

Attacks on Sergeant Major Fish Nests Verses Size and Color of Male Sergeant Major

By: Fernanda Cabrera, Kelsey English, and Kiersten Wiley

Dr. Lacher and Dr. Woolley

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Abstract

Three trips to Champagne Reef were made in order to retrieve data on size, color, and number of attacks on egg nests for the Sergeant Major fish, *Abudefduf saxatilis*, over a 21 day stay in the Commonwealth of Dominica. The physical characteristics of fish were compared to the number of attacks on their egg nests in five minute intervals. Our hypothesis was that fish that are larger and darker blue will receive fewer attacks to their nest. However, after evaluating 27 trials which tested each combination of body size (small, medium, large) and color (light, true, dark) variables three times each, it was observed that the size of the fish had little to no effect, but that the darker shade of blue the fish was, the lower the number of attacks on their nests.

Introduction

The Sergeant Major fish, or *Abudefduf saxatilis*, can be found along many coral reefs worldwide in warm waters. The Sergeant Major fish gets its name from the 5 black vertical bars across their bodies that are similar to the bars representing an army officer. The fish are usually a light blue color unless it is breeding season, when males turn a darker blue and become more aggressive while guarding their nests (Bester 2007). The nests are usually found on rocks and in crevices along the reef. The eggs are purple in color during the first four days then turn green before hatching. Spawning occurs during the summer months of June to August (Bester 2007).

We surveyed Champagne reef which is located along the southern Caribbean coast of the island of Dominica. During initial observations of the Sergeant Major fish along Champagne reef, we noticed that there were three different sizes of fish (small 4-6 inches, medium 6-9 inches and large 8-10 inches) as well as three different shades of blue coloration. We conducted an

observational study to evaluate the effects of three levels of body size and color of the *Abudefduf saxatilis* on number of attacks on the nest from other fish. Our hypothesis is that the larger and darker blue the *Abudefduf saxatilis* is, the fewer number of attacks on the nest there will be.

Materials and Methods

A total of four trips to Champagne Reef were needed to collect all of the data for this project. Throughout the reef a variety of nests were surveyed that had one male guarding one nest of eggs. Each of us would float above a single nest while recording data on the male fish and the number of attacks on its nest. The shade of blue (light blue, true blue or dark blue) and the size (small 4-6 inches, medium 6-8 inches, and large 8-10 inches) of the fish protecting the nest of interest were collected. Fish were placed in color categories by selecting the lightest blue, and the darkest bluefish seen on one day, all fish were then compared to our controls and placed in a category. Size was designated by comparing the average size of the fish to the rest of the fish which information was taken. The final piece of data that was taken was the number of attacks from predatory fish on the selected nest during a five minute interval; this information was taken three times in five minute intervals measured using a watch for each nest. Overall three trials were recorded for each of the nine categories of fish available, giving a total of 27 replications.

Results

During the three trips that were spent collecting data, a total of 27 nests were observed. The color and approximate size of the fish, and number of attacks on the nest in a five minute interval were recorded during three different intervals for each of the nests studied. The number

of attacks on the nest of the Sergeant Major fish were recorded and averaged for each different variable.

	Light Blue (9)	True Blue (9)	Dark Blue (9)	Average Attacks by Size Class
Small 4-6 Inches(9)	2.444 (3)	1.222(3)	1.000(3)	1.548(9)
Medium 6-8 Inches(9)	2.667(3)	2.222(3)	0.667(3)	1.852(9)
Large 8-10 Inches(9)	2.000(3)	2.000(3)	0.667(3)	1.556(9)
Average Attacks by Color Class	2.37(9)	1.815(9)	0.778(9)	

Table 1 - Mean attacks per five minute interval for three replicate observations for each Sergeant Major fish observed at Champagne Reef. The number in parentheses represents the number of fish in that category.

The results of this experiment were very consistent throughout the study. Looking at the chart above, as you move down and right, the numbers get smaller. Therefore the number of attacks is largest in small and light blue fish and fewest in large and dark blue fish. The bottom row of numbers shows the average attacks for each color of the male Sergeant Majors, light blue fish averaged 2.37 attacks, true blue fish averaged 1.815 attacks, and dark blue fish averaged 0.778 attacks per five minute interval. The far right column shows the average attacks by size of the male Sergeant Majors, small fish averaged 1.548 attacks, medium fish averaged 1.852 attacks, and large fish averaged 1.556 attacks per five minute interval.

Figure 1 below clearly shows that the average attacks on the nest steadily decreases with increasing darkness of the male fish. For the light blue and true blue fish, nests with intermediate sized individuals had more attacks, while for dark blue fish, nests with small fish had more attacks.

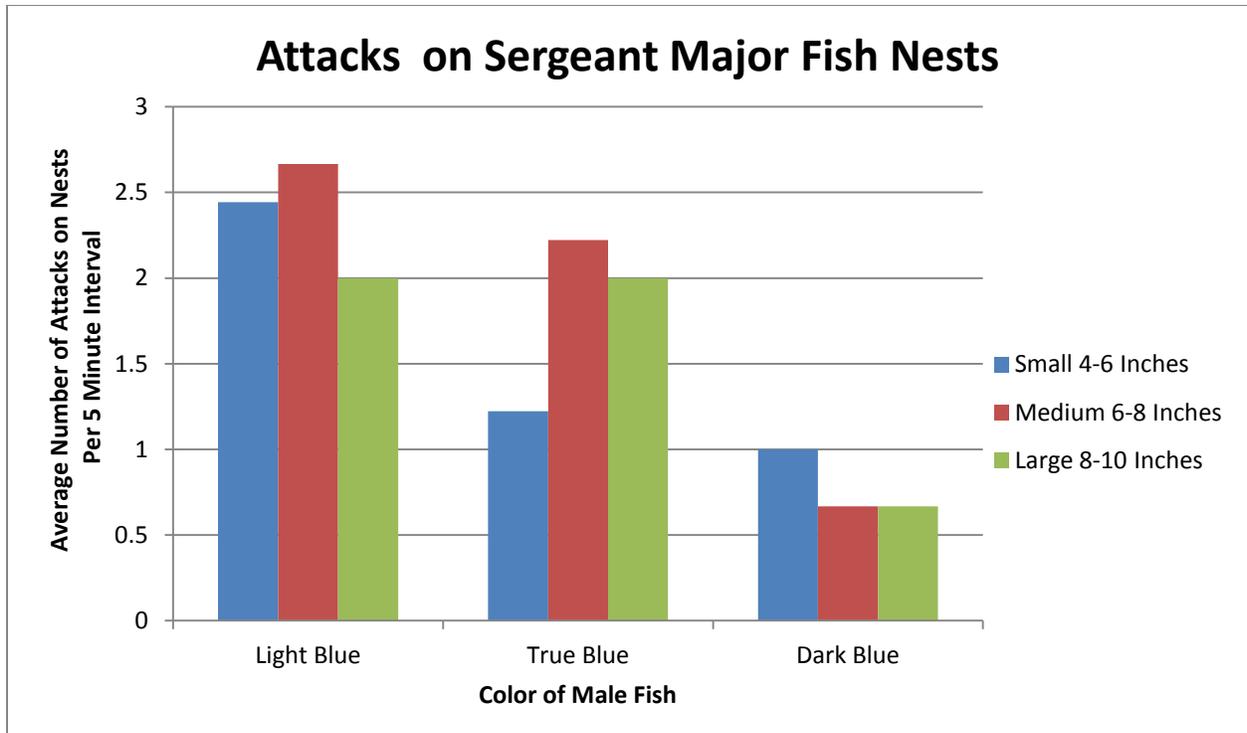


Figure 1- This figure is a visible representation of the effect from size and color of the Sergeant Major fish versus the average number of attacks on the nest in a five minute interval.

Discussion

At the end of our study we concluded that the color of the male Sergeant Major fish was related to the number of attacks on the nest, while the size of the fish had mixed results and did not seem to be as influential. This differs slightly from our initial hypothesis that the larger and the darker the male fish was, the less attacks there would be on the nest of eggs.

While conducting this study we realized very quickly that the darker Sergeant Majors, were more aggressive. We assume that this outward show of aggression reduces the number of attacks from other fish. Darker males attacked potential predators sooner and within a larger radius of their nest than the lighter colored Sergeant Majors.

Due to the fact that it was not possible to catch each Sergeant Major in the study and measure their exact size as well as record their exact tint and shade of blue, some of the fish in the study could have been placed in the wrong categories. This possible error would be due to the human judgment and subjectivity among the three people that recorded data.

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