Amphibious adults thus seem to be ancestral for temnospondyls. Loss of the tail fin skeleton and the postbranchial lamina on the clithrum may be synapomorphies of Temnospondyli and its sister group; they are not shared by the aquatic Anthracosauria.

Poster Session IV (Saturday, November 8, 2014, 4:15 - 6:15 PM)

A MORPHOLOGY-BASED RANKING APPROACH TO MEASURE DENTAL DEPTH VARIATION IN ARVICOLINES AND ITS APPLICATION TO REVEAL PATTERNS OF DENTAL VARIATION IN LIVING AND EXTINCT FORMS

MARKOVA, Evgenia, Institute of Plant and Animal Ecology, Ural Branch, SAS, Ekaterinburg, Russia; BORODIN, Aleksandr V., Institute of Plant and Animal Ecology, Ural Branch, SAS, Ekaterinburg, Russia

In order to improve resolving power of morphological methods in studying the Quaternary fossil record of arvicoline (one of the most abundant rodent groups in the Northern Hemisphere during the last 2.6 Ma), we develop a unified approach to measuring dental depth variation based on counting the number of additional prisms of the crown and the respective number of dentine elements of the occlusal surface. The novelty of the approach is determination of the crown morphology of the molar pattern and by using the same scale to measure dental complexity of any molar in a tooth row in any arvicoline taxa, living or extinct. The approach is used to describe dental variability patterns in phylogenetically distant species (16 widespread arvicolines in the Late Pleistocene and modern fauna of northern Eurasia) and to test several hypotheses to reveal the most important sources of dental variation in modern hypselodont arvicolines (genus Microtus). Ontogenetic changes in molar complexity and bilateral asymmetry among right and left molars of the same individual during the process of tooth wear were assessed in M. gregalis using an intraval tooth-printing method. Moreover, a geographic sampling of M. gregalis, M. oeconomus, and M. arvalis obtusus was undertaken in different landscape-geographic regions of the central and northern part of northern Eurasia in order to compare the numbers of dental variation related to geography and to age of an individual (based on the percentage of skull maturity). The results suggest that in captivity, for animals less than 3 months of age, and in the most molars with in a given molar type, the changes are significant and negligible compared to among-individual variation. Within-individual differences among right and left molars, when present, were not related to age of an animal. We suggest that the crown morphology pattern could be regarded as inherent characteristic of an individual persisting throughout postjuvenal tooth wear. However, in natural populations of Microtus occurring along the environmental gradients, age component could not be excluded from the list of significant sources of dental variability.

The study is supported by RFBR grant 12-04-01377.

Poster Session III (Friday, November 7, 2014, 4:15 - 6:15 PM)

THE AGE OF THE KAYENTA FORMATION OF NORTHEASTERN ARIZONA: OVERCOMING THE CHALLENGES OF DATING FOSSIL BONE

MARSH, Adam D., The University of Texas at Austin, Austin, TX, United States of America; ROWE, Timothy, The University of Texas at Austin, Austin, TX, United States of America; SIMONETTI, Antonio, The University of Notre Dame, Notre Dame, IN, United States of America; STOCKLI, Daniel, The University of Texas at Austin, Austin, TX, United States of America; STOCKLI, Lisa, The University of Texas at Austin, Austin, TX, United States of America

The Glen Canyon Group spans a period of Earth history that records the Triassic-Jurassic boundary and a biotic response to the end-Triassic mass-extinction. Owing to the absence of datable ash beds or useful biot stratigraphic invertebrate fossils, the Early Jurassic has been poorly constrained in western North America and its chronology has been constructed upon difficult superpositional relationships and the presence of vertebrate taxa. The Kayenta Formation is host to a number of important taxa such as some of the first frogs, caecilians, turtles, crocodyliforms, amphibians, and large-bodied saurischian dinosaurs in North America. However, that unit has been assigned to either the Triassic or Jurassic nineteen different times since it was first mapped in 1882. Here, we attempt to directly date fossil bone from the Kayenta Formation from a single quarry near Gold Spring, AZ that produced skeletons of the theropod Dilophosaurus wetherilli and early saurisichian Sarahsaurus auroferranensis. Electron-dispersive spectroscopy of bones from this quarry shows that they comprise recrystallized hydroxylapatite with pore spaces perminalized by calcite, iron-rich calcite, and barite. We analyzed two bones from the Gold Spring quarry using a laser ablation multicollector-inductively coupled plasma mass spectrometer (LA-MC-ICP-MS) configuration but the calculated apatite ages are too young to corroborate the stratigraphic evidence suggesting that the Kayenta Formation is either Late Triassic or Early Jurassic. Further investigations into the spatial distribution of elements in the bones shows that concentrations of major and trace elements decrease moving away from the bone surface. Lead concentrations are highly variable within the fossil bone suggesting that some regions may have been subjected to Pb loss. However, the anomalously young apatite ages are mostly a result of U enrichment, where U concentrations are as high as 1100 ppm in the fossil bone. We collected detrital zircons from matrix removed from the Gold Spring quarry and four other localities within the Kayenta Formation and calculated U ages using high-resolution LA-ICP-MS. One of these dates, 183.7 ± 2.7 Ma, is the first deposition-age radiometric date from the Kayenta Formation and shifts the age designation for this Early Jurassic unit from the Sinemurian-Pliensbachian to the Pliensbachian-Toarcian. Future efforts will sample the rest of the Glen Canyon Group in order to construct the first chronology of the Early Jurassic in western North America.

The study is supported by RFBR grant 12-04-01377.