Anza-Borrego Desert State Park Paleontology Society

Fossil Canid Taxonomic Identification Based On Teeth

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Steven Byrum ▲ s.byrum@hotmail.com ▲ Southwestern College ▲ Biology

Introduction

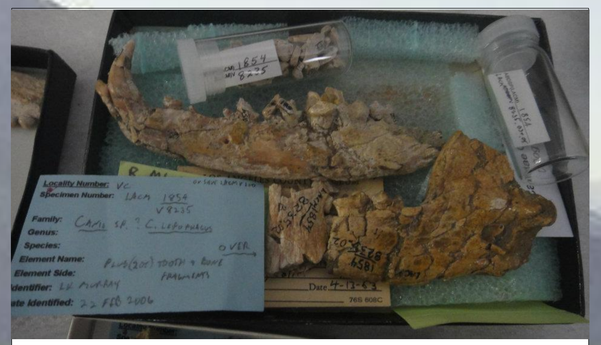
The Anza-Borrego Desert State Park Paleontology Society is an organization working under the Desert State Park to help build and maintain the Park's extensive collection of fossils.

The purpose of my internship is to help the department by measuring the teeth of the park's canid specimens and attempt to find correlations between teeth measurements and species to aid in identification.

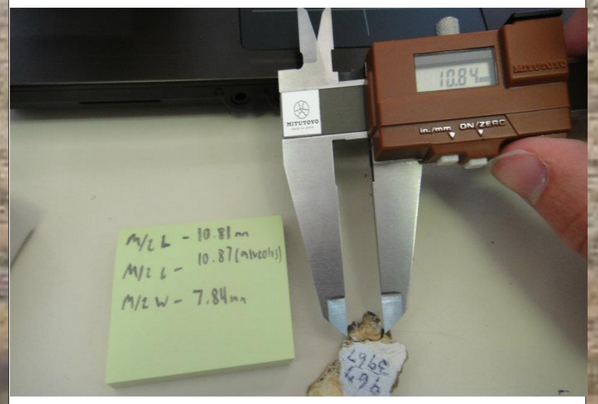
All of the fossils I am working on are Pliocene-age animals of the family canidae (dogs and relatives). The Pliocene was a relatively recent epoch, spanning from 5.4 to 2.5 million years ago, and because of this, its fossil record contains many animals similar to present day fauna as well as many extinct horses, camels, and tortoises. Canids from this area at this point in time include the bone-crushing dog *Borophagus diversidens* one or more wolf species, and ancestral species of the modern gray fox *Urocyon cinereoargenteus* and coyote *Canis latrans.*

Methods

❖ All canid specimens with at least partial dentition (upper maxillary or lower mandibular teeth) are taken from the collection for examination. The only tool required is a pair of electronic calipers, as well as knowledge of what measurements to take based on the work of previous researchers.

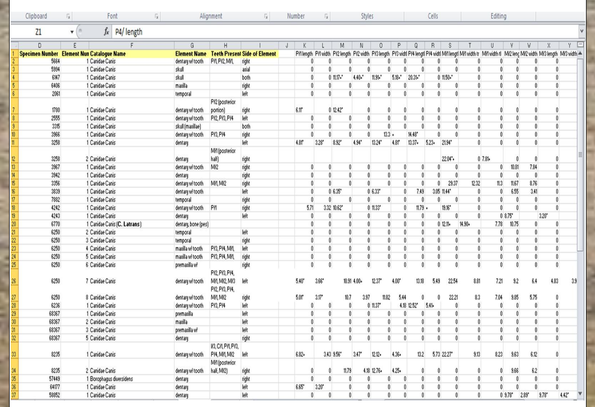


❖The dental formula of a canid is $\frac{3.1.4.2.}{3.1.4.3.}$ for each side, with 3 incisor teeth, 1 canine, 4 `premolars, and 2 molars on top/ 3 molars on the bottom. The fossil specimens are often broken and incomplete, thus and number of measurable parts. Not every tooth can be measured, which will lead to incomplete data.



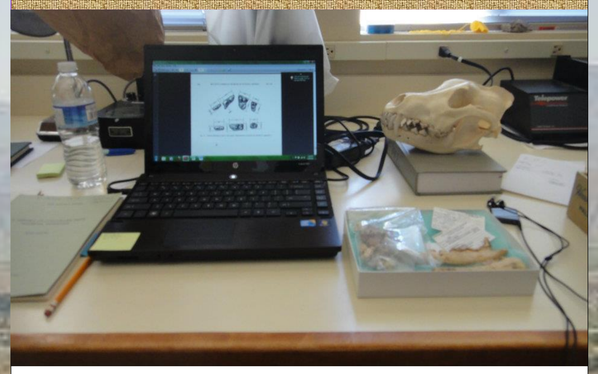
❖ Being sure to reset the calipers to zero after every measurement, the width and length of every available tooth is measured in millimeters. Due to its shape, the width of the lower first molar is measured at two different places. It is of utmost importance to measure each tooth of each specimen in the exact same way in order to ensure accuracy.

❖ Skulls from the comparative collection of recent animals including gray wolf *Canis lupus*, coyote *Canis latrans*, and gray fox *Urocyon cinereoargenteus*, were also used to help identify specimens which still exist today. Measuring complete sets of teeth for comparison makes it easier to know what to look for in the fossil specimens.



❖ The data are recorded onto a table, where the majority of work will take place. The available measurements may be calculated into different ratios such as length over width or tooth over tooth row. The data for each specimen will be plotted and examined for any notable differences that can distinguish species.

Results



Data obtained from the project are still being analyzed. If the teeth in the collection prove to be insufficient in identification due to lack of measurable specimens, other skeletal elements of the fossils may have to be analyzed instead.

Conclusion

Through this internship I have gained experience in taking fossil measurements, learning vertebrate anatomy and taxonomy, and participating in a working environment. It is a very rewarding experience, and I hope to continue research on this project until completion.

Acknowledgements

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