

Survey of Fishes in Deep Water Near Rodney's Rock

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Abstract:

In this study, we surveyed the most abundant fish along a transect line set at a depth of 3.0 to 6.5 meters on the north side of Rodney's Rock. The five most abundant fishes in the deep water transect were Brown Chromis (*Chromis multilineata*), Sergeant Major (*Abudefduf saxatilis*), Bicolor Damselfish (*Stegastes partitus*), Yellowtail Damselfish (*Microspathodon chrysurus*), and Bluehead Wrasse (*Thalassoma bifasciatum*). These species were all much less abundant, with the exception of the Brown Chromis, in the shallow water survey conducted by Hoffman et al. (2005).

Introduction:

Dominica is a small island located in the Lesser Antilles region of the southern Caribbean. The island thrives on ecotourism, one aspect being its variety of aquatic life. Rodney's Rock is located on the Caribbean coast of Dominica. The rock hosts various habitats for reef fish such as shallow coral reefs, vertical rock formations, and reefs reaching depths of up to 6.5 meters. The diversity of Rodney's Rock makes it an ideal location for observing and studying fishes and their habitat preferences. This study examines the relative abundance of fishes on a deep water transect at Rodney's Rock.

Material & Methods:

A transect line, 12 meters long and anchored by a weight at each end, was established on the north side of Rodney's Rock. Depth of the transect line varied from 3.0 to 6.5 meters. The location of the transect line was chosen to provide contrast with the information gathered by Hoffman et al. (2005), who surveyed fishes in shallow water 1 to 2 meters in depth. The transect was located roughly 46 meters west of Hoffman et al.'s (2005) transect, 6.5 meters from the point, and 9 meters from the wall of Rodney's Rock. The transect line stretched across two submerged rock formations which are blanketed by various species of coral and sponges. This, along with crevices in the rock and areas of sandy bottom make an ideal habitat for fish species diversity.

The transects were performed over the course of three days: June 2, June 3, and June 8, 2005. An average of five transects were performed each of the three days. For each transect, two members of the group started at opposite ends of the line and swam the length. Each pass made by the pair was counted as one transect. Fish were included in the count if they were within either swimmer's line of vision on either side of the line. Once the swimmers reached the end of the line, a single transect was completed.

Results:

Table 1 shows the relative abundance of all the fish observed and counted over the three day period on the deep transect. Means and standard deviations are also included to facilitate comparison. Brown Chromis were always too numerous to count. Figure 1 shows the next ten most abundant fish on the deep transect compared to the same species on the shallow transect.

Ten most abundant species on deep transect: The Brown Chromis, *Chromis multilineata*, is light brown dorsally and white ventrally, with yellow fringe on its dorsal fin. It also has a white spot where the dorsal fin and tail meet. The tail is deeply forked. It is three and a half to five inches with a maximum of six and a half inches in length. The next seven most abundant species were readily identified by their size and color pattern. The Sergeant Major, *Abudefduf saxatilis*, has a white oval shaped body with vertical fading black bars with yellow coloration on dorsal. It is four to six inches with a maximum of seven inches in length. The Bicolor Damselfish, *Stegastes partitus*, has a black anterior and white posterior. It is two to three inches long with a maximum length of four inches. Yellowtail Damselfish, *Microspathodon chrysurus*, has a dark blue to black oval shaped body with a yellow tail. It is four to six and a half inches with a maximum of seven and a half inches in length. The Bluehead Wrasse, *Thalassoma bifasciatum*, has a long, cylindrical body with a blue head, a black ring, white ring, black ring and its remaining body is green. It is four to five inches in length with a maximum of six inches. The Surgeonfish, *Acanthurus bahianus*, has green dorsal coloration fading to blue ventral coloration with a white band around the tail. It is six to twelve inches with a maximum of fifteen inches in length. The Dusky Damselfish, *Stegastes fuscus*, has an oval shaped body with dark brown to black coloration. Its dorsal and anal fins do not extend past the base of the tail. It is three to five inches with a maximum of six inches in length. The Slippery Dick, *Halichoeres bivittatus*, has a greenish body with a yellow head and black vertical lines toward the end of the tail. It is five and a half to seven inches with a maximum of nine inches. The last two species were identified largely by

size and shape. The Sharpnose Puffer, *Canthigaster rostrata*, has an oval green dorsum with a yellow midsection and blue-gray ventum; also has intermittent blue spots. It is two to three inches with a maximum of four and a half inches. The Trumpetfish, *Aulostomus maculatus*, has a long slender body with a trumpet-like mouth. Its colorings vary from yellow, tan, to a reddish-brown. It is one and a half to two and a half feet with a maximum of three feet in length.

Discussion:

The results indicate the Sergeant Major was overwhelmingly more abundant on the deep transect than the shallow. Though not picky eaters, Sergeant Majors feed in small schools of two to five fish and swim in open areas (University of Michigan, 1995-2005). Juveniles tend to remain in shallow areas using them as shelter from predators then migrate to deeper water as they mature. Since juveniles were excluded in the survey by Hoffman et al. (2005), the number of Sergeant Majors recorded in the shallow area was low.

The Yellowtail and Bicolor Damselfish were both abundant in the deep area and relatively absent from the shallow area. According to Humann (1994), Yellowtail Damselfish are typically found in water depths of three to twelve meters; Bicolor Damselfish are found from six to 24 meters. The shallow transect was placed in water less than three meters deep, therefore there was an absence of Yellowtail and Bicolor Damselfish. The Dusky Damselfish was relatively common in both habitats. However,

according to Hoffman et al. (2005), the Dusky Damselfish preferred shallow waters (Figure 2). This is due to the fact that the Dusky's preferred algae are more common in shallow water (Anderson, et al., 2001).

The Bluehead Wrasse was also predominantly found on the deep transect. The Bluehead Wrasse often hunts in packs allowing them to steal eggs from egg-laying fishes such as Bicolor Damselfish and Sergeant Majors, both of which were prevalent in the deeper water (Shedd Aquarium, 2001). The remaining fish were not significantly more abundant in the deep water than the shallow water.

The Brown Chromis were excluded from the results because it is a schooling fish and therefore was too numerous to count. Fluctuations in the data between days may be attributed to poor visibility associated with rainy weather on June 2nd and 3rd. Jellyfish also posed a problem for the researchers on June 8th.

Given the results, there was an obvious difference in the relative abundance of fishes at the two sites near Rodney's Rock. Being positioned closer to the point of Rodney's Rock and in deeper water, the transect line was not sheltered by the cove and more apt to be affected by the waves and currents.

References:

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Tables and Figures:

Table 1: Relative Abundance of Fishes in the North Deep End of Rodney's Rock. TNTC: too numerous to count.

Common Name	Day 1	Day 2	Day 3	Mean	S.D.
Brown Chromis	TNTC	TNTC	TNTC	TNTC	NA
Sergeant Major	1.31	11.59	0.82	4.57	4.97
Bicolor Damselfish	4.59	4.37	3.95	4.30	0.27
Yellowtail Damselfish	3.75	3.86	4.00	3.87	0.10
Bluehead Wrasse	3.26	3.72	2.40	3.12	0.54
Surgeonfish	3.43	3.75	1.80	2.99	0.85
Dusky Damselfish	2.33	2.43	2.30	2.35	0.06
Slippery Dick	1.30	0.39	0.40	0.70	0.43
Sharpnose Puffer	0.55	0.47	0.35	0.46	0.08
Trumpetfish	0.88	0.32	0.15	0.45	0.31
Stoplight Parrotfish	0.33	0.32	0.67	0.44	0.16
Smooth Trunkfish	0.79	0.07	0.04	0.30	0.35
Striped Parrotfish	0.05	0.25	0.19	0.16	0.08
Yellowfin Grouper	0.00	0.32	0.12	0.15	0.13
Queen Parrotfish	0.15	0.18	0.10	0.14	0.03
Spotted Goatfish	0.04	0.07	0.25	0.12	0.09
Spotted Drum	0.25	0.00	0.00	0.08	0.12
Grunt	0.12	0.04	0.00	0.05	0.05
Banded Butterfly	0.09	0.00	0.00	0.03	0.04
Rock Beauty	0.00	0.09	0.00	0.03	0.04
Blackbar Soldierfish	0.00	0.07	0.00	0.02	0.03
Blue Tang	0.00	0.04	0.00	0.01	0.02
Yellow Goatfish	0.00	0.00	0.00	0.00	0.00

Table 2: Relative Abundance of Fishes in the North Shallow End of Rodney’s Rock

Common Name	Day 1	Day 2	Day 3	Mean	S.D.
Surgeonfish	1.75	4.69	4.24	3.56	0.57
Dusky Damselfish	2.18	2.00	4.93	3.03	1.48
Slippery Dick	1.21	1.98	3.87	2.36	1.00
Banded Butterfly	0.69	1.34	1.75	1.26	0.26
Grunt	0.40	0.69	1.93	1.01	0.64
Spotted Goatfish	0.68	0.68	1.13	0.83	0.23
Bluehead Wrasse	0.30	0.86	1.00	0.72	0.14
Sharpnose Puffer	0.35	0.95	0.75	0.68	0.14
Brown Chromis	0.10	0.95	TNTC	0.53	0.30
Yellowtail					
Damselfish	0.31	0.30	0.36	0.32	0.03
Trumpetfish	0.11	0.00	0.57	0.23	0.28
Bicolor Damselfish	0.00	0.33	0.29	0.21	0.06
Stoplight Parrotfish	0.31	0.00	0.05	0.12	0.06
Yellow Goatfish	0.20	0.10	0.00	0.10	0.06
Striped Parrotfish	0.00	0.00	0.30	0.10	0.15
Sergeant Major	0.00	0.00	0.15	0.05	0.08
Queen Parrotfish	0.00	0.00	0.05	0.02	0.03

Figure 1: Most Abundant Fish in Deep Compared to Shallow Water at Rodney’s Rock

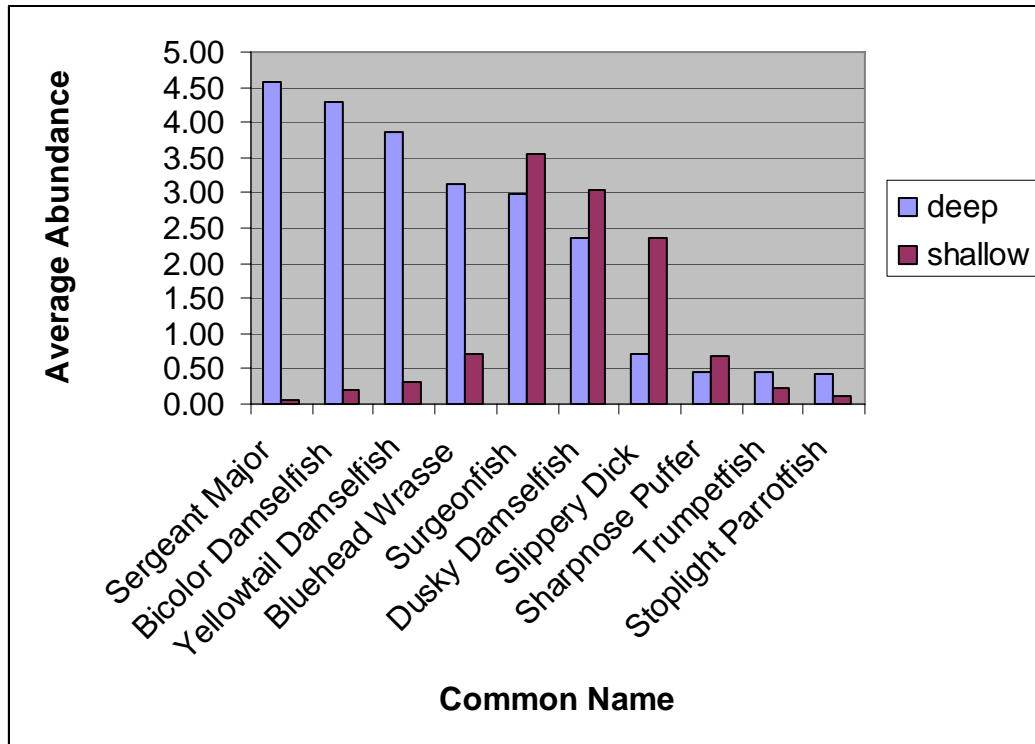


Figure 2: Most Abundant Fish in Shallow Compared to Deep

