

Are Fat Squirrels Happy Squirrels?

Food preference in *Sciurus niger* and *Sciurus carolinensis*

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Figure 1. Fox squirrel on Reed campus eating corn.

Current scientific knowledge of squirrel diets during winter months includes the high-tannin hypothesis: that they will store high tannin foods for later and consume low-tannin foods immediately (3). They will also eat foods that have secondary metabolites with anti-predatory properties (2). However, there is little data on changing dietary preference as the temperature changes.

Question: Will squirrel food preference shift to higher fat content foods as the temperature lowers?

Both the fox squirrel (*Sciurus niger*, figure 1) and eastern grey squirrel (*Sciurus carolinensis*) display foraging and caching behaviors (1). But as the temperature lowers during the winter months, more fat is needed to stay warm and have energy in the low-food season. In response, squirrels may then consume higher fat foods to survive.



Figure 2. Eastern grey squirrel on Reed campus.

Experimental Design

Hypothesis: Squirrels will show a preference for foods with higher fat content per gram as the temperature decreases.

Data Collection

Various types of foods were bought for testing; each had a different fat content (Table 1). The types of food were three different kinds of nuts (cashews, brazil nuts, and pecans), corn, sunflower seeds, and blueberries. When a potential squirrel subject was found and treed (a researcher would walk slowly in its general direction until it ran up a tree) each of these foods was placed at the base of the tree (Figure 3).



After the squirrel came down and saw the food, it was allowed to eat its fill. When the squirrel left, the amount of each type of food remaining was counted. Temperature in each instance was recorded using an alcohol-based thermometer. Time and location were also recorded.

Sampling sites included the great lawn on Reed campus, Woodstock Park, Kenilworth Park, and Westmoreland Park.

Table 1. Fat content of foods used. 30 gram measurement was used as a standard to approximate the amount of food per squirrel serving.

food	grams of fat in 30 gram serving
blueberries	0
corn	3
cashews	13
sunflower seeds	15
brazil nuts	19
pecans	22

Figure 3. Typical setup of squirrel food.

Data Analysis and Results

The majority of data were not statistically significant, and appeared similar to Figure 4. This was the pattern observed in all nuts, sunflower seeds, and blueberries.

However, corn preference was significant at the $\alpha=0.1$ level, $p=0.0739$ (Figure 5). Warmer temperature ranges were therefore correlated with increased corn consumption, and colder temperatures with decreased.

These data did support the hypothesis that colder temperatures would encourage consumption of fattier foods. While there was no significant variation in preference for the fattier nuts (for instance brazil nuts had a p-value of 0.3908, Figure 4) only the variation between fatty and non-fatty food was significant.

Figure 5: ANOVA of corn preference of squirrels as temperature increases. Temperature ranges are the same as figure 1. Here, there is a significant increase in corn preference as temperatures are warmer, ($DF=2, T=10, p=0.0739$).

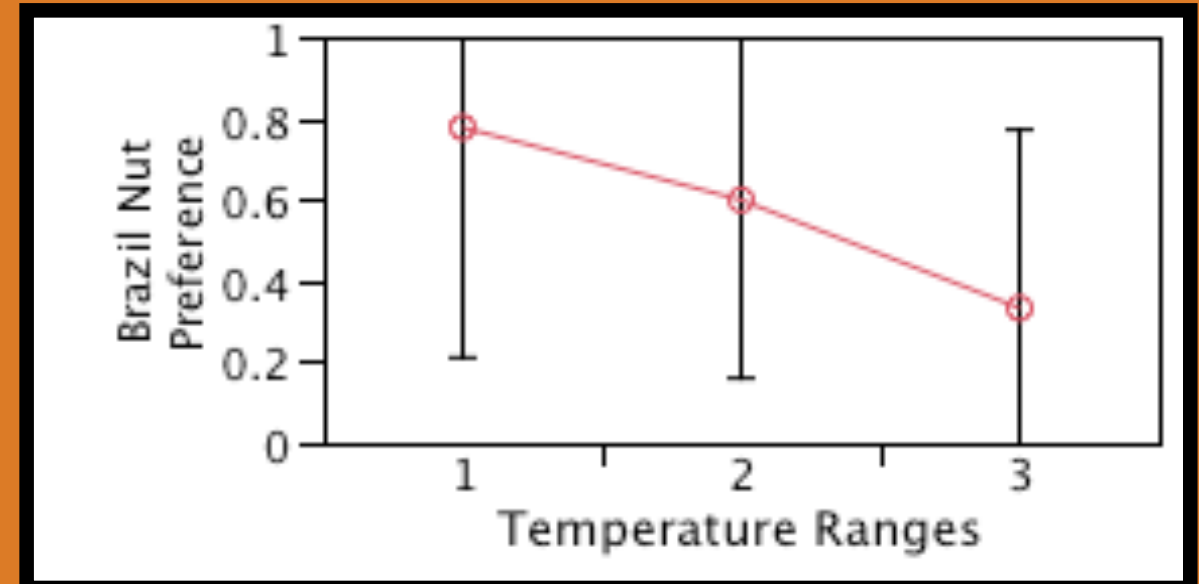
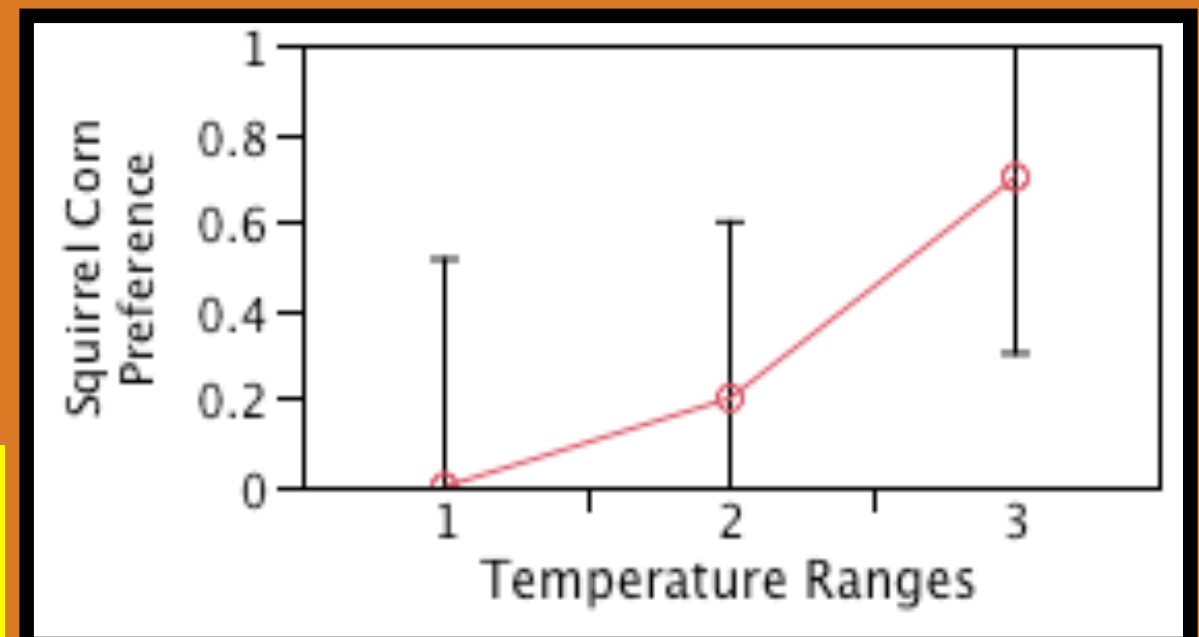


Figure 4: ANOVA of Brazil nut preference of squirrels as temperature increases. Temperature ranges are as follows: 1 (6,7,8), 2 (9,10,11), 3 (12,13,14). There is no significant data here, and none for all other nuts tested, though a general trend of lower preference at higher temperatures is evident ($DF=2, T=10, p=0.3908$).



Conclusion

It appears that while most data did not support our hypothesis, there was a significant decrease in corn consumption as the temperatures dropped. This leads to the possibility that corn was low enough in fat to trigger a response to the squirrels (a difference of 11g fat/30g serving between corn and cashews vs. a difference of 7g fat per 30g serving between cashews and pecans). So while results were not as expected, there is the possibility of temperature affecting squirrel food choice.

Future Directions

As this experiment yielded little significant data, future directions could include a variety of high-fat and low-fat foods to test if that yields more significant preference. Other variables could also be tested, such a familiarity of food with the squirrel, exposure to human contact, or other nutrients within the food.

References

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