

Ranzania ogaii, a New Miocene Slender Mola from Saitama, Japan (Pisces: Tetraodontiformes)

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Abstract A fossil slender mola from the Middle Miocene Hiranita Formation, Chichibumachi Group, Saitama Prefecture, Japan is described as a new species *Ranzania ogaii* in the family Molidae (Tetraodontiformes). This new species is characterized by having closely attached, long neural spines in the caudal vertebrae and unique scale plates that have a single prominent tubercle at the center of each regularly-shaped, polygonal scale plate in the middle of the body.

Introduction

Marine deposits of the Miocene age in the Chichibu Basin, central Japan, have yielded various vertebrate fossils including numerous shark teeth and a teleostean scombrid fish *Scomberomorus* sp. (UYENO *et al.*, 1983; UYENO & SAKAMOTO, 1984, 1985).

In the present study, we examined a fossil fish attributable to the Molidae of the Tetraodontiformes discovered by Mr. Kiyohiko OGAI in the bed of the left bank of the Arakawa River about 500 m above the Yanagi-Ohashi Bridge in Ochiai, Chichibu City, Saitama Prefecture, Japan (Fig. 1). The specimen was collected from the Middle Miocene Hiranita Formation of the Chichibumachi Group (ARAI, 1960).

After comparison with species of the Molidae, fossil and extant, we have concluded that this Miocene species is distinct from living and other fossil species of the genus *Ranzania* in its characteristic body scale plates.

Systematic Paleontology

Class Osteichthyes

Order Tetraodontiformes

Family Molidae RANZANI, 1839

Genus *Ranzania* NARDO, 1840

Ranzania ogaii sp. nov.

(New Japanese name: Chichibu-kusabi-fugu)

Holotype: National Science Museum catalogue number NSM PV-17186. Es-

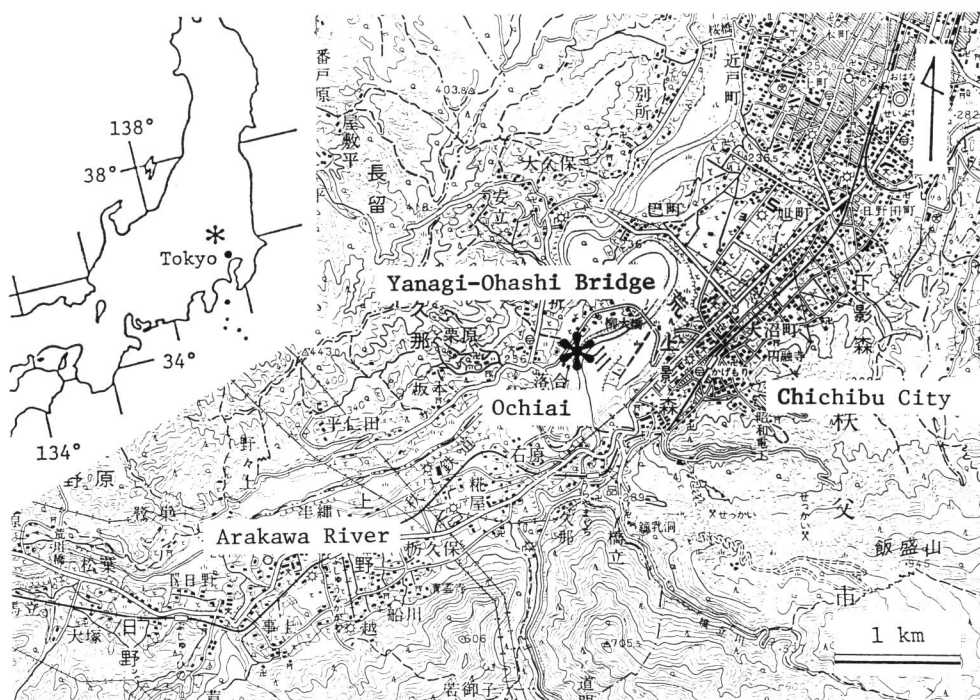


Fig. 1. Map showing the fossil locality of a new Miocene slender mola *Ranzania ogaii* sp. nov. (from 1:25,000 map of "Chichibu," published by the Geographical Survey Institute of Japan).

timated total length (TL) is about 200 mm (Fig. 2; Pls. 1–3).

Etymology: Named after Mr. Kiyohiko OGAI who is an enthusiastic fossil collector and donated the present fossil specimen.

Diagnosis: A species of *Ranzania* covered with regularly-shaped polygonal scale plates having a single prominent tubercle centrally.

Description: The specimen is incomplete and lacks its cranium and caudal fin regions. It consists of a few elements of the head and shoulder girdle, vertebrae, proximal pterygiophores of the dorsal and anal fins, and scale plates.

At the anteriormost part of the fossil, an unidentifiable element of the head is preserved. In the opercular region, only the opercle is well preserved. Of the shoulder girdle, an incomplete cleithrum is observable. An unidentified bone is located at the anterior portion of the cleithrum (Pl. 2).

Eight long and slender proximal pterygiophores of the dorsal fin are countable (the total number cannot be estimated). They are close together with their adjacent neural spines of the vertebrae. The proximal pterygiophores of the anal fin are elongate and slender, and eight are counted. They are articulated with the sets of two haemal spines of the caudal vertebrae. The first proximal pterygiophore is tightly articulated

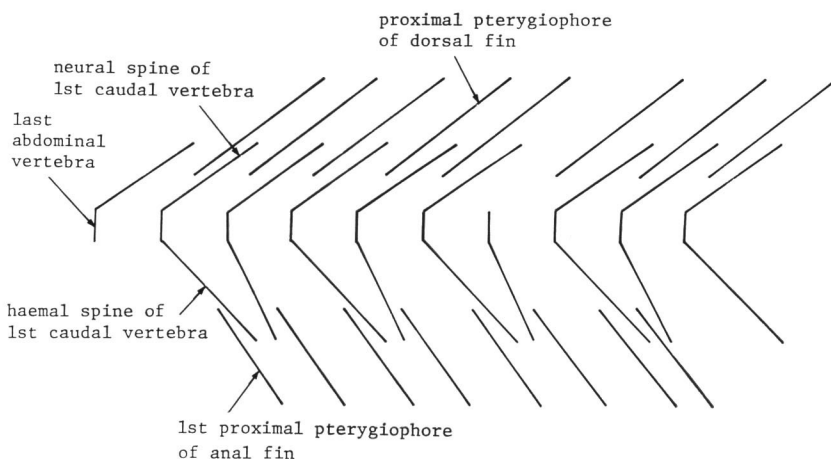


Fig. 2. Diagram showing the relationships between the proximal pterygiophores of the dorsal and anal fins and the neural and haemal spines of the vertebrae in *Ranzania ogaii* sp. nov., holotype, NSM PV-17186.

with the anterior margin of the haemal spine of the first caudal vertebra. The more anterior they are, the more tightly articulated with each other.

In the abdominal region, only the last abdominal vertebra with a long and slender neural spine remained. Anterior to this vertebra, an unidentified slender bone is preserved. In the caudal region, nine incomplete caudal vertebrae are observed (the total cannot be estimated). They possess slender neural and haemal spines. The neural and haemal spines and the proximal pterygiophores are obliquely (posterodorsally and posteroventrally) placed. The successive sets of two haemal spines are decidedly oriented toward one another (Fig. 2; Pl. 2).

Scale plates are sporadically observed, but rather well preserved in the middle of the body. They are regularly-shaped polygons, each with a prominent tubercle centrally (Pl. 3).

Discussion

On the basis of reported works by FRASER-BRUNNER (1951), TYLER (1980) and WEEMS (1985), the present species is positively identified as a member of *Ranzania* of the family Molidae by possession of the following characters: the body is covered with polygonal scale plates, the neural and haemal spines and the pterygiophores are long, slender and obliquely inclined, the successive sets of two haemal spines of the caudal vertebrae are decidedly oriented toward each other, and the first proximal pterygiophore of the anal fin articulates along the anterior margin of the haemal spine of the first caudal vertebra.

In *Ranzania*, three species are known from the Middle Miocene to Holocene

(WEEMS, 1985): *R. laevis* (PENNANT, 1776) (living) (Pl. 4), *R. grahami* WEEMS, 1985 (lower Middle Miocene), and *R. tenneyorum* WEEMS, 1985 (lower Middle Miocene). The Recent species has been recorded from all warm seas (FRASER-BRUNNER, 1951), and the others were reported from the eastern United States (WEEMS, 1985).

In the shape of the scale plate in the middle of the body, the present species is more similar to *R. laevis* than to *R. grahami*: regularly-shaped polygonal in the former two species (Pl. 3) vs. very irregularly-shaped polygonal in the latter (WEEMS, 1985). It is distinguishable from specimens of *R. laevis* larger than 200 mm TL in the tubercle of each scale plate: a single prominent tubercle vs. very short tubercle or almost none in the latter (Pl. 3). However, in young specimens of *R. laevis* (90 mm TL in FRASER-BRUNNER, 1951; 40–62 mm TL, 5 specimens, examined in the present study), each scale plate exhibits a prominent tubercle(s) centrally.

R. tenneyorum could not be compared, because it is known from only the premaxillaries (WEEMS, 1985), and this specimen is missing them.

The present fossil is attributed as a new species of *Ranzania*, based mainly on the scale plates available for discrimination in the present study.

Comparative material: *Ranzania laevis*, NSMT-P 23019, 247 mm TL, Miyakejima Is., Japan, 1976.9.26; NSMT-P 35121, 5 specimens, 40–62 mm TL, stomach content of *Katsuwonus pelamis*, north of Mariana Is., 1975.5.28; NSM PV dried specimen no. 551, 518 mm TL, 17°46'S, 156°11'W, 1978.6.15; ZUMT (Department of Zoology, University Museum, University of Tokyo) 23033, 194 mm TL, off Tanabe, Wakayama Pref., Japan, 1930.8.7.

Acknowledgments

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Explanation of Plates

Plate 1. The holotype of *Ranzania ogaii* sp. nov. (NSM PV-17186), from Middle Miocene Hiranita Formation, Saitama Prefecture, Japan. Estimated about 200 mm TL.

Plate 2. Anterior and posterior parts of *Ranzania ogaii* sp. nov., holotype, NSM PV-17186. Scales indicate 10 mm.

Plate 3. Scale plates in the middle of the body in *Ranzania*. A and B, *Ranzania ogaii* sp. nov., holotype, NSM PV-17186; C, *R. laevis* from TYLER (1980, p. 390, fig. 325, 493 mm in standard length, greatest length of largest scale plate 6.0 mm). Scale in A indicates 5 mm.

Plate 4. X-rayed photograph of the vertebrae and their adjacent bones of *Ranzania laevis*, NSM PV dried specimen no. 551, 518 mm TL. Some posterior abdominal vertebrae are fused to one another and deformed, and the posterodorsal corner of the dorsal fin base is cut off arbitrarily in this photograph.



