tooth, allowing for novel patterns of tooth ridges and different types of teeth to develop on the same plate.

The Late Cretaceous (Santonian) ichthyofauna of Iharkút (Hungary), with a summary on the European Late Cretaceous continental fish faunas

Márton. Szabó[1, 2] and A. Ősi[1]
[1]*Department of Palaeontology, Eötvös University, Budapest*
[2]*Department of Paleontology and Geology, Hungarian Natural History Museum, Budapest*

The Late Cretaceous (Santonian) Iharkút vertebrate site (Bakony Mts., Hungary) yielded the remains of a large variety of vertebrate taxa, including several fish forms as well. The intensive hand-quarrying and screening of the fluvial deposits of the Csehbánya Formation exposed at the locality resulted in a large variety of skeletal and dental remains of the lepisosteid *Atractosteus*, a pycnodontid identified as cf. *Coelodus*sp., vidalamiin and non-vidalamiin amiiforms, an indeterminate elopiform, two indeterminate ellimmichthyiforms, a possible salmoniform, further indeterminate acanthomorphs, at least one indeterminate teleostean, and numerous indeterminate actinopterygians (represented by various teeth). Most of the Iharkút fish taxa are considered as freshwater forms, however, some taxa (e.g. Elopiformes) presumes the vicinity of a marine-deltaic environment. The overall picture of the Iharkút fish fauna resembles some North American fish faunas. Detailed studies report Late Cretaceous continental fish faunas from the Iberian Peninsula, Western Hungary, Southern France and Romania. Some Iharkút fish taxa (e.g. Vidalamiinae) are first reported from the Late Cretaceous of Europe, suggesting that these European fish faunas could have been far more diverse than previously thought. Other groups, (e.g. Lepisosteiformes), however, were much more common, reported from various other European sites as well, indicating a quite general occurrence throughout the continental habitats of the Late Cretaceous European archipelago. The revision of earlier collected remains attributed to infrequent taxa is, however, required, just like an intensive screen-washing for the localities, where it has not been carried out.

Phylogenetic value of jaw elements of lacertid lizards (Squamata: Lacertoidea): a case study with material from the Oligocene of France

Lukardis C.M. Wencker[1], Emanuel Tschopp[1,2,3], Andrea Villa[1] and Massimo Delfino[1,4]
[1]*Università degli Studi di Torino, Italy*
[2]*Division of Paleontology, American Museum of Natural History, New York*
[3]*Museu da Lourinhã, Lourinhã, Portugal*
[4]*Institut Català de Paleontologia Miquel Crusafont, Barcelona*

The species-rich family of Lacertidae is the dominant reptile group in Europe nowadays. However, due to poor preservation and disarticulation, several fossil species are based on single bones, mostly dentaries or other tooth-bearing elements. Here, we used disarticulated bones of lacertid lizards from four Oligocene localities in France (Coderet, La Colombière, Roqueprune 2, Mas de Got B) and compared the phylogenetic signals of three jaw elements: dentaries, maxillae, and premaxillae. We identified three lacertid morphotypes among the premaxillae, four among the maxillae, and six among the dentaries. These morphotypes were scored as single operational taxonomic units for each locality into three separate character matrices with the same 227 characters. Subsequently, the phylogenetic position of the morphotypes within Lacertoidea was tested using maximum parsimony. The resulting consensus trees with the dentaries and the maxillae both recovered a large polytomy in the lacertids, but all morphotypes were situated within that family. The consensus tree with the premaxillae showed a considerably better resolution but recovered one group outside

Lacertidae. The combination of convergent characters and missing data seem to be the reason for the "outgroup" position of some premaxillary morphotypes. The polytomies found in the trees with maxillae and dentaries are most likely caused by their higher morphological variability. Therefore, those bones only seem to be identifiable at family level. However, together with the premaxillae, a determination down to species level was possible. Hence, species descriptions based on highly variable morphological elements like lacertid maxillae and dentaries should be treated with caution.

Tyrannosaurid theropods: did they ever smile like crocodiles?

Mark P. Witton[1] and David W.E. Hone[2]
[1]*SEES, University of Portsmouth,*
[2]*School of Biological and Chemical Sciences, Queen Mary University of London*

A relationship between surficial skull textures and craniofacial epidermal tissues has long been recognised among living animals, but the use of skull rugosity profiles as means to make detailed predictions of facial skin types in fossil animals has only occurred in the last decade. Recent work on craniofacial anatomy of tyrannosaurine theropods has proposed a regime of scales, cornified sheaths and armoured skin across the dorsal skull region, as well as lipless jaws covered with crocodylian-like 'flat scales'. Here, we present an alternative interpretation of tyrannosaurid facial tissues based on studies of nearly 30 tyrannosaurid specimens, cataloguing rugosity profiles and jaw bone foramina frequency. We were unable to locate specifically crocodylian-like rugosity profiles in tyrannosaurids and question the correlation of crocodylian skull textures to epidermal scales: modern crocodylian faces are covered with cracked skin, not squamous epidermis. Moreover, discrepancies in skull rugosity profiles between extinct and living archosaur species show that crocodylian and bird anatomy have limited application in the reconstruction of non-avian dinosaur craniofacial tissues. We find an average of 43.5 neurovascular foramina in tyrannosaurid maxillae but 175.5 in crocodylians: these values give differing expectations for extra-oral tissues, ranking tyrannosaurids among 'lipped' taxa. Possible further evidence for differentiated tissue types around tyrannosaurid jaws are morphological distinctions between tyrannosaurid alveolar foramina and those situated elsewhere on the jaw. Hummocky rugosities indicative of scaly integument are present on the maxillae of some tyrannosaurids. We conclude that tyrannosaurids, and probably most extinct theropods, were not overtly crocodylian-like in facial appearance.