COLORADO STATE UNIVERSITY
EXTENSION

JUVENILE FORAGING AND GROWTH RESPONSES IN HIBERNATING GROUND SQUIRRELS LARIMER COUNTY

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INTRODUCTION

I conducted my CSU Summer Extension Internship at the CSU Mountain Campus (Fig 4), a high elevation, subalpine ecosystem that hosts a variety of different large and small mammals, alpine plants, dense evergreen forests, and an influx of human workers and visitors [6]. It is located off Pingree Park Road, south of the Highway 14, in the Poudre Canyon and borders the Roosevelt National Forest.

I specifically sampled two species, the Wyoming Ground Squirrel (Urocitellus elegans) (Fig. 1) and the Golden Mantel Ground Squirrel (Callospermophilus lateralis) (Fig. 2). Both species coexist in the same environment but exhibit different social structures based on previous studies [5]. C. lateralis are solitary [1] while the U. elegans are colonial [4], but both species care of their young (pups) underground for a significant part of the adult's active season. Pups will spend their first hibernation with their mother and as juvenile emerge with their parents for the mating season. This period is what we are most interested in, as this where the primary growth period occurs.

While often only seen as agricultural pests, both species are vital to their native ecosystems [3]. They are considered ecosystem engineers as they form burrows. These allow the soil to breathe and provide shelter for animals in the future[2].

INTERNSHIP GOALS

The overarching goal of my internship is to measure growth rates after the first year of hibernation. There is a focus on the pups and yearlings of both species, however the data presented with just be for C. lateralis. The difference between the species is marginal.

Diet will be a key aspect of this research, as forage quality can be indicators of the environment. As will the change in growth between years, in relation to hibernation.

APPLICATION TO EDUCATION

This internship provided invaluable experience in the field, from collection data to handling wildlife. I learned a lot about the permitting process and about working within and around communities, recreators and professionals at the CSU Mountain Campus.
I also had the incredible opportunity to work with many k-12 kids camps throughout the summer, as well as the housing and dinning staff at Mountain Campus.
The general public was very curious about our work, and I had the opportunity to teach them about wildlife sampling techniques, mammal life history, and the importance of understanding how wild animals respond to mad-made changes to their environment. (Fig 3)

METHODS

We used baited traps with peanut butter, vanilla and rolled oats to live-trap animals. We trapped animals across different locations around the Mountain Campus to target active burrows used by ground squirrels. We periodically checked the status of the trap (approximately every 20-35 minutes).

Once trapped, animals were quickly moved to the processing area where we collected a variety of physical and demographic information about the individual (Fig 5), including sex, age, capture status, GPS, body measurements (hind foot, pelvic width, body length, tail length, etc.), and identification information (PIT Tags, ear tags, dye marks). We also collected biological samples (i.e. cheek swabs, fecal samples, and hair samples) for future physiological analyses. Each animal was then released in the same location of capture after measurements were taken.

Figure 5

Figure 6

Figure 4

TAKE AWAY

This internship helped me take a leadership role in various ways, in sometimes stressful situations. This experience was unlike anything I have been in before and learned a lot about myself as a team member.

This internship also provided an opportunity to become more comfortable in working in a constantly changing environment, as well as in handling animals (Fig 6), because there were always challenges to overcome while maintaining safety for everyone involved.

At this point in time, this research is still in an unfinished state. The data that is the focus of this project requires a few years worth of lab work. The data that is available shows a skewed sex ratio in yearlings unlike pups (Table 1). Also, there is a possible different in weight gain between ages, but unconclusive (Table 2).

Table 1.

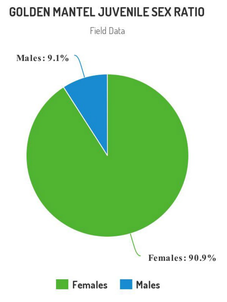
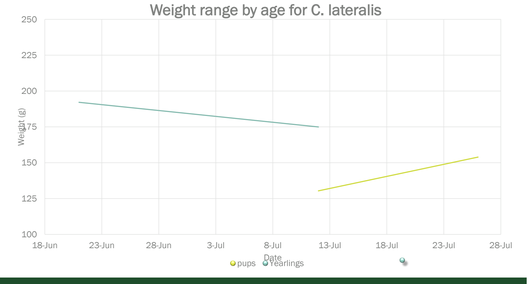


Table 2.



SPECIES EXAMPLE

Figure 1. Adult Urocitelus elegans in front of burrow

Figure 3: C. lateralis near burrow, eating an unknown seed
Credit: Clare Ryan

Figure 2: Clare Ryan teaching how to handle a ground squirrel

NEXT STEPS

Hopefully continuing to work on this research and do analysis with the lab data as well as work on processes the data. Ideally, this would even lead to a published work. At this point, the vegetation and stress samples have not been analyzed so only the behavior and location data could be processed. In the future the data from the lab would be added to the conclusion.

Works Cited:
[1] Bartels, M. A., and D. P. Thompson. 1993. Spermophilus lateralis. Mammalian Species 440:1-8.
[2] Davidson, A.D., Detling, J.K. and Brown, J.H. (2012), Ecological roles and conservation challenges of social, burrowing, herbivorous mammals in the world's grasslands. Frontiers in Ecology and the Environment, 10: 477-486. https://doi-org.ezproxy2.library.colostate.edu/10.1890/110054
[3]Durrant, S., R. Hansen. 1954. Distribution patterns and phylogeny of some western ground squirrels. *Systematic Zoology*, 3: 82-85.
[4] Fagerstone, K. A. (1988). The Annual Cycle of Wyoming Ground Squirrels in Colorado. *Journal of Mammalogy*, *69*(4), 678–687. https://doi.org/10.2307/1381622
[5] Mammals of Colorado, D.M. Armstrong, J.P. Fitzgerald, and C.A. Meaney, 2nd Edition, Denver Museum of Nature & Science and University Press of Colorado (pg. 134-136) (2011)
[6] Zimmer, A. (2021, July 22). Colorado's Ecosystems [web log]. Retrieved September 30, 2022, from https://www.coloradovirtuallibrary.org/resource-sharing/state-pubs-blog/colorados-ecosystems/.