

A Photo Illustrated Guide to the Moss Families of the Island of Dominica

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Abstract:

No complete identification has ever been documented of Dominica's mosses. The last known research was done in 1914 by Miss E. F. Noel. My main goal was to identify as many of the island's mosses down to family.

I collected the specimens while on the various hikes we took as a group around the island and was able to isolate plantlets from each patch taken. Photographs were taken of the patches and individual plantlets using advanced digital photography. Identification was performed using texts from books and from the internet.

Documentation was saved in digital form and the patches were later released back into their natural environment from where I found them. A total of seven families were isolated from fifteen specimen patches taken from the wild.

Introduction:

Dominica is renowned as being one of the few remaining landmasses to keep true to a life style that integrates itself into nature rather than forming nature to its lifestyle. Ecosystems become extremely fragile when confronted with man's technological advances as communities grow into civilizations. As people move further into natural environments, roads and home sites threaten the endemic flora and fauna. Some of the most sensitive indicators of almost all ecosystems are the bryophytes, more specifically the mosses.

Mosses are some of the most basic forms of plants, still utilizing sperm and egg as their primary reproductive cells. Most mosses cannot thrive without a great deal of moisture and as such Dominica plays a very interesting role as home to a wide variety of these delicate plants. The constantly high humidity levels and abundant water sources provide for a habitat where mosses are able to complete their life cycles often multiple times a year.

Complete documentation of the island's mosses has never been done and therefore no reference material was available pertaining specifically to the individual species found on the island. The last person to have recorded any form of information dealing with Dominica's mosses was Miss E. F. Noel in 1914. Due mostly to the lack of reproductive fruiting bodies found on most of the mosses during the time of this main study, this guide identifies the mosses of Dominica only down to the family level.

Materials and Methods:

During our various hikes and journeys to some of Dominica's major natural tourist sites, I kept an eye out for any mosses growing along the sides of hiking trails, live and downed trees, and rocks. Depending on the specific environments of where we had hiked, I was able to find many types of mosses, often finding duplicates of moss families I had found before.

When I came across what looked like a new family I would carefully extract a two-inch by two-inch sample of the moss patch from the surface on which it was

growing. I would carefully photograph the patch using a “Super Macro” function on my Canon Powershot S3 IS digital camera and proceeded to package the sample in a “Ziploc” plastic bag for transport. I tried recording general location, growing media, date, and coordinates, if available, down in a plant collection field book.

Back in the lab, I would separate individual moss plantlets from the larger sample patches using needle nose forceps. I kept the parent patches of moss in Petri dishes where I was able to control moisture levels with spray bottles filled with stream water and keep the plants alive for photographs and further research. Plantlets were placed in convex dish microscope slides for cell identification using a 2-4x magnification dissection microscope and later photographed using Dr. Woolley’s Nikon D1x digital camera with a special macro lens attachment.

After identification was completed for each specimen, they were all released near the Springfield Station on surfaces as close as possible to those on which they were found.

Results:

<i>Family</i>	<i>Sterile or Reproductive</i>	<i>Location</i>
Fissidentaceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Rock, 15°20'55"N 61°19'56"W)
Hypnaceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Rock, 15°20'55"N 61°19'56"W), Emerald Pool Trail (Growing on Living Tree Root)
Leskeaceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Living Tree Branch, 15°20'55"N 61°19'56"W), Emerald Pool Trail (Growing on Living Tree Branches)
Leucodontaceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Rock, 15°20'55"N 61°19'56"W), Emerald Pool (Growing on Rock)
Meesiaceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Rock, 15°20'55"N 61°19'56"W), Springfield Station Stream (Growing on Rock) 15°20'47"N 61°22'07"W
Neckeraceae	Sterile	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Dead Tree Trunk, 15°20'55"N 61°19'56"W), Emerald Pool Trail (Growing on Living Tree Root)
Polytrichaceae	Reproductive	(Morne Trois Piton Ntnl. Park, Middleham Falls Pool, Growing on Dead Tree Trunk, 15°20'55"N 61°19'56"W), Springfield Station Water (Growing on Water Spout) 15°20'47"N 61°22'07"W, Boiling Lake Trail (Growing on Soil) 15°19'06"N 61°17'39"W

*All plants collected on Dominica between May 23, 2007 and June 10, 2007.

Conclusions:

A total of fifteen individual specimens were collected from various locations around the island. Seven families were identified out of those fifteen specimens but it is unlikely that seven is the total number of families on the island since a large, in-depth

study has never officially been funded or recorded.

More specimens could have been collected if greater detail had been paid during various hikes to trees and rocks further into the jungles than just along the trails.

Further identification of the mosses could have been achieved if all of the mosses had been in their reproductive phases and those that were reproductive were only identified down to family in order to preserve consistency in this report.

Some families of interest that were not collected were found at the edge of Boiling Lake. These were not collected due to the incredibly long amounts of time for them to form patches. In an effort to leave the island as natural as I had found it, I chose not to take specimens that seemed would take long periods of time to fill in the patch that I had taken and therefore, undoubtedly, a few families may have gone unidentified because of this.

The mosses of the island of Dominica certainly merit further study. There has not been any formal documentation of them to any level of identification and further study to find if there are endemic species is needed for the future. Mosses are extremely prevalent on all locations of the island including the city streets and buildings and would make an excellent subject for further study due mainly to their abundance around the island.

Moss Families of Dominica

Division Bryophyta

Class Polytrichopsida

Order Polytrichales

Family Polytrichaceae

Class Bryopsida

Subclass Dicranideae

Order Dicranales

Family Fissidentaceae

Subclass Bryideae

Order Splachnales

Family Meesiaceae

Order Hypnales

Family Leskeaceae

Family Hypnaceae

Family Neckeraceae

Family Leucodontaceae

Division Bryophyta

Bryophytes are classified as plants that are terrestrial in nature and that lack vascular systems. Bryophytes do not flower or produce any form of fruit. They reproduce using spores.

Class Polytrichopsida

Classified as being one of the more primitive bryophytes, mosses of the class Polytrichopsida are dioicous. Most of the identifying characteristics of this class have to do with reproductive organs. All mosses in the class possess a columnar columella, operculate peristomate capsule, and an elongate sporophyte seta (Glime, pg.38).

Order Polytrichales

The Palaeos Project explains the order Polytrichales as follows:

“The group exhibits great diversity, with the best-developed gametophyte of all land plants. The most typical features of the gametophyte are closely spaced adaxial lamellae on the leaves, forming a pseudoparenchyma, and differentiation of leaves into a distinct blade and sheathing base. The calyptra is typically hairy in many common species of the Northern Hemisphere, enveloping the developing capsules of the sporophyte generation. This has given the whole group its name, although most genera have a practically naked calyptra. Capsules of the Polytrichales normally have a well-developed peristome with at least 16 teeth formed of whole cells. The epiphragm covering the mouth of the capsule is a unique character that distinguishes Polytrichales from all other groups of mosses. Size and shape of the capsule vary greatly among genera.”

Family Polytrichaceae



Morphology:

Among the most common and conspicuous family of the mosses, this family exhibits a stem with a central woody strand. Leaves are usually narrow with the base sheathing. The capsule is on a long smooth seta.

Substrate:

This family is often found growing on dead and decaying wood or the soil near water sources.

Habitat:

This moss is not picky when it comes to where it can be found. It is common out in the open under the sun as well as under the jungle canopy.

Class Bryopsida

The Palaeos Project explains the class Bryopsida as follows:

“The Bryopsida include 90% of all moss species. Bryopsid sporophytes generally have vertically aligned plates embedded between multiple layers of cells in the amphithecium. They possess stomata which may or may not be homologous with those in higher plants. The sporophytes also develop opercula, peristomes, continuous columella, and a spongy layer between the amphithecium and the spore mass. The setae frequently twist at some stage of sporophyte development.

All bryopsid gametophytes are arthrodontous or descend from ancestors which were *arthrodontous*. These mosses have peristome teeth which are formed by walls growing between the rows of cells making up the mouth of the spore capsule.”

Subclass Dicranideae

Order Dicranales

The representatives of this order have 16 peristomes that are arranged in a row. Usually the peristome is split into two parts. Many of the mosses of this order have teeth that stand on a recognizable basic skin. The surfaces of the sheet cells are nearly continuous and rectangular (Becker).

Family Fissidentaceae



Morphology:

This is one of the most easily recognizable families of mosses, even recognizable when sterile. Leaves are distichous, vertically placed and arranged on a single plane. The leaves seem split along the basal portion of the upper edge. The split seems to clasp the stem of the lower edge of the next leaf above (Grout, pg.72).

Substrate:

This family prefers the cold, hard surface of stream and river rocks to call its home.

Habitat:

This family is very often found growing within the patches of other mosses like Meesiaceae and Polytrichaceae. It is a shade loving family that will be found where the rocks it is growing on are under jungle canopy and very close to a constant, flowing water source.

Subclass Bryideae

Order Splachnales

Family Meesiaceae



Morphology:

Members of this family love wet, boggy conditions. The leaves spread to a squarrose-recurved formation, rather firm in structure, with ovate-lanceolate to elongate-lanceolate shapes. This family has been indicated as very rare to find so identification to this particular level may be inaccurate (Grout, pg.197).

Substrate:

This family also prefers the cold, hard surface of stream and river rocks.

Habitat:

You can often find this family forming its own patches on rocks that are under the jungle canopy and in the shade or you can find it growing in the patches of other mosses like Polytrichaceae. It prefers to be in extremely moist conditions like those found near a constant water source.

Order Hypnales

Mosses of this order are world-wide. They are an extremely common and extremely wide-spread order. The seta is very long which makes the capsule hang due to its own weight. Often, the mosses of this order create true masses that can cover large areas (Becker).

Family Leskeaceae



Morphology:

Mosses of this family have main stems that creep with secondary stems that ascend or are erect in nature. Stem leaves are often very different from the branch leaves, but both are costate in most of the family's species (Grout, pg.236).

Substrate:

This family prefers the high-rise real estate and is often found growing on the branches of living trees.

Habitat:

This family loves the sun and moisture.

Family Hypnaceae



Morphology:

Mosses of this family often form mats of closely interwoven stems and branches. They grow mostly either on rotting plants material and wood or on the soil. They can also be found on stones, but this is less often the case than wood or soil (Grout, pg.263).

Substrate:

This family of moss is not very picky about where it makes its home. It grows on rocks as well as living and dead trees.

Habitat:

This moss prefers the shade. Not often seen in full sun but very common in densely shaded areas of the jungle and more so along trails near streams.

Family Neckeraceae



Morphology:

Members of the family Neckeraceae are often found growing on rocks and trees. Leaves are large and often ovate-lanceolate to lingulate. Primary stems are creeping with secondary stems erect, pendent, or horizontal (Grout, pg.392).

Substrate:

This family prefers the soft substrate of wood, both living and dead.

Habitat:

A rare find when found nestled amongst the patches of some Polytrichaceae. More common found alone near Emerald Pool where it has the opportunity to grow much larger.

Family Leucodontaceae



Morphology:

This family of moss is not picky when it comes to choosing its habitat on which to grow. Soil, decaying wood, live tree trunks, rocks, and shaded earth are among all of its favorite growing places. Main stems are creeping with secondary stems ascending and erect. The stem leaves are often very different than those found on the branches. Both types of leaves are costate in most of the species. The basal portion of the leaves are more elongated and are less papillose.

Substrate:

This family of moss is a rock lover as well.

Habitat:

This family makes one of the most beautiful patches out of all the families seen on the island. Rarely seen any distance away from large amounts of constant moisture, it can be found growing all over the rocks surrounding the various pools.

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