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The Evaluation of *Acheta domesticus* Hiding Preference

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INTRODUCTION

Acheta domesticus, commonly referred to as “house crickets,” is a species of insects that are mainly found in the central and eastern United States (Walker 2014). Crickets are known for their inability to survive well in the wild, due to the fact that they are a food source for a large selection of vertebrates. For instance, this species is commonly used for fishing bait and also for food for house pets because many animals feed on them (Walker 2014). Research has been conducted to determine why crickets are preferred by these animals. In a prior study, it was found that the proteins found in *A. domesticus* are high in nutrients and this accounts for why many vertebrates have adapted to hunt them. Furthermore, research has also been conducted to try and determine if this species could even provide humans with an economically feasible source of nutrients (Collavo et al. 2005).

Due to the fact that crickets are hunted in large quantity, some researchers believe that this species has adapted to hide in order to better survive. Specifically, many cricket species reside in environments where it is possible for them to conceal themselves. For example, some crickets can burrow into soft soil and hide underground (Huber et al. 1989). Crickets are also known to hide underneath debris, stones, or even fallen logs (Huber et al. 1989). In this current study, we tried to determine if this hypothesized hiding preference could be transferred to a lab setting.

We hypothesized that crickets rely on their ability to hide in order to survive, so they will spend more time in an environment where they would be able to conceal themselves. If the time the groups spent in either environment did not vary significantly, then this would be considered a null hypothesis for the experiment. We predicted that when the groups were put into a container with one side filled with mulch and the other side empty, the groups would spend a statistically significant amount of time in the mulch environment during the 16-minute period.

METHODS

In order to conduct this experiment, ten house crickets were used to test whether or not the crickets prefer to stay in the open or remain hidden. Using three containers, half of each container was covered with mulch while the other half was empty. Before collecting data, the crickets were acclimated in the containers for two minutes. Each trial was set for a duration of sixteen minutes while the location of the crickets were recorded every two minutes. This procedure was conducted three times. With the IBM SPSS Statistics program, a Mann-Whitney U Test was used to analyze the data in order to determine if there was a significant difference in the preference of the crickets (IBM Corp., 2016).

Test Statistics ^a			
	Trial 1	Trial 2	Trial 3
Mann-Whitney U	10.000	.000	17.500
Wilcoxon W	55.000	45.000	62.500
Z	-2.739	-3.652	-2.080
Asymp. Sig. (2-tailed)	.006	.000	.038
Exact Sig. [2*(1-tailed Sig.)]	.006 ^b	.000 ^b	.040 ^b

Table 1. There is a significant difference in the preference of the crickets in all three trials.

The results of the Mann-Whitney U Test showed that the p-values were significant; $p < 0.05$ was the cutoff for significance.

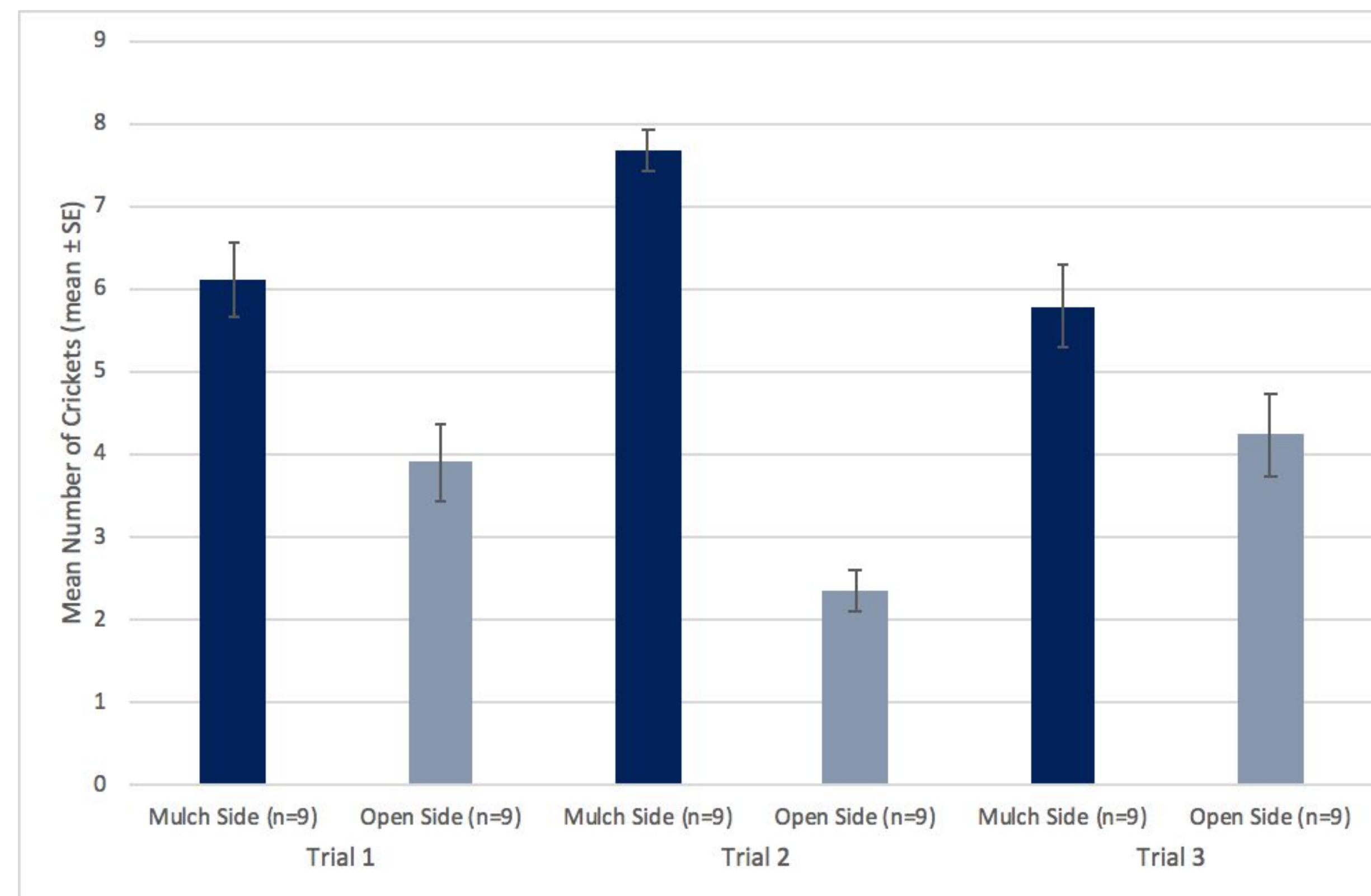


Figure 1. The average number of crickets was higher on the mulch side than the open side in all three trials. The error bars denote the standard error of the mean number of crickets on each side of each trial.

RESULTS

The Mann-Whitney U Test calculated the p-values of the collected data, determining that the results were significant using the cutoff of 5%. The p-values were 0.0060, 0.000, and 0.040 along with the z values of -2.739, -3.652, and -2.080, respectively. In addition, a bar graph was created in order to compare the average number of crickets in both environments across the three trials. The mean number of crickets on the mulch side across the three trials were higher than the mean number of crickets on the open side.

DISCUSSION

We originally hypothesized that the crickets would spend more time in an environment that would be more advantageous for them to conceal themselves because of their need to remain hidden in the wild. We predicted that when groups of house crickets were put into a container with one side filled with mulch and the other side empty, the groups would spend a statistically significant more amount of time in the mulch environment during a 16-minute period. Due to the fact that house crickets have numerous predators, researchers have determined that they have adapted to hide themselves in order to better survive (Huber et al. 1989). It has also been hypothesized that crickets are hunted in large quantities due to their proteins being rich with nutrients, and prior research has been taken to determine if *A. domesticus* could possibly be a viable, and cost effective, source of nutrients for humans (Collavo et al. 2005). Our hypothesis was supported by the experiment because the house crickets did spend a significantly more amount of time in the mulch in all three trials. Furthermore, the fact that the *A. domesticus*'s hiding preference could be replicated in a lab setting seems to indicate that predators do not need to be present in order for them to display this behavior. Also, the house crickets that were used in this experiment were store bought and had never been introduced into a wild environment. This seems to support the idea that this characteristic is an evolutionary trait that the crickets are possibly born with and not simply a learned behavior.

CONCLUSION

- *Acheta domesticus* prefer to be hidden as seen by the increase number of crickets on the mulch side.
- Based on the experiment, it can be inferred that when tracking *A. domesticus* in a closed space, they will more likely be hiding in places that offer protection.

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