

EFFECTS OF TREE ABUNDANCE AND DISPERSION ON THE HOME RANGES OF THE EASTERN GRAY SQUIRREL (*SCIURUS CAROLINENSIS*)

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ABSTRACT

The Eastern gray squirrel (*Sciurus carolinensis*) of North America prefers a habitat made up of dense and relatively old and large trees. Each squirrel establishes an individual home range, which consists of a food source and a place of shelter, all of which can be accessed without the squirrel traveling a great distance. We hypothesized that the home ranges of squirrels should be smaller in areas with many closely spaced large trees than in areas with few widely spaced trees. Ranges were measured after observing squirrels for four weeks, and numbers of tree clumps were counted within the ranges. Our results showed a negative correlation between the perimeter of a squirrel home range and the number of tree clumps within that range. Therefore, as expected, the home range of Eastern gray squirrels appears to depend on the number and dispersion of large trees in an area. More squirrel home ranges need to be studied to determine the generality of our results.

Keywords: Eastern grey squirrel (*Sciurus carolinensis*), habitat, home range, tree abundance

INTRODUCTION

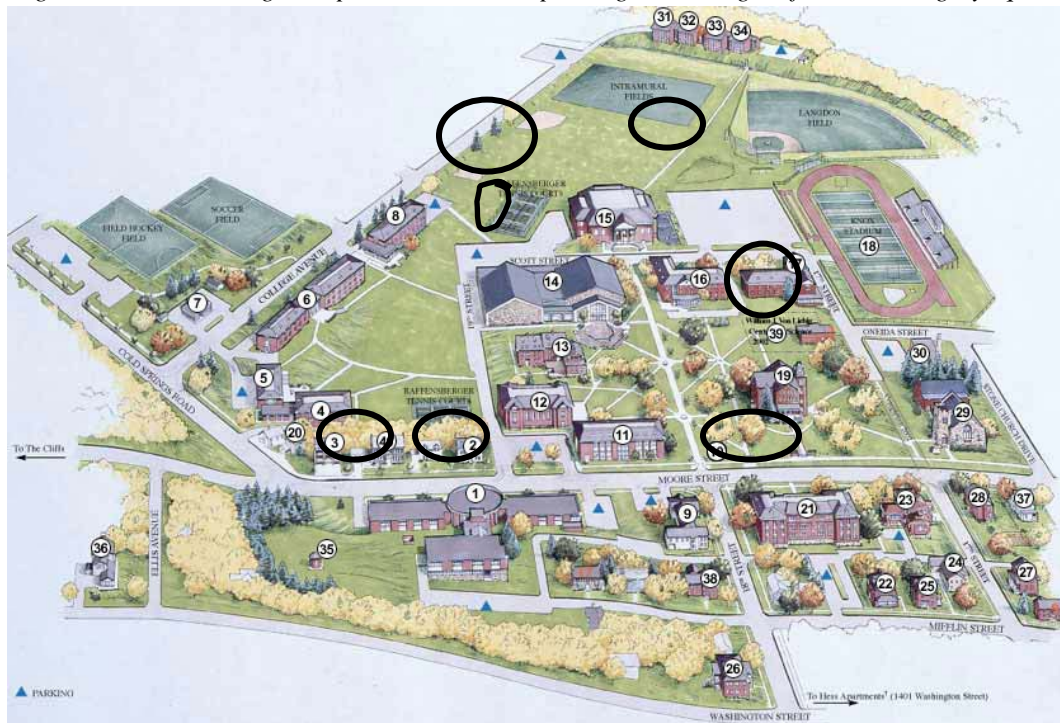
The Eastern gray squirrel (*Sciurus carolinensis*) remains active all year-round, and therefore is dependent on its habitat for providing the necessary means of survival, such as food and shelter. Squirrels prefer to live in mature, hardwood forests, dominated by nut trees (Lawniczak 1995). Large, old trees are ideal homes for these squirrels (Koprowski 1994), which have adjusted to human populated areas by staying close to areas full of large trees. Squirrels occupy two types of homes, including a permanent tree den as well as a nest of leaves and twigs on a tree crotch 30-45 feet above the ground (MacClintock 1970). Once their home is established, they are sedentary and stay within that area surrounding their particular tree. They are creatures of habit; they appear to run along the same tree branches with consistently identical routes (Seton 1982). These patterns of movement give rise to a squirrel's home range. The home range of a squirrel is the area in which all of the food and shelter it needs are readily available. A single home range can consist of a variety of large and small trees, shrubs, and grasses. Once a squirrel determines its range, it very rarely travels beyond it, as long as there are provisions for survival in that

particular area (Seton 1982). We hypothesized that squirrels should have smaller home ranges in areas with a high density of large trees, than in areas with widely spaced large trees. This is because Eastern gray squirrels prefer large trees, but at the same time do not like to travel far from shelter in search of food (Seton 1982).

METHODS AND MATERIALS

The Juniata College campus was used as the field site for testing our hypothesis. Seven sites were specifically observed around the campus, which were based upon where it was possible to sight and track a single squirrel's range for an extended period of time. The specific sites are as follows: behind Tussey Hall and the Human Resources building, behind Swigart Music Hall and a private home, Founders Hall's lawn, South Hall lawn, two sites on the East Apartments' playing fields, and beside the tennis courts next to Ellis. Figure 1 shows a map of the Juniata College campus, and the position of each home range site.

Figure 1. Juniata College campus with the corresponding home ranges of the Eastern gray squirrel.



Each squirrel was observed for two weeks, during March 26 to April 16, 2002. Observations were taken in the morning and late afternoon hours, which were when the squirrels were known to be the most active. Squirrels were identified by distinct characteristics such as tail width, coat color, feet color, and body size. We recorded where a particular squirrel went, marking the farthest points it traveled. The areas were then measured off with a 12 ft. tape measure and the perimeters of the home ranges were found. Counts were made of the large tree clumps inhabiting the areas. A tree was considered large if it had a 27-inch circumference or larger, and a clump consisted of three or more large trees that were within a 3 to 4-ft radius of each other. The number of tree clumps was compared with the perimeters of the squirrel home ranges.

RESULTS

The perimeters of the home ranges of seven squirrels are shown in Table 1. Home-range perimeter was negatively, but not significantly correlated with the number of tree clumps within a squirrel's range [range = $-0.0038(\text{number of tree clumps}) + 3.3116$, $r^2 = 0.3545$, $n = 7$, $P > 0.05$; Fig. 2).

Table 1. Perimeters of the home ranges of seven Eastern gray squirrels and the number of clumps of large trees in their ranges.

Perimeter of Home Ranges (ft.)	Large Tree Clumps
225	2
350	2
395	3
432	2
507	0
615	1
660	1

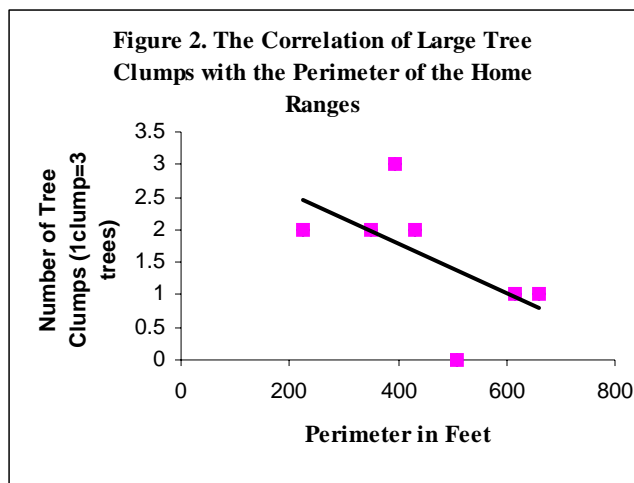


Figure 2. Graph of correlation between the perimeter numbers and their corresponding large tree clumps.

DISCUSSION

As expected by our hypothesis, squirrel home-range size was inversely correlated with tree-clump numbers, but it was not significant. Since squirrels rarely want to breach their home-range boundaries (Seton 1982), it makes sense that the squirrels would have smaller ranges where there are more clumps of trees for protection and food. Where tree clumps were few in number, a squirrel would have to travel farther to meet its survival needs.

We sometimes observed squirrels entering another's home range, but there was no sign of aggressive behavior exhibited by either animal. Perhaps squirrels in heavily human populated areas show little territoriality.

To verify the trends that we have observed, more squirrel home ranges should be analyzed.

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