Kelsey Fruits

Invertebrate Zoology

Jeremy Kaplan

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Horsehair Worm Experiment: Frozen vs Fresh Cysts

Introduction

Gordiids are commonly referred to as horsehair worms and are members of the phylum Nematomorpha (Hanlet and Janovy, 2004). The phylum Nematomorpha consists of freshwater and marine species. The freshwater species are known to be dioecious, parthenogenetic, and have complex lifestyles (Bolek et al.,2015). Juvenile gordiids are parasites in terrestrial arthropod host, but then develop into free-living adults that emerge into aquatic environments. There are four main arthropod hosts that gordiids commonly infect, including beetles, orthopterans, praying mantids, and cockroaches (Bolek et al.,2015). Gordiids will develop and grow in the hemocoel of the arthropod host. Adult gordiids will emerge from their host when the infected terrestrial arthropod enters the water (Bolek et al.,2015). After entering the water it takes less than a minute for an adult horsehair worm to emerge from the arthropod. There is much effort going on to better understand the diversity of horsehair worms, but it is occasionally a try and fail effort. Studies of horsehair diversity have been hindered by: 1) the lack of reliable way to collect adult free-living hairworm over large geographical areas; and, 2) the fact that the free-living adults have relatively short life spans (Bolek et al.,2015). Recent advances are currently being discovered on how to better understand/study the gordiid worms. The question being asked in this experiment was if frozen cysts or fresh cysts caused a higher rate of infection. Our hypothesis was that if the food specimens are fresh, there will be a higher rate of infection in the crickets.

Materials and Methods

The materials used were container/chambers that separated each cricket from one another. Each cricket was given a piece of infected snail. After a period of time the crickets were moved to a mutual container for the rest of the experiment. Inside the container was food and water that would last throughout the duration of the experiment. Our experiment was over the fresh cysts so we needed 3-4 snails and 10 crickets. The steps used to infect the crickets are as follows: 1) Place the snail on a dissection microscope where you will then crack open the shell to remove the body; 2) Once the body is removed separate the body into 3 sections; 3) Place a section of the body on a coverslip until you have enough for all 10 crickets; 4) Place a singular cover slip into each cricket chamber to eventually be consumed by the cricket.

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| Frozen vs. fresh snail tissue |  |  |
| Cricket # in each group | Frozen Snail Tissue | Fresh Snail tissue |
| 1 | 3 | 0 |
| 2 | 2 | 0 |
| 3 | 0 | 0 |
| 4 | 0 | 0 |
| 5 | 0 | 0 |
| 6 | 0 | 0 |
| 7 | 0 | 0 |
| 8 | 0 | 0 |
| 9 | 0 | 0 |
| 10 | 0 | 0 |

Results

The results are in the graph as shown. Our group experimented with the fresh snail tissue. The results show that there were no horsehair worms in the crickets that were fed the fresh snail tissue. The graph shows that there were 5 horsehair worms found within the crickets that ate the frozen snail tissue, but this came from only 2 crickets out of 10. The results show that frozen cyst infected 2 more crickets than the fresh cysts did.

Discussion

Our hypothesis for this experiment was that the fresh cysts would cause a higher infection rate in crickets. The results show that we were wrong because the frozen cysts caused a higher rate of infection. The results were not what I thought they would show because we only had 2 crickets that were infected out of 20. In an experiment conducted by Hanelt and Janovy they exposed crickets to larvae of Paragordius varius for 28 days. In their results they exposed 26 crickets, 21 were infected, but only 11 out of the 21 were still alive (Hanelt and Janovy,2004). This can compare to our results because out of 10 crickets that were infected only about 2-4 would be alive in each container. In the experiment by Hanelt and Janovy it also showed that the horsehair worms collected all tended to be immature in stage instead of being adults. I think to make this experiment would be if were able to study crickets in their own environment, but that is pretty much impossible. What would also make the experiment better would be if you used large amount of crickets. With there being so many crickets that died before the experiment was over it would make sense to add more numbers of crickets to maybe change the results. Overall, gordiids worms are interesting to study, but are also tough to study because they do not stay alive long enough to continue out the cycle.

Literature Cited

Vilalobos, De, A. Schmidt-Rhaesa, B. Hanelt, and M.G. Bolek. 2015. Ecology and general biology: thorp and covich’s freshwater invertebrates (Phylum: Nematomorpha). Academic Press: 303-326.

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