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A NEW FIND OF DISCOSAURISCID SEYMOURIAMORPH FROM THE LOWER PERMIAN OF BOSKOVICE BASIN IN MORAVIA (THE CZECH REPUBLIC)

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Abstract: A preliminary description of a new specimen belonging to the family Discosauriscidae (Seymouriamorpha), Discosauriscidae indet., is presented in this paper. The specimen is partially prepared; only its skull was chemically removed from the matrix and accessible for the study in dorsal aspect. The skull is about 40 mm long and three-dimensionally preserved. The skull differs from all other discosauriscids in three autapomorphic features: 1) distinct ornamentation of the skull roof bones consisting of strongly developed ridges and deep grooves; 2) intertemporal larger than the supratemporal; and 3) anterolateral margin of intertemporal almost straight. These features strongly indicate that the specimen represents a new taxon. However, the taxonomy of this specimen will be evaluated only after its complete preparation.

Key words: Seymouriamorpha, Discosauriscidae, skull, Lower Permian, the Czech Republic

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Introduction

The first finds of members of the family Discosauriscidae Romer, 1947 (Romer 1947) from the Boskovice Basin in Moravia (the Czech Republic) were made in 1872 near the town of Malá Lhota (Augusta 1948). Makowsky (1876) described these finds as *Archegosaurus austriacus*. As the name *Archegosaurus* was already preoccupied, Kuhn (1933) introduced a new generic name for this species – *Discosauriscus* Kuhn, 1933. Špinar (1952) made a comprehensive revision of all finds of discosauriscids since Makowsky's first description of *A. austriacus*. Špinar (1952) described two genera, each containing two species and confirmed their position within Seymouriamorpha Watson, 1917: *Discosauriscus pulcherrimus* (Fritsch, 1880), *Discosauriscus potamites* (Steen, 1938), *Letoverpeton austriacum* (Makowsky, 1876) and *Letoverpeton moravicum* (Fritsch, 1879). Klembara and Meszároš (1992) published a new, chemically prepared, three-dimensionally preserved discosauriscid specimens from two localities of the Boskovice Basin. This new, three-dimensionally preserved material enabled an up to date revision of Moravian discosauriscids. Klembara (1997) reduced the number of discosauriscid taxa from the Lower Permian deposits of the Boskovice Basin to only one genus and two species: *Discosauriscus austriacus* (Makowsky, 1876) and *Discosauriscus pulcherrimus* (Fritsch, 1880). The species *Discosauriscus potamites* (Steen, 1938) and *Letoverpeton moravicum* (Fritsch, 1879) were recognized as junior synonyms of *Discosauriscus austriacus* (Klembara 1997). As it has been shown (Klembara 1997), *D. austriacus* is very abundant, whereas only several specimens of *D. pulcherrimus* have been recorded in the Boskovice Basin so far. Meanwhile, two other genera and species were discovered and described from the Lower Permian deposits of the Boskovice Basin: *Makowskia laticephala* Klembara, 2005 and *Spinarerpeton brevicephalum* Klembara, 2009a. Thus, three genera and four species of discosauriscids (Discosauriscidae, Seymouriamorpha) are recognized from the Boskovice Basin to date.

The aim of this paper is a brief, preliminary description of the skull of a new discosauriscid specimen from the Lower Permian of the Boskovice Basin within the context of the anatomical knowledge of all recognised species belonging to the family Discosauriscidae.

Material and methods

The specimen DE K 396 (DE – Department of Ecology, Faculty of Natural Sciences, Comenius University in Bratislava, Slovakia) was found embedded in a laminated limestone and it consists of the skull and anterior portion of the postcranial skeleton. The skeleton was partially chemically prepared. So far, the skull portion was almost completely removed from the rock using a 10% solution of acetic acid (for details of the method see Klembara and Meszároš 1992) (Text-fig. 1a). Most of the skull-roof bones are three-dimensionally preserved, however, most of the

palatal elements are absent or damaged. The length of the frontal + parietal + postparietal measured in the median plane is 37 mm. Several forelimb elements are visible in the right orbit (Text-fig. 1a).

Most of the bones of the skull roof are well preserved. To reconstruct the original shape of the skull, an enlarged, wax-plasticine model was constructed. Each bone of the skull was measured, modelled at six times natural size, and then reassembled using flat metal bars. The result is a drawing of the reconstructed skull in dorsal view (Text-fig. 1b). The premaxillaries, nasals, lacrimals, jugals and quadratojugals are not preserved and they were reconstructed on the basis of their anatomy in *Discosauriscus austriacus* (Klembara 1997) (Text-fig. 1c).

Systematic palaeontology

Order **Seymouriamorpha Watson, 1917**
Family **Discosauriscidae Romer, 1947**

D i a g n o s i s . Seymouriamorph tetrapods with 1) short preorbital region; 2) rounded to oval orbits positioned mainly in anterior half of the skull; 3) otic notch dorsoventrally broad and anteroposteriorly deep; and 4) rounded to oval ventral scales.

Discosauriscidae indet.

M a t e r i a l . DE K 396, skull and anterior portion of the postcranial skeleton, is the only known specimen and is deposited in the Department of Ecology, Faculty of Natural Sciences, Comenius University in Bratislava, Slovakia.

L o c a l i t y a n d h o r i z o n . Boskovice Basin in Moravia (the Czech Republic); Kochov-Horka, western margin of the town Letovice (Klembara and Meszároš 1992). Middle Letovice Formation, Autunian, Lower Permian (Zajíc and Štamberg 2004).

D i a g n o s i s . Autapomorphies relative to discosauriscids *Discosauriscus*, *Makowskia*, *Spinarerpeton* and *Ariekanerpeton* include: 1) strong vermiculate ornamentation of the skull roof bones; 2) intertemporal larger than the supratemporal; and 3) a small process of parietal lying between the postfrontal and intertemporal is missing, thus the anterolateral margin of the parietal is long and almost straight.

D e s c r i p t i o n . The bones of the skull roof are massively constructed and the sutures between them are mostly simple (Text-fig. 1a). The shape of any given bone may differ on the left and right sides. The ornamentation of all bones is conspicuously developed. It consists of high ridges of different lengths and course, and deep grooves and pits. Such ridges form a pronounced polygonal pattern. Due to this strong ornamentation, the ossification centres are not clearly recognizable. Deep lateral line canals are present on the left intertemporal and postfrontal and right postfrontal and postorbital.

The frontal is a mediolaterally narrow bone and is longer then the parietal (Text-fig. 1a, b). The prefrontal has a long posterior process and it joins the long anterior process of the postfrontal at a level slightly anteriorly to the mid-length of the frontal. The prefrontal, postfrontal and postorbital bear sharp orbital margins. The orbital margin is highest on the right postorbital. The right postorbital is of triradiate shape; the posterior process is the shortest and fits between the intertemporal and squamosal (Text-fig. 1a, b). The postorbital is subdivided; there is a small, independent bone, lying within the territory of the posteromedial portion of postorbital 1 (designated as postorbital 2 here, Text-fig. 1a). The lateral end of the postorbital is pointed.

The anterior portion of the left parietal is mediolaterally wider than that of the right parietal; however, it is opposite in the posterior portion of the parietal (Text-fig. 1a). The anterolateral margin of the parietal is long and almost straight (only very shallowly concave). It has a long suture with the intertemporal but only a very short one with the postfrontal. On the right side, the parietal-postfrontal suture is slightly longer. The pineal foramen is rounded and not closed by the parietals anteriorly. Posteriorly to the pineal foramen, the suture between the parietals is straight. The left intertemporal is a large pentagonal-shaped bone, and is larger than the left supratempotal. The right intertemporal has an approximately oval shape. As preserved, the right intertemporal is mediolaterally compressed and dorsally vaulted, giving the impression that it is smaller than the supratemporal in dorsal view. However, its reconstruction shows it is larger in size than the right supratemporal (Text-fig. 1a, b). There is a small oval bone present between the right prefrontal and intertemporal bones (Text-fig. 1b). Such small bones, lying within the territory of the given bone or between the territories of two or three bones, are quite common within the skull roof bones of discosauriscisds (Klembara 1993, Klembara et al. 2002). The posterior portion of the right intertemporal extends into a small process fitting into the anterior portion of the supratemporal. The supratemporal is quadrangular. Its suture with the parietal is slightly shorter than the intertemporal-parietal suture.

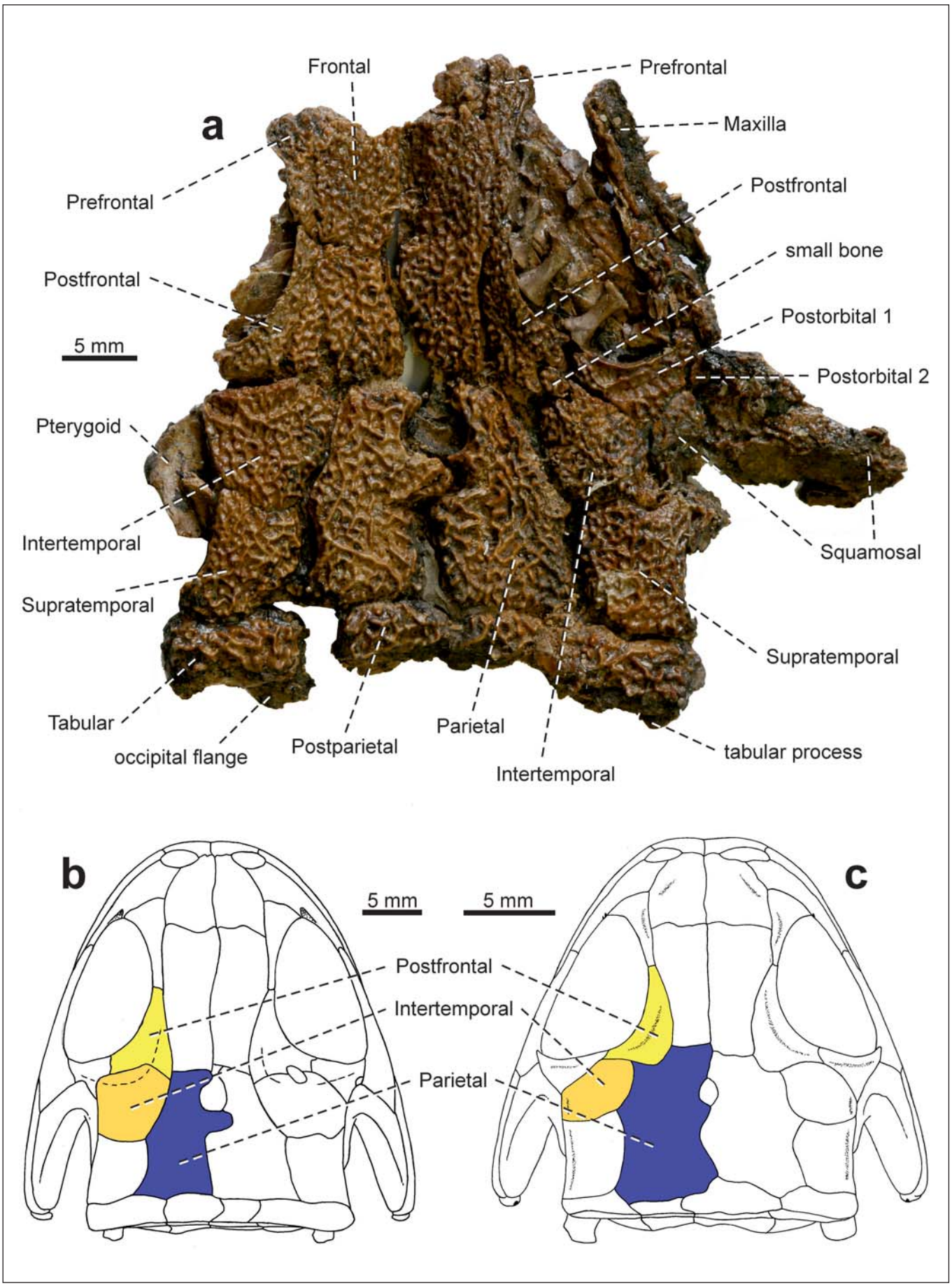
The tabulars and postparietals are mediolaterally elongated. The tabular process is of quadrangular shape and extends posteriorly from the ventral surface of the tabular. The tabular occipital flange is orientated posteroventrally and has a smooth dorsal surface. It joins medially the slightly smaller occipital flange of the postparietal. The tabular has a suture with the parietal.

Approximately only the posterior half of the right maxilla is preserved. On its internal surface, the supradental shelf and several teeth are observable. The teeth are conical, slightly posteriorly curved and their basal portions bear dorsoventral grooves. The tooth crowns have medial and distal cutting edges.

C o m p a r i s o n s . So far, three genera and four species belonging to the family Discosauriscidae (Seymouriamorpha) have been described from the Lower Permian localities of the Boskovice Basin in Moravia (the Czech Republic):

1) *Discosauriscus austriacus* (Makowsky, 1876)
2) *Discosauriscus pulcherrimus* (Fritsch, 1880)
3) *Makowskia laticephala* Klembara, 2005
4) *Spinarerpeton brevicephalum* Klembara, 2009a.

The fifth species belonging to Discosauriscidae is *Ariekanerpeton sigalovi* (Tatarinov, 1968) from the Lower Permian of Tadzhikistan (Klembara and Ruta 2005a, b).



Text-fig. 1. a – Discosauriscidae indet., DE K 396, skull in dorsal view. b – reconstruction of skull of DE K 396 in dorsal view. c – reconstruction of skull of *Discosauriscus austriacus* in dorsal view (on the basis of specimen Z 15529 from the locality Kochov-Horka, Boskovice Basin, deposited in the Slovak National Museum, Bratislava, Slovakia; Klembara 1997).

Among the discosauriscids, the skull of DE K 396 is most similar to that of *Discosauriscus austriacus* (Text-fig. 1c). The specimen DE K 396 can be distinguished from all other species of Discosauriscidae by the following features:

Distinct ornamentation of the skull roofing bones. The ornamentation consists of high and mostly sharp ridges joined together forming a polygonal pattern. Such distinct ornamentation is developed neither in the similar-sized specimens of *Discosauriscus austriacus*, nor in the largest known specimens of *D. austriacus* (with the skull length up to about 62 mm; Klembara 1995, 1997, 2009a, b). The degree of ossification and the type of sutures on the skull roof bones of DE K 396 correspond to those of the similar-sized specimens of *Discosauriscus austriacus* (Klembara 1995, 1997).

The intertemporal is larger than the supratemporal. This is in contrast to all other seymouriamorphs (Klembara 2009a).

A small process of the parietal fitting between the postfrontal and intertemporal is absent. As a consequence, the anterolateral margin of the parietal is long and almost straight. This is clearly observable on both parietals. Such parietal morphology is not present in any known seymouriamorph.

Reconstructed skull. Although several bones of the skull roof are missing, it was possible to make a reconstruction at least in dorsal view (Text-fig. 1b).The skull is about as long as it is wide. It has a semi-elliptical shape with the long axis along the mid-line. The preorbital portion is short. The orbits are anteroposteriorly elongated and oval. They lie in the posterior portion of the anterior half of the skull length; only their posterior-most parts extend posterior to the mid-length of the skull. The prefrontal-postfrontal suture is short and lies slightly anteriorly to the mid-length of the frontals. The pineal foramen lies at the level of the anterior halves of the intertemporals and slightly posteriorly to the level of the posterior margins of the orbits. The anterior portions of both parietals are mediolaterally narrow due to the large size of the intertemporals. The intertemporal is larger than the supratemporal. The jaw joint lies at the level of the tabular. The otic notch is anteroposteriorly deep, similar to that in *Discosauriscus* (Klembara 1997), but not as deep as in *Spinarerpeton* KLEMBARA, 2009a (Klembara 2009a).

Conclusions. Although the specimen DE K 396 is not yet fully prepared, its skull morphology clearly exhibits several features absent not only in *Discosauriscus*, but also in other species of Discosauriscidae. Thus, it likely represents a new taxon. If so, this taxon will probably belong to Discosauriscidae, because the skull of DE K 396 exhibits three of the four distinguishing features of Discosauriscidae (see the above Diagnosis). The taxonomic resolution of DE K 396 is pending its full preparation.

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