

Platichthys miostellatus, A New Miocene Righteye Flounder from Yaita City, Tochigi Prefecture, Japan

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Abstract A righteye flounder fossil without anterior region of the head was found in the Middle Miocene Tamada Formation, Yaita City, Tochigi Prefecture, Japan. It is described as *Platichthys miostellatus* sp. nov. in the family Pleuronectidae on the basis of characters such as the presence of small bony tubercles along the bases of the dorsal and anal fins throughout almost entirely their lengths, and having 27 caudal vertebrae.

Introduction

A righteye flounder fossil lacking the anterior part of the head was found at Yaita City, Tochigi Prefecture, central Honshu, Japan.

The fossil was discovered in a rock belonging to the Tamada Formation, Shioya Group, in the Middle Miocene. It was found to be a new species of the genus *Platichthys* in the family Pleuronectidae of the order Pleuronectiformes: traces of small bony tubercles are observed along the bases of the dorsal and anal fins throughout almost entirely their lengths, and possesses 27 caudal vertebrae.

In the present paper, the fossil is described in detail and compared with Recent congeners.

Locality

The specimen was collected by Mr. Masao USUI on the grounds of the Kumano Shrine, Takashio, Yaita City, Tochigi Prefecture, central Honshu, Japan (Fig. 1). It was discovered in the rock matrix belonging to the Tamada Formation, Shioya Group, in the Middle Miocene (UCHIO, 1950; SUZUKI, 1959).

Systematic Paleontology

Class Osteichthyes
Order Pleuronectiformes
Suborder Pleuronectoidei
Family Pleuronectidae
Subfamily Pleuronectinae

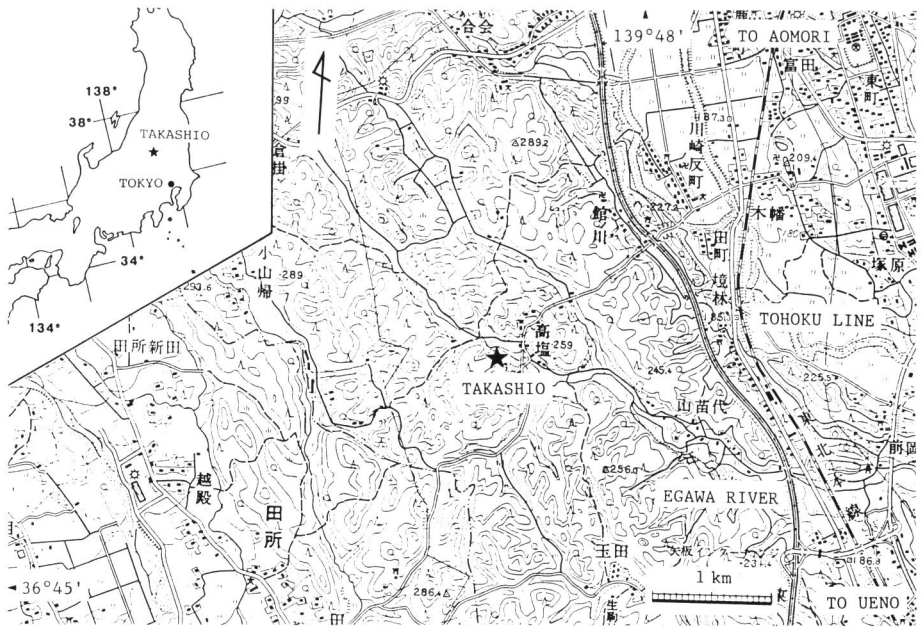


Fig. 1. A map of the locality yielded a new Miocene righteye flounder, *Platichthys miostellatus* sp. nov.

Genus *Platichthys* Girard, 1854

Platichthys miostellatus sp. nov.

(Figs. 2 and 3)

Holotype: Tochigi Prefectural Museum catalogue number TPM 3258.

Diagnosis: A *Platichthys* species possessing 27 caudal vertebrae.

Description: The specimen is incomplete and lacks anterior part of the head.

The head region is incomplete. Only a part of the opercular and suspensorial elements is observable. Several fragments of 5 branchiostegal rays are observed.

The dorsal fin rays remain only between 2nd and 22nd caudal vertebrae and counted as 36 (the total cannot be estimated). The proximal pterygiophores are countable excepting anterior and posterior part of the body, and are 42 in number (the total is not estimated). Two proximal pterygiophores are usually located between each of the adjacent neural spines. The traces of small bony tubercles are observed along the bases of the fin rays throughout almost entirely (observable) its length (Figs. 2 and 3).

The anal fin rays are observable excepting their anterior- and posteriormost ones, and counted as 47 (the total is estimated at about 51). The proximal pterygiophore is counted as about 51 and usually two are located between two adjacent haemal spines, the approximately 7 anterior ones excepted. The anteriormost one, the

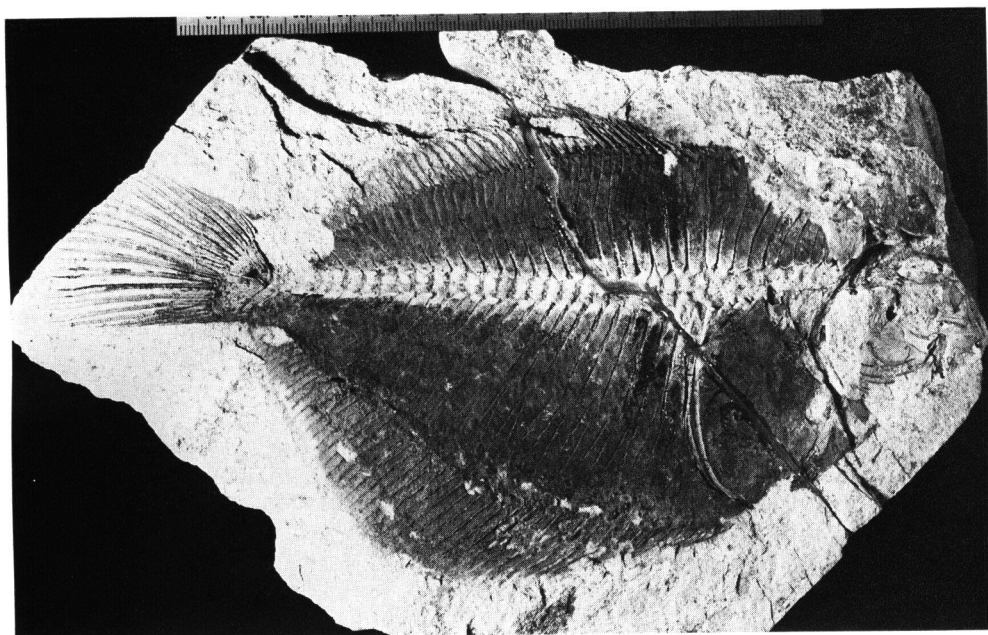


Fig. 2. A new Middle Miocene righteye flounder, *Platichtys miostellatus* sp. nov., TPM 3258, from the Miocene Tamada Formation, Yaita City, Tochigi Prefecture, central Honshu, Japan.

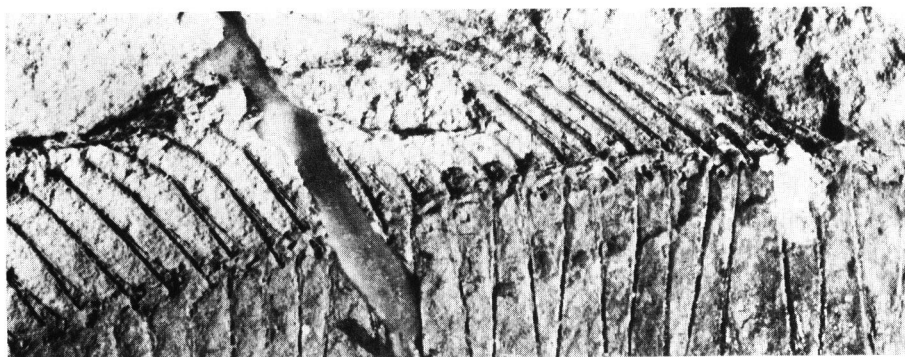


Fig. 3. Traces of the small bony tubercles along the base of the dorsal fin rays in *Platichtys miostellatus* sp. nov.

largest and stoutest among them, is attached to the anterior margin of the first haemal spine. Its anteroventral end curves forwardly. The traces of small bony tubercles are observable along the base of the fin rays, though poorly observable at the anterior and posterior part.

The pectoral fin is incomplete, and only basal parts of 7 fin rays and a part of the coracoid are observed.

Of the pelvic fin, basal parts of 6 rays and a part of the pelvis are preserved.

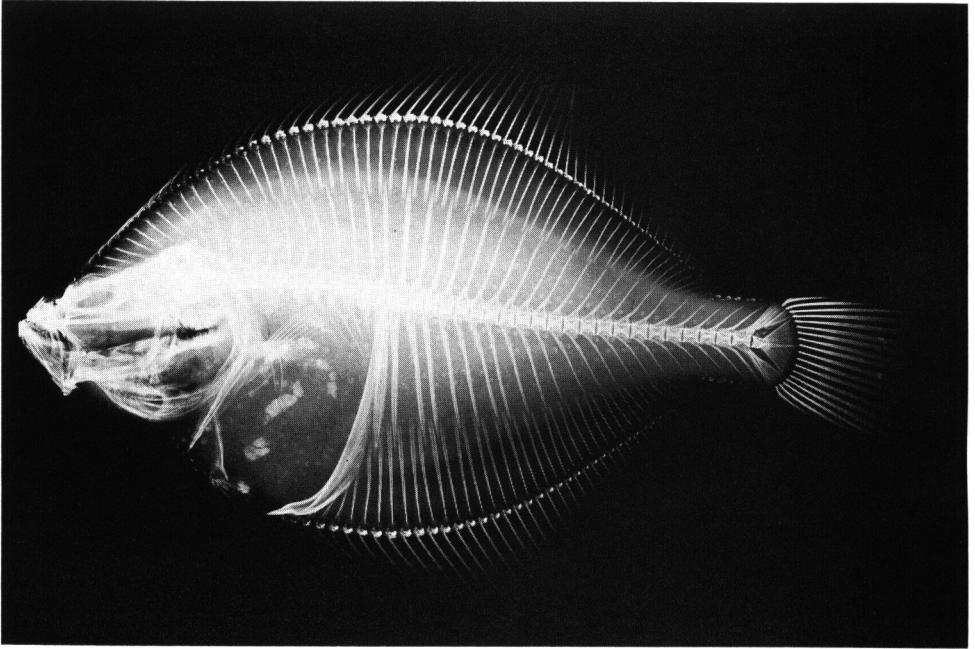


Fig. 4. X-rayed photograph of *Platicthys stellatus*, NSMT-P (National Science Museum, Tokyo, Pisces) 9148, 180 mm SL, Ohta, Tone River, Japan.

The centrum of each vertebra can be seen as its trace. The abdominal vertebrae are incomplete and lack the anterior ones. They are counted as 9 (the total is estimated at 11 or 12). Each centrum possesses a thin neural spine dorsally. The neural spines are incomplete distally excepting the last two. The first observable neural spine is nearly straight and directed upward. The neural spines of the second to last abdominal vertebrae slightly curve anteriorly, and the degree of its inclination becomes smaller toward rear. The last 5 pleural ribs are preserved.

The caudal vertebrae are 27 in number. They have well developed neural and haemal spines, but the last 3 neural spines are missing.

The caudal fin rays are almost complete except in the distal region of the dorsal half. Dorsal and ventral 3 rays are simple and unbranched, while the middle 12 rays are branched.

Parhypural, hypural 1+2, hypural 3+4, hypural 5 and epural are well preserved. The relation between these bones and caudal fin rays is just as in *Platicthys stellatus* (Figs. 2 and 4).

Consideration

The present species clearly possesses pleuronectiform characters such as a great

body depth and the almost consistent presence of two proximal pterygiophores of the dorsal and anal rays between two adjacent neural and haemal spines.

On the basis of the presence of the traces of small bony tubercles along the bases of the dorsal and anal fins throughout almost entirely their lengths (Figs. 2–4), it is safely identified to belong to the genus *Platichthys* of the subfamily Pleuronectinae (Pleuronectidae; Pleuronectoidei) (NORMAN, 1934; SAKAMOTO, 1984a, b).

Since no fossils of *Platichthys* have certainly been reported, we compared the present species with Recent two species: *Platichthys flesus* and *P. stellatus*. The former is distinguishable from the latter in the presence of embedded cycloid scales all over body and dorsal and anal fins without distinct dark bars (NORMAN, 1934). However, because of the poor condition of the present fossil, there are only two characters, number of the caudal fin rays and caudal vertebrae, available for comparison. As for the first character, we cannot find any significant differences among three species. Because, the present species has 18 caudal rays (with 12 branched), and *P. flesus* 18–19 (11–12) rays and *P. stellatus* mostly 18 (12) respectively (NORMAN, 1934; SAKAMOTO, 1984a, b). Concerning the second character, there is a clear difference between the present fossil (with 27 caudal vertebrae) and the other two species (23–25) (NORMAN, 1934; SAKAMOTO, 1984a, b). Although the difference is found only in the number of the caudal vertebrae, judging from the extensive studies including meristic counts by NORMAN (1934), SAKAMOTO (1984a, b) and others, we concluded that this character is considered adequate to look upon the present fossil as a new species of the genus *Platichthys*.

Incidentally, *P. flesus* is distributed in the coasts of Europe and usually dextral (righteyed) (NORMAN, 1934); *P. stellatus* in the central Japan and Korean Pen. northward, the Okhotsk Sea, the Bering Sea to the coast of southern California (SAKAMOTO, 1984a) and 100% sinistral (reversed; lefteyed) in Japan, about 70% in the Kodiak Is. and Alaska Pen. and about 50% in North America (HUBBS and KUROMA, 1942). However, whether the present specimen is dextral or sinistral could not be determined because of the poor condition of the fossil.

Etymology: The species name, *miostellatus*, is composed of two words: *mio*- from “Miocene” and *stella*-meaning “star” (derived from species name of the starry flounder *P. stellatus*).

Acknowledgments

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References

- HUBBS, C. L. & K. KURONUMA, 1942. Hybridization in nature between two genera of flounders in Japan. *Pap. Mich. Acad. Sci., Arts. Letters*, **27**: 267–306, pls. 1–4.
- NORMAN, J. R., 1934. A systematic monograph of the flatfishes (Heterosomata). 1. Psettodidae, Bothidae, Pleuronectidae. viii+459 pp., London, Brit. Mus. Nat. Hist.
- SAKAMOTO, K., 1984 a. Pleuronectidae. In H. Masuda *et al.* eds., The fishes of Japanese Archipelago: 351–354, pls. 314–318, Tokyo, Tokai Univ. Press.
- SAKAMOTO, K., 1984 b. Interrelationships of the family Pleuronectidae (Pisces: Pleuronectiformes). *Mem. Fac. Fish., Hokkaido Univ.*, **31** (1/2): 95–215.
- SUZUKI, A., 1959. Cenozoic formations in the southeast area of Shiobara mountain region. *Bull. Utsunomiya Univ.*, (9): 63–75. (In Japanese with English summary.)
- UCHIO, T., 1950. Tertiary fossil fauna from Tochigi Prefecture (1). *Jour. Geol. Soc. Japan*, **56** (661): 455–458. (In Japanese with English summary.)