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A New Righteye Flounder from the Late Pleistocene Togane Formation, Chiba Prefecture, Japan

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Abstract A righteye flounder fossil from the Late Pleistocene Togane Formation, Togane City, Chiba Prefecture, Japan was reexamined. It was originally identified as *Lepidopsetta mochigarei* or *Reinhardtius* sp. cf. *R. matsuurae* of the family Pleuronectidae, but due to its distinctive elongated urostyle and eight branched caudal rays, it is now designated as the holotype for a new genus and species, *Chibapsetta dolichurostyli*.

Introduction

In 1953, a righteye flounder fossil was found on the grounds of Togane High School, Togane City, Chiba Prefecture, Japan. The fossil was discovered in the Late Pleistocene mudstone bed belonging to the Togane Formation (Fig. 1). Formerly, this specimen was mentioned as *Lepidopsetta mochigarei* Snyder by MASUTOMI and HAMADA (1966) or listed as *Reinhardtius* sp. cf. *R. matsuurae* Jordan et Snyder by OHE (1970) of the family Pleuronectidae.

Recently, the present authors reexamined the fossil, and concluded that it is an undescribed genus and species of the family Pleuronectidae.

Systematic Paleontology

Class Osteichthyes
Order Pleuronectiformes
Family Pleuronectidae
Genus ***Chibapsetta*** nov.

Type species. *Chibapsetta dolichurostyli* sp. nov.

Diagnosis. This genus is unique in having the following combination of characters. The urostyle is elongated posterodorsally reaching to near the edge of the hypural plates. The number of branched caudal rays is 8. The number of vertebrae is 44 (13 abdominal and 31 caudal).

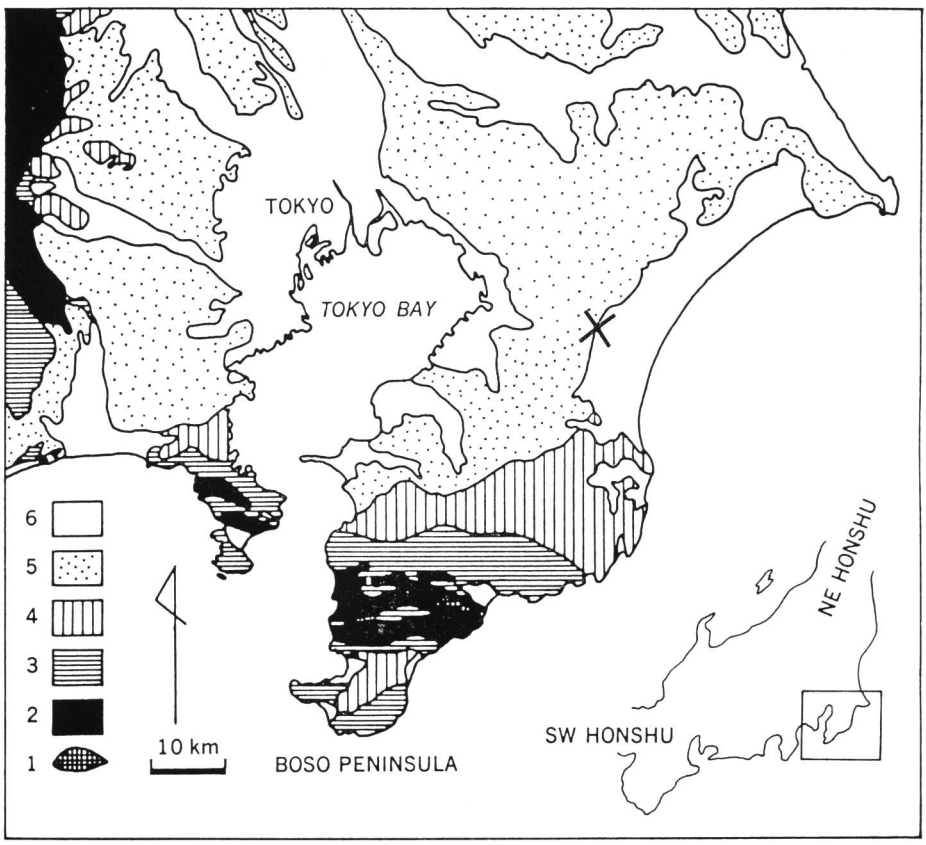

Fig. 1. A geological map of the locality that yielded a new Late Pleistocene righteye flounder, *Chibapsetta dolichurostyli* gen. et sp. nov. (after Ishizaki and Takayanagi (1981) which is based on Hirokawa, O. (Chief ed.) (1978)). 1. Ultramatic rocks; 2. Pre-Neogene; 3. Miocene-Pliocene; 4. Early Pleistocene; 5. Late Pleistocene; 6. Holocene.

Remarks. Within the family Pleuronectidae, only this specimen exhibits an elongated urostyle reaching to near the end of the hypural plates, and in only one case has the character of 8 branched caudal rays been reported. The latter is treated within the species discussion. The combination of these two criteria, one unique within the family, and the other at best, extremely rare, is considered adequate to establish the new genus.

Etymology. The generic name consists of *Chiba*, the prefecture where the fossil was located, and *psetta*, a Greek word meaning flatfish.

Chibapsetta dolichurostyli gen. et sp. nov.

(Figs. 2–4)

Holotype. National Science Museum, Tokyo, Catalogue number NSM PV-4583.

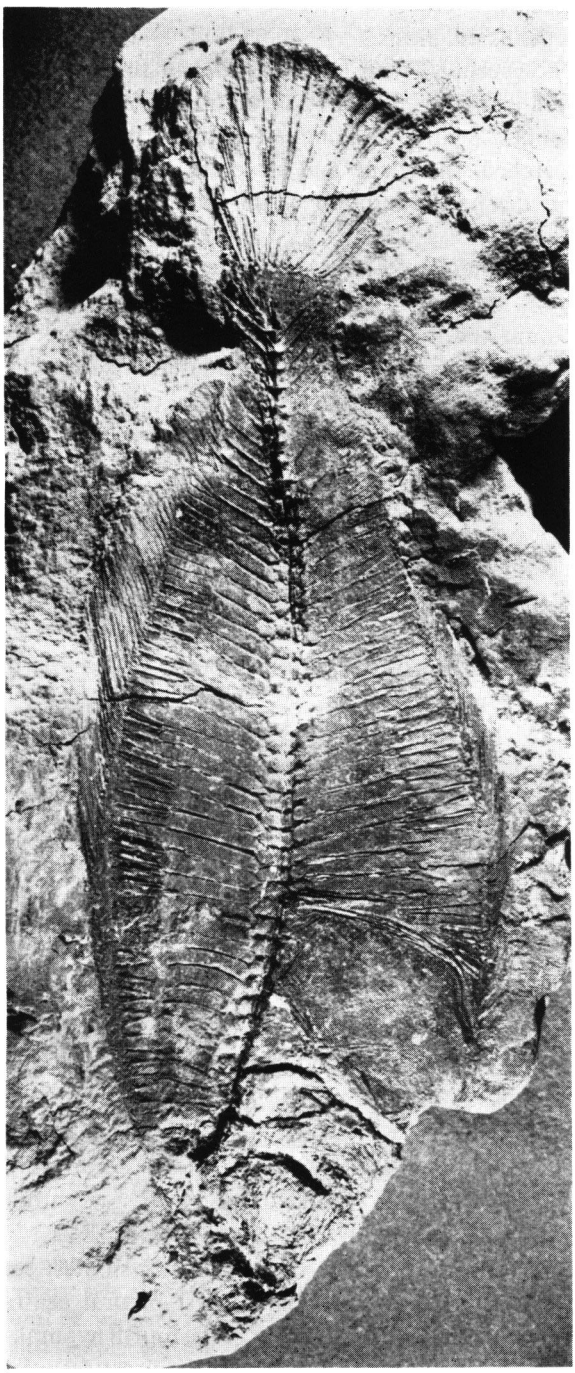

Fig. 2. A new Late Pleistocene righteye flounder, *Chibapsetta dolichurostyli* gen. et sp. nov., NSM PV-4583, from the Late Pleistocene Togane Formation, Chiba Prefecture, Japan. About 21.3 cm in standard length.

Standard length is about 21.3 cm.

Diagnosis. See genus diagnosis.

Description. The specimen with an elliptical and somewhat elongated body is almost complete; depth being highest at about two fifths from the anterior end. Standard length (SL) is about 2.8 times this highest depth. While the dorsal and anal contours are evenly arched, the shape and structure of the head are not accurately observable because of the poor condition of this part of the fossil. Head length is roughly 1/3.5 SL.

The dorsal fin rays remain excepting their anterior- and posteriormost ones, and counted as 76 (the total number is estimated as about 80). These fin rays become higher posteriorly toward the middle of the body, then evenly decrease their height posteriorly. The proximal pterygiophores are countable except their anterior- and posteriormost ones, and are 74 in number (the total is estimated as about 79). Two proximal pterygiophores are usually located between each of the adjacent neural spines.

The anal fin rays are observable only at the anterior about two thirds of their base, and counted as 38 (the total is estimated as about 61). Of the 54 proximal pterygiophores countable (the total is estimated as about 60) except the posteriormost ones, usually two are inserted between two adjacent haemal spines, the approximately eight anterior ones, excepted. The anteriormost one, the largest and stoutest among proximal pterygiophores, is attached to the anterior margin of the first haemal spine. Its anteroventral end curves forwardly.

The pectoral fin rays are incomplete, and only six rays are observable. The main part of the coracoid is preserved under the base of the pectoral fin. A pair of postcleithra, which are elements on both sides, are observable between the base of the pectoral fin and the coracoid. Their tips are directed toward the anterior tip of the first anal proximal pterygiophore.

Of the pelvic fin, all that remains are the distal tips of four rays.

The centrum of each of the 13 abdominal vertebrae possesses a neural spine. Even though the first spine is incomplete and lacks its distal half, it can be seen to be directed anterodorsally. The second to fifth spines are nearly straight and directed upward, the sixth to tenth spines slightly curve anteriorly, the 11th and 12th spines are incomplete and lack their distal halves, and the last spine is nearly straight. Several pleural ribs are observable.

There are 31 caudal vertebrae with neural and haemal spines well developed.

Although the caudal fin rays are not complete, about two thirds of the ventral portion is observable. It is slightly rounded posteriorly. Ventralmost 5 rays are simple and unbranched, while the middle 8 rays are branched.

The second preural centrum, which is the largest and stoutest centrum, has fused neural and haemal spines. Only a trace of the first preural centrum is preserved. Observable hypural fragments are: the dorsal half of the fourth hypural, and the posterior remains of the fifth hypural between the epural and the urostyle. A parhypural frag-

ment is observed near the base of the ventral fourth ray. The posterior remain of the epural is located between the neural spine of the second preural centrum and the fifth hypural. The urostyle elongates posterodorsally along the dorsal border of the fourth hypural and reaches to near the posterior edge of the hypural plates (Fig. 3).

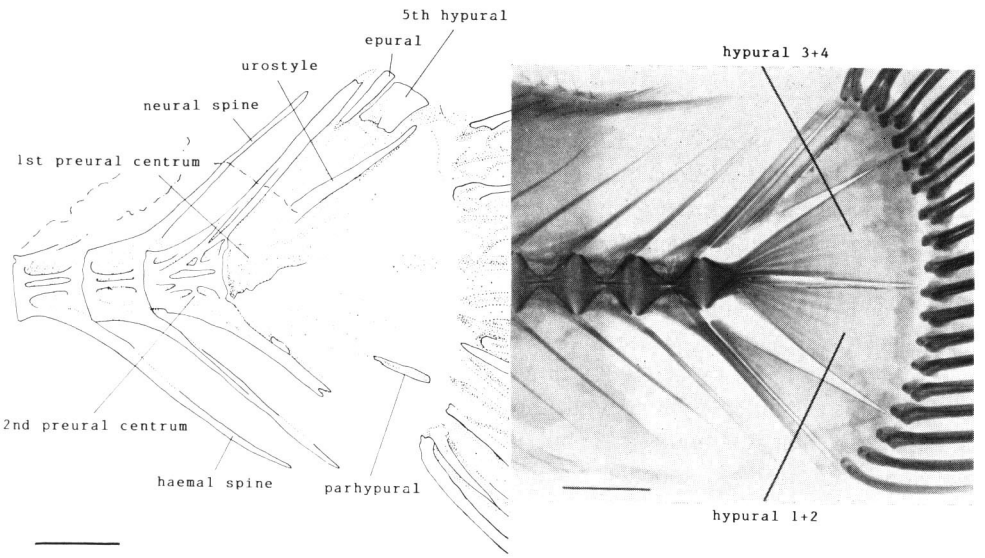

Fig. 3. Caudal skeletons and rays. Left, *Chibapsetta dolichurostyli* gen. et sp. nov.; right, a Recent pleuronectid *Hippoglossoides dubius* from off Hokkaido (X-rayed and photographic reversal), HUMZ 52983 (Laboratory of Marine Zoology, Hokkaido University), 24.4 cm in standard length. Scale bars indicate 5 mm.

Fig. 4. Preserved scales of *Chibapsetta dolichurostyli*. Left: a drawing of a ventral view of a scale of the ocular side above the hypural plate; middle: a ventral view of scales underlain by the proximal pterygiophores of the dorsal fin rays between the neural spines of the ninth and tenth caudal vertebrae; right: a ventral view of scales in the trace of the neural spine of the third caudal vertebra. Scale bars indicate 0.5 mm.

Remains of ctenoid scales are observed on several parts of the body. Ctenii are well developed and arranged in a single row (Fig. 4, left). The basal ridges of each scale are observable from their underside (in ventral view). Several scales are partially underlain by neural and haemal spines (Fig. 4, middle) or the proximal pterygiophores of the dorsal and anal fin rays (Fig. 4, right).

Consideration

The present species is a member of the order Pleuronectiformes as it has combination of characters described below in addition to 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. Further, it is included in the suborder Pleuronectoidei, because it has well developed postcleithra, and the epural and fifth hypural between the neural spine of the second preural centrum and the urostyle (AMAOKA, 1969; HENSLEY & AHLSTROM, 1984).

According to NORMAN (1934), in a large number of (pleuronectiform) genera the scales of the ocular side are ctenoid, those of the blind side cycloid, and in others the scales are ctenoid on both sides, but the spinules are nearly always more strongly developed on those of the ocular side. Therefore, on the basis of preserved situation of scales with well developed ctenii and vertebral skeleton, it is safely concluded that the present species is a righteyed flatfish. There are two righteyed groups in the Pleuronectoidei, the Brachipleurinae of the Citharidae and the Pleuronectidae. This fossil is not a member of the Brachypleurinae because of the presence of the well developed first proximal pterygiophore of the anal fin (absent in *Brachypleura* as reported by AMAOKA, 1972), and the absence of the urodermal sensu AMAOKA (1979) (present in *Lepidoblepharon* as reported by AMAOKA, 1969). As these two characters and others agree with members of the family Pleuronectidae, it is so classified.

Possession of the eight branched caudal rays is very unique within this family (0 or 10–17 branched caudal rays (SAKAMOTO, 1984). HENSLEY and AHLSTROM (1984) tabulated the number of branched caudal rays of the Pleuronectiformes and reported that in the Rhombosoleinae the number ranged from 8 to 15 (the species name and specimens with 8 branched caudal rays were not indicated in their paper), however, the specimens examined by the senior author in extensive osteological studies of the Pleuronectidae (SAKAMOTO, 1984) exhibited 10 to 14. Even if there is an existing rhombosoleine with 8 branched caudal rays (as stated by HENSLEY and AHLSTROM, 1984), it is unlikely that the present species is a rhombosoleine pleuronectid because of their limited distribution (southern Australia and southeastern South America).

Although it is impossible to classify it within the existing subfamilies because of unobservable subfamilial characters defined by the senior author (SAKAMOTO, 1984), it is similar to the pleuronectine species of *Hippoglossoides* (especially *H. dubius*) in having the vertebrae formula 13+31 and a slender body. However, it is distinguished from members of this genus in having an elongated urostyle, 8 branched caudal rays

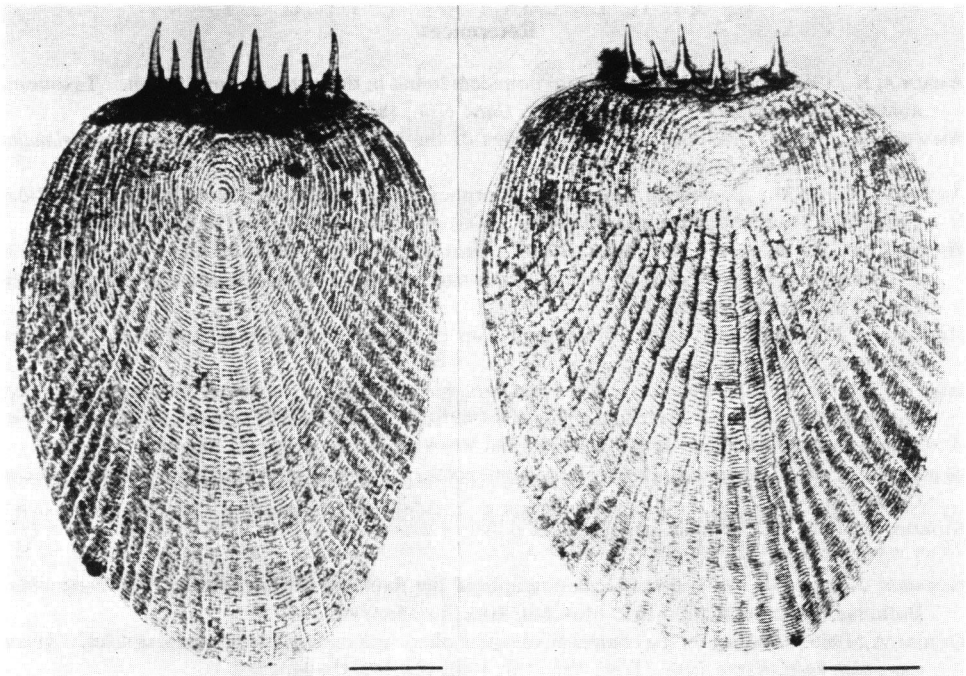

Fig. 5. Scales above the hypural plates of a Recent pleuronectid *Hippoglossoides dubius* (same specimen as Fig. 3). Left, ocular side; right, blind side. Scale bars indicate 0.5 mm.

and scales with well developed ctenii (Figs. 3–5).

To date, no pleuronectiforms having an elongated urostyle reaching to near the end of the hypural plates have been identified (OCHIAI, 1966; MONOD, 1968; AMAOKA, 1969, 1972; HENSLEY & AHLSTROM, 1984; SAKAMOTO, 1984). Judging from the possession of the unique characters of *C. dolichurostyli*, it probably became extinct at the end of the Late Pleistocene.

Etymology. The species name, *dolichurostyli*, consists of two Greek words: *dolicho*-meaning "long" and *urostylos*-meaning "tail column".

Acknowledgements

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