

A Survey of Scaridae on Champagne Marine Reserve, Dominica WI

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Abstract:

Scaridae, commonly known as parrot fish, are unique fish native to tropical waters. Parrot fish play a vital role in their ecosystem. These unique creatures extract and eat algae from coral which in turn helps keep the coral in good health. It is important to have Scaridae in shallow reef communities to help promote the health of the ecosystem. My project was to survey the abundance of Scaridae in the Champagne Marine Reserve, which is one step closer to understanding the health of the shallow reef ecosystems in Dominica.

Introduction:

Scaridae, or more commonly referred to as the parrot fish family, is a very unique family of fish. Scaridae receive their name from their fused teeth, giving them a parrot-like beak,

Spotlight Parrot Fish (Combs 2009)



specialized for their diet. Scaridae are very remarkable for many aspects of their biology. Different species of parrot fish are found in many distinctive colors and various patterns. These colors and patterns also vary within a species making females, males, and juveniles easy to differentiate. Parrot fish's nocturnal activities are also extraordinary; at night "certain species of parrot fish envelope

themselves in a transparent cocoon made of mucous secreted from an organ on their head. Scientists think the cocoon masks their scent, making them harder for nocturnal predators, like moray eels, to find" (National Geographic 2009). Parrot fish exhibit protogyny. Scaridae live in a male dominated school, consisting of a dominant male and multiple females. When the dominant male dies one of the females turns into a male and takes on the male dominating position in the school.

Parrot fish play a vital role in the management of shallow water reefs in most tropical marine environments. Parrot fish are omnivorous; their diet is made up of extracting algae from coral. The ingested coral is ground down, and without being digested is then excreted (National Geographic 2009). The excreted coral goes to the formation of beaches. Without parrotfish, and a few other shallow reef algae eaters, algae would cover the reefs and leave them in poor health.

Site Characterization:

Champagne Marine Reserve is located 15.245°N, 61.373°W, on the Commonwealth of Dominica. Champagne Marine Reserve is home to a shallow reef with many species that reside and feed within its boundaries. A few of the species that dwell within the borders of the reserve are spiny sea urchins, squid, damsel fish, and eels. Champagne Reserve seemed to have no

evident coral or any other environmental health problems, such as: coral bleaching episodes, lack of wildlife, or heavy pollution problems.

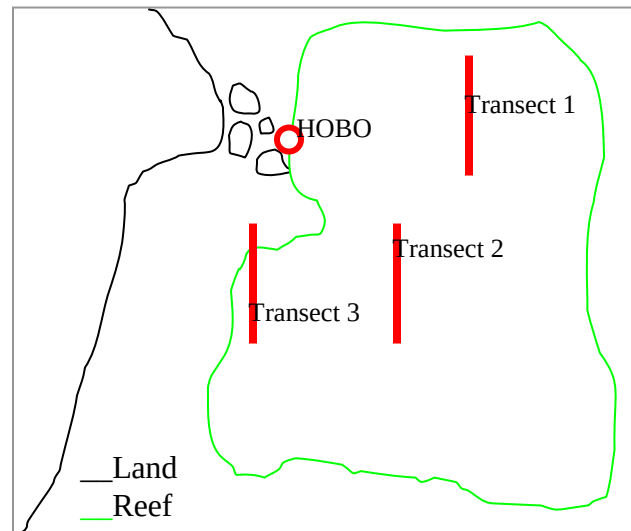
Materials and Methods:

- 12 stakes
- Flagging tape
- Underwater measuring tape (at least 30 meters in length)
- Hydrolab Water Quality Monitoring System
- Snorkeling gear
- HOBO data collector
- Underwater writing slate

I arranged three 27.43m transects at different areas at and around Champagne Reef: on the coral (Transect 1 with an average depth of 5.51m), far from the beach (Transect 2 with an average depth of 4.51m), and close to the beach (Transect 3 with an average depth of 2.19m). Each transect takes into account various surroundings, so the differences in shelter and food availability will better reflect the ecosystem as a whole. I ran the underwater measuring tape as straight as the underwater

topography would allow, and proceeded to strategically place a stake with flagging tape every 6.86m so my transects were visible from the surface. After all transects had been assembled, I snorkeled over each transect and recorded on my underwater writing slate the number and species of parrotfish within a meter of the transects. I took recordings of number and species on 29 May, 31 May, and 03 June to have a bigger sample size to work with.

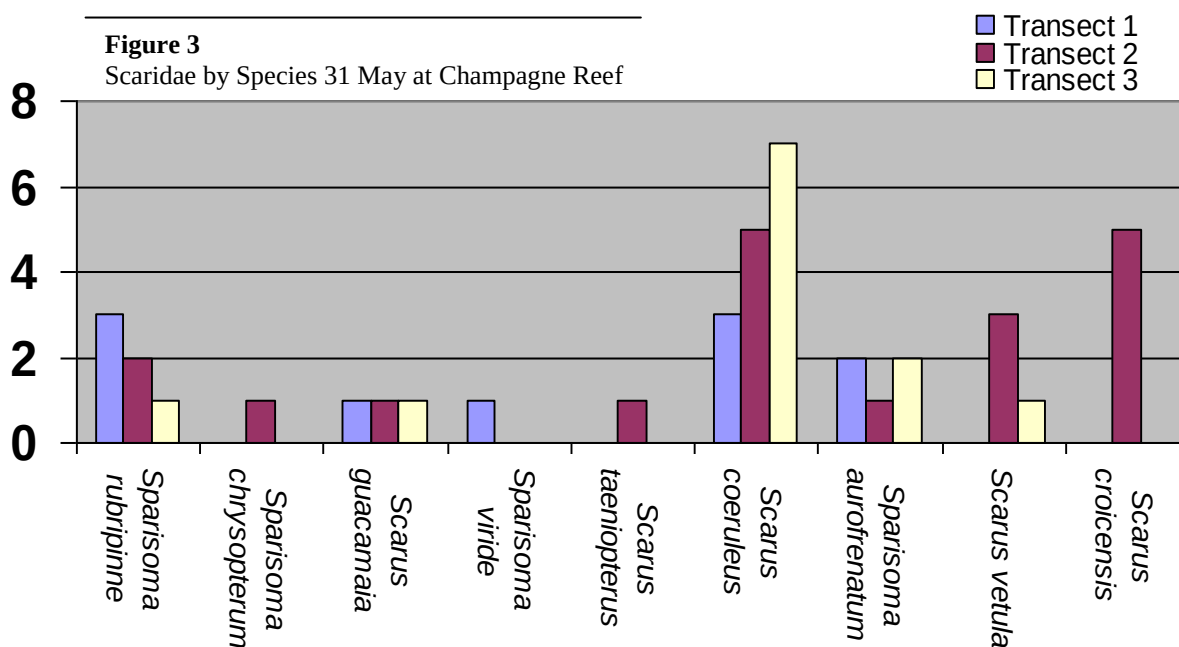
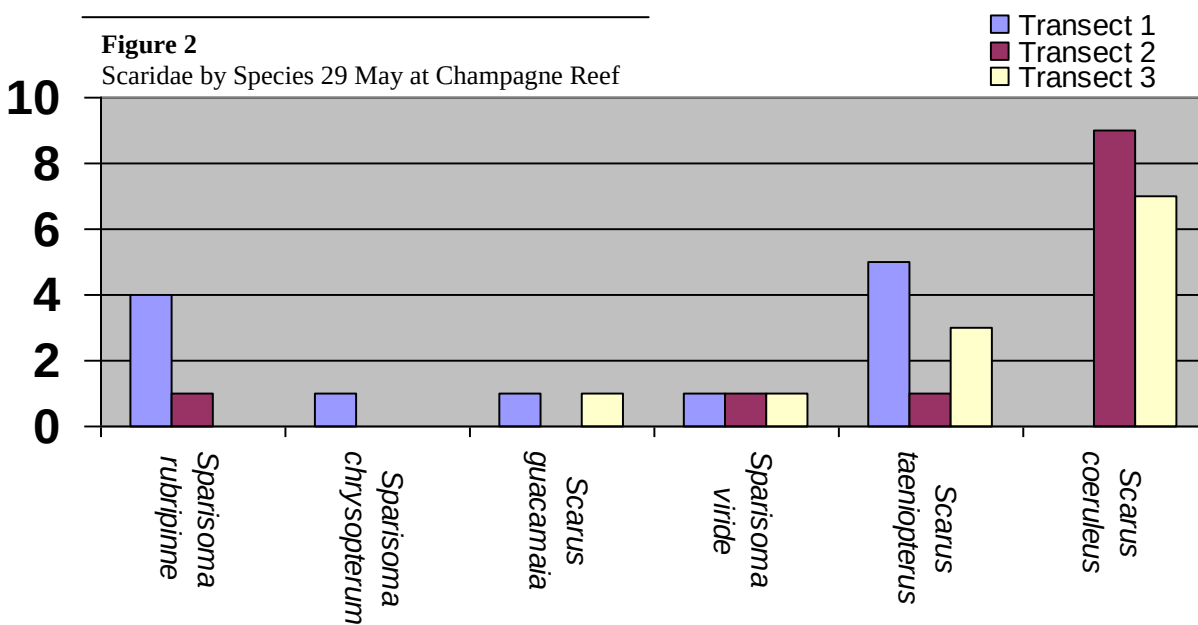
Figure 1
Map of Transects and Data Logger at Champagne Reef



On 29 May, a HOBO data logger was placed on the reef to collect continual temperature readings on Champagne Reef. The data logger was left on the reef until 03 June, and then was removed to record the data that was collected during the five day period.

The Hydrolab equipment was used on 29 May and 03 June to record the water parameters at the Champagne Marine Reserve. The water quality monitoring system calculated the dissolved oxygen levels, pH, turbidity, salinity, and temperature.

Results:



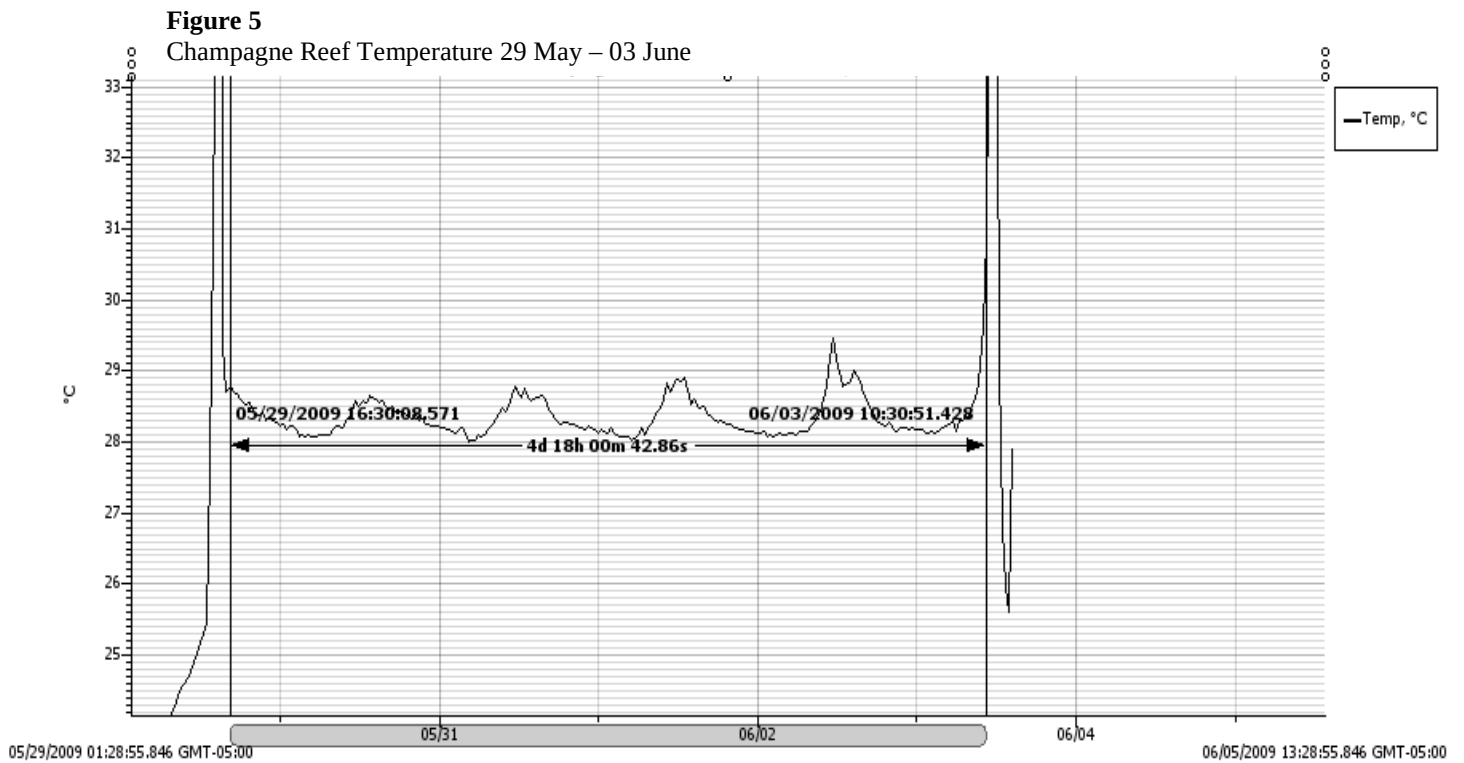
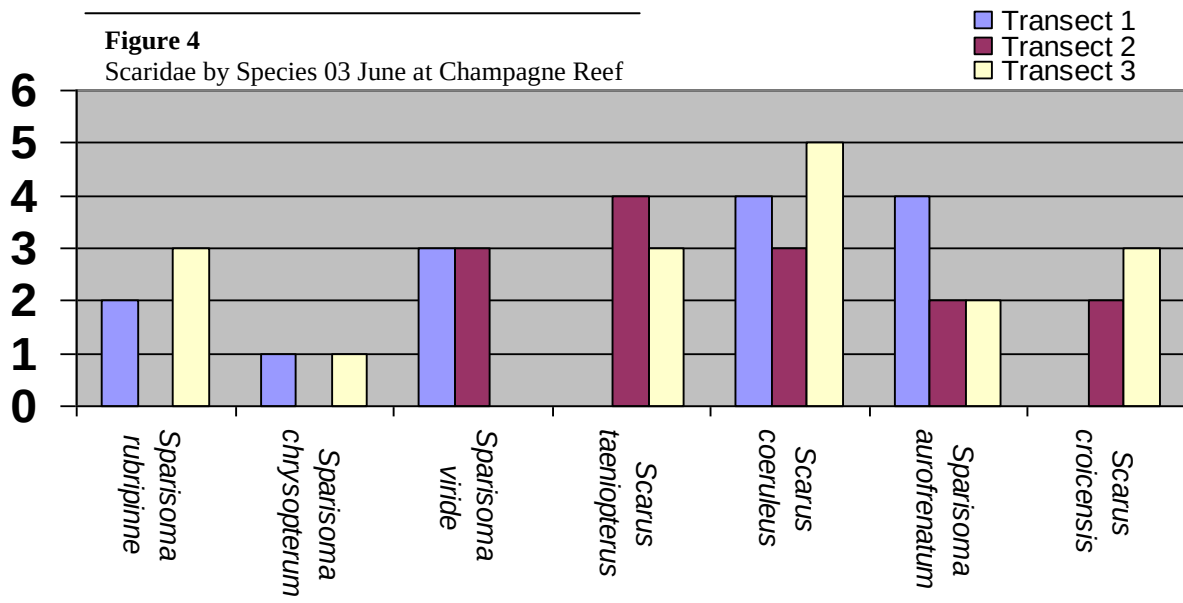
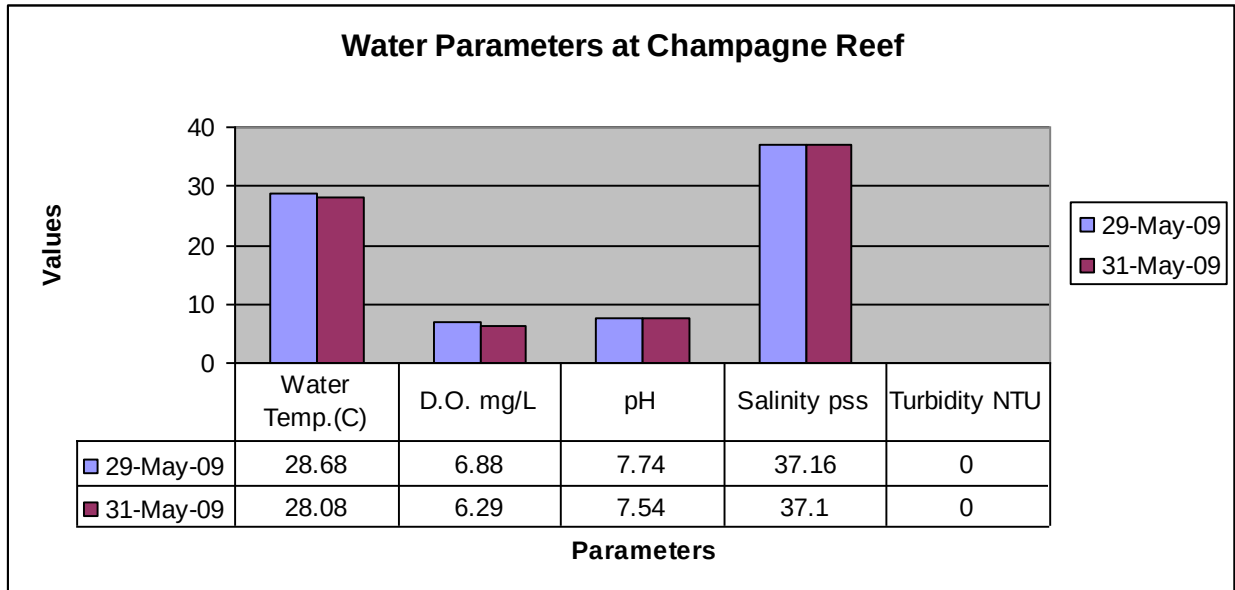


Figure 6



Discussion:

It is important to understand the relationship of parrotfish and their tropical environment. I found in my research that Champagne Marine Reserve is not lacking in the parrot fish population. With a total of 16 *Sparisoma rubripinne* (Yellowtailed Parrot fish), 4 *Sparisoma crysopteron* (Redtailed Parrot fish), 5 *Scarus guacamaia* (Rainbow Parrot fish), 10 *Sparisoma viride* (Spotlight Parrot fish), 17 *Scarus taeniopterus* (Princess Parrot fish), 43 *Scarus coeruleus* (Blue Parrot fish), 13 *Sparisoma aurofrenatum* (Redband Parrot fish), 4 *Scarus vetula* (Queen Parrot fish), and 10 *Scarus croicensis* (Striped Parrot fish) over the three days I collected data at Champagne Reef. By far *S. coeruleus* was the most abundant and *S. crysopteron* and *S. vetula* were the least abundant species present. On average I counted approximately 38.33 Scaridae on my site representative transects per day.

From 29 May to 04 June, the HOBO data logger placed at my site recorded 228 samples, with the average of 28.36°C. The recorded temperatures never reached above 30.9°C or below 27.988°C. The data logger revealed that the temperatures fluctuated, but not by enough degrees

to affect the parrot fish's ecosystem. The fairly constant temperatures of Champagne's marine waters provide an ideal habitat for the Scaridae to thrive.

The water parameters of Champagne Marine Reserve also provide perfect conditions for parrot fish. The temperatures, dissolved oxygen, pH, and turbidity remaining stable, promote the ideal habitat for parrot fish to survive.

If given the opportunity I would like to have more time to continue the research I have conducted on Scaridae at Champagne Marine Reserve. I would like to expand my research to other reefs on Dominica and to some of the shallow reefs on the islands surrounding Dominica. I would like to implement more transects at each site, and take coral productivity data to configure the extent of positive effects that the parrot fish have had on the reefs' health.

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