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Recent records of myxomycetes from New Brunswick, Canada

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Abstract

Studies of the diversity of myxomycetes or plasmodial slime moulds (Amoebozoa) in New Brunswick are lagging behind those of many other groups of terrestrial organisms. Here, we summarize the myxomycetes of the province as documented by recently collected specimens held by the New Brunswick Museum (NBM). Between 2007 and 2019, 264 specimens were collected, representing 80 species in 29 genera. Most of these records result from targetted searching during NBM-led biodiversity surveys (the BiotaNB project) in provincial protected natural areas between 2014 and 2019 and a mycological foray on Campobello Island in 2016. Previously, only seven species had been reported for the province. Consistent with their worldwide distributions and abundance, *Arcyria cinerea, Fuligo septica, Ceratiomyxa fruticulosa*, and *Lycogala epidendrum* were the most collected species, whereas the globally rare species *Paradiacheopsis microcarpa* has been collected in New Brunswick six times. Forty-two species were found only once, and five of these (*Comatricha mirabilis, Fuligo laevis, Hemitrichia chrysospora, Lepidoderma neoperforatum, Listerella paradoxa*) are rare worldwide.

Key words: Slime moulds; Ceratiomyxomycetes; Amoebozoa; protected natural area; PNA; Atlantic Maritime Ecozone; herbarium; moist chamber; New Brunswick Museum; NBM; BiotaNB; Campobello mycological foray

Introduction

Myxomycetes, or plasmodial slime moulds, are a group of eukaryotic microorganisms that occur in their trophic (feeding) stage in soil, decaying wood, leaf litter, or other organic material. They are often included in studies of fungi and in mycology textbooks; however, molecular evidence places them within a distinct evolutionary "supergroup", the Amoebozoa (Adl *et al.* 2019). They consume mostly bacteria and contribute to the flow of nutrients from bacteria and other decomposers to the soil and, thus, to plants and higher trophic levels (Stephenson 2021). They have been recorded in every terrestrial habitat investigated to date (Stephenson and Rojas 2017); a few species have been found in aquatic habitats (Lindley *et al.* 2007), but their most important habitats are forests (Ing 1994). Although much remains to be learned about their role in soil ecology, they seem to be an essential biotic component of most soils (Stephenson 2021). Despite their importance and abundance in these substrates, myxomycetes are often overlooked because soil scientists tend to focus on fungi and bacteria (Stephenson 2021).

Most myxomycetes are cosmopolitan in distribution, absent only at very high latitudes and the highest elevations. However, some species appear to be restricted to temperate or tropical regions, and others have been collected only in deserts or other arid areas, or around melting snowbanks in alpine environments (Stephenson 2021; Schnittler *et al.* 2022). Many morphologically defined species may be "complexes of cryptic species showing more limited distribution patterns than the morphospecies as a whole" (Schnittler *et al.* 2022: 382).

These organisms are visually undetectable in the field during much of their life cycle. Although visible and identifiable by traditional methods during the fruiting stage (when spores are produced and dispersed), most species are very small, with a typical height <2 mm (Rollins and Stephenson 2011). However, larger species do exist, and one species (*Brefeldia maxima* (Fr.) Rostaf.) can reach 1 m^2 in size (Ing 1999). The fruiting stage exhibits a great variety of forms, sizes, and colours (Figure 1). The fruiting bodies can be found from early summer to late fall in temperate regions (Rollins and Stephenson 2011) and can

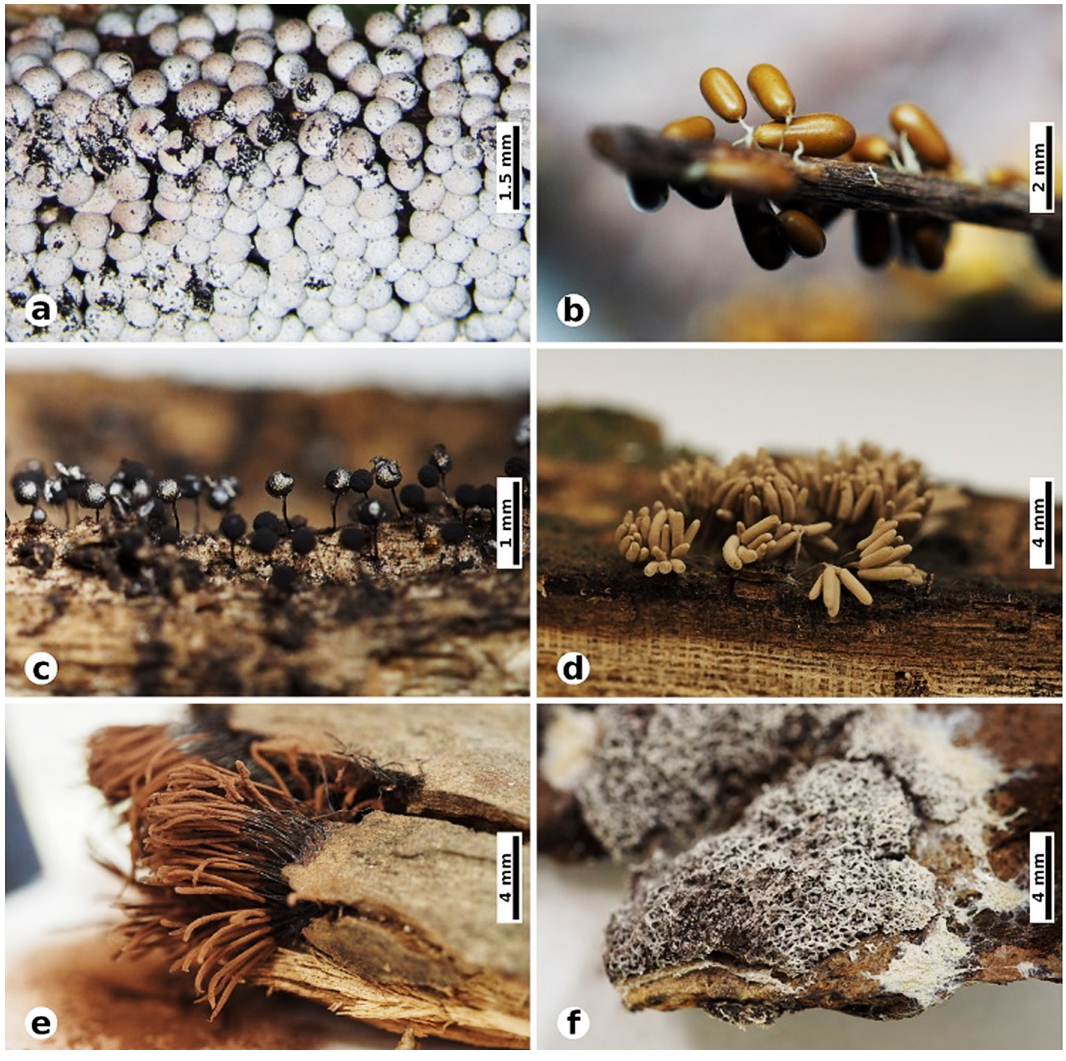

FIGURE 1. Slime moulds collected from New Brunswick. a. *Physarum diderma – A.M. Bremner AB12.08.10-01* (NBM-MM-000001) – Jacquet River Protected Natural Area (PNA), 12 August 2010. b. *Leocarpus fragilis V.F. Zoll 601* (NBM-MM-000132) – Nepisiguit PNA, 18 August 2016. c. *Collaria arcyrionema – V.F. Zoll 343* (NBM-MM-000062) – Grand Lake PNA, 10 August 2014. d. *Arcyria affinis – V.F. Zoll 595* (NBM-MM-000146) – Nepisiguit PNA, 15 August 2016. e. *Stemonitis fusca – A. Carter [B.W. Malloch B20130619-01]* (NBM-MM-000153) – Grand Lake PNA, 19 June 2013. f. *Fuligo septica*: *V.F. Zoll 336* (NBM-MM-000074) – Portobello Creek National Wildlife Area, 9 August 2014. Photos: A.M.B.

be cultured any time of year from organic matter in moist chambers (Stephenson and Stempen 1994).

With over 1000 described species (Lado and Hernández-Crespo 2021), the myxomycetes have traditionally been classified in six orders: Ceratiomyxales, Echinosteliales, Liceales, Trichiales, Stemonitales, and Physarales (Stephenson 2021). Modern molecular phylogenetic studies have upset traditional classifications and resulted in division into several classes, orders, and families (Fiore-Donno *et al.* 2013; Lado and Eliasson 2017; Leontyev *et al.* 2019). Here, we follow the classification system for orders and families outlined by Leontyev *et al.* (2019). Species in the order Ceratiomyxales are not true myxomycetes, but are often treated along with them, and we have done so in our study. There are no widely used or accepted common names for myxomycetes.

Studies on the biodiversity of myxomycetes in Canada are rarely conducted, or at least rarely published. However, national and provincial lists of myxomycete species were recently compiled through the federal–provincial General Status of Species in

Canada program (CESCC 2022). Initiated in 1996, this program has reported at five-year intervals (2000, 2005, etc.) on the conservation status of species in numerous major groups of organisms. The report for 2020 (CESCC 2022) was the first to include myxomycetes. It lists 290 species for Canada and 51 for New Brunswick based on a variety of sources, including peer-reviewed literature, herbarium specimens, and community knowledge. However, it does not include specimen citations or other references to the specific sources of information supporting the species records. For most of the myxomycetes, there was insufficient information available to assess their conservation status (CESCC 2022). As far as we know, Alberta is the only province for which a relatively up-to-date peer-reviewed species checklist has been published (Richardson and Currah 1990).

Little has been published on the myxomycetes of New Brunswick. The earliest reference to any species occurring in New Brunswick was by James Fowler, who included *Lycogala epidendrum* (L.) Fr. in a short list of fungi appended to his catalogue of the provincial flora (Fowler 1879). No voucher specimen is known to exist, although collections of fungi made by Fowler are present in several herbaria (MyCoPortal 2022). Another early New Brunswick botanist, George Upham Hay, published more extensive lists of the fungi of the province, based on specimens he sent for identification to several leading American mycologists. Two of Hay's lists included a few myxomycetes. These were *Hemitrichia clavata* (Pers.) Rostaf. (as *Hemiarcyria clavata* (Pers.) Rostaf.) in Hay (1903) and *Fuligo muscorum* Alb. & Schwein. (as *Fuligo ochracea* (Peck) Peck), *Fuligo septica* (L.) F.H. Wigg., and *L. epidendrum* in Hay (1908). Of these species, we are aware of voucher material only of *L. epidendrum*, identified by C.G. Lloyd and housed at the U.S. National Fungus Collection (BPI; MyCoPortal 2022). Three additional species, *Mucilago crustacea* P. Micheli ex F.H. Wigg. (as *Mucilago spongiosa* (Leyss.) Morgan), *Physarum cinereum* (Batsch) Pers., and *Siphoptychium casparyi* Rostaf. (as *Tubifera casparyi* (Rostaf.) T. Macbr.), were reported by Wehmeyer (1950).

In this paper, we present the findings of incidental and targetted collecting and study of myxomycetes in New Brunswick since 2007 by research associates and staff of the New Brunswick Museum (NBM). All collections resulting from this work have been deposited in the NBM herbarium. We are aware of other, earlier (pre-1980), unpublished collections, but a critical review of this material, which is scattered among herbaria outside New Brunswick, was outside the scope of our study. Information on these collections can be obtained via online data portals, especially MyCoPortal (https://www.mycoportal.org) and the Global Biodiversity Information Facility (https://www.gbif.org). They include important material well worthy of further study and publication. Examples are specimens from Campobello Island collected in 1898 and 1902 by the Harvard mycologist and all-round cryptogamist William Gilson Farlow (see Pfister 2016); specimens from the Campbellton area, collected in 1912 by plant pathologist John William Eastham, who at the time was employed at the Department of Agriculture in Ottawa (Cody *et al.* 1986) and who authored a checklist of the myxomycetes of the Ottawa region (Eastham 1912); and specimens from Kouchibouguac National Park, collected during a mycological survey of the park in 1977 and 1978 by staff of the Biosystematics Research Institute of Agriculture Canada (Cody *et al.* 1986).

Study Area

The eastern Canadian province of New Brunswick has an area of about 73 000 km^2 and is situated at 44.5–48°N and 64–69°W. It adjoins the Bay of Fundy on its south coast and the Gulf of St. Lawrence on its east and north coasts. Its elevation reaches 820 m in the northern interior. Mean annual temperatures range from 6.8°C in the middle Saint John River valley in the south-central interior to 2.2°C or less at elevations above 600 m in the north (Environment Canada 2017). Precipitation varies from about 1000 mm/year in eastern and northern coastal locations to upwards of 1400 mm/year near the Bay of Fundy, with snowfall accounting for 13% to more than 30% of annual totals.

Along the major south–north gradient of vegetation in eastern North America, the province is situated in the transition zone between temperate deciduous and boreal evergreen forests. The eastern part of this zone in Canada is recognized as the Acadian Forest Region (Rowe 1972) or Atlantic Maritime Ecozone (McAlpine and Smith 2010). Red Spruce (*Picea rubens* Sargent) is its most characteristic tree species. Provincially, seven ecoregions (Highlands, Northern Uplands, Central Uplands, Valley Lowlands, Eastern Lowlands, Grand Lake, and Fundy Coast) are recognized, each with distinctive climatic features and landforms reflected in a recurring pattern of dominant vegetation (Zelazny 2007). In upland settings, the forest cover ranges from north-temperate hardwoods dominated by Sugar Maple (*Acer saccharum* Marshall) to mainly coniferous, montane (oro-)boreal stands of Black Spruce (*Picea mariana* (Miller) Britton, Sterns & Poggenburgh) and Balsam Fir (*Abies balsamea* (L.) Miller). Floodplain forests in the middle Saint John River valley are dominated by Silver Maple (*Acer saccharinum* L.), one of several temperate hardwood species that reach their northeastern range limits in New Brunswick (Clayden 2000).

Although forests still cover about 85% of the province, settlement, forestry, agriculture, and introduced pathogens have brought about major shifts in the relative abundance and size–age distributions of native tree species over the past few centuries (Mosseler *et al.* 2003; Loo *et al.* 2010). Declines of late successional species, such as Eastern Hemlock (*Tsuga canadensis* (L.) Carrière) and American Beech (*Fagus grandifolia* Ehrhart), contrast with increases in the abundance of more disturbance-tolerant species, such as Trembling Aspen (*Populus tremuloides* Michaux), Red Maple (*Acer rubrum* L.), Grey Birch (*Betula populifolia* Marshall), White Spruce (*Picea glauca* (Moench) Voss), and Balsam Fir.

The collections we report here originate mostly from provincial protected natural areas (PNAs), with smaller numbers from two provincial parks (PPs), Portobello Creek National Wildlife Area, Fundy National Park, and Roosevelt Campobello International Park (Table 1, Figure 2). The PNAs encompass relatively intact portions of the New Brunswick landscape that are representative of its seven major ecoregions. Other localities where a single or a few collections were made are not listed in Table 1, but are mapped in Figure 2, with details provided under the specimen citations.

Methods

Collection, culture, identification, and curation of specimens

In 2009, an ongoing survey of the biodiversity of New Brunswick's larger PNAs, the BiotaNB program, was initiated by the NBM (McAlpine 2022). This program has focussed mainly on the 10 largest PNAs, which range from 2823 to 26022 ha in area and were established in 2003 under the provincial *Protected Natural Areas Act*. The project has attracted researchers with a wide range of taxonomic expertise. Only sporadic collections of myxomycetes were made during the first several years. More intensive, targetted collecting began in 2014 when V.F.Z., who has studied myxomycetes in the neighbouring state of Maine, USA (Zoll and Stephenson 2013, 2015), joined the BiotaNB project. In 2016, V.F.Z. also took part in a mycological foray on Campobello Island and has encouraged other BiotaNB participants to search for myxomycetes, resulting in additional collections that are reported here.

Most specimens were found fruiting in the field by various collectors examining downed branches, decaying logs, stumps, moss mats, bark on living trees, and various other substrates, sometimes with a hand lens (10–20× magnification). Samples of organic material including ground litter, leaves, decaying wood, bark, twigs, moss, and dung were collected from the field and placed in moist chambers (lidded plastic containers with moistened paper towel on the floor of the container) using the technique described by and illustrated in Stephenson and Stempen (1994). These chambers allow time for single-celled amoeboids and plasmodia to mature and fruit if present in the substrate. The moist chambers were maintained at room temperature and examined periodically up to three months after collecting the substrate or until the

TABLE 1. Targetted collecting areas for myxomycetes, by date, location, ecoregion, and number of specimens.

Date	Location*	Ecoregion	No. collections	Collectors
August 2014	Grand Lake PNA, Portobello Creek National Wildlife Area	Grand Lake	37	V.F.Z., S.R.C., K.E.D., K.J. Vanderwolf, A. Carter, and G. Bishop
June/July/ September 2015	Nepisiguit PNA	Highlands	27	V.F.Z., A.M.B., S.R.C., K.E.D., D.W.M., B.W.M., D.F. McAlpine, and G. Bishop
May/August 2016	Nepisiguit PNA	Highlands	38	V.F.Z., A.M.B., D.W.M., and B.W.M.
September 2016	Campobello Island: Roosevelt-Campobello International Park, Herring Cove PP	Fundy Coast	15	V.F.Z., A.M.B., J.B. Tanney, D. Porter, and M. Mulvey
August 2017	Spednic Lake PNA, Andersonville PNA, Canoose Flowage PNA, Spednic Lake PP	Valley Lowlands	29	V.F.Z., A.M.B., D.W.M., B.W.M., A. Carter, S.R. Haughian, S.A. Sullivan, E. Hines, and J. Hines,
June/July 2018	Spednic Lake PNA, Canoose Flowage PNA, Spednic Lake PP	Valley Lowlands	67	V.F.Z., A.M.B., and D.W.M.
June/July 2019	Kennedy Lakes PNA, Upper Dungarvon PNA	Central Uplands	12	A.M.B., D.W.M., A. Carter, D.F. McAlpine, and J.R. Blacquiere

*PNA = protected natural area, PP = provincial park.
Note: Except for the material originating from a four-day mycological foray (Campobello Island in 2016), all collections listed in this table were made during two-week-long NBM BiotaNB surveys of PNAs and other nearby protected areas.

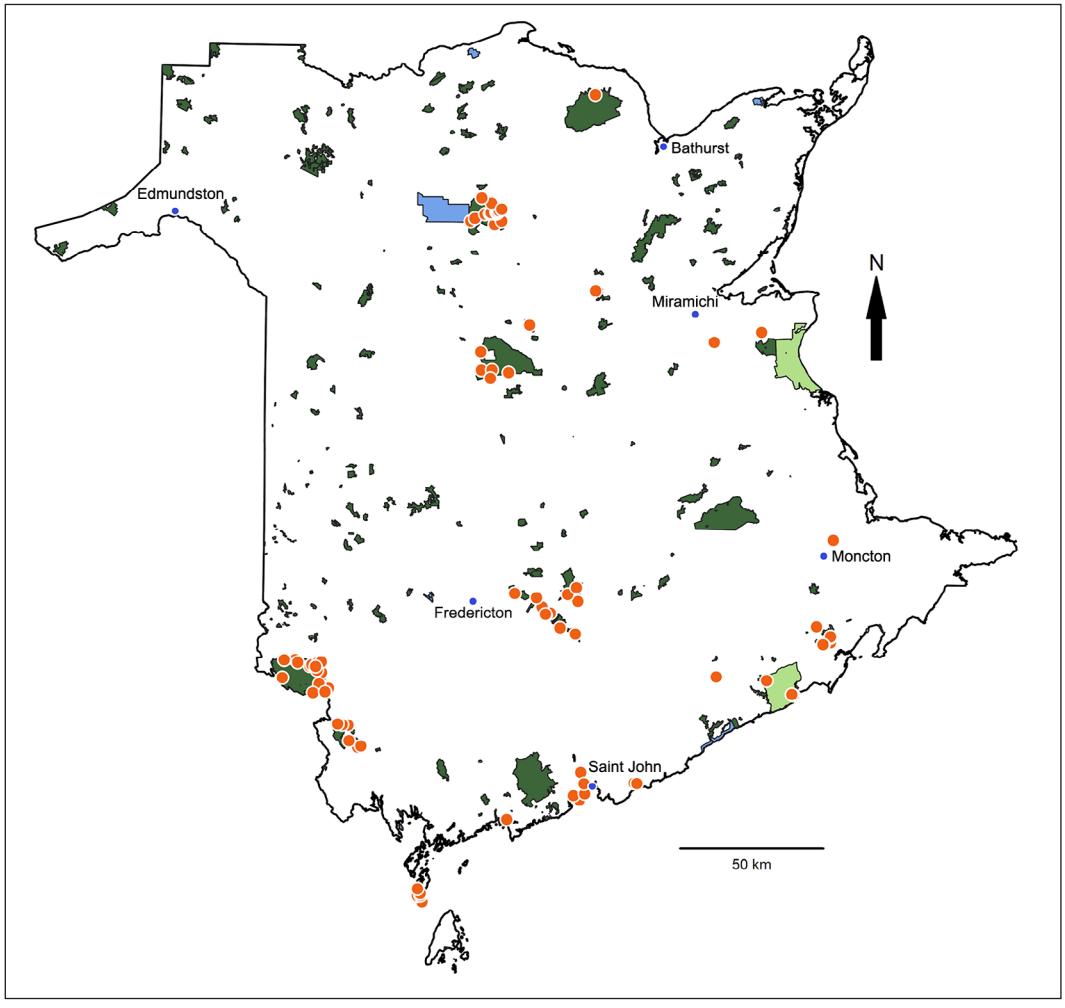

FIGURE 2. Location of New Brunswick myxomycete collections deposited at the New Brunswick Museum, Saint John, New Brunswick, from 2007 to 2019. Collection locations = solid orange circles; protected natural areas = dark green; national parks = light green; provincial parks = blue.

substrate became covered with fungi.

Specimens from field collections and those harvested from the moist chamber cultures were glued with some of the substrate to archival mat boards cut to fit appropriate-sized pasteboard boxes. The specimens were air-dried at room temperature then placed through a freeze-thaw cycle (−20°C for one week, room temperature for one week, then −20°C for one week) to kill any pests. All specimens were deposited in the herbarium of the New Brunswick Museum (NBM). The collector (field) number and catalogue number are listed for each collection. Collector numbers are in square brackets when the number was assigned by someone other than the collector. The Latin abbreviation *s.n.*, without number (*sine numero*), is used when no collector number was given to the collection.

Collections were identified or verified by V.F.Z. except for a collection of *Listerella paradoxa* E. Jahn identified by K.E.D. in 2015 and 13 collections identified by others before 2014. A solution of 3% potassium hydroxide was used for microscopic examination and measurements of collections are as described in Stephenson and Stempen (1994). Most identifications were made using Martin and Alexopoulos (1969), Stephenson and Stempen (1994), Lado and Pando (1997), Ing (1999), and Poulain *et al.* (2011).

Nomenclature

The nomenclature of the myxomycetes, including standardized abbreviations of author names,

essentially follows Lado (2005–2022). The scientific and common names of trees and other vascular plants follow Brouillet *et al.* (2010+). In the annotated list of myxomycete species, we have largely retained the verbatim descriptions of habitats and substrates recorded by the collectors. These descriptions often note either the common or the scientific names of trees and shrubs; we use both names on first mention in the manuscript then switch to common names. Besides those mentioned in the description of the study area, other tree and shrub species recorded were Striped Maple (*Acer pensylvanicum* L.), Mountain Maple (*Acer spicatum* Lamarck), Yellow Birch (*Betula alleghaniensis* Britton), Heart-leaved Birch (*Betula cordifolia* Regel), Red Ash (*Fraxinus pennsylvanica* Marshall), Canada Fly-honeysuckle (*Lonicera canadensis* Bartram & W. Bartram ex Marshall), Eastern Hop-hornbeam (*Ostrya virginiana* (Miller) K. Koch), Jack Pine (*Pinus banksiana* Lambert), Eastern White Pine (*Pinus strobus* L.), Red Oak (*Quercus rubra* L.), American Mountain-ash (*Sorbus americana* Marshall), Eastern White Cedar (*Thuja occidentalis* L.), and White Elm (*Ulmus americana* L.). Short forms of common names include fir for Balsam Fir, beech for American Beech, hemlock for Eastern Hemlock, white pine for Eastern White Pine, and cedar for Eastern White Cedar. Trees and shrubs that were sometimes recorded to genus only include maple (*Acer* L.), alder (*Alnus* Miller), birch (*Betula* L.), ash (*Fraxinus* L.), spruce (*Picea* A. Dietrich), poplar (*Populus* L.), mountain ash (*Sorbus* L.), and viburnum (*Viburnum* L.). The names "white birch" or "paper birch" as originally recorded could refer to either *Betula cordifolia* Regel or *Betula papyrifera* L. We report these instances as white birch, but their specific identity remains uncertain.

Data collation and presentation

Figure 2 was prepared using geographic information system software QGIS v. 3.22.7 (available from https://www.qgis.org/en/site/). Shape files for PNAs and PPs were downloaded from the GeoNB website (http://www.snb.ca/geonb1/e/DC/catalogue-E.asp) in February 2021. Shape files for Canadian national parks were downloaded from the Natural Resources Canada website (https://www.nrcan.gc.ca/home) in February 2021.

Sources consulted for information on the geographic ranges of species included Martin and Alexopoulos (1969), Ing (1999), Stephenson (2021), Global Biodiversity Information Facility (GBIF 2022), and "Global Mapper" function of Discover Life (2022). Species are listed as "cosmopolitan" unless they appeared to have substantial gaps in their ranges that are unlikely to be attributable merely to limited exploration and collecting. The preferred substrates of species were determined from Martin and Alexopoulos (1969), Stephenson and Stempen (1994), Stephenson (2021), and personal observations by V.F.Z.

The number of specimens presented in the results, including Figure 2, represents a complete tally of relevant collections studied and deposited at the NBM up to 2019. However, detailed citations are provided only for specimens that are either identified to species or distinct from other species presented in the checklist. In two cases, the qualifier "cf." (short for the Latin *confer*/*conferatur*, meaning compare; difficult to identify to species) is inserted before species names in the checklist.

Results

The targetted search effort resulted in 225 collections from seven PNAs, two PPs, one national wildlife area, and one internationally managed park (Table 1). An additional 39 specimens were collected outside the main effort. Eighty species in 29 genera were recorded, belonging to eight orders and 12 families (Table 2).

The majority of the myxomycetes recorded are represented by specimens that fruited in the field under natural conditions, but some were collected from moist chamber cultures. Species known only from fruiting bodies appearing in moist chamber culture are indicated in the notes after each species.

The species of greatest abundance was *Arcyria cinerea* (Bull.) Pers., which was represented by 24 collections, followed by *L. epidendrum* (19), *Fuligo septica* (L.) F.H. Wigg. (15), and *Ceratiomyxa fruticulosa* (O.F. Müll.) T. Macbr. (14). There were 42 species represented by only one collection. Five of these are apparently rare worldwide. These are *Comatricha mirabilis* R.K. Benj. & Poitras (Martin and Alexopoulos 1969), *Fuligo laevis* Pers. (Discover Life 2022), *Hemitrichia chrysospora* (Lister) Lister (Martin and Alexopoulos 1969), *Lepidoderma neoperforatum* A. Kuhnt (GBIF 2022), and *Listerella paradoxa* (Discover Life 2022). Another globally rare species, *Paradiacheopsis microcarpa* D.W. Mitch., has been collected in New Brunswick six times.

Annotated Checklist of Species

The list is sorted alphabetically by genus, species, **county**, date (ascending), and NBM catalogue number (ascending). In cases where more than one specimen of a species was collected at, and cited from, a single locality, the abbreviation "*ibid*." is used to minimize duplicated information on the locality, habitat, substrate, and date, as appropriate.

Arcyria affinis Rostaf. (Figure 1d). **Northumberland Co.**: Nepisiguit PNA, near forest road, ~2.75 km SW of Popple Depot, 47.38395°N, 66.54089°W, on

Table 2. Orders, families, and genera recorded in this study. The order Ceratiomyxales belongs in the class Ceratiomyxomycetes; all other orders are in the class Myxomycetes.

Order	Family	Genus
Ceratiomyxales	Ceratiomyxaceae	*Ceratiomyxa*
Clastodermatales	Clastodermataceae	*Clastoderma*
Cribrariales	Cribrariaceae	*Cribraria*
Liceales	Liceaceae	*Licea* *Listerella*
Physarales	Didymiaceae	*Diderma* *Didymium* *Lepidoderma*
	Lamprodermataceae	*Collaria*
	Physaraceae	*Badhamia* *Craterium* *Fuligo* *Leocarpus* *Physarum*
Reticulariales	Reticulariaceae	*Lycogala* *Reticularia* *Tubifera*
Stemonitidales	Amaurochaetaceae	*Comatricha* *Enerthenema* *Paradiacheopsis* *Stemonitopsis*
	Stemonitidaceae	*Stemonitis*
Trichiales	Dianemataceae	*Calomyxa* *Dictydiaethalium*
	Trichiaceae	*Arcyria* *Hemitrichia* *Metatrichia* *Perichaena* *Trichia*

underside of decaying white birch branch on ground, mixed forest with white birch, fir, Red Maple, 14 August 2016, *V.F. Zoll 590* (NBM-MM-000106); N part of Nepisiguit PNA, ~1.2 km S of Lower West Branch Portage Brook, 47.43942°N, 66.62305°W, on decaying wood, with hardwoods, birch, conifers, 15 August 2016, *V.F. Zoll 595* (NBM-MM-000146). Cosmopolitan. This species may be difficult to differentiate from *Arcyria incarnata* or other reddish species of *Arcyria*, but the specimens do have the deeper calyculus of *A. affinis*.

Arcyria cinerea (Bull.) Pers. **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, Fox Hill Drive, ~0.4 km SW of intersection of Fox Hill Drive and Glensevern Road, 44.85511°N, 66.93706°W, on decaying Balsam Fir log on ground, forest of fir and birch, 25 September 2016, *V.F. Zoll 632* (NBM-MM-000015); NW part of Canoose Flowage PNA, ~2.25 km SE of S end of Mud Lake, 45.48967°N, 67.37869°W, on decaying branch on ground, old growth forest of maple, birch, Yellow Birch, beech, fir, and spruce, 15 August 2017, *V.F. Zoll 656* (NBM-MM-000032); 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on leaf litter, mixed forest with Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 699* (NBM-MM-000160), *V.F. Zoll 701* (NBM-MM-000161), *V.F. Zoll 707* (NBM-MM-000162), *V.F. Zoll 731* (NBM-MM-000163), *V.F. Zoll 733* (NBM-MM-000164). **Northumberland Co.**: Nepisiguit PNA, W of forest road, ~7 km SSW of Popple Depot, 47.34154°N, 66.55291°W, on decaying branch on ground, Jack Pine, birch, fir, 14 August 2016, *V.F. Zoll 589* (NBM-MM-000087). **Saint John Co.**: Black River, N of Old Black River Road, 45.26989°N, 65.81964°W, on decomposed log, possibly Red Maple, 9 July 2018, *E. Hines EF.7.9.18.7s* (NBM-MM-000209). **Sunbury Co.**: Portobello Creek

National Wildlife Area, NE side of French Island at The Narrows between Portobello Creek and French Lake, 45.92429°N, 66.30027°W, Red Oak–hemlock forest, decaying log, in knothole with moss, 9 August 2014, *V.F. Zoll 322* (NBM-MM-000071); Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on decaying log, 11 August 2014, *V.F. Zoll 340* (NBM-MM-000067). **York Co.**: Spednic Lake PNA, ~1.8 km NNE of N end of East Brook Lake, 45.70610°N, 67.51768°W, on Moose (*Alces americanus*) dung, mixed forest including maple, birch, poplar, alders, 12 August 2017, *V.F. Zoll 664* (NBM-MM-000044); *ibid.*, on spruce bark, living tree, *V.F. Zoll 676* (NBM-MM-000045); Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on decaying wood, mixed forest with birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 697* (NBM-MM-000178); *ibid.*, on leaf litter, *V.F. Zoll 710* (NBM-MM-000179), *V.F. Zoll 748* (NBM-MM-000185); *ibid.*, on hemlock stump, *V.F. Zoll 715* (NBM-MM-000180), *V.F. Zoll 717* (NBM-MM-000181), *V.F. Zoll 718* (NBM-MM-000182), *V.F. Zoll 724* (NBM-MM-000183), *V.F. Zoll 727* (NBM-MM-000184); Spednic Lake PP, 45.60619°N, 67.44583°W, on spruce bark, living tree, mixed forest with beech, hemlock, Striped Maple, Red Maple, white birch, Yellow Birch, 16 June 2018, *V.F. Zoll 744* (NBM-MM-000199); *ibid.*, on Red Maple, living tree, *V.F. Zoll 745* (NBM-MM-000200); Spednic Lake PNA, near N end of Bolton Lake, 45.71394°N, 67.59278°W, on bark of dead branch of Red Oak, in mixed forest with poplar, spruce, Yellow Birch, and white birch, 21 June 2018, *V.F. Zoll 696* (NBM-MM-000246). Cosmopolitan, among the most common species globally. This species is particularly common in moist chamber cultures. The cylindrical white or ashy-grey sporangia are easily identifiable and are found on many substrates, including decaying wood, leaf litter, bark, and dung.

Arcyria denudata (L.) Wettst. **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on decaying branch, ground litter, 10 August 2014, *V.F. Zoll 327* (NBM-MM-000056). Only one collection of this species has been made in New Brunswick, unlike in the eastern USA (Stephenson *et al.* 2020), where this species is one of the most collected. A few collections have been made in other Canadian provinces.

Arcyria ferruginea Saut. **Charlotte Co.**: Campobello Island, northwestern part of Herring Cove PP, ~0.7 km NNE of intersection of Route 774 and Glensevern Road, 44.87969°N, 66.95319°W, on decaying wood on ground, forest of fir, spruce, and birch, 22 September 2016, *V.F. Zoll 626* (NBM-MM-000020). Cosmopolitan. In addition to this record, there is only one other record reported for New Brunswick from Campbellton, 30 September 1912, collected by John W. Eastham, deposited in the University of British Columbia Herbarium (Mycoportal 2022), despite this species being common throughout the Northern Hemisphere.

Arcyria incarnata (Pers. ex J.F. Gmel.) Pers. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.3 km SE of S end of Mud Lake, 45.48904°N, 67.37852°W, on decaying wood under leaves, old growth forest, maple, birch, Yellow Birch, beech, fir, spruce, 11 August 2017, *V.F. Zoll 649* (NBM-MM-000029). **Northumberland Co.**: Nepisiguit PNA, NW of forest road at brook by culvert, ~2.3 km SW of Popple Depot, 47.38665°N, 66.53618°W, on bark, decaying branch, 4 July 2015, *B.W. Malloch s.n.* (NBM-MM-000116); N part of Nepisiguit PNA, ~1.2 km S of Lower West Branch Portage Brook, 47.43942°N, 66.62305°W, on decaying wood on ground, forest with hardwoods, birch, and conifers, 15 August 2016, *V.F. Zoll 597* (NBM-MM-000148); Nepisiguit PNA, N of Nepisiguit River, S of Melansons Gulch, near base of Mount Walker, ~11.9 km SW of Popple Depot, 47.36382°N, 66.66053°W, on bark, decaying branch, forest with fir and spruce, 19 August 2016, *V.F. Zoll 621* (NBM-MM-000102); Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.5346°W, on decaying Balsam Fir log, partly decorticated, with some moss, in mixed forest with Red Maple, white pine, fir, cedar, birch, 21 August 2016, *V.F. Zoll 615* (NBM-MM-000127). **Queens Co.**: Grand Lake PNA, just S of Route 105 at Trout Creek, ~1.1 km SW of Jemseg, 45.82335°N, 66.12427°W, on decaying branch, on ground, flood plain with Silver Maple, Red Ash, elm, 13 August 2014, *V.F. Zoll 349* (NBM-MM-000054). **York Co.**: Spednic Lake PNA, S end of Upper Palfrey Neck, 45.63416°N, 67.47789°W, on decaying beech log, forest of maple, spruce, beech, and Yellow Birch, 12 August 2017, *V.F. Zoll 651* (NBM-MM-000039); Spednic Lake PNA, ~0.15 km NE of Diggity Stream, 45.62049°N, 67.42865°W, on decaying wood, forest including Red Maple and Striped Maple, 18 August 2017, *V.F. Zoll 671* (NBM-MM-000038). Cosmopolitan on decaying wood. It differs from *A. denudata* in having a capillitium that is easily detached from the calyculus on maturity.

Arcyria pomiformis (Leers) Rostaf. **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, N of Fox Hill Drive, near base of Fox Hill, 44.85354°N, 66.95303°W, on underside of decaying log on ground, forest of fir, and birch, 25 September 2016, *V.F. Zoll 636* (NBM-MM-000013).

Northumberland Co.: Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on decaying Balsam Fir log, mixed forest with fir, 15 August 2016, *V.F. Zoll 605* (NBM-MM-000131). Cosmopolitan on decaying wood and tree bark. This species can be confused with *A. cinerea* if the sporotheca appears more cylindrical than globose or ovate.

Badhamia lilacina (Fr.) Rostaf. **Sunbury Co.**: Grand Lake PNA, Fernmount, ~0.79 km S of intersection of Fernmount Road and Grub Road, 45.95860°N, 66.32943°W, on ground litter including *Sphagnum*, 8 August 2014, *G. Bishop [V.F. Zoll 326]* (NBM-MM-000079). Recorded only from the Northern Hemisphere (Europe, eastern Canada, and northeastern USA). This species is usually found on *Sphagnum* in boggy areas (Schnittler *et al.* 2022).

Calomyxa metallica (Berk.) Nieuwl. **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on hemlock stump, mixed forest of birch, Red Maple, hemlock, fir, and Striped Maple, 15 June 2018, *V.F. Zoll 716* (NBM-MM-000186). Cosmopolitan. This species is typically found fruiting on tree bark. The single collection was from a moist chamber culture.

Ceratiomyxa fruticulosa (O.F. Müll.) T. Macbr. **Albert Co.**: Caledonia Gorge PNA, 6.5 km NNW of Riverside Albert, Caledonia Brook, 45.80098°N, 64.77283°W, on root of living Balsam Fir among moss, 29 June 2011, *E.K. Duke EKD2011-17* (NBM-MM-000229). **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, Liberty Point, ~0.35 km S of the S end of Glensevern Road, 44.83167°N, 66.92900°W, on decaying wood, forest of fir, birch, and mountain ash, 23 September 2016, *D. Porter [V.F. Zoll 628]* (NBM-MM-000011). **Northumberland Co.**: Nepisiguit PNA, Popple Depot, E of Nepisiguit River, W of forest road, 47.39880°N, 66.51164°W, on decaying wood, with Trembling Aspen, fir, 30 June 2015, *V.F. Zoll 382* (NBM-MM-000142); Nepisiguit PNA, N of Nepisiguit River and S of forest road, ~4.9 km SW of Popple Depot, 47.38529°N, 66.57273°W, on decaying wood, mixed forest on S side of road with maple, birch, spruce, fir, poplar, Bracken Fern (*Pteridium aquilinum* (L.) Kuhn), 2 July 2015, *V.F. Zoll 388* (NBM-MM-000112); *ibid.*, on decaying bryophyte-covered log, *V.F. Zoll 390* (NBM-MM-000114); Nepisiguit PNA, W of forest road, ~7 km SSW of Popple Depot, 47.34154°N, 66.55291°W, on decaying branch on ground, Jack Pine, birch, fir, 14 August 2016, *V.F. Zoll 587* (NBM-MM-000086); SW part of Kennedy Lakes PNA, 46.7717°N, 66.57573°W, on rotting white birch branch on ground, young mixed forest of white birch, Yellow Birch, fir, spruce, maple, poplar, and cedar, 2 July 2019, *A.M. Bremner et al. AB2019.07.02-09* (NBM-MM-000225). **Saint John Co.**: City of Saint John, Irving Nature Park, Sheldon Point trail, 45.23153°N, 66.07914°W, on rotting wood, open coastal mixed forest walking trail with many large trees, mostly fir and Yellow Birch, some mountain-ash, white birch, alder, and spruce, 7 August 2018, *E. Hines s.n.* (NBM-MM-000212). **Sunbury Co.**: Grand Lake PNA, Kenny Brook Area, 45.97447°N, 66.44526°W, on decorticated conifer, conifer forest, flat, dry, 16 June 2013, *J.B. Tanney [B.W. Malloch B20130616-02]* (NBM-MM-000158); Portobello Creek National Wildlife Area, NE side of French Island at The Narrows between Portobello Creek and French Lake, 45.92429°N, 66.30027°W, on decaying wood, 9 August 2014, *V.F. Zoll 324* (NBM-MM-000073); Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on dead branch, Red Maple, Silver Maple swamp, 10 August 2014, *V.F. Zoll 344* (NBM-MM-000063). **York Co.**: Spednic Lake PNA, ~1.6 km NW of N end of Bolton Lake, 45.72428°N, 67.60622°W, on decaying branch on ground, mixed forest, 10 August 2017, *V.F. Zoll 673* (NBM-MM-000052); Spednic Lake PP, ~3.6 km W of S end of First Lake, 45.60645°N, 67.44680°W, on decaying log, in mixed forest including birch, conifers, hemlock, and maples, 16 June 2018, *A.M. Bremner [V.F. Zoll 684]* (NBM-MM-000235); Spednic Lake PNA, between forest road and N end of Palfrey Lake, 45.6857°N, 67.4902°W, on decaying branch on ground, in mixed forest with poplar, spruce, Yellow Birch, and white birch, 20 June 2018, *V.F. Zoll 689* (NBM-MM-000240). Cosmopolitan; one of the most common species worldwide. The coralloid form and the poroid form are considered the same species and both were found. As noted previously, the Ceratiomyxales are not true myxomycetes; they bear spores on the outside of their fruiting bodies, rather than inside. The two other species in this genus occur only in the tropics.

Clastoderma debaryanum A. Blytt. **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, Liberty Point, ~0.5 km SSW of the S end of Glensevern Road, 44.83112°N, 66.93136°W, on decorticated log on ground, forest of fir, birch, and mountain ash, 23 September 2016, *V.F. Zoll 637* (NBM-MM-000008); *ibid.*, on decaying log on ground, 23 September 2016, *V.F. Zoll 638* (NBM-MM-000009). Cosmopolitan. Most commonly found on tree bark in moist chamber cultures, because of its small size.

Collaria arcyrionema (Rostaf.) Nann.-Bremek. ex Lado (Figure 1c). **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of

intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, with *Physarum viride* on dead branch of Red Maple, Silver Maple swamp, 10 August 2014, *V.F. Zoll 328* (NBM-MM-000057); *ibid.*, on dead branch of Red Maple, *V.F. Zoll 329* (NBM-MM-000058), *V.F. Zoll 330* (NBM-MM-000059), *V.F. Zoll 343* (NBM-MM-000062); *ibid.*, with *C. fruticulosa* on dead branch, Red Maple, *V.F. Zoll 344* (NBM-MM-000063); *ibid.*, on dead branch of Red Maple, 11 August 2014, *V.F. Zoll 320* (NBM-MM-000064). Cosmopolitan. Easily recognized by its silvery or iridescent bronze peridium.

Comatricha mirabilis R.K. Benj. & Poitras. **Northumberland Co.**: SW part of Kennedy Lakes PNA, 4.3 km NW of Upper Peaked Mountain Lake, 46.77170°N, 66.57573°W, with *L. neoperforatum* on Mountain Maple twigs, young mixed forest of white birch, Yellow Birch, spruce, fir, maple, poplar, and cedar (saplings), 2 July 2019, *A. Carter [A.M. Bremner AB2019.07.02-10]* (NBM-MM-000216). Widespread but apparently rare; recorded from Europe, North America (Canada, USA, and Mexico) and South America.

Comatricha nigra (Pers. ex J.F. Gmel.) J. Schröt. **Northumberland Co.**: Kennedy Lakes PNA, 5.8 km SW of peak of Fowler Mountain, near South Branch Renous River, 46.7923°N, 66.4772°W, on underside of well-rotted piece of moss-covered wood/bark standing upright (perhaps an old tree trunk), in open mature coniferous forest of fir, spruce, white pine, 4 July 2019, *A.M. Bremner AB2019.07.04-03* (NBM-MM-000217). Cosmopolitan; frequently collected. Reported here on decaying wood, this species is also often found on tree bark in moist chamber cultures.

Comatricha pulchella (C. Bab.) Rostaf. **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on wood, decaying log, 11 August 2014, *V.F. Zoll 325 (NBM-MM-000065)*. Cosmopolitan.

Craterium minutum (Leers) Fr. **York Co.**: Spednic Lake PNA, ~0.37 km NW of N end of Bolton Lake, 45.71639°N, 67.59516°W, on decaying birch, mixed forest including birch, fir, Red Maple, Striped Maple, 17 August 2017, *V.F. Zoll 666* (NBM-MM-000048). Cosmopolitan. The fruiting bodies look like tiny goblets with lids.

Cribraria argillacea (Pers. ex J.F. Gmel.) Pers. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~2.8 km SW of Popple Depot, 47.38266°N, 66.54118°W, on decaying wood, fir, hardwood forest including maple, and Yellow Birch, 28 June 2015, *V.F. Zoll 380* (NBM-MM-000091); Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.53460°W, on decaying Balsam Fir log, partly decorticated, with some moss, in mixed forest with Red Maple, white pine, fir, cedar, birch, 20 August 2016, *V.F. Zoll 609* (NBM-MM-000123). Cosmopolitan. Normally found on decaying conifer wood, this species is a shiny silvery-grey colour when immature, but later turns clay coloured.

Cribraria cancellata (Batsch) Nann.-Bremek. **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on decaying wood, 10 August 2014, *V.F. Zoll 332* (NBM-MM-000061); Grand Lake PNA, between Ripples and Clarks Corner, off Coy Road, ~4.7 km SE of Ripples, 45.97014°N, 66.16402°W, on decaying wood, 12 August 2014, *V.F. Zoll 334* (NBM-MM-000082). **York Co.**: Spednic Lake PNA, N of Georgia Pacific Road, near SW edge of Big La Coote Stream, 45.69927°N, 67.49879°W, on wood which was partly submerged, forest of poplar, birch, and maple, 13 August 2017, *A. Carter [V.F. Zoll 652]* (NBM-MM-000041). **Northumberland Co.**: Nepisiguit PNA, Popple Depot, W of Nepisiguit River, 47.39718°N, 66.51435°W, on decaying spruce log, E side of dirt road in coniferous forest, 26 June 2015, *V.F. Zoll 384* (NBM-MM-000140), *V.F. Zoll 392* (NBM-MM-000141). Cosmopolitan; frequently collected. This species is easily recognized, with its delicate longitudinal ribs and nodding sporotheca on dark-coloured stalks.

Cribraria confusa Nann.-Bremek. & Y. Yamam. **York Co.**: Spednic Lake PP, 45.60645°N, 67.44680°W, on maple bark, living tree, 16 June 2018, *V.F. Zoll 694* (NBM-MM-000245). Cosmopolitan. This collection was from a moist chamber culture.

Cribraria intricata Schrad. **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, with *Physarum album* on decaying branch, greyish-brown peeling bark, 11 August 2014, *V.F. Zoll 335* (associated record of NBM-MM-000066); Grand Lake PNA, between Ripples and Clarks Corner, off Coy Road, ~4.7 km SE of Ripples, 45.97014°N, 66.16402°W, on decaying branch on ground, forest with Red Maple, fir, and birch, 12 August 2014, *V.F. Zoll 319* (NBM-MM-000080). Cosmopolitan. This species is found on decaying wood.

Cribraria microcarpa (Schrad.) Pers. **Charlotte Co.**: SW part of Andersonville PNA, N of Northwest Branch Digdeguash River, ~0.56 km SSW of intersection of Route 3 and Route 755, 45.40698°N, 67.25471°W, on decaying branch on ground, mixed forest, 16 August 2017, *V.F. Zoll 662* (NBM-

MM-000025). **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on decaying Balsam Fir log, mixed forest with fir, 18 August 2016, *V.F. Zoll 617* (NBM-MM-000136); *ibid.*, on decaying Balsam Fir log, mixed forest with Red Maple, white pine, fir, cedar, birch, 18 August 2016, *V.F. Zoll 679* (NBM-MM-000137). **Sunbury Co**.: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, with *C. arcyrionema* on Red Maple, lignin, dead branch, 10 August 2014, *V.F. Zoll 330* (NBM-MM-000059). **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72277°N, 67.66444°W, with *A. cinerea* on hemlock stump, mixed forest of birch, Red Maple, hemlock, fir, and Striped Maple, 15 June 2018, *V.F. Zoll 727* (NBM-MM-000184). Cosmopolitan. Found on decaying wood and on ground litter in moist chamber cultures, this species is fairly easy to recognize with its tiny, nodding fruiting bodies on long, delicate stalks.

Dictydiaethalium plumbeum (Schumach.) Rostaf. **Northumberland Co.**: Nepisiguit PNA, N of Nepisiguit River, ~0.15 km ENE of mouth of Little South Branch Nepisiguit River, 47.35328°N, 66.68336°W, on moss, 27 June 2015, *V.F. Zoll 378* (NBM-MM-000089). **York Co.**: Spednic Lake PNA, Todds Island, ~1.2 km SSE of N end of island, 45.6025°N, 67.5102°W, on decaying hemlock, 22 June 2018, *D.W. Malloch [V.F. Zoll 692]* (NBM-MM-000243). Cosmopolitan. This species forms a pseudoaethalium, which consists of closely compacted cylindrical sporangia, each with a little cap. The pseudoaethalium may reach 10 cm or more in width.

Diderma cinereum Morgan. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~1.5 km SW of Popple Depot, 47.39254°N, 66.52930°W, on leaf litter, mixed forest of White Spruce, Jack Pine, Red Maple, and Trembling Aspen, 18 August 2016, *B.W. Malloch [V.F. Zoll 607]* (NBM-MM-000138). Probably cosmopolitan; not particularly common. Although *Diderma* species typically have a peridium with two layers, this species has only one.

Diderma niveum (Rostaf.) T. Macbr. **York Co.**: Spednic Lake PNA, Bolton Lake, 45.71394°N, 67.59278°W, on bark of oak dead branch, mixed forest with poplar, spruce, Yellow Birch, white birch, 21 June 2018, *V.F. Zoll 737* (NBM-MM-000206). Cosmopolitan. This specimen from a moist chamber culture fits descriptions of *D. niveum,* which is, however, a nivicolous species (i.e., normally detected at the edge of melting snowbanks). This and two other species detected in the present study (*Lepidoderma carestianum* (Rabenh.) Rostaf. and *L. neoperforatum*) are reported to be truly nivicolous rather than merely requiring cool conditions (Schnittler *et al.* 2022). It is, therefore, notable that the substrate on which the fruiting bodies of *D. niveum* eventually appeared in culture and the fruiting bodies of the two species of *Lepidoderma* were collected in late June/early July with no sign of recent snowmelt nearby.

Diderma testaceum (Schrad.) Pers. **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on leaf litter, mixed forest with birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 711* (NBM-MM-000189), *V.F. Zoll 713* (NBM-MM-000190), *V.F. Zoll 738* (NBM-MM-000191). Probably cosmopolitan; found in Europe and in North and Central America. These collections were from moist chamber cultures of leaf litter, although this species can also be found fruiting in the field.

Diderma sp. **Queens Co.**: Grand Lake PNA, ~0.2 km NE of intersection of Route 690 and Pondstream Road, 45.94438°N, 66.11012°W, on decaying branch on ground, 13 August 2014, *K.E. Driscoll [V.F. Zoll 347]* (NBM-MM-000077). The yellow plasmodium developed into grey sporangia heaped in separate mounds, each on a shiny yellowish hypothallus, containing dark brown, minutely warted spores. Appearing to have a single peridium, yellowish granular lime, and no columella, this specimen could not be identified to a species, but was distinct from the other three species of *Diderma* found in our study.

Didymium iridis (Ditmar) Fr. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on decaying Balsam Fir log, mixed forest with fir, 18 August 2016, *V.F. Zoll 602* (NBM-MM-000133). **Westmorland Co.**: Irishtown Nature Park, on E shore of the reservoir, 46.15774°N, 64.74706°W, on moss, 7 August 2007, *B.A. Bagnell & G. Bishop s.n.* (NBM-MM-000150). Cosmopolitan. Like most species of *Didymium*, the fruiting body is covered with white starlike lime crystals.

Didymium melanospermum (Pers.) T. Macbr. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.3 km SE of S end of Mud Lake, 45.48904°N, 67.37852°W, on decaying hardwood, old growth forest of maple, birch, Yellow Birch, beech, fir, and spruce, 11 August 2017, *B.W. Malloch [V.F. Zoll 648]* (NBM-MM-000028). **Northumberland Co.**: Hells Gate Hardwoods PNA, 46.9332°, 65.1094°W, on thallus of *Peltigera* (*Peltigera aphthosa* (L.) Willd. or *Peltigera leucophlebia* (Nyl.) Gyeln.) lichen, bryophytes, and bark, on forest floor, mature mixed forest of Red Spruce, Yellow Birch, Red Maple, and hemlock, 13 August 2019, *S.R. Clayden 27966* (NBM-MM-000267); Nepisiguit PNA, N of Nepisiguit River, S of Melansons Gulch, near base of Mount

Walker, ~11.9 km SW of Popple Depot, 47.36382°N, 66.66053°W, on twig embedded in moss, with fir and spruce, 19 August 2016, *V.F. Zoll 606* (NBM-MM-000100); *ibid.*, on moss, *V.F. Zoll 608* (NBM-MM-000101); Upper Dungarvon PNA, 5.3 km SW of Grassy Lake, E side of Dungarvon River, 46.8019°N, 66.6241°W, on decaying plant debris on ground, young coniferous forest of fir and spruce, some deciduous trees present (birch, maple, beech), under tree trunk, 5 July 2019, *A.M. Bremner AB2019.07.05-02* (NBM-MM-000215); South Branch Big Sevogle River PNA, 47.09452°N, 66.00510°W, growing on *Bazzania* (liverwort), brook ravine with waterfalls, shale rock bluffs and mature coniferous forest of spruce and white pine with some maple and Yellow Birch, 15 September 2019, *A.M. Bremner et al. AB2019.09.15-05* (NBM-MM-000218); Goodfellow Brook PNA, 46.89888°N, 65.36604°W, on bark, at base of cedar, sheltered shaded log, mature wet forest of cedar, fir, spruce, and Red Maple, 16 September 2019, *J. Gagnon [V.F. Zoll 754]* (NBM-MM-000228). **York Co.**: Spednic Lake PNA, ~0.37 km NW of N end of Bolton Lake, 45.71639°N, 67.59516°W, on decaying birch, mixed forest including birch, fir, Red Maple, Striped Maple, 17 August 2017, *V.F. Zoll 667* (NBM-MM-000049). Cosmopolitan; very common. One of the more common species collected in New Brunswick.

Didymium minus (Lister) Morgan. **Northumberland Co.**: Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.54360°W, on decaying Balsam Fir log, partly decorticated, with some moss, in mixed forest with Red Maple, white pine, fir, cedar, birch, 20 August 2016, *V.F. Zoll 610* (NBM-MM-000124); *ibid.*, on ground litter, *V.F. Zoll 612* (NBM-MM-000126). **York Co.**: Spednic Lake PNA, ~0.37 km NW of N end of Bolton Lake, 45.71639°N, 67.59516°W, on decaying branch on ground, mixed forest including birch, fir, Red Maple, Striped Maple, 17 August 2017, *V.F. Zoll 668* (NBM-MM-000050); Canoose Flowage PNA, ~1.34 km WSW of mouth of Canoose Stream, 45.4851°N, 67.3540°W, on fallen birch branch, 18 August 2017, *B.W. Malloch [V.F. Zoll 674]* (NBM-MM-000027). Cosmopolitan. Somewhat similar to *D. melanospermum*, but with smaller fruiting bodies and smaller spores.

Didymium nigripes (Link) Fr. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.3 km SE of S end of Mud Lake, 45.48904°N, 67.37852°W, on decaying Balsam Fir on ground, old growth forest of maple, birch, Yellow Birch, beech, fir, and spruce, 11 August 2017, *V.F. Zoll 655* (NBM-MM-000031). Cosmopolitan. Very similar to *D. iridis*, but with a darker stalk.

Didymium cf. *proximum* Berk. & M.A. Curtis. **Northumberland Co.**: Nepisiguit PNA, N of Nepisiguit River, S of Melansons Gulch, near base of Mount Walker, ~11.9 km SW of Popple Depot, 47.36342°N, 66.66077°W, on moss, grass, and spruce cone, 16 September 2015, *A.M. Bremner AB2015.09.16-07* (NBM-MM-000098). *Didymium proximum* is essentially cosmopolitan, but mostly found in eastern Canada and the USA, and in Europe. It is less common and perhaps not as widespread as *D. iridis* and *D. nigripes.* This species is very similar to *D. iridis* but can be distinguished by the colour of the plasmodium: yellow in *D. proximum* and cream or brown in *D. iridis*. The cited specimen is provisionally named because the plasmodium was not seen, but the yellow peridium and the slightly larger spores fit with *D. proximum.*

Enerthenema papillatum (Pers.) Rostaf. **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, Liberty Point, ~0.35 km S of the S end of Glensevern Road, 44.83167°N, 66.92900°W, on decorticated log on ground, forest of fir, birch, and mountain ash, 23 September 2016, *V.F. Zoll 627* (NBM-MM-000010); Campobello Island, Roosevelt Campobello International Park, N of Fox Hill Drive, near base of Fox Hill, 44.85354°N, 66.95303°W, on decaying Balsam Fir, forest of fir, and birch, 25 September 2016, *A.M. Bremner [V.F. Zoll 635]* (NBM-MM-000014). **Sunbury Co.**: Near western point of Fulton Island between Main Thoroughfare and Blind Thoroughfare, 45.90122°N, 66.25619°W, on oak bark, 13 August 2014, *S.R. Clayden 24696 [V.F. Zoll 338]* (NBM-MM-000070). **York Co.**: NE end of Spednic Lake PNA, off Route 630, W of Sixth Lake, 45.717°N, 67.468°W, on decaying wood, among viburnum and cedar, 12 August 2017, *A. Carter [V.F. Zoll 654]* (NBM-MM-000051). Cosmopolitan; apparently common in the Northern Hemisphere. Distinguished by its unusual "may-pole" arrangement of the capillitium.

Fuligo laevis Pers. **Saint John Co.**: Manawagonish Island Nature Preserve, ~0.23 km SW of N end of Manawagonish Island, 45.20897°N, 66.10733°W, on side of pole covered in lichens, supporting birds nest platform, 17 May 2016, *A.M. Bremner AB2016.05.17-02* (NBM-MM-000022). Probably cosmopolitan; known from Europe, North America, Asia, and Australia. This species is globally rare, and we are aware of only three other collections from Canada and the USA (GBIF 2022; MyCoPortal 2022), all at least 90 years old and recorded as *Fuligo septica* var. *laevis* (Pers.) Fr.

Fuligo leviderma H. Neubert, Novotny & K. Baumann. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.3 km SE of S end of Mud Lake, 45.48904°N, 67.37852°W, on dead maple, old growth forest of

maple, birch, Yellow Birch, beech, fir, and spruce, 11 August 2017, *E. Hines [V.F. Zoll 653]* (NBM--MM-000030). Widespread in the Northern Hemisphere; most commonly reported in Europe.

Fuligo septica (L.) F.H. Wigg. (Figure 1f). **Albert Co.**: Caledonia Gorge PNA, W of Canada Creek, 45.77404°N, 64.78297°W, on rotten log (conifer?) lying on the ground, 29 June 2011, *D.W. Malloch s.n.* (NBM-MM-000005). **Charlotte Co.**: Campobello Island, Herring Cove PP, trail to Dicks Pond, E of Adams Estate, 44.87957°N, 66.95304°W, infected with (and filed under) *Nectriopsis violacea* (J.C. Schmidt ex Fr.) Maire, an ascomycete fungus specific to *F. septica* (Rossman *et al.* 1999), among mosses and debris on forest floor, old humid forest dominated by Red Spruce, with Balsam Fir, Yellow Birch, Heart-leaved Birch, and American Mountain-ash, 23 September 2016, *S.R. Clayden s.n.* (NBM-FF-008382); Campobello Island, Roosevelt Campobello International Park, Fox Hill Drive, ~0.4 km SW of intersection of Fox Hill Drive and Glensevern Road, 44.85511°N, 66.93706°W, on moss on tree base, forest of fir and birch, 24 September 2016, *M. Mulvey [V.F. Zoll 630]* (NBM-MM-000016); *ibid.*, on decaying wood on ground, *A.M. Bremner [V.F. Zoll 631]* (NBM-MM-000017); NW part of Canoose Flowage PNA, ~2.25 km SE of S end of Mud Lake, 45.48967°N, 67.37869°W, on moss over decaying conifer, old growth forest of maple, birch, Yellow Birch, beech, fir, and spruce, 15 August 2017, *V.F. Zoll 657* (NBM-MM-000033). **Northumberland Co.**: NE corner of Nepisiguit PNA, headwaters of Pentland Brook, 47.41973°N, 66.56937°W, on moss and ground litter, in forest dominated by Balsam Fir, Heart-leaved Birch, White Spruce, Black Spruce, American Mountain-ash, and Mountain Maple, on W-facing slope, 7 July 2015, *S.R. Clayden et al. 25253* (NBM-MM-000144); Nepisiguit PNA, N of forest road, near brook running N toward Nepisiguit River, ~2.25 km SW of Popple Depot, 47.38704°N, 66.53635°W, on bryophytes on base of dead Balsam Fir, near a beaver pond in mature hardwood forest, 16 August 2016, *V.F. Zoll 600* (NBM-MM-000118); *ibid.*, on decaying wood (bark) ground litter, *A.M. Bremner [V.F. Zoll 616]* (NBM-MM-000121); Upper Dungarvon PNA, 5.3 km SW of Grassy Lake, E side of Dungarvon River, 46.8019°N, 66.6241°W, on moss-covered rotting tree trunk, in young coniferous forest of fir and spruce, some deciduous trees present (birch, maple, beech), 5 July 2019, *A.M. Bremner AB2019.07.05-01* (NBM-MM-000214). **Saint John Co.**: City of Saint John, 277 Douglas Avenue, New Brunswick Museum, hillside above Marble Cove, 45.26875°N, 66.08289°W, on dried whale bone (kept outside during preparation as a zoology specimen), in open gravel, paved area near mixed forest, NW side of building, 9 July 2008, *D.F. McAlpine & A.M. Bremner s.n.* (NBM-MM-000262); Saint John, Tucker Park, between Tucker Beach Road and Kennebecasis Drive, 45.3106°N, 66.0993°W, on forest floor, mixed forest of spruce, fir, and birch, 27 July 2017, *A.M. Bremner [V.F. Zoll 645]* (NBM-MM-000023). **Sunbury Co.**: Portobello Creek National Wildlife Area, NE side of French Island at The Narrows between Portobello Creek and French Lake, 45.92429°N, 66.30027°W, on ground litter, 9 August 2014, *V.F. Zoll 323* (NBM-MM-000072), *V.F. Zoll 336* (NBM-MM-000074); *ibid.*, on decaying log, *V.F. Zoll 339* (NBM-MM-000075). **York Co.**: Spednic Lake PNA, near SW edge of Todds Island, ~0.68 km SSE from N end of island, 45.59782°N, 67.50765°W, on decaying wood, 17 August 2017, *S.A. Sullivan [V.F. Zoll 669]* (NBM-MM-000037). Cosmopolitan; among the most common myxomycetes globally. This species has relatively large fruiting bodies, from 2 to ~20 cm wide. It is found on decaying wood, ground litter, living plants, and soil. All three specimens collected on Campobello Island during the Campobello Mycological Foray in 2016 are covered with a thick purple and white mycelium and purple perithecia belonging to *N. violacea*.

Hemitrichia calyculata (Speg.) M.L. Farr. **Albert Co.**: Fundy National Park, Maple Grove Trail, along both sides of forest road, 45.59008°N, 64.98361°W, on rotting wood, hardwood forest dominated by Sugar Maple, Yellow Birch, and beech, with scattered Red Spruce and Balsam Fir, 24 September 2013, *M. Burzynski s.n.* (NBM-MM-000264). **Charlotte Co.**: Canoose Flowage PNA, ~1.2 km SE of mouth of Canoose Stream, 45.48374°N, 67.32349°W, on decaying wood, toward bog, 14 August 2017, *D.W. Malloch, [V.F. Zoll 672]* (NBM-MM-000026). **Queens Co.**: Grand Lake PNA, just S of Route 105 at Trout Creek, ~1.1 km SW of Jemseg, 45.82335°N, 66.12427°W, on decaying wood on ground, floodplain with Silver Maple, elm, and Red Ash, 13 August 2014, *V.F. Zoll 348* (NBM-MM-000053); *ibid.*, on decaying log on ground, *V.F. Zoll 350* (NBM-MM-000055). **Sunbury Co.**: Near western point of Fulton Island between Main Thoroughfare and Blind Thoroughfare, 45.90122°N, 66.25619°W, on decaying wood, 13 August 2014, *V.F. Zoll 345* (NBM-MM-000069). **York Co.**: Spednic Lake PNA, ~0.37 km NW of N end of Bolton Lake, 45.71639°N, 67.59516°W, on decaying birch, mixed forest including birch, fir, Red Maple, Striped Maple, 17 August 2017, *V.F. Zoll 665* (NBM-MM-000047). Cosmopolitan; common. This species is found fruiting on decaying wood. Similar in appearance to *H. clavata* except for a longer, slender stalk, it resembles a cone of cotton candy.

Hemitrichia chrysospora (Lister) Lister. **Kings Co.**: Glebe Mine, 2.4 km SE of Parlee Brook (12.4 km SE of Sussex), 45.65995°N, 65.38129°W, on rotting old mining timber lying on floor of mine, 23 March 2011, *A.M. Bremner et al. AB2011.03.23-01* (NBM-MM-000002). Known from Europe, North America, and Africa; rare. There are apparently only four earlier records from North America, all collected in the USA in the 1950s.

Hemitrichia clavata (Pers.) Rostaf. **Northumberland Co.**: Nepisiguit PNA, Popple Depot, E of Nepisiguit River, W of forest road, 47.39880°N, 66.51164°W, on decaying wood, with Trembling Aspen, Balsam Fir, 30 June 2015, *V.F. Zoll 383* (NBM-MM-000143). Cosmopolitan; common. Similar in appearance to *H. calyculata* except for its shorter, stouter stalk and deeper calyculus.

Hemitrichia leiocarpa (Cooke) Lister. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~2.8 km SW of Popple Depot, 47.38266°N, 66.54118°W, on decaying wood, hardwood forest, including maple and Yellow Birch, 28 June 2015, *D.W. Malloch [V.F. Zoll 379]* (NBM-MM-000097). Cosmopolitan; relatively uncommon. Previous records from Canada (Ontario) are from the 1930s and the most recent record from the eastern USA (West Virginia) is from 1982. Consequently, little is known about the species' status in eastern North America.

Hemitrichia serpula (Scop.) Rostaf. ex Lister. **Northumberland Co.**: Nepisiguit PNA, near forest road, ~2.75 km SW of Popple Depot, 47.38395°N, 66.54089°W, on decaying birch on ground, birch, maple, fir, 14 August 2016, *V.F. Zoll 593* (NBM-MM-000109). Cosmopolitan. This species is easily recognized by its yellow to brownish, pretzel-like plasmodiocarp.

Leocarpus fragilis (Dicks.) Rostaf. (Figure 1b). **Albert Co.**: Fundy National Park, Dickson Falls Trail, 45.58690°N, 64.97468°W, on rotting wood on forest floor, in rocky, humid, brook ravine with rapids and falls, and mixed forest dominated by Red Spruce, Yellow Birch, Heart-leaved Birch, and Red Maple, 23 September 2013, *W.R. Buck s.n.* (NBM-MM-000233). **Charlotte Co.**: Lepreau Parish, 1.5 km NW of Little Lepreau, 45.13741°N, 66.48784°W, on bark of hardwood log cut for firewood and piled, origin of log unknown, probably southern New Brunswick, 30 September 2018, *D.W. Malloch s.n.* (NBM-MM-000211). **Northumberland Co.**: Nepisiguit PNA, near forest road, ~2.75 km SW of Popple Depot, 47.38395°N, 66.54089°W, on decaying birch bark on ground, birch, maple, fir, 14 August 2016, *V.F. Zoll 591* (NBM-MM-000107); Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on leaf litter, mixed forest with fir, 18 August 2016, *V.F. Zoll 601* (NBM-MM-000132). Cosmopolitan; apparently common globally. This species can resemble a cluster of insect eggs.

Lepidoderma carestianum (Rabenh.) Rostaf. **Albert Co.**: Caledonia Gorge PNA, W side of Rhody Brook, 45.77350°N, 64.81337°W, Canada Fly-honeysuckle, on living stem, 28 June 2011, *D.W. Malloch s.n.* (NBM-MM-000004). Probably cosmopolitan; widespread in the Northern Hemisphere, recorded for the Southern Hemisphere only from Australia and New Zealand. This species is normally found at higher elevations, usually at the edge of melting snowbanks. See notes under *D. niveum*.

Lepidoderma neoperforatum A. Kuhnt. **Northumberland Co.**: SW part of Kennedy Lakes PNA, 4.3 km NW of Upper Peaked Mountain Lake, 46.77170°N, 66.57573°W, on Mountain Maple twigs, young mixed forest of white birch, Yellow Birch, spruce, fir, maple, poplar, and cedar (saplings), 2 July 2019, *A. Carter [AB2019.07.02-10]* (NBM-MM-000216). So far known mostly from Europe (Norway, Germany, France, Austria) and the USA (Kuhnt 2017; GBIF 2022). The only North American record is a paratype collected in New Hampshire in 1909. The specimen from New Brunswick is significant considering the lack of modern records outside Europe; however, the species was only recently recognized as distinct and described by Kuhnt (2017), partly from older collections filed under other names. It is too soon to say whether the species is rare in North America or merely overlooked. Similar to *Lepidoderma perforatum* Mar. Mey. & Poulain, except for smaller perforations in the peridium. Although normally *L. neoperforatum* is a snowbank species, this collection was not made in such a habitat. See notes under *D. niveum*.

Licea minima Fr. **Northumberland Co.**: Nepisiguit PNA, W of forest road, ~7 km SSW of Popple Depot, 47.34154°N, 66.55291°W, on Jack Pine bark, forest with fir, birch, Jack Pine, 14 August 2016, *V.F. Zoll 682* (NBM-MM-000088). Cosmopolitan; frequently collected in the Northern Hemisphere. The single collection of this species was from a moist chamber culture, as is the case with most collections of *L. minima*. Because of their small size, the fruiting bodies are not usually noticed unless brought in with a collection of larger myxomycetes.

Licea operculata (Wingate) G.W. Martin. **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on moss on base of maple, mixed forest of Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 702* (NBM-MM-000165). **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~2.8 km SW of Popple Depot, 47.38266°N, 66.54118°W, on bark of Yellow Birch, hardwood forest, including maple,

and Yellow Birch, 28 June 2015, *V.F. Zoll 681* (NBM-MM-000096). **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on bryophyte-covered Balsam Fir log on ground, mixed forest with birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 728* (NBM-MM-000192); Spednic Lake PP, 45.60619°N, 67.44583°W, on hemlock bark, living tree, mixed forest with beech, hemlock, Striped Maple, Red Maple, white birch, Yellow Birch, 16 June 2018, *V.F. Zoll 740* (NBM-MM-000201). Cosmopolitan. All four of these collections were from moist chamber cultures, where it usually appears on bark.

Licea pygmaea (Meyl.) Ing. **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, with *A. cinerea* on hemlock stump, mixed forest of birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 715* (NBM-MM-000180), *V.F. Zoll 724* (NBM-MM-000183), *V.F. Zoll 727* (NBM-MM-000184); *ibid.*, on hemlock stump, *V.F. Zoll 723* (NBM-MM-000193, NBM-MM-000194); *ibid.*, on bryophyte-covered Balsam Fir log on ground, *V.F. Zoll 742* (NBM-MM-000195). Cosmopolitan; infrequently collected in North America. All these collections were from moist chamber cultures. Because of their small size, the fruiting bodies are seldom noticed in the field unless brought in with a collection of larger myxomycetes.

Licea variabilis Schrad. **York Co.**: Spednic Lake PNA, ~1.8 km NNE of N end of East Brook Lake, 45.70610°N, 67.51768°W, on decaying wood, 12 August 2017, *A. Carter [V.F. Zoll 650]* (NBM-MM-000043). Widespread in the Northern Hemisphere, and recorded from South America. This species is found on decaying wood.

Listerella paradoxa E. Jahn. **Northumberland Co.**: Nepisiguit PNA, Popple Depot 47.39766°N, 66.51409°W, on Green Reindeer Lichen (*Cladonia mitis* Sandstede), abandoned road and adjoining well-lit Jack Pine–Black Spruce forest, ground with heavy lichen cover and lots of exposed mineral soil and stones, 30 June 2015, *K. E. Driscoll 1163* (NBM-MM-000258). Widespread but apparently rare, collected in Europe, New Zealand, and from scattered locations in North America, including the USA states of California, Michigan, and West Virginia as well as Ontario, Canada (Eliasson and Gilert 1982; Stephenson *et al.* 2009; MyCoPortal 2022). It occurs on lichens in the genus *Cladonia* and other substrates.

Lycogala epidendrum (L.) Fr. **Albert Co.**: Caledonia Gorge PNA, N of Canada Creek, 45.77877°N, 64.77415°W, on surface of living moss, 2 July 2011, *K.J. Vanderwolf s.n.* (NBM-MM-000006); Caledonia Gorge PNA, 6 km WNW of Riverside Albert, E side of Rhody Brook, 45.77081°N, 64.81094°W, on mossy decaying logs next to brook, mainly beech and Yellow Birch, hardwood dominant, some Red Spruce, about 1 m from brook, 2 July 2011, *E.K. Duke EKD2011-55* (NBM-MM-000231); Fundy National Park, Dickson Falls Trail, 45.58690°N, 64.97468°W, on rotten wood, rocky, humid, brook ravine with rapids and falls, and mixed forest dominated by Red Spruce, Yellow Birch, Heart-leaved Birch, and Red Maple, 23 September 2013, *W.R. Buck s.n.* (NBM-MM-000259); Fundy National Park, Maple Grove Trail, along both sides of forest road, 45.59008°N, 64.98361°W, on wet wood of maple, hardwood forest dominated by Sugar Maple, Yellow Birch, and beech, with scattered Red Spruce and Balsam Fir, 24 September 2013, *G.J. Samuels s.n.* (NBM-MM-000265); Fundy National Park, East Branch Trail, 45.64317°N, 65.11551°W, on rotting wood, moderately open, mixed, mature forest of Yellow Birch and Red Spruce, with Heart-leaved Birch, maple, beech, and fir, 25 September 2013, *M. Burzynski s.n.* (NBM-MM-000263); *ibid.*, on bark of dead birch tree, *A.M. Bremner AB2013.09.25-09* (NBM-MM-000266). **Charlotte Co.**: Campobello Island, Herring Cove PP, E of Glensevern Road, ~0.1 km NNW of the westernmost end of Lake Glensevern, 44.86286°N, 66.93859°W, on decaying wood, birch forest, 24 September 2016, *V.F. Zoll 629* (NBM-MM-000018). **Northumberland Co.**: Nepisiguit PNA, Popple Depot, W of Nepisiguit River, 47.39718°N, 66.51435°W, on decaying spruce, with Black Spruce, Jack Pine, 26 June 2015, *V.F. Zoll 377* (NBM-MM-000139); Nepisiguit PNA, near forest road, ~3.4 km SW of Popple Depot, 47.38107°N, 66.54884°W, on decaying wood and moss, N-facing slope Nepisiguit River valley, mature hardwood forest dominated by Sugar Maple, Yellow Birch, and Striped Maple, 28 June 2015, *S.R. Clayden 25034B [V.F. Zoll 381]* (NBM-MM-000104); Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on decaying Balsam Fir log, mixed forest with fir, 18 August 2016, *V.F. Zoll 604* (NBM-MM-000135); NW part of Kennedy Lakes PNA, 3.5 km NW of Louis Lake, next to brook that runs N between Halfmoon Lake and North Branch Renous River, 46.8696°N, 66.6275°W, on rotting spruce trunk on ground, coniferous dominant forest of fir, spruce, birch, and ash, 30 June 2019, *A.M. Bremner et al. AB2019.06.30-02* (NBM-MM-000222); Kennedy Lakes PNA, S of Highway 108, 46.77093°N, 66.57540°W, on decaying wood, 2 July 2019, *J.R. Blacquiere & S. Mathé [V.F. Zoll 753]* (NBM-MM-000226). **Sunbury Co.**: Grand Lake PNA, 1.5 km NE of McGowans Corner, 45.89594°N, 66.28232°W, on rotted wood, in maple stand, 16 June 2013, *L.K. McAlpine [B.W. Malloch B20130616-02]* (NBM-MM-000152); Grand Lake

PNA, 1.5 km NE of McGowans Corner, 45.89404°N, 66.28051°W, on decorticated wood, seasonal floodplain area, stand of ash, elm, maple, and alder, 22 June 2013, *E.K. Duke ED20130622-05* (NBM-MM-000155); Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on decaying wood on ground, 10 August 2014, *V.F. Zoll 331* (NBM-MM-000060). **York Co.**: Spednic Lake PNA, W of Dead Brook, ~1 km NW of intersection of Georgia Pacific Road and Route 630, 45.67765°N, 67.46612°W, on decaying wood in deep depression with wet leaf litter, mixed forest, 15 August 2017, *E. Hines [V.F. Zoll 659]* (NBM-MM-000040); Spednic Lake PNA ~0.65 km NW of N end of Pirate Lake, 45.72276°N, 67.66444°W, on decaying log, in mixed forest including birch, conifers, hemlock, and maples, 15 June 2018, *V.F. Zoll 683* (NBM-MM-000234); Spednic Lake PNA, S end of Upper Palfrey Neck, 45.63540°N, 67.47835°W, on dead wood on ground, in hardwood forest of beech and maple, 17 June 2018, *A.M. Bremner [V.F. Zoll 685]* (NBM-MM-000236); Spednic Lake PNA, N of Georgia Pacific Road, off gravel road near Big La Coote Stream bridge, 45.69959°N, 67.49805°W, on large decorticated log, in open clearing, 18 June 2018, *V.F. Zoll 688* (NBM-MM-000239). Cosmopolitan; very common. This species is often first noticed in the early stages of fruiting by its bright candy pink colour, which later changes to yellowish brown or almost black.

Lycogala exiguum Morgan. **Albert Co.**: Caledonia Gorge PNA, 6.4 km WNW of Riverside Albert, E side of Rhody Brook, 45.77222°N, 6481361°W, on decaying log, mossy, Yellow Birch, Sugar Maple, hardwood dominant, 2 July 2011, *E.K. Duke EKD2011-68* (NBM-MM-000232). Cosmopolitan; uncommon. This species differs from *L. epidendrum* by being generally smaller, with smaller spores and a different pattern of surface scales.

Metatrichia floriformis (Schwein.) Nann.-Bremek. **Sunbury Co.**: Grand Lake PNA, 1.5 km NE of McGowans Corner, 45.89397°N, 66.28050°W, decorticated maple, seasonal floodplain area, stand of ash, elm, maple, and alder, 22 June 2013, *E.K. Duke ED20130622-06* (NBM-MM-000156). Cosmopolitan; frequently collected in both the Northern and Southern Hemispheres.

Metatrichia vesparia (Batsch) Nann.-Bremek. ex G.W. Martin & Alexop. **Sunbury Co.**: Grand Lake PNA, Fernmount, ~0.79 km S of intersection of Fernmount Road and Grub Road, 45.95860°N, 66.32943°W, core of decaying birch inside bark, 8 August 2014, *V.F. Zoll 321* (NBM-MM-000078). **York Co.**: Spednic Lake PNA, ~1.36 km NW of N end of East Brook Lake, 45.70118°N, 67.52793°W, underside of log, non-forested stream edge, 15 August 2017, *E. Hines [V.F. Zoll 661]* (NBM-MM-000042). Cosmopolitan; relatively common globally and across the USA and Canada. The name *vesparia* alludes to the resemblance of this species to paper wasp nests.

Paradiacheopsis microcarpa (Meyl.) D.W. Mitch. ex Ing. **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.48766°N, 67.37828°W, on hemlock bark, mixed forest with maple, birch, Yellow Birch, beech, fir, spruce, 23 June 2018, *V.F. Zoll 747* (NBM-MM-000208). **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~2.8 km SW of Popple Depot, 47.38266°N, 66.54118°W, on maple bark, hardwood forest, including maple, Yellow Birch, 28 June 2015, *V.F. Zoll 677* (NBM-MM-000093), *V.F. Zoll 678* (NBM-MM-000094); *ibid.*, moss on maple bark, *V.F. Zoll 680* (NBM-MM-000095); N part of Nepisiguit PNA, ~1.2 km S of Lower West Branch Portage Brook, 47.43942°N, 66.62305°W, on maple bark, living tree, forest with hardwoods, birch, and conifer, 15 August 2016, *V.F. Zoll 618* (NBM-MM-000149). **York Co.**: Spednic Lake PP, 45.60619°N, 67.44583°W, on hemlock bark, living tree, mixed forest with beech, hemlock, Striped Maple, Red Maple, white birch, Yellow Birch, 16 June 2018, *V.F. Zoll 741* (NBM-MM-000202). Scattered records across the Northern Hemisphere; apparently rare. In North America known from a single specimen collected in 1940 in Kansas, USA. All the collections of *P. microcarpa* originated from moist chamber cultures, as is usual with *Paradiacheopsis* species because of their small size. In these cultures, they often develop on bark of living trees.

Paradiacheopsis rigida (Brändza) Nann.-Bremek. **York Co.**: Spednic Lake PNA, E side of gravel road E of stream bridge, 45.69959°N, 67.49805°W, on decaying birch branch on ground, mixed forest of conifers, poplar, and white birch, 19 June 2018, *V.F. Zoll 690* (NBM-MM-000241). Scattered records across the Northern Hemisphere; uncommon, in North America known only from one record each in Mexico and Ontario, Canada (Discover Life 2022; GBIF 2022; MyCoPortal 2022). This species normally appears in moist chamber cultures on bark of living trees.

Perichaena chrysosperma (Curr.) Lister. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.25 km SE of S end of Mud Lake, 45.48967°N, 67.37869°W, on Red Maple bark, old growth forest, maple, birch, Yellow Birch, beech, fir, spruce, 15 August 2017, *B.W. Malloch [V.F. Zoll 660]* (NBM-MM-000035). **York Co.**: Spednic Lake PP, 45.60619°N, 67.44583°W, on Red Maple, living tree, mixed forest with beech, hemlock, Striped Maple, Red Maple, white birch, Yellow Birch, 16 June 2018, *V.F. Zoll 743* (NBM-MM-000203). Cosmopolitan;

common. This species is found on decaying wood and bark and on many substrates in moist chamber cultures, including old hay bales.

Perichaena corticalis (Batsch) Rostaf. **Northumberland Co.**: Nepisiguit PNA, near forest road, ~2.75 km SW of Popple Depot, 47.38395°N, 66.54089°W, on bark of Red Maple, forest with birch, maple, fir, 14 August 2016, *V.F. Zoll 619* (NBM-MM-000110). Cosmopolitan. This collection was made from a moist chamber culture. It has only sparse sporangia, although these are normally found crowded in nature.

Physarum album (Bull.) Chevall. **Albert Co.**: Caledonia Gorge PNA, 6 km NW of Riverside-Albert, Rhody Brook, 45.77396°N, 64.81462°W, on bark of dead maple branch lying on the ground, mostly hardwood stand of Sugar Maple, beech, Red Spruce, white birch, and Striped Maple, 28 June 2011, *A.M. Bremner AB2011.06.28-08* (NBM-MM-000151). **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on decaying branch, greyish-brown peeling bark, 11 August 2014, *V.F. Zoll 335* (NBM-MM-000066). Cosmopolitan. This species is similar in appearance to *Physarum viride* except the lime in the fruiting body is white rather than yellow.

Physarum bivalve Pers. **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on leaf litter, mixed forest with Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 703* (NBM-MM-000166), *V.F. Zoll 732* (NBM-MM-000167). Cosmopolitan. These two collections are from moist chamber cultures, on leaf litter. Named *bivalve* because of the species' laterally compressed shape resembling little clams.

Physarum contextum (Pers.) Pers. **Northumberland Co.**: Nepisiguit PNA, near forest road, ~2.75 km SW of Popple Depot, 47.38395°N, 66.54089°W, on decaying birch branch on ground, birch, maple, fir, 14 August 2016, *V.F. Zoll 592* (NBM-MM-000108). Cosmopolitan, but poorly known in the Southern Hemisphere; in North America, it has been frequently collected across Canada and the USA. This species is usually found on ground litter.

Physarum diderma Rostaf. (Figure 1a). **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on leaf litter, mixed forest with Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 704* (NBM-MM-000168). **Restigouche Co.**: on PNA border line, ~0.5 km from Belledune Pond, Jacquet River Gorge PNA, 47.82011°N, 65.99975°W, on stem of fern, 12 August 2010, *A.M. Bremner AB12.08.10-01* (NBM-MM-000001). Widely distributed across the Northern Hemisphere; not especially common.

Physarum flavicomum Berk. **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on bryophyte-covered fir log on ground, mixed forest with birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 735* (NBM-MM-000196). Cosmopolitan. The single collection of this species was made from a moist chamber culture.

Physarum galbeum Wingate. **Northumberland Co.**: Nepisiguit PNA, N of forest road, near brook running N toward Nepisiguit River, ~2.25 km SW of Popple Depot, 47.38704°N, 66.53635°W, on decaying poplar branch, brook off Nepisiguit River, 16 August 2016, *D.W. Malloch [V.F. Zoll 598]* (NBM-MM-000119). Mostly found in the Western Hemisphere (the Americas and Hawaii), especially the USA, with just a few collections made in Europe.

Physarum luteolum Peck. **Northumberland Co.**: Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.54360°W, on ground litter, mixed forest with Red Maple, white pine, fir, cedar, birch, 21 August 2016, *A.M. Bremner [V.F. Zoll 614]* (NBM-MM-000122). Probably cosmopolitan; most frequently found in Canada and the USA.

Physarum psittacinum Ditmar. **Charlotte Co.**: Baillie Settlement PNA, ~1 km NW of intersection of Mann Road and Route 3, 45.40220°N, 67.27095°W, on decaying branch resting on moss, mixed forest including fir, Red Maple, cedar, 16 August 2017, *V.F. Zoll 663* (NBM-MM-000024). **Northumberland Co.**: N part of Nepisiguit PNA, ~1.2 km S of Lower West Branch Portage Brook, 47.43942°N, 66.62305°W, on decaying deciduous log on ground, with hardwoods, birch, conifers, 15 August 2016, *V.F. Zoll 594* (NBM-MM-000145). Probably cosmopolitan but not recorded from Australia or New Zealand; in North America, most records are from the eastern half of Canada and the USA. Short bright orange stalks make this species easy to spot.

Physarum virescens Ditmar. **Charlotte Co.**: Campobello Island, Roosevelt Campobello International Park, Liberty Point, ~0.35 km S of the S end of Glensevern Road, 44.8317°N, 66.9290°W, on ground litter, forest of fir, birch, and mountain ash, 23 September 2016, *A.M. Bremner [V.F. Zoll 634]* (NBM-MM-000012). **Queens Co.**: Grand Lake PNA, ~0.58 km NE of Printz Cove, 45.99528°N, 66.11713°W, on pine needles, 11 August 2014, *K.J. Vanderwolf [V.F. Zoll 337]* (NBM-MM-000084). **Saint John Co.**: Black River, N of Old Black River Road, 45.26818°N, 65.80529°W, on leaf litter, 14 August 2018, *E. Hines s.n.* (NBM-MM-000210). **Sunbury Co.**: Grand Lake PNA, between Ripples and Clarks Corner, off Coy Road, ~4.7 km SE of Ripples, 45.97014°N, 66.16402°W, on dead maple leaf, fir/birch/Red Maple

forest, 12 August 2014, *A. Carter [V.F. Zoll 346]* (NBM-MM-000083). Cosmopolitan. This species has bright yellow or greenish-yellow heaped sporangia.

Physarum viride (Bull.) Pers. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~1.4 km SW of Popple Depot, 47.39109°N, 66.52703°W, on decaying twig on ground, with deadfall fir covered with moss, 18 August 2016, *V.F. Zoll 603* (NBM-MM-000134); Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.53460°W, on decaying fir log, partly decorticated, with some moss, in mixed forest with Red Maple, white pine, fir, cedar, birch, 20 August 2016, *V.F. Zoll 611* (NBM-MM-000125); Kennedy Lakes PNA, 5.8 km SW of peak of Fowler Mountain, near South Branch Renous River, 46.7923°N, 66.4772°W, on moss-covered rotting tree trunk, in young coniferous forest of fir and spruce, some deciduous trees present (birch, maple, beech), 4 July 2019, *D.W. Malloch [V.F. Zoll 760]* (NBM-MM-000227). **Queens Co.**: Grand Lake PNA, 1.25 km N of Coytown, 45.8463°N, 66.2050°W, rotten wood (probably *Alnus*), mixed forest, maple, alder, elm dominant; flat and damp, 19 June 2013, *A.M. Bremner [B.W. Malloch B20130619-02]* (NBM-MM-000154). **Sunbury Co.**: Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on dead branch of Red Maple, 10 August 2014, *V.F. Zoll 328* (NBM-MM-000057); *ibid.*, with *C. arcyrionema* on Red Maple, wood, dead branch, *V.F. Zoll 330* (NBM-MM-000059); Grand Lake PNA, between Ripples and Clarks Corner, off Coy Road, ~4.7 km SE of Ripples, 45.97014°N, 66.16402°W, on decaying wood, 12 August 2014, *V.F. Zoll 333* (NBM-MM-000081). Cosmopolitan. This species has nodding yellow sporothecae similar to those of *P. album*, except for the colour of the lime.

Reticularia splendens Morgan. **Albert Co.**: Fundy National Park, Dickson Falls Trail, 45.58690°N, 64.97468°W, on rotting wood on forest floor, rocky, humid, brook ravine with rapids and falls, and mixed forest dominated by Red Spruce, Yellow Birch, Heart-leaved Birch, and Red Maple, 23 September 2013, *W.R. Buck s.n.* (NBM-MM-000260); Fundy National Park, Maple Grove Trail, along both sides of forest road, 45.59008°N, 64.98361°W, on wet wood of maple, hardwood forest dominated by Sugar Maple, Yellow Birch, and beech, with scattered Red Spruce, and Balsam Fir, 24 September 2013, *G.J. Samuels s.n.* (NBM-MM-000261). This species is widespread in the Northern Hemisphere.

Stemonitis axifera (Bull.) T. Macbr. **Charlotte Co.**: NW part of Canoose Flowage PNA, ~2.25 km SE of S end of Mud Lake, 45.48967°N, 67.37869°W, on decaying stump of Yellow Birch, old growth forest of maple, birch, Yellow Birch, beech, fir, and spruce, 15 August 2017, *V.F. Zoll 658* (NBM-MM-000034). **Northumberland Co.**: Nepisiguit PNA, near forest road, Pentland Brook, ~7.4 km WSW of Popple Depot, 47.37904°N, 66.60507°W, on rotted log in full shade, road adjoining flood plain, mixed wood forest of spruce, fir, and poplar, 3 July 2015, *G. Bishop et al. s.n.* (NBM-MM-000103); Nepisiguit PNA, Nepisiguit River, ~5.4 km E of Popple Depot, 47.3815°N, 66.5794°W, on rotting wood, 5 July 2015, *D.F. McAlpine & S.R. Clayden s.n.* (NBM-MM-000105). Cosmopolitan; very common. This species is found on decaying wood.

Stemonitis fusca Roth (Figure 1e). **Queens Co.**: Grand Lake PNA, 1.25 km N of Coytown, 45.8464°N, 66.2050°W, rotten maple, mixed forest, maple, alder, elm dominant; flat and damp, 19 June 2013, *A. Carter [B.W. Malloch B20130619-01]* (NBM-MM-000153). **York Co.**: Spednic Lake PNA, near SW edge of Todds Island, ~0.75 km SSE from N end of island, 45.59748°N, 67.50655°W, on large fallen ash log, 17 August 2017, *S.R. Haughian [V.F. Zoll 670]* (NBM-MM-000036); Spednic Lake PNA, ~1 km E of Palfrey Stream and 1.2 km W of Route 630, 45.71584°N, 67.48369°W, on rotting birch log, mixed hardwood forest, 19 August 2017, *J. Hines [V.F. Zoll 675]* (NBM-MM-000046). **Sunbury Co.**: Portobello Creek National Wildlife Area, 1.5 km NE of McGowans Corner, 45.89725°N, 66.28226°W, decorticated wood, Silver Maple stand, 23 June 2013, *G.S. Sreedharan [B.W. Malloch B20130623-01]* (NBM-MM-000157). Cosmopolitan; very common. This species is found on decaying wood.

Stemonitis pallida Wingate. **Albert Co.**: Caledonia Gorge PNA, Crooked Creek at washed-out bridge, 45.79711°N, 64.77371°W, on fallen branch, white birch, 2 July 2011, *K.J. Vanderwolf s.n.* (NBM-MM-000007). Probably cosmopolitan; uncommon. This species is associated with decaying wood.

Stemonitopsis aequalis (Peck) Y. Yamam. **Charlotte Co.**: Campobello Island, northwestern part of Herring Cove PP, ~0.7 km NNE of intersection of Route 774 and Glensevern Road, 44.87969°N, 66.95319°W, on decaying Balsam Fir log, forest of fir, spruce, and birch, 22 September 2016, *V.F. Zoll 625* (NBM-MM-000019). Cosmopolitan; infrequently collected. This species is found on decaying wood.

Stemonitopsis cf. *hyperoptera* (Meyl.) Nann.-Bremek. **Northumberland Co.**: Nepisiguit PNA, N of Nepisiguit River and S of forest road, ~4.9 km SW of Popple Depot, 47.38529°N, 66.57273°W, on decaying bryophyte-covered log, mixed forest with maple, birch, spruce, fir, poplar, Bracken Fern, 2 July 2015, *V.F. Zoll 389* (NBM-MM-000113). This

specimen is provisionally identified because its spores do not appear to be reticulate, but it appears to otherwise fit the description of this species. *Stemonitopsis hyperoptera* is found on decaying wood, mostly in the Northern Hemisphere.

Stemonitopsis typhina (F.H. Wigg.) Nann.-Bremek. **Northumberland Co.**: 250 m E of Lower North Branch Little SW Miramichi River PNA border, 46.96844°N, 66.36342°W, on decaying wood, mixed hardwood forest of beech, birch, and spruce, 6 July 2019, *D.F. McAlpine [V.F. Zoll 758]* (NBM-MM-000220). Cosmopolitan. The silvery peridium which persists on the sporangium makes this species easy to identify. It is found on decaying wood.

Trichia affinis de Bary. **Charlotte Co.**: Canoose Flowage PNA, ~2.4 km SE of S end of Mud Lake, 45.48766°N, 67.37828°W, on underside of decaying branch on ground, mixed forest with Yellow Birch, maple, 23 June 2018, *V.F. Zoll 693* (NBM-MM-000244). Widely distributed in temperate and boreal areas, this species is associated with decaying wood and moss.

Trichia botrytis (J.F. Gmel.) Pers. **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on leaf litter, mixed forest with Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 706* (NBM-MM-000169). Cosmopolitan. The single collection of this species was from a moist chamber culture.

Trichia contorta (Ditmar) Rostaf. **Northumberland Co.**: N part of Nepisiguit PNA, ~1.2 km S of Lower West Branch Portage Brook, 47.43942°N, 66.62305°W, on moss over decaying log on ground, hardwoods, birch, conifers, 15 August 2016, *V.F. Zoll 596* (NBM-MM-000147). **York Co.**: Spednic Lake PNA, N of forest road, near Big La Coote stream bridge, 45.69959°N, 67.49805°W, on inner side of fallen trunk of Balsam Fir, in wet area near water, in mixed forest with birch, poplar, and conifers, 19 June 2018, *V.F. Zoll 686* (NBM-MM-000237); Spednic Lake PNA, W of Palfrey Stream, ~0.1 km NE from the confluence of Big La Coote Stream and Palfrey Stream, 45.701°N, 67.499°W, on bark on underside of fallen trunk of Balsam Fir, on old logging trail, in mixed forest of white birch, Yellow Birch, and Grey Birch, white pine, Balsam Fir, spruce, and poplar(?), 19 June 2018, *A.M. Bremner [V.F. Zoll 687]* (NBM-MM-000238); Spednic Lake PNA, Bolton Lake, 45.71394°N, 67.59278°W, on bark of dead branch of Red Oak, mixed forest with poplar, spruce, Yellow Birch, white birch, 21 June 2018, *V.F. Zoll 746* (NBM-MM-000207). Cosmopolitan. Associated with decaying wood and bark.

Trichia decipiens (Pers.) T. Macbr. **Northumberland Co.**: Nepisiguit PNA, N of forest road, S of Nepisiguit River, ~2.7 km SW of Popple Depot, 47.38734°N, 66.53460°W, on decaying Balsam Fir log, under bark, mixed forest with Red Maple, white pine, fir, cedar, birch, 21 August 2016, *V.F. Zoll 622* (NBM-MM-000128), *V.F. Zoll 623* (NBM-MM-000129). **York Co.**: Spednic Lake PNA, between McAllister Cove and McAllister Brook, ~0.4 km W of N end of McAllister Cove, 45.65683°N, 67.67315°W, under bark on decaying poplar branch on ground, in mixed forest with poplar, spruce, Yellow Birch, white birch, and fir, 22 June 2018, *V.F. Zoll 691* (NBM-MM-000242). Cosmopolitan. This species is associated with decaying wood.

Trichia erecta Rex. **Charlotte Co.**: 350 m NW of Canoose Flowage PNA border, 3.6 km NW of Lynnfield, 45.42639°N, 67.31766°W, on leaf litter, mixed forest with Red Maple, fir, cedar, birch, 14 June 2018, *V.F. Zoll 700* (NBM-MM-000170), *V.F. Zoll 705* (NBM-MM-000171), *V.F. Zoll 719* (NBM-MM-000172), *V.F. Zoll 721* (NBM-MM-000173), *V.F. Zoll 729* (NBM-MM-000174), *V.F. Zoll 730* (NBM-MM-000175), *V.F. Zoll 739* (NBM-MM-000176). **York Co.**: Spednic Lake PNA, trail to Pirate Lake, 45.72276°N, 67.66444°W, on moss-covered wood, mixed forest with birch, Red Maple, hemlock, fir, Striped Maple, 15 June 2018, *V.F. Zoll 726* (NBM-MM-000198). Cosmopolitan. Although this species is usually associated with decaying wood of conifers, all of the New Brunswick collections were from moist chamber cultures of leaf litter, except for one culture of moss-covered wood.

Trichia favoginea (Batsch) Pers. **Northumberland Co.**: Nepisiguit PNA, N of Nepisiguit River and S of forest road, ~4.9 km SW of Popple Depot, 47.38529°N, 66.57273°W, on decaying birch log, mixed forest on S of road, with maple, birch, spruce, fir, poplar, Bracken Fern, 2 July 2015, *V.F. Zoll 387* (NBM-MM-000111); Nepisiguit PNA, NW of forest road at brook by culvert, ~2.2 km SW of Popple Depot, 47.38753°N, 66.53629°W, under spruce and Balsam Fir, in conifer-dominated patch of forest, 25 May 2016, *A.M. Bremner AB2016.05.25-06* (NBM-MM-000130). **Sunbury Co.:** Grand Lake PNA, near western edge of Loders Creek, ~1.45 km NE of intersection of Route 105 and Route 690, 45.89592°N, 66.28224°W, on alder bark, 12 August 2014, *A. Carter [V.F. Zoll 341]* (NBM-MM-000068). Cosmopolitan, but in the tropics only found at higher elevations (Ing 1999). This species is associated with decaying wood and bark and with ground litter in moist chamber cultures.

Trichia scabra Rostaf. **Northumberland Co.**: Nepisiguit PNA, N of forest road, near brook running N toward Nepisiguit River, ~2.25 km SW of Popple Depot, 47.38704°N, 66.53635°W, on decaying

deciduous branch on ground, near beaver pond, in mature hardwood forest, 16 August 2016, *V.F. Zoll 599* (NBM-MM-000117). Cosmopolitan. This species is found on decaying wood.

Trichia varia (Pers. ex J.F. Gmel.) Pers. **Northumberland Co.**: Nepisiguit PNA, N of forest road, ~2.8 km SW of Popple Depot, 47.38266°N, 66.54118°W, on decaying moss-covered log, hardwood forest, including maple, Yellow Birch, 28 June 2015, *V.F. Zoll 393* (NBM-MM-000092). Cosmopolitan. This species is normally found on decaying wood. The single collection reported here was from a moist chamber culture.

Tubifera ferruginosa (Batsch) J.F. Gmel. **Albert Co.**: Lewis Mountain PNA, 2 km SE of Rosevale, near West Branch Turtle Creek, 45.83888°N, 64.84603°W, on rotting wood, in hardwood dominant forest of Sugar Maple and Eastern Hop-hornbeam, 1 July 2011, *E. Duke EKD2011-48* (NBM-MM-000230). **Charlotte Co.**: Campobello Island, northwestern part of Herring Cove PP, ~0.7 km NNE of intersection of Route 774 and Glensevern Road, 44.87969°N, 66.95319°W, forest with fir, spruce, birch, 22 September 2016, *J.B. Tanney [V.F. Zoll 633]* (NBM-MM-000021). **Northumberland Co.**: Nepisiguit PNA, N of Nepisiguit River, S of Melansons Gulch, near base of Mount Walker, ~11.9 km SW of Popple Depot, 47.36345°N, 66.66066°W, on decaying conifer log covered with bryophytes with Black Spruce, fir, few birch, 1 July 2015, *V.F. Zoll 385* (NBM-MM-000099); Nepisiguit PNA, N of Nepisiguit River and S of forest road, ~4.9 km SW of Popple Depot, 47.38529°N, 66.57273°W, on decaying bryophyte-covered log, mixed forest on S side of road with maple, birch, spruce, fir, poplar, Bracken Fern, 2 July 2015, *V.F. Zoll 391* (NBM-MM-000115); Nepisiguit PNA, N of forest road, near brook running N toward Nepisiguit River, ~2.25 km SW of Popple Depot, 47.38704°N, 66.53635°W, collected on moss, hardwood dominant forest of Sugar Maple, poplar, Yellow Birch, white birch, Striped Maple, and Mountain Maple with some fir and spruce, 16 August 2016, *A.M. Bremner [V.F. Zoll 613]* (NBM-MM-000120); E side of Upper Dungarvon PNA, 5.3 km SW of Grassy Lake, E side of Dungarvon River, 46.8018°N, 66.6245°W, on moss-covered rotting tree trunk, in young coniferous forest of fir and spruce, some deciduous trees present (birch, maple, beech), 5 July 2019, *A.M. Bremner AB2019.07.05-08* (NBM-MM-000213). **Saint John Co.**: City of Saint John, Saints Rest Marsh-F. Gordon Carvell Nature Preserve, 45.22515°N, 66.13831°W, hollow of tree snag, in forest at edge of salt marsh, not very mature forest of fir, spruce, white birch, and beech, 16 August 2013, *A.M. Bremner AB16.08.13-01* (NBM-MM-000159). **Sunbury Co.**: Portobello Creek National Wildlife Area, NE side of French Island at The Narrows between Portobello Creek and French Lake, 45.92429°N, 66.30027°W, on decaying log, 9 August 2014, *V.F. Zoll 342* (NBM-MM-000076). Cosmopolitan as traditionally circumscribed. Found on decaying wood and leaf litter, this is a relatively large myxomycete (up to 15 cm wide). According to Leontyev *et al.* (2015), what was considered one species may be a complex of morphologically similar species. One specimen (NBM-MM-000021) is placed here with some hesitation. It fits *T. ferruginosa* in most respects; however, the shape of its pseudoaethalium resembles that of *Tubifera dimorphotheca* Nann.-Bremek. & Loer.

Discussion

The findings of this study can be usefully compared with those of Stephenson *et al.* (2020), who analyzed the diversity and relative abundance of myxomycetes in the eastern USA. Their study was based on 58 594 digitized occurrence records of 460 species from 32 states, and they assigned species to four abundance categories: very abundant (>3% of all records), less abundant (>1.5% to <3% of all records), occasional (>0.5% to <1.5% of all records), and rare (<0.5% of all records). All 11 species categorized by Stephenson *et al.* (2020) as very abundant (*A. cinerea*, *A. denudata*, *L. epidendrum*) or "less abundant" (*F. septica*, *H. calyculata*, *H. clavata*, *M. vesparia*, *P. viride*, *S. fusca*, *S. axifera*, and *T. favoginea*) were also found in our surveys in New Brunswick. However, several of these species were represented in New Brunswick by only one or a few records, including *A. denudata* by one collection, *M. vesparia* by two, and *T. favoginea* by three. Thirty-nine additional species were found by Stephenson *et al.* (2020) to be occasional in the eastern USA, and the remainder were rare. Of the 39 occasional species, 22 were found in New Brunswick.

Of the seven species of slime mould reported for New Brunswick by Wehmeyer (1950), two (*M. crustacea* and *P. cinereum*) are common globally (Martin and Alexopoulos 1969) but were not found in our current study. *Siphoptychium casparyi*, a widely distributed but uncommon species (Martin and Alexopoulos 1969) reported by Wehmeyer (1950), and *F. muscorum* reported by Hay (1903), as *F. ochracea*, also were not detected in the current study.

In the neighbouring state of Maine, USA, 166 species have been recorded (Zoll and Stephenson 2015). The highest numbers of collections are from three counties in the southeast and centre of the state, reflecting a concentration of centres for research and teaching in biology and natural history (University of Maine, Eagle Hill Institute, and Acadia National Park). Similar to New Brunswick, Maine is more than 80% forested and is largely situated in the transition

zone between eastern Canadian boreal forests and the mixed hardwood forests of the eastern USA. There are no comparable, recently published checklists of myxomycetes for any province in eastern Canada, although many collection records have been posted on online databases. The website of Mycoquébec lists 184 slime moulds that are known in Quebec (Landry and Labbé 2022) but does not include specimen citations. Gourley (1983) included 57 species of slime moulds in a checklist of the fungi of Nova Scotia. However, most of these species and the specimens on which the records are based were already reported for Nova Scotia by Wehmeyer (1950). Twenty of the myxomycete species on the Nova Scotia list (Gourley 1983) have not been detected in New Brunswick.

These comparisons indicate that much more research and larger sample sizes are needed before firm conclusions can be drawn about the diversity, relative abundance, and distributions of slime mould species in New Brunswick. Our study has focussed on their diversity in relatively intact mature forest communities in protected areas. We are unable to assess whether younger and/or managed forests in the province have lower species richness or different assemblages of species. However, the association of many myxomycetes with substrates that are especially well represented in older forests (e.g., rotting logs and other dead wood, deep litter layers, and bryophyte mats) makes it very likely that the PNAs and other such protected areas are important for conserving myxomycete diversity in New Brunswick.

This is the first formal publication on the myxomycetes of New Brunswick in more than 70 years, adding 77 species to the seven that were previously reported. Future fieldwork is planned to cover additional PNAs in New Brunswick (McAlpine 2022). Together with studies of historical collections, those surveys will undoubtedly add to the number of species known to occur in the province.

Author Contributions

Conceptualization: V.F.Z., A.M.B., and S.R.C.; Investigation: V.F.Z., A.M.B., S.R.C., K.E.D., B.W.M., and D.W.M.; Data Curation: A.M.B., K.E.D., and V.F.Z.; Writing – Original Draft: V.F.Z., A.M.B., S.R.C., and K.E.D.; Writing – Review & Editing: V.F.Z., A.M.B., S.R.C., K.E.D., A.J., B.W.M., and D.W.M.

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