

A Continuing Study of the Mushrooms on the Caribbean Island of Dominica

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Abstract

This study is aimed at collecting and identifying the mushrooms that are present on the island of Dominica. Areas include the Archbold Tropical Research and Education Centre (ATREC) and surrounding areas; Elfin Forrest, (Boeri Lake and Freshwater Lake), Boiling Lake, Cabrits National Park, Emerald Pool, Middleham Falls, and Syndicate Trail. This study is a continuation of the study of Selyna Nunez's project, "Photographic Field Guide to Mushrooms on the Caribbean Island of Dominica." Although I and Selyna Nunez have compiled a vast list of mushrooms on the island, there is much more to be discovered in order to fully comprehend the extent of the mushroom fauna.

Introduction

Dominica has been named the "Nature Isle of the Caribbean" for its natural beauty. Dominica is the youngest island in the Lesser Antilles and is home to several types of forest including second growth transitional forest, elfin forest, dry forest, and montane forest. This study was conducted on the island of Dominica and is a continuation of Selyna Nunez's 2008 project, "Photographic Field Guide to Mushrooms on the Caribbean Island of Dominica". Selyna Nunez was able to classify seven different mushroom species: *Cyathus Striatus*, *Lentinus Spp.*, *Hygrocybe occidentalis var. occidentalis*, *Hygrocybe chloochlora*, *Coprinus plicatilis*, *Pleurotus ostreatus*, and possibly *Auricularia polytricha*. This study was conducted in order to Strengthen Selyna Nunez's project and to expand the number of known mushroom species on the island of Dominica.

This study includes the following families: Bolbitiaceae, Clavariaceae, Cortinariaceae, Gloeophyllaceae, Hygrophoraceae, Lepiotaceae, Lycoperdaceae, Polyporaceae, and Tricholomataceae.

Bolbitiaceae have spores that are thick walled with an apical pore. The pileipellis (similar to the cuticle) have round or calvate cells. These mushrooms are found on humus, plant parts, hardwood, and dung.

Clavariaceae (also known as coral fungi) contain mushrooms with fingerlike, erect fruiting bodies. Fruiting bodies consist of an upper half of spore-bearing mechanisms and may be single or branched (often appearing as a bush). Spores have a very wide range of color including white and brown. The flesh of the mushroom may be brittle to leathery and tough.

The Cortinariaceae family is a very large with mycorrhizal and decomposer species. The species in this family have dark spores that can range from pale yellow/brown to a dark cinnamon color. Most species in this family have a partial veil that is consistent of a cortina or spiderweb-like veil.

Gloeophyllaceae is known as wood-decay fungi and has the capability of rotting wood turning it brown.

Hygrophoraceae have fruiting bodies that have a wide range of size and color. The pileus of the mushroom can be sharply conic to plane. The surface of the mushroom may be slimy to dry. The lamellae of the mushroom tend to be thick and waxy. If the lamellae is rubbed it feels like you are rubbing the wax of a candle. The hygrophoraceae family is normally found on humus, grass, and leaf litter.

Lepiotaceae are often called “Parasol Mushrooms” The mushrooms have free lamellae, and long, thin stipes. The lamellae are normally free and the spores are elliptical and thick-walled.

Lycoperdaceae are known as “true puffballs”. Puffballs harness their spores in a tough outer skin. At maturity, mushrooms in Lycoperdaceae will have their tough skin split open, allowing billions of spores to be scattered. Mushrooms in this family can be found in grass, humus, or wood debris.

Polyporaceae are mushrooms that have fruiting bodies that range from soft to very tough. Most of these mushrooms have their fertile layer, called a hymenium, in vertical pores on the underside of the caps. Some of the mushrooms have gill or gill like structures instead of vertical pores. Most of the species in Polyporaceae have brackets, but some have stipes.

Tricholomataceae are ground mushrooms that include species that are found on the ground, humus, plant parts, stumps, and wood. Tricholomataceae V are those on wood with a well formed stipe (Miller).

Materials and Methods

Mushrooms were collected from both sides of the trails at Archbold Tropical Research and Education Centre (ATREC) and surrounding areas; Elfin Forrest (Boeri Lake, Freshwater Lake, and Boiling Lake), Cabrits National Park, Emerald Pool, Middleham Falls, and Syndicate Trail.

Archbold Tropical Research and Education Centre is a biological research station owned and operated by Clemson University. Archbold provides living amenities as well

as research facilities. The forest around Archbold is considered second growth transitional forest. Second growth transitional forest is characterized by forest that has re-grow after a major environmental disaster or agricultural use.

Elfin Forest is found at Boeri Lake, Freshwater Lake, and Boiling Lake. Elfin forest consists of very stunted, moss-covered trees. The Elfin Forest is home to many vascular epiphytes as well as orchids. The soil is often rich, but boggy. Most precipitation occurs due to fog drip, which is when fog condenses on leaves then falls to the forest floor below.

Cabrils National Park is located on the North end of the island near the city of Portsmouth. Cabrils is home to Fort Shirley, an 18th century British garrison. The forest that surrounds Cabrils is typical of dry forest. The main characteristic of dry forest is the long periods of drought that the forest experiences. Deciduous trees primarily occupy the canopy. Trees on the moister side of a dry forest tend to be evergreens.

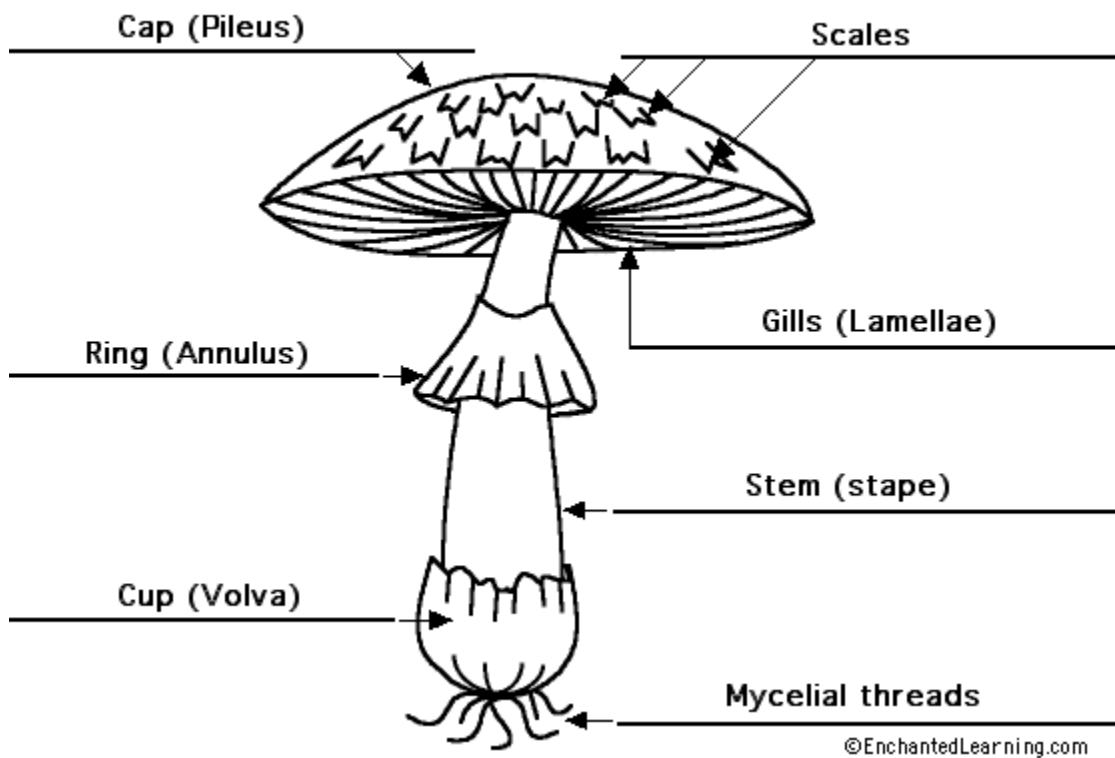
Emerald Pool, Middleham Falls, and Syndicate Trail are all home to Montane forest. Montane forest occurs at an elevation above 3,300 feet. Montane forest's canopy tends to be high. At exposed summits and ridges, Montane forest often transitions to elfin forest. (Lack, place the year, not the page number, should be Lack et al., 1997)

Mushrooms were removed by using a pocket knife and cutting some of the substrate that it was attached too as well. The substrate provided additional information about the habitat where the mushrooms occurred. Once the mushrooms were cut they were placed in a brown paper bag in an attempt to prevent decay. Samples were then brought back to Archbold Research Center where they were analyzed by gathering spore prints and very vivid digital images provided by Dr. Woolley's Nikon D300 camera with

macro lenses. The flash that was used was a Nikon SB 600 flash. Spore prints were accomplished by placing the half of the mushroom on white paper and the other half on black paper (depending on the mushroom, sometimes only one color was used to determine the spore print). Although I was only able to collect a few spore prints, the pictures that Dr. Woolley provided me were enough evidence to classify the mushrooms. Mushrooms were identified as precisely as possible, with some being classified to species and others only to family. None of the classifications are completely accurate and this would be a great project to build on for future Dominican Study Abroad Students.

Charts and Diagrams:

Parts of a Mushroom



Source: (www.enchantedlearning.com/.../labelanswers.shtml)

Results

Family: *Bolbitiaceae*

Genus: *Conocybe*

Habitat and Distribution: *Conocybe* is found on grassy areas as well as hardwoods.

Most have a cone-shaped pileus. Widely distributed. Fruiting occurs in spring and summer.

Date of Discovery: 5/21/09

Description of Mushroom Found: Found on Mt. Joy Trail at Archbold Research

Station. Narrow Grey stipe rising to a white cone-shaped pileus. Close gill spacing. Found in cluster along moist hardwood.

Classification Justification: Mushroom was found on moist hardwood in early summer.

Narrow stipe gave rise to a cone-shaped pileus.

Source: (<http://www.eol.org/pages/16796>)



Figure 1A- Lateral/Ventral View



Figure 1B- Lateral View

Family: *Clavariaceae*

Genus: *Ramaria*

Common Name: White Coral Fungi

Habitat and Distribution: *Ramaria* is found on hardwoods and the ground. Widely distributed. Fruiting occurs in summer and fall.

Date of Discovery: 5/21/09

Description of Mushroom Found: Found on hardwood on Massacre Trail at Archbold Research Station. White stipe branching into a dense cluster of white pointed tips.

Classification Justification: Mushroom was found on hardwood in early summer.

Mushroom has branching clusters which is characteristic of the Genus *Ramaria*.

Source: (Miller, 346)



Figure 2A- Lateral View

Figure 2B- Lateral View

Genus: *Clavariadelphus*

Common Name: Grey Fairy Club

Habitat and Distribution: *Clavariadelphus* is found on hardwoods. Fruiting in summer and fall.

Date of Discovery: 5/23/09

Description of Mushroom Found: Mushroom was found on hardwood on trail to Middleham Falls. Grey stipe with white to grey fruiting body.

Classification Justification: Mushroom was found on hardwood in early summer. Mushroom had a narrow base moving into a wider stipe which is characteristic of the Genus *Clavariadelphus*.

Source: (<http://mgd.nacse.org/fsl/survey/Clavariadelphus.html>)



Figure 3A- Ventral View



Figure 4A- Lateral View

Family: *Cotinariaceae*

Genus: *Gymnopilus*

Habitat and Distribution: *Gymnopilus* is found on stumps and logs. Widely distributed. Fruiting in summer and fall.

Date of Discovery: 5/21/09

Description of Mushroom Found: Mushroom was found on soft soil on Mt. Joy Trail at Archbold Research Station. Wide orange stipe giving rise to an orange pileus. Open gill spacing.

Classification Justification: Mushroom was found in early summer. Although not found on hardwood, the mushroom was found very close to a small stump. The specimen found has a orange pileus which is characteristic of the genus *gymnopilus*.

Source: (<http://www.mushroomexpert.com/gymnopilus.html>)



Figure 4A- Ventral View

Family: Gloeophyllaceae

Gloeophyllum sepiarium

Habitat and Distribution: *Gloeophyllum sepiarium* is found single to several on stumps, conifer logs, bridge timbers, boards, and other wood. Widely distributed. Fruiting in summer and fall.

Date of Discovery: 5/26/09

Description of Mushroom Found: Brown shelf mushroom found at Battalie Beach on hardwood in early summer.

Classification Justification: Mushroom was found in ear summer on a hardwood.



Source: (Miller, 427)

Figure 5A- Ventral View

Family: Hygrophoraceae

Genus: *Hygrocybe*

Habitat and Distribution: *Hygrocybe* is found on the ground surrounding hardwood.

Widely distributed. Fruiting in spring, summer, and fall.

Date of Discovery: 5/23/09

Description of Mushroom Found: Mushroom found on leaf litter next to hardwood on Middleham Falls Trail. Mushroom has a narrow orange stipe giving rise to a wide orange pileus. Closed gill spacing.

Classification Justification: Mushroom was found in early summer near a hardwood.

Source: (Miller, 63)

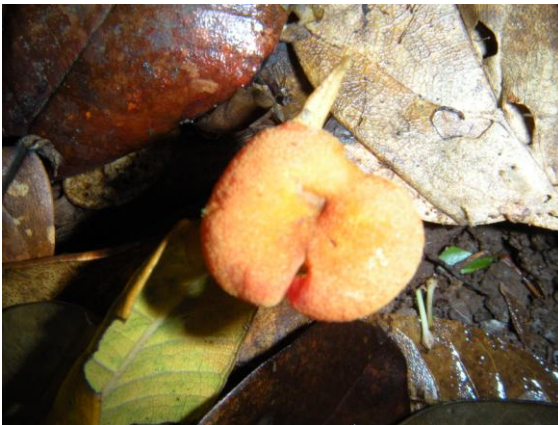


Figure 6A- Ventral View

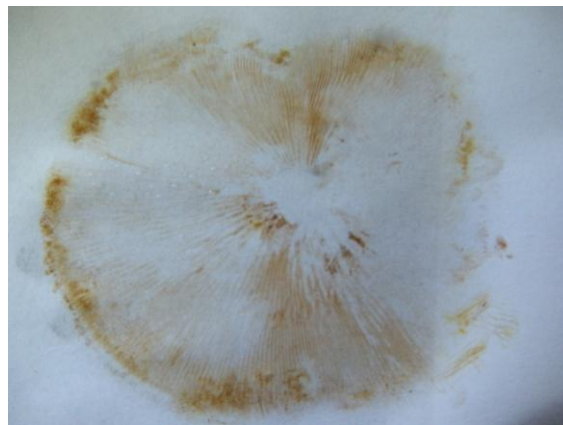


Figure 6B- Spore Print



Figure 6C- Lateral View

Genus: *Hygrocybe*

Habitat and Distribution: *Hygrocybe* is found on the ground surrounding hardwood.

Widely distributed. Fruiting in spring, summer, and fall.

Date of Discovery: 5/23/09

Description of Mushroom Found: Mushroom found on side of hardwood on Middleham Falls Trail. Mushroom has a very narrow orange stipe giving rise to a wide slimy pileus. Closed gill spacing

Classification Justification: Mushroom was found on the side of a hardwood in early summer.

Source: (Miller, 62)



Figure 7A- Ventral View



Figure 7B- Ventral/Lateral View

Family: *Lepiotaceae*

Genus: *Lepiota*

Habitat and Distribution: *Lepiota* is found growing on conifers and hardwoods.

Widely distributed. Fruiting in summer and fall.

Date of Discovery: 5/23/09

Description of Mushroom Found: Mushroom found on the side of a moist hardwood on Middleham Falls Trail. Mushroom has short white stipe giving rise to a wide white and brown pileus.

Classification Justification: Mushroom found on hardwood in early summer. Pileus has a white outer rim progressively turning more brown as you reach the center.



Figure 8A-Ventral/Lateral View

Family: *Lycoperdaceae*

Genus: *Calvatia*

Habitat and Distribution: *Calvatia* is found in grassy and wooded areas. Widely distributed. Fruiting in summer and fall.

Date of Discovery: 5/26/09

Description of Mushroom Found: Mushroom found in wooded area near moist soil on the West Cabrits Trail. Very minute stipe with large round pileus (characteristic of puffball mushrooms)

Classification Justification: Found in wooded area in early summer. Mushroom is white which is characteristic of most *calvatia*.

Source: (<http://www.eol.org/pages/16796>)



Figure 9A- Lateral View



Figure 9B- Dorsal View

Family: *Polyporaceae*

Genus: *Pycnoporous*

Habitat and Distribution: Found on logs, limbs, and stumps of hardwoods. Widely distributed. Fruiting in summer and fall.

Date of Discovery: 5/23/09

Description of Mushroom Found: Mushroom found on hardwood stump on Middleham Falls Trail. Mushroom has a multi-colored pileus, with the inner rim being red moving outward to an orange outer rim.

Classification Justification: Mushroom was found on a stump of a hardwood in early summer. Pileus is multi-colored being orange to red.

Source: (Miller, 429)



Figure 10A- Lateral View

Family: *Tricholomataceae*

Clitocybula abundans

Habitat and Distribution: Found on conifer logs and stumps. Widely distributed.

Fruiting in spring, summer, and fall.

Date of Discovery: 5/21/09

Description of Mushroom Found: Mushroom found on fallen log on Massacre Trail on Archbold Research Station. Mushroom has narrow white stipe giving rise to wide pileus with orange spots. Open gill spacing.

Classification Justification: Mushroom found on fallen log in early summer.

Mushroom has orange spots on pileus

Source: (Miller, 162)



Figure 11A- Lateral View



Figure 11B- Ventral View



Figure 11C- Spore Print

Unidentified Mushrooms

Date of Discovery: 5/21/09

Description of Mushroom Found: White pileus with open gill spacing. Found on log on Massacre Trail on Archbold Research Station.



Figure 12A- Dorsal View

Date of Discovery: 5/21/09

Description of Mushroom Found: White shelf mushroom with grey outer bands.

Found on log on Mt. Joy trail on Archbold Research Station.



Figure 13A- Ventral View

Date of Discovery: 5/21/09

Description of Mushroom Found: Mushroom is in early fruiting stage. Grey stipe with white tips. Found on fallen log on Mt. Joy Trail on Archbold Research Center.



Figure 14A- Ventral View



Figure 14B- Lateral View

Date of Discovery: 5/21/09

Description of Mushroom Found: White shelf mushroom found on fallen hardwood on Mt. Joy Trail at Archbold Research Station.



Figure 15A- Dorsal View



Figure 15B- Ventral View

Date of Discovery: 5/21/09

Description of Mushroom Found: Shelf mushroom with purple center radiating out and having a white rim. Found on Mt. Joy trail on Archbold Research Station.



Figure 16A- Ventral View

Date of Discovery: 5/21/09

Description of Mushroom Found: Red Shelf Mushroom with white outer rim. Found on fallen log on Mt. Joy Trail on the Archbold Research Station.



Figure 17A- Ventral View



Figure 17B- Ventral View

Date of Discovery: 5/21/09

Description of Mushroom Found: White Shelf Mushroom with grey rings. Found on Mt. Joy Trail at Archbold Research Station



Figure 18A-Ventral View/Dorsal View



Figure 18B-Ventral View

Date of Discovery: 5/23/09

Description of Mushroom: Brown shelf mushroom with white outer rim. Found on steps on Middleham Falls Trail



Figure 19A- Ventral View

Date of Discovery: 5/23/09

Description of Mushroom: Brown shelf mushroom with white outer striated rim. Found on steps on Middleham Falls Trail.



Figure 20A- Ventral View



Figure 20B- Dorsal View

Date of Discovery: 5/25/09

Description of Mushroom Found: Shelf mushroom with red base and white outer rim.

Rim covered with red spots. Found on Middleham Falls trail.



Figure 21A- Ventral View



Figure 21B- Ventral View

Date of Discovery: 6/1/09

Description of Mushroom Found: Mushroom has narrow stipe with white pileus.

Pileus is spotted with brown. Center of pileus is concave.



Figure 22A- Ventral View



Figure 22B- Ventral View

Date of Discovery: 6/1/09

Description of Mushroom Found: Mushroom found on Boeri Lake trail. White stape with small brown pileus. Pileus is covered with white protrusions.



Figure 23A- Ventral View



Figure 23B- Ventral View

Date of Discovery: 6/4/09

Description of Mushroom Found: Mushroom found on Boiling Lake Trail on leaf litter. Pileus of mushroom is bright red with a thin red stape. Closed gill spacing.



Figure 24A- Ventral View

Conclusion

In conclusion, the method used to collect mushrooms worked very well overall. Some difficulties occurred when trying to preserve the mushrooms for further photography at night. Although mushrooms were placed in a paper bag, once they were collected, a few mushrooms lost their color and shape from the time of collection to the time of photography. This could be due to the lack of nutrients that the mushroom was receiving in the bag (as compared to in its natural environment). It could also be due to the fact that the mushrooms were placed in a backpack that had other items in it that could have shifted during carry and caused the mushrooms to deteriorate faster. A possible solution would be to place the mushrooms in a sealed plastic container, such as a Rubbermaid tub, to prevent shape deterioration. In order to harvest the color of the mushroom for longer, it may help future students to place a moist towel in the bottom of the container.

Mushroom identification often proved to be a difficult task due to the amount of resources at hand. Although the mushroom book “North American Mushrooms” provided me with a general idea of how I should classify the mushrooms I collected, it was a field guide based on mushrooms in North America. This produced error in my results due to the fact that the classifications I found were based on mushrooms in North America, and not mushrooms specifically for the island of Dominica. Therefore, in order to have a better grasp on what mushrooms exist in Dominica and which mushrooms I collected, further material is needed that is specific to the area.

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