Exploring Time Collection Bias in Ant Biodiversity Studies

Zohayr Adnan[1], Amelia Gobetz[1], John Halloran[1]
[1]*Connetquot High School*

Abstract

Scientists try to remove as much bias in experiments as possible. This study explores how most ant collection studies do not provide a “Time Collected” section in their methods. This may lead to a biased data set due to humans diurnal nature, leaving out important nocturnal samples that contribute to biodiversity. This study was conducted through a 3 day period, in which traps were set up during the morning and night. The hypothesis was that there would be a distinct difference in the species caught between day time collections and night time. However, the data did not prove nor refute the hypothesis, 21 of the samples were all *Prenolepis imparis*, a common ant species found during the colder months. The experiment being in November may have lead to the less diverse samples that were collected.

Introduction

Ants serve a vital role in the ecosystem as they are essential for soil aeration, fertilization, and ecological balance[1] .Scientists chose to study them because of their complex and varied forms of eusociality. Ants can be important bioindicators of ecosystem health. Good ecosystem health is extremely important because it ensures an abundance of natural resources that are essential for biomedical and pharmaceutical research. It is important to eliminate as much bias in the study of ants so we can make accurate conclusions about the health of the ecosystem and its biodiversity.

Materials & Methods

To start the collection,
traps were placed in a residential location and a photo taken of it. It was left there for 30 minutes, with a photo taken of it every 15 minutes. The traps were then removed, put in a plastic bag, and placed in a freezer. This process was repeated every morning at 8:30AM and 8:30PM, 6 times.

Each trap made by placing 10g of tuna on top of an index card →→→

Results

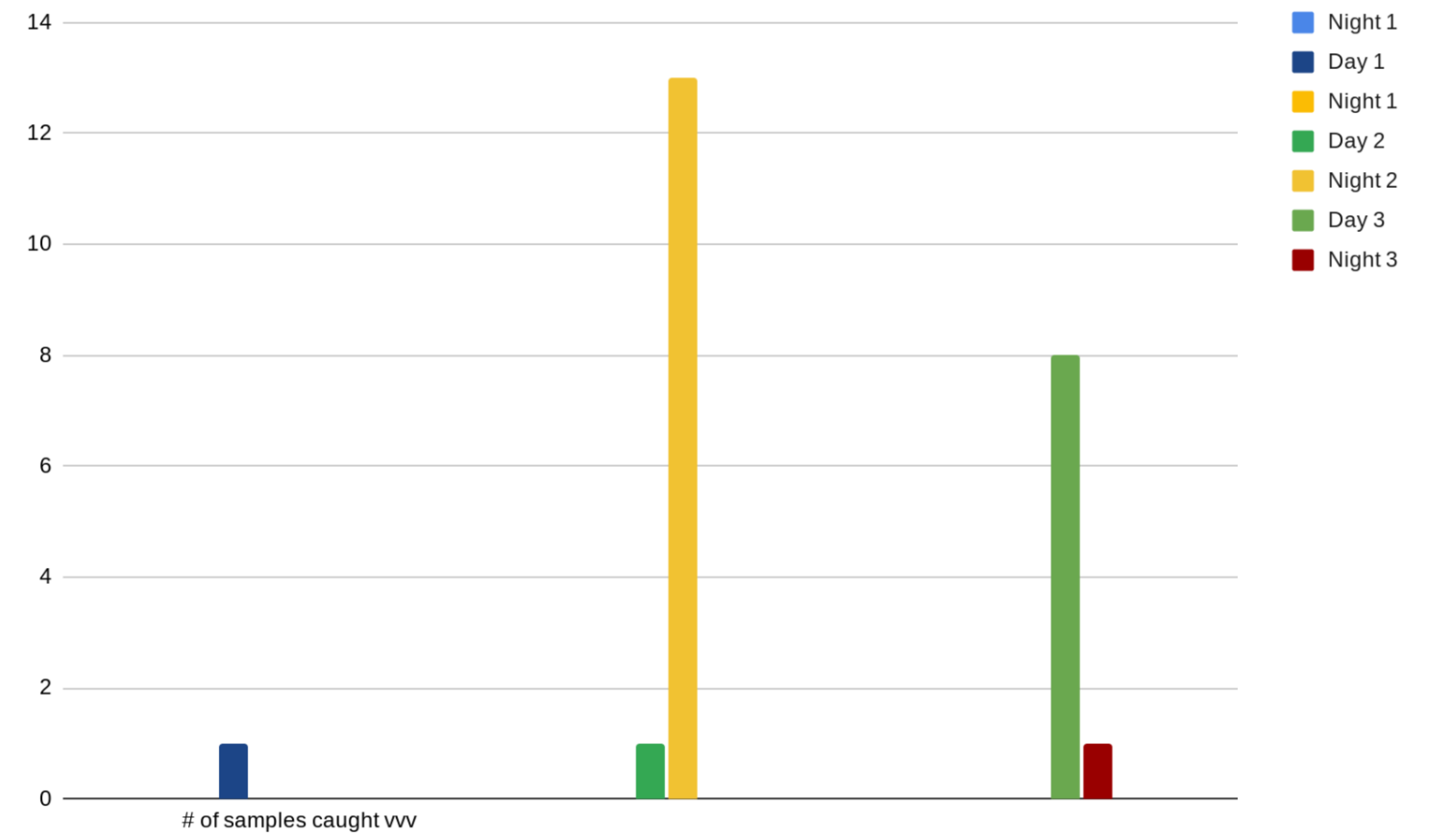

Figure 1

Figure 1 is a bar graph on all the number of samples obtained through the 3 days of collection.

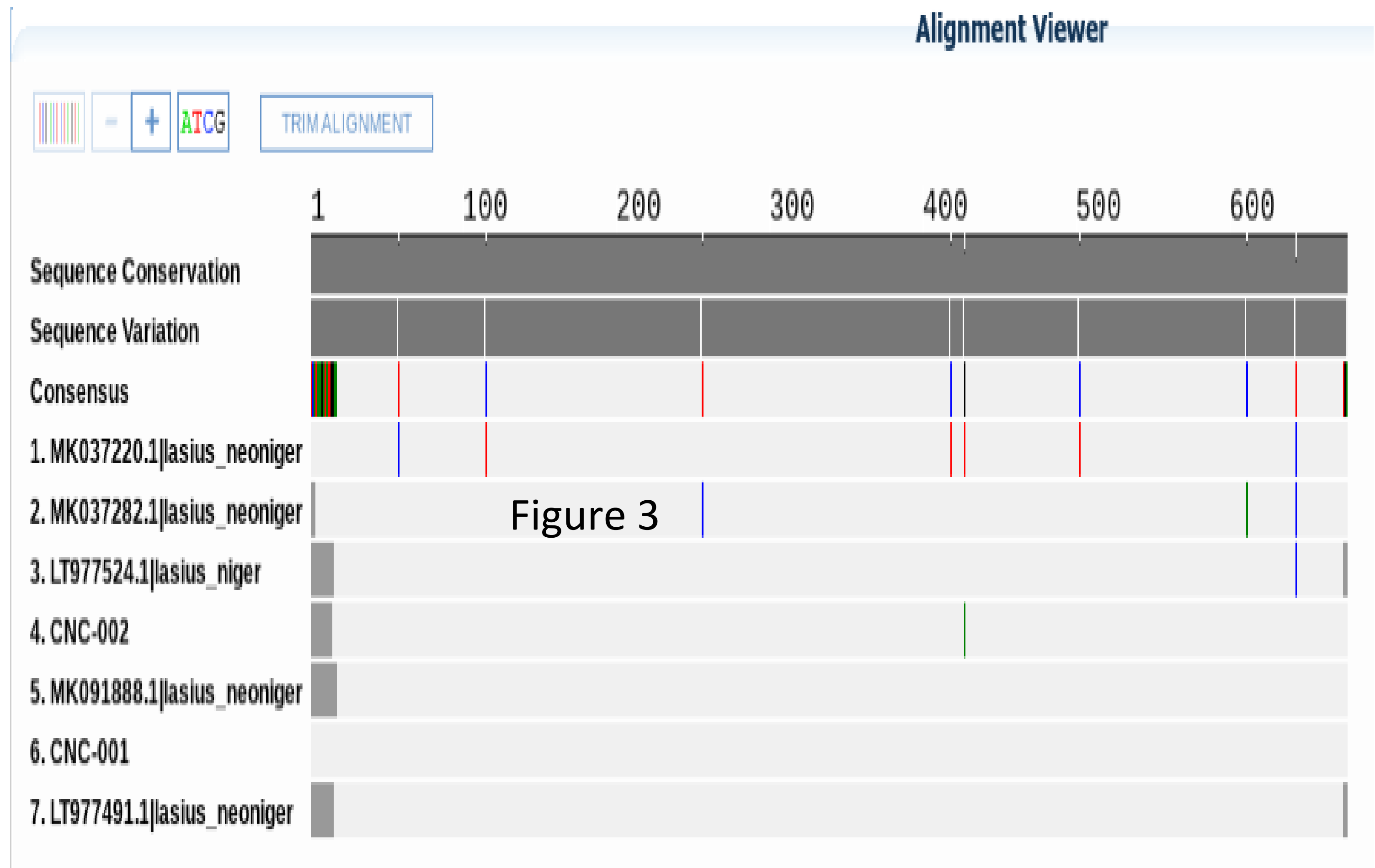

Figure 3

Figure 3 shows CNC001 and CNC002 being compared to *lasius neoniger*, a suspected match for our samples barcode. As shown, these samples were a complete match. An error in the BLAST had said the sample would have been *lasius niger,* however this species in not native to North America. When our sample was compared to *lasius niger*, there were mismatches proving it could not be that species.

These are all the samples we barcoded using the Blue Line on DNA subway. A line in the sequence shows a difference in nitrogen base pairs.

Figure 2

Discussion

The data did not support nor refute the hypothesis. The end goal was to see if there was a difference in species collected during the day, however the samples caught were almost 100% the same species, *Prenolepis imparis* (except for 3 samples, CNC001 and CNC002 which were shown as *Lasius neoniger*, and CNC024, an unknown organism). The data does show that out of the 24 samples caught, 14 were caught at night (more than 50% of the samples). Also, CNC024 was a sample that we had caught that was definitely not an ant, and when barcoded most samples had shown many mismatches in the DNA Subway database. The sample is inferred to be apart of the *Megaselia* family for flies, which are known to be attracted to dead animal flesh. The significant thing about this fly though was that all the matched organisms were not found in NY, the closest match was found in Nova Scotia. This fly may have been the first of the species to be recorded on Long Island or even New York.

References
1. https://www.accuratepest.net/blog/posts/what-will-happen-if-ants-go-extinct#:~:text=Ants%20play%20a%20crucial%20role,catastrophic%20damage%20to%20our%20ecosystem.

Acknowledgements
We would like to thank Connetquot High School and Cold Spring Harbor for their support in helping us complete this project.