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Studies on the Bryophytes of Southern Manitoba.

IV. Collections from Bird's Hill Provincial Park

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Abstract. One hundred and seventeen taxa of bryophytes were collected in Bird's Hill Provincial Park, Manitoba. Habitats sampled included ditches, streams, marshes, moist clay banks, dry grassland, and areas forested by black spruce, tamarack, white cedar, white spruce, aspen, balsam poplar, and bur oak. *Cephalozia catenulata*, *Platydictya confervoides*, *P. subtile*, and *Thuidium minutulum* are new records for the province.

Introduction

Bird's Hill Provincial Park lies approximately 24 kilometers northeast of downtown Winnipeg. Approximately 36 square kilometers in extent, it is bounded on all sides by private, usually partly developed land. Much of the central upland part of the park, which had already been cleared and farmed before establishment of the park in 1964, has now been developed for recreational purposes.

Bird's Hill itself, occupying most of the park, rises about 30 kilometers above the surrounding alluvial plain. It consists of coarse-textured glacio-fluvial deposits on limestone and dolomite, and was formerly an island in glacial Lake Agassiz (Ehrlich et al. 1953).

A considerable part of the park is occupied by scrubby aspen-oak forest (*Populus tremuloides*² - *Quercus macrocarpa*), with jack pine only occasional on the coarse glacial till of the upland areas. Interspersed in this forest are small areas of prairie and scrub, sometimes of fire origin. Coniferous forest is only a minor constituent of the park vegetation. In the wet, poorly-drained depressions, especially in the western and northern parts of the park, black spruce (*Picea mariana*) and tamarack (*Larix laricina*) forest has developed on deep layers of peat. Much of the northern area is inaccessible because of excessive wetness. White spruce (*Picea glauca*) occurs in isolated areas of mixedwood on better drained but periodically wet sites, and occasionally on well-drained up-

land sites. White cedar (*Thuja occidentalis*) occurs as small, isolated populations on mesic-wet sites in the western part of the park.

The only bryophyte previously recorded for the park is "Sphagnum moss" (National Audubon Society 1966). However, a study of the distribution of terrestrial bryophytes in a black spruce bog has been made by the authors (Stringer and Stringer, 1973).

The present study was carried out chiefly in May and June 1972. Collections were made at 35 sites (Figure 1). Much of the northern part of the park remained flooded throughout the summer, and site 11 (Figure 1) was the only part of this area that could be visited. Collections from site 11 were made in late August.

Bryophytes Collected

A total of 117 taxa were collected from Bird's Hill Provincial Park; these are listed. Nomenclature of the Eubrya and Sphagnobrya follows Crum et al. (1965). Nomenclature of Mniaceae follows Koponen (1968, 1971). Hepatic nomenclature follows Schuster (1953, 1966, 1969), with abbreviations of authorities modified to conform with the list of Sayre et al. (1964).

Hepaticae

Blepharostoma trichophyllum (L.) Dum.
Cephalozia catenulata (Hüb.) Spruce
Cephalozia media Lindb.
Cephaloziella rubella (Nees) Warnst.
Chiloscyphus pallescens (Ehrh.) Dum.
Chiloscyphus polyanthus (L.) Corda
Frullania eboracensis Gott.
Jamesoniella autumnalis (DC.) Steph.
Lophocolea bidentata (L.) Dum.

²Vascular plant nomenclature follows Scoggan (1957).

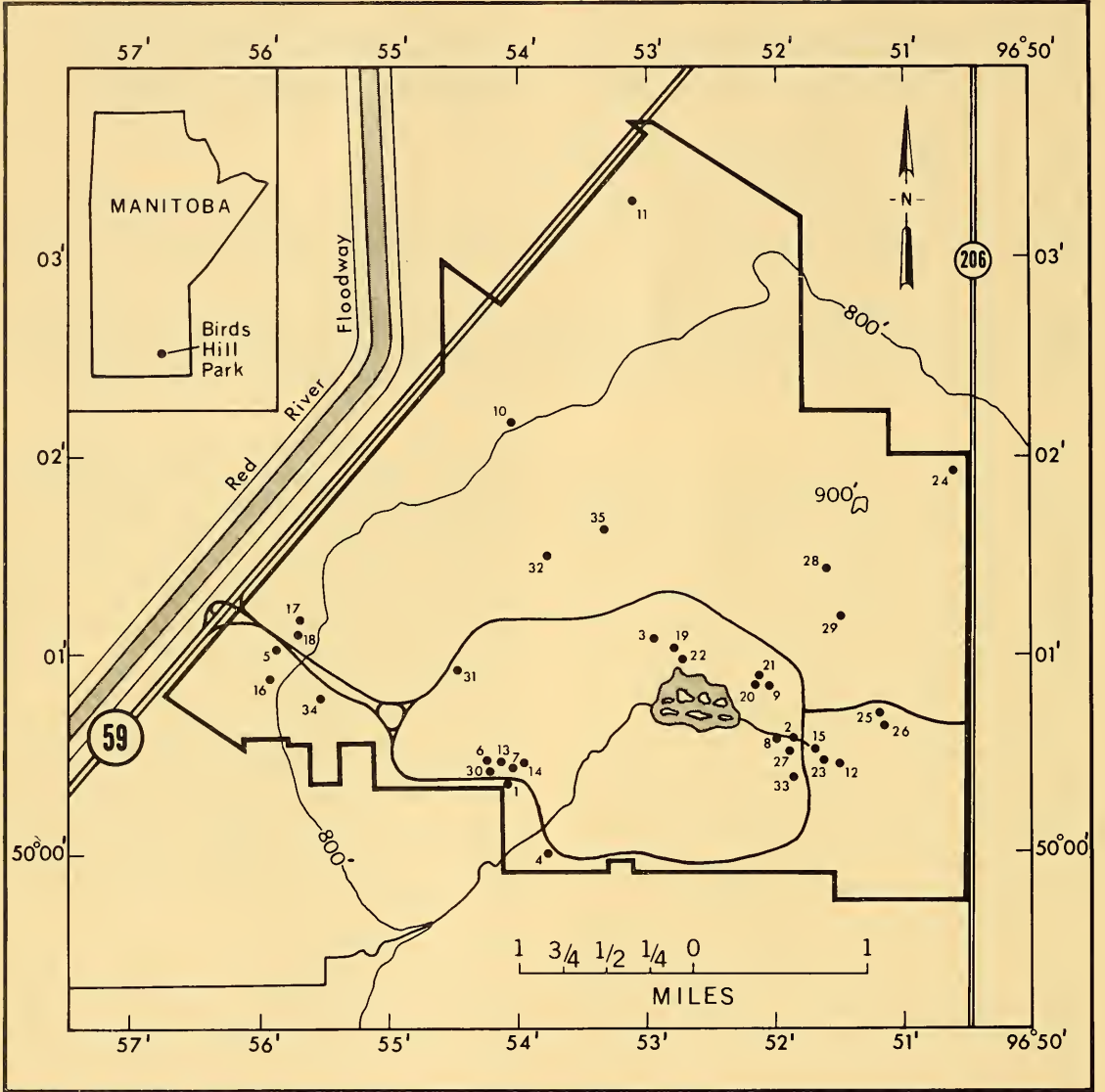


FIGURE 1. Bird's Hill Provincial Park, Manitoba, showing locations of collecting sites 1-35.

Lophocolea heterophylla (Schrad.) Dum.
Lophocolea minor Nees
Marchantia polymorpha L.
Porella platyphylla (L.) Lindb.
Ptilidium ciliare (L.) Nees
Ptilidium pulcherrimum (Web.) Hampe
Radula complanata (L.) Dum.
Riccardia latifrons (Lindb.) Lindb.
Riccardia palmata (Hedw.) Carruth.
Riccardia pinguis (L.) S. Gray
 Sphagnobrya
Sphagnum capillaceum (Weiss) Schrank
Sphagnum squarrosum Sw. ex Crome

Eubrya
Amblystegium juratzkanum Schimp.
Amblystegium serpens (Hedw.) B.S.G.
Amblystegium varium (Hedw.) Lindb.
Aulacomnium palustre (Hedw.) Schwaegr.
Astomum muehlenbergianum (Sw.) Grout
Barbula convoluta Hedw.
Barbula fallax Hedw.
Barbula unguiculata Hedw.
Brachythecium acuminatum (Hedw.) Rau and Herv.
Brachythecium campestre (C. Müll.) B.S.G.
Brachythecium collinum (Schleich. ex C. Müll.) B.S.G.
Brachythecium rutabulum (Hedw.) B.S.G.

- Brachythecium salebrosum* (Web. and Mohr) B.S.G.
Brachythecium starkei (Brid.) B.S.G.
Brachythecium velutinum (Hedw.) B.S.G.
Bryoerythrophyllum recurvirostrum (Hedw.) Chen.
Bryum angustirete Kindb. ex Mac.
Bryum argenteum Hedw.
Bryum caespiticium Hedw.
Bryum creberrimum Tayl.
Bryum pallescens Schleich. ex Schwaegr.
Bryum pseudotriquetrum (Hedw.) Gaertn., Meyer and Scherb.
Bryum stenotrichum C. Müll.
Callicladium haldanianum (Grev.) Crum
Calliogeron giganteum (Schimp.) Kindb.
Campyllum chrysophyllum (Brid.) J. Lange
Campyllum hispidulum (Brid.) Mitt.
Campyllum stellatum (Hedw.) C. Jens.
Ceratodon purpureus (Hedw.) Brid.
Climacium dendroides (Hedw.) Web. and Mohr
Dicranella schreberiana (Hedw.) Schimp.
Dicranella varia (Hedw.) Schimp.
Dicranum polysetum Sw.
Distichum capillaceum (Hedw.) B.S.G.
Drepanocladus aduncus (Hedw.) Warnst.
Drepanocladus aduncus (Hedw.) Warnst. var. *kneiffii* (B. S. G.) Mönk.
Drepanocladus aduncus (Hedw.) Warnst. var. *polycarpus* (Bland. ex Voit) Roth
Drepanocladus fluitans (Hedw.) Warnst.
Drepanocladus revolvens (Sw.) Warnst.
Drepanocladus sendtneri (Schimp.) Warnst.
Drepanocladus uncinatus (Hedw.) Warnst.
Encalypta procera Bruch
Eurhynchium pulchellum (Hedw.) Jenn.
Fissidens osmundioides Hedw.
Funaria hygrometrica Hedw.
Grimmia alpicola Hedw.
Grimmia apocarpa Hedw.
Haplocladium microphyllum (Hedw.) Broth.
Hedwigia ciliata (Hedw.) P. Beauv.
Helodium blandowii (Web. and Mohr) Warnst.
Hylocomium splendens (Hedw.) B. S. G.
Hypnum cupressiforme Hedw.
Hypnum cupressiforme Hedw. var. *resupinatum* (Wils.) Schimp.
Hypnum lindbergii Mitt.
Hypnum pallescens (Hedw.) P. Beauv.
Hypnum pratense Koch ex Spruce
Hypnum revolutum (Mitt.) Lindb.
Isopterygium turfaceum (Lindb.) Lindb.
Leptobryum pyriforme (Hedw.) Wils.
Leptodictyum brevipes (Card. and Thér. ex Holz.) Broth.
Leptodictyum riparium (Hedw.) Warnst.
Leptodictyum trichopodium (Schultz) Warnst.
Leptodictyum trichopodium (Schultz) Warnst. var. *kochii* (B. S. G.) Broth.
Leskea polycarpa Hedw.
Mnium spinulosum B. S. G.
Myurella julacea (Schwaegr.) B. S. G.
Oncophorus wahlenbergii Brid.
Orthotrichum obtusifolium Brid.
Orthotrichum pumilum Sw.
Orthotrichum speciosum Nees ex Sturm
Philonotis fontana (Hedw.) Brid.
Physcomitrium pyriforme (Hedw.) De Not.
Plagiomnium cuspidatum (Hedw.) Kop.
Plagiomnium drummondii (Bruch and Schimp.) Kop.
Plagiomnium rostratum (Schrad.) Kop.
Plagiomnium rugicum (Laur.) Kop.
Plagiothecium denticulatum (Hedw.) B. S. G.
Platydictya confervoides (Brid.) Crum
Platydictya subtile (Hedw.) Crum
Platygyrium repens (Brid.) B. S. G.
Pleurozium schreberi (Brid.) Mitt.
Pohlia nutans (Hedw.) Lindb.
Pohlia wahlenbergii (Web. and Mohr) Andr.
Polytrichum juniperinum Hedw.
Ptilium crista-castrensis (Hedw.) De Not.
Pylaisiella polyantha (Hedw.) Grout
Rhodobryum roseum (Hedw.) Limpr.
Rhynchostegiella compacta (C. Müll.) Loeske
Tetraphis pellucida Hedw.
Thuidium delicatulum (Hedw.) B. S. G.
Thuidium delicatulum (Hedw.) B. S. G. var. *radicans* Crum, Steere and Anderson
Thuidium minutulum (Hedw.) B. S. G.
Thuidium recognitum (Hedw.) Lindb.
Timmia megalopolitana Hedw.
Tomenthypnum nitens (Hedw.) Loeske
Tortula ruralis (Hedw.) Gaertn, Meyer and Scherb.

Our annotated list of bryophytes collected from Bird's Hill Provincial Park is available, at a nominal charge from the Depository of Unpublished Data, National Science Library, National Research Council of Canada, Ottawa, Canada K1A 0S2. Voucher specimens have been deposited in the authors' own herbarium and at the University of Winnipeg.

Common Bryophyte Species

Sites 1–4 — open ditches, and clay banks of shallow, slow-running streams, bordered by *Carex* spp. and *Typha latifolia*.

Here *Dicranella varia* and *Riccardia pinguis* were common on wet silt and clay banks. *Riccardia pinguis* is described by Schuster (1957) as a common species of moist calcareous areas. Its abundance in Bird's Hill Park is probably a reflection of the predominantly calcareous nature of the bedrock in the park (Ehrlich et al. 1953). *Pohlia wahlenbergii*, *Philonotis fontana*, and *Marchantia polymorpha* were also fairly common along ditches, while on the drier banks *Dicranella schreberiana* and *Barbula unguiculata* were frequent.

In the ditches and in moist habitats along the streams, as in most other wet or moist sites in the park, *Drepanocladus* spp. and *Leptodictyum* spp. were frequent and often abundant. *Drepanocladus aduncus* var. *polycarpus* was by far the most common member of the genus, although *D. aduncus* (*typicus*), *D. revolvens*,

and *D. sendtneri* were locally abundant. *Leptodictyum trichopodium* var. *kochii* was also common, *L. trichopodium*, *L. brevipes* and *L. riparium* less so. Several other pleurocarps, especially *Brachythecium rutabulum*, *Campylium stellatum*, and *Amblystegium juratzkanum* were often found growing among *Drepanocladus* spp.

On the more exposed, drier clay banks, small acrocarps were prominent, notably *Barbula convoluta*, *B. fallax*, *Bryum creberrimum*, and *Bryum stenotrichum*. A number of species of wide ecological amplitude, e.g. *Ceratodon purpureus*, *Leptobryum pyriforme*, were prominent on dry banks but could also be found at most of the other sites visited.

Sites 5–9 — *Carex* marshes with hummocks and small open pools, often with *Typha*, and a shrub layer of *Salix* spp., *Cornus stolonifera*, and *Ledum groenlandicum* (7).

In these sites, *Drepanocladus aduncus* var. *polycarpus* and *Campylium stellatum* were abundant, while *Hypnum lindbergii* and *Plagiomnium rugicum* were also fairly common. Typical wetland species such as *Sphagnum capillaceum* and *Tomenthypnum nitens* were sometimes abundant.

Sites 10–14 — bog forest (see Figure 2) dominated by black spruce and tamarack (10, 11, 13, 14) or white spruce and tamarack (12), often with a *Sphagnum* or *Carex* hummock-hollow topography and a tall shrub stratum of *Cornus stolonifera*, *Salix* spp., and *Betula occidentalis* (11).

These collecting areas had the highest bryophyte cover and the largest number of species of all the sites visited. Deadfall in advanced stages of decay was frequent, and carried a high moss cover (see Figure 3).

There was a relatively large number of hepatics, many apparently confined to rotten wood, where *Lophocolea heterophylla*, *L. bidentata*, *Chiloscyphus pallescens*, *C. polyanthus*, and *Cephalozia media* were most frequent. Less often were found *Blepharostoma trichophyllum*, *Cephaloziella rubella*, *Frullania eboracensis*, *Lophocolea minor*, *Jamesoniella autumnalis*, and *Porella platyphylla*. *Ptilidium pulcherrimum* was common on both live and fallen bark, while

Radula complanata was found on bark of black spruce and white cedar.

In almost all of the forested sites (10–28), the following species were common: *Platygyrium repens*, *Pylaisiella polyantha*, *Ceratodon purpureus*, *Campylium hispidulum*, *C. chrysophyllum*, *Brachythecium salebrosum*, *B. rutabulum*, *B. campestre*, *Amblystegium juratzkanum*, *A. serpens*, *Plagiomnium cuspidatum*, and *P. rugicum*. They were most prominent in the drier areas (24–28) where they were largely restricted to rotten wood. In more mesic forests they occurred mainly on dry hummock tops or stumps.

In the wetter forested sites, several species formed a conspicuous part of the ground cover, e.g. *Thuidium recognitum*, *Climacium dendroides*, *Tomenthypnum nitens*, and *Helodium blandowii*. *Sphagnum capillaceum* and *S. squarrosus* were also common.

A number of species were found almost exclusively in black spruce-dominated forests. These included *Hylocomium splendens*, *Pleurozium schreberi*, *Hypnum pratense*, *Plagioteichium denticulatum*, *Platydictya subtile*, and *Myurella julacea*.

Orthotrichum speciosum, *O. obtusifolium*, and *O. pumilum* were quite common as epiphytes on the trees in wet-mesic forested areas, *O. speciosum* being particularly common in the wetter sites.

A few small acrocarps occurred characteristically on rotten wood, e.g. *Oncophorus wahlenbergii*, *Tetraphis pellucida*, and *Pohlia nutans*, mixed sometimes with the pleurocarp *Haplocladium microphyllum*.

Sites 15–23 — wet-mesic forest, usually dominated by white spruce and balsam poplar (*Populus balsamifera*) except in 16 and 17 where the dominants were white spruce – white cedar and white cedar – balsam poplar respectively. Most sites had evidence of logging and a considerable amount of deadfall.

The bryophyte species collected in these sites were largely the same as those common in the black spruce areas although cover was considerably less and the number of species reduced. Hepatics in particular were much



FIGURE 2. Site 13, a black spruce bog forest, with a few tamarack bordering the willow - sedge marsh in the foreground.



FIGURE 3. Forest floor of site 13, showing deadfall and a large patch of *Thuidium recognitum* (right center). Prominent understory vascular species are *Rubus pubescens*, *Cornus canadensis*, and *Carex* spp.

scarcer although several collections were made of *Lopocolea* spp. and *Chiloscyphus* spp.

Thuidium recognitum and *Climacium dendroides* were still prominent in the moister sites, while *Brachythecium* spp., *Plagiomnium* spp., *Amblystegium* spp., and *Eurhynchium pulchellum* were usually conspicuous.

Sites 24-28 — upland, usually xeric, mixed-wood forest dominated by white spruce, aspen, oak, and by balsam poplar (24). *Juniperus communis* was the dominant shrub in 25 and 26, while *Corylus americana*, *Prunus virginiana*, and *Amelanchier alnifolia* were prominent in others.

These forests had a relatively poor bryophyte flora, consisting chiefly of common pleurocarps on rotten wood.

Liverworts were very rare. However, the only collection of *Ptilidium ciliare* in the park was made at site 25 where several large patches were found.

Polytrichum juniperinum was frequent, along with small acrocarps such as *Bryum* spp.

Sites 29-35 — granite boulders (29), and dry, sandy grassland (32, 33), sometimes crossed by trails (31), spring flooded (30), or recently burnt (35); site 34 was an abandoned gravel pit with limestone and dolomite till.

In the dry grassland areas almost all of the rather sparse bryophyte cover consisted of short turf mosses such as *Bryum argenteum*, *B. creberrimum*, *B. caespiticium*, *Barbula convoluta*, *Tortula ruralis*, *Encalypta procera*, and *Ceratodon purpureus*, with *Funaria hygrometrica* abundant in recently burnt areas.

Spring-flooded grasslands often had a considerable cover of *Drepanocladus aduncus* var. *polycarpus*.

The only bryophytes found on rocks were *Grimmia apocarpa* and *Hedwigia ciliata*. One collection of *Grimmia alpicola* was also made on an isolated granite boulder at site 26.

One collection of *Astomum muehlenbergianum* was made at site 35. This species has been reported only once previously for Manitoba (Longton 1972) for the Carberry area in the southwestern part of the province.

New Records

Four new records were made for the province: *Cephalozia catenulata*, *Platydictya confervoides*, *P. subtile*, and *Thuidium minutulum*.

Platydictya confervoides was found once on thin humus on a granite rock at site 26. Grout (1932) gives its distribution (as *Amblystegiella confervoides*) as New England, southeastern Canada, along the Great Lakes, and in the Rocky Mountains. As no records are listed by Bird (1966) for Saskatchewan or Alberta, the Bird's Hill collection appears to be the first from the prairie provinces, and a western extension of the species' range in Canada.

Platydictya subtile was fairly common on tree bases in black spruce – tamarack forests. Grout (1932) gives its range (as *Amblystegiella subtilis*) as follows: southern Canada and northern U.S., west to Minnesota and Wisconsin, New Jersey, Pennsylvania, Ohio, and Illinois. No records are given by Bird (1966) for the prairie provinces. The present report thus represents a northwestern extension of the range.

One collection of *Thuidium minutulum* was made on humus and well-rotted wood at site 16. According to Grout (1932), this species is most common in the southern United States, although it ranges as far north as Minnesota and

New Brunswick. The present record extends its northwestern range.

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