



New specimens of albanerpetontid amphibians from the Upper Cretaceous of Uzbekistan

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The albanerpetontid fossil record in Asia was limited to five dentaries of unidentified genus from the Upper Cretaceous Khodzhakul (lower Cenomanian) and Bissekty (Turonian) formations, Kyzylkum Desert, Uzbekistan. Here I describe two fragmentary frontals from the Khodzhakul local fauna as the first unequivocal record of the genus *Albanerpeton* in Asia.

Introduction

Albanerpetontidae is a monophyletic family of fossil salamander-like lissamphibians, known from the Middle Jurassic–early Pliocene of Laurasia and North Africa (Fox and Naylor 1982; Gardner and Averianov 1998; Gardner 2000a, 2002; McGowan 2002; Gardner et al. 2003; Venczel and Gardner 2005). The phylogenetic relationships of the Albanerpetontidae with other lissamphibian groups are still uncertain: different cladistic analyses nest this group as the sister-taxon of all living lissamphibians (caecilians, salamanders, and frogs) or only of frogs and salamanders (Gardner 2001; McGowan 2002; Ruta et al. 2003). Currently the family Albanerpetontidae includes three valid genera (Gardner et al. 2003; Venzel and Gardner 2005): *Albanerpeton* Estes and Hoffstetter, 1976 from the Early Cretaceous–early Pliocene deposits of North America and Europe (seven species), *Celtdens* McGowan and Evans, 1995 from the Late Jurassic?–Early Cretaceous of Europe (two species) and *Anoualerpeton* Gardner, Evans, and Sigogneau-Russell, 2003 from the Middle Jurassic–Early Cretaceous of Europe and North Africa (two species).

Curtis and Padian (1999: figs. 11, 12) assigned to the Caudata two atlantes from the Early Jurassic Kayenta Formation in Arizona, USA. These atlantes are short and have a very deep posterior cotyla (seemingly notochordal), a foramen for the first spinal nerve and a broad intercotylar tubercle flanked by shallow, weakly expanded laterally anterior cotylae. According to this complex of characters, these atlantes more likely belong to Albanerpetontidae rather than Caudata (Averianov et al. in press). If so, the Kayenta specimens extend temporal range of the group back to the Early Jurassic.

The albanerpetontid fossil record in Asia was limited to five dentaries of unidentified genus from the Upper Cretaceous Khodzhakul (lower Cenomanian) and Bissekty (middle–upper Turonian) formations, Kyzylkum Desert, Uzbekistan (Nessov 1981; Gardner and Averianov 1998). Here I report on new taxonomically informative fragments of albanerpetontid frontals ZIN PH 1/78 and ZIN PH 2/78 from the Khodzhakul local fauna

collected by the Uzbek-Russian-British-American-Canadian Paleontological (URBAC) Expedition in 2004 (Archibald et al. 1998). Both are part of the Paleoherpetological Collection of the Zoological Institute (ZIN PH), Russian Academy of Sciences, Saint Petersburg, Russia. Both were found at site SSHD-8, Sheikhdzheili locality; Kyzylkum Desert, north-central Uzbekistan; upper part of Khodzhakul Formation; lower Cenomanian, Upper Cretaceous.

Description

ZIN PH 1/78 is a posterior fragment of fused frontals which retains a faint median line of fusion ventrally near the posterior edge (Fig. 1A). The anterior part with internasal process and anterior slots is not preserved. The orbital margin is relatively short and slightly concave in dorsal or ventral view. The posterior slot for receipt of the posterior end of the prefrontal is deep. Posterior to the posterior slot, the lateral wall of the frontal extends posterolaterally about 20° from the midline. The specimen is about 3 mm wide across the posterior edge. The posterior border of the frontal roof is transverse and slightly concave on either side of the midline. The ventrolateral orbital crest is moderately wide in ventral view and lacks distinct grooves. There is a small triangular facet for the parietal on the posterior end of the ventrolateral orbital crest which projects slightly beyond the posterior edge of the frontal roof. The medial edge of the ventrolateral orbital crests is rather sharp and ventromedially oriented. Despite the absence of the anterior part of the bone, the short preserved part of the orbital margin diverging from the midline at a relatively large angle suggests that the bone was triangular in shape.

ZIN PH 2/78 (Fig. 1B) is an incomplete anterior fragment of fused frontals with a distinctly worn ventral surface. Generally, ZIN PH 2/78 agrees well in morphology and size with ZIN PH 1/78. Two small ventral foramina (probably for the entry of the orbitonasal artery; Gardner 1999a) are present on the frontal roof, at the level of anterior edge of posterior slot. The dorsal surface of the both specimens bears a sculpture of shallow polygonal pits.

Discussion

The fused frontals of albanerpetontids are one of the most taxonomically informative elements which may be used to differenti-

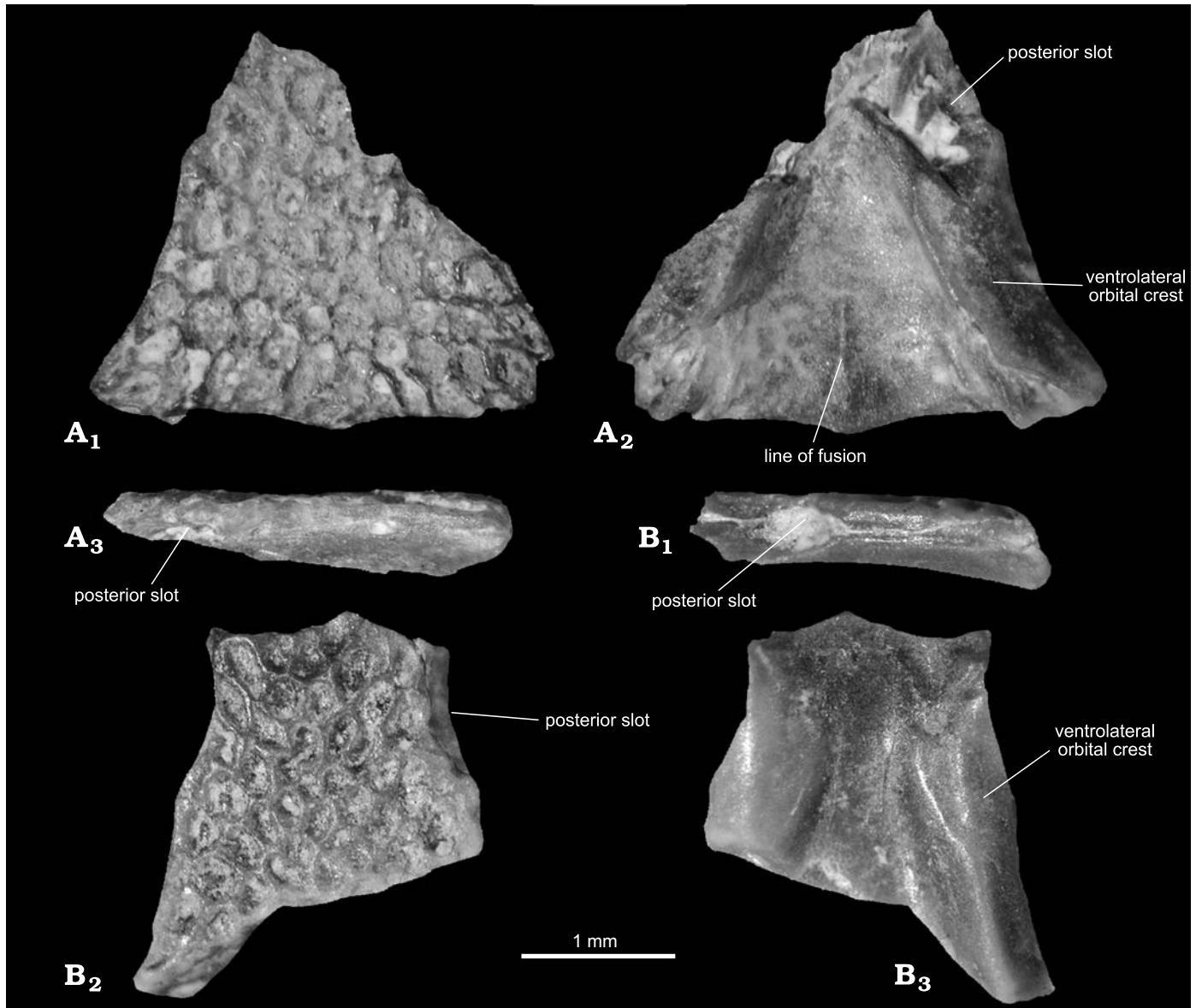


Fig. 1. Albanerpetontid amphibian *Albanerpeton* sp. ZIN PH 1/78 (A) and ZIN PH 2/78 (B). Frontals from the Late Cretaceous (early Cenomanian) Sheikhdzheili locality of Kyzylkum Desert, Uzbekistan, in dorsal (A₁, B₂), lateral (A₃, B₁), and ventral (A₂, B₃) views.

ate taxa (McGowan 1998a; McGowan and Evans 1995; Gardner 2000b; Rees and Evans 2002). In *Celtesdens* and *Anoualerpeton* the frontals are hourglass-shaped, nearly bell-shaped or rectangular in outline, with a relatively long orbital margin (Fig. 2A, B) and with narrow, grooved ventrolateral orbital crests (Gardner 2000a; Rees and Evans 2002; Gardner et al. 2003). In *Albanerpeton* the frontals are triangular in outline, with relatively short orbital margins (Fig. 2C) and wide ventrolateral orbital crests without any grooves (Gardner 2000a, 2002; Rees and Evans 2002). The Uzbek specimens (especially ZIN PH 1/78) strongly resemble those of *Albanerpeton* (presumably triangular in dorsal or ventral outline, short orbital margin, relatively wide and ungrooved ventrolateral orbital crests) and are referred to this genus.

The geologically oldest record for *Albanerpeton* is in the latest Aptian or earliest Albian of Oklahoma, and subsequent Cre-

taceous records of this genus were apparently restricted to the North American Western Interior and Europe (Gardner 1999b, 2002; Venzel and Gardner 2005).

The occurrence of *Albanerpeton* in lower Cenomanian of Uzbekistan raises two alternative scenarios: the Uzbek *Albanerpeton* may be a North American immigrant dispersed into Asia through the Bering Land Bridge during the Albian–early Cenomanian or the genus *Albanerpeton* may have had an Asian origin and dispersed into the North America before the latest Aptian–earliest Albian. The first scenario is more preferable at our current state of knowledge, because of the absence of *Albanerpeton* (and other albanerpetontid amphibians) in the relatively diverse Jurassic and Early Cretaceous terrestrial tetrapod assemblages of Asia (Gardner and Averianov 1998; Gardner 1999). An albanerpetontid frontal was reported from the Upper

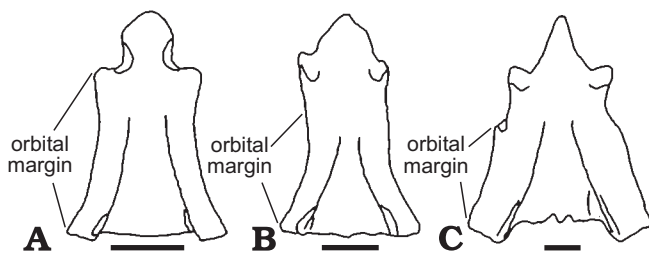


Fig. 2. Outlines of the fused frontals of albanerpetontids, all in ventral view. **A.** *Celtendens* sp. (modified from Gardner 2002: fig. 1P). **B.** *Anoualerpeton unicus* (modified from Gardner et al. 2003: fig. D2). **C.** *Albanerpeton nexuosus* (modified from Gardner 2002: fig. 1R). Scale bars 1 mm.

Jurassic of Kyrgyzstan by Nessov (1988) but this specimen was never described or figured and its location is unknown. As a result, the presence of an albanerpetontid in the Jurassic of Asia has yet to be confirmed.

Albanerpetontid amphibians are extremely rare components of the Khodzhaikul and Bissekty local faunas. Most other vertebrates from these formations are represented by hundreds or thousands of bones whereas albanerpetontids are known by five dentaries (four from the Khodzhaikul Formation and one from the Bissekty Formation) described by Gardner and Averianov (1998), an indeterminate dentary fragment from the Khodzhaikul Formation (personal observation) and the two fragments of fused frontals described herein. The reason for the rarity of the albanerpetontids in the Khodzhaikul and Bissekty local faunas is unclear.

The presence of non-endemic albanerpetontid taxon in Asia was predictable. On the basis of continental reconstructions and the limited fossil occurrences of albanerpetontids in Asia, Gardner and Averianov (1998) proposed that Asian albanerpetontids would show close affinities with European or North American taxa. The new Uzbek specimens provide the first record of *Albanerpeton* in Asia.

Acknowledgements.—I thank all members of the URBAC Expedition for help. I am also grateful to Alexander O. Averianov (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia) for reading an earlier version of the manuscript and useful comments, and to Susan E. Evans (University College of London, UK), Magdalena Borsuk-Bialynicka (Institute of Paleobiology, Polish Academy of Sciences, Warsaw, Poland), and Andrzej Elżanowski (Department of Zoology, University of Wrocław, Poland) for revisions and linguistic corrections. The financial support of the National Geographic Society (grants nos. 5901-97 and 6281-98), the National Science Foundation (grants EAR-9804771 and 0207004), the Civilian Research and Development Foundation and the Russian Foundation for Basic Research (grants RU-G1-2571-ST-04, CRDF RUB1-2860-ST-07 [RFBR 07-04-91110-AFGIRa]) are gratefully acknowledged.

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