

A New Species of *Laccognathus* (Porolepiform Crossopterygii) from the Devonian of Latvia

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Abstract—A new species of the genus *Laccognathus*, *L. grossi* sp. nov., from the upper strata of the Gauja Formation of the Main Devonian Field (Lode locality, Latvia) is established. Morphological similarity and differences of the new species from the previously described *L. panderi* Gross from the lower strata of the Gauja and the Amata Formation of Latvia are discussed.

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INTRODUCTION

The genus *Laccognathus* represented by the only species *L. panderi* was established by Gross (1941) based on the lower jaw fragments, which he collected in the Devonian of the Ermani locality, Latvia. Some cranial and postcranial bones that were initially described as *Dendrodus biporcatus* (Gross, 1930, 1933, 1936) from the same and other localities of Latvia, which were dated by Gross to the Middle Devonian *Asterolepis ornata* and *A. radiata* zones), were also referred to this species (Gross, 1942). Subsequently, these specimens were dated Abavskaya Subformation of the Burtnekskaya Formation and the lower strata of the Gauja Formation of the Main Devonian Field, i.e., the Givetian Stage of the Middle Devonian (Ahlberg, 1998). Vorobyeva et al. (1997) described scales of *Laccognathus* sp. from the Mikhailovskii Mine of the Kursk Magnetic Anomaly of the Central Devonian Field, from the deposits of the Timan Horizon (Frasnian) of the Upper Devonian. This genus was recently recorded in the Upper Devonian (Frasnian) of Canada (Daeschler et al., 2003).

In 1971, an expedition of the Paleontological Institute of the Russian Academy of Sciences headed by the author of the present paper collected unique material of extinct fishes (*Asterolepis ornata*, *Panderichthys*, and *Laccognathus*) in the Lode quarry (vicinity of the town of Cesys, Latvia). These beds were assigned to the terminal Gauja Formation (Frasnian) of the Upper Devonian (Vorobyeva, 1980) or the upper strata of the Gauja Subhorizon (Lyarskaya, 1981). The position of the Givetian–Frasnian boundary in the Baltic Region is recently widely discussed (Forey et al., 2000). This boundary is placed at the level of either the upper strata of the Gauja Formation (Mark-Kurik et al., 1999) or the beds overlying the Amata Formation. In either case, the

Gauja and Lode formations are tentatively referred to the Givetian, i.e., to the Middle Devonian. However, this question remains open.

The *Laccognathus* specimens collected in Lode include several almost complete fishes and skulls; this allowed a detailed study of many morphological features of porolepiform crossopterygians, including some previously unknown characters.

I studied the original material housed in the Paleontological Museum of Berlin (Museum für Naturkunde) and compared the specimens of *L. panderi* collected by Gross with *Laccognathus* from Lode. This comparison has led to the conclusion that the latter should be assigned to a new species (Vorobyeva, 2003), which is described below under the name *L. grossi* sp. nov. In addition, the diagnosis of the genus *Laccognathus* is amended.

SYSTEMATIC PALEONTOLOGY

Family Holoptychiidae Owen, 1860

Genus *Laccognathus* Gross, 1941

Laccognathus: Gross, 1941, p. 19.

Type species. *Laccognathus panderi* Gross, 1941; Middle Devonian of Latvia.

Diagnosis. Large fishes, 1–2 m long; body terete. Paired fins with moderately developed fleshy lobes. Head short (less than one-fifth as long as body); snout wide, rounded; skull dorsoventrally flattened. Large single external naris bordered posteriorly by wedge-shaped bone (praelacrimale), which homologous to nariodale of other holoptychiids and rostrale laterale of osteolepiforms (Vorobyeva, 1980, 2004). External incisure of exochoana probably present. Lower jaw short, wide, with three large incisures on external surface and three coronoids, poorly developed anterior infradental

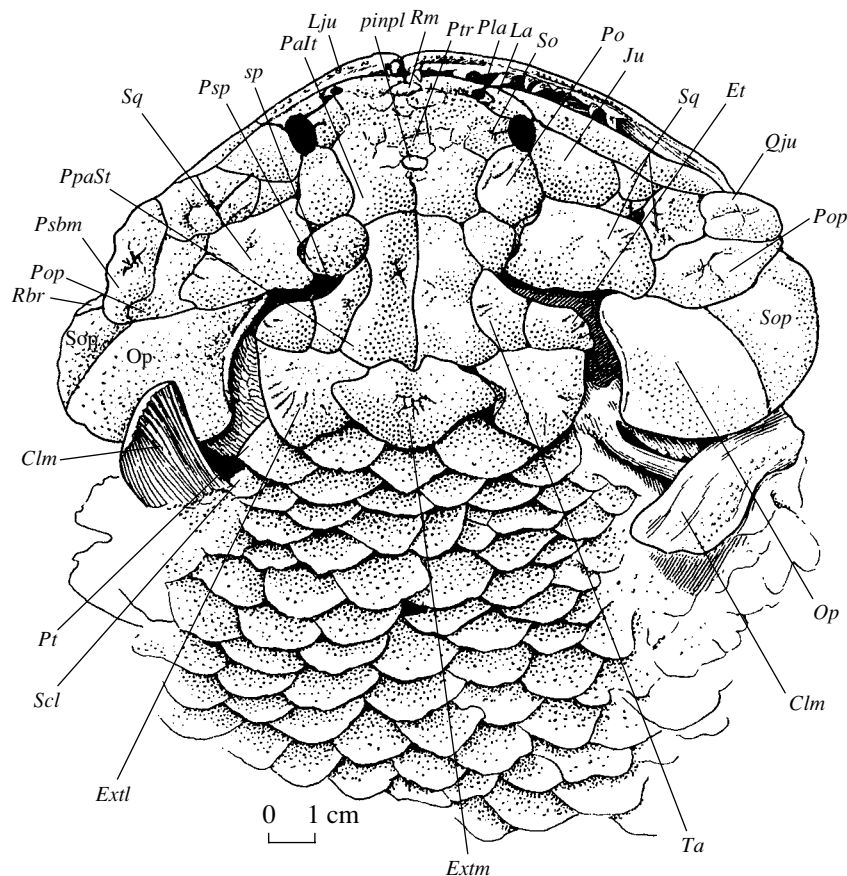


Fig. 1. *Laccognathus grossi* sp. nov., reconstruction of the skull roof based on specimen PIN, no. 3547/6. Designations: (Clm) cleithrum, (Et) extratemporale, (Extl, Extm) lateral and medial extrascapularia, (Ju) jugale, (La) lacrimal, (Lju) lower jaw, (Op) operculum, (Palt) parietointertemporale, (pinpl) pineal plate, (Pla) praelacrimal, (Po) postorbitale, (Pop) praeoperculum, (PpaSt) postparietosupratemporale, (Psbm) praeoperculo-submandibulare, (Psp) praespiraculare, (Pt) posttemporale, (Ptr) postrostrale, (Qju) quadratojugale, (Rbr) radii branchiostegi, (Rm) rostrale mediale, (Scl) supracleithrum, (So) supraorbitale, (Sop) suboperculum, (Sq) squamosum, (sp) spiracle, and (Ta) tabulare.

flange, and highly positioned mandibular sensory canal. Presymphysial plate positioned transversely, with two or three canines bordered anteriorly and posteriorly by rows of small denticles. Five hyobranchial arches present, anterior three articulated with basibranchiale. Gulare mediale absent. Six submandibularia and five radiobranchialia present. Interclavicle short and wide. Clavicles positioned close to ascending process, which overlapped by cleithrum. Cheek plate with large upper squamosal and several small lower squamosals. Praespiraculare lacking branch of supraorbital sensory canal. Scales, membrane skull bones, and pectoral girdle with denticles. Dental microstructure of dendrodont type.

Species composition. Three or four species: *L. panderi* Gross, lower part of the Gauja Subhorizon of the Frasnian and the Burtniekskii Horizon of the Givetian of Latvia; *L. grossi* sp. nov., upper part of the Gauja Subhorizon of Latvia; *Laccognathus* sp., Timan Horizon of the Central Devonian Field; and *Laccognathus* sp., Early–Middle Frasnian of Canada.

Comparison. *Laccognathus* differs from other genera of the family in the presence of one external narial incisure and praelacrimal, which borders it posteriorly; in the presence of three large external fossae (incisures) in the lower jaw; in the ornamentation of scales and membrane bones; the absence of gulare mediale; the number and articulation pattern of the hyobranchial arches, the morphology of the prespiracular plate, the shape of the interclavicle, the weakly developed anterior infradental flange; and in the ornamentation of membrane bones and scales.

Remarks. In the theses presented at the International Paleozoichthyological Symposium devoted to the 100th birthday of Gross, new well-preserved specimens of *Laccognathus* from the Upper Devonian of Canada (Early–Middle Frasnian) were mentioned (Daeschler et al., 2003). These theses provide only little information on this taxon, including the presence of three large incisures on the external surface of the lower jaw, the presence of a prelacrima, single external naris, and the proportions of the roof shields (the parietal shield is slightly shorter than the postparietal shield). The first