

EDEN Undergraduate Internship Report

The goal of my internship was to explore the mechanisms of natural selection using the model system of *Peromyscus maniculatus*, the deer mouse. Previous research had shown that variation in coat color of mice around the Sandhills region of Nebraska was mainly due to a deletion in the agouti gene. The purpose of this project was to explore whether this variation arose as an adaptation to the different substrates of the area.

During the first phase of the internship, my primary focus was assisting in the construction of the enclosures in the Sandhills area. Two enclosures were built, with each one subdivided into quadrants designed to hold 100 mice. Once these enclosures were completed, we began intensive trapping of the area in order to catch “light” mice in the Sandhills and “dark” mice from the surrounding farmland. Although we did not reach our goal of 800 mice, almost 4 quadrants were filled by the time this phase of the internship was complete. In addition to merely trapping the mice, we took measurements of the physical attributes of each mouse, along with spectrometry measurement for later analysis, photos, and DNA samples. Each mouse was further given an ear clip and injected with an RFID tag for later identification.

Once the enclosures were built, I returned to Boston for the second phase of the internship. During this phase, the measurements we had taken of the mice were compiled and analyzed. The spectrometry measurements were analyzed using the CLR 1.05 program, which produced several statistics used to measure “brightness”. Using the tail clips from the mice, we were able to successfully extract DNA for further analysis. In order to determine the exact concentration of DNA in each sample, I used the ND1000 program to nanodrop each sample we extracted. I also created and tested primers for the agouti gene in deer mice, along with designing a Taqman Genotyping Assay to genotype each mouse based on the deletion in the agouti gene.

Despite initial difficulties constructing large steel enclosures in the middle of a virtual desert, this part of the project was completed successfully. The structures are stable and will last for the duration of the experiment, which may be up to 5 years. Trapping the mice, while taking longer than expected, is going successfully and we now have a much better understanding of the habitat of deer mice in the Sandhills. Although I might have allocated more time to collect and process deer mice if I could redo this project, I would say that the main goals of building the enclosure and beginning to stock them were accomplished. I plan to return to the project this fall to help out with trapping work in Nebraska. This summer has been a phenomenal and eye-opening experience for me, and I hope to stay connected with the project in the future.