Lycopodiaceae
clubmoss family

Upwards of 15 genera comprise this ancient family. Perennial herbs, they somewhat resemble coarse mosses. The solitary sporangia are borne either in a terminal strobilus or are axillary with leaves. Spores are of equal size. In Nova Scotia we have four genera.

A. Rhizomes absent; upright stems clustered; axillary sporangia; spores pitted. *Huperzia*
aa. Rhizomes present; upright shoots alternate; sporangia aggregated into terminal strobili, spores with netlike pattern. B

- B. Strobili on leafy peduncles; mainly of wetland habitats. *Lycopodiella*
- bb. Strobili sessile or on peduncles with remote scant leaves; mainly of dry upland places. C
  - C. Tips of stems 5–12mm in diameter; leaves in 6 ranks or more; leaves bristly, free for most of their length, not scalelike. *Lycopodium*
  - cc. Distal shoots 2–6mm in diameter; leaves in 4–6 ranks, strongly overlapping (scalelike) and appressed along the stem with only tips free. *Diphasiastrum*

Diphasiastrum Holub

There are 15–20 species worldwide; numerous hybrids are possible. Generally these clubmosses are northern or subarctic in distribution. Nova Scotia has four species.

Rhizomes bear sparse leaves that are reduced to scales, rooting from the lower surfaces. Upright stems are flattened or angled, with 2–5 branches. Leaves are arranged in four ranks and of two sizes. Sporophylls are smaller than unspecialized leaves.

Key to species

A. Plants < 12 cm tall; strobili sessile.	*Diphasiastrum sitchense*	
aa. Stems 8–50cm; strobili on peduncles.	B	
B. Branches square or angled, bluish.	*D. tristachyum*	
bb. Branches flat; green.	C	
C. Lateral branches irregular, annual winter bud constrictions present; strobili 10–25mm tall, without sterile tips.	*D. complanatum*	
cc. Lateral branches regular, fan–shaped, annual winter bud constrictions absent; strobili 20–40mm tall often with sterile tips.	*D. digitatum*	

Diphasiastrum complanatum (L.) Holub
lycopode aplati

Photo by Alex Wilson

Flattened stems bear opposite tiny scalelike leaves. Subterranean rhizome is nearly leafless, with only a few scales. Plant tend to be sprawling. Peduncles are branched, with 1–2 strobili. The plant is rarely found in fruit.

Deciduous forests and brushy hillsides spreading out into abandoned fields.

Infrequent, scattered through the Cobequid hills southwest to the Annapolis Valley and east to Cape Breton.

Wide-ranging, from Greenland to AK, south to OR, WY and NY. Circumboreal.

Diphasiastrum digitatum (Dillenius) Holub

lycopode en éventail

Photo by Roger Lloyd

Another creeping species, most of the rhizome is above ground. Branches are regular and nearly opposite, fan-shaped. As in previous species, dimorphic leaves give the plant the appearance of being flat. Leaves are reduced to scales, clasping at the base. Terminal strobili are borne on long peduncles.

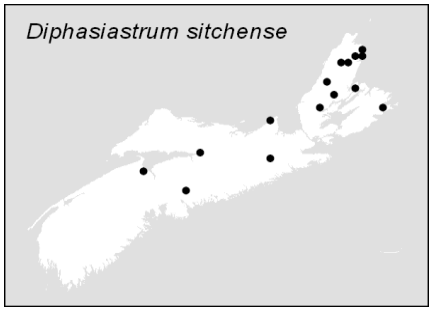
Frequently found throughout, in old–fields, pastures and mixed coniferous woods.

Eastern distribution from NF to ON, south to MO and GA. Endemic to North America.

Hybrids form with *D. digitatum* X *tristachyum* and have been named *D*. X *habereri*. Known from Boularderie Island, its most easterly record to date.

Diphasiastrum sitchense (Rupr.) Holub

lycopode de Sitka



Its dark shiny leaves and round branches should separate it from the previous two species. Relatively short in stature, the leaves spiral around the branches. Strobili are borne on leafy branches.

Photo by Roger Lloyd

Commonly found on alpine and subalpine barrens or wooded slopes in northern NS.

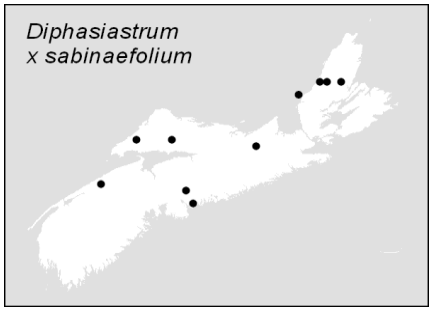
Collected from Kings Co. to northern Victoria Co.

Across the continent from Greenland, south to OR and NY. Asia.

Photo by Roger Lloyd

***Diphasiastrum* × *sabinifolium* (Willd.) Holub** (= *D . sitchense* X *tristachyum*) is widespread and frequent in eastern Canada. This hybrid is commonly confused with *D . sitchense*. It is known from NF to ON, south to NY; AK. (**lycopode à feuilles de genévrier**)

Photo of D. xsabinifolium by Sean Blaney



***Diphasiastrum tristachyum* (Pursh) Holub**

Ground–cedar; lycopode à trois épis

Photo by Roger Lloyd

Rhizomes are subterranean and the erect stems are much–branched. Scalelike leaves are glaucous beneath. Peduncles long, with terminal branches, each with a terminal strobilus. Yellow scalelike leaves in the strobili.

Found in dry, sandy soil, gravelly banks, barrens or forests.

Scattered throughout, but common in Shelburne, Kings and Cumberland counties.

Ranges from NF to MB, variously south to MO, AL and GA. Europe.

Photo by Roger Lloyd

Huperzia Bernh.

Commonly called fir-mosses, there are at least 10 species of this genus; three are known in NS. Leaves are appressed, not in ranks. Gemmae form amidst the leaves and shed at maturity. Sporangia are borne singly, sometimes basally on unmodified leaves.

Key to species

A. Leaves serrated, narrowly obovate; teeth 1–8, shiny.	*Huperzia lucidula*
aa. Leaves lanceolate, margins entire or with 1–3 teeth, not shiny.	B
B. Shoots with weak annual constrictions; branches with gemmae forming in a single whorl at the end of annual growth.	*H. selago*
bb.Shoots without constrictions; gemmae forming in 1–3 whorls throughout the mature shoots.	*H. appalachiana*

Huperzia appalachiana Beitel & Mickel

lycopode des Appalaches

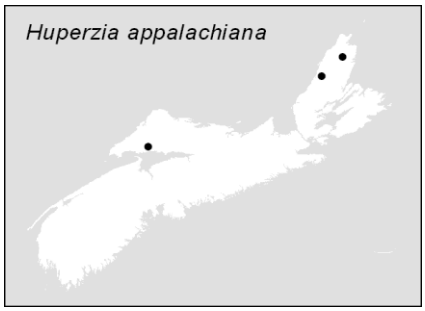
Photo by Sean Blaney

Shoots lack the constrictions of *H. selago*. Gemmae-producing branches are carried throughout the plant. Leaves have entire margins, their upper surfaces covered in stomata. Spores have concave sides.

Its alpine habitat should help to separate it. Found on damp acidic granite as on talus slopes or exposed cliffs.

In NS, known from the Fundy coast, Cumberland County (McAlese Brook and Moose River) and Kings County (Amethyst Cove). Also a collection from Clyburne Brook, Victoria Co. (at MT and CAN).

Disjunct populations from Greenland, NF to ON, south to MN and NY; VA to TN and south to GA.



***Huperzia lucidula* (Michx.) Trevisan**
Shining Fir–moss; lycopode brillant

Photo by Sean Blaney

A robust creeping species, it has larger leaves than most clubmosses. Their margins are shallowly toothed. Rows of long and short leaves alternate along the stem. The sporangia arise from the leaf axils, in alternating zones the length of the stems. The larger leaves with shiny appearance and papery texture serve to separate this species from most others.

Inhabiting deciduous forest soils, it may be found in uplands or in intervales.

Found throughout the province, but more common on the northern side from Annapolis to northern Cape Breton.

Ranges from NF to MB, south to AR and GA; NM.

Photo by Roger Lloyd

***Huperzia selago* (L.) Bernh. ex Schrank & Martius**

Fir Clubmoss

Photo by Sean Blaney (with H. appalachiana on the right)

Paler in colour than *H. lucidula* it also branches from the compact base. Leaves are equal in length, crowding the stems. Their margins are entire. Sporangia are borne in leaf axils early in the season, followed by bands of sterile leaves.

Grows in rock crevices along streams and moist ravines.

Limited to the northern half of the province, as far west as Brier Island, Digby Co. Many localities clustered about the Bay of Fundy, inland to the south–facing slopes of the Cobequids and along the slopes of northern Cape Breton.

Greenland; across the continent to AK, south to BC, MN and NY.

Photo by Roger Lloyd

Lycopodiella Holub

Creeping plants, their rhizomes are placed above the soil. Upright stems have very leafy and unbranched peduncles, terminating in a single strobilus. Two species are found in NS.

A. Fertile stems 3.5–6cm long; leaf margins entire.	*Lycopodiella inundata*
aa. Fertile stems mostly 8–35cm; leaf margins sparsely toothed.	*L. appressa*

Lycopodiella appressa (Chapman) Cranfill

lycopode apprimé

Photo by David Mazerolle

The stems approach 30cm in length, with terminal strobili 1–3cm long.

Typically found on lacustrine beaches, in wet depressions or savannahs.

Associated with south and southwestern counties. Few records along the Atlantic to Boularderie Island.

NF to NS; ME to IL and KS, south to FL and TX; Cuba.

Photo by Roger Lloyd

***Lycopodiella inundata* Holub**
Bog Clubmoss; lycopode inondé

Photo by David Mazerolle

Small and compact, this sparsely branched plant is generally prostrate and shallow-rooted. Each branch is covered by appressed green leaves. Sporangia arise in the leaf axils of the terminal spike, with little differentiation from sterile sporophylls.

Frequently found in peatlands, sandy beaches and poorly drained areas, especially in acidic substrates with prolonged wetting.

More common in western counties, but found throughout.

NF to AK, south to CA, IA and NC.

Photo by Roger Lloyd

Lycopodium L.
Clubmosses

Worldwide there are from 15–25 species of these trailing plants, generally subarctic or temperate. Six are found across NS. Stems may be rhizomatous or stoloniferous, upright, and branched or unbranched. Leaves are long and slender, toothed or entire and arranged in at least six ranks. The scattered leaves on the rhizome are papery. No gemmae are produced. Strobili are solitary and sessile, or if more than one, stalked. Peduncles may have some leaves. Hybrids are unknown in this genus.

Key to species

A. Strobili stalked; stems with 2–5 branches; leaves hairlike distally. B

B. Strobili solitary, pedicels lacking; branches 2–3, upright. *Lycopodium lagopus*

bb. Strobili 2–5, on pedicels; branches 3–6, oblique or spreading. *L. clavatum*

aa. Strobili sessile, stems branched or dendroid, with many branches; leaves without hairlike tips. C

C. Strobili single; horizontal stems above ground. *L. annotinum*

cc. Strobili 1–7 on much–branched, stems; rhizomatous D

D. Lateral shoots flat in cross–section; leaves unequal in size; lateral leaves twisted, proximal leaves reduced. *L. obscurum*

dd. Lateral shoots round in cross–section; leaves equal in size, none twisted. E

E. Leaves dark green below the branches on the main axis, soft to touch. *L. hickeyi*

ee. Leaves pale green below the branches; prickly to touch. *L. dendroideum*

***Lycopodium annotinum* L.**
(includes var. *pungens* (LaPylai) Desv.)
Bristly Clubmoss; lycopode innovant

Photo by David Mazerolle

Much–branched from above- ground rhizomes, this plant has sharply pointed sessile leaves, 6–11mm long. They are arranged in rows spiralling the stem. The prostrate rhizomes have fewer leaves. Superficially resembling *Huperzia lucidulum*, but the presence of strobili should easily separate it.

Dry, open deciduous forests and the edges of fields.

Common throughout.

NF to AK, south to OR, AZ and NC. Circumpolar.

Photo by Roger Lloyd

***Lycopodium clavatum* L.**
lycopode claviforme

Photo by Sean Blaney

Photo by Roger Lloyd

A long–trailing species, this one has soft leaves borne in ranks upon the stems and rhizomes. Strobili are terminal on long peduncles, sparsely covered in bracts and scale–like leaves. Spikes 2–4 per peduncle. The soft hairlike bristles on the leaves will separate it from *L. annotinum*.

Usually on lighter soils on hillsides, barrens and pastures.

Common throughout.

NF to SK; AK to BC, variously south. Eurasia.

***Lycopodium dendroideum* Michx.**
lycopode dendroïde

Photo by Roger Lloyd

Rhizomatous, the stems are erect, branching only near the top. Leaves are decurrent scales, prickly to touch. Strobili are sessile, produced after the second year.

Found in forests or open habitats.

Yarmouth to Kings, Colchester and Pictou counties, with a couple stations in Victoria Co.

Elsewhere across Canada, variously south to WY and AL; Asia.

***Lycopodium hickeyi* WH Wagner, Beitel & RC Moran**
lycopode de Hickey

Photo by David Mazerolle

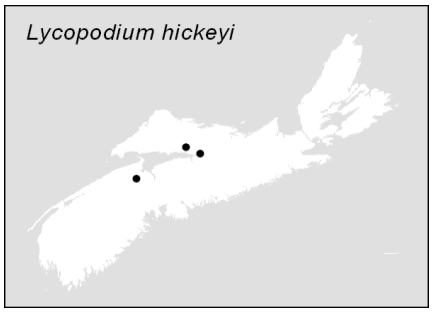
Resembles *L. obscurum*, but for the branchlets which are round in cross–section. Ground–pine has flat branchlets. Leaves are all of equal size, while the other species has smaller leaves closer to the rhizome.

Habitat is generalized shrubby forests and deciduous stands.

Collected from only two locations so far, Colchester and Kings Counties. Our older specimens of *L. obscurum* should be examined to see if they rightfully belong here.

Ranges from NS to ON, south to MN, TN and NC; SK and WA.

Photo by Roger Lloyd



***Lycopodium lagopus* Laestadius ex C. Hartman**

lycopode patte-de-lapin

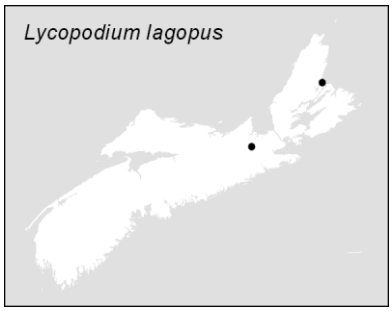
Photo by David Mazerolle

Leaves are appressed with their margins entire, ending in a hairlike bristle. The bud constrictions are conspicuous. Lateral branches are erect, or mostly so, with a single cone, or at most, a pair on very short peduncles.

Open grassy fields and second–growth forests.

From Digby and Inverness counties.

Greenland to AK, south to OR, IL and PA; Eurasia.



***Lycopodium obscurum* L.**
Ground–pine; Tree Clubmoss; lycopode obscur

Photo by Roger Lloyd

Resembling a small tree, this neat plant arises from underground rootstocks. Flat branchlets crowd the erect stems. Leaves are tightly packed in six ranks around the branches, with smaller leaves on the erect stems. Strobili are terminal and sessile. Sporophylls differentiated from leaves.

Dry sites, open and sandy areas similar to pine habitat.

Common throughout.

NS to ON, south to AL and GA; AK.

Photo by Ross Hall