vertebrates, which due to increased resource partitioning and turnover between habitats reach their highest diversity in small species. Dinosaur ovipary and gigantism resulted in rapid growth through multiple morphological stages, from disproportionately small infants to extremely large adults. Interspecific competition from juveniles of large dinosaurs may have excluded smaller dinosaurs from communities. Mass death assemblages confirm the relatively large standing crop of juveniles in the fossil record, yet their impact on taxonomic diversity and body size distributions has yet to be determined. Did community-level interactions effect global dinosaur diversity, and did juveniles have a significant impact on their community structure? Here we examine the impact of ontogenetic niche shift on community structure and overall dinosaur diversity. We compiled 39 non-avian dinosaur communities containing over 240 unique species, spanning five continents and 136 million years, using the Paleobiology Database with mass estimates from the primary literature. To assess the impact of community-level interactions we compared the shape of local-scale mass distributions against the published global. In local assemblages showing divergence from the global pattern, we quantified species-mass likelihood in relation to the presence of larger species and added juveniles as morphospecies within their communities. We find carnivorous theropods diverge significantly from the global trend, indicating local ecology played a significant role in their mass distributions. Carnivorous theropods follow a bimodal trend, with communities containing a pervasive gap in species between 100–1,000 kg. The prevalence of this gap is significantly correlated with the presence of carnivorous species greater than 1,000 kg. Juveniles of these large megatheropods represent a significant proportion of dinosaur biomass, consistently falling within the carnivore body size gap in communities. These juveniles filled mesocarnivore niches, deflating taxonomic diversity in communities. The persistence of these trends through time and space suggest dinosaurs' use of multiple niches through ontogeny is an important biological factor in community structure and low overall dinosaur diversity.

Symposium: Dietary Reconstruction

DIET AND RESOURCE PARTITIONING IN MOSASAURS - THE NECESSITY OF A MULTI-PROXY APPROACH

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A wide diversity of analytical techniques can inform us about the diet of extinct animals. Ideally, multiple, independent lines of evidence converge to bolster the argument. In reconstructing diet, niche partitioning and the ecology of mosasaurs, their tooth morphology, biting and swimming biomechanics, eye morphology, neurosensory adaptations, dental microwear, geochemical signatures and stomach contents can all provide independent clues as to the feeding biology of these extinct marine squamates.
Analyses performed over the last decade, exploring the $\delta^{13}C$ stable isotope signature of various mosasaur faunas, interestingly showed larger mosasaurs to generally exhibit more depleted $\delta^{13}C$ values than smaller ones. In extant marine ecosystems, the trophic effect alone can be seen to drive $\delta^{13}C$ values up to about 1‰ less depleted values with every step up the food chain, so this does not account for such a difference between macropredators in the same ecosystem. This underscores that diet is not the only determining factor in $\delta^{13}C$ signature, and is likely to be overprinted by other factors, including diving behavior (Bohr effect) and a nearshore-offshore gradient.
We recently expanded our analyses with a new dataset covering the Maastrichtian mosasaur fauna from Denmark (c. 44°N paleolatitude) and generally arrive at a similar pattern to that observed earlier in the roughly coeval but different latitude faunas of the Netherlands, Angola and the U.S.A., with larger mosasaurs exhibiting more depleted values. The mosasaur fauna of Denmark, as recognized so far, is very similar to that of the type Maastrichtian of the Netherlands and Belgium, and includes *Mosasaurus*, *Plioplatecarpus*, *Carinodens*, and - newly-recognized in Denmark - *Prognathodon*.
We contextualize the $\delta^{13}C$ stable isotope record in mosasaur teeth against a series of dental microwear analyses. Indeed, type Maastrichtian mosasaur dental microwear analysis shows the larger taxa to be more generalist, whereas the smaller mosasaurs yield a more specialist dental microwear signal, which may well provide an additional explanation for the $\delta^{13}C$ values differing between larger apex predators and smaller mosasaurs, beyond trophic level and diving depth.
This elucidation of influencing factors in the context of this system clearly demonstrates the importance of applying multiple proxies in reconstructing the complexities of mosasaur feeding paleobiology.

Symposium: Paleoneurology

VESTIBULAR MORPHOLOGY REVEALS ECOMORPHOLOGICAL TRENDS AND ONTOGENETIC CHANGES IN CROCODYLOMORPHS

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