

Assessing confidence intervals for stratigraphic ranges of higher taxa: the case of Lissamphibia

David Marjanović and Michel Laurin

CNRS, UMR 7179, *Équipe Squelette des vertébrés: aspects fonctionnels et évolutifs*, U. Paris 6, Case 19, 4 place Jussieu, 75252 Paris cedex 05, France

To evaluate stratigraphic evidence for the time of origin of the clade of extant amphibians (Lissamphibia), we attempt to establish a confidence interval on the lower bound of the stratigraphic range of this clade. This is based on the stratigraphic distribution of 1207 fossiliferous localities that have yielded lissamphibians, the relative area of sedimentary rocks from various periods (upper Paleozoic to present) exposed on the continents, and ten exponential-growth models of lissamphibian diversity that differ according to the assumed effects of three major biological crises and the assumed starting times of lissamphibian diversification. This method does not rely on a phylogeny of Lissamphibia, but only assumes that fossils which belong to Lissamphibia have been identified as such. The results suggest a more recent (Permian) origin of Lissamphibia than advocated in most recent molecular studies, which proposed an origin in the Late Devonian or Early Carboniferous. Our results are also more compatible with the monophyly than the polyphyly of the extant amphibians, but depend heavily on poorly constrained assumptions about lissamphibian extinction rates during biological crises. Counts of lissamphibian diversity through time that consider ghost lineages and stage durations show moderate declines across the Cretaceous-Paleogene and Oligocene-Miocene boundaries.

Sharks as indicators of trophic structure within 'mid' Cretaceous watermasses

Emma-Louise Nicholls

Department of Earth Sciences, University College London, Gower Street, London, WC1E 6BT, UK

The Elasmobranchii were apical predators during the Cretaceous period and their presence crucial for regulating the balance of oceanic food-webs. In the 'mid' Cretaceous a period of transgressive episodes caused a eustatic rise, meaning the destruction of shallow water environments as well as the deepening and of large expanses of ocean. The subsequent effects of the 'mid' Cretaceous transgressive episodes upon the radiation, diversity and palaeobiogeography of the Elasmobranchii are being investigated in order to establish the effects of the transgressions upon the Cretaceous ecosystems. This research is the first study to use organisms of high trophic level as palaeoenvironmental indicators, as sharks are virtually unique amongst vertebrates in yielding statistically large numbers of specifically identifiable remains. In order to establish the diversity and spatial variations of the elasmobranch faunas, sediment from a number of well-defined time-planes during critical intervals of the sea-level rise are being sampled. Localities within the UK include the Anglo-Paris Basin, the North Sea Basin and the intervening shallows of the East Midlands Shelf.

The Case of the Lamnid-Orectolobe. Where does *Palaeocarcharias* belong?

Emma-Louise Nicholls and David J. Ward

Department of Earth Sciences, University College London, Gower Street, London, WC1E 6BT, UK

Palaeocarcharias stromeri is an Upper Jurassic selachian from the Solnhofen area of southern Germany and Cerin, France. Three specimens have been recovered including the near-complete holotype at Jura Museum in Eichstätt. Its fusiform body plan is reminiscent of the Orectolobid morphology though the teeth, that show linear gradient monognathic heterodonty, are high-cusped which is a morphology considered unique to the Lamniformes. Subsequently, *Palaeocarcharias* was originally placed within the Lamniformes though more recent analyses have suggested the Genus be placed within the Orectolobiformes, Carcharhiniformes or a Genus Palaeocarchariformes.

This study uses character state analysis of Lamniformes, Orectolobiformes and Carcharhiniformes in order to re-assess the systematic affinities of the Genus.

A new species of *Confuciusornis* from the Early Cretaceous of northwestern China

Zihui Zhang^{1,2}, Chunling Gao³, Qingjin Meng³, Jinyuan Liu³, Lianhai Hou^{2,4} and Guangmei Zheng¹

¹ College of Life Sciences, Beijing Normal University, Beijing 100875, China

² College of Life Sciences, Capital Normal University, Beijing 100037, China

³ Dalian Natural Museum, Dalian 116023, China

⁴ Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, PO Box 643, Beijing 100044, China

A new species of *Confuciusornis* —the oldest known beaked bird is erected based on a nearly complete fossil from the Early Cretaceous Yixian Formation of western Liaoning, northeast China. *Confuciusornis feducciai* is the largest and shows the highest ratio of the forelimb to the hindlimb among all known species of *Confuciusornis*, the skeletal qualitative autapomorphies including a V-shaped furcula, a rectangular deltopectoral crest, the absence of an oval foramen at the proximal end of the humerus, the very slender alular digit, a relatively much longer ischium which is 2/3rds the length of the pubis. Comparison with other described species strongly suggests the new specimen a valid distinctive taxon, and provides further evidence for diversification in an Early Cretaceous avian genus. Anatomical features suggest an arboreal habit of the new bird.

Some notes on the life style of confuciusornithids (Aves, Confuciusornithiformes, Confuciusornithidae)

Andrei Zinoviev

Department of Biology, Tver State University, Chaikovskogo pr., 70a, Tver, 170002, Russia

Confuciusornithids is a group of Early Cretaceous birds from Liaoning Province of China. They possess a mosaic of primitive and derived characters, making them extremely important for understanding the evolution and early radiation of birds. By analyzing peculiarities of confuciusornithids' morphology (skeleton, plumage, horny sheaths of beak and claws) and taphonomy, we propose the most plausible reconstruction of their life style. Being strikingly similar in body outlines to modern tropic birds (Phaethontidae) these creatures fed on fish, catching it on the wing from the surface layer of freshwater reservoirs. They rested (and, probably, nested) in canopies of adjacent abundant tropical vegetation. Confuciusornithids were not swimming birds like gulls and ducks; neither had they perched like modern passerines. Wing digit II, devoid of *alula* and equipped with the large sharp claw, helped *Confuciusornis* to climb in canopies in the way similar to that of hoatzin's chick. Unable to fly from the ground, *Confuciusornis* must have climbed tree trunks to get airborne. In doing so it helped itself with digit IV, free of primaries and furnished with large hooked claw. A couple of remarkable elongated rectrices, developed in some specimens of *Confuciusornis*, most likely served for sexual display.