KARTALASPIS AND OTHER EARLY DEVONIAN ARTHRODIRES AND THEIR STRATIGRAPHICAL SIGNIFICANCE

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Macroremains of fossil fishes, including arthrodires, even small ones, such as actinolepids and phlyctaeniids, are fairly rare in cores of boreholes drilled through the Devonian rocks. The macroremains are often fragmentary and it is hard to identify single isolated skeletal elements at the generic or specific level. In the table the best-preserved arthrodires from the Baltic area (including East Prussia) and Belarus are listed. Most of these forms are still undescribed, among others also *Kartalaspis belarussica*, the index fossil of the Rezekne Formation (Upper Emsian). An exception is *Actinolepis spinosa* Mark-Kurik, 1985. This species is an actinolepid; all the other arthrodires in the list are phlyctaeniids. The material of *Actinolepis, Kartalaspis* and a new phlyctaeniid genus from East Prussia (Kulikovskaya core) is more or less complete. Of the remaining three arthrodires, nothing but single exoskeletal plates have been found.

Table. Actinolepid and phlyctaeniid arthrodires in the Lower Devonian (D_1) and/or in the ?basal Middle Devonian (D_2) of the Baltic area (including East Prussia = Kaliningrad District, Russia) and Belarus. Abbreviations: dex – right plate, sin – left plate.

Taxon	Skeletal elements	Borehole and depth	Region	Stratigraphical unit
Actinolepis spinosa Mark-Kurik	Head + trunk-shield + scales	Ventspils-D_3 237 m	Latvia	D_1 Kemeri or Rezekne? Fm
Phlyctaeniid n.gen.?	AL sin	Rujiena 10-K 262.5 m	Latvia	D_1 Rezekne? Fm
Kartalaspis belarussica Mark-Kurik, nomen nudum	Head + trunk shield + endo-cranium	Vil'chitsy-1, 327.6 & 344.5 m; Raigla-425, 272.2 m	Belarus Estonia	D_1 Vitebsk Fm Lepel' & Obol' Beds; Rezekne Fm, lowermost part
Phlyctaeniid n.g. et sp.	Trunk shield	Kulikovskaya-1, 1158-1154 m	East Prussia	D_1
?*Phlyctaenius pusilla* (Gross)	AVL dex	Nemanskaya-9 890.5 m	East Prussia	D_1 Viešvile Gr.
Diadsomaspis cf. *elongata* (Gross)	PNu dex	Liepkalnis-137 631.2 m	Lithuania	D_2 Pärnu or D_1 Rezekne? Fm

The age of the arthrodires under consideration is in some cases controversal (or poorly known), and has changed in the course of time due to reinterpretation of the age dating of fossil-bearing strata. *Actinolepis spinosa* was described by Mark-Kurik (1985) as one of the fossil fishes coming from the Lower Devonian (Pragian–lower Emsian) Kemeri Formation (Fm) or Regional Stage (R.S.) in western Latvia. Karatajute-Talimaa (1997) mentioned that the uppermost part of the Kemeri R.S. in this region could correspond to the Rezekne R.S. in eastern Latvia. Thus this arthrodire can have a younger age.

Although recognized as one of the index fossils for the Rezekne R.S. (Rzhonsnitskaya & Kulikova, 1990), *Kartalaspis belarussica* has existed in literature as a nomen nudum for many years and the species name has been spelt differently (*belorussica, byelorussica*). This arthrodire is remarkable from two aspects. Firstly, it is the only phlyctaeniid from the Baltic area + Belarus with the endocrania preserved, even in two specimens. Secondly, it has been found in two distant localities: the Vil'chitsy borehole, Mogilev District, eastern Belarus, and the Raigla borehole, SE Estonia. In the Vil'chitsy core, *Kartalaspis* remains occurred on two levels of the Vitebsk Fm, a unit, largely coeval to the Rezekne Fm (Golubtsev, 1997; Mark-Kurik, 2000). The upper level (depth 327.6 m) belongs to the upper part the Lepel' Beds and the lower one (depth

344.5 m) to the Obol' Beds (S. Kruchek, pers. comm.). The Raigla core sample (depth 272.2 m) with a *Kartalaspis* skull comes from the lowermost part of the Rezekne Fm (Kleesment et al., 1980).

The East Prussian new phlyctaeniid from the Kulikovskaya core (1158–1154 m) has a complete trunk shield resembling that of *Heintzosteus* from the Kapp Kjeldsen division, Wood Bay Fm (Pragian) of Spitsbergen (Blieck et al., 1987). Its almost straight spinal plates are shorter than those of *Heintzosteus*. Unfortunately, more exact age of this Early Devonian arthrodire is not known.

An interesting phlyctaeniid anterior lateral (AL) plate, coming probably from the Rezekne Fm, has been found at a depth of 262.5 m in the Rujiena borehole in northern Latvia. The high plate has a long straight lower margin and a very short upper portion. The latter can be considered as an advanced character for phlyctaeniids. The plate shows some similarity to the equivalent plate of such a phlyctaeniid as *Kolpaspis* from the Battery Point Fm, Gaspé Peninsula, eastern Canada. Numerous phlyctaeniids have been found in the Battery Point Fm. This unit is now considered to be of the Emsian age (Blieck & Cloutier, 2000).

A tiny anterior ventrolateral (AVL) plate was discovered in the East Prussian Nemanskaya-9 core at a depth of 890.5 m, at the same level with the specific heterostracan *Skalviaspis* (Karatajute-Talimaa, 1989), i.e. in the Viešvile Group, Pragian-Emsian (Paškevicius, 1997). The plate belongs probably to a particularly small phlyctaeniid *Phlyctaenius* (*Phlyctaenaspis*) *pusilla* (Gross, 1937), known from the lower Emsian Klerf Beds of the Rhineland, Germany. Earlier the same fish remain was mentioned under the name *Aggeraspis*? (Karatajute-Talimaa, 1981).

One more arthrodire, *Diadsomaspis* cf. *elongata* (Gross), 1933, described by Gross (1937) from the Upper Emsian (Upper Koblenz) of the Rhineland, can be reported from the Baltic area. This comparatively large form is represented by a single paranuchal (PNu) plate, ornamented with concentrically arranged ridges. Karatajute-Talimaa (1989) mentioned this phlyctaeniid (under the name *Diadsomaspis* sp.) as coming from the basal conglomerate of the Middle Devonian Pärnu Fm from a depth of 631.2 m in the Liepkalnis core. But according to Lyarskaya (1974, Table 1), the same form (*Diadsomaspis* sp.) was found in the upper part of the Rezekne Fm.

It can be concluded that at least two phlyctaeniids, similar to the arthrodires of the same group and known from the Rhineland, occur in the Lower Devonian (or close to the upper boundary of it?) of the Baltic area. Their occurrence shows the contacts of the Baltic and Rhineland basins during the Early Devonian. *Kartalaspis* and probably the phlyctaeniid from the Rujiena core confirm the Early Devonian age of the Rezekne Fm, as phlyctaeniids are especially characteristic of the Lower Devonian of different regions, such as Spitsbergen, Rhineland and eastern Canada.

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