DOI

PRESENCE OF AMPHIPODA IN FRESHWATER SPRINGS

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ABSTRACT

A suitable environment for the species Crustacea: Amphipoda would be in a pure water form that is perceived as moist and warm. Also, the desired habitat holds little to no involvement with the Homo sapiens species. Factors that were effective and shown to be a difference for the Amphipoda species in springs closer and farther from humans were body size, temperature, and overall presence of these organisms. The main characteristics of disparity between the freshwater spring used was the distance between itself and human contact and how congested the area was with activity from the out-of-water society. Additionally, the temperature was affected when the body of water came into close contact with the outside world. Human beings unknowingly influence the habitat of Amphipoda, which then leads to the entire ecosystem because the organism Crustacea: Amphipoda is proven as both a primary consumer and a decomposer. This research started as the study of the differences between Amphipoda in different freshwater springs, however, it adopted an accelerating growth of size and changed into what is the overall cause of those distinctions. Distinctions in question were clarified as body size, temperature of water, and presence of the desired species. Homo sapiens and their existence have a clear history of altering one's ecosystem, and the interaction between the human race and amphipods made this claim very clear. It was found the temperature is lower when more closely associated with humans and the body size of Amphipoda did decrease significantly.

Keywords: body size, Homo sapiens*, Amphipoda, consumer, decomposer, temperature, habitat*

INTRODUCTION

The human race has been the reason for many habitats failing and sometimes disappearing when in contact with them. Our first question was how much does the presence of the human race effect the lifestyle and habitat of Amphipoda (see Figure 1) (Glazier, 2014). Since the general public understands how environments on land are altered by the Homo sapiens species (deforestation). Humans always have an effect on the environment when present, and we wanted to test how organisms underwater were affected as well. Our hypothesis included that the temperature would decrease and the body size of Amphipoda species within the body of water would also decrease the closer to human interactions. While having many freshwater springs surround a college campus, the group was able to test the differences between further locations and one that flows straight-through the outskirts of the campus itself. As told above, the species of Crustacea: Amphipoda can play two roles in an ecosystem: primary consumer and decomposer. Both jobs resemble the beginning steps of the cycle of life for an ecological community. Primary consumers are organisms that are apart of not the first trophic level, but instead the second level (National Geographic, n.d.). So, if the amphipods were influenced by humans, then so would the entire ecosystem made up of organisms on higher trophic levels which depended on food and other factors from the lower-level organisms. Specifically, we studied the interaction between Amphipoda and humans, and the variables that occurred when we decided to move locations from one testing site to the other. Currently, there is some information that's known about this relationship and as a result, the hypothesis which was tested will most likely follow similar patterns of deforestation and how that ecosystem was after interacting with the human race population.

Figure 1. Crustacea: Amphipoda is shown above.

FIELD SITE

Both sites examined within this study are freshwater springs that are near the Juniata College campus in Huntingdon, Pennsylvania. The first spring examined is known as Cold Springs and is approximately a twenty to thirty-minute walk from the campus, also depending on where you began the journey. The second location is known as Muddy Run and coasts through the town of Huntingdon. The location we used for this experiment was less than a five-minute walk and took place near student dorm buildings, specifically titled East Housing Residences.

For collecting data at Muddy Run we started near the bridge walkway facing the East Housing Residences buildings and then we moved locations to the under the passing of College Avenue near the neighborhoods of citizens of Huntingdon, Pennsylvania (not college-owned residences).

METHODS AND MATERIALS

This study began once the group chose the two desired freshwater springs to collect data from, analyze, and compare. Two convenience-friendly springs were chosen because sampling was going to take place after the group walked to the locations. No other form of transportation was taken other than by foot during this experiment. Sampling occurred one day a week for five weeks. The group would be out at a location for at least an hour to two hours at a time walking up and down the stream searching for an amphipod. Before searching for amphipods, the water's temperature was recorded by the group using a thermometer upon arrival at the spring location. To search for the species, members would pick up stones and see the organisms that were found under or still latching onto the stone. Effort was also made by mixing up the sediment of the water to recycle the organisms at the bottom of the spring to the surface to be visible to the human eye for observation.

Once an amphipod was found, the organism would be pulled from the water using forceps or a transfer pipette and the length would be recorded immediately using a ruler. The amphipod would be stretched out on the ruler to obtain the most accurate measurement. Then, the organism would be released back into the water to sustain the ecological community balance.

From the weeks of observation, two out of five days was when no amphipod was found in the water, and the group left the field site after hours of searching 'empty-handed'. On both of those occasions, the only data that was collected was the temperature of the water. Even though there were weeks that no amphipod was found to study, there was still something credible to accumulate towards the research experiment. Having no data transpired into data within itself, and it began to drive the result of our hypothesis.

RESULTS

In Cold Springs, we found three amphipods over three days. We first went on Sunday, April 2nd. The water was the coldest on this day, at 57 degrees Fahrenheit and the amphipod we found was the smallest one we found, measuring 6.7 millimeters. The second time we went was Sunday, April 9th. The water was much warmer on that day, at 68.9 degrees Fahrenheit, and the amphipod we found was the largest one we found, measuring 8.2 millimeters. We last went to Cold Spring on Tuesday, April 11th. The water was slightly warmer than a couple days prior, at 69.1 degrees Fahrenheit, making it the warmest day so far. The amphipod we found was much smaller than the one we found two days prior, though it was larger than the one we found a week prior, measuring 7.1 millimeters. In Muddy Run, however, we did not find a single amphipod over the two days that we went, despite our thorough checking and the presence of other wildlife in the area.

Date	Temperature of Water (degrees Fahrenheit)	Length of Amphipod (millimeters)
April 2nd	57	6.7
April 9th	68.9	8.2
April 11th	69.1	7.1

DISCUSSION

We found amphipods all three times we collected data from Cold Spring, but not a single amphipod when we went to Muddy Run. Though both streams are quite similar in terms of the wildlife that can be found there, the primary difference is their location and the proximity of their location to human settlements. Cold Spring is isolated from any human settlement, but Muddy Run is located in the middle of Juniata property, specifically being directly in front of East Houses. While surveying Muddy Run, we noticed a lot of trash scattered around the banks of the stream, submerged in the stream itself, and even caught in between the branches of the smaller trees on the stream bank. Speaking to people who lived near Muddy Run, pollution has been an issue in the area for many years now. On the surface, it might not seem like it affected wildlife that much. During our second trip, we saw a wide variety of animals, from water louses, water striders, and hellgrammites to fish, tadpoles, frogs, and even some birds and a rabbit. However, there was a complete lack of amphipods there, just like on our first trip, which was striking considering it was the warmest it had been since we started collecting data. We hypothesize that the human activity at Muddy Run is the reason for the lack of amphipods in the stream. Human activity leads to a large amount of pollution and cloudy water. While some species, like frogs, hellgrammites, water louses, water striders, and slugs can thrive in the murkier waters, amphipods prefer and thrive more in clear waters, such as Cold Spring.

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