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Effects on Varying Locations of Food on the Feeding Habits of the Eastern Grey Squirrel (*Sciurus carolinensis*) in Central Pennsylvania and Maryland

Michael Howard, Nick Moschgat, and Jake Safko

ABSTRACT

Species of animals in different ecosystems have varying behaviors while feeding. The Eastern grey squirrel is a species of animal that is found in numerous different ecosystems across the United States. If a squirrel is given multiple locations of food with varying amounts of exposure to outside factors, the squirrel will go to the food source that has the most cover from the external factors. The squirrels had a preference to the feeding locations that were higher in the tree. Very rarely did the squirrel choose the peanut that was located at the base of the tree. The peanuts up in the tree on the branch, and the peanut up in the tree by the trunk gave the squirrel more protection for the possibility of being attacked while eating. The elevation gave the squirrel an escape from ground predators along with being able to hide in the foliage of the tree from predators that might come from above. Being able to know the feeding behaviors of animals allows researchers to better know how to research different species of animals in the future, along with gaining knowledge on how trophic levels of the ecosystem affects the food chain.

Keywords: Eastern grey Squirrel (Sciurus carolinensis)*, Feeding event, Feeding Habits, Location, Spring Ecology*

INTRODUCTION

The eastern grey squirrel (*Sciurus carolinensis*) known depending on the region as just the grey squirrel depending on the region of the country, is a tree squirrel native to eastern North America. Pennsylvania and Maryland are home to 4 other species of squirrel; fox, red, northern flying and southern flying. In the wild grey squirrels inhabit large areas of mature, dense woodland ecosystems. These forests usually contain large mast-producing trees such as oaks and hickories, providing ample food sources. Oak-hickory hardwood forests are generally preferred over coniferous forests due to the greater abundance of mast forage. Grey squirrels are scatter-hoarders; the squirrel hoards food in numerous small caches for later recovery. Some caches are quite temporary, especially those made near the site of a sudden abundance of food which can be retrieved within hours or days for reburial in a more secure site. Some examples of the food the grey squirrel eats ranges from tree bark, tree buds, berries, many types of seeds and acorns, walnuts, and other nuts, like hazelnuts and some types of fungi found in the forests. In our research we wanted to find the effect that location of food had on the feeding habits of the grey squirrel. Grey squirrels are known to have a wide variety of predators so they are on high alert at all times. We hypothesized that the squirrel would select the food that is in the most cover or secure location being the location nearest to the trunk of the tree. This is because it would be the most protected for the squirrel to feed safely. Our hypothesis was not supported by the data that was collected.

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METHODS

During our research we used plain unsalted peanuts as our food for the squirrels. These peanuts would be placed in 3 locations at each site. With the Coronavirus pandemic, our research was unable to be completed at one location. However, that allows for a wider range of data to be collected. Each of the locations was at the individuals of the groups houses, in central Pennsylvania and central Maryland. Site 1 is in Sykesville Md, Site 2 is in Cresson, PA and Site 3 is in Huntingdon, PA. At each of these sites A peanut would be placed at the base of a tree on the ground, up in the tree out on a branch, and up in the tree by the trunk. This research was completed from Monday April 6th to April 30, 2020. The research was completed every Tuesday and Thursday of each week at noon. The peanuts would be placed in their position at least thirty minutes before noon to allow the squirrels to be adapted to the peanuts being there and the food source available to them. For our research we concluded a feeding event of the squirrel going to the peanut and picking it up. Since squirrels do not normally eat their food as soon as they discover it we were unable to record a feeding event as seeing the squirrel eat the peanut.

Figure1. The image shows the locations of the peanuts in each of the sites

RESULTS

Table 1. Table shows the date of which the data was collected and the location of the peanut in the tree where the squirrel was first selected in the tree.

Date	Site 1	Site 2	Site 3
7-Apr	Branch	Branch	Base
9-Apr	Branch	Branch	Branch
14-Apr	Trunk	Base	Trunk
16-Apr	Base	Trunk	Trunk
21-Apr	Branch	Branch	Branch
23-Apr	Trunk	Trunk	Branch
28-Apr	Trunk	Trunk	Trunk
30-Apr	Branch	Branch	Trunk

Table 2. The table shows the frequency in which the squirrel selected the specific location at each site

	Site1	Site2	Site3
Branch	4	5	3
Trunk	3	3	4
Base	1	0	1

Table 3. The table shows the results of a chi-squared test finding a chi-squared statistic of 0.3818, along with a p value of 0.983938 which is greater than .05 so the data did not support our hypothesis but was supporting in showing the squirrels did not feed from the base.

	Site 1	**Site 2**	**Site 3**	**Row Totals**

Branch	4 (3.67) [0.03]	4 (3.67) [0.03]	3 (3.67) [0.12]	11
Trunk	3 (3.33) [0.03]	3 (3.33) [0.03]	4 (3.33) [0.13]	10
Base	1 (1.00) [0.00]	1 (1.00) [0.00]	1 (1.00) [0.00]	3
Column Totals	8	8	8	24 (Grand Total)

Table 4. Table shows a chi-squared calculation of the observed and expected feeding locations that the squirrels selected during the observation. The chi-square statistic is 4.6222, the p-value is 0.09951 which is greater than 0.05 which shows that the data is not significant.

	Branch	**Trunk**	**Base**	***Row Totals***
observed	12 (10.00) [0.40]	10 (9.00) [0.11]	2 (5.00) [1.80]	24
expected	8 (10.00) [0.40]	8 (9.00) [0.11]	8 (5.00) [1.80]	24
Column Totals	20	18	10	48 grand total

DISCUSSION

We as a group were determined to understand how the location of the placed peanuts would influence the feeding decisions that the observed squirrels would make. As we were conducting our experimental research, we noticed the difference when it came to the location of the available peanuts. Looking at our data, it is apparent that the squirrels took a liking to the peanuts up in the branches. Two of our three sites had the most observed squirrels coming to forage in the branches; this was a big indicator to us that our hypothesis was wrong. As a whole, the peanuts placed in the branches was where the squirrels tended to be the most. The peanuts placed on the trunk of the trees saw quite a few squirrels as well; almost just as many. The peanuts placed at the base of the tree saw the least. There were only two squirrels observed foraging at the base of the tree. Our original hypothesis was proved to be incorrect. We thought that the squirrels would prefer the peanuts closer to the trunk because this would offer a sort of security while the squirrels were foraging. Instead the squirrels chose to forage for the peanuts in the branches. This could mean that these squirrels felt more secure while suspended up in the branches rather than being closer to the ground. All of the foliage from the branches could have made them feel hidden. They could be trying to avoid predators as well as having a good viewpoint of their surroundings. The squirrels prefer to be off the ground and in the branches rather than being close to the trunk or the base.

Since the difference between the data that we collected for the branches and the trunk was minimal, it is hard to say what the squirrels truly prefer. In future experiments, we could observe for a longer period of time to collect more data points so that a more definitive result can be concluded. We could also make sure that the peanuts in the branches are placed much higher up from the peanuts placed at the trunk. This would create more of a decision to make for the squirrels since the distance between the trunk peanuts and the peanuts in the branches has been increased. We also came to realize another issue that could have affected the data that we collected. When collecting data for this experiment, there were times of high wind. During these times of wind, it was rare to see any squirrel activity near the peanuts. It seemed that they did not favor windy days. In further experiments, it would be interesting to test their eating habits during different types of weather. This could help us understand what factors lead to these dietary decisions.

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