Poster Session III

AMPHIBIANS AND REPTILES OF THE MIO-PLIOCENE GRAY FOSSIL SITE AND THEIR PALEOECOLOGICAL IMPLICATIONS

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Identification of fossil reptiles and amphibians from the Gray fossil Site to lower levels of classification has proved to be a difficult endeavor. Herein the challenges are discussed, and tentative designations are reported.

Two families of salamanders are represented based on trunk vertebrae, the Plethodontidae and Ambystomatidae. Vertebral variation in plethodontids limits identifications to the family level. Ambystomatids however, are congeneric (genus *Ambystoma*) and vertebrae from the site are indistinguishable from this taxon.

Testudines are primarily represented by carapace and plastron elements, and are identified here to the family or generic level. The most abundant taxa are the emydids *Trachemys* and *Chrysemys*. Two other turtles, *Terrapene* and Chelydridae, are represented by isolated individuals. Alligatoridae material is limited to a partial cranium, postcranial elements, and osteoderms; unfortunately cranial and mandibular characters are required for a more specific taxonomic assignment. The excavation of a partially articulated specimen is underway and may assist in this classification. Squamates are only represented by snakes of the families Viperidae and Colubridae. As with other localities, trunk vertebrae are the primary fossil elements. The most common snakes from the site are colubrids in the subfamily Natricinae; much less common are colubrine colubrids and viperids.

Despite the fact that lower levels of classification have not been determined, paleoecological inferences can still be made based on phylogenetic bracketing. In sum, the reptiles and amphibians from the site are indicative of a ponded environment; a reconstruction that matches the site's lacustrine sediments.

Marine Reptiles Symposium, Wednesday 5:15

A NEW *PROGNATHODON* (SQUAMATA: MOSASAURIDAE) FROM THE CRETACEOUS OF ANGOLA

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Recent field reconnaissance in Angola provides a new sample of rich marine Cretaceous faunas including mosasaurs, fishes, turtles, and plesiosaurs. The new material includes two partial mosasaur skulls from the Namibe province tentatively assigned to the globidensine mosasaur genus *Prognathodon*. However, the new *Prognathodon* possesses a dentition documenting broader variation of dental morphologies in that genus than previously recognized. The new material includes well-preserved premaxillae, maxillae and dentaries, and preserves the entire marginal dentition. It has slender teeth with constricted bases and displays the characteristic prognate condition, reduced number of marginal teeth and wrinkeled enamel diagnostic of the genus.

In the context of prey preference and feeding guild models recognized by previous workers, the new taxon overlaps with the genus *Mosasaurus* and suggests that *Prognathodon* may have adapted to a broad variety of feeding niches. The taxic assemblage of the Maastrichtian of Angola is reminicent of that seen in the Maastrichtian of northwestern Europe and allows a comparative exploration of habitat segregation and prey preference.

We present the new material and discuss the geographic, temporal and ecological distribution of globidensine mosasaurs, and review prevailing prey preference guild models in light of recently documented diversity of tooth morphologies in globidensine mosasaurs.

Thursday 1:45

ANALYSES OF LOWER ACTINOPTERYGIAN INTERRELATIONSHIPS, CONTRADICTORY HYPOTHESES

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There is great contradiction in available hypotheses of interrelationships of lower actinopterygians. The disagreements are clearly illustrated by major changes in the relationships of living polypteriforms, acipenseriforms, amiiforms, and lepisosteiforms to fossil forms and also to teleosts. *Polypterus* is in most cases placed as the most basal actinopterygian, nevertheless different Paleozoic taxa (*Lophosteus, Dialipina, Cheirolepis*) are displacing *Polypterus* to a higher position. There is no agreement concerning the interrelationships within palaeonisciforms and neopterygians. Several hypotheses of sister-group relationship to teleosts have been proposed based on morphological evidence (e.g., mobile maxilla, presence of supramaxilla, position of symplectic); i.e.: (other actinopterygians + [*Lepisosteus* + [*Amia* + Teleostei]]) or (other actinopterygians + [*Amia* + [*Lepisosteus* + Teleostei]]). Different results are obtained when fossil taxa (i.e.: Pycnodontiformes, *Dapedium*) are added as sister groups. The discrepancies are caused by different reasons, as for instance the selection of taxa and different assumptions over homologies. An analysis of different hypotheses of actinopterygian interrelationships will be presented, the role of fossils will be discussed, as well as the major problems concerning homologization of structures in lower actinopterygians.

Poster Session III

CAN LOW MAGNIFICATION MICROWEAR BE USED TO INFER THE DIET OF AUSTRALIA'S MARSUPIALS? A PILOT STUDY OF TEN SPECIES OF MACROPODOIDS

SCHWARTZ, Leah, New York Univ., New York, NY

Discerning feeding habits of fossil animals has implications for paleoenvironmental interpretations, many of which have been controversial in Australia, particularly in the late Oligocene and early to mid Miocene. Primarily disagreement here is over the beginning of aridity and the opening of grasslands, a question which ungulate paleoecology has been used to address on other continents. Despite being ecological correlates, Australian macropodoids are traditionally more difficult to interpret than ungulates, with hypsodonty and body size analyses having only limited success. While analysis of wear features of mammalian teeth is a powerful way of predicting diet, applying such analyses to Australian marsupials using traditional methods has been cost prohibitive.

A new method has recently been developed using low magnification stereo light microscopy to analyse wear features. This method has been shown to be effective in predicting the diets of placental mammals, and has so far been used in perissodactyls, artiodactyls, notoungulates, xenarthrans, sciurids and primates. This study extends the use of this method to the diprotodontid marsupials of Australia by examining ten species of extant macropodoids with varying diets. Macropodoids are usually classed into grazers, browsers and mixed feeders but also include animals whose diet is primarily frugivorous and mycophagous. The majority of macropodoids are to some degree seasonal in their diets, responding to Australia's El Niño affected climate. Nevertheless, clear differentiation of dietary type can be seen in the microwear signal, which will allow use of this nascent database to interpret the diet of fossil species.

Saturday 2:00

CHEMICAL AND MOLECULAR ANALYSES OF SOFT TISSUE MATRIX FROM *TYRANNOSAURUS REX* (MOR 1125): PRELIMINARY RESULTS

SCHWEITZER, Mary, WITTMEYER, Jennifer, North Carolina State Univ., Raleigh, NC

Soft tissue components, including flexible fibrous matrix, pliable, hollow and transparent blood vessels, and two populations of microstructures with cell-like morphology, were identified in a well preserved *Tyrannosaurus rex* (MOR 1125) Here we report preliminary chemical and molecular analyses of the soft tissue matrix components of demineralized cortical and medullary bone, recovered from MOR 1125. Transmission EM, coupled with elemental analyses, reveals that even after demineralization some biogenic apatite remains tightly bound to the matrix. AFM shows fibers in some demineralized matrix that exhibit a banding pattern consistent with collagen. Immunochemical evidence is consistent with the presence of collagen and osteocalcin protein epitope preservation, and amino acid analyses reveal the presence of diagnostic amino acids in some sample preparations. However, results of multiple extractions and treatments show considerable variation in results. While existing data support the presence of original molecular components in some treatments, there is also strong evidence for a high degree of alteration in these same components. Evidence for molecular and chemical interactions leading to preservation will also be presented.

Saturday 8:30

***MEGALOCOELACANTHUS DOBIEI*: MORPHOLOGICAL, RANGE AND ECOLOGICAL DESCRIPTIONS OF THE YOUNGEST FOSSIL MARINE COELACANTH**

SCHWIMMER, David, Columbus State Univ., Columbus, GA

The coelacanth *Megalocoelacanthus dobiei* was a gigantic (>3.5 m) latimeriid known primarily from Late Cretaceous (Campanian) marine deposits in eastern USA. Placement of the monospecific genus *Megalocoelacanthus* in the Latimeriidae has been questioned, with some favoring inclusion in Mawsoniidae; however, all available characters support its inclusion in Latimeriidae. *Megalocoelacanthus* shares derived characters with *Latimeria* including: a vertically elongate palate with sigmoid ventral margin; large, roughly square principal coronoid; and a lateral posterior foramen on the mandible for the subopercular sensory canal. However, unlike all other latimeriids, *Megalocoelacanthus* lacked marginal dentition and had a laterally compressed, dorsoventrally exaggerated skull. Gular and opercular surfaces are externally smooth, but a well-preserved posterior angular shows external surface ornamented with parallel ridges. Planktivorous or obligate suction feeding habit is indicated by the large skull and strongly denticulate branchials, and absence of marginal teeth.

Here I propose that the resemblance to *Mawsonia* (Mawsoniidae), another clade of giant coelacanths (but freshwater and Gondwanan), is probably convergent due to large size and feeding habit. The *Megalocoelacanthus* type series was based on two principal specimens from Alabama with preserved palates, lower jaws, a basisphenoid, principal coronoid, opercular, gular plates, ceratohyals, ceratobranchials and a partial shoulder girdle. Cheek bones, skull roof and most appendicular elements are unknown, but a recently discovered principal coronoid extrapolates to a fish ~4.5 meters long, assuming typical proportions for latimeriids. The species is now represented by 9 regional specimens, plus referred fossils from the Atlantic Coastal Plain and the Campanian of Kansas. The inclusion of *Megalocoelacanthus* within Latimeriidae is evolutionarily significant because it is the most recent coelacanth known only from fossils, aside from a fragmentary large coelacanth angular from the Maastrichtian of France, which may be at least congeneric with *M. dobiei*.