

Habitat preference of prawns found in the Check Hall River

By

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Abstract:

This study was focused on describing habitat of prawns found in the Check Hall River. Six different experimental sites were selected based on their sunlight exposure, organic deposits, current, depth and size of experimental area of each site. Most prawns were found in areas that had a constant water flow, various sizes of rock readily available, and abundant organic matter. However, some species of prawns preferred specialized habitats.

Introduction:

During three weeks study abroad program in Dominica, an individual project was conducted on the habitats of prawns found in the Check Hall River. Prawns are differentiated from their relatives such as shrimp, Crayfish, and lobster based on its habitats and body features. Prawns inhabit fresh water, and in most species, second pereopods are enlarged. All prawns have pinchers on the first and second pairs of pereopods (Chase 1969). The GPS location of the experimental site in the Check Hall river was 15° 20' 44 N, 061° 22' 10 W, and Altitude of 1080 ft. The most commonly found species of prawns in the Check Hall River include *Atya innocous*, *Xiphocaris elongata*, *Macrobrachium heterochirus*, *Macrobrachium carcinus*, and *Macrobrachium crenulatum* (Chase 1969). A description of the area where prawns were located, the number of prawns found during the day time versus night time, and the size comparison of prawns found in different areas of Check Hall River were the main issues that will be discussed in this project.

Materials:

- Dive mask
- Snorkel
- Underwater camera
- SCEPTRE Field Station
- Flowmeter
- Tape measure

Methods:

I. Locations

A total of six different locations on the Check Hall River were selected based on significant characteristics (Table I). Site 1 was exposed to sunlight, had a current of 0.301 meters per second, a depth of 0.5-0.6 meters, and almost no organic deposits. Site 2 was not exposed to sunlight due to extreme shade created by surrounding trees. It had a current of 0.081 meters per second, a depth of 0.45-0.6 meters, and dense organic deposits that covered the entire floor. Site 3 was readily exposed to sunlight, had a current of 0.247 meters per second, a depth of 0.3-0.1.05 meters, and organic deposits that covered most of the floor. Also site 3 was the most diverse and largest amongst all site in terms of depth and size of experimental area. Site 4 was not exposed to sunlight, had a current of 0.072 meters per second, a depth of 0.1 - 0.3 meters, and dense organic deposits that covered the entire floor. Site 5 was partially exposed to sunlight, had a current of 0.220 meters per second, a depth of 0.6-0.75 meters, and dense organic deposits that covered about half of the floor. Site 6 was readily exposed to sunlight, had a current of 0.201 meters per second, a depth of 0.45-0.6 meters, and almost no organic deposits.

II. Data Collecting

After establishing all the sites, three sets of data were obtained from each site. First, the number of prawns located at each site between 2:00 – 4:00 P.M were recorded. Second, the same procedure was repeated during 8:00 – 10:00 P.M. Lastly, the sizes of prawns found in each site were recorded. In addition, any behavior of prawns in their natural habitat were observed and recorded.

Figure I: Location of experiment sites on Check Hall River



Table I: Experiment sites

	Depth (m)	Current (m/s)	Organic deposits	Sunlight
Site 1	0.5 – 0.6	0.301	None	Exposed
Site 2	0.45 – 0.6	0.081	Organic deposits cover most of its entire domain	Shady
Site 3	0.3 – 1.05	0.247	Organic deposits cover most of its domain.	Exposed
Site 4	0.1 – 0.3	0.072	Organic deposits cover most of its domain	Shady
Site 5	0.6 – 0.75	0.220	Organic deposits cover about half of domain.	Partially exposed
Site 6	0.45 – 0.6	0.201	None	Exposed

Result:

Table II: Number of prawns located at each site between 2:00 – 5:00 P.M

	23-May	24-May	28-May	Total	Ave.	Standard Dev.
Site 1	7	7	6	20	6.67	0.58
Site 2	10	10	11	31	10.33	0.58
Site 3	14	15	13	42	14	1
Site 4	1	0	1	2	0.67	0.58
Site 5	8	6	7	21	7	1
Site 6	6	2	4	12	4	2

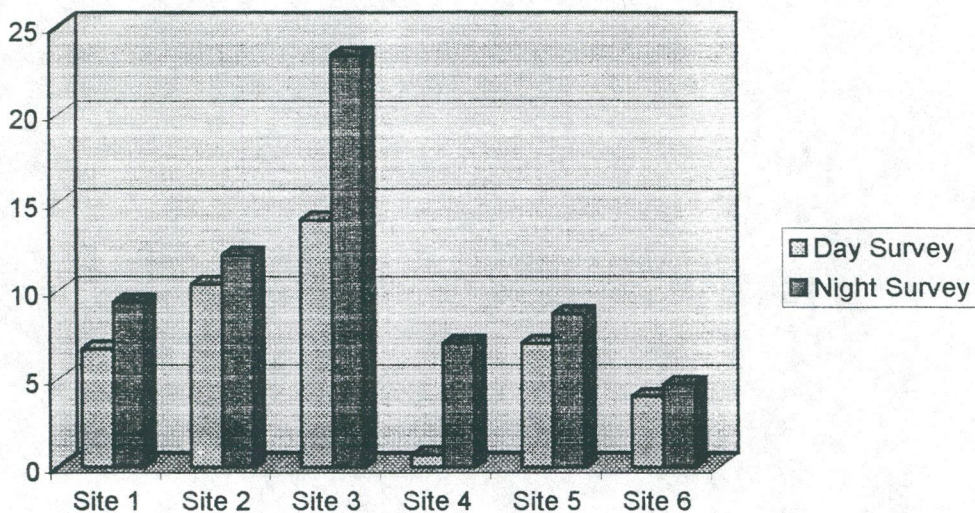
Table III: Number of prawns located at each site between 8:00 – 10:00 P.M

	23-May	24-May	29-May	Total	Ave.	Standard Dev
Site 1	8	10	10	28	9.33	1.15
Site 2	10	15	11	36	12	2.64
Site 3	15	25	30	70	23.33	7.64
Site 4	5	6	10	21	7	2.64
Site 5	7	8	11	26	8.67	2.08
Site 6	3	4	7	14	4.67	2.08

Table IV: Size of prawns found in each site.

	Size (cm)																			Ave.	Standard Dev.
Site 1	7.5	5	5	2	1.5	5	2.5	1.5	2.5	2.5	1.5	2	2.5	1.5	5	2.5	2.5	5	2.5	3.16	1.72
Site 2	5	5	5	7.5	7.5	2	2	2	1.5	1.5	2	2.5	2.5	5	2.5	5	2.5	1.5	2	3.4	1.98
Site 3	7.5	2.5	1.5	5	5	2	10	2.5	5	10	2.5	10	5	12.5	2	2	2.5	5	15	5.66	4.04
Site 4	15	12.5	25	15	18	12.5	12.5													15.71	4.49
Site 5	7.5	5	2.5	2.5	1.5	1.5	2	2.5	5	13	2.5	2.5	5	5	2.5	5	5	2.5	2.5	3.95	63
Site 6	1.5	2.5	2.5	1.5	2.5	2.5	5	2.5												2.56	1.08

Graph I: Number of prawns found during Day Survey and Night Survey



Discussion:

Habitats most suitable for prawns are characterized by:

- Constant flow of water
- Areas where various size of rocks are readily available
- Areas in rich in organic matter, such as leaf litter, moss, decomposing trees, etc.

Although this project was mainly focused on the habitats of prawns found in the Check Hall River, many behavioral observations were also made during the process of completing the project. *Atya innocous* was only found in shady areas with large quantities of organic deposits. This species in particular was extremely sensitive to light and had tendency to run away from the light. *Xiphocaris elongata* was the smallest and most frequently found species regardless of the different variables selected for this project. In addition, *Xiphocaris elongata* is most active prawns and mobile prawns

can normally be found in the range between the floor and surface. The genus *Macrobrachium* is extremely territorial and conflicts amongst individuals due to invasion of territory was frequently witnessed. Thus, it is highly unlikely to find a large population of this genus in small areas. All three species of *Macrobrachium* observed to grew larger then genera *Atya* and *Xiphocaris*, and it was not unusual to find individuals of *Macrobrachium* that were over 10 cm long. For *Macrobrachium crenulatum*, the largest previously documented size of its kind was 18 cm, but during this project, over 25 cm long *Macrobrachium crenulatum* was captured. Site 3 had the most prawn activity during both daytime and evening surveys (Table II, Table III). Also, according to table IV, site 3 had most of prawns and second largest prawns. The most likely reasons for these results are that site 3 consisted of nearly all of characteristics considered. For example, depth arranging from 0.3 to 1.05 meters, a large quantity of organic deposits covered almost all of its floor, and it had a modest current of 0.247 meters per second. Also, indicated in the map of Check Hall River in table I, site 3 had the largest area, resulting in the largest variation of habitat types within a single experimental location. Site 4 had the smallest population; however, it had the largest prawns amongst all the sites. This may be due to their behavior. As mentioned earlier, prawns are extremely territorial. Since site 4 had smallest area available, larger prawns were most likely to dominate the area and competitively inhabit the area over smaller ones. Site 2 was where most individuals of *Atya innocous* were found. *Atya innocous* is the species that is extremely sensitive to light. Based on site 4 descriptions, an unexposed pool with large quantity of organic deposits, one would expect to find similar species of prawns in areas such as site 2. When comparing the number of prawns located in daytime and evening surveys, the number of prawns observed increased in all of the sites during the evening survey. This may be due to their nocturnal behavior

References:

Chase, Fenner A., Jr., and Horton H. Hobbs, Jr. 1969. *The Freshwater and Terrestrial Decapod Crustaceans of the West Indies with Special Reference to Dominica*. Smithsonian Institution Press, Washington, D.C., 475 pp.