Using Radio Telemetry to Assess the Behaviors and Habitat Use of Urban Grey Squirrels (*Sciurus carolinensis)* and Potential Competition with American Red Squirrels (*Tamiasciurus hudsonicus*)

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Background

Historically red squirrels (*Tamiasciurus hudsonicus)* have been associated with coniferous forest (Riege 1991).

However, Gurnell (1987) shows that red squirrels can inhabit deciduous forests. Gray squirrels (*Sciurus carolinensis)* are more often associated with deciduous forest (Reige 1991; Nupp and Swihart 2000).

Much of the research involving interactions between species has been conducted in Europe, where the introduced North American gray squirrel was found to be causing the decline and extirpation of the European red squirrel (*Sciurus vulgaris*) (e.g.,Wauters et al. 2002).

Few studies have looked at the interaction between American red squirrels with gray squirrels, particularly in urban environments such as college campuses.

Study Objective:

Identify if grey squirrels are outcompeting and replacing red squirrels through competitive exclusion

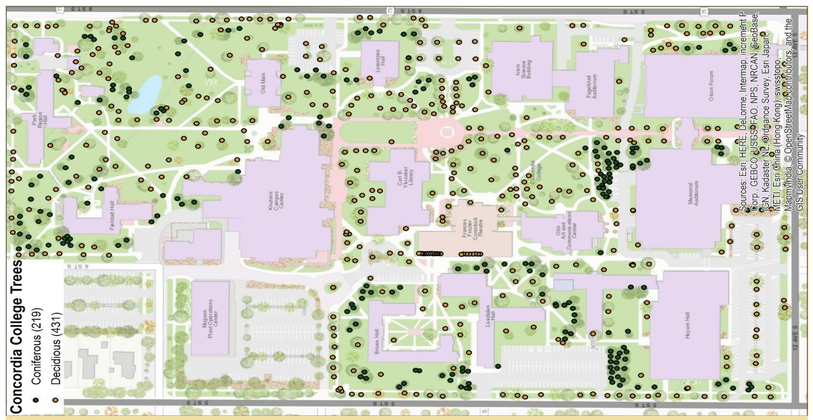
When occupying the same area, there are anecdotal reports that red squirrels are more aggressive and displace gray squirrels, but this has failed to be supported by studies.

Riege (1991) suggests that exploitation competition, may favor gray squirrels in primarily gray squirrel habitat, but that the two species may co-exist in intermediate or mixed habitats in which neither species has an advantage.

Methods

1. Squirrels were caught in baited (peanut butter and rolled oats) Tomahawk live traps and handled and collared using a canvas handling cone (Koprowski 2002; Arenz 1997).
2. Determined and recorded identifying characteristics.
3. Squirrels were also pit tagged to ensure a permanent identifier.
4. Squirrels were given a zip-tie collar with a radio transmitter.
5. Three colored beads were added to the collars for identification.
6. All collars had a length of aquarium tubing over the zip tie to prevent the squirrels from pulling their collars too tight and choking.
7. Squirrels were released at the point of capture.
8. Radio telemetry was used to track collared squirrels' locations and behaviors throughout the year.
9. Locations were recorded as GPS coordinates and a site description.
10. Observations were recorded and entered into a spreadsheet for analysis.
11. Site description and behaviors observed along with GPS coordinates were used to infer the location type as either deciduous, coniferous, or ground.

Radio Collared Grey Squirrel on campus

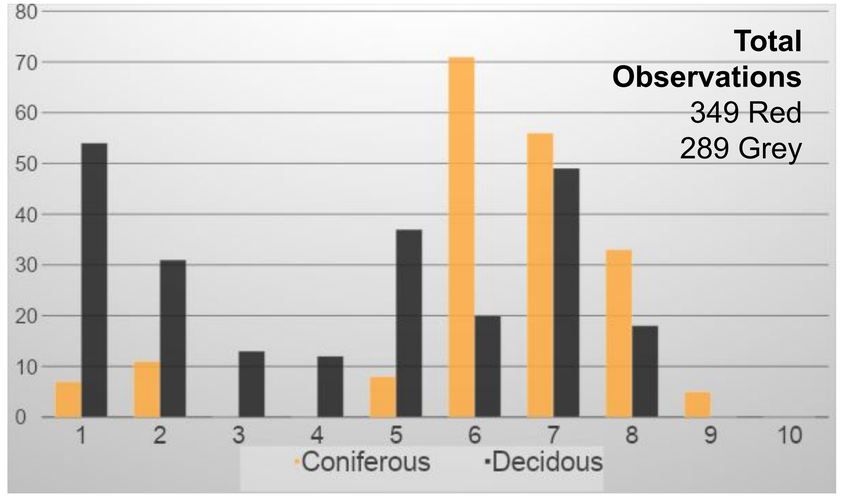


Campus Map with trees highlighted and labeled

Results

Findings

- Each year, **except 2018**, <u>red squirrels were significantly more likely to be found in coniferous trees than grey squirrels</u>. ($p<0.001$)
- Grey squirrels in coniferous trees **increased** from 2017 (red squirrels present) to 2018 (no red squirrels).
- **Decrease** of the red squirrel population through the years



Conclusions

- Supports competitive exclusion between the two species.
- Support for hypothesis of grey squirrels outcompeting red squirrels on campus for resources
- More years of observations are needed to determine if this trend continues and if grey squirrels move into conifers due to competitive release of red squirrel populations decreasing.

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