

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN THE UNIVERSITY OF MICHIGAN PRESS

THE JAPANESE FLOUNDERS OF THE GENERA
TANAKIUS, *MICROSTOMUS* AND
GLYPTOCEPHALUS

BY CARL L. HUBBS

In the cooler seas of Japan and the adjacent coasts of the Asiatic mainland there are to be found three well-marked species of flounders having small mouths and a much increased number of segments—vertebrae, scales and fin rays. The nomenclature of these species has passed through and remains in a state of complex confusion. With the aid of recent elucidations by the Russian ichthyologist P. J. Schmidt (1929–1931), it now appears possible to bring order out of this confusion.

In this paper there are given: firstly, a brief discussion and characterization of the three genera (and species); secondly, a chronological account of the naming of the three species; thirdly, a synonymy of each, and fourthly, a bibliographic list.

Tanakius kitaharae, although superficially so similiar as to have been confused with them, is probably not immediately related to the other Japanese flounders with small mouths and many segments, as I have already pointed out. Its most intimate relationship appears to be with *Dexistes rikuzenius* Jordan and Starks (of which *Araias arionmmus* Jordan and Starks has been shown to be a simple synonym). In propos-

ing *Tanakius* in 1918 (p. 370), I ventured to separate it only subgenerically from *Dexistes*, but the generic distinction accepted by Jordan and Hubbs (1925: 300) appears more in line with the current generic treatment of the whole family. The distinctive characters of *Tanakius* as contrasted with *Dexistes*, with which it is probably most closely related, and with *Microstomus*, with which it has most often been confused, are given in the two papers just cited. It is distinguished from *Glyptocephalus*, with which Schmidt has recently united it, by lacking the great caverns in the skull bones characteristic of that genus, and also in having the eye balls scaly, the eyes more nearly apposed, etc.

The species *Microstomus achne* and *Glyptocephalus stelleri* have usually been held in these genera, though under other specific names, as explained below. Since *Veraequa achne* proves identical with the species wrongly called *Microstomus stelleri* by authors, *Veraequa* becomes a synonym of *Microstomus*.

The distinctive features of the three species (and genera) under discussion may be indicated in the following

KEY TO THE JAPANESE FLOUNDERS WITH SMALL MOUTHS AND MANY SEGMENTS

- 1a. Eye-ball scaly. A few of the posteriormost dorsal and anal rays branched.
 - 2a. Mouth not greatly asymmetrical. Teeth well developed on both sides of jaws. Lateral line straight. No accessory scales about lateral line pores. Scales well imbricated. Caudal fin doubly truncate. Fin rays very thin. Skin very thin. Body elongate-elliptical. Only a fourth of upper orbit behind lower. Skull bones without large cavities.
 1. *Tanakius kitaharae*
- 1b. Eye-ball scaleless. No branched rays in dorsal or anal fin.
 - 2b. Mouth greatly asymmetrical. Teeth absent or nearly so on eyed side of jaws. Lateral line with a low arch. Accessory scales developed about lateral line pores. Scales scarcely imbricated. Caudal fin broadly rounded. Fin rays very thick. Skin leathery. Body broadly elliptical. Only a fourth of upper orbit behind lower. Skull bones without large cavities.
 2. *Microstomus achne*

- 2c. Mouth not greatly asymmetrical. Teeth well developed on both sides of jaws. Lateral line straight. No accessory scales about lateral line pores. Scales rather well imbricated. Caudal fin doubly truncate or narrowly rounded. Fin rays rather thin. Skin rather thin. Body ovate. Nearly one-half of upper orbit behind lower. Skull bones with large cavities.

3. *Glyptocephalus stelleri*

The involved systematic history of these three species may be outlined, as an introduction to and explanation of the synonymies which follow.

1. The first reference to any of these three species in the scientific literature is apparently that of Otaki (1897: 7, pl. 6, fig. 7), who dealt with a species which has been supposed to be *T. kitaharae* under the name of the European species *Pleuronectes cynoglossus*.

2. In 1903 Schmidt merely listed what now proves to be the *Glyptocephalus*, as "*Microstomus Stelleri* n. sp."

3. The following year Jordan and Starks (1904: 625, pl. 7) described two of the species, under the first valid specific names but apparently under wrong generic identifications, as *Veraequa achne* and as *Microstomus kitaharae*. The status of *kitaharae* as a species has not been questioned, except by Schmidt (1929: 366) when he confounded the Japanese species of *Tanakius* and *Glyptocephalus*. The generic and specific validity of *Veraequa achne* has been generally accepted, except by myself (1918: 371). In referring *achne* to *Microstomus*, however, I held it distinct from the common Japanese species of the genus.

I am now able to affirm the identity of "*Microstomus stelleri*" of authors with *M. achne*; which fortunately makes it unnecessary to propose a substitute name for "*M. stelleri*." The small type of *Veraequa achne*, recently examined in the United States National Museum, is clearly an example of the species generally called *Microstomus stelleri*. It has the leathery skin and thick fin rays of that form. For a specimen of its size (145 mm. standard length) it is not especially slender. The depth is given in the type description and figure as too

narrow (2.87) owing to the fact that the specimen was somewhat shrunken and wrinkled in preservation. The true depth appears to have been 2.65 in standard length. This value compares well with that obtained from two small specimens identified by Jordan and Starks as *M. stelleri*: 2.7 in one 89 mm. long to caudal, and 2.55 in one 170 mm. long. The apparently narrower interorbital is due to the large size of the eyes in the young, and to shrinkage. The scales are of about the same size as in "*stelleri*." The vertical fin rays (counting the last one as double) are not distinctive.

	" <i>V. achne</i> "		" <i>M. stelleri</i> "	
Albatross Station	3772	5031	4808	4807
Number of dorsal rays ..	84	81	85	85
Number of anal rays ...	67	68	70	71

I conclude that *Veraequa achne* is identical with *Microstomus stelleri* of authors, and that the species should be known as *Microstomus achne*.

4. In the next paper dealing with these flounders, Schmidt (1904: 246) described his *Microstomus stelleri*. This name has generally been taken to apply to the Japanese species of *Microstomus*, here known as *M. achne*, but was really based, Schmidt now claims (1929: 367; 1931a: 318; 1931b: 127), rather on the species of *Glyptocephalus*. One of Schmidt's paratypes in the U. S. National Museum, from Aniwa Bay, Sakhalin, is a young *Glyptocephalus*. Even though the original description of *stelleri* may not clearly differentiate the species as a *Glyptocephalus* or as a *Tanakius*, the type-localities fix the name with the former genus. The name *stelleri* therefore goes with the Japanese *Glyptocephalus*.

5. In 1906 Jordan and Starks, reviewing the Japanese flounders, recognized the three species under discussion under four names: *Veraequa achne* (= *Microstomus achne*), *Microstomus kitaharae* (= *Tanakius kitaharae*), *M. stelleri* (= *M. achne*) and *Glyptocephalus* (species not named). For *V. achne* they merely repeated the type description and figure, and misplaced the genus.

6. Pavlenko (1910: 59, pl. 2, fig. 13a, b) gave the *Glyptocephalus* its second specific name, *ostroumowi*. This was overlooked by American ichthyologists until used by me in 1915 (p. 491).

7. Not acquainted with Pavlenko's action, Snyder followed (1911: 548; 1912: 440, pl. 49, fig. 1) with a description of the *Glyptocephalus* as *G. sasae*, new species. In the second paper *M. stelleri* (= *M. achne*) was also listed.

8. In their *Catalogue*, Jordan, Tanaka and Snyder (1913: 328-332) merely followed Jordan and Starks and Snyder.

9. In my 1915 paper (pp. 489-492) I listed the three species as *Microstomus stelleri* (= *M. achne*), *M. kitaharae* and *Glyptocephalus ostroumowi*.

10. In 1916 (1916b: 390, pl. 106, fig. 326) Tanaka described and figured *M. achne* under the name then current (*M. stelleri*).

11. In the same year (1916a: 67), Tanaka described as a new species *M. hireguro*, and in the following year (1917: 447, pl. 122, fig. 351) gave an English description and a figure of this nominal species. I have identified *hireguro* with *kitaharae* (Hubbs, 1918: 371, and Jordan and Hubbs, 1925: 301), but now think it virtually certain that it is rather a synonym of *Glyptocephalus stelleri*. The general proportions, ovate form and posteriorly inserted upper orbit all point to this conclusion.

12. In 1918 I indicated the generic distinctness of *kitaharae* from *Microstomus*, and erected for it the subgenus *Tanakius* of *Dexistes*; and synonymized *Veraequa* with *Microstomus* but retained both *achne* and "*stelleri*" as distinct species.

13. Jordan and Hubbs (1925: 300-301) recognized the three species as *Microstomus stelleri*, *Tanakius kitaharae* and *Glyptocephalus ostroumowi*, and gave a new diagnosis of *Tanakius*.

14. Schmidt in 1919 trenchantly separated the Japanese *Microstomus*, under the unavailable name of *M. stelleri* Jordan and Starks, but wholly confounded the species of *Tanakius* and *Glyptocephalus*.

15. Soldatov and Lindberg (1930: 412-415), in a work presumably prepared before Schmidt's 1929 contribution appeared, held to the more conventional nomenclature: *Microstomus stelleri*, *M. kitaharae* and *Glyptocephalus ostroumovi*.

16. Schmidt then (1931a: 318) recognized the three species as *Microstomus* sp., *Glyptocephalus kitaharae* and *G. stelleri*.

17. In his last paper Schmidt (1931b; 127-128) did not name the *Microstomus*, but dealt with the other two as *Glyptocephalus (Tanakius) kitaharae* and *G. stelleri*. He further suggested that *Veraequa achne* belonged in the subgenus *Tanakius*.

This discussion of the three Japanese flounders combining small mouths with many vertebrae is summarized in the following synonymies. To facilitate cross reference and to validate the synonymy as listed, each item therein is followed by a number in *Italic* type, referring to the paragraph head in the preceding discussion.

1. *Tanakius kitaharae* (Jordan and Starks)

Pleuronectes cynoglossus (not of Linnaeus) Otaki, 1897: 7, pl. 6, fig. 7 (1).

Microstomus kitaharae Jordan and Starks, 1904 (Aug. 13): 625, pl. 7, fig. 2 (3); 1906: 223, fig. 21 (5). Jordan, Tanaka and Snyder, 1913: 332 (8). Hubbs, 1915: 490 (9). Soldatov and Lindberg, 1930: 413 (15). And of other authors.

Dexistes (Tanakius) kitaharae Hubbs, 1918: 371 (12).

Tanakius kitaharae Jordan and Hubbs, 1925: 300 (13).

Glyptocephalus kitaharae (in part) Schmidt, 1929: 367 (14).

Glyptocephalus kitaharae Schmidt, 1931a: 318 (16).

Glyptocephalus (Tanakius) kitaharae Schmidt, 1931b: 127 (17).

2. *Microstomus achne* (Jordan and Starks)

Veraequa achne Jordan and Starks, 1904: 625, pl. 7, fig. 1 (3); 1906: 210, fig. 16 (5). Jordan, Tanaka and Snyder, 1913: 328, fig. 277 (8). Schmidt, 1931b: 127 (17).

Microstomus stelleri Jordan and Starks, 1906: 225, fig. 22 (5). Snyder, 1912: 440 (7). Jordan, Tanaka and Snyder, 1913: 331, fig. 280 (8). Hubbs, 1915: 489 (9). Tanaka, 1916b: 390, pl. 106, fig. 326 (10). Hubbs, 1918: 371 (12). Jordan and Hubbs, 1925: 300 (13). Schmidt, 1929: 366 (14). Soldatov and Lindberg, 1930: 412 (15). And of other authors.

Microstomus achne Hubbs, 1918: 371 (12).

Microstomus sp. Schmidt, 1931a: 318 (16).

3. *Glyptocephalus stelleri* (Schmidt)

Microstomus Stelleri [*nomen nudum*] Schmidt, 1903: 522 (2); 1904 (October): 246 (4).

Glyptocephalus stelleri Schmidt, 1931a: 318 (16); 1931b: 127 (17).

Glyptocephalus [species not named] Jordan and Starks, 1906: 226 (5).

Glyptocephalus ostroumowi Pavlenko, 1910: 59, pl. 2, fig. 13a, b (6).

Hubbs, 1915: 491 (9). Jordan and Hubbs, 1925: 301 (13).

Glyptocephalus ostroumowi Soldatov and Lindberg, 1930: 414 (15).

Glyptocephalus sasae Snyder, 1911: 548, and 1912: 440, pl. 49, fig. 1 (7). Jordan, Tanaka and Snyder, 1913: 332 (8).

Microstomus hireguro Tanaka, 1916a: 67, and 1917: 447, pl. 122, fig. 351 (11).

Glyptocephalus kitaharae (in part) Schmidt, 1929: 367 (14).

LITERATURE CITED

HUBBS, CARL L.

1915 Flounders and soles from Japan collected by the United States Bureau of Fisheries Steamer "Albatross" in 1906. Proc. U. S. Nat. Mus., 48: 449-496, pls. 25-27.

1918 Supplementary notes on flounders from Japan with remarks on the species of *Hippoglossoides*. Ann. Zool. Jap., 9 (4): 369-376.

JORDAN, DAVID STARR, and HUBBS, CARL LEAVITT

1925 Record of fishes obtained by David Starr Jordan in Japan, 1922. Mem. Carn. Mus., 10 (2): 93-346, pl. 5-12, fig. 1.

JORDAN, DAVID STARR, and STARKS, EDWIN CHAPIN

1904 List of fishes dredged by the Steamer Albatross off the coast of Japan in the summer of 1900, with descriptions of new species and a review of the Japanese Macrouridae. Bull. U. S. Fish. Comm., 22, 1902: 577-630, 52 figs., pls. 1-8.

1906 A review of the flounders and soles of Japan. Proc. U. S. Nat. Mus., 31: 161-246, figs. 1-27.

JORDAN, DAVID STARR, TANAKA, SHIGEHO, and SNYDER, JOHN OTTERBEIN

1913 A catalogue of the fishes of Japan. Jour. Coll. Sci., Imp. Univ. Tokyo, 33: 1-497, figs. 1-396.

OTAKI, KEINOSUKE

1897 Pleuronectidae of Japan. Jour. Fish. Bur., Tokyo, 6: 4-9, 4 pls.

(2): 1-95, pls. 1-10, figs. 1-13. (In Russian.)

PAVLENKO, M. N.

1910 Fishes of Peter the Great Bay. Trd. Obšč. Jest. Kazan', 42

SCHMIDT, P. J.

- 1903 Sur les conditions physico-géographiques et la faune de la mer du Japon et de la mer d'Okhotsk. Bull. Imp. Russ. Geogr. Soc., 38 (5), 1902: 503-532. (In Russian.)
- 1904 Pisces marium orientaliu Imperii Rossici, St. Petersburg: I-XI, 1-464, figs. 1-31, pls. 1-6. (In Russian.)
- 1929 On the Pacific species of the genera *Microstomus* and *Glyptocephalus*. C. R. Acad. Sci. U.R.S.S., 1929: 363-368.
- 1931a On a collection of flat-fishes from Fusan (Korea). *Ibidem*, 1931: 313-320, fig. 1.
- 1931b Fishes of Japan, collected in 1901. Tran. Pac. Comm. Acad. Sci. U.S.S.R., 2: 1-176, figs. 1-30.

SNYDER, JOHN OTTERBEIN

- 1911 Descriptions of new genera and species of fishes from Japan and the Riu Kiu Islands. Proc. U. S. Nat. Mus., 40: 525-549.
- 1912 Japanese shore fishes collected by the United States Bureau of Fisheries Steamer "Albatross" expedition of 1906. *Ibidem*, 42: 399-450, pls. 51-61.

SOLDATOV, V. K., and LINDBERG, G. J.

- 1930 A review of the fishes of the seas of the Far East. Bull. Pac. Sci. Fish. Ind., Vladivostock, 5: I-XLVII, 1-576, figs. 1-76, pls. 1-16. (In Russian, with English summary.)

TANAKA, SHIGEO

- 1916a Nihon san gyoriui no ichi shinshû [a new species of Japanese fish]. Dobuts. Zasshi [Zool. Mag.], 28: 67. (In Japanese.)
- 1916b Figures and descriptions of the fishes of Japan, 22: 383-398, pls. 106-110.
- 1917 *Ibidem*, 25: 441-454, pls. 121-125.