**Do Termites Show a Preference for Paths Drawn in Permanent Marker?**

Daniel Middleton

September 23, 2021

BL1100: General Biology 1 Laboratory

Section L05

Rahul Dharglakar

Lab Partners: Mercy & Adrienne

**Introduction**

Termites are a very complex colony-forming insect that exhibit great variation with over 3,000 different species. Communicating through the use of pheromones, they set trails that lead to their main sources of food: dead plants and fecal matter. Typical of other colony-forming insects, they form a caste system in which the queen and king take on reproductive duties, sterile workers forage for food while maintaining the nest, and soldiers are primarily responsible for defending the nest from some of the numerous predators of termites. Observations from an entomologist seem to indicate that termites possess an ability to follow lines drawn in a notebook, and considering termites communicate through pheromones we expect them to follow a path drawn in a heavily scented marker versus a trail that does not have a scent. Our goal was to test the null hypothesis that termites would not prefer a scented path to the alternative that termites would follow a scented path longer than an unscented one.

**Materials and Methods**

We split our experiment into 2 parts. The first part consisted of observing 3 termites set on a piece of white printer paper with a variety of lines drawn by brown erasable marker, pencil, pen, teal-colored pencil, and a black Sharpie, determining if they had any preference for certain materials. We then took one material they favored pairing with one they had no preference for, marking paths on a new piece of paper separated by a ruler to prevent crossing over (Figure 1). Recording the number of seconds they spent following each path, we tested 5 termites on pencil and Sharpie, with individual termites alternating for 3 trials on each line (30 data points total).

Table

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Figure 1: Experiment setup, part 2

**Results**

We noticed that the termites during the first part seemed to spend more time on the side of the paper with the brown erasable marker and the sharpie, with at least two following the straight paths drawn with both utensils for a period of time. They seemed to completely ignore the pen, pencil, and colored pencil. Then, carrying out the second part of our experiment, we found that the termites followed the Sharpie line for a longer period of time than the pencil line, resulting in statistically significant data (p < 0.05).



Table 1: Total time spent (in seconds) on each line

**Discussion**

We expected that termites would mostly follow the Sharpie line considering the essentially blind workers communicate through pheromones (Costa-Leonardo and Haifig, 2014), meaning they would likely follow the trail with a heavier scent and statistically, our results supported this with a mean and standard deviation of 27±30.4 seconds for the Sharpie and 1±1.7 seconds for the pencil. Nonetheless it is very important to note the fact that, as shown in Appendix 1, 3 of the termites died in the middle of the trial due to handling errors. Dead termites obviously cannot follow a line, so they were excluded from the calculations by using a value of 0 seconds. In accordance with time requirements we used a small sample size of 5, so future experiments need more care while handling the termites and a larger sample size.

**Acknowledgments**

I would like to thank my lab partners Mercy and Adrienne for their participation in this experiment, as well as our TA Rahul Dharglakar for providing help during the lab as well as the required termites.

**Literature Cited**

Costa-Leonardo A.M., Haifig I. (2014) Termite Communication During Different Behavioral Activities. In: Witzany G. (eds) Biocommunication of Animals. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-7414-8\_10

**Appendix**



Table 2: Raw data, D indicates termite died during the trial