A NEW SPECIES OF PALEOCENE CHIMAEROID FROM CALIFORNIA

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ABSTRACT: A new species of Chimaeroid from the Paleocene of California is described which is the first New World record for the genus *Ischyodus*. The relationships of the present new species within the genus *Ischyodus* is discussed.

The ratfishes of Chimaeroids are elasmobranch fishes known from the Devonian to the Recent. The suborder Chimaeroidei is known from the Jurassic. The oldest member being *Ischyodus aalensis* Reuss 1887. In these fishes the jaw elements are frequently preserved and are of taxonomic importance. The genus *Ischyodus* is extinct.

CLASS: HOLOCEPHALI

Order: Chimaeriformes

Suborder: Chimaeroidei

Family: Edaphodontiae Owen, 1845

Genus *Ischyodus* Egerton, 1843

***Ischyodus zinsmeisteri*, new species**

Holotype: LACM 37206, a lower right mandible, (Figs. 1, 2).

Horizon and Locality: The locality where the specimen was collected is LACM Loc. number 3216, a dark rusty brown concretion in a limestone at lat. 34°14′58″ N, and long. 118°42′52″ W, T2N R18W, elevation 1200 to 1225 feet above sea level on a ridge between Meier and Runkle Canyons, Calabasas Quadrangle 1942, 7.5 minute series scale 1:24,000 Simi Hills, Ventura Co, California. The collector was William Zinsmeister. The rocks are mapped as being marine and of Paleocene age (Jennings and Strand, 1969).

Diagnosis: A mandible with an elongate and pointed beak. The symphyseal tritor is placed near the base of the jaw and is the smallest tritor.

Description: The type (Fig. 2) is characterized by a long, straight beak which is inclined at an angle of approximately 45° from the vertical. Below and behind the beak are two well defined ridges which are directed anteriorly in the same manner as the beak. The ridges end in a raised cutting edge (Fig. 2B). The lateral side of the mandible (Fig. 2A) is flat except where the anterior one-half of the beak curves toward the symphysis. The inner side of the beak possesses a thick ridge that originates just below the lip and runs to the base of the tooth (Fig. 2B). The cutting edge of the tooth (Fig. 2A) shows a high beak followed by two rounded protuberances formed at the top of the two ridges (Fig. 2B). Tritors are columns of calcified hard tissue which are less subject to normal wear than the surrounding soft calcified tissue of the jaw plate. They are visibly distinct and represent important taxonomic entities. There are five tritors (Fig. 2B): 1), a beak tritor, shown in detail in (Fig. 2D); 2), a symphyseal tritor; 3), an anterior dorsal tritor; 4), a posterior dorsal tritor and 5), a median tritor. The last four are seen in (Fig. 2B). The beak tritor consists of a tritoral

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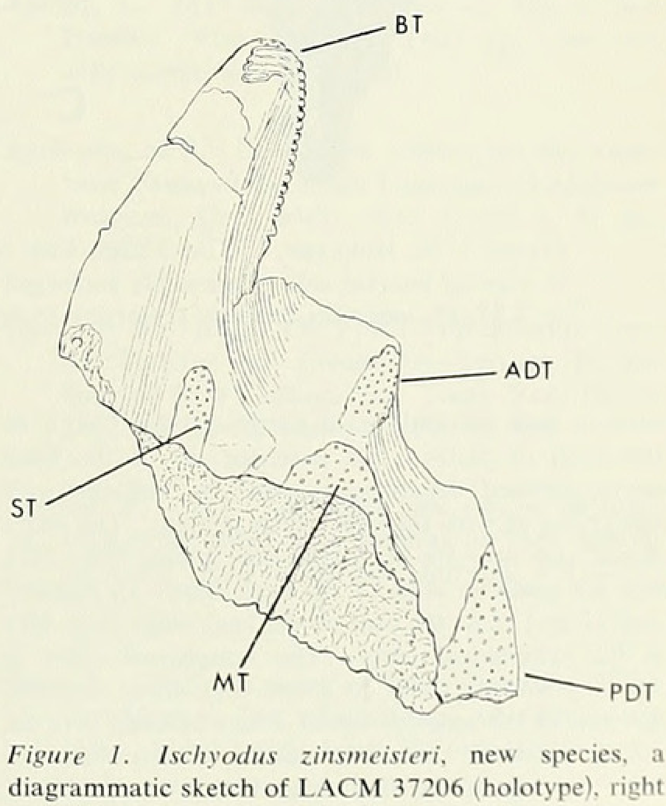

Figure 1. Ischyodus zinsmeisteri, new species, a diagrammatic sketch of LACM 37206 (holotype), right mandible enlarged × 3.6: bt. beak tritor; st. symphyseal tritor; adt. anterior dorsal tritor; pdt. posterior dorsal tritor; mt. median tritor.

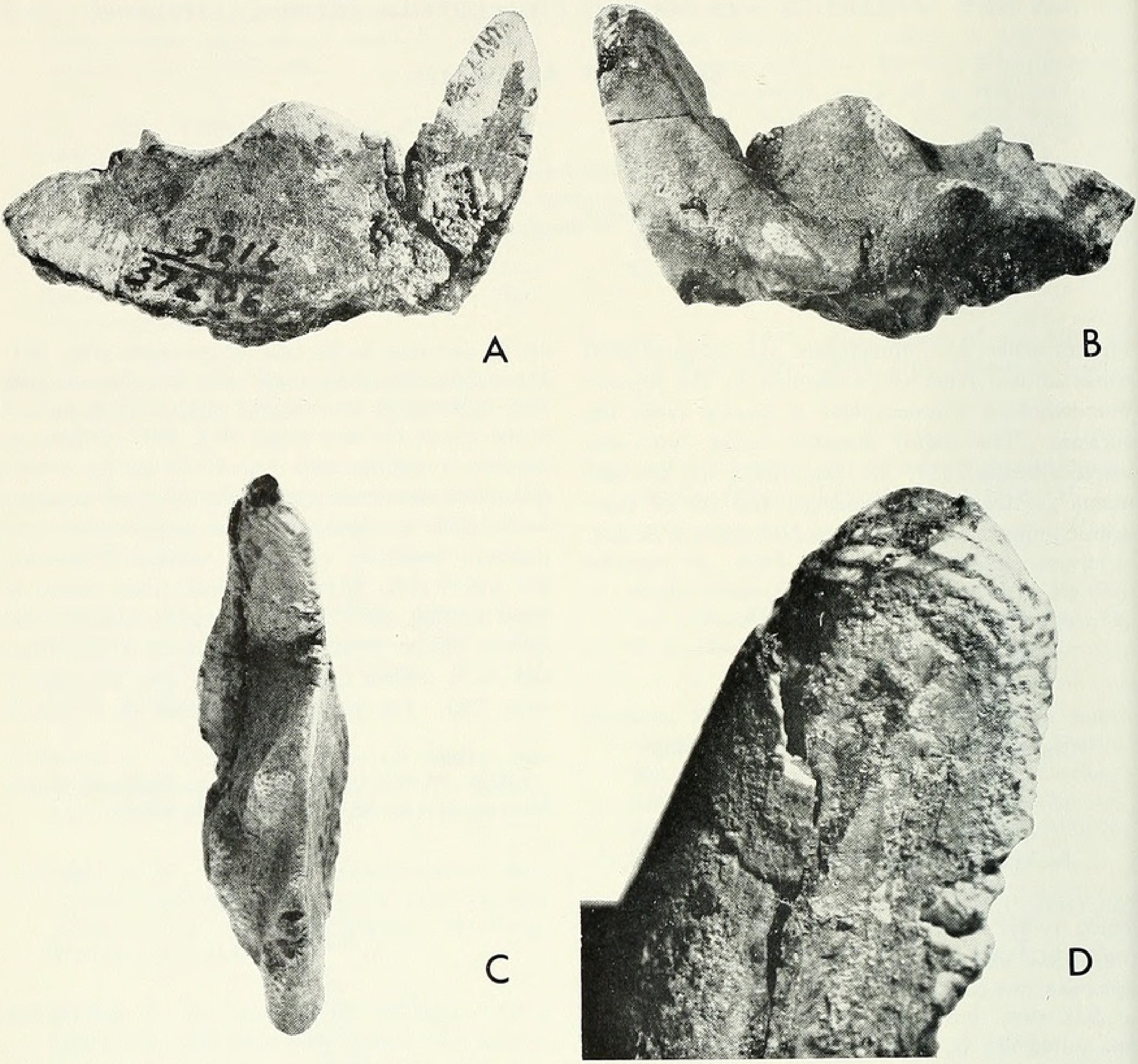

Figure 2. A, Holotype, LACM 37206, view of lateral surface of mandible (enlarged × 2.5); B, view of internal side of mandible (enlarged × 2.5); C, superior view of mandible (enlarged × 2.5); D, inner tip of beak (enlarged × 9.2).

column with pteromic hard tissue (Orvig, 1967), in the form of plates. The posterior tip of the beak shows exposed canals surrounded by radiating calcifications as with the other tritoral areas. The inner dorsal side near the tip shows four plates (Fig. 2D) and the posterior edge of the beak shows 15 platelets seal (Fig. 1). At the base of the beak ridge (Fig. 2B) is the symphyseal tritor. The symphyseal tritor is roughly elongate oval in shape and about one-half the size of the anterior dorsal tritor; as such, it is the smallest tritoral area. The anterior dorsal tritor lies near the top of the first ridge below the border of the cutting edge. The cutting edge of the first ridge in front of this tritor does, however, seem to be composed of a hard tissue. The anterior tritor is elongate oval and rests atop the upper portion of the first ridge as mentioned. The posterior dorsal tritor is incomplete, but rests on the posterior side of the second ridge and occupies one-half of the cutting edge. The median tritor lies at the base of the first ridge posterior to the anterior dorsal tritor and below the posterior dorsal tritor. The median tritor is incomplete yet it is the largest tritoral area.

Measurements in (mm): Total length, 32.1; height, 22.1; thickness, 9.0; height of beak, 11.0. Symphyseal tritor, length, 4.0; width, 2.0. Anterior dorsal tritor, length, 6.0; width, 2.0. Posterior dorsal tritor (incomplete), length (greatest), 10.0+; width (greatest), 4.0. Median tritor (incomplete), length, 8.0+; width, 5.0+.

DISCUSSION

The present fossil mandible is referable to the ratfish genus *Ischyodus*. Several conflicting systems have been used for naming tritors in this genus. More recent among the workers suggested systems are Woodward (1911), Gurr (1962), and Radwanski (1968). Woodward (1911) refers to a beak tritor which is the apical dentine of Gurr (1962). The symphyseal tritor of Leriche (1902) and Radwanski (1968) is the internal anterior tritor of Gurr (1962). The internal posterior tritor of Gurr is the median tritor of Woodward (1891) and Radwanski (1968). The median tritor of Gurr (1962) does not occur in studies by either Woodward (1891) or Radwanski (1968), therefore, this tritor should be given a different name, perhaps intermediate tritor would be appropriate. The external anterior tritor and the external posterior tritor have similar usage by all of the above authors so they present no real problem. I have followed the terminology of Woodward (1891), Leriche (1902), and Radwanski (1968).

The genus *Ischyodus* was erected by Egerton (1843). It ranges from the Jurassic to the Eocene. *Ischyodus* differs from the related genus *Edaphodon* in that there is a hard layer on the outer aspect immediately below the oral margin (Woodward, 1891). The symphyseal facet is narrow. There is a beak tritor, a median tritor which is undivided and two external tritors. Woodward does not mention a symphyseal tritor and Applegate (1970) is in error in stating that this genus has only four tritoral areas since *I. thurmanni*, Pictet and Campeche, 1858, has at least five and *I. dolloi*, Leriche, 1902 has, according to Gurr (1962) six tritors. The large size of the upper part of the beak, the small size and low placement of the symphyseal tritor separate *Ischyodus zinsmeisteri* from any of the closely related Tertiary or Cretaceous species. It is closest to *Ischyodus dolloi*, whose lower jaw was described by Gurr (1962).

This specimen is the first member of the genus to be described from the New World; only two other Tertiary species being known. *Ischyodus thurmanni* is a species that bridges the Cretaceous-Tertiary gap, being known from the Cretaceous of Europe and the Paleocene of New Zealand. *Ischyodus dolloi* is known from the Paleocene of Belgium and the lower Eocene of England.

Ischyodus zinsmeisteri was etched from a limestone which contains an important, but as yet, undescribed Paleocene shark fauna. Tentative identifications of this fauna suggests that it has shark species known from North Africa and Europe. Stratigraphic studies in progress will hopefully place the beds from which *Ischyodus zinsmeisteri* was collected more precisely in the Paleocene.

Mr. Zinsmeisteri states in a letter (14 May 1973) that the *Ischyodus* specimen was collected from a small, dark rusty-brown concretion. Associated with *Ischyodus* were several species of mollusks, *Retipirula crassitesta* and *Amauropsis martinezensis*. The locality is 428 feet above the contact between the Martinez marine member and the underlying Simi conglomerate. To be more specific, Zinsmeister says this is what he calls the lower concretionary horizon of the Martinez marine member.

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PREDATION ON THE ISOPOD CRUSTACEAN *PORCELLIO SCABER* BY THE THERIDIID SPIDER *STEATODA GROSSA*

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ABSTRACT: A population of the theridiid spider *Steatoda grossa* in Pacific Grove, California was studied to observe its predatory behavior towards the terrestrial isopod *Porcellio scaber* and subsidiary prey items. The isopod and spider are both found to be nocturnally active. The carcasses of consumed prey are cut from the spider's web to collect in a debris pile which can be examined for an indication of long term dietary consumption. The isopod, though rejected as prey by most spiders because of repugnant tegumental glands, composes 84 percent of the diet of this spider as determined by web analysis. The spider from laboratory experiments was found to average 5.0 days between meals but able to tolerate periods of three weeks or more without feeding.

Cloudsley-Thompson (1958), reported birds, reptiles, amphibia, and many other insectivorous animals including spiders, harvestmen, mites and centipedes as predators of terrestrial isopods. For central Californian woodlice, Miller (1938) listed as vertebrate predators "at least two species of salamanders, several species of reptiles, birds, and insectivores; among the invertebrates, the black widow spider (*Latrodectus mactans*) and various species of centipedes." Gorvett (1956) has stressed the importance of the tegumental glands as defense mechanisms in isopods; these organs only occur in terrestrial species and the fact that their secretions are distasteful to many spiders suggests that spider predation has provided the strongest selective pressure for their evolution. Spiders thus appear to be at least potentially the major predators on woodlice, yet detailed studies of spider predation on isopod populations are almost non-existent.

Porcellio scaber Latreille, 1804 is the terrestrial isopod which shows the greatest development of the tegumental glands (Gorvett, 1951). This species is a member of the cryptozoan community, a term coined by Dendry (1895) to describe the assemblage of small terrestrial animals found dwelling in darkness beneath stones, rotten logs, bark of trees, and other similar situations. Though cosmopolitan in distribution, and one of the commonest isopods in the United States, little study

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