A Preliminary Study of the Fishes in the Batali River Mouth, the Checkhall River, the Castle Bruce River Mouth and Middleham Falls Pool in Dominica W.I.

By Britney Burback

Abstract

This is an introductory study to some species of inland and freshwater fishes found on Dominica. The study serves as a basic guide to some of the fish species found at the Batali River mouth, the Checkhall River, the Castle Bruce River mouth and Middleham Falls. Physical descriptions of specimens, photographs and locations of observations collected during this study are included in the report. Additionally, a technique for further studies in the streams of Dominica has been modeled in this report.

Introduction

Dominica, often called the "Nature Island" of the Caribbean, is located in at the heart of the Lesser Antilles (15°20'N, 61°20'W) (Evans and James, 1997). Although the island is only 750 square kilometers in total area, its mountainous terrain gives it the feel of a much larger island (Evans and James, 1997). Because the land is so mountainous and receives large amounts of rainfall, numerous rivers flow across the land and into the sea. When searching for the number of species of fish that inhabit the rivers numbers vary from ten to sixteen depending on the source (fishbase.org; Evans and James, 1997). In their guide, Evans and James (1997) even admit that it is very likely more species exist and merely have not been documented. Because of this information gap, this study was developed primarily for the students of the Archbold Tropical Research and Education Center (ATREC) as a better way to identify the fish seen in Dominica's various freshwater environments.

Materials and Methods

The materials used to gather this information were an Olympus Tough series underwater camera, a mask and snorkel, a Lowrance Elite 500C depth sounder rigged into a floating tub for portability, and a Geopacks Flowmeter (MFP51). Pictures and sightings of the fishes were identified using an unpublished key with information assembled from a variety of sources including fishbase.org and the Checklist of Inland Fishes of the Caribbean Islands. Additionally, photos from reputable websites were used for comparison with the photos taken during the study when diagnostic characteristics noted in the key could not be observed without collecting specimens. The key was mainly used to identify the specimens down to family and then photographs of possible species were searched on the internet for further classification. Due to the extreme lack of information regarding the subject area, some species were observed but not identified.

At each location, personal observations were made and photos were taken. The locations visited included the mouth of the Batali River at Batali Bay, the section of the Checkhall River that runs through the Springfield Estate, the Castle Bruce river mouth at St. David's Bay and the pool beneath Middleham falls.

To map the cross-section of the stream, a fish finder was adapted into a plastic tub and walked along a transect that went from bank to bank of the river. At half-meter intervals, the depth was recorded from the fish finder as well as the distance from the starting shore and repeated until the far shore was reached. During calculation, 0.5 feet were added to each depth as the tub with the fish finder sat six inches below the surface of the water. Finally, since the depth finder calculated distances in feet, the data was converted into meters. This information was then placed into Microsoft Excel on a graph of distance vs. depth in order to show the topography of the bottom of Batali Bay.

Results

Twelve species were observed from five locations on the island, and eight fish were identified at least to genus and photographed. Species not classified and photographed likely included three species of gobies, one species of flounder and one fish that resembled a bass. The locations and dates of the sightings are listed below in Table 1. Table 2 and Figure 1 represent the ability to map the cross-section of a stream with the Lowrance Elite 500C depth sounder rigged into a floating tub for portability.

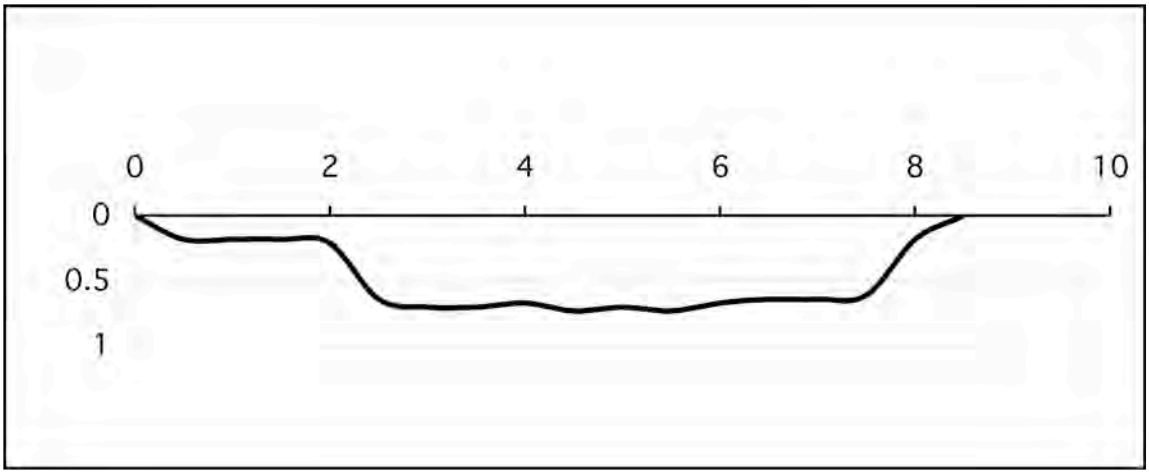
Table 1: Data Collected

Species	Date Found	Location(s) Found
Sicydium punctatum	27.5.2010, 28. 5.2010	Checkhall River Middleham Falls
Sicydium antillarum	28.5.2010	Middleham Falls
Centropomus parallelus	31.5.2010, 6.6.2010	Batali Bay
Agonostomus monticola	25.5.2010 31.5.2010, 6.6.2010 2.6.2010	Melville Hall River Batali Bay St. David's Bay
Gobiomorus dormitor	31.5.2010, 6.6.2010	Batali Bay
Orange Sicydium sp.	31.5.2010	Batali Bay
Centropomus sp.	2.6.2010	St. David's Bay
Awaous banana	6.6.2010	Batali Bay

Table 2: Data from Depth Sounder of Batali River mouth

Distance (m)	Depth (ft)	Offset (ft)	Depth final (ft)	Depth final (m)
0	0	0	0	0
0.5	0.1	0.5	0.6	0.18
1	0.1	0.5	0.6	0.18
1.5	0.1	0.5	0.6	0.18
2	0.2	0.5	0.7	0.21
2.5	1.6	0.5	2.1	0.64
3	1.8	0.5	2.3	0.70
3.5	1.8	0.5	2.3	0.70
4	1.7	0.5	2.2	0.67
4.5	1.9	0.5	2.4	0.73
5	1.8	0.5	2.3	0.70
5.5	1.9	0.5	2.4	0.73
6	1.7	0.5	2.2	0.67
6.5	1.6	0.5	2.1	0.64
7	1.6	0.5	2.1	0.64
7.5	1.5	0.5	2	0.61
8	0.1	0.5	0.6	0.18
8.5	0	0	0	0

Figure 1: Stream Profile of the Batali River mouth (based on Table 2)



Note: Distance starts at the south end of the creek (0) and moves to the north (8.5). Depths and distances are in meters. Data collected by Dr. Will Heyman and Travis Roof.

Discussion:

Several species documented in Dominica were not observed. These include *Anguilla rostrata*, *Oosthetus brachyrurus, Pomadasys crocro, Eleotris pisonis,* and *Gobiesox punctulatus*. However, locations they are known to inhabit were not visited. Also, five species of fish were observed and four photographed but due to lack of photographic representation and characteristics needed to key out species, they were not included in the report.

The most diverse location visited was the mouth of the Batali River at Batali Bay. Over half the specimens observed occurred there.

Future projects could build on this study, adding more detailed descriptions and quantitative observations about the locations visited. Quantitative data that could be studied may include bathymetry of the bottom, water chemistry and temporal observations such as time of day or period in the lunar cycle. Further studies should sample more of the brackish and freshwater environments on Dominica as well as capture specimens in order to take better photographs and, if available, use a reputable key for identification. For a more specified study, one could examine the differences of the species that use cryptic coloration, like *Awaous banana* or *Gobiomorus dormitor*, documenting the variances observed between species in Dominica and the other islands of the Caribbean or South America.

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The Freshwater Fishes Observed in Batali Bay, Checkhall River, Castle Bruce Rivermouth, and Middleham Falls Pool in Dominica W.I.

Centropomidae

The Centropomidae family, commonly known as snooks, consists of twelve species of fish found in the Americas and Atlantic Ocean. They resemble perch and are notably recognized by concave snout profiles and obvious lateral lines. They commonly inhabit marine and brackish waters, although they can sometimes be found in freshwater. In some places they are valuable food fishes. They can grow to a maximum length about 1.4 m (Froese and Pauly, 2010).

Centropomus sp.— Snook

Description: Numerous members of this species were seen schooling together in the Batali Bay River mouth. Estimated sizes of fish ranged from 20 to 60cm. Notable physical characteristics included the ventral most part of the fish being dark grey and parallel lateral lines apparent running from halfway down the lateral side of the body to the tail. The face has the characteristic downward slope of *Centropomus* species.
Location: This photograph was taken in the Batali River mouth that empties into Batali Bay (Figure 2). Several of these fish were seen swimming in the river near Batali Bay. They seemed to school together and stick near a submerged palm tree.

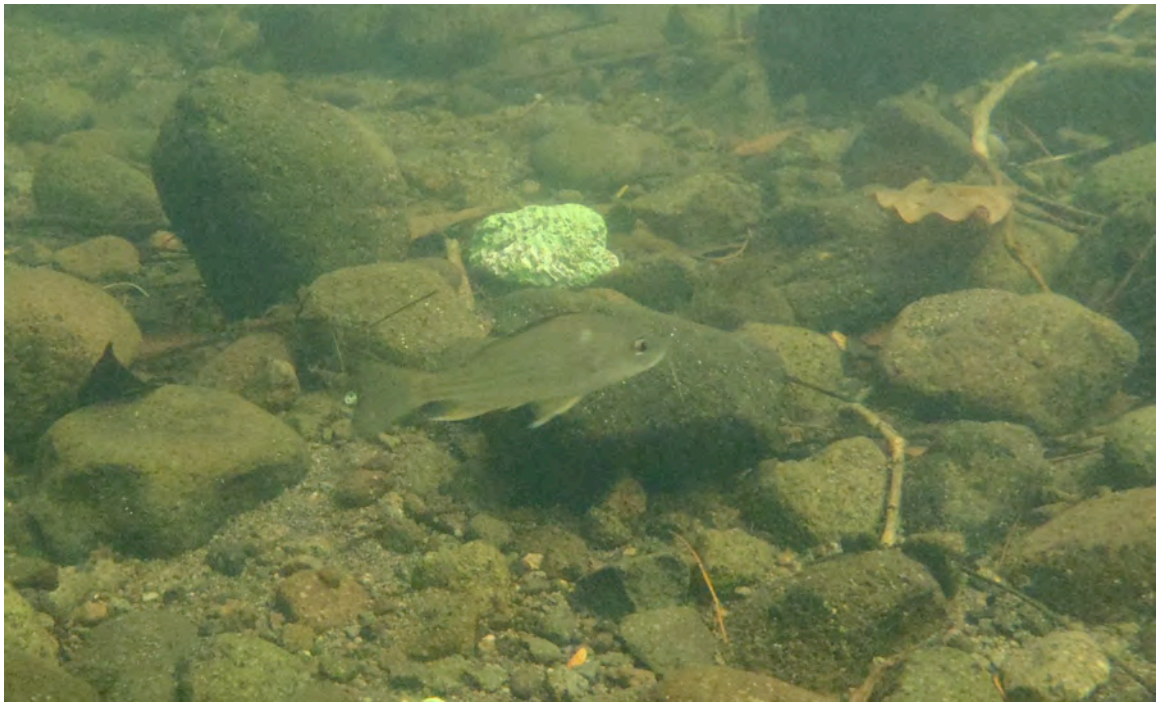

Figure 2: ***Centropomus sp.***

Centropomus parallelus –Fat Snook

Description: A silver fish to 72 cm with a pointed head, laterally compressed body, forked tail and lateral line extending to the tail (Preliminary Guide).

Location: This picture was taken in the mouth of the Castle Bruce River at St. David's bay on the Atlantic side of the island (Figure 3). They are thought to found in inland waters of the Lesser Antilles, although they are only recorded from Dominica (Preliminary Guide). However, they are recorded from Southern Florida and the Mexican Gulf coast close to Florianopolis, Brazil (Preliminary Guide).

Figure 3: ***Centropomus parallelus***

Eleotridae

The Eleotridae family is known commonly as sleepers due to their relatively inactive nature. The species of this family has been found in all subtropical and tropical waters except the Mediterranean and the surrounding tributaries. Members of the family typically have a stout body, short and broad head and usually a neutral tan color with some metallic flashes. Sometimes confused with Gobiidae, Eleotridae will never have a subterminal mouth and the space between second dorsal fin and tail is often equal to or larger than the base of the second dorsal fin (Froese and Pauly, 2010). In Gobiidae, the space between the second dorsal and tail is much smaller than the base of the second dorsal fin (Murdy, 2004).

Gobiomorus dormitor—Big-Mouth Sleeper

Description: Specimens observed ranged greatly in size and reach a maximum length of 60 cm (Murdy, 2004). Often the fish would not move until a diver was directly over top of them, making them extremely easy to photograph. All had distinctive dark stripe running from the pectoral fins to the tail.

Location: These pictures are from the mouth of the Batali River at Batali Bay (Figure 4a and 4b). Fish observed were readily abundant on the river bottom, hiding among rocks.

Figure 4a: ***Gobiomorus dormitor, large***

Figure 4b: Gobiomorus dormitor, small

Gobiidae

The family Gobiidae encompasses over 220 genera and 1500 species, making it the largest family of fishes (Murdy, 2004). With success from the depths of 500 m to shallow coral reefs and freshwater streams, members of this family populate a number of benthic environments (Murdy, 2004). Species are especially rich in equatorial coral reefs (Murdy, 2004).

Sicydium punctatum

Description: *Sicydium punctatum* are some of the easiest residents to spot in streams on Dominica due to their bright blue coloration. Members of this species can reach lengths of 8 cm and have sexually dimorphic coloration, appearing either bright blue or light brown. This species is frequently confused with *Sicydium antillarum*. The bars on the

lateral sides of *S. punctatum* eventually cross or branch near the goby's dorsal surface where as the bars of *S. antillarum* are completely parallel and do not branch (Bell et. al., 1995; Bell, 2009).

Location: These gobies in Figure 5a were photographed in the pool beneath Middleham falls. They are also common in the Checkhall River on the Springfield Estate, like the brown goby in Figure 5b.

Figure 5a: Blue Sicydium punctatum

Figure 5a: Brown Sicydium punctatum

Sicydium punctatum—orange morph

Description: This color morph was described by K.N.I. Bell as a morph with a blotchy pattern of yellow/orange and brown/black (Figure 6). He postulates that is possible that this color morph could be merely a variant of S. punctatum or potentially a hybrid with *Lentipes concolor* (Bell, 2007). For further information about the species, see entry for *Sicydium punctatum*.

Location: This specimen was photographed at the mouth of the Batali River at Batali Bay.

Figure 6: Orange morph of Sicydium punctatum

Sicydium antillarum

Description: Described by K.N.I. Bell, the most obvious distinguishing feature from *S. punctatum* are the vertical bars on the side of its body (Bell et. al., 1995). For further information, see entry for *Sicydium punctatum*.

Location: This specimen of *S. antillarum* was photographed in the pool beneath Middleham Falls near Cochrane (Figure 7).

Figure 7: Sicydium antillarum

Awaous banana—River goby

Description: Representatives of this species can reach lengths of 30 cm. They are known to occur in the fresh and brackish waters of Florida south through the western Atlantic and from Baja California southward toward Peru on the eastern Pacific (Murdy, 2004). It has a pointed face, fleshy lips and cryptic coloration.

Location: This specimen was photographed in the waters of the Batali River mouth by Batali Bay over a sandy bottom (Figure 8).

Figure 8: ***Awaous banana***

Mugulidae

Mullets, fish in the family Mugulidae, are found in all tropical and temperate seas of the world. Specimens are generally found in coastal and brackish water. Their anatomy is

chiefly recognized by a muscular stomachs and subabdomincal pelvic fins. Members of this family usually school and eat algae, diatoms and the detritus found on substrates (Froese and Pauly, 2010).

Agonostomus monticola—Mountain Mullet

Description: This species has been recorded to 36 cm in fresh, brackish and marine waters. It is counter-shaded with a brown or copper upper portion of the body and a pale bottom portion. A lighter golden stripe runs from the eye to the tail.

Location: These Mountain Mullet were photographed in the mouth of the Batali River at Batali Bay (Figure 9). They tended to hide out around submerged objects, especially a fallen palm tree.

Figure 9: ***Agonostoumus monticola***

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