

浙江长兴新发现的中华旋齿鲨化石

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关键词 浙江长兴 晚二叠世 旋齿鲨类

内 容 提 要

本文记述了浙江长兴新发现的中华旋齿鲨化石, 并讨论了其齿列形态和分类问题。

最近南京乌龙潭公园周主任从浙江长兴农民手中收集到一系列牙齿化石, 保存化石的围岩为中厚层黑色沥青质亮晶灰岩, 由岩性可知, 新发现的牙齿化石产自当地上二叠统长兴组。化石标本经笔者仔细修理, 牙齿的左侧面完全暴露, 共保存 11 枚连续而比较完整的牙齿, 其形态特征与中华旋齿鲨相同。自从 1963 年刘宪亭和张弥曼根据从浙江长兴发现的旋齿鲨类的齿列碎块建立 *Sinohelicoprion changhsingensis* (长兴中华旋齿鲨) 之后, 张弥曼在 1976 年和雷奕振在 1983 年先后又描述了从西藏定日和湖南嘉禾发现的该属牙齿化石, 它们被分别描述为新种, 即 *S. qomulongma* 和 *S. macrodentus*。迄今在我国发现并描述的中华旋齿鲨已有三种, 但令人遗憾的是代表各种的化石材料均很破碎, 保存最好的标本也只有 5 枚连续而比较完整的牙齿。因此, 至今关于中华旋齿鲨的特征我们知道的还很少。这次从浙江长兴发现的中华旋齿鲨齿列保存有 11 枚连续而比较完整的牙齿, 比已知三种中华旋齿鲨的模式标本都好。它可以对中华旋齿鲨牙齿的前后形态变化和齿列形态特征做一些补充。

新发现的中华旋齿鲨齿列 (编号: 乌化 001)。具有 11 枚连续而比较完整的牙齿, 呈平缓的弧形, 长约 120 毫米。牙齿的基部 (base) 和齿轴 (shaft) 保存不甚完好。此段齿列中前部有个别牙齿较小, 因此从前到后牙齿的大小变化不十分规则。牙齿割切型, 侧面稍隆起。单个牙齿由切叶 (cutting blade), 侧部 (翼) (lateral part or wing) 和基部三部分组成。相邻牙齿之间无齿间隙 (interdental space)。齿冠切叶较长, 约占整个牙齿长度之半; 侧视三角形, 前、后缘刃状而有小齿; 小齿顶端平, 并且中间被一小沟分开。随前后牙齿的大小变化, 齿冠切叶的前、后缘长短也稍有不同, 其上小齿数也不完全相等, 每个切叶边缘的小齿数平均约为 18 个。齿冠侧部宽带状, 略向下前方伸延, 其前缘有大小不规则的锯齿; 相邻两牙齿侧部的前、后缘相互重叠。基部很短, 向下前方变尖并斜伸到前一牙齿的侧部之下。

现在描述的此段旋齿鲨齿列、其后部几枚牙齿的形态特征与 *Sinohelicoprion changhsingensis* 的模式标本基本相同, 它们之间的差别仅仅是原来的模式标本的牙齿稍大而已。就此而论, 笔者认为把现在描述的新发现的旋齿鲨齿列应当归入 *S. changhsinge-*

nsis 之中。它的牙齿前、后大小不十分规则的变化可作为 *Sinohelicoprion* 及其模式种 *S. changhsingensis* 鉴别特征的补充。若考虑到 *S. changhsingensis* 的模式标本和新发现的标本都不是在原层位上发现的,它们是同层,还是有上、下层的关系,目前尚不清楚;还有,现在描述的齿列其前后牙齿大小变化的特征无法与 *S. changhsingensis*, *S. gomulongma* 和 *S. macrodentus* 三种的模式标本相比较;这样来看,现在描述的齿列标本也不是没有代表 *Sinohelicoprion* 另一新种的可能。不过,在目前已知化石材料甚少的情况下,新发现的齿列标本又与 *S. changhsingensis* 产自同一地点,同一组地层,把它归入 *S. changhsingensis* 之中比另立新种为好。

刘宪亭和张弥曼 1963 年建立 *Sinohelicoprion changhsingensis* 时,比较详细地讨论了长兴中华旋齿鲨与世界已知旋齿鲨种类的关系,并且指出其牙齿的割切型,齿冠切叶前、后缘的小齿特征与巴基斯坦盐岭地区二叠系地层中发现的 *Helicampodus kokeni* 最为相近。现在描述的内兴中华旋齿鲨新材料和雷奕振 1983 年描述的湖南嘉禾大致同时的中华旋齿鲨化石均有与 *Helicampodus kokeni* 牙齿基部变尖的相似特征。这进一步表明 *Sinohelicoprion* 与 *Helicampodus* 有十分密切的亲缘关系,而与牙齿基部很长和螺旋形齿卷的 *Helicoprion* 的亲缘关系较远。在指出 *Sinohelicoprion* 与 *H. kokeni* 有许多相似性的同时,刘宪亭和张弥曼也指出 *Sinohelicoprion* 牙齿切叶表面光滑,没有磨蚀和侧部宽短的特征明显地不同于 *Helicampodus kokeni*。现在还可以补充的是 *Sinohelicoprion* 齿冠切叶相对很高,即切叶的高度远大于宽度,而 *Helicampodus kokeni* 齿冠切叶相对低矮,其高度和宽度相等,这也是两者之间的明显差别。中国三个地区发现的中华旋齿鲨牙齿的内部构造已经张弥曼等研究得相当详细,而 *Helicampodus* 则缺少这方面的研究。若从 *S. changhsingensis* 和 *H. kokeni* 的牙齿表面形态的某些相似性来看,它们似可简单地被处理为同一个属。事实上,已知的旋齿鲨属种大部分都是根据不完整的齿列和零散牙齿特征而建立的,很难复原它们确实的位置关系,对它们的牙齿上、下、前、后的形态变化也了解的很少。在这种情况下,充分揭示各地标本的特征,详加区分,比粗略地把它们合并在一起为好。

关于 *Sinohelicoprion changhsingensis* 的齿列形态,建立这一新属新种时只有少数几枚牙齿的一小段齿列,刘宪亭和张弥曼推测它的完整齿列很可能是螺旋形的。从现在新发现的这段保存有 11 枚连续牙齿的齿列来看,它长约 120 毫米,弧度平缓,前、后牙齿的大小变化不甚规则,无齿间隙以及牙齿基部很短等特征都与 *Helicoprion* 典型螺旋形的齿卷明显不同,而很大的可能是弧形的。

在旋齿鲨类的研究中尚有一些基本的问题不很清楚,因此在描述和分类方面的意见也很不一致。上个世纪末,Карпинский (1899) 关于此类化石的研究成果堪称为一个里程碑。在分类方面,他将旋齿鲨类划为一个科 Edestidae, 其后的研究者都遵从他的意见; 1911 年他又从 Edestidae 科中分出 Helicoprionidae 科,这个意见并未得到后来研究者的普遍认同。1981 年佐杰尔 (Zangerl) 在他的古鱼类学教科书中关于旋齿鲨类提出了新的分类方案: 即在 Edestidea 超科之下根据牙齿基部向前, 还是向后伸延分为 Agassizodontidae 和 Edestidae 两科,前一科为佐杰尔所新建。同时他重新解释了与 *Sinohelicoprion* 牙齿形态十分相近的 *Helicampodus kokeni* 模式标本的定向,认为

H. kokeni 牙齿基部不是向前,而可能是向后伸延的,其理由的该模式标本四枚牙齿最右边的一枚切叶表面没有磨蚀的小面,而且也比左边的三枚牙齿大。从我们现在所描述的 *Sinohelicoprion changhsingensis* 新材料来看,其齿列的牙齿前、后的大小变化是不甚规则的。从整个齿列来看,牙齿向其基部伸延的方向总趋势是逐渐变小的,依佐杰尔的解释,此齿列的牙齿基部应是向前伸延的。按这一定向将此段齿列的牙齿从前向后数第三至第五枚牙齿分离开来,依佐杰尔的解释,这局部几枚牙齿的基部又应是向后伸延的。这表明在旋齿鲨齿列的牙齿前、后变化不规则,保存又不完整的情况下,佐杰尔的定向和分类还是有问题的。在目前旋齿鲨类的化石材料均很不完整;分支系统关系不清楚的情况下,分科的证据尚不充分。所以在这篇文章中我们还是采用原来把旋齿鲨类划为一个科 Edestidae 的分类意见。

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NEW MATERIAL OF *SINOHELICOPRION* FROM CHANGXING, ZHEJIANG PROVINCE

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Key words Changxing, Zhejiang; Late Permian; Helicoprionid

Summary

Ever since Liu and Chang in 1963 erected the new genus and species, *Sinohe-*

licoprion changhsingensis, on the basis of a few teeth discovered from the Late Permian Changxing (=former Changhsing) Formation of Changxing, Zhejiang Province, the teeth fossils of this genus were also found in Dingri of Xizang and in Jiahe of Hunan in China. They were respectively described as new species. To date three species were already referred to *Sinohelicoprion*, but it is a pity that their holotypes are all very fragmentary, the best one is only a row of five teeth. Therefore we know very little about its dentition character. Recently a new specimen of *Sinohelicoprion* was found from the same locality as the holotype of *S. changhsingensis*. It is much to be regretted that this specimen was not found *in situ*. Though that is the case, judging from the rock that preserved the fossil, it is safe to say that it occurs from the same stratigraphic horizon as the holotype of *S. changhsingensis*, that is the Changxing Formation. This new discovery is very significant, because it is the best preserved specimen of *Sinohelicoprion* ever known and may complement some new characters to the generic diagnosis.

The new material described in this paper is a row of continual 11 teeth and gently arciform, its length measures about 120mm. The variations in size of the teeth are somewhat irregular from end to end. A tooth may be regarded as consisting of three parts: a cutting blade, a lateral part (wing) and a base. There is no interdental space between adjacent teeth. The cutting blade is triangular in lateral view, it forms about half of the total length of the tooth. There are many denticles on its anterior and posterior edges, which are 18 averagely in number on each side. The tops of the denticles are flat and each was separated medially by a small groove. The lateral part is wide belt-shaped and extends slightly forwards and downwards, its anterior edge is irregularly serrated, and overlaps one another with the posterior edge of the lateral part of front teeth. The base very short and tapers, it inclines apparently forwards and extends under below the lateral part of the front tooth.

When establishing their new genus and species, *Sinohelicoprion changhsingensis*, Liu and Chang in 1963 discussed carefully the relationship of *Sinohelicoprion* to already known genera of edestid group and showed that it is similar to *Helicampodus kokeni* from the Chideru beds of Salt Range in Pakistan in having a teeth of cutting-type and many flat-topped denticles on anterior and posterior edges of the cutting blade. That the bases of teeth taper on the present specimen also indicate that the affinities of *Sinohelicoprion* to *Helicampodus kokeni* are very close. Meanwhile Liu and Chang also showed that *Sinohelicoprion* differs from *Helicampodus* in having the smooth cutting blade, wide lateral part and lacking abrasion surface. Now we may yet show that the cutting blade of *Sinohelicoprion* is higher than that of *Helicampodus kokeni*. As already mentioned above, though *Sinohelicoprion* bears some resemblances to *Helicampodus kokeni*, the difference between them also is very remarkable. That Liu and Chang in 1963 separately erected new genus and species, *Sinohelicoprion changhsingensis*, for the helicoprionid specimen found from Changxing of Zhejiang is very necessary.

The posteriorly several teeth of this helicoprionid specimen described above agree more closely with the holotype of *S. changhsingensis* in morphological character, the difference between them only is that the latter is larger than the former.

At the present moment, the creation of a new species for the present specimen is thought to be unwarranted. Therefore it was here referred to *Sinohelicoprion changhsingensis*.

With regard to the dentition morphology of *Sinohelicoprion*, Liu and Chang in 1963 once conjectured on the basis of the curve of a few teeth that it is very probably spiral. From the present described specimen it will be seen that the tooth whorl of *Sinohelicoprion changhsingensis* is not as spiral as that of *Helicoprion*, and it is very probably arciform.

Concerning the subdivision of edestid group into several families, there are various opinions at present. Zangerl in 1981 subdivided it into two families, namely Agassizodontidae and Edestidae, based mainly on the directions that the bases of symphyseal teeth point forward or backward. From the new helicoprionid specimen described in this paper, that Zangerl gave the classification of edestid group and the orientation to the type specimen of *Helicampodus kokeni* require yet to make a thorough and careful study. Under the circumstances that the fossil materials and kinds of edestid group all are very little and their morphological characters all are not very clear, the conditions which subdivide it into various families are not mature yet. Therefore we use in the present paper the family name of Edestidae in its original wide sense.

图版说明 (Explanations of plate)

图 版 I (Plate I)

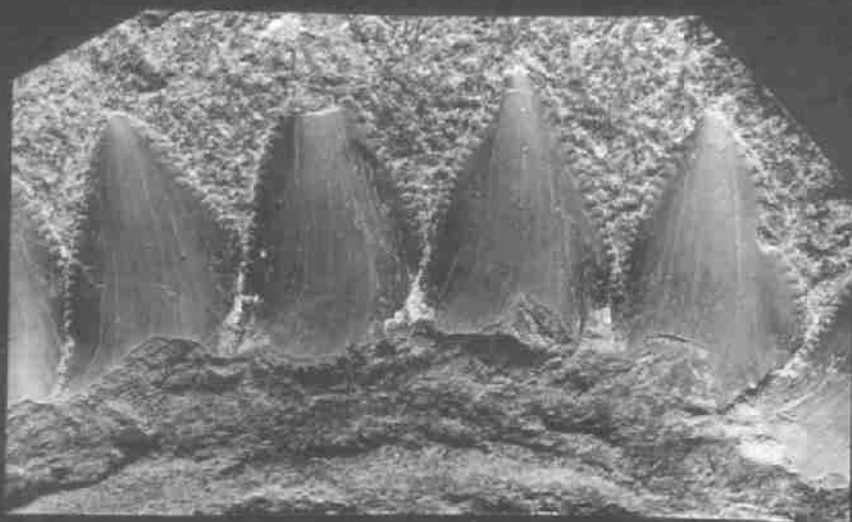
图 1 (Fig. 1) *Sinohelicoprion changhsingensis* Liu et Chang 一段齿列 (a part of dentition), 左侧视 (left lateral view), 1.

图 1a 和图 1b (Fig. 1a and Fig. 1b) 为图 1 的局部放大 (Partial enlargement of Fig.1), 分别 $\times 2$, $\times 3$ (respectively $\times 2, \times 3$).

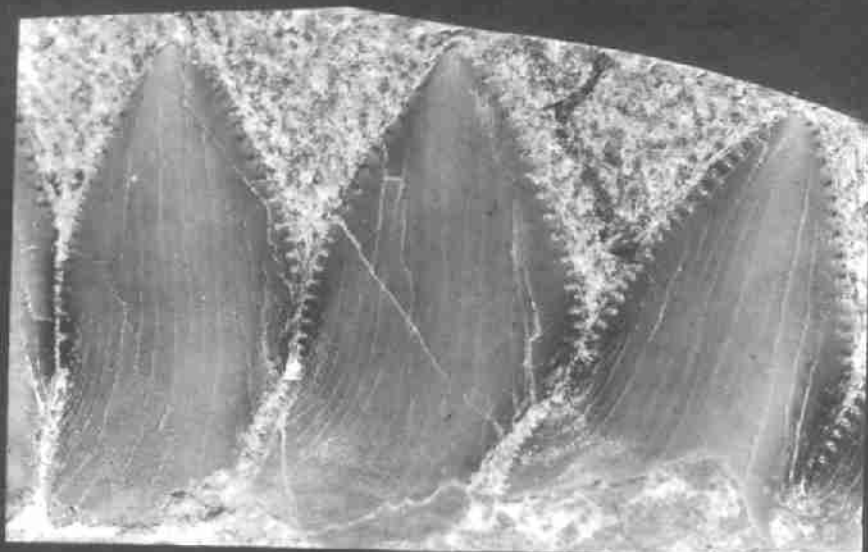
(标本保存在南京乌龙潭公园龟鳖自然博物馆)



1



1a



1b