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# The early Vallesian vertebrates of Atzelsdorf (Late Miocene, Austria). 3. Squamata, Scleroglossa

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(With 1 plate)

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**Abstract**

The faunal assemblage of the Lower Austrian locality Atzelsdorf dates from the lower Upper Miocene, Pannonian C, MN9. Although the herpetological record is rather rare, the single finding of a representative of the Scleroglossa is a stratigraphically interesting one: *Pseudopus pannonicus*. So far, the oldest record of this fossil Glass Lizard comes from Vösendorf, Pannonian E, MN9 of Austria. *Pseudopus pannonicus* of Atzelsdorf extends the stratigraphical range of the species back to Pannonian C. In the German locality Hammerschmiede of approximately the same age another, unpublished record of the species was found.

Environmental requirements of the Glass Lizard indicate the presence of dense, half-high vegetation possibly near woodland and a shallow water area.

**Keywords:** *Pseudopus*, Glass Lizard, Pannonian, Vienna Basin.

**Zusammenfassung**

Die fossile Fauna der niederösterreichischen Fundstelle Atzelsdorf dokumentiert einen Lebensraum des tiefen Abschnitts des Obermiozäns, Pannon C, MN9. Obwohl sie nur spärliche Reste aus der Herpetologie enthält, stellt der einzige Fund eines Vertreters der Scleroglossa einen sehr interessanten dar: *Pseudopus pannonicus*, fossiles Gegenstück zum heute lebenden Scheltopusik. Bislang stammten die ältesten Funde aus Vösendorf, Pannon E, MN9. *Pseudopus pannonicus* aus Atzelsdorf stellt damit den bislang ältesten Nachweis dar. In der deutschen Lokalität Hammerschiede etwa des selben Alters wurde ein weiterer, unpublizierter Fund gemacht.

Ökologisch betrachtet deutet die Präsenz des Scheltopusik auf einen mit dichtem, halbhohem Pflanzenbewuchs bedeckten Lebensraum möglicherweise in der Nähe eines Waldes und eines Seichtwassers hin.

**Schlüsselwörter:** Pseudopus, Scheltopusik, Pannonium, Wiener Becken.

## Introduction

The Atzelsdorf site is an abandoned gravel pit located about 35 km NE of Vienna in Lower Austria. It is geologically situated at the western margin of the Vienna Basin. The

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deposits of the Atzeldorf site belong to the Hollabrunn-Mistelbach Formation, which comprises deltaic deposits that were discharged by the palaeo-Danube River into Lake Pannon during the Late Miocene.

Biostratigraphic investigations (HARZHAUSER 2009) and well-log correlations point to a correspondence of the Aztelsdorf fauna with the Vienna Basin Pannonian Zone C, basal MN9, and an absolute age of about 11.2-11.1 Ma (for more details, see HARZHAUSER 2009, this volume).

## Systematic Palaeontology

Superorder Squamata OPPEL, 1811

Order Scleroglossa ESTES, QUEIROZ & GAUTHIER, 1988

Suborder Lacertilia OWEN, 1842

Family Anguidae GRAY, 1825

Genus *Pseudopus* MERREM, 1820

### *Pseudopus pannonicus* (KORMOS, 1911)

(plate 1)

1911 *Ophisaurus pannonicus*. – KORMOS:17; fig. 19.
1912 *Ophisaurus novorossicus*. – ALEXEJEW: 39; pls 1, 2.
1913 *Ophisaurus intermedius*. – BOLKAY: 221; pls 11-12.
1913 *Varanus deserticolus*. – BOLKAY: 222-223; fig. 2.

Neotype: mandibulare sin. with dentition, Hungarian Geological Institute (without collection number), Budapest, Hungary (KORMOS 1911).

Type locality: Polgardi 2 (Hungary). Upper Miocene (Turolian, MN13) (KORMOS 1911).

Geographic and startigraphic range: Upper Miocene – Pleistocene: France (BAILON 1991), Germany (Klembera et al. submitted), Austria (RAUSCHER 1992), Czech Republic (FEJFAR 1961), Hungary (FEJÉRVÁRY-LÁNGH 1923; KRETZOI 1956; VENCZEL 2001), Poland (MŁYNARSKI 1960, 1962, 1964; MŁYNARSKI et al. 1984), Romania (ESTES 1983).

Material: 1 parietale (NHMW 2008z0048/0001, ex collection PENZ). 1 vertebra dorsalis (NHMW 2008z0048/0002).

Remarks: The terminology is based on FEJÉRVÁRY-LÁNGH (1923).

Description: The single parietale (pl. 1, figs 1a, b) represents the well preserved central part with the proximal remain of the left processus paroticus ossis parietalis. The right one is broken.

The longitudinal range from the sutura frontalis to the posterior point of the broken processus paroticus ossis parietalis measures 16.4 mm. Between the lateral margines the distance amounts to 13.2 mm. The cross-section is maximally 5.9 mm thick.

Viewing from dorsal, the robust and nearly quadratic facies dorsalis is sculptured by pits and tubercles. Peripherally, the tubercles become parallel ridges orientated to radial. The unsculptured area levis is as long as the half length of the sculptured facies dorsalis. Situated centrally, the foramen parietale is indistinctly developed as well as the sulci interparietales and the sulci occipitales. The left processus paroticus ossis parietalis bears no dermal sculpture. It possesses a broad and robust proximal base.

From ventral view, the oval, centrally located foramen parietale is distinct. As well is the deep fossa parietalis. The sharp-edged crista cranii parietalis features a prominent peak at the height of the foramen parietale, leading to the lower and more rounded ramus posterior cristae cranii parietalis. Straight, rounded and half as long as the crista cranii parietalis, the carinae praefoveales ossis parietalis fuse before they end in the fossa parietalis. They enclose the lamina parietalis.

The v e r t e b r a d o r s a l i s (pl. 1, figs 2a-e) is nearly complete, just the left facies costalis is slightly damaged. As the triangular centrum appears slightly convex ventrally it originates from the vertebrae XV-XXX. The vertebrae VI-X feature a median keel, vertebrae X-XV possess parallel lateral margins. Lateral grooves are present on the vertebrae XXX-XLVI (FEJÉRVÁRY-LÁNGH 1923).

The maximum range between the prae- and postzygapophyses measures 10 mm. The distance between the lateral limits of the two postzygapophyses runs up to 10.4 mm. Laterally, the dorsal point of the postzygapophyses and the ventral reach of the centrum are 6.1 mm apart. The length of the centrum, measured from the anterior points of the cava glenoidea to the posterior end of the condylus vertebrae, amounts to 9.1 mm.

From dorsal view, the sharp-edged processus spinosus forms a process anteriorly, becomes concave more posteriorly and extremely rises to posterior.

Viewing from anterior, the procoelous centrum is flat and the canalis neuralis triangular. The praezygapophyses rise laterally.

From posterior aspect, the canalis neuralis has become half-round. The centrum remains flat and the postzygapophyses rise laterally.

C o m p a r i s o n : Referring to FEJÉRVÁRY-LÁNGH (1923), the parietale and the vertebra dorsalis correspond in size and osteal characteristics to the ones determined as *Pseudopus pannonicus* ("*Ophisaurus*" *pannonicus*).

Compared with the additionally extinct species *Pseudopus laurillardi* and with the single extant *Pseudopus apodus*, *Pseudopus pannonicus* represents the largest Glass Lizard which ever existed. While *Pseudopus laurillardi* reached a presumptive length of 100 cm (AUGÉ & RAGE 2000), *Pseudopus apodus* actually measures up to 120 cm, *Pseudopus pannonicus* supposedly was even 200 cm long (FEJÉRVÁRY-LÁNGH 1923).

Therefore, the big size of the parietale and the vertebra dorsalis are typical of *Pseudopus pannonicus*. The measurements even overtop the mean size of the 45 vertebrae dorsales

of *Pseudopus pannonicus* of the Austrian, Upper Miocene locality Kohfidisch, MN11 (TEMPFER 2005).

The parietale of *Pseudopus laurillardi*, the smallest representative of the genus, differs remarkably from the ones of the other species. As diagnostic difference, its processus praefrontales are larger developed (AUGÉ & RAGE 2000; RAGE & BAILON 2005) and the laterally extending anterolateral process of the parietale is plate (KLEMBARA et al. in review).

Keeping these considerations in mind, the determination of the elements has resulted in *Pseudopus pannonicus*.

## Discussion

The oldest remains of *Pseudopus pannonicus* so far date from the Upper Miocene of Austria (Vösendorf, MN9: PAPP & THENIUS 1954; Richardhof-Golfplatz, MN9: HARZHAUSER & TEMPFER 2004; Götzendorf, MN9: BACHMAYER & MŁYNARSKI 1977; Kohfidisch, MN11: TEMPFER 2005; Eichkogel, MN11: THENIUS 1952). The presence of *Pseudopus pannonicus* in Atzelsdorf, MN9, represents the oldest record. In the German locality Hammerschmiede of approximately the same age another, unpublished record of the species was found (KLEMBARA et al. submitted).

During the European Tertiary, two different species of the genus *Pseudopus* existed: *Pseudopus laurillardi* (LARTET, 1851), following KLEMBARA et al. (in review) synonymous to *Pseudopus moguntinus*, known from the Upper Oligocene till the Upper Miocene of Germany, Poland (MŁYNARSKI 1984; MŁYNARSKI et al. 1984), Czech Republic, and France (KLEMBARA 1981), from the Lower Miocene (MN4) of Béon 1 in France (RAGE & BAILON 2005) and the Middle Miocene (MN6) of Sansan in France (AUGÉ & RAGE 2000). And *Pseudopus pannonicus* (KORMOS, 1911) ranging from the Upper Miocene up to the Pleistocene.

The species *Pseudopus laurillardi* is more common in the older localities. Following FEJÉRVÁRY-LÁNGH (1923) and MŁYNARSKI (1962), the series *Pseudopus laurillardi – Pseudopus pannonicus – Pseudopus apodus* might be phylogenetic. Increasing and decreasing size does not correspond to climatic changes.

The recent *Pseudopus apodus* is restricted to the Balkans as far north as North-West Croatia, North Greece, South Macedonia and South and East Bulgaria. It also inhabits the Crimea, the Caucasus, and parts of South-West and Central Asia (ARNOLD & OVENDEN 2002). In that area of distribution warm, dry summers as well as cool, wet winters exist. Typically, the summer shows a dry, high-sun season with the warmest month over 22° C (MÜLLER 1996).

As the largest Glass Lizard *Pseudopus pannonicus* existed from the Upper Miocene to the Pleistocene, its occurrence does not correspond to any predominating climate conditions. The Early/Middle (MN6) Badenian transition when climatic cooling including frost periods took place (BÖHME 2003) did not lead to the extinction of *Pseudopus laurillardi*. When *Pseudopus pannonicus* occurred (MN9), aridity was interrupted by more humid conditions (BÖHME et al. in press). The climate change towards returning aridity

and rising temperatures in the later Upper Miocene did not drastically influence the size of the species. Neither did increasing humidity after the terminal Miocene.

## Environmental Conclusions

During the Pannonian, the flat land of the Vienna Basin was covered by the Lake Pannon which was supplied by rivers.

*Pseudopus pannonicus* can be restricted to a definite environment based on its occurrence in some different Austrian localities. The similarity consists of the presence of a water body and its surrounding meadows and forest.

The locality Atzelsdorf as well is situated in the delta of the Danube's precursor. The vast Pannon Lake showed a shallow water area there. The presence of *Pseudopus pannonicus* indicates dense, half-high vegetation possibly within woodland and a shallow water area.

The European Glass Lizard of today characteristically inhabits dense vegetated environments covered with brushwood. It can be found not only in river valleys and at the marine shore but also in the wooded hilly or mountainous country up to 2100 m altitude (PETZOLD 1971).

Deserts or compact forests are avoided by the Glass Lizards which needs little holes to hide and sun exposed stone piles to bask. Occasionally and voluntary, it may enter shallow water bodies to rest there for some time. But contrary to the blind-worm (*Anguis fragilis*), it is not able to swim (PETZOLD 1971).

Mainly hard-shelled molluscs represent the staple food of *Pseudopus apodus* which is provided with a very strong set of teeth just as *Pseudopus pannonicus* was.

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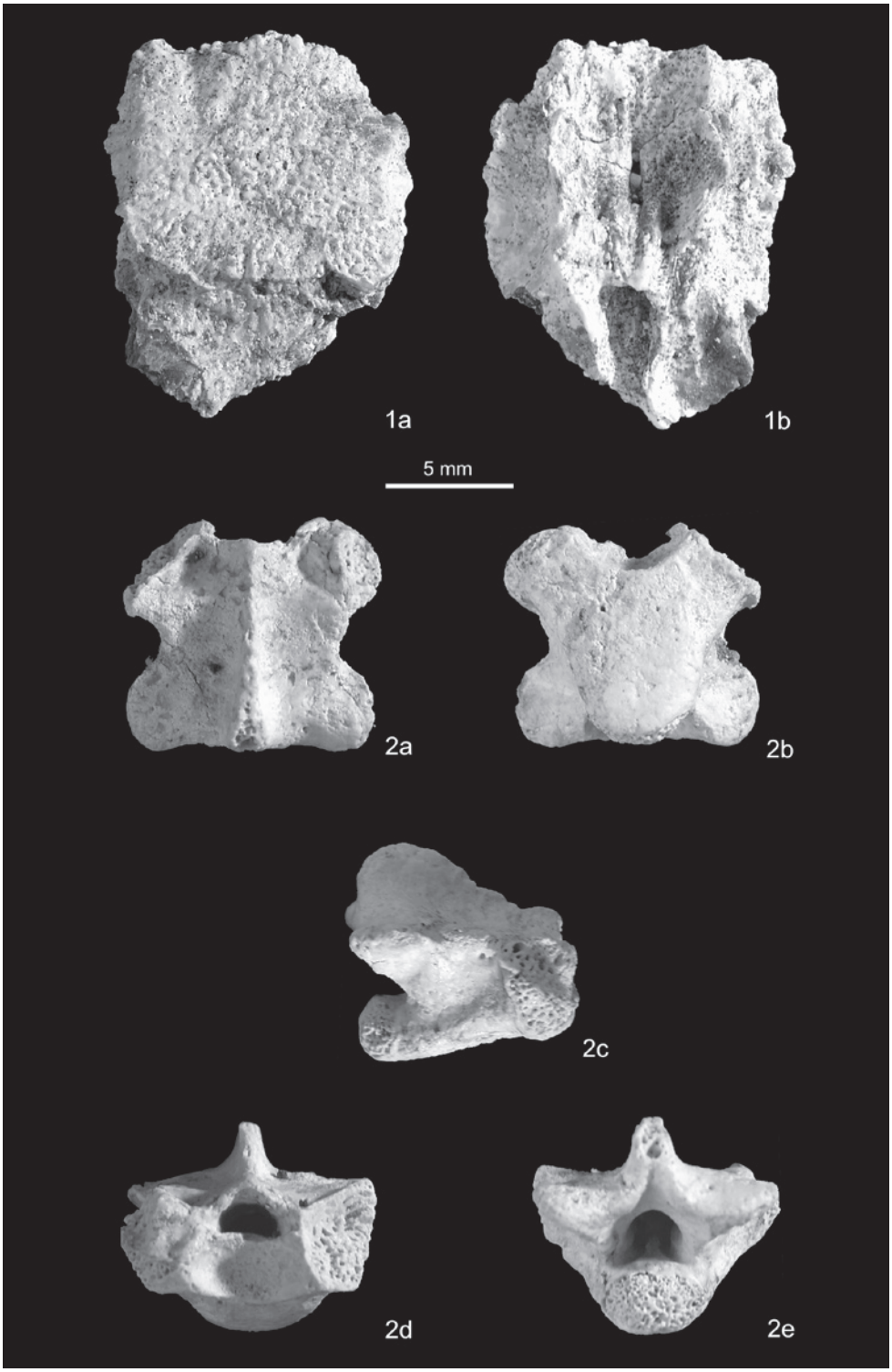
## Plate 1

***Pseudopus pannonicus* (KORMOS, 1911)**

**1: parietale** (Atzelsdorf, Austria; NHMW 2008z0048/0001; ex collection PENZ).
**a:** dorsal view, **b:** ventral view.

**2: vertebra dorsalis** (Atzelsdorf, Austria; NHMW 2008z0048/0002).
**a:** dorsal view, **b:** ventral view, c**:** lateral view, **d:** anterior view, **e:** posterior view.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