

# Albanerpetontid amphibian (Lissamphibia: Albanerpetontidae) from the Early Miocene of the locality Merkur–North (north-west of the Czech Republic): data and a description of a new material

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## AGEOS Albanerpetontidný obojživelník (Lissamphibia: Albanerpetontidae) zo spodného miocénu lokality Merkur–Sever (severozápadné Česko): dáta a opis nového materiálu

**Abstract:** This paper deals with the first description of an albanerpetontid amphibian from the Early Miocene locality Merkur–North. The material comes from grey calcareous marls at the base of the so-called “Main Brown Coal Seam”. The marls are interpreted as reworked volcanic ash (Most Formation). The genus *Albanerpeton* was already known from this locality, but the material has never been described or illustrated. The new material of dentaries extends our knowledge about the state of the Merkur–North population. The extinct clade of Albanerpetontidae represents primarily Laurasian lissamphibians known from the Middle Jurassic to Pliocene periods. The Upper Oligocene to Lower Miocene albanerpetontids of central Europe belong to the species *A. inexpectatum*. The material described here allocated a big similarity close to this species.

**Key words:** Lissamphibia, *Albanerpeton*, Czech Republic, Eggenburgian

### 1. INTRODUCTION

The Albanerpetontidae is an extinct clade of salamander-like lissamphibians. This family represents primarily Laurasian amphibians known from the Middle Jurassic to Pliocene (e.g. Estes & Hoffstetter, 1976; Fox & Naylor, 1982; McGowan & Evans, 1995; Gardner, 2000, 2001; McGowan, 2002; Gardner et al., 2003). Many aspects of their biology (e.g. the presence or absence of lungs) are still poorly understood (Böhme, 2002). A typical member of this family is the genus *Albanerpeton*, found in North America and Europe. Members of the genus have a robust head and neck which likely allowed them to actively burrow, and they lived in a wide range of environments. This genus was the last of its clade; it survived until the Late Pliocene in southern Europe and became extinct when the region developed its present Mediterranean-type vegetation (Delfino & Sala, 2007).

A review of the Albanerpetontidae was done by Gardner & Böhme (2008). The Upper Oligocene to Lower Miocene albanerpetontids of central Europe belong to the species *A. inexpectatum* Estes & Hoffstetter, 1976 (Wiechmann, 2003; Böhme, 2008; Gardner & Böhme, 2008). Generally, the highest abundance of this taxon is known from some fissure fillings (e.g. Petersbuch 2, with about 2000 bones), whereas generally

the specimens are rare in floodplain deposits. Gardner & Böhme (2008) interpret this pattern as a preferential adaptation of this fossorial species to karstified limestone plateaus, preferring more stable microclimate. The youngest record in Germany is described from Sandelzhausen (Early to Middle Miocene; Böhme, 2010). In the North Alpine Foreland Basin (NAFB) albanerpetontids are so far restricted to the Lower Miocene deposits of the Upper Freshwater Molasse. Recently, new species of Albanerpetontidae was described from the Lower Pliocene deposits of Hungary as *A. pannonicus* Venczel & Gardner (2005). The unnamed new species of *Albanerpeton* mentioned by Böhme (2002) from the Merkur–North locality (Early Miocene) of the Czech Republic can be disregarded because subsequent examinations of undescribed frontals and jaws from the locality indicate that these specimens belong to *A. inexpectatum* (Gardner & Böhme, 2008). In this locality, mention of the occurrence of *Albanerpeton* sp. was also made by Kvaček et al. (2004), on the basis of an isolated undescribed frontoparietal (Böhme, pers. comm.). The new material of dentaries extends our knowledge about the state of the Merkur–North lissamphibian population. This paper brings the first description and figuration of the material of *Albanerpeton* material from this Lower Miocene locality (Fig. 1).



Fig. 1. Localization of Merkur–North locality.

Obr. 1. Geografická pozícia lokality Merkur–Sever.

## 2. MATERIAL, LOCALITY, AND GEOLOGICAL SETTING

The fragmentary specimens of *Albanerpeton* are distinctive for their particular symphysis, typical for this group. All material was collected by screen-washing. The specimen Ah–984 (Fig. 2C) was photographed using a scanning electron microscope (SEM). The specimens are housed in the geological collection of the Bílina opencast mine.

The Merkur–North locality (Early Miocene, MN 3a) is situated in NW Czech Republic and represents an opencast mine near the town of Chomutov (Fig. 1). Its coordinates are 50°25' N and 13°21' E. The specimens are found in grey calcareous marls at the base of the so-called “Main Brown Coal Seam” belonging to the Most Formation. The deposits are interpreted as reworked volcanic ash. Until now the locality has yielded a rich material of various vertebrate groups of fishes, amphibians, and reptiles, for example frogs (Kvaček et al., 2004), lacertids (Čerňanský & Joniak, 2009), chamaeleonids (Fejfar & Schleich, 1994; Čerňanský, 2010), gekkotan lizards (Čerňanský & Bauer, in press), choristoderans (Evans & Klembara, 2005), amphisbaenids (Čerňanský & Venczel, in press), anguimorph lizards (Klembara, 2008) and snakes (Ivanov, 2002). The sediments are also rich in remains of limnic and terrestrial molluscs, plants, and mammals (Fejfar et al., 1997a,b, 1998; Kvaček et al., 2004).

## 3. SYSTEMATIC PALEONTOLOGY

Amphibia LINNAEUS, 1758

Allocaudata FOX & NAYLOR, 1982

Albanerpetontidae FOX & NAYLOR, 1982

*Albanerpeton* ESTES & HOFFSTETTER, 1976

*Albanerpeton* cf. *inexpectatum* ESTES & HOFFSTETTER, 1976

**Repository:** Geological Collection of Bílina opencast mine (specimens referred to in the form Ah–number SGDB).

**Material, locality, and horizon:** Left dentary (Ah–983 SGDB, Ah–984 SGDB, Ah–985 SGDB, Ah–986 SGDB, Ah–987 SGDB), right dentary (Ah–982 SGDB); Merkur–North opencast mine; base of Early Miocene (Eggenburgian), Early Orlanium, zone MN 3a.

**Description:** *Dentary.* The Ah–983 SGDB dentary is a small and relatively robust bone (Fig. 2A). In dorsal view, it is strongly convex laterally and compressed mediolaterally (Fig. 2B), whereas in lateral or medial views it does not gradually heighten posteriorly. It has approximately the same height over its entire length. A high straight alveolar ridge supports a single row of at least 18 teeth (18 teeth and 1 tooth locus are present in Ah–983 SGDB). The alveolar shelf is approximately 2/3 higher than the ventral portion of the dentary and only 1/4 shorter than the teeth. Teeth are labially attached to the dental parapet (*crista dentalis*) over almost their entire length, with only the tooth crowns rising above the labial wall of the dentary (especially in the middle and posterior portion of the tooth row). In medial view, the closed Meckelian canal is exposed in the posterior third of the bone. Above this opening, the alveolar foramen is situated. The subdental shelf (*lamina horizontalis*) is straight. On its roof, the longitudinal prominent groove (*sulcus dentalis*) is developed. The symphyseal facet is prominently built. It has a distinctive horizontal expansion. The articulation area is created by the medial surface and also by the dorsal surface of horizontal extension. Before the anterior ending, there is a foramen. The otherwise smooth labial surface of the dentary is pierced along its lateral portion by a longitudinal series of three mental foramina and another three smaller foramina are situated on the anterior curved portion.

*Dentition.* Pleurodont teeth are conical, simple, and robustly built, and slightly antero-posteriorly compressed (Fig. 2C). Their sizes increase anteriorly. The lingual surfaces of the tooth crowns are slightly convex. The tooth crowns are smooth and do not contrast with tooth necks. The sizes of inter-dental gaps are roughly half those of the tooth bases. The tooth bases are without resorption pits. The teeth have well-developed *crista medialis* and *crista distalis* with prominent *angulus medialis*

and distalis. The angle between the crista mesialis and the crista distalis of the teeth encloses around 115 degrees. As a result of this apical angle, the occlusal cutting edges are relatively sharp.

#### 4. DISCUSSION AND CONCLUSION

The material from Merkur–North described here shows typical features of albanerpetontid's jaws, by the combination of the following characteristics (according to Gardner, 2000): (i) highly pleurodont teeth; (ii) a closed Meckel's canal; and (iii) symphyseal prongs with an associated foramen on the underside of the dental symphysis. However the praemaxilla, which is lacking in Merkur–North material, is the most taxonomically informative element among *Albanerpeton*. For this reason, exact determination at species level is not possible. The material of dentaries from Merkur–North shows a nearly identical morphology to that of the European species *A. inexpectatum*. Some differences between Merkur–North material and the material described by Böhme (2010) from Sandelzhausen (Germany) are caused by individual variability. The dentaries

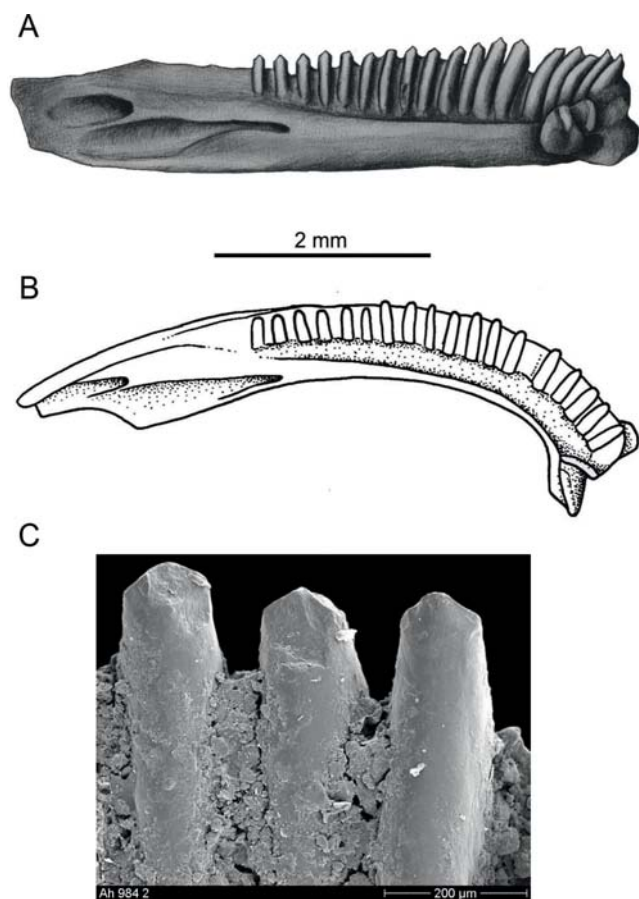


Fig. 2. *Albanerpeton* cf. *inexpectatum* Estes & Hoffstetter, 1976; left dentary A – ligual view of Ah-983 SGDB; B – dorsal view of Ah-983 SGDB; C – lingual side of the teeth in Ah-984 SGDB.

Obr. 2. *Albanerpeton* cf. *inexpectatum* Estes & Hoffstetter, 1976; ľavé dentále A – linguálny pohľad na Ah-983 SGDB; B – dorzálny pohľad na Ah-983 SGDB; C – linguálna strana zubov u Ah-984 SGDB.

from Merkur–North have a slightly more massively built symphyseal facet and deeper longitudinal groove (*sulcus dentalis*) than the Sandelzhausen material. The same condition of dentary features described here is present in the material described by Böhme (2002) as *Albanerpeton* sp. from Korneuburg Basin (Austria, Early Miocene). According to five dentaries, this taxon was more common in Merkur–North as suggested by previous data. This is also supported by the character of deposits indicating freshwater molasse (see in Kvaček et al., 2004). The occurrence of *Albanerpeton* has never been documented in other Lower Miocene localities in the Most Formation.

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**Resumé:** Práca predstavuje dáta a opis nového materiálu čelade Albanerpetontidae z lokality Merkur–Sever (Obr. 1). Výskyt tohto taxónu za spodnomiocénnej lokality Merkur–Sever v severozápadných Čechách už známy bol, avšak materiál nebol nikdy opísaný ani vyobrazený. Lokalita predstavuje sedimenty sladkovodnej molasy, čo poukazuje na veľmi vhodný ekosystém práve pre opísanú čelad' Albanerpetontidae

v spodnom miocéne. Na iných lokalitách Mosteckej panvy sa výskyt tejto čelade nepreukázal. Okrem tu opísaných nálezov dentálnych kostí je lokalita známa bohatým výskytom ektotermných stavovcov ako sú žaby, chameleóny, amfísbény, jašterice, hady a dokonca bazálne archosauiry – synapsidné choristodéry. Fosiliférne sedimenty sú tvorené šedými vápnitými slieňmi na báze hlavného uhoľného sloja a sú interpretované ako prepracovaný vulkanický popol (mostecké súvrstvie). Čelad' Albanerpetontidae predstavuje vyhnutú skupinu obojživelníkov, známych od strednej jury až po vrchný pliocén. Typickým zástupcom je rod *Albanerpeton*, ktorého výskyt bol zaznamenaný v Európe a v Severnej Amerike. Tento taxón je vo vrchnom oligocéne až spodnom miocéne strednej Európy zastúpený druhom *A. Inexpectatum* Estes & Hoffstetter, 1976. Materiál z lokality Merkur–Sever (Obr. 2) je morfológicky identický práve s týmto druhom. Nanešťastie, nový materiál neobsahuje iné kosti okrem dentálnych, ktoré by umožňovali isté zaradenie. Najviac diagnostických znakov je u tohto rodu prítomných na premaxile, ktorá však zachovaná nie je.