

# The Effect of *Dyspanopeus Sayi* on the Biodiversity of Cold Spring Harbor

## Team: The Biodiversity Kids

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Barcoding Process

DNA Extraction

PCR of the Core Gene

Electrophoresis

Sanger Sequencing

### Methodology

On September 19th, we went to a spit located near the Cold Spring Harbor Lab. We performed our collection at low tide from 9:30 a.m. to 11:00 a.m. Each group was paired with an esteemed scientist from the Cold Spring Harbor Laboratory. With the scientist from the DNA Learning Center, we took tubes and buckets to act as collection containers. Large rocks were flipped and moved aside and then after that, as we walked along the spit we observed *Dyspanopeus sayi*, as well as other organisms included in the Davenport study. We plan to collect a small sample of the population in order to limit our impact on the environment. After visiting the spit, we went to the Cold Spring Harbor Laboratory to analyze, take pictures and specifically label each organism using the taxonomy. Once we had observed these organisms under a dissection microscope and taken pictures against a scale to help in identification, we placed all the samples in ethanol for preservation until the class can begin the process of DNA isolation, DNA sequencing, and Barcoding. When we receive the final DNA results for the class, all the information gathered will be placed on a google spreadsheet so that we can analyze the data from our class collection. Once we can truly identify this species using DNA Barcoding and can accurately establish this organism as the species of mud crab, known as *Dyspanopeus sayi*, we can begin to examine the impact on the biodiversity of these crabs in the harbor.

### Abstract

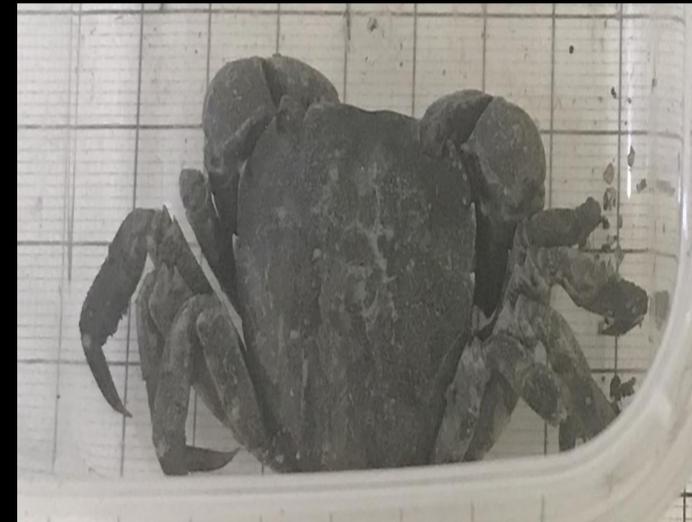
Mud Crabs (*Dyspanopeus sayi*) are a native species that are found along the coastlines of North America. They thrive off of increases of food, or decreases of predators. *Dyspanopeus sayi*'s life cycle is complex, as it starts with eggs, develops into the Zoea phase, changes into the megalopa and eventually develops into a sub-adult, after that it's last stage is the adult (Johnson, 2019). According to the Davenport study taken in the late 1800's, *Dyspanopeus sayi* have been found in recent studies, but not studies in the late 19th century to early 20th century (Davenport, 1898). An increase in the amount of Mud Crabs in recent studies could be due to the fact that there might be less predators or more prey. There could also be an increase in the quality of their environment in general. Most Mudcrabs feed off of dead organisms and crustaceans like plankton. Our main goal is to find out how an abundance of Mud Crabs affects the biodiversity of Cold Spring Harbor. We suspect that their large population has come from an increase in the population of their prey. There is an abundance of them in the harbor and we are curious as to how they affect the biodiversity of the harbor overall. We think that Mudcrabs are not a beneficial organism because they feed on vital organisms like Barnacles and Bivalves. We plan to analyze and compare data on collections done in previous years (Davenport study, larger data sets), as well as to compare our collection to data of the other groups in our class, to help examine and better understand the impact of *Dyspanopeus sayi* on the overall biodiversity of Cold Spring Harbor. Bivalves remove harmful things from the water which helps stabilize the environment and the atmosphere and Mud Crabs consume these species so if there are more Mud Crabs, then there will be less Bivalves, and more toxins in the water. Our main goal and our main target is to find out how an abundance of this species affects the biodiversity of Cold Spring

### Conclusion/Results

Using our collection data, we saw that the *Dyspanopeus Sayi* were very abundant. Based off of our collection data we found quite a bit of Mud Crabs in the locations that we searched. Although the *Dyspanopeus Sayi* were present in the Davenport Project, they were not as abundant as they are now. This might be due to the fact that we have more advanced technology than Davenport had, it might be due to an increase in food, or it might be due a decrease in predators. Either way, the amount of Mud Crabs in Cold Spring Harbor has gone up. Although we were unable to barcode the organisms ourselves we did use taxonomy to identify the organisms ourselves. We did this by comparing the organisms we collected to pictures of different species that the lab gave us. In that way, the things we used made us more prepared than Davenport was at the time due to our advanced technology.

### Collection Data

Assumed Organism Name	Assumed Scientific Name	Latitude Collected	Longitude Collected
Barnacles	Cirrepeda	40.8594N	- 73.4655W
Mud Crab	<i>Dyspanopeus Sayi</i>	40.8594N	- 73.4655W
Fiddler Crab	<i>Uca Spinosis</i>	40.8594N	- 73.4655W
Longnose Spider Crab	<i>Lishia Spinosis</i>	40.8594N	- 73.4655W
Grass Shrimp	<i>Misis Spanosis</i>	40.8594N	- 73.4655W
Ribbed Mussel	<i>Geulensia Demissa</i>	40.8594N	- 73.4655W
Bristletail	<i>Hallocompa Spinosis</i>	40.8594N	- 73.4655W
Quahog	<i>Mercenaria Mercenaria</i>	40.8594N	- 73.4655W
Softshell Crab	<i>Mya Spinosis</i>	40.8594N	- 73.4655W
Easter Mudsnail	<i>Llyanassa Obsoleta</i>	40.8594N	- 73.4655W
Ragworm	<i>Nereisis Spinosis</i>	40.8594N	- 73.4655W
Milky Ribbon Snail	<i>Cerebratulus Lacteus</i>	40.8594N	- 73.4655W



### Resources

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