

**First Record of the Deep-sea Sole,
Embassichthys bathybius,
from Japan**

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(Received November 27, 1980)

Recently, five specimens of the deep-sea sole, *Embassichthys bathybius* (Gilbert, 1891), were collected by a trawl from depths of 335~850 m, off Cape Erimo, the Pacific coast of Hokkaido.

They are characterized by having a very thin body on dorsal and ventral thirds, a small head, numerous small scales, extremely long proximal radials of the dorsal and anal fins, and many light blue spots on the body and fins.

The present species has been recorded from depths of 320~1370 m off the eastern Pacific coast from southeastern Alaska to southern California (Gilbert, 1891; Townsend and Nichols, 1925; Hagerman, 1950; Welander and Alverson, 1954; Hubbs, 1959; Alverson et al., 1964; Sasaki, 1972) and rarely from the Bering Sea (Fedorov, 1967). The specimens from off Cape Erimo represent the first record of this species from the western North Pacific.

Here, the present specimens are described and compared with other specimens collected from

the Bering Sea and eastern North Pacific.

The specimens examined were preserved in 10% formalin or 40% isopropyl alcohol and deposited in the Laboratory of Marine Zoology, Hokkaido University (HUMZ). Counts and measurements were made in accordance with the method of Hubbs and Lagler (1958). For counts of fin rays and vertebrae soft X-ray was used.

Embassichthys bathybius (Gilbert)
(New Japanese name: Shimofuri-garei)

(Fig. 1)

Material: HUMZ 77496 (410.1 mm SL, sex unknown), off Cape Erimo, 800 m deep, May 8, 1978; HUMZ 80780 (396.5 mm SL, sex unknown), off Cape Erimo, 830~850 m deep, February 22, 1978; HUMZ 80781 (435.1 mm SL, female), off Cape Erimo, March 5, 1978; HUMZ 82043 (374.0 mm SL, sex unknown), 41°42'N, 143°43'E, off Cape Erimo, 335 m deep, April 3, 1979; HUMZ 86878 (410.2 mm SL, sex unknown), 41°40'N, 143°50'E, off Cape Erimo, 350~380 m deep, January 30, 1979.

Comparative material: HUMZ 31653, 31658~31660, 31662, 31663 (279.4~348.6 mm SL), Queen Charlotte Sound, Pacific coast of Canada, 1973; HUMZ 67383 (314.5 mm SL), 54°26'N, 158°55'W, Pacific coast of Alaska Peninsula, 750~830 m deep, June 13, 1977; HUMZ 68503

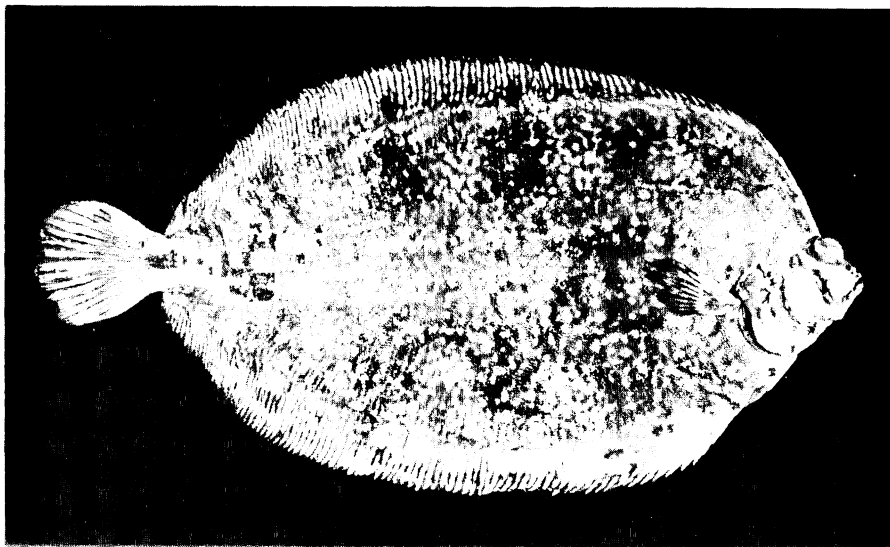


Fig. 1. *Embassichthys bathybius*, HUMZ 86878, 410.2 mm SL, from off Cape Erimo, Hokkaido.

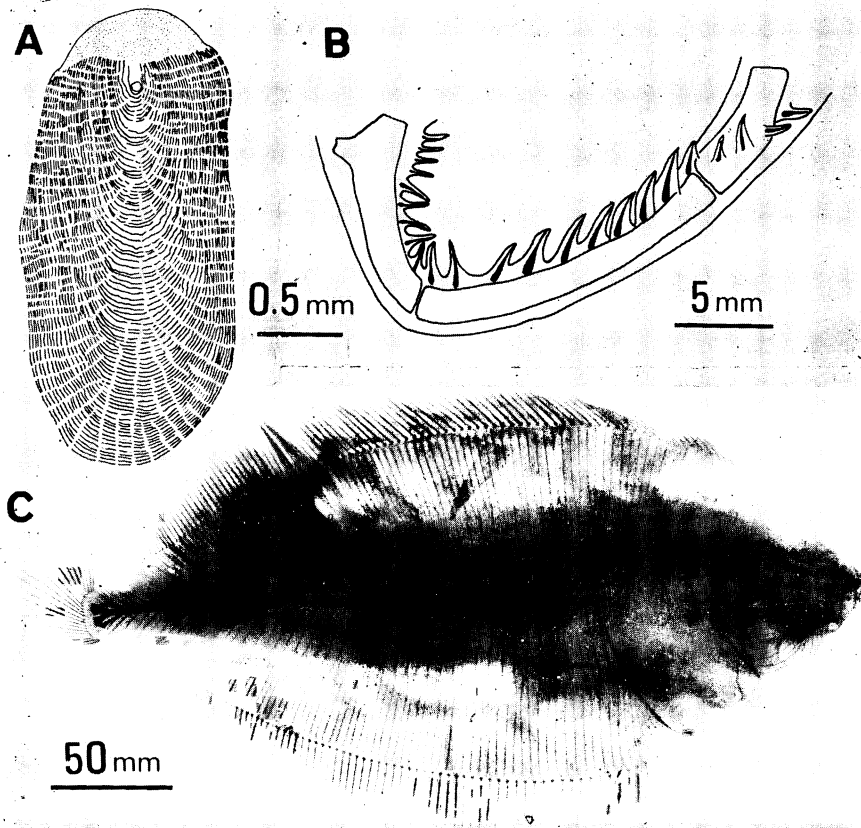


Fig. 2. Several characters of *E. bathybius*. A: Scale on middle part of body. B: first gillarch on right side. C: Radiograph showing the long proximal radials of dorsal and anal fins (HUMZ 31658, 323.8 mm SL, A Canadian specimen was used here, since our specimens were too large to show the whole body).

(401.2 mm SL), 52°58'N, 171°00'E, Bering Sea, 560~580 m deep, June 25, 1977; HUMZ 84234~84236 (361.4~402.0 mm SL), 54°29.56'N, 167°24.56'W, Bering Sea, 680 m deep, June 11, 1979; HUMZ 85420 (374.0 mm SL), 60°13.3'N, 179°06.5'W, Bering Sea, July 27, 1979.

Description: Counts and proportional measurements are shown in Table 1.

Body oval, very deep and thin with dorsal and ventral thirds very compressed. Caudal nearly sessile, peduncle very narrow in depth.

Head small, upper profile with a deep concavity at hinder margin of upper eye. Snout pointed at tip and short, shorter than eye diameter. Eyes large, subequal to a little more than length of upper jaw, separated by high, rather sharp, scaled ridge. Lower eye considerably in advance of upper eye. Mouth oblique, small

in size, and asymmetrical. Maxillary extending to anterior part of lower eye. Lower jaw slightly projecting beyond tip of upper when mouth is closed. Teeth on both sides of both jaws uniserial, broad incisors. Gill rakers weak and rather short, and pointed at tip, not serrate (Fig. 2B).

Scales very small, cycloid on both sides of body (Fig. 2A). Lateral line slightly arched above pectoral fin.

Origin of dorsal fin above posterior part of eye. Anal fin starting at a vertical line through base of pectoral fin, similar in shape and structure to dorsal. These fins having very long proximal radials (Fig. 2C). Pectoral fin on ocular side longer than that on blind side. Pelvic fins equal in size and symmetrical. Caudal fin rounded posteriorly, moderate in size, inner 14~17 rays

Table 1. *Embassichthys bathybius*: proportional measurements and counts of the present specimens, and comparison of them with the original description and other specimens captured from the Bering Sea and eastern Pacific coast.

	Off Cape Erimo	Bering Sea	Pacific coast of Alaska Peninsula	Queen Charlotte Sound	Santa Barbara Channel Gilbert (1891)
Number of specimens	5	5	1	6	2 (Syntypes)
Standard length (mm)	374.0~435.1	361.4~402.0	314.5	279.4~348.6	
In SL:					
Head length	4.78~5.39	4.42~4.89	4.49	4.21~4.88	4~4.4
Body depth	2.03~2.31	2.19~2.34	2.11	1.99~2.48	2~2.33
In HL:					
Snout length	5.24~6.09	5.33~8.17	5.93	5.72~7.38	2.75~2.8
Upper eye diameter	3.15~4.43	3.40~4.33	3.00	2.67~3.83	
Lower eye diameter	3.50~4.71	3.33~4.17	3.33	3.27~3.80	
Interorbital width	20.25~27.26	22.37~28.57	29.17	20.71~26.17	
Upper jaw length on ocular side	4.26~4.79	4.14~4.60	4.67	4.15~4.87	5
Upper jaw length on blind side	4.08~4.66	4.19~4.65	4.38	3.89~4.63	
Lower jaw length on ocular side	3.03~3.35	2.92~3.31	3.18	2.85~3.16	
Lower jaw length on blind side	3.18~3.33	3.05~3.49	3.17	2.89~3.25	
Depth of caudal peduncle	2.41~2.82	2.88~3.25	2.69	3.02~3.80	
Longest dorsal fin ray	2.07~2.70	2.00~2.79	2.40	2.31~2.65	2.5
Longest anal fin ray	2.35~2.50	1.97~2.78	2.52	2.01~2.86	
Pectoral fin on ocular side	1.36~1.64	1.57~1.92	1.60	1.53~2.40	2
Pectoral fin on blind side	2.28~2.69	2.30~2.85	2.52	2.17~3.04	
Pelvic fin on ocular side	3.99~4.91	4.15~5.48	4.55	4.65~6.84	
Pelvic fin on blind side	3.99~4.91	4.15~5.48	4.55	4.77~6.48	
Caudal fin	1.26~1.50	1.40~1.89	1.62	1.33~1.82	1.5
Counts:					
Dorsal	110~116	114~120	112	108~116	111~117
Anal	94~102	98~101	98	93~101	96~98
Pectoral on ocular side	12~13	11~13	11	11~12	10~11
Pectoral on blind side	12~13	10~12	11	11~12	
Pelvic	5	5	5	5	5
Caudal	21	20~21	21	20~21	
Transverse scale rows	about 210~240	about 219~238	about 214	about 225~247	about 165
Gill raker on ocular side	7~9+13~15	6~9+14~15	9+14	6~9+13~14	
Gill raker on blind side	6~9+14	6~8+14~15	7+14	6~9+13~15	
Teeth	14~17+26~32 14~18+30~33	13~23+27~34 15~23+31~38	12+30 12+32	12~21+26~37 12~22+31~42	(Lower jaw 16+21)
Vertebrae	13~14+48~50=61~63	13~14+48~51=61~65	14+47=61	13~14+47~49=61~63	14+49=63

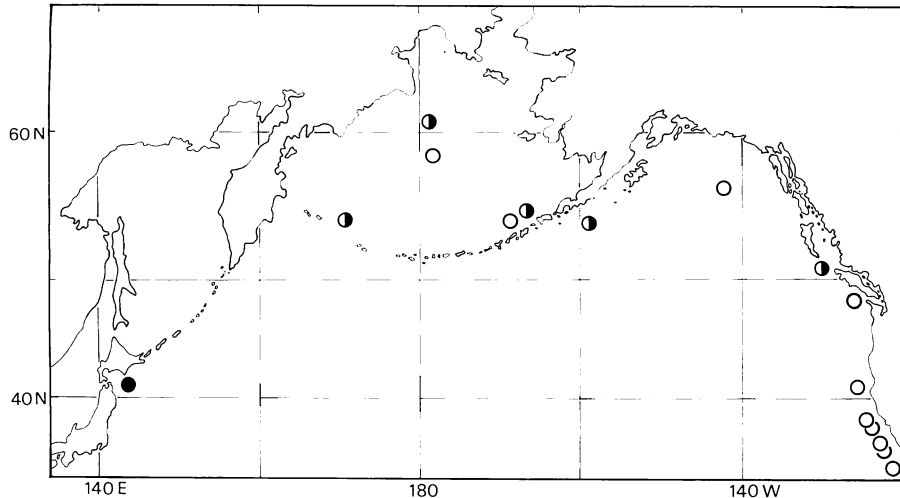


Fig. 3. Map showing localities where *E. bathybius* was captured. Solid circle, present specimens; half solid circle, compared specimens; open circle, previous records.

branched, other rays simple. All fins scaled at least on their bases.

Color in fresh specimens: Body on ocular side brown, becoming darker toward margins; light blue spots scattered on body, densely gathered on dorsal and ventral thirds to form six broad blotchy bands. Lips, branchiostegal membranes and gill rakers black. All fins dark brown; fin rays with tiny light blue spots, fin membranes with black narrow margins. On blind side, body heavily dusky brown, all fins black.

Biological note. One female specimen (HUMZ 80781), 435.1 mm SL, has a well enlarged ovary only on the ocular side, but the sex can not be determined in other specimens because of extremely undeveloped gonads.

Remarks. The present specimens were compared with Gilbert's (1891) original description of syntypes from the Santa Barbara Channel and with our other specimens from the Bering Sea, Queen Charlotte Sound and the Pacific coast of the Alaska Peninsula (Table 1). The present specimens almost fall into those ranges in the counts, proportional measurements and colorations. But a great difference is seen in the number of transverse scale rows when compared with the syntypes. However, it is known that the scale counts show a great variation within the species with a range from 200 to 222 (Welander and Alverson, 1954; Fedorov, 1967), though a

somewhat higher number of about 210 to 247 is present in both our new specimens and the compared specimens. This is probably due to the very small size and large number of scales in this species.

This species has been known from off southern California to southeastern Alaska and from the Bering Sea. In addition, during our recent investigations on the fish fauna of the Bering Sea and North Pacific, it was also captured from the Pacific coast of the Alaska Peninsula and the western part of the Bering Sea (Fig. 3). It did not, however, extend to the coast of Japan and its adjacent waters. So, the present specimens from off Cape Erimo represent its first record from our waters.

The species is not uncommon in deep waters of the Pacific coast of North America (Hubbs, 1959; Alverson et al., 1964), and it is rarely caught from the Bering Sea. Judging from these facts, it is highly probable that the present specimens migrated from the northern waters. Though it is obscure whether the species shows a continuous distribution from the eastern Pacific coast through the Bering Sea to the western Pacific coast, it may not be a resident in Japan and its adjacent waters, because only five specimens have been captured from the western Pacific coast in spite of much fishing efforts during a long period.

Acknowledgments

We are grateful to Dr. Gordon R. Williamson, Heather Cottage, Kessock, Inverness, Scotland, Britain for his critical reading of the manuscript. We also thank Mr. Shin-ichi Kanamaru, Hokkaido Regional Fisheries Research Laboratory, and the crew of the Tanshu Maru, Taisei Maru LXXXVI, Mito Maru V, Rissho Maru LI, Chi-yoki Maru LXXXV, Eikyu Maru V, Yakushi Maru XXI, and Shotoku Maru, who collected the specimens.

Literature cited

- Alverson, D. L., A. T. Pruter and L. L. Ronholt. 1964. A study of demersal fishes and fisheries of the northeastern Pacific Ocean. H. R. MacMillan Lectures in Fisheries, Inst. Fish., Univ. British Columbia, 190 pp., 72 figs.
- Fedorov, V. V. 1967. On the occurrence of the deep-water flatfish *Embassichthys bathybius* (Gilbert, 1891) (Pleuronectidae, Pisces) in the Bering Sea. Vopr. Ikhtiol., 7 (3): 566~570, figs. 1~2. (In Russian).
- Gilbert, C. H. 1891. Scientific results of explorations by the U. S. Fish Commission Steamer Albatross. XII. A preliminary report on the fishes collected by the steamer Albatross on the Pacific coast of the North America during the year 1889, with descriptions of twelve new genera and ninety-two new species. Proc. U. S. Nat. Mus., 8 (979): 49~126.
- Hagerman, F. B. 1950. The extension of the range of the deep sea flounder, *Embassichthys bathybius* (Gilbert). Calif. Fish Game, 36 (2): 165~166, fig. 1.
- Hubbs, C. L. 1959. Initial discoveries of fish faunas on seamounts and offshore banks in the eastern Pacific. Pac. Sci., 13 (4): 311~316.
- Hubbs, C. L. and K. F. Lagler. 1958. Fishes of the Great Lakes region. Bull. Cranbrook Inst. Sci., 26: 1~213, figs. 1~251,
- Sasaki, T. 1972. Demersal fishes collected in the southeastern shelf waters of Alaska. Bull. Fac. Fish., Hokkaido Univ., 22 (4): 281~289, fig. 1.
- Townsend, C. H. and J. T. Nichols. 1925. Deep sea fishes of the "Albatross" Lower California Expedition. Bull. Amer. Mus. Nat. Hist., 52 (1): 1~20, pls. 1~4.
- Welander, A. D. and D. L. Alverson. 1954. New and little known fishes of the eastern Pacific. Fish. Res. Pap., Wash. Dep. Fish., 1(2): 37~44, figs. 1~2.
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日本初記録のカレイ科魚類シモフリガレイ (新称)

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北海道襟裳岬沖水深 335~850m からオッタートロール船により、深海性のカレイ科魚類シモフリガレイ (新称) *Embassichthys bathybius* が 5 個体採集された。

本種はこれまで南カリフォルニア沖からアラスカ南東沖までの海域およびベーリング海から報告されている。したがって、今回採集された標本は西部太平洋および日本初記録である。

本種は東部太平洋の沿岸では普通にみられること、ベーリング海からもまれに報告されていること、および西部ベーリング海の Myednuii 島近くでも採集されたことから、本個体は北方海域から移住してきたと考えられる。しかし、永年のトロール漁業にもかかわらず、日本の沿岸からはただ 5 個体しか得られていないことから、この海域に定住していないと考えられる。

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