ANATOMY OF THE BASAL ORNITHURINE BIRD *ARCHAEORHYNCHUS SPATHULA* FROM THE EARLY CRETACEOUS OF LIAONING, CHINA

SHUANG ZHOU[1,2]

[1] *Key Laboratory of Evolutionary Systematics of Vertebrates, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing 100044, China;*
Email: zhoushuang_ivpp@163.com
[2] *Graduate University of Chinese Academy of Sciences Beijing 100049*

As one of the earliest known beaked ornithurine birds, *Archaeorhynchus spathula* is important for understanding the early evolution of this derived avian clade. Recently, two new complete and articulated referred specimens of *Archaeohyrnchus spathula* were collected from Lower Cretaceous deposits in Jianchang, Liaoning, northeastern China. These specimens preserve new anatomical information, particularly in regards to the morphology of the skull, including the inner structure of the occiput, fore limbs, hind limbs and sternum. The sternum is similar to that of an unnamed ornithurine from the Xiagou Formation, Gansu Province. These new specimens are inferred to be subadult; together with the holotype of *Archaeorhynchus*; they comprise the entire Early Cretaceous record of subadult ornithurines and reveal important information regarding the ontogeny of this group. The caudal vertebrae are complete in the two referred specimens and provide information about the development of the pygostyle in basal ornithurines. At least four vertebrae form the pygostyle of *Archaeorhynchus* and fusion progresses disto-proximally. The preservation of gastroliths in all known specimens of *Archaeorhynchus* signifies it was likely herbivorous. This detailed account of the skeletal anatomy of *Archaeorhynchus* increases our understanding of the early evolution of ornithurines in the Lower Cretaceous.

NOTES ON PELVIC AND HINDLIMB MYOLOGY AND SYNDESMOLOGY OF *EMEUS CRASSUS* AND *DINORNIS ROBUSTUS* (AVES: DINORNITHIFORMES)

ANDREI V. ZINOVIEV

Zoology Dept., Tver State University, Tver, 170002, Russia; Email: nyroca2002@gmail.com

Dinornis robustus and *Emeus crassus* represent two variants of moa locomotor adaptations, *Dinornis* being more mobile. Nevertheless, the number and the position of their hindlimb muscles are almost identical. The only difference, related to the locomotor specializations is the development of muscles, related to the length of the leg elements. An overall hindlimb anatomy of these two species follows archetype, which is close to the proposed for the avian ancestor. In this way the hindlimb anatomy and syndesmology of moa resemble that of ancestral Tinamiformes, as well as geographically close Apterygiformes and Casuariiformes. Other members of Ratitae, such as Rheiformes and especially Struthioniformes show significant deviations from the archetype due to the distinct locomotor adaptations. Certain traits of hindlimb morphology are peculiar only for Dinornithiformes. First of all, it is the enormous development of *m. iliofemoralis externus*, by far surpassing in bulk mentioned muscle in other birds. Generally reduced, this muscle abducts the femur, thus preventing the passive adduction of this bone during one leg supported locomotor phase. As the massive ratites with wide pelves, moa must have exerted the maximal power of femoral abductors (*m. iliofemoralis externus, m. iliotibialis lateralis pars acetabularis*) to keep the body balanced. Changes in the center of gravity, proposed for moa in comparison to other birds and

that of *Dinornis* in relation to other moa, does not have anatomical support. Proceeding from the position of antitrochanter, femora of moa were in the same position as in other cursorial birds. The other difference, unique for moa (although additional observations on mummies are desirable), is an unusual insertion of *m. iliofemoralis internus*. Inserting just distally to the femoral neck on the anterior surface of femoral shaft, it thus must have changed its function of weak outward rotator of femur. The significance of this shift is unclear. Of other pelvic muscles *m. iliofemoralis* have unusually long attachment on the posterior surface of the femoral shaft, feature, observed outside of Dinornithiformes only in *Apteryx* (McGowan, 1979). Terminal tendons of the long digital flexors to the second toe were, at least in *Dinornis robustus*, were strongly separated from those to the other foretoes. This feature might indicate that the second toe have played a major role in scratching and digging, reported as one of the activities of moa in obtaining the food (fern roots).