
AN ANALYSIS OF *MEESIA* (MEESIACEAE, MUSCI) IN ARCTIC NORTH AMERICA AND GREENLAND

Marc Favreau

225, rue Léopold, Longueuil (Québec) J4H 3T6, Canada
[marc.favreau@tps-gc-pwgsc.gc.ca]

Guy R. Brassard

1270, Alloway Crescent, Ottawa (Ontario) K1K 3Z1, Canada
[mossguy@cyberus.ca]

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Résumé – Nous présentons une analyse des quatre espèces du genre *Meesia* signalées au Groenland et dans les zones arctiques d'Amérique du Nord. Dans cette région, le *Meesia uliginosa* et le *Meesia triquetra* sont assez communs et largement répandus, tandis que le *Meesia longiseta* est relativement rare. On connaît encore mal le *Meesia hexasticha* en Amérique du Nord, où l'espèce est rare et limitée au Bas-Arctique. Tant que la situation taxonomique du *Meesia hexasticha* n'aura pas été étudiée avec soin à l'échelle mondiale, il vaut mieux ne pas exclure cette espèce de la flore du continent. Par ailleurs, nous signalons pour la première fois des spécimens synoïques du *Meesia triquetra*.

Mots-clés : mousses, *Meesia*, *Meesia hexasticha*, *Meesia longiseta*, *Meesia uliginosa*, *Meesia triquetra*, arctique, Amérique du Nord, Groenland.

Abstract – An analysis of the four species of *Meesia* known to occur in arctic North America and Greenland is presented. In the area, *Meesia uliginosa* and *Meesia triquetra* are quite common and widely distributed, while *Meesia longiseta* is relatively rare. *Meesia hexasticha* has been misunderstood in North America, where it is rare and limited to low-arctic regions. Until the taxonomic status of *Meesia hexasticha* is carefully studied on a world-wide basis, this species should not be excluded from the flora of the continent. Synoicous specimens of *Meesia triquetra* are here reported for the first time.

Key words: mosses, *Meesia*, *Meesia hexasticha*, *Meesia longiseta*, *Meesia uliginosa*, *Meesia triquetra*, arctic North America, Greenland.

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This analysis of the moss genus *Meesia* is based on a manuscript on the family Meesiaceae which was submitted in 1987 for the Illustrated Moss Flora of Arctic North America and Greenland series (Mogensen, 1985), but was never published, due to the discontinuation of that project in the late 1980's. The area covered includes Greenland and those regions of North America located north of the tree line.

The genus *Meesia* belongs to the family Meesiaceae, which includes 4 other genera. *Neomeesia*, with the single species *Neomeesia paludella* (Besch.) Deguchi, is known only from southern Chile (Deguchi, 1983), while *Amblyodon*, *Paludella* and *Leptobryum* are each represented by a single species in our area. *Amblyodon dealbatus* (Sw. ex Hedw.) Bruch & Schimp. is a boreal and montane moss which has a discontinuous distribution in the northern hemisphere and also occurs in southernmost South America (Ochyra, 1992); we have seen specimens from low-arctic regions of western North America, and the species is also reported from Greenland (Nyholm, 1998). *Paludella squarrosa* (Hedw.) Brid. has a wider and more continuous circumboreal distribution (Abramova, 1956); we have seen specimens from across

arctic North America, where the species barely reaches the high arctic. *Leptobryum* was recently moved from the Bryaceae to the Meesiaceae on the basis of DNA sequencing (e.g. Cox and Hedderson, 1999). One species, the cosmopolitan *Leptobryum pyriforme* (Hedw.) Wilson, occurs in our area, having been reported from Alaska (Steere, 1978) and Greenland (Nyholm, 1993) as well as all provinces and territories of Canada (Ireland *et al.*, 1987). The four genera of Meesiaceae occurring in our area are quite diverse morphologically, but the axillary hairs provide characters that are common to all four, including *Leptobryum* and *Meesia* (Zolotov and Ignatov, 2001).

The following descriptions of the genus *Meesia* and its various species are based on the study of 180 specimens of *Meesia* from across arctic North America and Greenland, as well as a few European specimens of *Meesia hexasticha*, for comparison.

Meesia Hedw., Spec. Musc. 173. 1801, *nom. cons.* -
Lectotype: *Meesia longiseta* Hedw.

Plants in dark green or yellowish green tufts, sometimes forming cushions or even extensive mats. Stems simple,

or slightly branched, with papillose rhizoids; stem cross section with small, thin-walled epidermal cells, small, very thick-walled outer cortical cells, large, thin-walled inner cortical cells, and a distinct central strand. Leaves erect to squarrose-spreading when wet; costa strong, percurrent or subpercurrent; margins plane or revolute, entire to serrate; lamina cells smooth or mammillose, incrassate, short-rectangular to hexagonal; basal cells larger and thinner-walled, especially towards costa. Dioicous, autoicous or synoicous.

Setae single, smooth, often very long. Capsules yellow to brown, smooth, elongate-pyriform to subglobose, arcuate from an erect neck; exothecial cells incrassate and collenchymatous on ventral side, thin-walled and larger on dorsal side; operculum convex, conic, or very shortly rostrate; annulus thin or rudimentary, fragile, the fragments usually adhering to the operculum and the capsule rim; exostome teeth blunt or truncate, much shorter than the endostome; endostome segments long and thin, perforate, with irregular margins; basal membrane short; cilia short or rudimentary.

Even in the absence of sporophytes, *Meesia* can readily be distinguished from the other genera of Meesiaceae. In *Amblyodon*, the upper lamina cells are long-hexagonal, lax, and thin-walled, while in *Meesia* they are irregularly rectangular, and incrassate. In *Paludella*, the leaves are strongly squarrose-recurved, with the margins revolute, and the lamina cells are mammillose and unipapillose, while in *Meesia* the leaves are erect, or squarrose-spreading and then with the margins flat throughout, and the lamina cells are smooth or mammillose, but not papillose. In *Leptobryum*, the leaves are narrowly lanceolate and long-acuminate, about 10 times longer than wide, with the costa filling most of the upper half, while in *Meesia* they are variously ovate, triangular, ligulate or oblong-lanceolate, 2 to 5 times longer than wide, with the costa strong but not occupying more than half of the upper leaf width.

The genus *Meesia* includes about 6 species growing in wet and usually nutrient-rich habitats. It is known from all continents, except Africa. Four of the species occur in arctic North America and Greenland, and material from that area can be separated with the following key. All four species were illustrated by Nyholm (1998).

Key to *Meesia* in arctic North America and Greenland

- (1) Leaves serrate, in 3 distinct rows *Meesia triquetra*
- (1) Leaves entire or slightly denticulate near tip, not in distinct rows (2)
- (2) Leaf margins plane or slightly recurved near middle; leaves ovate or broadly lanceolate
..... *Meesia longiseta*
- (2) Leaf margins revolute or recurved along most of leaf length; leaves triangular, long-triangular, or ligulate (3)
- (3) Leaves non-decurrent to shortly decurrent, usually ligulate with a rounded tip, occasionally triangular with a pointed tip; costa usually more than 0.4 the width of the leaf base; upper costa cross sections with inner cells mostly angular-rhomboidal, and larger than the ventral and dorsal cells *Meesia uliginosa*
- (3) Leaves decurrent, triangular to long-triangular, pointed at tip; costa less than 0.4 the width of the leaf base; upper costa cross sections with 1 or 2 rows of enlarged ventral cells, 1 row of enlarged dorsal cells, and smaller, thicker-walled, and rounded inner cells *Meesia hexasticha*

Meesia hexasticha (Funck) Bruch

Flora 9: 163, 165. 1826. - *Diplocomium hexastichum* Funck, Deutschl. Moose 43. 1820.

Meesia hexagona Albertini in Funck, l.c., nom. nud. in synon.

Meesia longiseta var. *hexasticha* (Funck) Schwaegr. ex Hüb., Musc. Germ. 715. 1833, nom. inval. in synon.

Meesia albertinii Bruch & Schimp., Bryol. Eur. 4: 15, pl. 310. 1841.

Stems 0.5-5.0 cm long, and up to 7 cm long in northern Quebec according to Faubert (pers. comm.). Leaves triangular or long-triangular, with the sides rounded only near base, widely, but often shortly, decurrent, 1.8-3.5 mm long, 0.5-0.9 mm wide, stiff, erect-spreading to

almost appressed; margin recurved to strongly revolute along most of its length, entire or subentire; costa subpercurrent or percurrent, 0.15-0.35 the width of leaf at base, in cross section with 1 or 2 rows of enlarged ventral cells, 1 row of somewhat enlarged dorsal cells, and smaller, thicker-walled, and rounded inner cells; lamina cells smooth or mammillose, rectangular, 15-60 µm long, 12-22 µm wide. According to Nyholm (1998), the species is autoicous or synoicous.

Setae 2.0-4.0 cm long; capsules yellowish or reddish brown, arcuate from an erect neck, 1.5-2.5 mm long including the neck, 0.7-1.2 mm wide; annulus very rudimentary; exostome teeth thin, yellowish or almost

transparent, 0.15-0.30 the length of endostome; endostome segments long, yellowish brown; cilia short. Spores 43-49 µm.

Meesia hexasticha may be closely related to *Meesia uliginosa*, and is often difficult to distinguish from forms of this species with pointed leaves and unusually narrow costae. *Meesia hexasticha* may prove to represent an extreme form of the variable *Meesia uliginosa*, but it should not be excluded from the flora until both taxa are closely examined on a world-wide basis.

The most reliable distinguishing characters are offered by the costal anatomy. *Meesia hexasticha* has one or two rows of enlarged ventral cells, one row of somewhat enlarged dorsal cells, and inner cells smaller and thicker-walled, with the lumina rounded and more or less isodiametric. *Meesia uliginosa* has one row of small ventral and dorsal cells, and most inner cells larger, irregularly angular-rhomboidal. Cross sections should be taken at various distances from the leaf base, since the costal anatomy of *Meesia hexasticha* is usually less developed towards the leaf base, while in *Meesia uliginosa* the angular and enlarged inner costal cells are often less distinct towards the leaf apex. The wide leaf decurrencies of *Meesia hexasticha* may be helpful in recognizing the species, but some specimens of *Meesia uliginosa* also have well developed (but usually narrow) decurrencies.

From *Meesia longiseta*, *Meesia hexasticha* is most easily distinguished by the shape of the leaves. These are triangular or long-triangular (with the sides mostly rectilinear, rounded only near leaf base), while the leaves of *Meesia longiseta* are ovate or ovate-lanceolate (with the sides rounded along most of their length). In *Meesia hexasticha*, the leaf margins are strongly revolute or at least clearly recurved throughout, while in *Meesia longiseta* they are plane, or slightly recurved in places. The costal anatomy of *Meesia longiseta* is similar to that of *Meesia hexasticha*, but there is always only one row of enlarged ventral cells. The very short exostome of *Meesia hexasticha* has often been mentioned as a diagnostic character, but one specimen from Baffin Island (*Brassard 14565*, NFLD) has an exostome as long as that of *Meesia longiseta*.

The few arctic North American collections of *Meesia hexasticha* are from various types of wet habitats, and associated with other mosses, such as *Aulacomnium turgidum* (Wahlenb.) Schwägr., *Catoscopium nigrum* (Hedw.) Brid., *Drepanocladus* spp., *Meesia triquetra*, and *Meesia uliginosa*. However, the most typical specimen we have seen (*Scotter 9020*) had been collected on "dry lichen polygons". All the specimens we have studied have sporophytes.

Meesia hexasticha is a rare moss, known from

Svalbard (*Ochyra et al.*, 2009), northern Sweden (*Nyholm*, 1998), central and eastern Europe (*Abramova*, 1956), and eastern Siberia in Yakutia (*Ignatov et al.*, 2001) and Chukotka (*Afonina*, 2004). It has been excluded from the flora of Iceland by *Jóhannsson* (2003). In North America, collections determined as *Meesia hexasticha* are few, and most are misidentified specimens of other species of *Meesia*, especially *Meesia uliginosa*.

We have not seen any specimen of *Meesia hexasticha* from Greenland. *Lange and Jensen* (1887) cite an older collection from Smith's Sound, which they have not seen, but they suggest it is probably *Meesia longiseta*. However, *Nyholm* (1998) added Greenland to the distribution of the species, which she had previously not reported from that territory (*Nyholm*, 1958). Also, according to *Goldberg* (2003), at least one specimen from Greenland is in the Botanical Museum, Copenhagen (C), but we were unable to see that specimen. The occurrence of the species in Greenland still needs confirmation.

North American specimens seen:

CANADA. Manitoba: Churchill, 58°47' N - 94°12' W, 1956, *Crum et al. 44* (CANM); 1956, *Crum & Schofield 7025* (CANM). – **Nunavut:** Baffin Island, Clyde Inlet, 69°50' N - 70°40' W, 1950, *Wynne-Edwards 9322, 9324* (CANM). – **Ibid.:** Pangnirtung, 66°09' N - 65°44' W, 1980, *Brassard 14565* (NFLD). – **Northwest Territories:** Mackenzie River Delta, Crossley Lakes, 68°42' N - 129°32' W, 1966, *Scotter 9020* (C, CANM).

UNITED STATES. Alaska: Sukakpak Mountain, 67°36' N - 149°45' W, 1982, *Brassard 13777* (NFLD).

Meesia hexasticha has been generally excluded from the North American flora, since earlier specimens from more southern regions proved to belong to other species. However, the specimens cited above agree with material we have seen from Europe, where the species is generally considered as distinct (e.g. *Hill et al.*, 2006). Also, several sterile but very characteristic specimens of *Meesia hexasticha* have recently been collected in northernmost Quebec (*Faubert et al.*, 2011).

The known distribution of *Meesia hexasticha* in North America remains sporadic and restricted to northern regions (Figure 1), but the occurrence of the species in our area as well as in Svalbard and in eastern Siberia suggests that it may have a discontinuous but more or less circumpolar distribution at northern latitudes.

Meesia longiseta Hedw.

Spec. Musc. 173. 1801. - *Diplocomium longisetum* (Hedw.) Web. & Mohr, Ind. Mus. Pl. Crypt. 3. 1803. - *Amblyodum longisetum* (Hedw.) P. Beauv., Dict. Sc. Nat. 2: 23. 1904.

Bryum triquetrum Turn., Musc. Hib. 115. 1804.

Diplocomium tristichum Funck, Deutsch. Moose 43. 1820 *pro parte*. - *Meesia tristicha* Bruch, Flora 9: 165. 1826.

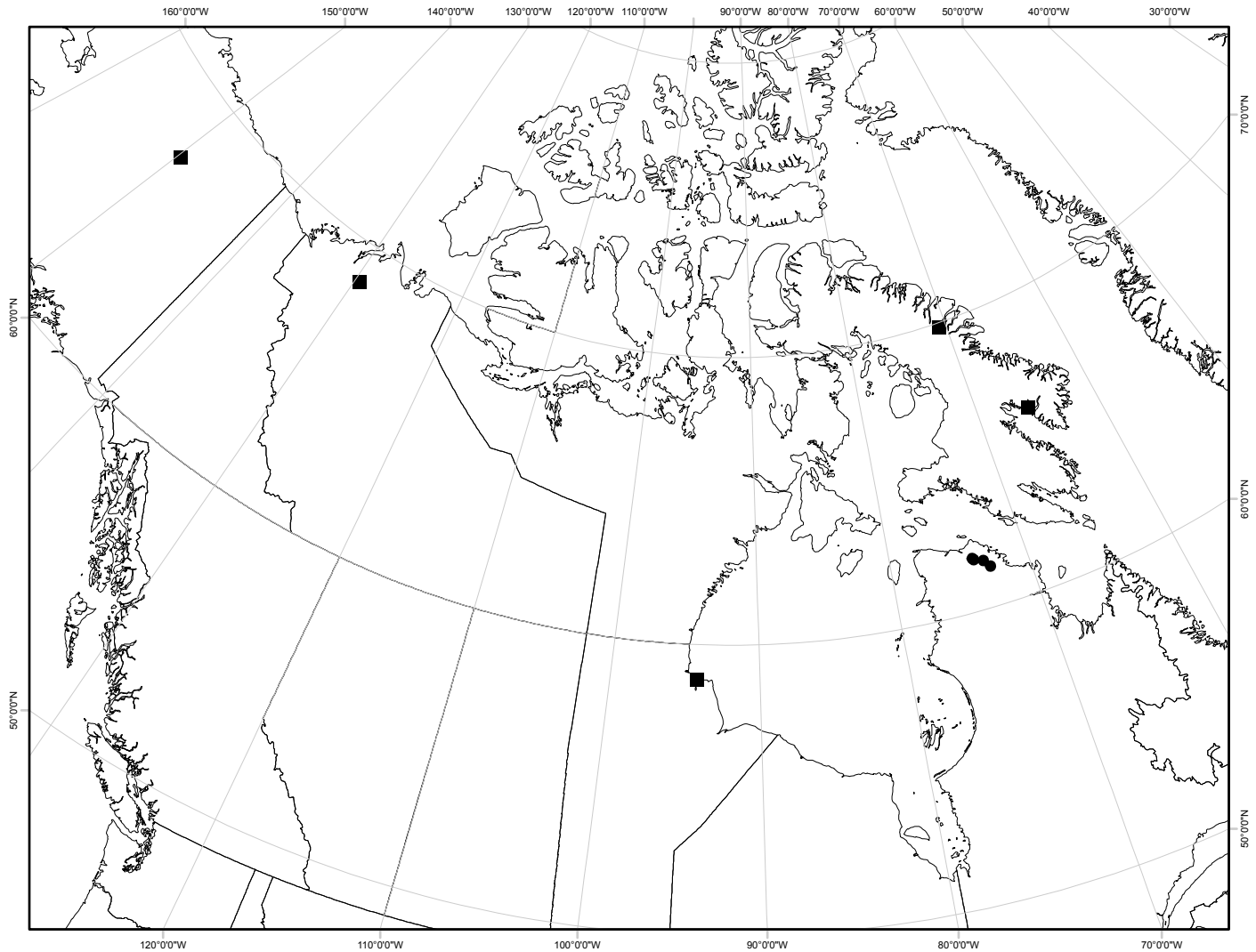


Figure 1. Distribution of *Meesia hexasticha* in North America. Squares represent specimens we have seen, while circles represent recent reports by Faubert *et al.* (2011). The occurrence of the species in Greenland requires verification (map M. Lapointe).

? *Meesia longiseta* var. *luxurians* C. Müll., Zweit. Deutsch. Nordpolexp. Koldewey 2: 70. 1873 *nom. nud.* - *Meesia longiseta* f. *tenuissima* Kabiersch, Hedwigia 77: 134. 1937.

Meesia macounii Kindb., Rev. bryol. 40: 36. 1905. - *Meesia longiseta* var. *macounii* Grout, Moss Fl. N. Am. 2: 182. 1935.

Stems 3-5 cm long, mostly unbranched. Leaves indistinctly 3- or 6-ranked, ovate or ovate-lanceolate, acute or obtuse, strongly decurrent, 1.5-5.5 mm long, 0.5-1.5 mm wide, loosely spreading from a wide erect base; margin entire or obscurely denticulate near apex, plane or slightly recurved in places, especially near mid-leaf; costa 0.10-0.25 the width of leaf base, subpercurrent or percurrent, in cross section with one row of enlarged dorsal cells, one row of enlarged ventral cells, and many rows of smaller, moderately incrassate, more or less isodiametric inner cells; lamina cells irregularly rectangular, 12-70 μm long, 12-24 μm wide. Synoicous. Perichaetial leaves erect and somewhat elongate.

Setae 4-7 cm long; capsules pale brown, 2.8-3.2 mm long including the neck, 0.9-1.2 mm wide; operculum

conic; annulus thin, but well-developed for the genus; exostome teeth yellowish brown, transversely striate, 0.4-0.5 the length of endostome; endostome segments long, yellowish brown; cilia short. Spores 38-58 μm .

Meesia longiseta is easily distinguished by its loosely spreading, ovate or ovate-lanceolate leaves, with the margins more or less entire and flat. The specimen cited below from Axel Heiberg Island has obscurely 3-ranked leaves and was confused with *Meesia triquetra* (Kuc, 1973), but the specimen is typical of *Meesia longiseta* in its leaf morphology and costal anatomy. For differences between *Meesia longiseta* and *Meesia hexasticha*, see that species.

Meesia longiseta forms large loose mats in wet, rich habitats, usually sedge fens. Most of the specimens we have seen did not contain other moss species. All the collections from subarctic North America have sporophytes, but the only high arctic specimen we have seen (Kuc M233, CANM) is sterile.

Meesia longiseta is a rare but widespread moss, with a circumboreal distribution occasionally extending into the arctic (Abramova, 1956). It is also reported from Colombia (Gradstein, 1993). North American collections are relatively few: we have seen and verified specimens from Ontario, Massachusetts, New York, Illinois, Idaho, Alberta, British Columbia, Nunavut, the Northwest Territories, Yukon, and Alaska (Figure 2). *Meesia longiseta* was recently reported from northernmost Quebec (Faubert *et al.*, 2010), but the specimen proved to be *Meesia hexasticha* (Faubert *et al.*, 2011).

We have not seen any specimen of *Meesia longiseta* from Greenland. Müller (1874) reported "*Meesia longiseta* var. *luxurians*" from East Greenland, without formal description; however, the description of *Meesia longiseta* f. *tenuissima* by Kabiersch (1937), apparently from the same material, suggests that the taxon may belong to a different species, possibly *Amblyodon dealbatus*. Lange and Jensen (1887) cite specimens from both East and West coasts of Greenland, but these probably represent other species since *Meesia longiseta* does not seem to have been collected since in Greenland. Nyholm (1958, 1998) included Greenland in the species' distribution, but she may have been referring to the same reports. According to Goldberg (2003), there is no specimen from Greenland in the herbarium of the Botanical Museum, Copenhagen (C). So the occurrence of the species in Greenland still needs confirmation.

Selected specimens seen:

CANADA. Nunavut: Axel Heiberg Island, Cruseo Lake, 79°24' N - 91°11' W, 1967, *Kuc M233* (CANM). – **Northwest Territories:** Yellowknife, 14.4 miles NW of airport, 1963, *Murdy 9* (CANM). – **Yukon:** 5 km E of Old Crow, 67°34' N - 139°42' W, 1976, *Cwynar 23* (NFLD)
UNITED STATES. Alaska: Yukon River, Prudhoe Bay Haul Road, No Name Creek, 66°07' N - 150°10' W, 1976, *Murray 76-103* (ALA). – *Ibid.*: Ballaine Road, 64°55' N - 147°50' W, 1974, *Calmes 658, 665* (ALA).

Meesia triquetra (L. ex Jolycl.) Ångström

Nov. Acta Roy. Soc. Sc. Upsal. 12: 357. 1844. - *Mnium triquetrum* L. ex Jolycl., *Système [sic] sexuel des végétaux* 749, 1803. - *Meesia trifaria* Crum, Steere & Anders., *Bryologist* 68: 434. 1965.

Diplocomium tristichum Funck, *Deutsch. Moose* 43. 1820 *pro parte*. - *Meesia tristicha* Bruch, *Flora* 9: 165. 1826.

Meesia tschutschica C. Müll., *Bot. Zentralbl.* 16: 122. 1883. - *Meesia triquetra* f. *crassifolia* Kabiersch, *Hedwigia* 77: 133. 1937.

Meesia tristicha var. *purpusii* Röhl., *Hedwigia* 36: 45. 1897.

Stems 1-12 cm long, mostly unbranched. Leaves in 3 distinct rows, ovate below, triangular or long-triangular above, strongly decurrent, 1.5-3.0 mm long, 0.8-1.5 mm wide, keeled, wide-spreading from an erect sheathing

base; margin plane, serrate throughout, or rarely becoming entire toward base; costa 0.1-0.2 the width of leaf base, percurrent or subpercurrent, in cross section with 2 rows of enlarged ventral cells, 1 row of enlarged dorsal cells, and smaller, very incrassate inner stereid cells; lamina cells smooth, slightly to strongly thick-walled, irregularly rectangular, 15-60 µm long, 12-20 µm wide, larger and thin-walled toward base, especially near the costa. Dioicous or synoicous. Perichaetial leaves slightly elongate; perigonia in terminal heads.

Setae 2-6 cm long; capsules yellowish to reddish brown, 1.7-3.0 mm long including the neck, 0.7-1.2 mm wide, ovoid or cylindrical, arcuate from an erect and somewhat shrivelled neck; operculum conic or shortly rostrate; exostome teeth thin, almost smooth, 0.2-0.3 the length of endostome; endostome segments long; cilia short. Spores 40-55 µm.

Meesia triquetra is readily distinguished by its serrate leaves in 3 distinct rows. It has been consistently reported as dioicous (e.g. Nyholm, 1998), but we saw 3 synoicous specimens from Alaska and the Northwest Territories. Specimens with short leaves and very thick cell walls ("f. *crassifolia*") are frequent in the Arctic.

Meesia triquetra grows in lax and generally tall turfs, most characteristically in *Carex* and *Eriophorum* fens, but also in other nutrient-rich wet areas, such as seepage slopes and pond margins, especially in calcareous areas. It has been collected at altitudes ranging from sea level to about 1,500 m. *Meesia triquetra* occasionally produces sporophytes in boreal and low-arctic regions (north to ca. 71° N, in Greenland), but all the high-arctic collections we have seen are sterile.

This relatively common boreal and arctic moss has a circumpolar distribution and is widespread in our area. It is also reported from Australia and New Guinea (Norris *et al.*, 1999). The North American distribution was mapped by Montagnes (1990).

Selected specimens seen:

GREENLAND: East Coast: Jameson Land, east Schuchert Dal, 71°26' N - 24°23' W, 1971, *Halliday B12b/71* (NFLD). – West Coast: Keglen, Sdr. Strømfjord airport, 67°05' N - 50°40' W, 1977, *Mogensen & Brassard 77-078* (NFLD).

CANADA. Labrador: Kangalaksiorkvik Fiord, 59°22' N - 64°02' W, 1975, *Weber 1565* (NFLD). – **Quebec:** Ungava Bay, Tasiujak, 58°42' N - 69°57' W, 1977, *MacInnes 5225* (NFLD). – **Ontario:** Hudson Bay, Cape Henrietta Maria, 55°10' N - 82°20' W, 1979, *Sims 5545* (CANM). – **Nunavut:** Bylot Island, 73°03' N - 80°07' W, 1982, *Scotter 67459* (NFLD). – *Ibid.*: Ellesmere Island, Tanquary Fiord, 81°25' N - 76°55' W, 1967, *Brassard 3089* (NFLD). – **Northwest Territories:** Mackenzie River Delta, Crossley Lakes,

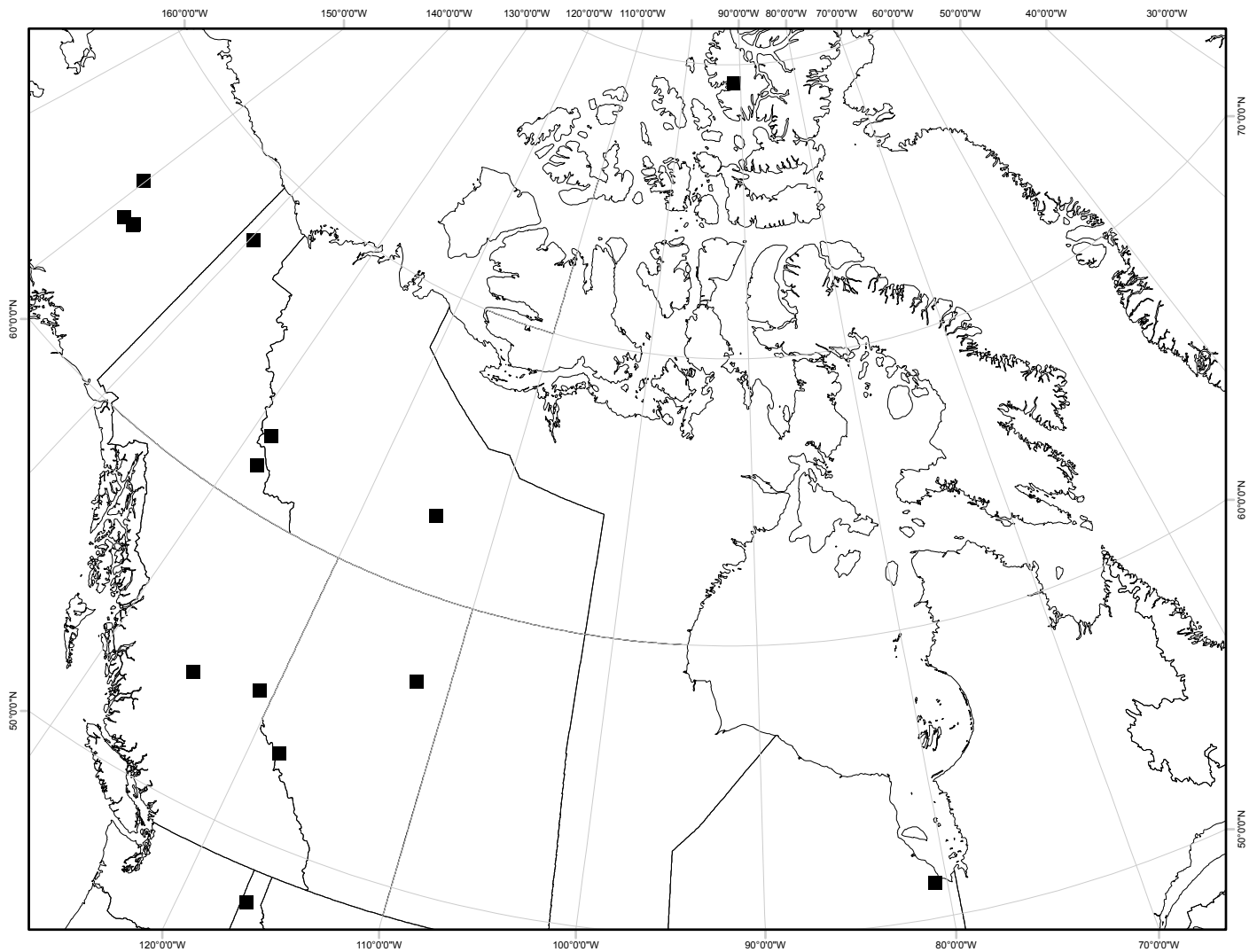


Figure 2. Distribution of *Meesia longiseta* in northern North America, based on specimens seen. The species also occurs further south in Canada and the United States (map M. Lapointe).

68°34' N - 129°34' W, 1966, *Scotter 9088* (CANM) [synoicous!]. – **Yukon**: Old Crow, Klo Kut base camp, 67°34' N - 139°39' W, 1976, *Cwynar 39* (NFLD).

UNITED STATES. Alaska: Vicinity of Prudhoe Bay, 70°15' N - 148°4' W, 1982, *Brassard 13879* (NFLD) [synoicous!]. – *Ibid.*: Colville River, Umiat, 69°22' N - 152°08' W, 1960, *Steere, Holmen & Mårtensson s.n.*, Bryoph. Arct. Ex. 6 (NFLD). – *Ibid.*: Cape Lisburne, 68°52' N - 166°15' W, 1953, *Steere and Crum 20946* (ALA) [synoicous!].

Meesia uliginosa Hedw.

Spec. Musc. 173. 1801. – *Amblyodum uliginosum* (Hedw.) P. Beauv., Dict. Sc. Nat. 2: 23. 1804.

Meesia minor Brid., Musc. Rec. 2: 168; pl. 2, fig. 13. 1803. – *Amblyodum minus* (Brid.) P. Beauv., Prodr. 41. 1805. – *Meesia uliginosa* var. *minor* (Brid.) Web. & Mohr, Bot. Tasch. 374. 1807. – *Meesia trichodes* var. *minor* (Brid.) Braithw., Brit. Moss Fl. 2: 222; pl. 79A. 1895.

Meesia alpina Funck ex Bruch, Flora 9: 164. 1826. – *Meesia uliginosa* var. *alpina* (Bruch) Hamp. Flora 20: 278. 1837. – *Meesia trichodes* var. *alpina* (Bruch) Braithw., Brit. Moss Fl. 2: 222, pl. 79A. 1895.

Meesia stricta Brid., Bryol. Univ. 2: 61. 1827.

Meesia angustifolia Brid., Bryol. Univ. 2: 62. 1827. – *Meesia uliginosa* var. *angustifolia* (Brid.) Hamp., Flora 20: 278. 1837. – *Meesia trichodes* var. *angustifolia* (Brid.) Hag., K. Norsk. Vid. Selsk. Skrift. 1908(9): 13. 1909.

Meesia trichodes Spruce, Musci Pyren. no. 147. 1847.

Stems 0.2-6.5 cm long, branched or unbranched. Leaves not in distinct rows, usually narrowly ligulate, sometimes triangular or long-triangular, non-decurrent or shortly decurrent, 1.5-4.0 mm long, 0.3-0.7 mm wide near leaf base, erect or erect-spreading when wet; apex rounded or pointed; margin entire, strongly revolute at least in lower half; costa strong, usually more than 0.4 the width of leaf at base, usually ending below the apex, in cross section with most inner cells irregular-rhomboidal

and larger than the ventral and dorsal cells; lamina cells irregularly rectangular, 20-65 µm long, 7-14 µm wide, longer at base. Autoicous or synoicous, occasionally dioicous.

Setae 0.6-5.0 cm long. Capsules yellowish brown, 1.8-2.5 mm long including the neck, 0.5-1.3 mm wide; urn cylindrical and arcuate to globose and inclined; neck erect and often shrivelled; operculum conic or convex; exostome teeth brown to almost transparent, 0.1-0.7 the length of endostome; endostome segments long; cilia short or absent. Spores 45-75 µm.

The most common expression of *Meesia uliginosa* is unmistakable, with its ligulate to almost linear leaves, very wide costa, and rounded apex. Plants with long pointed leaves ("var. *alpina*") or with short relatively wide leaves ("var. *minor*") are very frequent in the arctic, but they intergrade widely with each other and with more typical expressions of the species; these characters often vary among leaves on the same stem. The most extreme variants, with short, pointed leaves and relatively narrow costae, can be difficult to distinguish from *Meesia hexasticha*, and the differences are discussed under that species.

Meesia uliginosa is generally smaller than other species of *Meesia*. It grows in dense pure tufts or scattered among other mosses, on humus or mineral soil, in a wide range of wet habitats such as depressions, pond margins, seepage slopes, fens, and meadows. It is not restricted to fens, as are usually *Meesia triquetra* and *Meesia longiseta*. *Meesia uliginosa* has been collected at altitudes ranging from near sea level to about 1,200 metres, and is most often collected with abundant sporophytes.

This relatively common moss is widespread in our area and has a wide, boreal and arctic, circumpolar distribution, reaching south into southern Europe, the Caucasus, and the Himalaya (Abramova, 1956). It is also reported from Antarctica (Ochyra and Lewis Smith, 1999) and southern South America (Matteri and Ochyra, 1999). The North American distribution was mapped by Vitt (1992).

Selected specimens seen:

GREENLAND. East Coast: Wollaston Foreland, Mt. Zackenberg, 74°28' N - 20°35' W, 1947 *Holmen s. n.* (NFLD, TNS). – West Coast: Disko Island, Godhavn, 69°15' N - 53°33' W, 1956 *Holmen s.n.*, Bryoph. Arct. Exs. 78 (NFLD).

CANADA. Labrador: Saglek Fiord, St. John's Harbour, 58°28' N - 62°48' W, 1983, *Hedderson 1527* (NFLD). – **Quebec:** Ungava Bay, Abloviak Fiord, 59°29' N - 65°16' W, 1975, *Weber 1425* (NFLD). – **Ontario:** Polar Bear Provincial Park, 54°45' N - 82°18' W, 1978, *Williams 3908* (CANM). – **Manitoba:** Fort Churchill, 58°46' N - 94°10' W, 1956, *Crum &*

Schofield 6977 (CANM). – **Nunavut:** Baffin Island, Pangnirtung, 66°09' N - 65°44' W, 1980, *Brassard 14576* (NFLD). – **Ibid.:** Ellesmere Island, Van Hauen Pass, 81°07' N - 86°55' W, 1967, *Brassard 2845* (NFLD). – **Yukon:** South Richardson Mts., Doll Creek, 66°05' N - 135°48' W, 1977, *Ritchie 7039* (NFLD).

UNITED STATES. Alaska: Prudhoe Bay, 70°15' N - 148°40' W, 1982, *Brassard 13882* (NFLD). – **Ibid.:** Imiaknikpak Lake, 68°29' N - 154°03' W, 1973, *Murray 5821* (NFLD).

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