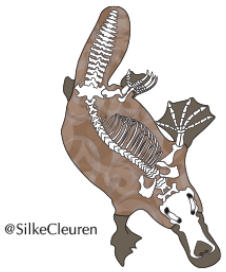

ICVM2023

International Congress of Vertebrate Morphology

Cairns - QLD - Australia • 28 July - 1 August 2023

Abstracts Hosted by

The Anatomical Record

Title: Correlation of precipitation and hatchling morphology in sea turtles Caretta caretta and Chelonia mydas

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The loggerhead sea turtle (*Caretta caretta*) has a worldwide distribution and spends most of its life in marine and estuarine environments. The green sea turtle (*Chelonia mydas*) also has a worldwide distribution. Nevertheless, the Atlantic and Pacific Ocean populations are more genetically isolated from each other. We used morphometric and geo-climatic data from the literature and field measurements from all over the world to assess the response of sea turtles to changes in temperature and precipitation on land. The hatchlings of *Ca. caretta* and *Ch. mydas* are growing larger (straight carapace length) as the precipitation increases in the nesting sites. According to the most recent IPCC report, the projected changes in precipitation may not differ greatly from their current values, except for an increase in seasonality, with spring becoming drier and autumn becoming wetter. Here we found that *Ca. caretta* shows an increase in straight carapace length as annual precipitation increases. Still, a decrease is seen in *Ch. mydas*. These observed trends may provide a glimpse of the ways in which the ecosystems may respond to changes. Although as the temperature rises, jellyfish become more abundant in the zooplankton and can support larger individuals, the concomitant decline of shrimp-like elements in the plankton that supports sea birds may increase the predation rates on turtle hatchlings that are larger.

Title: Functional morphology of the skull of Henodus chelyops (Placodontia)

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The Upper Triassic "one-toothed turtle-like" sauropterygian *Henodus chelyops* is only known from Tübingen-Lustnau, Germany. The body is covered by a shell; the limbs and neck are short. The skull is rectangular, and in many regards, it mimics that of modern turtles, but with one tooth "left" on each jaw. In total, eight skeletons are preserved, incl. seven skulls. We re-described the skull anatomy of the species taking intraspecific variation into account. Using the Anatomical Network Analysis (AnNA), we studied the functional morphology of the skull, also based on different historical reconstructions of its anatomy. We found a left-right modular separation of the skull, which indicates unilateral bite with the remaining placodont tooth. This differs from a turtle, in which a separate snout module was described and which is associated with the turtle beak. Other functional modules vary among different *Henodus* skull reconstructions, highlighting the sensitivity of the AnNA-approach. Using FEA, we also studied detailed stress and strain distributions in the skull. In union, we receive a good picture of functional anatomy and provide hypotheses on major forces acting on the skull. Much of the skull shape can be explained by the specific biting in *Henodus*. In addition, neck retraction forces might enforce the stepwise closure of the upper temporal openings in *Henodus*, mirroring what likely happened in early turtle evolution.

Title: The Perks of Being a Eupercarian: Rapid Skull Shape Evolution in a Massive Radiation of Bony Fishes

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Eupercaria, an enormous clade of teleost fishes, reigns supreme as one of the most diverse clades of vertebrates, extant or otherwise. They have colonized all seven continents, their range extends to almost every aquatic habitat from freshwater to the deep sea, and they exhibit numerous distinct ecologies and morphologies. Accordingly, many questions remain about the drivers of this radiation and how rapidly the diversification took place. Here, we use 3D geometric morphometrics, phylogenetic comparative methods and a novel phylogenetic hypothesis based on exon capture genomic data to quantify the tempo and mode of skull shape evolution across 600 species of Eupercarian fishes. We find a rapid burst in the rate of skull shape evolution and an increase in morphological disparity that roughly coincides with the KPG extinction event 66 mya, suggesting that this mass extinction event opened niches that ancestral eupercarians then rapidly filled. Finally, within eupercarians we find high rates of morphological evolution and disparity in Acanthuriformes and Tetraodontiformes while other clades like Perciformes and Labriformes exhibit intermediate levels of morphological disparity and rates of skull shape evolution. We hypothesize that habitat and diet played important roles in promoting the rapid diversification of the eupercarian skull during the Cenozoic.

Title: Comparative serration histology in hyper carnivorous fossils

Authors: Megan Whitney[1], Aaron R. LeBlanc[2], Ashley R. Reynolds[3], Kirstin Brink[4]