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Discovery of a Champsodontid (Pisces, Teleostei, Perciformes) in the Eocene of the Northern Caucasus

A. F. Bannikov

Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117997 Russia
e-mail: aban@paleo.ru

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Abstract—*Eochampsodon elongatus* gen. et sp. nov. is described from the Middle Eocene (Bartonian, Kuma Regional Stage) of the northern Caucasus (Gornyi Luch locality). This is the second genus of the previously monotypic family Champsodontidae. Earlier, extinct champsodontids were only known from the Oligocene.

Key words: Teleostei, Perciformes, Champsodontidae, new taxa, Middle Eocene, northern Caucasus.

INTRODUCTION

The monotypic family Champsodontidae is represented in the Recent fauna by the sole genus *Champsodon* Günther, 1867, which includes 13 species that occur in the Indo-Pacific (Fowler, 1956; Matsubara *et al.*, 1964; Lindberg and Krasyukova, 1969; Nemeth, 1994). Only one extinct champsodontid species, *Champsodon grossheimi* (Daniltshenko), is currently known in the Lower Oligocene of the northern Caucasus (Bannikov, 1998). In the original description, this specimen was referred to the chiasmodontid genus *Myersiscus* (= *Pseudoscopelus*) (Daniltshenko, 1960).

A new champsodontid has recently been found in a Middle Eocene (Bartonian) northern Caucasian locality close to the village of the Gornyi Luch in the Krasnodar Region. Since 1990, the author has systematically collected teleosteans in this locality, which is characterized by rich marine ichthyofauna. To date, about 40 teleost species from more than 31 families and 12 orders have been identified there (Bannikov and Parin, 1997; Bannikov and Tyler, 2001; Bannikov, 2002a, 2002b). The Middle Eocene champsodontid from Gornyi Luch substantially differs from species of the genus *Champsodon*, which is well understood osteologically due to recent publications (Matsubara *et al.*, 1964; Nemeth, 1994; Mooi and Johnson, 1997). This makes it possible to rank this form as a new genus, that is, the earliest champsodontid and the second genus in the family Champsodontidae.

The Champsodontidae are traditionally included in the suborder Trachinoidei of the order Perciformes (Fritzsche, 1982; Nelson, 1994). Mooi and Johnson (1997) substantially narrowed the limits of this suborder, excluding a number of families (in particular, the Champsodontidae) from its composition. Based on certain characters, primarily the presence of a parietal spine pierced by the supratemporal sensory canal, Mooi and Johnson suggested a relationship between the genus *Champsodon* and the Scorpaenoidei sensu Mooi et Gill, 1995, which are regarded as a suborder within Perciformes (Mooi and Gill, 1995). According to Mooi and Johnson, the fact that *Champsodon* lacks a suborbital stay (a diagnostic character of the Scorpaeniformes) does not contradict the hypothesis of scorpaenoid affinity, since this genus "lacks the element that normally bears it, the third infraorbital" (Mooi and Johnson, 1997, p. 172). The validity of Mooi and Johnson's hypothesis should be carefully checked (Imamura and Shinohara, 1998). The new champsodontid provides no evidence either for or against this hypothesis, since whether this fish had a pierced parietal spine remains uncertain because of poor preservation.

Eochampsodon elongatus gen. et sp. nov. probably lived in nearshore habitats at small or moderate depths, as do the extant champsodontids.

The material described in the present paper is deposited in the collection of the Paleontological Institute of the Russian Academy of Sciences (PIN), no. 4425. The holotype of *Eochampsodon elongatus* gen. et sp. nov. was found in 1999.

SYSTEMATIC PALEONTOLOGY

Family Champsodontidae Jordan et Snyder, 1902

Genus *Eochampsodon* Bannikov, gen. nov.

Etymology. From the Greek ἑως (sunrise) and the generic name *Champsodon*.

Type species. *Eochampsodon elongatus* sp. nov.

Diagnosis. Body elongated, with short caudal peduncle; head length considerably greater than body depth. Mouth large and oblique. Preopercle with long and massive posteroventral spine; other opercle bones

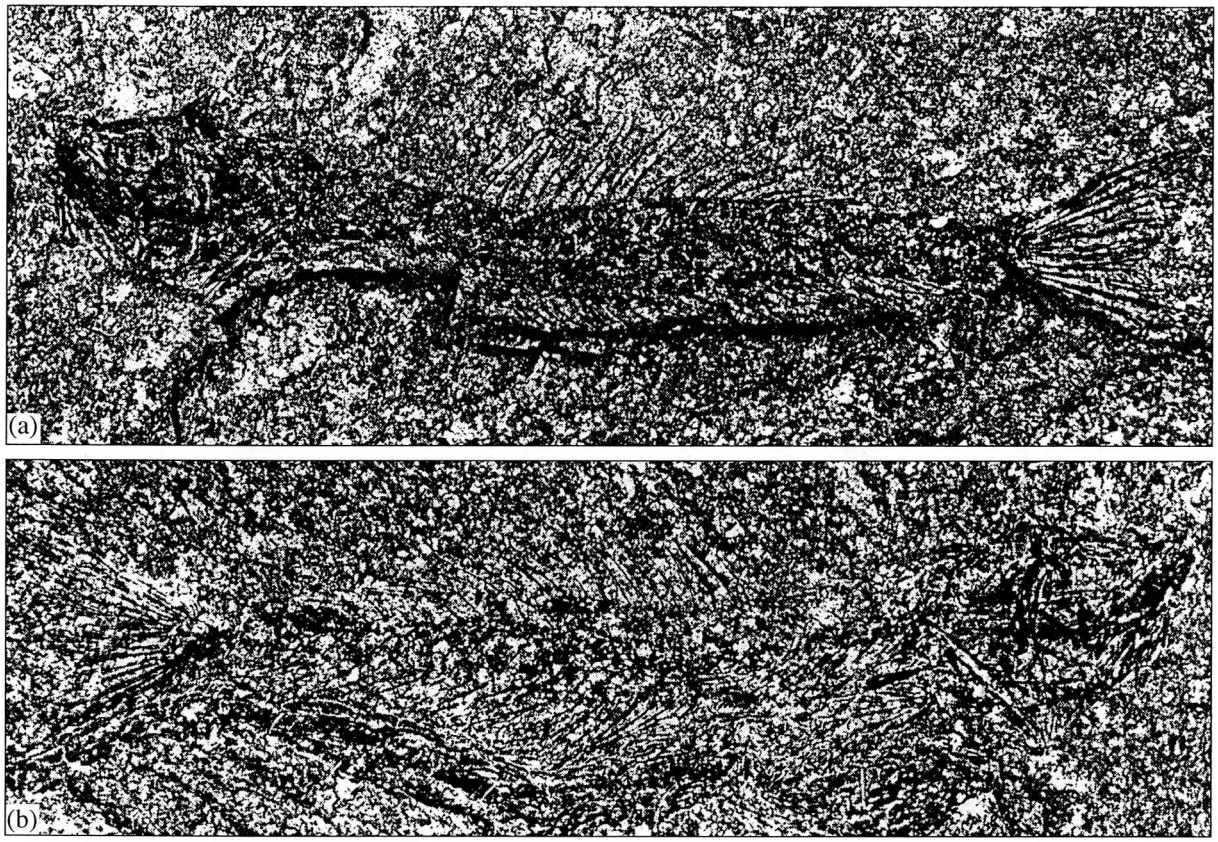

Fig. 1. *Eochampsodon elongatus* sp. nov., holotype PIN, no. 4425-46, ×3.2, (a) part and (b) counterpart.

with slightly fimbriate edges. Pectoral girdle narrow. At least 35 vertebrae, including more than 15 in abdominal region. Haemal arches of anterior caudal vertebrae non-expanded rostrocaudally. Hypurals fused into single plate. Two dorsal fins separated from each other by small space. First dorsal fin short and composed of about five spiny rays; second dorsal fin elongated. Anal fin elongated and lacking spines; about ten anterior anal pterygiophores placed anterior to haemal spine of first caudal vertebra. Pectoral fins relatively small; long pelvic fins located ventrally to them. Caudal fin notched, with 15 principal rays. Scales small, dense, and spinoid.

Species composition. Type species.

Comparison. The new genus differs from *Champsodon*, the sole other genus in the family Champsodontidae, in the larger number of vertebrae in both the vertebral column and the abdominal region (*Champsodon* has 29–33 vertebrae, including 10–12 in the abdominal region) and the considerably more anterior position of the rostral extremity of the anal fin. According to Nemeth (1994), extant *Champsodon* species have only two or three anterior anal pterygiophores placed ahead of the haemal spine of the first caudal vertebra; however, we observed four such pterygiophores in the holotype *C. fimbriatus* Gilbert (USNM, no. 051629). In the new genus, the fimbriation of the opercle, subopercle, and interopercle is much less developed than in *Champsodon*, and the anterodorsal process of the first dorsal pterygiophore does not come into contact with the dorsal end of the neural spine of the third vertebra, as opposed to that of *Champsodon* (Mooi and Johnson, 1997, text-fig. 17).

***Eochampsodon elongatus* Bannikov, sp. nov.**

Etymology. From the Latin *elongatus* (elongated).

Holotype. PIN, no. 4425-46, part and counterpart of a complete skeleton, Russia, Krasnodar Region, left bank of the Pshekha River, 1 km upstream from the village of Gornyi Luch; Middle Eocene, Kuma Regional Stage.

Description (Figs. 1–4). The body is elongated; the caudal peduncle is low and short. The head length is 3.8–3.9 times less than the standard body length (SL) and is less than the maximum body depth, which constitutes 19% SL. The caudal peduncle depth is 3.0–3.3 times less than the body depth. The eyes are moderately large: the horizontal diameter of the orbit is equal to, or larger than, the snout length.

The neurocranium is low, and an almost straight parasphenoid is exposed in the ventral part of the orbit. The hyomandibular axis is slightly inclined caudally. The quadrate is small and triangular. The mouth is large

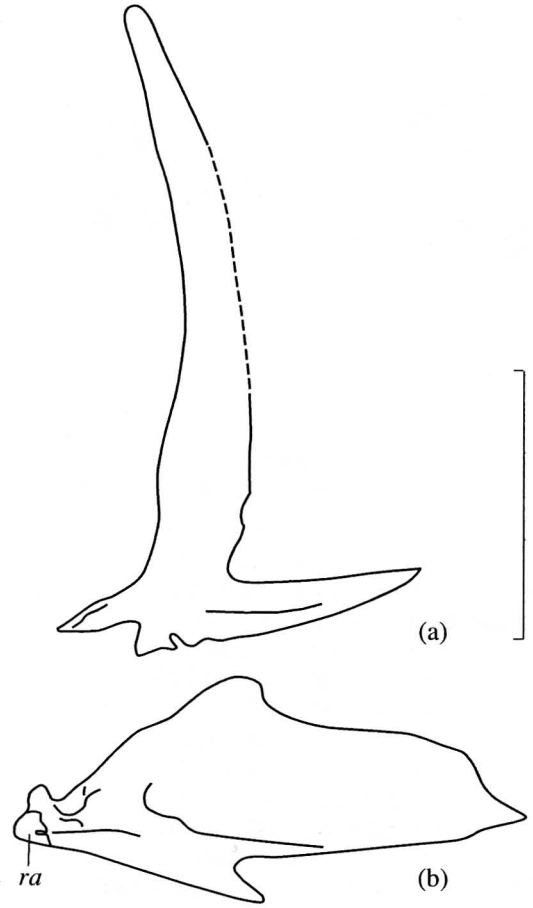

Fig. 2. *Eochampsodon elongatus* sp. nov. (?), specimen PIN, no. 4425-49: (a) preopercle and (b) left angulo-articular, inner view. Designations: (*ra*) retroarticular. Scale bar, 10 mm.

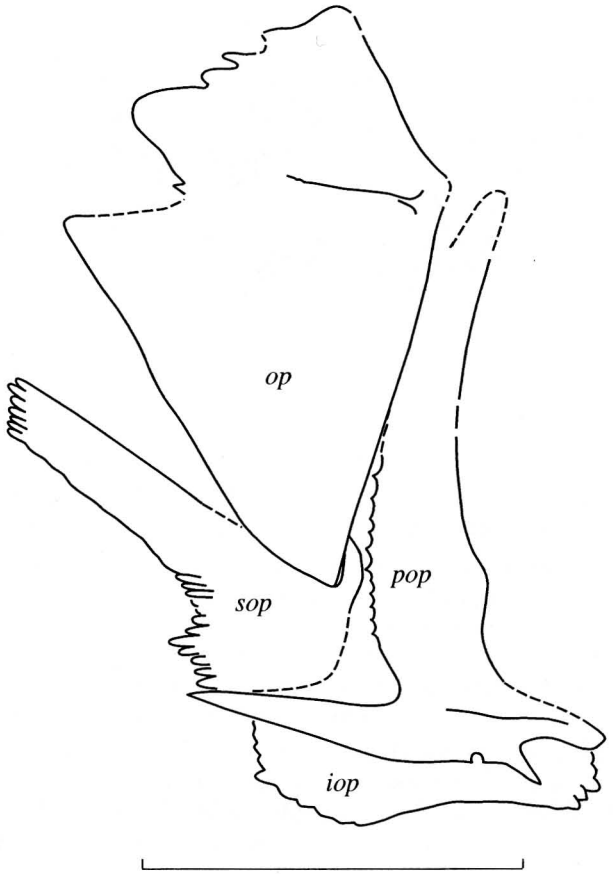

Fig. 3. *Eochampsodon elongatus* sp. nov. (?), specimen PIN, no. 4425-48, gill cover. Designations: (*iop*) interopercle, (*pop*) preopercle, (*op*) opercle, and (*sop*) subopercle. Scale bar, 10 mm.

and oblique, and the lower jaw articulation is placed approximately under the posterior orbital border. The premaxilla is long, curved, and bears numerous sharp teeth. The maxilla is large and narrow. The lower jaw is approximately 73% as long as the head. The dentary teeth are numerous, but poorly preserved. The dentary is thin at the symphysis. The angulo-articular is leaf-shaped, and its posterior corner contacts with a very small retroarticular. The preopercle has a long dorsal ramus and a short ventral ramus; at the bend, it has a stout and long spine directed caudally. The posterior edge of the preopercle is even (Fig. 2a) or serrated (Fig. 3),[1] while the ventral edge bears a spinule and a small notch behind it. The opercle is comparatively large and slightly fimbriated posterodorsally. The subopercle is oblong and has a thin anterodorsal process and weak fimbriation along the posterior edge. The interopercle is slightly fimbriated anteriorly and posteriorly and slightly concave ventrally. There are about seven slender branchiostegal rays, two posterior ones are connected to the epihyal. The ceratohyal lacks a foramen, and its ventral edge is slightly concave and moderately elongated.

The posttemporal is forked, and its main plate terminates posteriorly with a spine. The supracleithrum is elongated and slightly expands posteroventrally. The cleithrum is almost straight but curves rostrally in its dorsalmost part. The coracoid is strongly reduced. The ventral postcleithrum is small and rib-shaped. The pelvic bones are rather large, wedge-shaped, and directed almost parallel to the body axis.

The vertebrae are elongated and constricted in the middle. The abdominal region of the vertebral column (17 vertebrae) is approximately 91% as long as the caudal region (19 vertebrae). The neural spines are narrow, short, and slightly curved. No parapophyses are visible. The hypurals are clearly consolidated into a single plate. The structural details of the caudal skeleton are hidden by dense scales; the neural spines of the second and third praeural vertebrae probably expand medially, as in *Champsodon*. The number of epurals is unknown. The

[1] It is not improbable that the different structure of the preopercular edge in specimens PIN, no. 4425-48 and 4425-49 is evidence of the presence of one more champsodontid taxon in the Middle Eocene of the northern Caucasus.

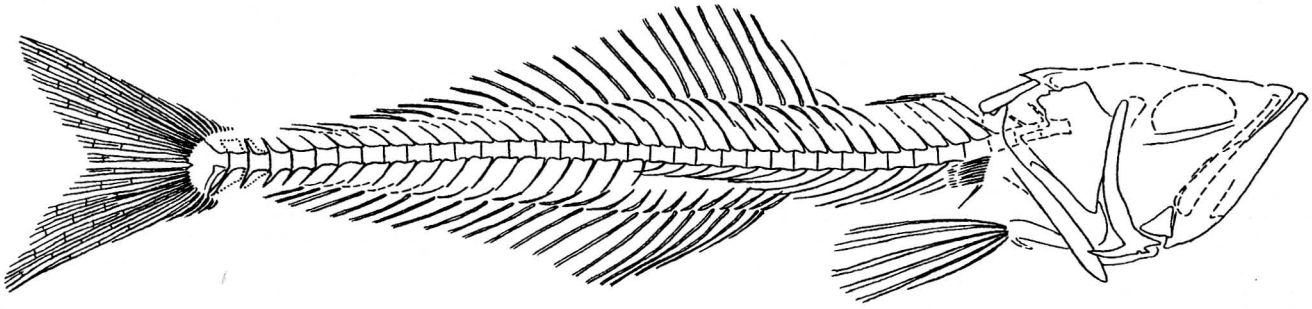

Fig. 4. *Eochampsodon elongatus* sp. nov., reconstructed skeleton.

ribs are strongly declined caudally and gradually become shorter posteriorly. The epineurals are not visible.

There are no supraneurals. The first dorsal fin is small and isolated from the second one. In both specimens with the first dorsal fin preserved (holotype and specimen PIN, no. 4425-47), it is pressed against the trunk; therefore, the number of its rays remains uncertain. The first dorsal fin includes, at most, five narrow pterygiophores, the anterior one being situated before the neural process of the third vertebra. The first predorsal distance is about 31% SL. The base of the second dorsal fin is long, its anterior end is located above the ninth or tenth vertebrae. The second dorsal fin contains about 24 soft rays, which gradually decrease in length posteriorly. The number of pterygiophores of the second dorsal fin approximately equals the number of neural spines located under the fin. The second predorsal distance is about 41% SL.

The anal fin is similar in shape and size to the second dorsal fin, and its anterior end is located slightly behind it. The anal fin consists of 23 soft rays. The anterior part of the anal fin base enters deep into the abdominal cavity; about ten anterior pterygiophores are located anterior to the haemal spine of the first caudal vertebra. The remaining anal pterygiophores correspond one-to-one to the haemal spines above them. The preanal distance is about 48% SL.

The pectoral fins are relatively short and narrow and attached directly below the vertebral column line approximately under vertebra 4. The number of rays in the pectoral fin is unknown.

The pelvic fins are comparatively long and attached approximately under the base of the pectoral fins. They consist of a spine and five branching rays. The pelvic fin is at least 16% as long as SL.

The caudal fin is medium-sized, forked, and consists of 15 principal rays (I7-6I). The dorsal and ventral procurrent rays are relatively numerous.

The scales form a continuous cover over the trunk. The scales are small, rough, and obviously belong to spinoid type 5 (after Roberts, 1993), as in *Champsodon*. It is impossible to reconstruct the lateral line.

Measurements. Standard body length of the holotype is 40.5 mm.

Comparison. The sole species of the genus.

Remarks. Taking into account the measurements of certain bones of the new species (the premaxilla of specimen PIN, no. 4425-49 is 26 mm deep, and its spine is 8.5 mm long), the length of the fish could exceed 20 cm (extant species of *Champsodon* are at most 15 cm long: Nemeth, 1994).

Material. Apart from the holotype, two fragments (specimens PIN, no. 4425-47 and 4425-48) and isolated premaxilla and angulo-articular (PIN, no. 4425-49); all from the type locality.

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