

STEINDACHNERIA SP. (STEINDACHNERIINAE, MERLUCIIDAE, GADIFORMES), A NEW FOSSIL RECORD OF LUMINOUS HAKE FROM THE OUTER CARPATHIANS (EGERIAN, ŽDÁNICE-HUSTOPEČE FORMATION, CZECH REPUBLIC)

STEINDACHNERIA SP. (STEINDACHNERIINAE, MERLUCIIDAE, GADIFORMES),
NOVÝ FOSILNÍ NÁLEZ SVĚTÉLKUJÍCÍ TRESKY Z EGERU VNĚJŠÍCH KARPAT
(EGER, ŽDÁNICKO-HUSTOPEČSKÉ SOUVRSTVÍ, ČESKÁ REPUBLIKA).

RŮŽENA GREGOROVÁ

Abstract:

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Steindachneria sp. (Steindachneriinae, Merlucciidae, Gadiformes), a new fossil record of luminous hake from the Outer Carpathians (Egerian, Ždánice-Hustopeče Formation, Czech Republic)

An incomplete skeleton from the Egerian (Chatian, nannoplankton NP25 Zone) deposits of the Ždánice-Hustopeče Formation possesses the combination of characters (12-13 abdominal vertebrae, tapering caudal part of the body, remarkable development of the anterior portion of the anal fin, first interneural spine of the second dorsal is stronger than in the preceding spines) corresponding to the genus *Steindachneria*. This is the first record of the genus *Steindachneria* in the Upper Oligocene of the Paratethys. This record extends existing up to now the geographical and stratigraphical range of the genus and its occurrence in the Outer Carpathians documents its presence in the larger Mediterranean region including Paratethys.

Key words: *Steindachneria*, Gadiformes, Egerian, Ždánice-Hustopeče Formation, Czech Republic

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Introduction

The ichthyofauna of the Ždánice-Hustopeče Formation (Egerian, Chattian-Aquitanian, Ždánice Unit, Outer Carpathians) is less frequent than that from the well-known Rupelian "Menilitic Formation". Only two localities are known in the Czech Republic (Moravia): Vážany nad Litavou and Krumvíř. The fish fauna from Vážany nad Litavou was described by JAROŠ (1937). This material was revised later by KALABIS (1967, 1968). The locality Krumvíř was studied by KALABIS (1957, 1964, and 1966) and BRZOBOHATÝ *et al.* (1975). GREGOROVÁ (1997) summarised the fish fauna from the Oligocene of the Moravian part of the Carpathians (Menilitic Formation, Ždánice-Hustopeče Formation) from the point of view of palaeoecology and stratigraphy.

A new Egerian locality of the fish fauna has recently been discovered during the construction of a cellar at Sklepní Streat 392 in Hustopeče. Twenty-one specimens of fish

remnants and some seaweed fragments have been collected from the facies of the Hustopeče Marls. A preliminary report was presented by GREGOROVÁ (2005). The fossil material of the fish fauna provides some interesting and rare representatives, such as a specimen of the luminous hake, *Steindachneria*. The description of this record is the subject of this paper.

In recent fauna the genus *Steindachneria* GOODE & BEAN, 1888 is represented by a single species, *Steindachneria argentea* GOODE & BEAN, 1896, endemic to the southern Caribbean realms and the Gulf of Mexico. The species inhabits the outer shelf and upper slopes on soft bottoms (bathodemersal, depth range 400–500 m, FROESE and PAULY, 2008).

The fossil records of *Steindachneria* are limited to only two continents of the world: the Americas and Europe. The otoliths were summarized by NOLF (2002). At least four taxa were recognized: *S. goederti* Nolf from the Lower Miocene of Washington State, *S. svenniseni* Nolf from the Upper (?) Miocene of Chile, the Recent *S. argentea* GOODE & BEAN known as fossils from the Lower Pliocene (and Lower Miocene?) of Venezuela, and *Steindachneria* sp. from the Lower Miocene of Italy. A well preserved otolith of *Steindachneria* sp. from the Italian Upper Burdigalian was figured in Nolf and Brzobohatý (2004). BOSNAKOV (1998–9) describes *Steindachneria* sp. among teleostean otoliths from the vicinity of a Bükkmogyorósd (Bükk Mountains in the north of Hungary) outcrop of Middle Miocene (Badenian) sandy deposits. According to BRZOBOHATÝ (personal communication) the otolith does not belong to the genus *Steindachneria* but to another gadiform fish.

The rare skeleton remains of a steindachneriine representative were described in the MS by SWIDNICKI (1990, *non vidi*, *fide* KOTLARCZYK *et al.* 2006) as *Parasteindachneria oligocenica* from Przysietnica (Poland, Upper Oligocene, NP25). KOTLARCZYK *et al.* (2006, p. 31, fig 16/E) accept the nomenclature of Swidnicki and figure an incomplete specimen of this species. Regardless of formal imperfection, the absence of a description and insufficient figuration do not allow an adequate comparison of the Czech and Poland material. In synonymy the authors mention the species *Merluccius macroactus* (Kr.), (JERZMANSKA 1968). The original description of Kramberger's specimen (KRAMBERGER, 1879, p. 64–65, Tab. 16, fig. 5) exclude the generic and species identity with the specimen from the Moravian Hustopeče locality (see below).

Systematic part

Order Gadiformes

Family Merlucciidae

Subfamily Steindachneriinae Marshal & Cohen, 1973

Genus *Steindachneria* Goode & Bean, 1888

Steindachneria sp.

Photo 1, fig. 1

Material: One incomplete specimen (imprint and counter print, no. Ge 29781)

Locality: Hustopeče

Stratigraphy: Ždánice-Hustopeče Formation (Egerian, NP 25)

Remark. The nannoplankton analysis made by Stjepan Čorić shows the presence of *Coccolithus pelagicus*, *Cyclicargolithus floridanus*, *Helicosphaera compacta*, *Pontosphaera enormis*, *P. multipora*, *R. bisecta*, *Reticulofenestra lockeri*, *R. clatrata*, *R. daviesii*, *R. stavensis*, *Reticulofenestra* sp., *Sphenolithus delphix*, *S. moriformis*, and *Zygrhablithus bijugatus*.

Figure 1. Lateral view of abdominal vertebrae in *Steindachneria* sp., showing the relation with skull, vertebrae, and interneural spines of dorsal fins.

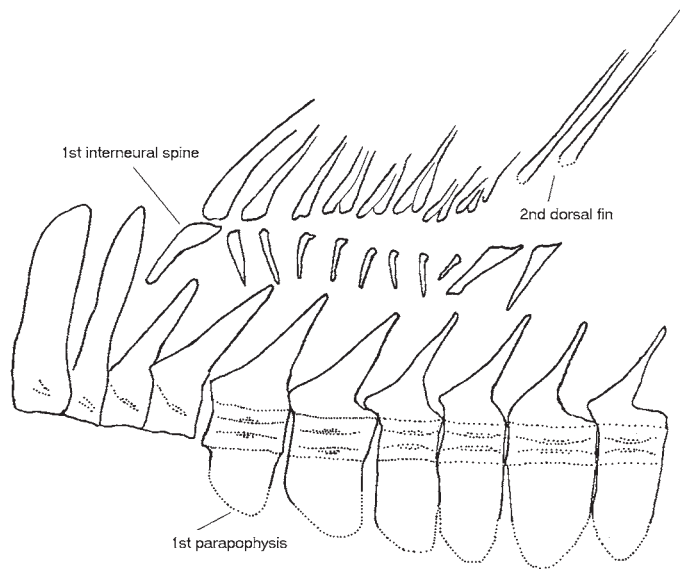


Photo 1. *Steindachneria* sp., Hustopeče, Egerian, length of specimen 47 mm. Photo: Kamil Jursa.

Diagnosis

Steindachneria sp. is determined by the combination of the following characters: 12-13 abdominal vertebrae, tapering form of the caudal part, elevation and development of the anal fin, better development of the second dorsal fin than the anal one, very long pectoral fin.

Description

The specimen (length of the preserved part = 47mm) lacks the extremity of the caudal body part, the first dorsal; a part of the second dorsal and the anterior part of anal fins are preserved, the same as the pelvic and pectoral fins. Maximal body depth just behind the head, caudal part of the body is tapering in form.

Skull

Only the posterior and dorsal part of the head is preserved and the individual bones are hardly distinguishable. In the otic region there is a space for the large otolith (cca 5,5 mm), which takes 1,2 times the orbit diameter. The imprint of the otolith is partially preserved, showing a significantly developed anterodorsal part, which corresponds in general to the genus *Steindachneria*.

The eye or orbit, 4,5mm in diameter, is situated near the dorsal edge of the head. Parasphenoid lies horizontal below the orbit and reaches the ventral part of the otolith.

Vertebral column

The first and second neural spines are larger and longer than the following spines (Fig. 1). These spines reach vertically the dorsal margin of the body.

Note. In gadiforms this character is typical of *Merluccius*, *Steindachneria*, *Muraenolepis*, *Squalogadus*, Bathygadinae, and Macrourinae. Only the first neural spine is enlarged in *Brosme*, *Gadus*, *Macruronus*, and *Lyconus*. The first to third spines are enlarged in *Melanonus*, *Physiculus* and *Euclichthys* (OKAMURA, 1989).

The first parapophysis originates on the fifth centrum (Fig. 1).

Note. The parapophyses are well developed in Gadiformes and the position of the first parapophysis differs also among the taxa (for details, see OKAMURA, 1989). The condition of the fossil specimen is similar to *Gadus*, *Macruronus*, *Steindachneria*, Bathygadinae, Macrourinae, *Squalogadus*, and *Trachyrincus*.

There are 12 or 13 abdominal vertebrae. The number of abdominal vertebrae varies in the recent merlucciids (13–29), *Merluccius* (21–29) seems to be a more specialised genus and *Steindachneria* (13–14) more primitive than the other three merlucciid genera. The number of abdominal vertebrae in macrourids is 10 to 15 (INADA, 1989). Future research, requiring additional material, will show if the possible number of 12 abdominal vertebrae in our fossil specimen would reveal a relationship between *Steindachneria* and macroiurids.

Dorsal fins

Dorsal fin 1 and 2 are close to each other. The first dorsal one begins just behind the head and has 9 rays. The first ray is the longest (11 mm; corresponding to 7 abdominal vertebrae), the last ray is only 2 mm long, thus the fin is pointed in shape. The second dorsal fin continues just behind the first one without a space at the vertical of the 8th vertebra. The relative distance between dorsal fins 1 and 2 varies among gadid fishes (see DUNN, 1989). In the fossil specimen the first interneural spine of the second dorsal is stronger and is placed at a more oblique angle than the preceding spines, like in the recent genera *Merluccius*, *Macruronus* and *Steindachneria* (Fig. 1).

The first interneural spine (pterygiophore) of the first dorsal is inserted between the second and third neural spines, as in many taxa including Bathygadinae and Macrourinae.

Note. *Brotula*, *Gadus* and *Trachyrincus*, however, are provided with the first interneural spine between the third and fourth neural spines, and in *Physiculus* between the fourth and fifth (OKAMURA, 1989).

The second dorsal fin has only 19–20 distinguishable rays. Although all of the rays are not preserved in their distal ends (the 13th ray has 8 mm and corresponds to the length

of five vertebrae), it is evident that the dorsal fin is better developed than the anal one. This character is known in *Melanonus*, *Macruronus*, *Lyconus*, *Muraenolepis*, *Squalogadus*, *Trachyrincus*, *Euclichtys*, *Steindachneria*, and Bathygadinae. The character of the anal fin having longer rays than the second dorsal is only present in the members of the *Macrourinae*.

Anal fin

The anal fin begins at the vertical of the 12th-13th vertebrae. Only the first nine rays are preserved after the rays become markedly shorter, very fine and hardly distinguishable. This similar remarkable development of the anterior portion of the anal fin is also found in recent *Euclichthys*, *Macruronus*, and *Steindachneria*.

Pelvic girdle

The girdle is inserted posterior to the cleithra. The longest rays are 12 mm in length and correspond to 7 vertebrae of the abdominal part.

Note. In *Brotula*, *Merluccius*, *Muraenolepis*, *Squalogadus*, and *Euclichthys* the pelvic girdle is inserted between the cleithra; in other gadiforms the position of the girdle is more posterior.

Pectoral girdle

The cleithrum, supracleithrum and posttemporal form a moderate arch behind the head. The spiniform postcleithrum is 12 mm long. The pectoral fin base is situated in the middle of the body. The rays are extremely long (13 mm) and reach behind the base of the anal fin.

Discussion. The above-described osteological and morphological characters allow to include the specimen from Hustopeče in the genus *Steindachneria*. The determination on species level requires better preserved material. The following characters exclude the Moravian specimen from *Merluccius macroactus* (KRAMBERGER, 1879): different position of the anal fin and the length of the anal fin rays (in Kramberger's specimen from Wola Radziszowska the origin of the anal fin is below the origin of the second dorsal versus quite behind this fin, the longest rays of the anal fin are in the middle part versus the important development of the first anal rays - one of the typical character of *Steindachneria*). The specimen described by Jerzmanska from Babice II as *Merluccius macroactus* (KRAMBERGER, 1879) is incomplete and, as shown by the figure and description, it does not possess any character typical of a *Steindachneria*. Thus, the Moravian specimen represents the first fossil record of the genus *Steindachneria* in the Upper Oligocene of the Paratethys. This record extends the known geographic and stratigraphic range of the genus, and its occurrence in the Outer Carpathians documents its presence in the larger Mediterranean region, including Paratethys.

SOUHRN

Studovaný exemplář z lokality Hustopeče lze charakterizovat kombinací znaků (12-13 abdominálních obratlů, zúžující se kaudální část těla, velmi vyvinutá přední část anální ploutve, první interneurální trn (pterygiofor) druhé dorsální ploutve je silnější než předcházející) odpovídajících rodu *Steindachneria*. Název *Steindachneria* sp. v hustopečských slínkách rozšiřuje geografické a stratigrafické rozpětí tohoto rodu. V geologickém záznamu se *steindachnerie* tedy objevují minimálně od svrchního oligocénu a jejich výskyt ve Vnějších Karpatech dokládá jejich přítomnost v širší Středozevní oblasti včetně Paratethydy.

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