

Take to the Trees: Patterns in *Sciurus carolinensis* Behavior.

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Eastern grey squirrels are diurnal, like (most) humans, making them ideal study subjects. Squirrel activity is known to follow a bimodal pattern throughout the day.

Reed College campus is home to many squirrels.

We noticed a great degree of variability in the number of squirrels seen around campus, even at the same time of day. We wondered whether this difference might be due to either changing weather or temperature.

The behavior of squirrels was observed over a three week period. Number of squirrels seen, behaviors, temperature, weather, time, and date were all recorded.



Results:

Hypothesis: Squirrels behave differently based on the temperature and/or weather.

	Running in tree		Total number of squirrels		Proportion eating in trees		Proportion eating on ground		Proportion running or foraging on ground	
	(-) p=0.0441	ns	ns	ns	(+) p<0.0001	ns	(-) p=0.0013	(+) p=0.0401	ns	(-) p=0.0081
Date										
Temperature	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Weather	ns	(+) p=0.0016	ns	ns	ns	ns	ns	ns	ns	ns
Time	ns	ns	ns	(-) p=0.0193	ns	ns	ns	ns	ns	ns

Correlated with increased total number of squirrels:

In the Art transect (AT):

greater proportion running/foraging on the ground ($p < 0.0001$) and decreased proportion sitting (not eating) in trees ($p = 0.0119$).

In the ODB transect (OT):

greater proportion running in trees ($p = 0.0051$) and greater proportion sitting in trees ($p = 0.0024$).

Figure 1: Selected results from multiple regression analysis. Significance based on inclusion of all four explanatory variables. AT in white, OT in green. Signs indicate whether dependent variable increases (+) or decreases (-) with an increase in the independent variable. Weather was scored on a scale of 0 to 3, with 0=sunny, 1=some clouds, 2=complete cloud cover, and 3=rain. NS indicates the p-value was greater than 0.05. Proportions were calculated by dividing the number of squirrels doing a behavior by the total number of squirrels observed.

Temperatures (°C): range 1-13.8 (AT), 5.1-13.8 (OT), mean 8.6(AT), 9.4 (OT). Times: range 7:25- 16:20(AT), 8:10-16:47(OT).

Methods:

Scan sampling was done with one behavior scored per squirrel.

Data was taken at various times of day during the study.

Temperature was recorded from hand-held thermometers.

Behaviors were scored as follows:

Eating	For each behavior, it was noted whether the squirrel was in a tree or on the ground.
Running	
Foraging	
Standing/sitting	

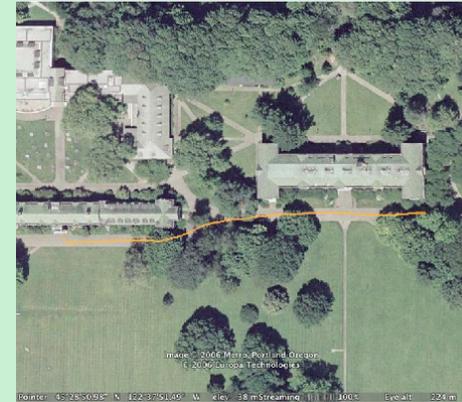
Squirrels were observed at two sites: by the art building, and between Old Dorm Block and Eliot Circle, as seen in the pictures.

Data was collected as follows:

ODB: 74 trials, average 2.1 squirrels per trial (range:0-6)

Art: 47 trials, average 6.7 squirrels per trial (range 0-18)

Analysis of the data was done using StatView. Multiple regression coefficients were used to determine the effects of the variables. A p-value of less than 0.05 was considered significant. Correlation matrices were also created to determine whether variables were related to one another.



Conclusions:

Squirrels are not consistent.

Few differences in squirrel numbers or behavior can be attributed to either temperature or weather when date is included in the model. The two exceptions are increased running in trees with “worse” weather (OT) and decreased total number of squirrels later in the day (OT).

The importance of date in squirrel behavior could be due to circannual rhythms, or simply different needs once the nuts have all fallen off of the tree and been cached away.

Even though some significant results were found, these differed between the two areas. This could be due to truly different behavior responses (since one of the areas has less nuts and many more people than the other), or as a result of the very differently sized squirrel populations.

Both sites showed that squirrels spend a significantly greater proportion of their time eating as it gets later in the year. This could be due to increased energy needs, decreased need for other activities, or some other factor such as need to build up fat layers before the food supply is completely depleted.

References:

Images of Reed College from Google Earth.

Images of squirrels taken by K.C. Regmi.

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