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Stable Isotope Analysis of Pinniped fossils from the San Diego Formation (Late Pliocene, California)

Pinnipeds (seals and allies) represent an intermediate morphological and ecological condition between fully aquatic marine and terrestrial mammals and as such are an ideal group for study of the land-sea transition in tetrapods. Morphology has been the primary focus of most studies of fossil pinnipeds, but supplemental ecological information can be gained through stable isotope analysis of fossil material. Tooth enamel is the preferred material for stable isotope analysis because it is less prone to diagenetic alteration. For studies of fossil pinnipeds, however, this presents a problem as most taxa exhibit a reduction in enamel and in the number and size of teeth. Here we assess the use of other biogenic materials (i.e., bone, dentin) as potential archives of ecological information for pinnipeds. Bone and dentin were sampled for carbon and oxygen stable isotope analysis from the Late Pliocene San Diego Formation of southern California. Taxa sampled include three species of fossil pinniped as well as coeval species of whales, sirenians, fish and terrestrial mammals. Three types of criteria were defined to assess the extent of diagenetic alteration in bone and dentin: 1) comparison of phosphate oxygen values with carbonate oxygen values; 2) similarity and degree of overlap in carbon values among ecologically distinct taxa; and 3) how well the recorded isotope values fit predicted values for Pliocene marine consumers. Once validated, these tools will then be applied to study of earlier species representing the initial radiation of pinnipeds into aquatic ecosystems.

P2.108 CLAESSENS, L.P.*; EDWARDS, S.V.; MARTINEZ, R.; KRZYZAK, M.; ECKARDT, M.; LESLIE, G.; MARCUCCI, M.; NEABORE, S.; VRCEK, I.; MOSS, S.; GRASSI, K.; College of the Holy Cross, Worcester, MA, Harvard University, Cambridge, MA; *lclaesse@holycross.edu*

Aves 3D: A new online resource for avian skeletal anatomy

Here we report the launch of a new National Science Foundation funded online resource for avian skeletal anatomy, www.Aves3D.org, which will offer three-dimensional models of a wide selection of skeletal elements of extant and extinct birds. The Aves 3D database is produced through non-contact laser scanning of skeletal material from, amongst others, the Harvard Museum of Comparative Zoology and the Yale Peabody Museum of Natural History. Database growth is fueled by undergraduate student research projects, which involve a variety of functional and phylogenetic studies supervised by both affiliated and external post-graduate students and researchers. The online database will also serve as a digital archive for the collections of contributing museums and allows for rapid global dissemination of 3D digital data on common as well as rare and potentially fragile specimens, in a format ready for a wide range of two and three-dimensional computational analyses. The size of the database is currently limited, and opportunities exist for initiating new student-based projects that will contribute to database growth.

P3.36 CLAFLIN, SB; PIEN, CL; RANGEL, EN; UTZ, KE; WALTHER, HV; WRIGHT, AN; ELLERBY, DJ*; Wellesley College; *dellerby@wellesley.edu*

The effects of feeding on medicinal leech swimming performance

The locomotor system of sanguivorous leeches is presented with a unique challenge: how to maintain mobility while coping with a greater than 500% increase in body mass during feeding. A meal of this size is likely to disrupt the function of the muscular hydrostat during swimming, reducing speed and increasing predation risks. We quantified the effects of feeding to satiety on swimming kinematics, and the time course of recovery of swimming performance post-feeding in the medicinal leech Hirudo verbana. There was a 5.07 fold increase in mass during feeding. Despite this, leeches were able to swim immediately after feeding, reaching 27% of their pre-feeding speed. Reduced speed was a consequence of a reduction in both swimming cycle frequency and stride length to 69 and 42% of the pre-feeding values respectively. Recovery of swimming ability was rapid, despite a prolonged increase in body mass. 50% restoration of swimming speed was achieved in approximately 1 hour while body mass was still 4.2 fold greater than before feeding. Rapid mass and volume reduction immediately post-feeding, and the properties of the obliquely striated swimming muscles appear to aid recovery of swimming performance. Such features that aid post-feeding recovery of mobility may have been important in the evolution of leech sanguivory.

P3.148 CLAIRARDIN, S.G. *; GRIFFIN, A.M.; HOLGERSSON, M.C.N. ; PAITZ, R.T. ; BOWDEN, R.M. ; Illinois St. Univ.; *sgclair@ilstu.edu*

Nest temperatures and offspring phenotype in the painted turtle: Does the magnitude of temperature fluctuations matter?

Maternal effects have been shown to impact offspring development. In oviparous reptiles, studies utilizing constant laboratory incubations have demonstrated that incubation temperatures can influence a suite of phenotypic traits, including sex. Recent work has investigated how more natural fluctuating temperatures influence offspring phenotype and shown that temperature fluctuations can produce effects that differ from what would be predicted under constant incubation conditions. This study aims to investigate the potential for female painted turtles (*Chrysemys picta*) to use vegetation cover as a predictor of temperature fluctuations within the nest. This relationship was characterized for 16 natural nest sites using temperature loggers to record nest temperatures and digital imagery to quantify vegetation cover. To study phenotypic outcomes of temperature fluctuations, eggs from eleven clutches were allocated to one of three incubation regimes: constant temperature (27°C), four degree fluctuation (27+/-4°C), and eight degree fluctuation (27+/-8°C). Data from natural nests indicate that daily maximum temperature, daily mean temperature, and daily temperature range, but not daily minimum temperature, were related to overstory cover. In the lab, temperature fluctuations had a significant effect on incubation duration, but not hatchling length, mass or plastron coloration. Additional parameters of offspring phenotype will be measured including righting time, immunocompetence (both cell-mediated and humoral), and sex. The findings from this study indicate that overstory cover can affect nest temperature fluctuations, which can ultimately influence offspring phenotype.