Observations of Territorial Behavior of *Stegastes fuscus*

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Abstract

Stegastes fuscus, commonly known as the Dusky Damselfish, is a fish prevalent off the shore of Champagne beach. *S. fuscus* is known to display aggressive territorial behavior. An observational study was performed and data were collected regarding the species of fish chased away by *S. fuscus* as well as the size of the feeding territory.

Introduction

Dominica, "the nature island," has an abundance of natural beauty. There are many beautiful beaches each with their own unique qualities. One particular beach, Champagne beach, was the dive site for this study. In the shallow waters off of the shore there is an abundance of marine life.

One of the commonly found fishes is *S. fuscus*, a territorial, herbivorous fish. Herbivorous fish forage in three ways: territorial defense, group foraging, and individual home ranges. *Stegastes fuscus* are the most obvious holders of feeding territory on coral reefs (Horn 167). They defend and maintain alga patches and according to Horn, author of Biology of Marine Herbiverous Fishes, strongly affect abundance, diversity and productivity of seaweed communities on coral reefs.

The feeding habits of herbivorous fish can be further subdivided into two classes: grazers and browsers. Grazers, such as the *S. fuscus*, are nonselective and eat by scraping or sucking. Browsers are selective in their eating habits and bite or tear macroalgae (Horn 170).

Territoriality of *S. fuscus* has been studied for years. Observations were made over a period of five days in the West Indies on the island of Dominica. Observations were focused on the territorial behavior of one *S. fuscus* about 20 feet of the shore of Champagne beach.

Materials and Methods

The site of observations and data collecting was Champagne beach, Dominica, West Indies. All observations were made in the morning between 9am and 12pm and written on an underwater tablet. Over a period of five days (May 23rd, May 27th, May 28th, May 30th, and June 2nd 2003) observations and measurements were taken. An initial

site was found, but because of the low visibility it could not be found on the subsequent day. A new site was located on the second day and data were recorded. The primary and secondary territory dimensions were measured using a grid. The grid was held at a certain spot and string was tied at the widest and longest points of the rock. The grid was one square meter.

Results

Although the fish was not marked in any way to identify a specific individual, a fish of the same size, color and behavior was seen throughout the period of observation. There were many species of fish that were chased away and a few that were tolerated (Tables 1 and 2). Table 1 presents the species of fish that attempted to feed on the Dusky Damselfishes primary or secondary territory and were relentlessly chased away. Table 2 presents the species of fish that attempted to feed on the *S. fuscus* primary or secondary territory but were tolerated. Table 3 gives the diameters of the widest points of the primary and secondary territories and the estimated areas. The dimensions, as shown in Figure 1, were used to estimate the areas. Figure 1 displays the primary and secondary observed territory of the *S. fuscus*. The dotted lines represent the estimated area of the territories. The lines beneath are the length and width at the widest and longest points.

Discussion

As the results show, eight species of fish were chased away frequently and only a few species were tolerated. Two species in particular were more prevalent, and thus were chased away more frequently. Another factor affecting the frequency of being chased away would be the feeding habits of these fish.

Stegastes fuscus is a grazer, and it can be concluded that the *S. fuscus* will not tolerate other grazers but will be more likely to tolerate browsers. Other grazers might threaten the food supply or invade its territory. One incidence was observed where another *S. fuscus* was very aggressive towards the original *S. fuscus* and seemed to be challenging the original fish. However the original *S. fuscus* stood his ground and the intruder was discouraged. Another intruder commonly found within a larger territory defended by *S. fuscus* is the Carribbean blenny or *Ophioblennius atlanticus*. The *O.*

atlanticus and *S. fuscus* share the same diet (Horn 171). This would be considered a threat to the food supply, but it continuously escaped and took refuge in the coral reef found on the primary territory. Overall, these results strongly indicated that the *S. fuscus*, the Dusky Damselflish, is territorial.

Stegastes fuscus observed had two territories, a primary and a secondary. The primary territory was the area at which the *S. fuscus* grazed most often. It was the site of the most aggression towards other fish and was covered with coral. The secondary territory was patrolled by the *S. fuscus* periodically and had no coral. The territories were measured and the secondary territory had an area of 7700 sq cm as compared to the primary territory which was 3500 sq cm. It can be concluded that the primary territory, although significantly smaller than the secondary, was more protected because it had coral to graze on and was therefore more valuable to the *S. fuscus*.

In future studies it would be beneficial to somehow mark the fish being observed for identification purposes. More days of observation would be advantageous for credibility as well. Overall it can be concluded that the aggressive territorial behavior of the *Stegastes fuscus* is strongly influenced by its feeding habits.

References

Horn, Michael H. Biology of Marine Herbivorous Fishes. Incomplete source from study abroad program

sources. 167-272.

Hunann, Paul. Reef Fish Identification. Paramount Miller Graphics, Inc. Jacksonville, FL. 1994.

Table 1. Species of fish that attempted to feed on the primary or secondary territory of *S. fuscus* and were not tolerated.

Species	Number
Halichoeres poeyi	1
Ophioblennius atlanticus	3
Scarus taehiopterus	5
Stegastes partitus(bicolored)	4
Stegastes partitus (white stripe tail)	8
Halichoreres garnoti (large bicolored)	4
Scarus croicensis (Juvenile)	11
**Mycteroperca tigris*	12

*I was not able to identify this fish due to low visibility, it is either a *Mycteroperca tigris* or within the Wrasse Family.

Table 2. Species of fish that attempted to feed on the *S. fuscus* primary or secondary territory and were tolerated

Species	Number
Halichoreres garnoti (small)	34
Aulostomus maculatus	1
Scorpaena grandicornis	1

Table 3. Dimensions and area of primary and secondary territory

Territory	Dimensions	Area
Primary	50X70cm	3500cm^2
Secondary	70X110cm	7700cm^2

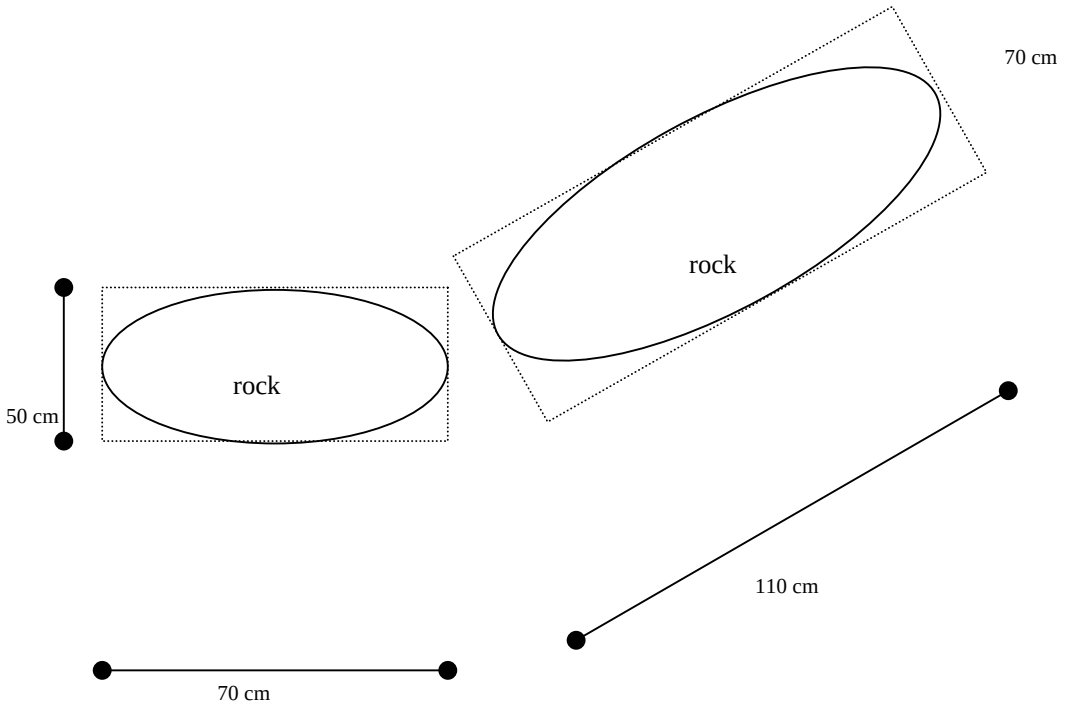

Figure 1. Dimensions of primary and secondary territories of *S. fuscus*