Miocene Cyprinid found from Yoshioka in the Oshima Peninsula, Southwest Hokkaido, Japan

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西南北海道渡島半島の吉岡産中新世コイ科魚類

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(要　　旨)

西南北海道渡島半島南部に分布する中新世前期の吉岡層から産出したコイ科魚類化石2種を記載した．1種は，カマツカ亜科のニゴイ属(?)の未定種で，標本はかなり分解しているが，咽頭骨および咽頭歯の印象を保存している．他の1種は，コイ亜科の新属・新種であると思われる未定種で，標本は骨片と特徴のある偏平な咽頭歯からなる．本標本は，A1歯が大きいこと，また，先端の歯鉤が，極めて弱くほとんど無いに等しいことなどの点で，類似の日本・中国・欧州の第三紀産の化石とは別種と考えられる．また，今回の北海道からの化石の産出により，コイ科魚類が古第三紀後期～日本海拡大以前の中新世に中国および日本の淡水性堆積盆地に広く分布していたことがより明らかになった．

(Abstract)

Two species of freshwater fish belonging to the family Cyprinidae are described from the Early Miocene Yoshioka Formation in the Oshima Peninsula, southwest Hokkaido. They are ? *Hemibarbus* sp. and Cyprininae gen. et sp. nov. The occurrence from Hokkaido indicates wide distribution of cyprinids, especially Cyprinine species, in East Asia from Late Paleogene to Early Miocene which is before time of the opening of the Sea of Japan.

Introduction

Tanai and Suzuki (1962) described the Yoshioka flora from the Miocene Yoshioka Formation in the Oshima Peninsula, southwest Hokkaido and incidentally showed some specimens of fossil fish. Later their specimens were referred to the family Cyprinidae by Tomoda *et al.* (1977), and Tomoda and Kodera collected additional fish specimens from the Yoshioka Formation and kindly offered me some of them. I examined them in detail, and found that two species of the family Cyprinidae are represented in them; One is a new

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species of the subfamily Cyprininae and the other is that of the subfamily Gobioninae.

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Locality and geology

The Early Miocene Yoshioka Formation (Yoshimura,1960) of the Yosioka Group is well developed in the Yoshioka area, southwest of Fukushima-cho, Matsumae-gun in the Oshima Peninsula of southwest Hokkaido. This formation is composed mainly of conglomerate, oil shale and alternation of sundstone and shale, and bears abundant fossil plants belonging to the Daijima-type flora (Tanai and Suzuki, 1962). Recently Ganzawa (1992) gave an age of 16-18 Ma for it.

Specimens treated in this paper were obtained from blackish oil shales at "Chogoro-zawa" in the western part of Yoshioka.

Systematic descriptions

Order Cypriniformes
Family Cyprinindae
Subfamily Gbioninae
Genus ?*Hemibarbus*
?*Hemibarbus* sp. indet.
(Figs. la,b; Plate 65, Figs. 1a-c)

Materials: Weathered fish body, Coll. no. T·K8501a,b (T. Tomoda and H. Kodera)

Body elongated and low; head broken and fragmental bones preserved; preoperculum triangular; operculum long anterior-postriorlly, straight radial grooves runnig; eye large, its diameter about half of hight of caudal peduncle; a spinous ray and 9 branched dorsal fin rays preserved; a spinous ray and 8 branched anal fin rays countable; 11 or 12 branched pectoral fin rays countable; caudal peduncle low; number of caudal vertebrae 16 or 17 ; near head a mold of right pharyngeal bone with some teeth preserved; bone strong and rather short, anterior limb very short, its end distinctively expanded and truncated; posterior limb curved toward the medial side; teeth strong, 4 or 5 teeth remained on the main row, the last tooth clearly spoon shaped, 3 or 4 small teeth preserved on the outer rows. Molds of 5 left serial teeth of the main row preserved near the pectoral fin.

Remarks: This fossil species can be referred to the genus *Hemibarbus* by characteristic pharyngeal bone and their teeth. Unfortunately any species for comparison with this species can not be obtained from reported Miocene species of Gobioninae. Most of them from the some Miocene of Japan are of isolated pharyngeal teeth which are classified in subfamily level from the Katabira, Hiramaki, Atsumi (Yasuno, 1989a,b, 1991b) and the

Himetani formations (Nakajima, 1988). Among them some teeth of the Katabira Formation are similar to this fossil one's. Pharyngeal bone and their teeth of *H. barbus* Temminik et Schlrgel which is recent species, from the Pleistocene beds in northeast Kyushu (Ueno, *et al.*, 1975) are very similar to those of the fossil specimens from Hokkaido. Among Chinese species, *Gnathopogodon* in Miocene and *Paleogobio* in Eocene (Chow, 1990) a few teeth of *Paleogobio* are somewhat similar to the fossil specimens, but there is not any description of the pharyngeal bone.

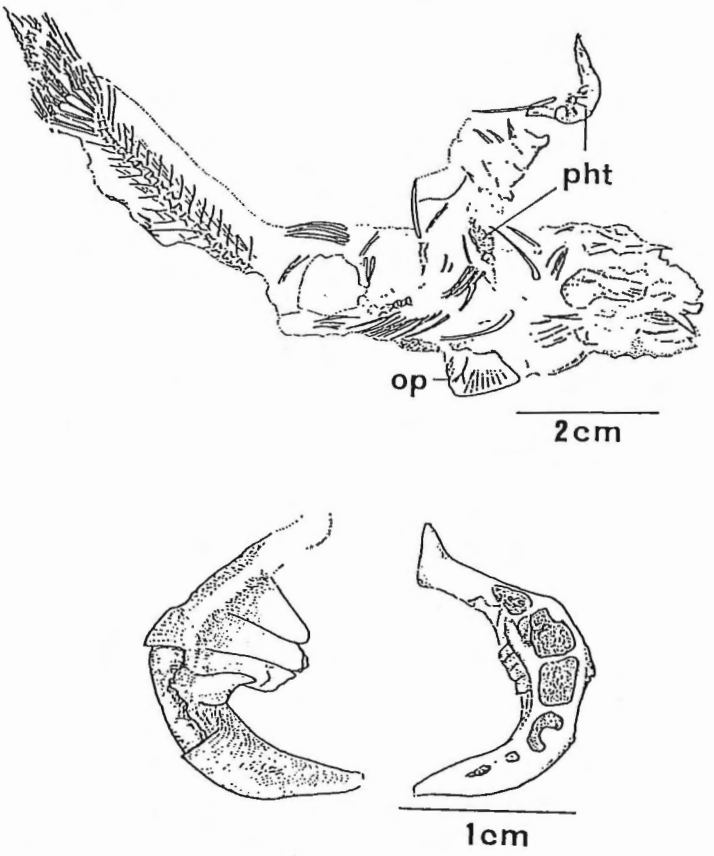


Fig. 1 ?*Hemibarbus* sp. from the Miocene Yoshioka Formation
Above; specimen TK8801b. Bottom; plaster casts of the pharyngeal bone with teeth of specimen TK8801a (left) and specimen TK8801b (right). op; operculum, pht; pharyngeal bone and teeth.

Mesurements (in mm.) and counts:

	TK8501a	TK8501b
Total length	110.00+	130.60+
Standard length	109.00+	111.80?
Head length	24.55+	24.40+
Highest body depth	22.00+	22.00+
Eye diameter	8.60	-
Caudal ped. depth	13.00?	12.80?
Dorsal	I ?,9+	I ?,9+
Anal	I ?,8+	I ?,8+
Pectoral	I ?,11-12	I ?,11-12
Vertebrae	?+16-17	?+16-17
Teeth	?,3?,5-	?,3?,5-

Subfamily Cyprininae
Gen. *et* sp. nov.
(Figs. 2; Plate 65, Figs. 2-5)

Material: Fragment with pharyngeal teeth. Coll. no. TK8530 (Y. Tomoda and H. Kodera)

Left pharyngeal teeth, fragmental bones, scales and a operculum preserved; operculum rectangular, ornamentation not clear; scales cycloid, thick, more than 15 apical grooves, about 10 weak basal grooves, circular ridges strong in apical area, with about 4 winter bands; 4 teeth of the main row preserved; tooth A1 subconical, large, hook on the tip much less or indistinct; tooth A2 compressed anterior-posteriorlly, occlusal surface narrow and curved cresently; tooth A3 pieced mold; tooth A4 thin, showing posterior surface; 3 teeth preserved on the outer rows, two teeth (?B1 and ?B2) very small, compressed, last one (?B3 or ?C1) smallest, removed from the specimes; tooth row possibly three.

Measurements (in mm):

	Height of crown	Width of crown
Tooth A1	1.1	1.2
Tooth A2	1.3	1.6?
Tooth A4	1.1	2.2
Tooth ?B1	0.6	0.8

Remarks: This species evidently belonges to the subfamily Cyprininae in having characteristic pharyngeal teeth which are anterior-posteriorlly compressed. Living species having such teeth are only those of the genera *Carassius* and *Carassioides* inhaviting from the Canton Province in South China to Vietnum in Southeast Asia (Kuronuma, 1962 ; Wu, 1977). Fossil species deffers from those living species in having probably three tooth rows and a large, strong tooth A1, and differs from Miocene species in having a large tooth A1 with indistinct hook which is much less than the other ones. Similar Miocene species have been found from following countries; Japan (Kodera and Nomura, 1988 ; Yasuno, 1976, 1983, 1986, 1989a, 1991a ; Tomoda, 1977), China (Chow, 1990) and Europe (Rutte, 1962 ; Obrehelo'va, 1970). Therefore, the fossil species is probably referable to new species of a new genus. From present occurrence in Hokkaido it becomes more clear that cyprinids, especially cyprininae species, widely flourished in East Asia from Late Paleogene to earliest Middle Miocene before time of the opening of the Sea of Japan.

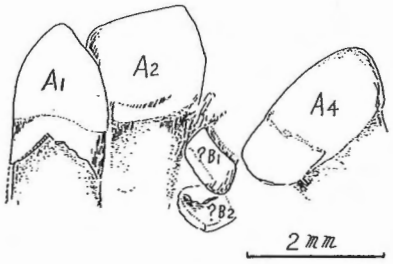


Fig. 2 Pharyngeal teeth of Cyprinine gen. *et* sp. nov., TK8530, from the Miocene Yoshioka Formation
Large and small teeth are respectively of those on the main and outer row.

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(C): in Chinese (C+E): in Chinese with English abstract

(G): in Germany (J+E): in Japanese with English abstract

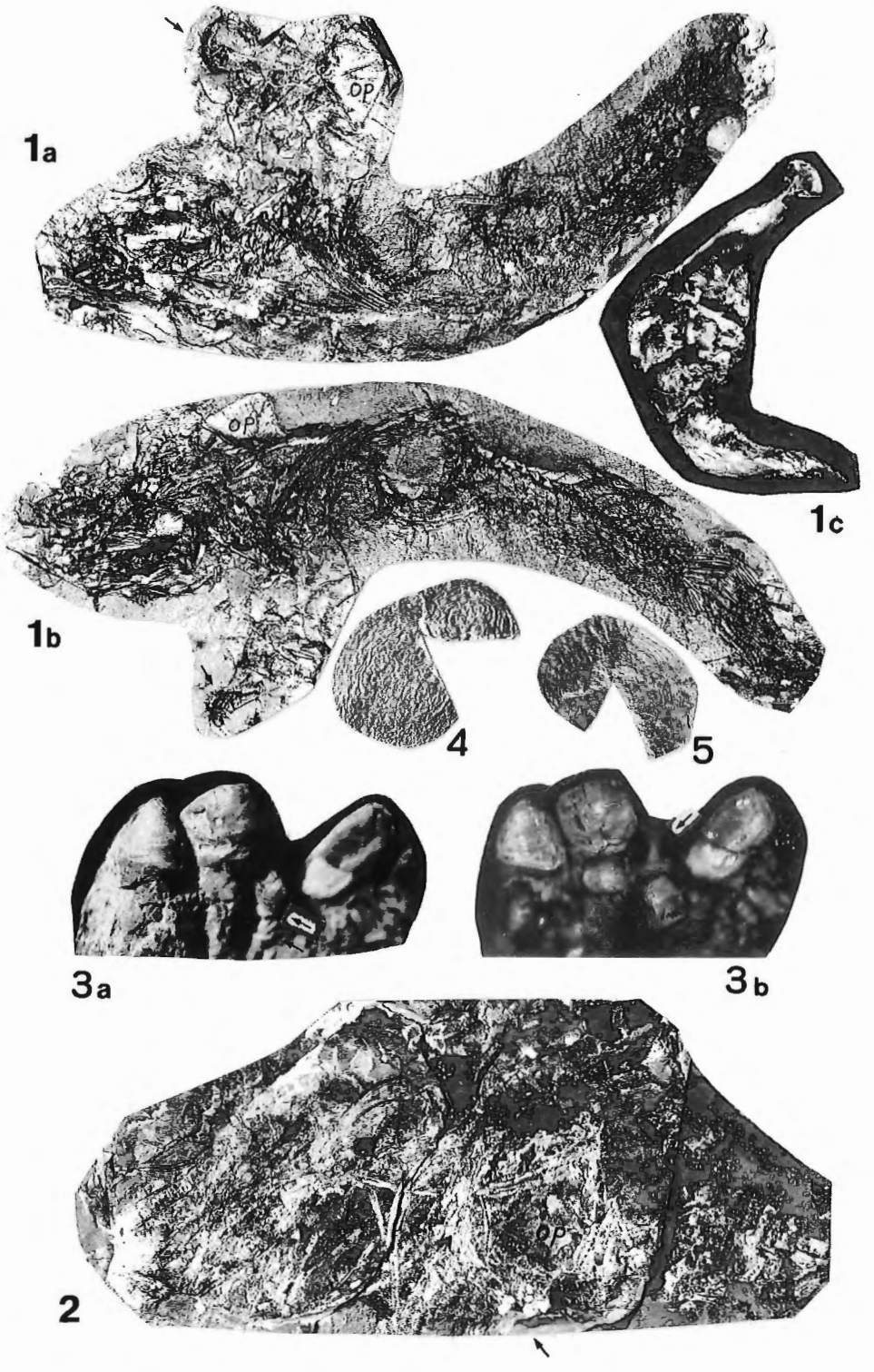
Plate 65

Fig. 1 Specimen of ?*Hemibarbus* sp. (× 1)
a; left lateral view. TK8501a.
b; a counter part of Fig. a. TK8501b.
c; medial view of left pharyngeal bone indicated by an arrow in Fig. b.(× 5.6)
op; operculum

Fig. 2 Specimen of Cyprininae gen. *et* sp. nov. TK8530. (× 1.7)
Pharyngeal teeth indicated by an arrow, operculum, scales, and bones are preserved.
op; operculum

Fig. 3 Pharyngeal teeth of the Cyprininae gen. *et* sp. nov. in Fig. 2. (×8.4)
Figs. a and b are the same specimen. Three large teeth are tooth A1, A2 and A4. In Fig. a arrows indicate small teeth on the outer row and in Fig. b an arrow indicates the mold of tooth A3.

Figs. 4 - 5 Scale of the Cyprininae gen. *et* sp. nov. of the specimen TK8530. (× 5.6)


1a
OP
1c
1b
OP
4
5
3a
3b
2
OP