Wildlife Services Coyote Management Project: Owl Pellet Dissection

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Center For Urban Resilience | Loyola Marymount University | Spring 2018

Abstract

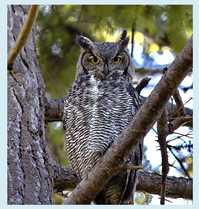
The "Wildlife Services Coyote Management Project" aims to advance the understanding of the urban coyote population in the Long Beach area. In addition to using pre-existing data already gathered by local wildlife services, the team is working to assemble more information on the behavior and distribution of urban coyotes by means of scat analysis. Now in its second year, the project will augment its data through genetic analysis of scat and building up the repertoire of animal skeletons through means of owl pellets to further study coyote diet. Owl pellets have been proven to be an effective means of finding more complete prey skeletons than coyote scat. Unlike the coyote, which chews its food before it swallows, the owl swallows its prey whole and expels the innutritious matter out in a pellet. This makes owl pellets an excellent source of nearly whole skeletons. Therefore, this portion of the Long Beach coyote project will focus on the methodology, results, and analysis of matching skeletons from owl pellets to bones found in coyote scat to better understand urban coyote diets. In addition to helping serve the ultimate goal of developing a coyote management plan for the City of Long Beach, the owl pellet analysis will also serve as a way of surveying the biodiversity on LMU's campus and the surrounding area.

Introduction

- Owl pellets make for an excellent source of intact prey skeletons, as they do not chew their food before they swallow[4].
- Loss of more delicate osseous structures is expected in digestion, but more resistant structures are generally retained[1].
- The heads of prey are generally the first ingested, rendering the skull the most likely portion of the body to be contained within the pellets[1].
- Pellets can be found at either of two locations[4]:
  1. Hunting ground
  2. Roosting site

Methods

Samples collected from Great Horned Owl roost near Sacred Heart Chapel



Samples dried at 175°C for 30 minutes[2,3]

Dissection process

Analysis and identification of skeletons, primarily skulls

Use as a reference for bones found in coyote scat

Data

Table 1: Samples from 2016 and 2018. The total sample size for each year was used to calculate a percentage of the total sample for each species, which are shown in Fig.2.

	Rattus	*Mus*	*Geomyidae*	*Aves*	Total
2016	24	0	15	4	43
2018	10	5	1	2	18

Figure 1: The four prominent samples collected were *Rattus* (rat), *Mus* (mouse), *Geomyidae* (gopher), and *Aves* (bird). Higher classification of *Rattus*, *Mus, and Geomyidae* samples were estimated to be *Rattus norvegicus, Mus musculus, and Thomomys bottae,* as they are common invasive species around the LMU campus and the surrounding area. Higher classification estimates of the sampled *Aves* was not possible with the given data, as the structures of the birds are much more delicate than those of the rodents and were lost in the pellet creation.

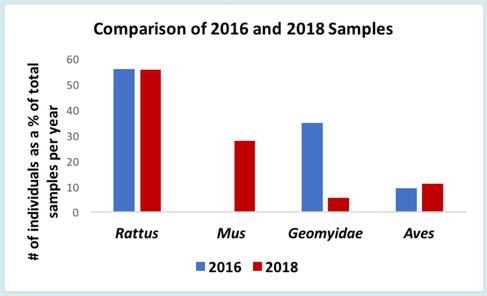


Figure 2: The four prominent samples are compared here for each of the two sample years, 2016 and 2018. Due to varying sample sizes, the number of individuals in each sample were divided by the total number of samples for that year to get a percentage of the overall sample size.

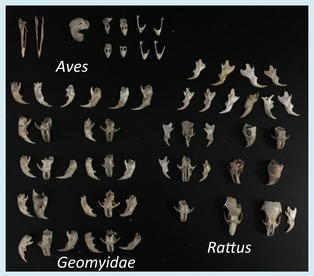


Figure 3: Selected samples from 2016 pellets. Distinguishing factor between *Rattus* and *Geomyidae* is thickness of mandible, where that of *Geomyidae* is thicker.

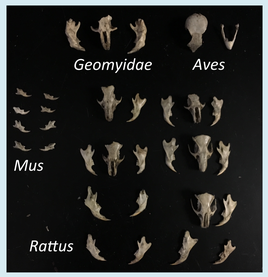


Figure 4: Selected samples taken from 2018 pellets. These samples included *Mus* in addition to the other samples collected in 2016.

Rattus

Geomyidae

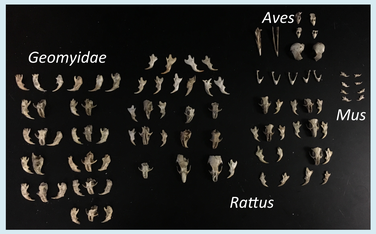


Figure 5: All samples, from 2016 and 2018, side by side, with reference images used for identification. *Aves* skull reference was not included as they are much more distinct and easy to recognize.

Mus

Results

- The four prominent samples collected were of genus *Rattus, Mus*, family *Geomyidae*, and class *Aves.* Classification levels varied based on availability of skull data.
- Specific species identification was estimated to be *Rattus norvegicus, Mus musculus, and Thomomys bottae*, based on sightings and data collected about prominent species in the area. Again, this is an estimate that could only be confirmed in the presence of further skeletal data.
- There are seemingly a similar proportion of *Rattus* and *Aves* collected in both sample years, but a fairly different proportion of *Geomyidae* and *Mus*.

Discussion

- In past years, the presence of gopher populations on campus proved a large problem, and measures were put in place to lower their numbers. Looking at the 2018 data, the percentage of gophers collected was much less than in 2016, suggesting that the measures taken were effective.
- The large proportions of brown rat found in both sample years makes sense, because if the same owls have consistently been using the same hunting grounds over the past two years, as we expect they have, it would make sense they would consistently be able to stick with the same prey.
- *Rattus norvegicus* (brown rat) and *Mus musculus* (house mouse) are two of the most common invasive rodent species found in California[5], therefore their presence on campus is expected.
- The collection of these invasive species proves possibly problematic for their use in the coyote scat analysis. If the same invasive species are prey to the coyotes in Long Beach, then identification will be possible. However, if the coyotes are preying on more native species, then an alternative identification strategy will be necessary.

References

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All species photos and skull diagrams are taken from Google Images.

Acknowledgements

Special thanks to Dr. Peter Auger, Dr. Eric Strauss, Dr. Demian Willette, Maria Curley, Emily Simso, CURes, and the LMU Biology Department for making this research possible.