HOKKAIDO UNIVERSITY

Title	A new righteye flounder, Poecilopsettamultiradiata (Teleostei: Pleuronectiformes: Poecilopsettidae), from New Zealand and New Caledonia (South-West Pacific)
Author(s)	Kawai, Toshio; Amaoka, Kunio; Séret, Bernard
Citation	Ichthyological Research, 57(2), 193-198 https://doi.org/10.1007/s10228-010-0153-7
Issue Date	2010-04
Doc URL	https://hdl.handle.net/2115/46856
Rights	The final publication is available at www.springerlink.com
Type	journal article
File Information	IR57-2_193-198.pdf

Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

A new righteye flounder, *Poecilopsetta multiradiata* (Teleostei: Pleuronectiformes: Poecilopsettidae), from New Zealand and New Caledonia (South-West Pacific)

Toshio Kawai · Kunio Amaoka · Bernard Séret

T. Kawai (✉)

Fisheries Science Center, The Hokkaido University Museum, 3-1-1 Minato-cho, Hakodate, Hokkaido 041-8611, Japan

e-mail: kawai@museum.hokudai.ac.jp

K. Amaoka

Hokkaido University, 3-1-1 Minato-cho, Hakodate, Hokkaido 041-8611, Japan

e-mail: amaoka@fish.hokudai.ac.jp

B. Séret

Département Systématique et Evolution, Muséum National d'Histoire Naturelle, CP 51, 55 rue Buffon, 75231 Paris cedex 05, France

e-mail: seret@mnhn.fr

Corresponding author: Toshio Kawai, Fisheries Science Center, The Hokkaido University Museum, 3-1-1 Minato-cho, Hakodate, Hokkaido 041-8611, Japan; Phone +81-138-40-5553; e-mail: kawai@museum.hokudai.ac.jp

Short running title: New poecilopsettid from SW Pacific

Manuscript category: Full papers

Number of text pages: 11; Number of figures: 2; Number of tables: 2

Abstract A new righteye flounder, *Poecilopsetta multiradiata*, is described from eight specimens (two males and six females) collected from deep waters (336–408 m) around New Zealand and New Caledonia (South-West Pacific). This new species is distinguished from its 14 congeners by the following combination of characters: high numbers of dorsal (70–73) and anal (58–62) fin rays, ca. 85–99 lateral-line scales, 31–32 caudal vertebrae, and relatively shallow body depth 36.9–41.9% SL.

Keywords *Poecilopsetta multiradiata* sp. nov. · Poecilopsettidae · Pleuronectiformes · New Zealand · New Caledonia · SW Pacific

Introduction

The Poecilopsettidae (sensu Chapleau and Keast 1988) consist of three genera, *Poecilopsetta* Günther 1880, *Nematops* Günther 1880, and *Marleyella* Fowler 1925. *Poecilopsetta* differs from *Marleyella* in lacking the prolonged anterior rays of the dorsal and pelvic fins that are present in the latter genus (e.g., Norman 1934; Hoshino et al. 2001). Most ichthyologists had separated *Poecilopsetta* from *Nematops* primarily because *Poecilopsetta* spp. lack tentacles on their eyes (vs. having a tentacle on both eyes or only on lower eye in *Nematops*) (e.g., Norman 1934; Sakamoto 1984, 1993; Hoshino et al. 2001). Guibord and Chapleau (2004), however, reported specimens of *Nematops macrochirus* Norman 1931 that lacked tentacles on the eyes, and distinguished *Poecilopsetta* from *Nematops* by the absence of an ocular-side nasal bone, and by the presence of two proximal pterygiophores between the first anal fin pterygiophore and hemal spine of the first caudal vertebrae (vs. ocular-side nasal bone present and three proximal pterygiophores between first anal fin pterygiophore and hemal spine of first caudal vertebrae in *Nematops*).

Members of the genus *Poecilopsetta* are characterized by a narrow mouth, tooth bands present on all jaws, absence of vomerine and palatine teeth, dorsal fin origin located at the vertical through the middle of the upper eye, and with moderate or small scales, either ctenoid or cycloid on the ocular side, and cycloid on the blind side (Günther 1880; Norman 1934). The genus contains 14 species (Quéro et al. 1988; Hoshino 2000; Guibord and Chapleau 2001, 2002; Hoshino et al. 2001; Kawai and Amaoka 2006), inhabiting deep waters of the Indian, western and central Pacific, and western Atlantic oceans.

From the waters around New Zealand, two specimens of *Poecilopsetta* were captured during the surveys operated by the Japan Marine Fishery Resource Research Center (JAMARC; today known as Marine Fisheries Research and Development Center), New Zealand Fisheries Agency, and New Zealand Fisheries Training Center in 1975 and 1976, and from 1979 to 1986, and

described as an unidentified species as *Poecilopsetta* sp. (Amaoka 1990). In 1985, 1989, 1993, and 1994, six additional specimens of same species were obtained during deepwater collections around New Caledonia by the French "Institut de Recherche pour le Développement" (IRD, formerly ORSTOM). Based on these eight specimens, a new species of *Poecilopsetta* is herein described.

Materials and methods

Specimens examined are deposited in the collections of the Hokkaido University Museum, Hakodate, Japan (HUMZ), the Muséum national d'Histoire naturelle, Paris, France (MNHN), the Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand (NMNZ), the National Museum of Nature and Science, Tokyo, Japan (NSMT), and the National Museum of Natural History, Maryland, USA (USNM). Counts and proportional measurements follow those of Hubbs and Lagler (1958), except that dorsal and anal fin rays were counted individually. Standard and head lengths are abbreviated as SL and HL, respectively. All measurements were made with dial calipers. Numbers of vertebrae were determined from radiographs. Lateral-line scales were estimated by counting scale pockets when specimens lose their scales. Sex of individuals was determined by examination of ovary development through the body cavity, i.e. the ovary extends to the middle of ventral body.

Poecilopsetta multiradiata sp. nov. (Fig. 1; Table 1)

Poecilopsetta sp.: Amaoka 1990: 326 (description).

Holotype. MNHN 2008-2205, female, 130 mm SL, 18°55′12″S, 163°24′13″E, 452–420 m, RV *Alis*, Cr. BATHUS 4, St. CP928, 7 August 1994, beam trawl.

Paratypes. MNHN 1994-0814, female, 110 mm SL, 18°56.80′S, 163°17.70′E, 440–450 m, RV *Alis*, Cr. MUSORSTOM 4, St. CP180, 18 September 1985; MNHN 2008-2206, female, 112 mm SL, MNHN 2008-2207, female, 119 mm SL, MNHN 2008-2208, male, 88.1 mm SL, 23°41.42′S, 168°15.50′E, 383–408 m, RV *Alis*, Cr. BATHUS 3, St. CP811, 28 November 1993, beam trawl; MNHN 2008-2209, female, 126 mm SL, 21°03.55′S, 167°32.25′E, 480 m, RV *Alis*, Cr. MUSORSTOM 6, DW465, 21 February 1989, Warren dredge; NMNZ P.045941 (formerly NSMT-P 41512), female, 165 mm SL, NSMT-P 41513, male, 155 mm SL, 28°44′S, 172°57′E, 336 m, RV *Shinkai-maru*, 25 April 1985, otter trawl.

Diagnosis. A species of the genus *Poecilopsetta* with the following combination of characters: high number of dorsal (70–73) and anal (58–62) fin rays, ca. 85–99 lateral-line scales, 31–32 caudal vertebrae, and relatively shallow body depth (36.9–41.9% SL).

Description. Condition of the holotype are listed first, followed by paratypes in parentheses.

Head length 20.8 (19.6–22.4)% SL; body depth 41.2 (36.9–41.9); snout length 2.5 (2.3–3.2); upper eye diameter 6.4 (6.7–8.9); lower eye diameter 7.0 (5.9–8.1); orbit length 9.1 (7.3–9.5); interorbital width 0.5 (0.4–0.6); ocular-side upper jaw length 6.7 (5.3–6.9), blind-side upper jaw length 5.9 (4.9–5.8); ocular-side lower jaw length 8.9 (7.7–9.2), blind-side lower jaw length 8.8 (7.7–9.0); caudal-peduncle depth 12.6 (9.3–12.4); caudal-peduncle length 7.4 (7.0–8.6); ocular-side pectoral fin length 10.6 (9.9–11.6), blind-side pectoral fin length 10.1 (8.4–11.2); ocular-side pelvic fin length 11.6 (9.6–11.5), blind-side pelvic fin length 9.6 (9.0–11.1).

Body compressed and elliptical. Head small and compressed. Snout short. Ocular-side anterior nostril a short tube situated on snout anterior to lower eye on the horizontal through middle of lower eye; ocular-side posterior nostril very short tube situated at anterior margin of interorbital space. Eyes dextral and small, separated by narrow bony ridge. Mouth small and oblique, maxilla extending to point between verticals through anterior margin of pupil and

mid-point of lower eye; tip of lower jaw with very small symphysial knob; lower jaw extending to vertical through middle of lower eye; band of small teeth on each jaw, tooth bands on blind-side jaws more developed than those on ocular-side jaws. Vomer and palatines toothless. Gill rakers on first arch not serrated, and slender on both limbs. Gill membranes united.

Scales very small and deciduous; ctenoid on ocular side, cycloid on blind side. Eyes, both jaws, and snout from tip to anterior interorbital region scaleless. Lateral line on ocular side strongly curved above pectoral fin; lateral line absent on blind side.

Dorsal fin origin on blind side of head at point equal with vertical through middle of upper eye. Anal fin origin posterior to anus on mid-ventral line. All dorsal fin rays, except for first ray, and all anal fin rays simple. First dorsal fin ray usually branched (simple in MNHN 2008-2207 and 2008-2208). Pectoral fin on both sides small; anterior 3 (2–3) rays on ocular side and all rays on blind-side fin simple. Pelvic fins small, first ray on blind-side fin opposite third ray of ocular-side fin; all ocular-side pelvic fin rays usually branched (all unbranched in MNHN 2008-2208), posterior 4 (0–4) rays branched in blind-side pelvic fin. Caudal fin rounded, inner 14 (15 in MNHN 1994-0814) rays branched, other rays simple. Anus on mid-ventral line. Urogenital papilla very small, located on ocular side slightly dorsal to anus.

Color in alcohol. Ocular-side body uniformly brown (faded to pale brown in MNHN 1994-0814, NMNZ P.045941, and NSMT-P 41513). Dorsal and anal fins dusky, except for base and tip of each fin (faded in MNHN 1994-0814, NMNZ P.045941, and NSMT-P 41513). Blind-side body uniformly milky-white. Ocular-side pectoral fin dark brown (faded in MNHN 1994-0814, NMNZ P.045941, and NSMT-P 41513); blind-side pectoral fin milky-white. Ocular-side caudal fin dusky, with two black spots near dorsal and ventral margins.

Distribution. *Poecilopsetta multiradiata* is known from New Zealand and New Caledonia, 336–480 m depth.

Etymology. This new species is named from the Latin *multus* (numerous) and *radius* (rays) in reference to its high number of dorsal fin rays.

Discussion

The higher number of dorsal fin rays (70–73) in *P. multiradiata* sp. nov. easily distinguishes this new species from following 13 congeners, *Poecilopsetta albomaculata* Norman 1939, *Poecilopsetta beanii*(Goode 1881), *Poecilopsetta colorata* Günther 1880, *Poecilopsetta dorsialta* Guibord and Chapleau 2001, *Poecilopsetta inermis* (Breder 1927), *Poecilopsetta macrocephala* Hoshino, Amaoka, and Last 2001, *Poecilopsetta natalensis* Norman 1931, *Poecilopsetta normani* Foroshchuk and Fedorov 1992, *Poecilopsetta pectoralis* Kawai and Amaoka 2006, *Poecilopsetta plinthus* (Jordan and Starks 1904), *Poecilopsetta praelonga* Alcock 1894, *Poecilopsetta vaynei* Quéro, Hensley, and Maugé 1988, and *Poecilopsetta zanzibarensis* Norman 1939, but 59–70 dorsal in *Poecilopsetta hawaiiensis* Gilbert 1905 slightly overlaps with that in *P. multiradiata*. In addition, 58–62 anal fin rays in *P. multiradiata* separates those in 12 congeners, except for 52–59 in *P. hawaiiensis* and 45–59 in *P. plinthus* (see Table 2). Hoshino et al. (2001) pointed out that the number of lateral-line scales is a useful character for species identification in *Poecilopsetta*. *Poecilopsetta multiradiata* is distinguished from seven Indo-Pacific (*P. dorsialta*, *P. inermis*, *P. macrocephala*, *P. natalensis*, *P. normani*, *P. plinthus*, and *P. vaynei*) and one Atlantic congeners (*P. albomaculata*) in having ca. 85–99 lateral-line scales. Lateral-line scale counts for these other species are either higher or lower, but are non-overlapping with those of *P. multiradiata* (see Table 2). Lateral-line scale counts of *P. multiradiata* overlap the ranges of counts for remaining five Indo-Pacific (*P. colorata*, *P. hawaiiensis*, *P. pectoralis*, *P. praelonga*, and *P. zanzibarensis*) and one Atlantic (*P. beanii*) congener (see Table 2).

Comparisons of dorsal and anal fin ray counts, and lateral-line scales among species included in *Poecilopsetta* indicated that, ranges of these three characters for *P. multiradiata* overlapped only those of *P. hawaiiensis* (see Table 2). Our detailed comparison between *P.*

multiradiata and *P. hawaiiensis* (Table 1) shows that the former species easily distinguished from the latter in having 31–32 caudal vertebrae (vs. 28–30), and has a more slender body (depth 36.9–41.9% SL vs. 44.2–57.4 % SL in *P. hawaiiensis*) (Fig. 2).

Poecilopsettid species are previously unknown from waters around New Zealand, and *P. multiradiata* represents the first record for the Poecilopsettidae from this region. For New Caledonian waters, *P. multiradiata* represents the second species of the Poecilopsettidae from that region, with *P. pectoralis* also having been reported from off New Caledonia (see Kawai and Amaoka 2006).

Comparative materials. *Poecilopsetta hawaiiensis*: HUMZ 145555–145567, 86.5–130 mm SL, 13 specimens, Hawaii Islands, 21°01.4′N, 156°46.5′W to 21°00.4′N, 156°45.4′W, 210–241 m, 13 November 1967; USNM 51638, 98.8 mm SL, holotype of *P. hawaiiensis*, USNM 51690, 80.6–119 mm SL, paratypes of *P. hawaiiensis*, 8 specimens, south coast of Oahu Island, Hawaii Islands, 386 m, 27 March 1902.

Acknowledgments We sincerely thank W. J. Richards (National Marine Fisheries Service, Southeast Fisheries Science Center, NOAA) for his critical reading of a draft of the manuscript. We are grateful to J. Rivaton (IRD, Noumea), P. Pruvost and R. Causse (MNHN), and J. T. Williams and S. J. Raredon (USNM) for providing specimens, and A. Stewart (NMNZ) and G. Shinohara (NSMT) for their acceptance of specimen transfer. We are also grateful to K. Nakaya (Hokkaido University), M. Yabe and H. Imamura (Graduate School of Fisheries Sciences, Hokkaido University), E. Mihara (Hokkaido Wakkanai Fisheries Experiment Station), and K. Hoshino (Seikai National Fisheries Research Institute, Fisheries Research Agency) for their helpful suggestions. Our thanks go to T. P. Satoh (NSMT) for preparing literatures, and to N. Kanehira (Faculty of Fisheries, Hokkaido University) for taking radiographs.

References

Alcock AW (1894) Natural history notes from H. M. Indian marine survey steamer "Investigator," Commander C.F. Oldham, R.N., commanding. Series II, no. 11. An account of a recent collection of bathybial fishes from the Bay of Bengal and from Laccadive Sea. J Asiatic Soc Bengal 63:115–137, pls 6–7

Amaoka K (1990) *Poecilopsetta* sp. In: Amaoka K, Matsuura K, Inada T, Takeda M, Hatanaka H, Okada K (eds) Fishes collected by the R/V Shinkai Maru around New Zealand. Japan Marine Fishery Resource Research Center, Tokyo, p 326

Breder CM Jr (1927) Scientific results of the first oceanographic expedition of the "Pawnee" 1925. Fishes. Bull Bingham Oceanogr Coll Yale Univ 1:1–90

Chapleau F, Keast A (1988) A phylogenetic reassessment of the monophyletic status of the family Soleidae, with comments on the suborder Soleoidei (Pisces; Pleuronectiformes). Can J Zool 66:2797–2810

Foroshchuk VP, Fedorov VV (1992) *Poecilopsetta normani*, a new species of flounder (Pleuronectidae) from Saya de Malha Bank, Indian Ocean. Vopr Ikhtiol 32:10–16

Fowler HW (1925) Fishes from Natal, Zululand and Portuguese East Africa. Proc Acad Nat Sci Phila 77:187–268

Gilbert CH (1905) The deep-sea fishes of the Hawaiian Islands. Bull US Fish Comm 23:577–713

Goode GB (1881) Fishes from the deep water on the south coast of New England obtained by the United States Fish Commission in the summer of 1880. Proc US Natl Mus 3:467–486

Guibord AC, Chapleau F (2001) *Poecilopsetta dorsialta*: a new species of Poecilopsettidae (Pleuronectiformes) from the Pacific Ocean. Copeia 2001:1081–1086

Guibord AC, Chapleau F (2002) *Poecilopsetta megalepis* Fowler 1934, un synonyme junior de

Poecilopsetta plinthus (Jordan and Starks, 1904) (Pleuronectiformes: Poecilopsettidae). Cybium 26:135–139

Guibord AC, Chapleau F (2004) *Nematops chui* Fowler, 1934: a junior synonym of *Nematops macrochirus* Norman, 1931 (Poecilopsettidae, Pleuronectiformes). Cybium 2004:262–264

Günther A (1880) Report on the shore fishes procured during the voyage of H. M. S. Challenger in the years 1873–1876. In: Report on the Scientific Results of the Voyage of H. M. S. Challenger During the Years 1873–76. Zool Rep Challenger Shore Fishes 1 (pt 6): 1–82, pls 1–32

Hoshino K (2000) Redescription of a rare flounder, *Poecilopsetta inermis* (Breder) (Pleuronectiformes: Pleuronectidae: Poecilopsettinae), a senior synonym of *P. albomarginata* Reid, from the Caribbean Sea and tropical western Atlantic. Ichthyol Res 47:95–100

Hoshino K, Amaoka K, Last P (2000) Description of transformation larvae and a juvenile of the dextral flounder, *Poecilopsetta praelonga* (Pleuronectidae, Poecilopsettinae) from the northwestern waters of Australia. Ichthyol Res 47:263–270

Hoshino K, Amaoka K, Last P (2001) A new dextral flounder, *Poecilopsetta macrocephala* (Pisces: Pleuronectiformes: Poecilopsettidae), from northwestern Australia. Species Divers 6:73–81

Hubbs CL, Lagler KF (1958) Fishes of the Great Lakes region. Bull Cranbrook Inst Sci 26:1–213

Jordan DS, Starks EC (1904) List of fishes dredged by the steamer Albatross off the coast of Japan in the summer of 1900, with description of new species and a review of the Japanese Macrouridae. Bull US Fish Comm 22:577–630, pls 1–8

Kawai T, Amaoka K (2006) A new righteye flounder, *Poecilopsetta pectoralis* (Pleuronectiformes: Poecilopsettidae), from New Caledonia. Ichthyol Res 53:264–268

Norman JR (1931) Two new flatfishes from the Indo-Australian Archipelago, with a synopsis of

the genera *Poecilopsetta* and *Nematops*. Treubia Buitenzorg 13:421–426

Norman JR (1934) A systematic monograph of the flatfishes (Heterosomata). 1. Psettodidae, Bothidae, Pleuronectidae. British Museum, London

Norman JR (1939) Fishes. The John Murray Expedition 1933–34. Sci Rep John Murray Exped 7:1–116

Quéro JC, Hensley DA, Maugé AL (1988) Pleuronectidae de l'ile de la réunion et de Madagascar. I. *Poecilopsetta*. Cybium 12:321–330

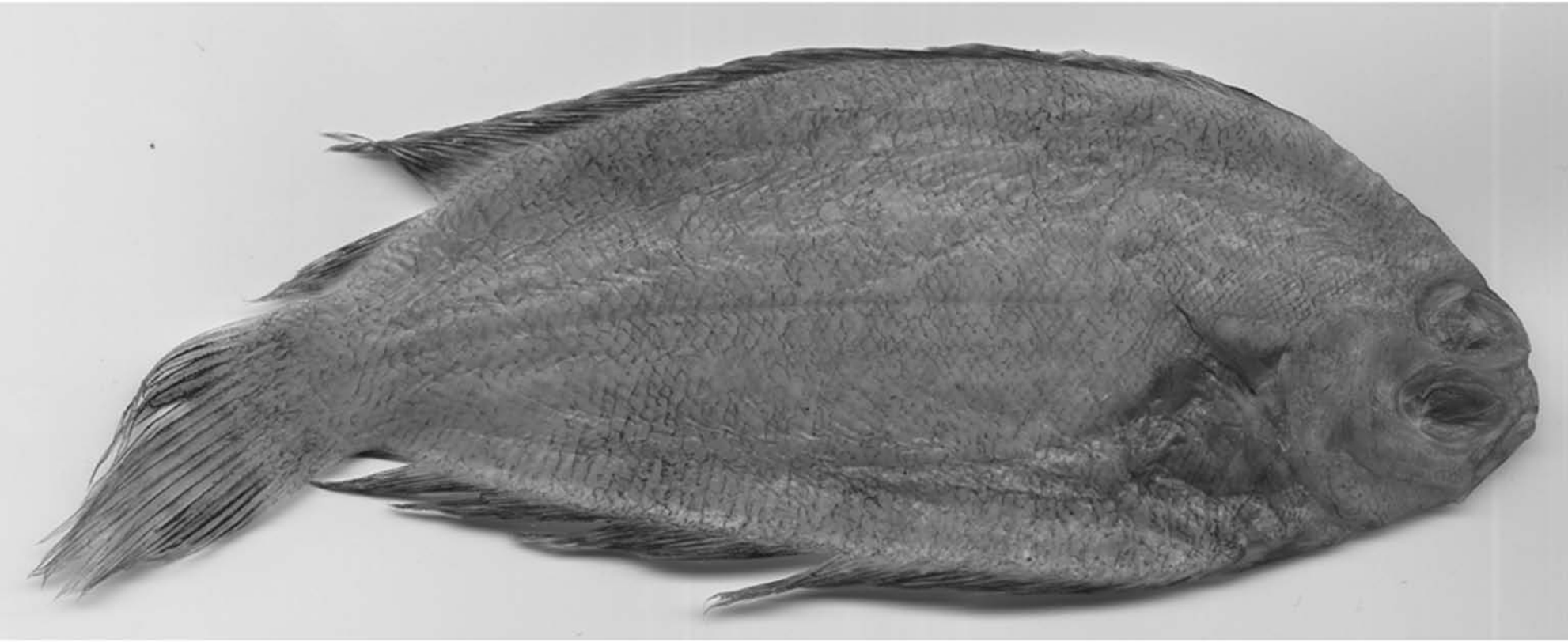
Sakamoto K (1984) Interrelationships of the family Pleuronectidae (Pisces: Pleuronectiformes). Mem Fac Fish Hokaido Univ 31:95–215

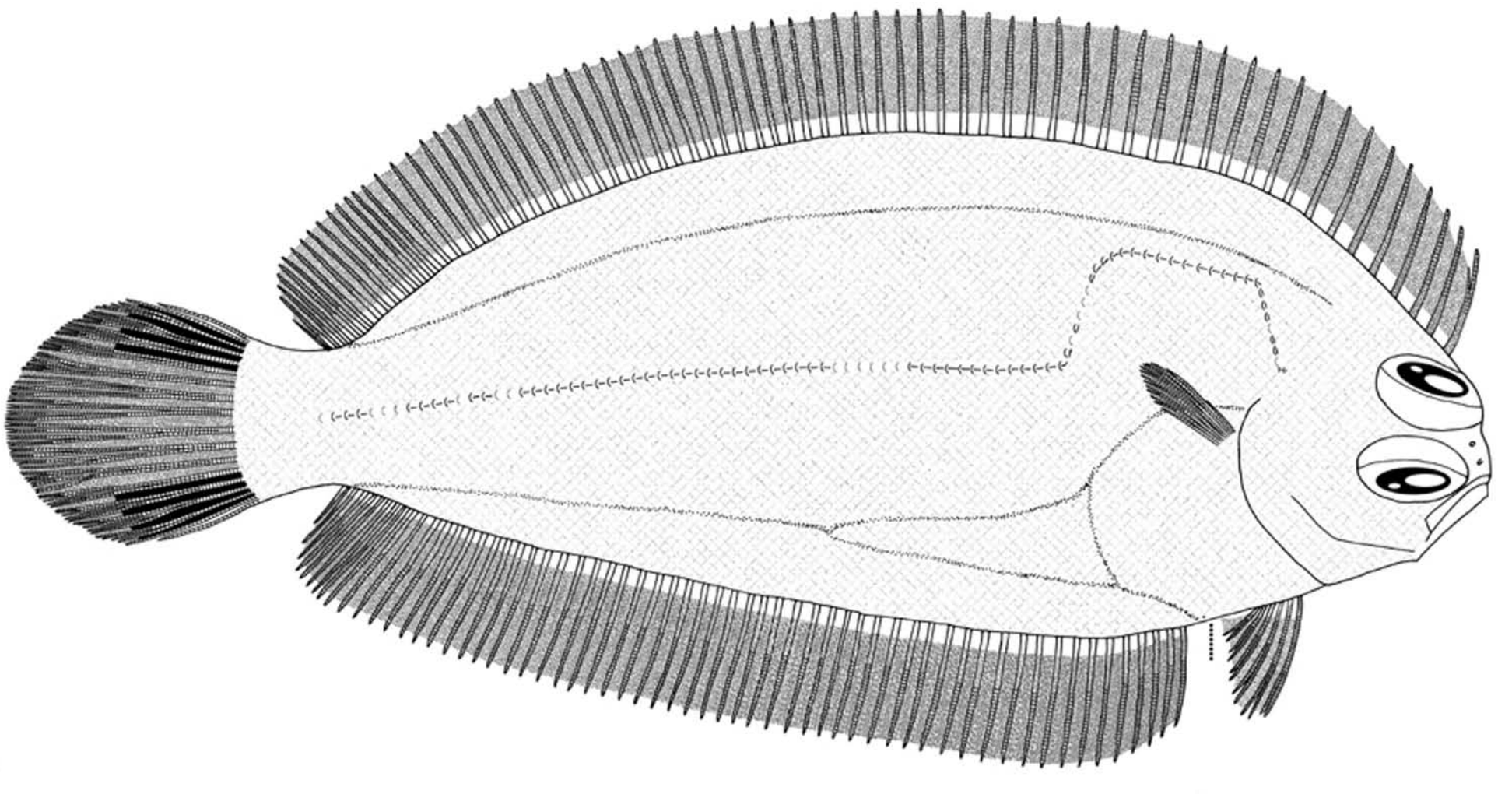
Sakamoto K (1993) A record of *Nematops macrochirus* (Pleuronectidae) from Australia, with comments on its sexual dimorphism. Jpn J Ichthyol 40:99–102

Figure legends

Fig. 1 Holotype of *Poecilopsetta multiradiata* sp. nov., MNHN 2008-2205, female, 130 mm SL, New Caledonia

Fig. 2 Comparison of body depth in *Poecilopsetta multiradiata* (*circles*) and *P. hawaiiensis* (*squares*). *Solid symbols* holotypes





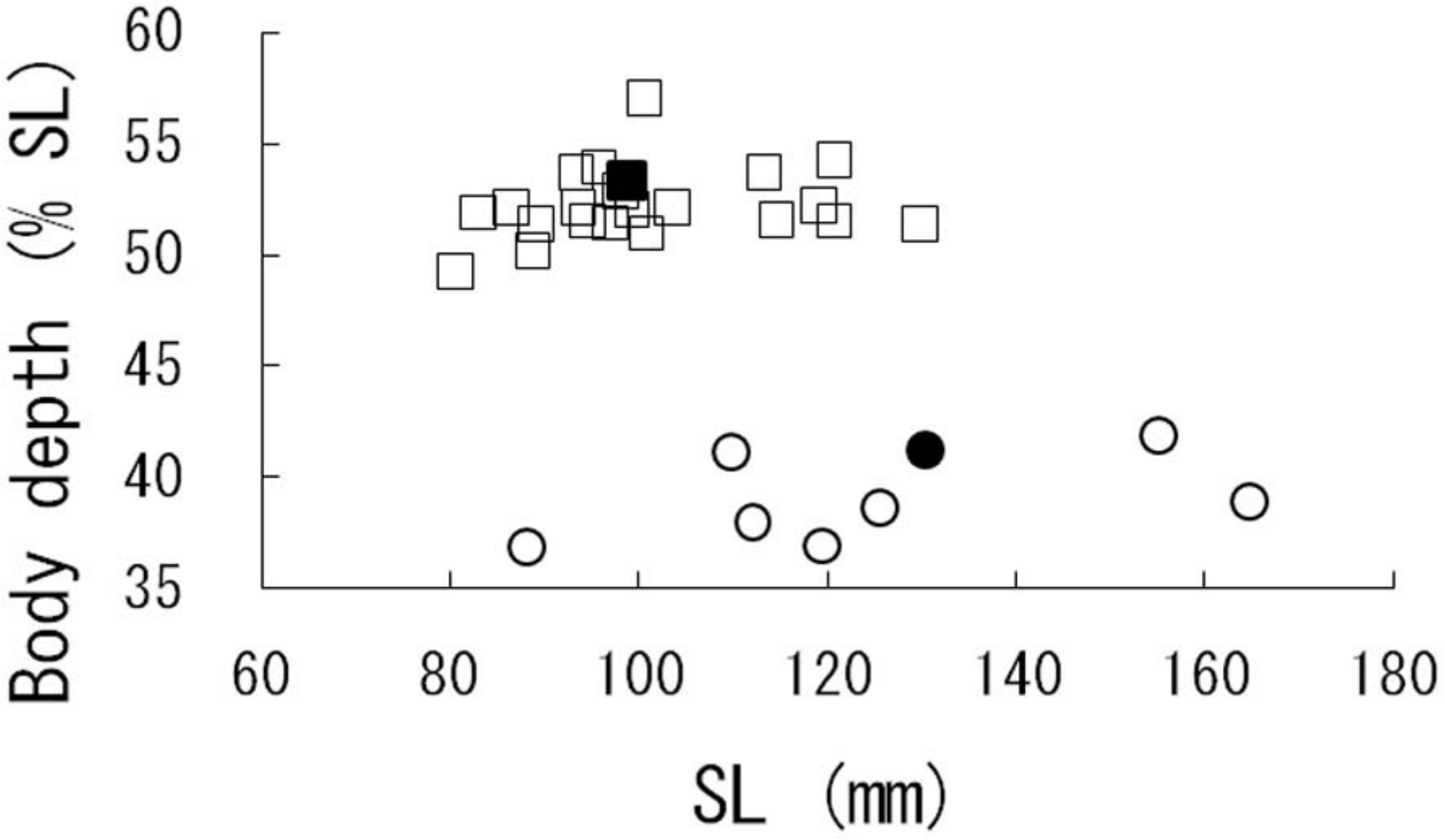

Body depth (% SL)
60
55
50
45
40
35
60
80
100
120
140
160
180
SL (mm)

Table 1 Comparison of counts and proportional measurements between *Poecilopsetta multiradiata* sp. nov. and *P. hawaiiensis*

	Poecilopsetta multiradiata sp. nov.		*P. hawaiiensis*[a]
	Holotype MNHN 2008-2205	Paratypes (n=7)	
Counts			
Dorsal fin rays	70	70–73	59–70 (65)
Anal fin rays	60	58–62	52–59 (54)
Pectoral fin rays on ocular side	9	9	8–12 (10)
Pectoral fin rays on blind side	8	8–9	5–10 (8)
Pelvic fin rays on ocular side	6	6	6 (6)
Pelvic fin rays on blind side	6	6	6 (6)
Caudal fin rays	20	20–21	20 (20)
Lateral-line scales	91	ca. 85–99	75–101 (85)
Gill rakers	8 + 13 = 21	8–9 + 12–13 = 20–21	7–10 + 11–13 = 18–23 (8 + 11 = 19)
Abdominal vertebrae	10	10	10 (10)
Caudal vertebrae	32	31–32	28–30 (29)
Standard length (SL, mm)	130	88.1–165	48.1–137 (98.8)
Measurements (in SL)			
Body depth	2.43	2.39–2.71	1.74–2.26 (1.87)
Head Length (HL)	4.81	4.46–5.04	3.49–4.51 (4.41)
Measurements (in HL)			
Snout length	8.21	6.58–8.80	6.82–8.48 (7.00)
Upper eye diameter	3.23	2.49–2.97	2.85–3.31 (3.03)
Lower eye diameter	2.98	2.76–3.37	2.88–3.34 (2.99)
Orbit length	2.28	2.31–2.73	2.56–3.71 (2.64)
Interorbital width	45.17	30.80–51.60	12.00–31.75 (14.93)
Upper jaw length on ocular side	3.11	3.18–3.79	3.04–4.06 (3.34)
Upper jaw length on blind side	3.52	3.80–4.13	2.91–4.08 (3.39)
Lower jaw length on ocular side	2.34	2.44–2.60	2.37–2.93 (2.38)
Lower jaw length on blind side	2.36	2.46–2.60	2.34–2.86 (2.38)
Pectoral fin length on ocular side	1.96	1.88–2.18	1.30–5.66 (1.66)
Pectoral fin length on blind side	2.07	1.87–2.37	1.83–6.52 (2.36)
Pelvic fin length on ocular side	1.79	1.82–2.09	1.88–3.40 (2.06)
Pelvic fin length on blind side	2.17	1.98–2.37	2.10–2.55 (2.06)
Depth of caudal peduncle	1.65	1.64–2.25	1.76–2.27 (1.82)
Length of caudal peduncle	2.82	2.41–3.22	2.81–3.51 (2.95)

[a] Gilbert (1905), Norman (1934), Hoshino et al. (2000), Guibord and Chapleau (2001), Kawai and Amaoka (2006), and present study. Data of holotype from present study in parenthesis

Table 2 Comparison of number of dorsal and anal fin rays, and lateral-line scales among 15 species of *Poecilopsetta*

	Dorsal fin rays	Anal fin rays	Lateral-line scales	Literature
P. multiradiata sp. nov.	70–73	58–62	ca. 85–99	Present study
P. albomaculata	60–61	51–53	ca. 140	Norman 1939
P. beanii	63–68	54–56[a]	ca. 80–ca. 88	Goode 1881; Norman 1934
P. colorata	55–62	46–53	90–124	Günther 1880; Norman 1934; Guibord and Chapleau 2001
P. dorsialta	58–62	45–52	73–83	Guibord and Chapleau 2001
P. hawaiiensis	59–70	52–59	75–101	Gilbert 1905; Norman 1934; Hoshino et al. 2000; Guibord and Chapleau 2001; Kawai and Amaoka 2006; present study
P. inermis	58–64	49–55	ca. 63–74	Breder 1927; Norman 1934; Hoshino 2000
P. macrocephala	62–66	53–56	75–78	Hoshino et al. 2001
P. natalensis	57–65	49–56	ca. 70–84	Norman 1931, 1934; Quéro et al. 1988; Guibord and Chapleau 2001; Hoshino et al. 2001
P. normani	64–68	55–56	126–147	Foroshchuk and Fedorov 1992
P. pectoralis	63–65	52–55	99–105	Kawai and Amaoka 2006
P. plinthus	59–69	45–59	54–68	Jordan and Starks 1904; Norman 1934; Guibord and Chapleau 2001, 2002
P. praelonga	57–65	45–55	91–113	Alcock 1894; Norman 1934; Hoshino et al. 2000; Guibord and Chapleau 2001
P. vaynei	65–67	55–56	72–83	Quéro et al. 1988; Hoshino et al. 2001
P. zanzibarensis	60–64	50–54	95–100	Norman 1939

[a]Goode (1881) described *P. beanii* as having 63 anal fin rays, but the value is probably incorrect and ignored because it is almost equivalent to the dorsal fin count (64), which is always higher than anal fin counts in flatfishes