

# 內蒙古伊克昭盟白堊系中 弓鱈魚科一新屬

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本文記述的标本是 1960 年底由內蒙古自治区地質局送交中国科学院古脊椎动物与古人类研究所鑑定的。化石产于薄层浅灰色泥質砂岩中,保存的尙称完好;在同一层位中还有介形虫、昆虫和植物化石。据李龙云同志說,这一层以下約 50 米处还产有龟化石。这些魚化石經笔者观察,其系統位置应归属于弓鱈魚科 (Amiidae)。我国华北中生代晚期地层中曾发现过中华弓鱈魚 (*Sinamia*) 化石,其他种属还很少发现,尤其缺少較完整而可資詳細鑑定的标本;所以这批标本的发现,不論在研究該类魚的系統关系上以及其在地史和地理分布上均頗有意义。笔者在此向采集标本的同志致以謝意。在研究过程中,周明鎮、吳汝康先生給以很多帮助,也于此深致謝意。

## 标 本 記 述

### 弓鱈魚目 *Amioidea*

#### 弓鱈魚科 *Amiidae*

#### 伊克昭弓鱈魚 *Ikechaoamia*, gen. nov. (新属)

**特征** 体长而稍側扁。头长大,頂骨愈合成一块。口緣牙齿大,呈圓錐形;下顎的牙齿尤其大。脊椎的椎体完全骨化,每一椎体两侧有二或三个縱长凹坑。肋骨短。鱈无棘鳞;背鱈基长,約占背部长 的 2/5;胛鱈基短;尾鱈外緣凸圓。鳞略呈长椭圆形,后端尖削,其长軸与体軸平行,被有珊瑚质层。

#### 东方伊克昭弓鱈魚 *Ikechaoamia orientalis* sp. nov. (新种)

(图版 I, 1—3; II, 1—4)

**标本** 一較完整个体,仅头頂部及鱈条稍有殘缺。另一标本为魚体的中段,身体的前端和后端仅由印痕代表。有一块标本 (V. 2519.4) 代表一幼年个体,缺失头部;还有少許散碎的骨骼。野外編号:60-IF 1323-6, 1333, 1336。古脊椎动物与古人类研究所登記号: V. 2519。

**产地及层位** 內蒙古自治区伊克昭盟杭錦旗毛不浪沟塔拉沟南 200 米;下白堊統下部。

**特征** 头长远大于体高,約为全长的 1/4。头外部骨骼平滑,无疣突。脊椎約 45

个,其中腹椎約 20 个。背鳍具 20 根鳍条支持骨,居体的中部稍后;背鳍起点位于背鳍起点之后。鳞片呈长椭圆形,后端尖削。

**标本描述** 正型标本(V. 2519.1)为一体长 110 毫米的小鱼,其他几块标本更小些。头部骨骼已因压挤移动了位置或已缺失。头部骨片无珙瑯质。由保存的部分观察,如顶骨、额骨等的形状很象中华弓鳍鱼(*Sinamia*)。顶骨愈合成一块。在顶骨和颞颥骨后方尚保存有部分板骨(tabularia),板骨数目与中华弓鳍鱼的相近。额骨能看到右侧的(V. 2519.6);左侧额骨已保存不全,只有后半部(V. 2519.4)。吻端各骨片在这几块标本中均保存不佳,观察不清。眼的位置靠前,围眼骨不易辨认。上颌骨及前上颌骨已经移动,但仍可见到其上的一些圆锥形牙齿;上颌骨有两列牙齿,以外列的较大。齿骨很大,口缘生有大而光滑的锥形齿,排列较疏。方骨及关节骨观察不清。

前鳃盖骨呈窄弓形,上下枝几相等。鳃盖骨已被压挤破碎,在 V. 2519.4 号标本上,可以辨认出它的轮廓,宽高约相等。下鳃盖骨及间鳃盖骨很不清晰,位于鳃盖骨前下方。在 V. 2519.1 号标本上可见到 9 根鳃条骨,长短相若,平滑无纹饰。

脊柱保存较佳,椎体骨化强,椎体侧面有二至三个凹坑,中有脊棱相隔。椎体长大于高,尾部的更长一些。肋骨短,17 对,略弯曲。前部神经棘短粗,不如肋骨长,尾部的神经棘及血管棘长几相等,后端的 9 根血管棘较硕长,它们分别支持着尾鳍条。

肩带部分可见到匙骨及上匙骨,匙骨为一较大的弓曲骨片,分上下两支,下支略宽大,两支相交形成钝角。

各鳍的鳍条分节,节距长大于宽,远端分叉,鳍前缘无棘鳞。胸鳍长大,几伸达腰带,具有 11 根鳍条。腹鳍较小,具 7 根鳍条,腰带骨呈长条形骨片,两端稍膨大。背鳍基长,约占背部长长的 2/5。鳍条也较长(尤以前中部分),具有 20 根长的支持骨。背鳍保存的不完全,可见到 7 根支持骨,与背鳍支持骨相似。尾鳍外缘呈不对称圆形,上部的较长。尾鳍条数目少(长鳍条 10 根),排列稀疏。尾鳍条分主枝及副枝,主枝粗壮,副枝纤细,紧贴附于主枝下方。它们分别被 9 根尾下骨支持着。在最后一椎体处联接一长条状骨片,沿着上歪的尾椎方向延伸,此一骨片竟长达 6 毫米(图版 I, 1, 3)。

鳞片呈长椭圆形,前端圆钝,后端尖削,有如甜瓜子形,前部(复盖部分)有细密的同心生长纹(图版 II, 3),后部(外露部分)光滑,有较前部为厚的珙瑯质层,边缘平滑无锯齿。在 V. 2519.1 号标本,脊柱的上方有一列侧线鳞,与脊柱平行伸向尾端,在每一侧线鳞片的后部有清晰的侧线穿孔。

**比较** 伊克昭盟的这批标本在头部骨骼的形状与排列上与中华弓鳍鱼(*Sinamia*)相近似;在鳃盖、上下颌的形状上颇似 *Urocles*;但在脊椎椎体方面又与 *Amiopsis* 很相似,此点也是过去一直认为是后者独有的特征,用以区别于 *Urocles* 属的唯一根据。在我们上述的标本上也具有这一特征,因而可以据此与 *Urocles* 区分开。此外,我们的标本有较长的背鳍,鳍条数目少而排列稀疏的尾鳍以及特殊形状的鳞片等均有别于上列各属。今定名为东方伊克昭弓鳍鱼(*Ikechaoamia orientalis*, gen. et sp. nov.)。

伊克昭弓鳍鱼的鳞片形状介于硬鳞与原始圆鳞之间,有过渡的征象,但仍具有较厚的珙瑯质层。在形状上虽与 *Amiopsis* 的有些相似,但后者的鳞片呈卵圆形,背鳍基也较后者为长;由椎体的结构上讲,二者颇为近似。伊克昭弓鳍鱼与中华弓鳍鱼的关系,虽在头

盖骨片的形状与排列上非常相似, 后者的背鳍也较长, 但还具有菱形硬鳞。从各方面看来, 上列各属间的特征在很大程度上是一致的, 很明显地应归属于一个较原始类群。

弓鳍鱼科在地史上自晚侏罗世至现代皆有。地理分布也很广泛。较原始的属, 除我国的 *Ikechaoamia* 和 *Sinamia* 外; 尚有 *Liodesmus* (欧洲晚侏罗世), *Urocles* (欧洲晚侏罗世、南美早白垩世), *Amiopsis* (欧洲晚侏罗世至早白垩世, 北美侏罗世?), *Opsigonia* (欧洲早白垩世)。但这些属的原始性质均不及我国上述两属的显著, 它们均已具有较典型的圆鳞。尤其发现在北美的种属多是些晚期的代表(5属), 直到现代还残留有少数现存种(*Amia*)。就现有材料来看, 这一类群的发源地似为欧亚大陆(以我国地域为主), 以后向美洲扩展。过去在内蒙古新生代地层中也曾发现有这一类鱼的较晚期的代表(*Pappichthys* 始新世)。相信在更多地区开展调查研究后, 将对这一类群的地史和地理分布, 以及其系统关系了解的更为清楚。

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## A NEW AMIID FROM INNER MONGOLIA, CHINA

(Summary)

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The material was collected in 1960 by a field party of Inner Mongolia Geological Bureau. The fossils were preserved in a layer of thin bedded grayish marly sandstone which, in addition to fishes, contains also ostracods, insects and plants. It is, therefore, certain that it comes from sediments deposited in fresh-water. The fishes are of special interest as representing a new genus of amiids. Most of the characters are known from a nearly complete skeleton, and there are 6 pieces showing important osteological characters. Therefore the new material is of considerable interest and worthy of notice.

### DESCRIPTION OF SPECIMEN

#### *Ikechaoamia*, gen. nov.

**Generic characters** Trunk elongate and laterally compressed. Head rather large; parietal unpaired. All marginal teeth large and conical, dentary ones the largest. Vertebral centra completely ossified, each centrum impressed with two or three extended pits on its side; ribs short and delicate. Fins without fringing fulcra; dorsal fin long-based, occupying about two-fifth of the back; anal fin small and short-based; caudal fin with convex hinder border. Scales elliptical in shape, the long axis horizontal; its hind tip sharpened and coated with somewhat thick layer of ganoine.

#### *Ikechaoamia orientalis*, gen. et sp. nov.

(Pl. I, figs. 1—3; II, figs. 1—4)

**Type specimen** Nearly complete fish, IVPP. Cat. No. V. 2519.

**Horizon and Locality:** Lower part of Lower Cretaceous; south of Mao-pu-lang-kou, Hang-chin District, Ikechao, Inner Mongolia.

**Specific characters** Attaining a length of about 110 mm, but usually smaller. Length of head with opercular apparatus greatly exceeding maximum depth of trunk and being about one fourth of the total length of the fish. External bones smooth, not ornamented. About 45 vertebrae, 25 being abdominal. Dorsal fin with about 20 supports, occupying the mid-hind of the back; anal fin with 7 supports, arising before the hinder end of the dorsal; pelvic fins inserted behind the anterior end of the dorsal. A long bony lamina on the end of the vertebral column.

**Description of specimens** The general proportions of the fish are well exhibited by the type specimen of which the rostral part and opercular apparatus are broken and displaced, and some structural details are better seen in other specimens. The great part of the cranial roof is formed by the large frontal bones, which are fused into a straight suture and are only slightly excavated at the outer edge by the orbits. They are marked along each border by a groove and

series of pores forming the openings of the sensory canal. The parietal is a large unpaired plate, its posterior margin is almost straight, its lateral margin on each side is slightly convex and meeting the medial margin of the supratemporo-intertemporal; and its anterior margin bears a rather strong anteriorly directed process, which extends forward between the frontals. This is best shown in the partial skull represented in Plate I, fig. 2. The supratemporo-intertemporal is a rather long bone. The orbital plates are imperfectly known. Behind the parietal and supratemporo-intertemporals there are several tabularia.

The bones of the dermal cranial roof are present in the same number and are situated apart from each other in the same way as those in *Sinamia*.

The maxilla and premaxilla are rather imperfectly preserved, the teeth are pointed and conical in shape. Two rows of teeth can be seen on the maxilla, of which the inner row is smaller.

The dermal bones of the lower jaw are imperfectly preserved. The dentary is a long slender bone, bearing a single regular series of high conical teeth; the outline of the angular and supra-angular are indistinct, the position of them can be recognized.

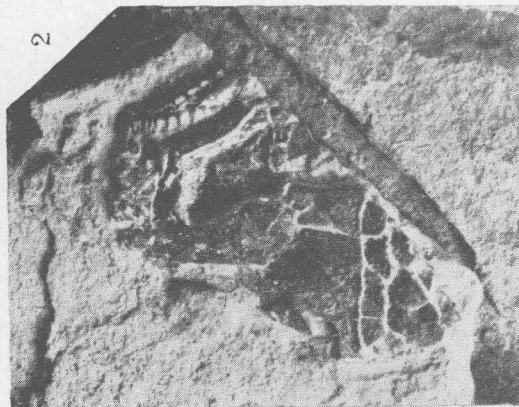
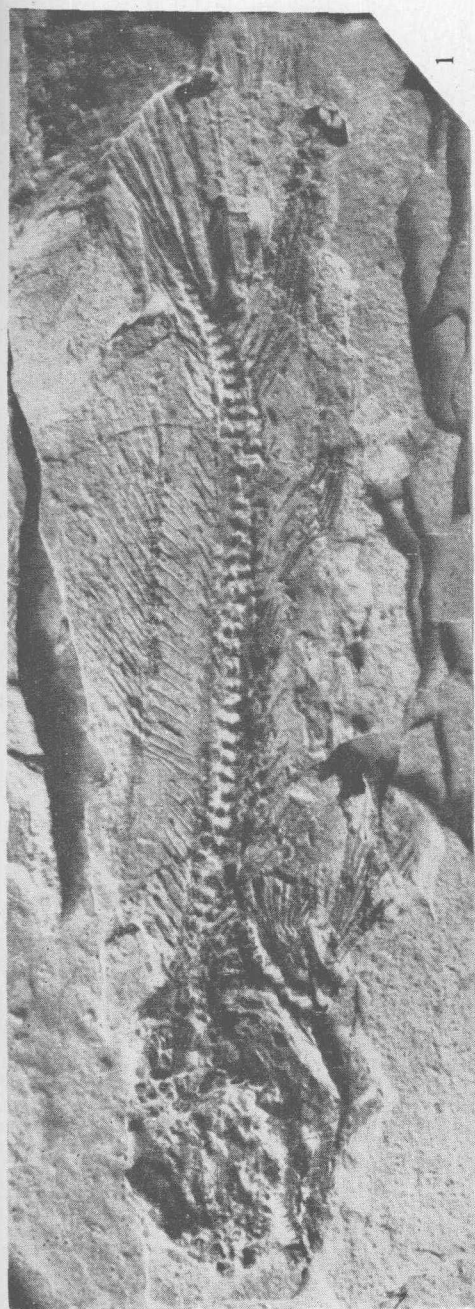
The preoperculum is a narrow arched bone, its surface is notched into several diamond shaped pieces by the opening of sensory canal. The operculum had been crushed, it is a large four-sided plate, and nearly as broad as deep. The suboperculum and interoperculum are so imperfectly preserved that no detailed description is worth given. The branchiostegal rays are narrow laminae, about 9 can be seen in the type specimen.

The vertebral centra are well ossified and all are marked by two or three lateral nicks. The vertebral centrum is longer than deep. The ribs are short and slightly curved. The neural arches in advance of the dorsal fin are robust; neural spines are short and with large proximal end. A series of rod-like supraneurals are closely in contact with the distal end of the neural spines respectively. In the caudal region the neural and haemal arches are symmetrical until the base of caudal fin, in which about 9 haemals predominate both in length and in stoutness.

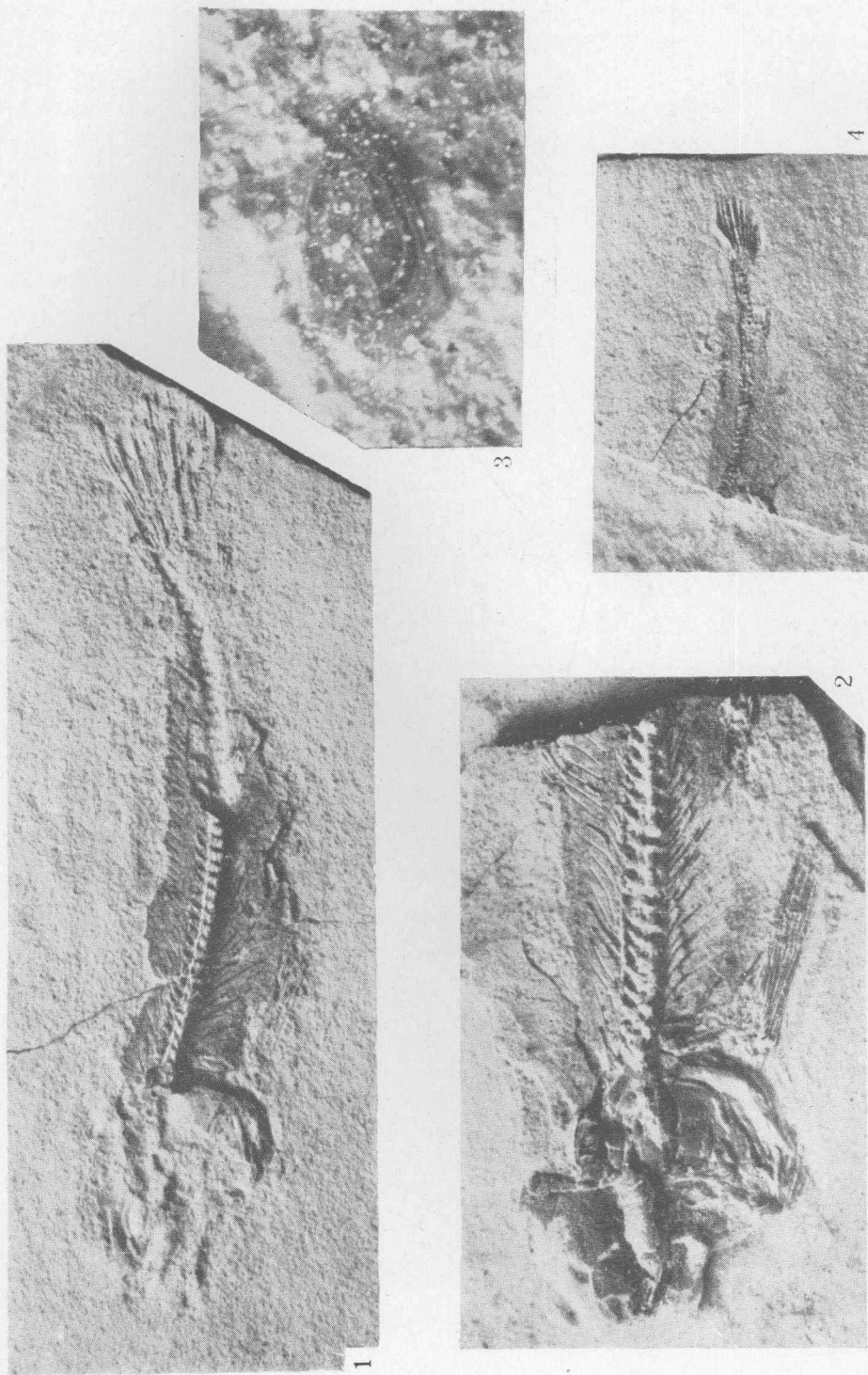
There are no fringing fulcra on the front margin of all the fins. The rays of them are closely articulated and divided distally. Pectoral fin is large, comprising about 11 rays, which extended nearly to the pelvic girdle. The pelvic fins are small than the pectorals, comprising about 7 rays. The dorsal fin is long-based, occupies nearly the half of the back, and with rather long rays. The anal fin is imperfectly preserved, and is short-based, comprises 7 rays. The caudal fin, especially well seen in the type specimen (Plate I, figs. 1, 3) is stout and unsymmetrically rounded as in *Amia*. In the caudal fin excepting the main ray, there is also a slender accessory ray, which is branched off from the base of the main, lying immediately beneath the main ray.

The scale is longer than deep, and sharpened at its free hinder border. The covered portion exhibits fine concentric lines of growth, the exposed portion is thickened with ganoine (Plate I, 3). This kind of scales exhibit about three rows along the vertebral axis distinctly. There is a long bone on the caudal base just continuing the upturned vertebral column, which produced distinctly into the upper caudal lobe. It seems to be a modified bone of the caudal base. A part of lateral line scales are preserved in type specimen, just above the vertebral axis and horizontally extending to the caudal base. Each of these scales is pierced by sensory canal at its hind portion perfectly.

**Remarks** This genus was satisfactorily defined by its diagnostic characters. Except these, there are some points indicating its relationship with primitive representatives of this kind of fishes.



1. 东方伊克昭弓鳍魚 (*Ikechaamiaia orientalis*, gen. et sp. nov.) 正型标本, 左侧視。×1.5, 标本登记号 V. 2519.1。  
2. 同上, 头骨的一部分, 表示頂骨、鰓骨及板骨 (*tabularia*) 的形状及位置关系。×2, 标本登记号 V. 2519.5。  
3. 同上, 尾鳍部分, 表示尾椎末端的特殊骨片、主鳍条和副鳍条的关系。×3, 标本登记号 V. 2519.1。



1. 东方伊克昭弓鳍魚 (*Ikechoamia orientalis*, gen. et sp. nov.), 另一个体, 头部及尾部均由印模代表。×2, 标本登记号 V. 2519.2。  
 2. 同上, 身体的前部, 显示鳃盖系統。×2, 标本登记号 V. 2519.3。  
 3. 同上, 鳞片。×22, 标本登记号 V. 2519.6。  
 4. 同上, 幼魚, 仅头部缺失。×2, 标本登记号 V. 2519.4。

The cranial roof bones closely resemble those of *Sinamia* both in number and in arrangement, but it differs from the latter in its body proportion, position of fins and shape of scales. The jaw-bones and opercular apparatus somewhat resemble to those of *Urocles*, but the vertebral centrum of the latter is smooth on its side. Though the vertebral centrum of *Amiopsis* is also impressed with pits, but some characters which are possessed by *Amiopsis* are decidedly distinguishable from our specimen, such as the base of dorsal fin occupying not more than one-third of the back and arising behind the beginning of pelvics and the scales almost oval in shape, etc. In all respects, our specimen represents a new form of Amiids, for which the name *Ikechaoamia orientalis*, gen. et sp. nov. is proposed, indicating the locality of the specimens discovered.

Based on the above diagnostic characters it seems to have a common ancestor with *Amiopsis* and probably evolved parallel with *Sinamia* from the same stock. Secondly, the scale shape of *Ikechaoamia* evidently represents a transitional type from ganoid to cycloid scales. It is the only Amiid hitherto known to have such kind of scales. This shows that the cycloid type of scale in Amiids is probably acquired from this evolutionary line.

With the knowledge at present it seems to indicate that the Amiids probably made their first appearance in Old-World, in other words, East Asia firstly, and then migrated to New Continent afterwards and persist till the present.