Hodkinson & R.C. Harris — Corticolous on dead yB branch. 3A 1241C. Thomson (2009) reported it from Newfoundland, but gave no details.

Vulpicida pinastri (Scop.) J.-E. Mattsson & M.J. Lai (C) — Corticolous on bS and wS dead branches and on bF live branch. 1B 1173; 2E 1054; 4C 1035.

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