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First records of *Evoxymetopon poeyi* (Teleostei: Trichiuridae) from Kanagawa Prefecture, Japan

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Abstract Two specimens of Poey's Scabbardfish (*Evoxymetopon poeyi* Günther, 1887) were collected off Aburatsubo, eastern Kanagawa Prefecture. Because the previous northernmost record of the species to date was of a single specimen from Tateyama Bay (southwestern Chiba Prefecture), the present specimens, described herein, represent the northernmost records of the species.

Key words: fish fauna, distribution, Actinopterygii, Sagami Bay, Scombroidei

Introduction

The cutlass fish genus *Evoxymetopon* Gill, 1863 comprises four valid species (i.e., *Evoxymetopon macrophthalmus* Chakraborty, Yoshino & Iwatsuki, 2006, *Evoxymetopon moricheni* Fricke, Golani & Appelbaum-Golani, 2014, *Evoxymetopon poeyi* Günther, 1887, and *Evoxymetopon taeniatus* Gill, 1863), only *E. moricheni* not having been recorded from Japanese waters (Nakamura and Parin 1993; Chakraborty et al. 2006; Nakabo and Doiuchi 2013; Fricke et al. 2014; Motomura 2020). Although *E. poeyi* has been widely recorded off the Pacific coast of southern Japan, from Chiba to Okinawa prefectures, there were no records of the species from Kanagawa Prefecture (Nakabo and Doiuchi 2013). However, two specimens collected off Aburatsubo Bay, southwestern Miura Peninsula (eastern Kanagawa Prefecture) were recently donated to the National Museum of Nature and Science, from Keikyu Aburatsubo Marine Park (closed down in September 2021), Miura City. These specimens, representing the first records of *E. poeyi* from Kanagawa Prefecture and the northernmost records of the species, are herein described in detail.

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Material and methods

Methods for counts and proportional measurements followed Sakiyama et al. (2011). All measurements were made with calipers to the nearest 0.1 mm, except for standard length, total length, dorsal-fin base length, and anal-fin base length (measured to the nearest 1 mm). Abbreviations: SL (standard length), NSMT (National Museum of Nature and Science, Tsukuba), and YCM (Yokosuka City Museum, Yokosuka).

Results

Evoxymetopon poeyi Günther, 1887

(Standard Japanese name: Hirenaga-yumetachi)

(Fig. 1)

Evoxymetopon poeyi Günther, 1887: 39, pl. 43 [type locality: Port Louis, Mauritius, ca. 128 m (70 fathoms) depth]; Wheeler 1969: 307 (Mauritius); Gushiken 1972: 47, fig. 238 (Ryukyu Islands, Japan); Abe and Asai 1975: 1, unnumbered figs. (Cape Muroto, Kochi Prefecture and Hachijo-jima Island, Izu Islands, Japan); Nakamura 1982: 267, fig. 184 (Kyushu-Palau Ridge); Lee and Yang 1983: 240, fig. 38 [Shiaoliuchiu (currently Liuqiu Island), Taiwan]; Nakamura 1984: 220, pl. 224-D (Pacific coast of southern Japan; Kyushu-Palau Ridge; Mauritius); Yanagisawa 1987: 36, figs. 1, 2 (Kumanonada Sea, off Tahara, Koza Town, Wakayama Prefecture, Japan); Nakamura and Parin 1993: 88, fig. 162 (Mauritius, Okinawa and Kyushu-Palau Ridge); Nakabo 1993: 1141, unnumbered fig. (Pacific coast of southern Japan; Kyushu-Palau Ridge; Indian Ocean); Yamada 1997: 655, fig. 12 (Kyushu-Palau Ridge); Fricke 1999: 559 (Mauritius); Nakabo 2000: 1343, unnumbered fig. (Pacific coast of southern Japan; Kyushu-Palau Ridge; Indian Ocean); Randall and Lin 2000: 643 (South China Sea); Nakabo 2002: 1343, unnumbered fig. (Pacific coast of southern Japan; Kyushu-Palau Ridge; Indian Ocean); Shinohara et al. 2005: 439 (Ryukyu Islands, Japan); Chakraborty et al. 2006: 141, figs. 2A, 3A [Ryukyu Islands, Japan and Tungkang (currently Donggang), Taiwan]; Yamada et al. 2007: 954, unnumbered figs. (East China Sea); Hasegawa 2011: 9, unnumbered figs. (south of Omaezaki City, Shizuoka Prefecture, Japan); Kuramochi 2011: 57 (southwest off Chichi-jima Island, Ogasawara Islands, Japan); Ho et al. 2011: 617 (Cheng-gong, Taitung, Taiwan); Yamada and Kudo 2012: 114, fig. 1-10 (off Mera, Tateyama City, Chiba Prefecture, Japan); Izawa 2012: 1726 (off Cape Muroto, Kochi Prefecture,

Figure 1. Fresh specimen of *Evoxymetopon poeyi* collected from Sagami Bay, Kanagawa Prefecture, Japan (NSMT-P 143553, 1460 mm standard length).

Japan); Nakabo and Doiuchi 2013: 1645, unnumbered fig. [Japan (Omaezaki, Shizuoka Prefecture; Miwasaki, Wakayama Prefecture; Cape Muroto, Kochi Prefecture; Okinawa-jima Island; upper part of continental slope in East China Sea; Kyushu-Palau Ridge); Taiwan; Mauritius]; Fricke et al. 2014: 296, table 1 (Ryukyu Islands, Japan and Donggang, Taiwan); Chiang et al. 2014: 292, unnumbered fig. (eastern coast of Taiwan); Ikeda and Nakabo 2015: 506, pl. 223-2 (Shirahama and Kii Channel, Wakayama Prefecture, Japan); Hata et al. 2016: 321, fig. 1 (Yoron-jima Island, north of Tanega-shima Island, and mouth of Kagoshima Bay, Kagoshima Prefecture, Japan); Izawa 2016: 826 (off Cape Muroto, Kochi Prefecture, Japan); Hata 2017: 260, unnumbered fig. (Kagoshima Bay, Kagoshima Prefecture, Japan); Koeda and Ho 2017: 97, figs. 1, 2 (upper) (Kenting, southwestern part of Taiwan); Nakae et al. 2018: 334 (Naze, Amami-oshima Island, Amami Islands, Japan); Okamoto 2018: 391, unnumbered fig. (Amami-oshima Island, Amami Islands, Japan); Okamoto 2019: 397, unnumbered fig. (Amami-oshima Island, Amami Islands, Japan); Koeda 2019: 1166, unnumbered figs. (Kenting, southwestern part of Taiwan); Fabres 2020: 160 (Rapa Nui); Shimose 2021: 157, fig. E (Yaeyama Islands, Ryukyu Archipelago, Japan).

Evoxymetopon taeniatus (not of Gill): Tucker 1956 (in part): 99, fig. 13, table III (Mauritius).

Material examined 2 specimens (1360–1460 mm SL). NSMT-P 143460, 1360 mm SL, off Aburatsubo, Misaki, Miura City, Kanagawa Prefecture, Japan; NSMT-P 143553, 1460 mm SL, same locality, 22 Dec. 2020, coll. by FV Saen-maru.

Description Counts and measurements, expressed as percentages of SL, are given in Table 1. Body strongly compressed, elongate, ribbon-like; dorsal profile steeply elevated from snout tip

Table 1. Counts and measurements of *Evoxymetopon poeyi* from Sagami Bay, Kanagawa Prefecture, Japan.

	NSMT-P 143460	NSMT-P 143553
Standard length (SL; mm)	1360	1460
Counts		
Dorsal-fin elements	93	93
Pectoral-fin rays	12	11
Pelvic-fin rays	1	1
External anal-fin rays	18	20
Measurement		
As % of SL		
Total length	102.6	102.7
Preanal length	47.7	47.6
Head length	11.9	11.8
Snout length	4.5	4.5
Postorbital length	5.4	5.4
Preopercle length	2.1	2.3
Upper jaw length	4.0	4.2
Body depth at pectoral-fin base	7.3	7.6
Body width at pectoral-fin base	1.8	1.7
Body depth at anus	6.7	6.8
Body width at anus	1.5	1.6
Predorsal length	9.2	9.0
Dorsal-fin base length	91.5	91.5
Orbit diameter	2.1	2.1
Suborbital width	0.7	0.8
Interorbital width	1.5	1.6
Depth above lateral line at anus	3.6	3.6
Depth below lateral line at anus	3.2	3.3
Prepectoral-fin length	12.7	12.6
Pectoral-fin base	1.1	1.1
Length of pectoral fin	5.9	5.8
Prepelvic fin length	16.0	16.2
Length of pelvic fin	1.0	1.0
Preanal fin length	49.6	49.5
Anal-fin base length	48.9	48.3
Depth of caudal peduncle	0.4	0.4
Length of caudal peduncle	1.6	1.6

to dorsal-fin origin, thereafter more or less straight and parallel to body axis before gradually lowering from above origin of first external anal-fin ray to caudal peduncle; ventral profile more or less straight from lower-jaw tip to origin of first external anal-fin ray before subsequently rising to caudal peduncle; dorsal and ventral profiles of caudal peduncle nearly straight, parallel to body axis. Dorsal profile of head straight, forming prominent sagittal crest. Dorsal-fin origin located posterior to posterior margin of eye. First dorsal-fin spine compressed, elongate, plate-shaped. Dorsal contour of dorsal fin without notch, almost parallel to dorsal profile of body. Pectoral-fin roughly triangular, insertion below level of lower eye margin, behind posterior tip of opercle; anterior and posterior margins nearly straight, dorsal contour indented; dorsalmost point of anterior margin not reaching lateral line, below level of posterior margin (dorsalmost point extending above lateral line). Pelvic fins present, small, depressed, scale-like, without rays. Pelvic-fin insertion just below eighth dorsal-fin ray origin. Anal-fin origin just behind anus. First anal-fin spine small, scale-like; fin origin just below 34th or 35th dorsal-fin ray origin. Anterior part of anal fin (except first spine) embedded. Caudal fin forked; posterior tips of both lobes rounded; lower lobe distinctly larger than upper. Eye and iris round, orbit elliptical. Eye positioned laterally; 5.6 or 5.7 times in head length. Interorbital space distinctly keeled. Nostril single, slit-like, vertically elongate. Mouth large, posterior tip of maxilla beyond vertical through posterior margin of nostril but not that of anterior margin of eye. Posterior part of upper jaw completely concealed under lacrimal bone. Single row of conical teeth on both jaws. NSMT-P 143553 with single fang-like tooth on left side of anterior part of upper jaw; NSMT-P 143460 with fang-like teeth on both sides of anterior part of upper jaw, a single fang-like tooth on right side of upper jaw anterior tip. Tooth patch on tang. Gill rakers spine-like, pointed. Posterior margins of opercle and preopercle convex, rounded, smooth. Posterior margin of preopercle embedded in skin. Body scaleless. Lateral line single, originating just above opercle, nearly straight along body, terminating at caudal-fin base.

Coloration of fresh specimen—Body uniformly whitish-silver. Caudal peduncle to caudal-fin base and pectoral-fin base black. All fin soft rays white, semi-transparent. First dorsal-fin spine blackish. Spines of pelvic and anal fins whitish-silver. Pupil silver.

Distribution *Evoxymetopon poeyi* has been recorded from the northwestern Pacific, Japan and Taiwan, Mauritius, and Rapa Nui (Easter Island). In Japanese waters, the species has been recorded from Chiba (Tateyama City), Shizuoka (Omaezaki City), Wakayama, Kochi (Muroto Cape), and Kagoshima (mouth of Kagoshima Bay) prefectures, Ryukyu Islands (including

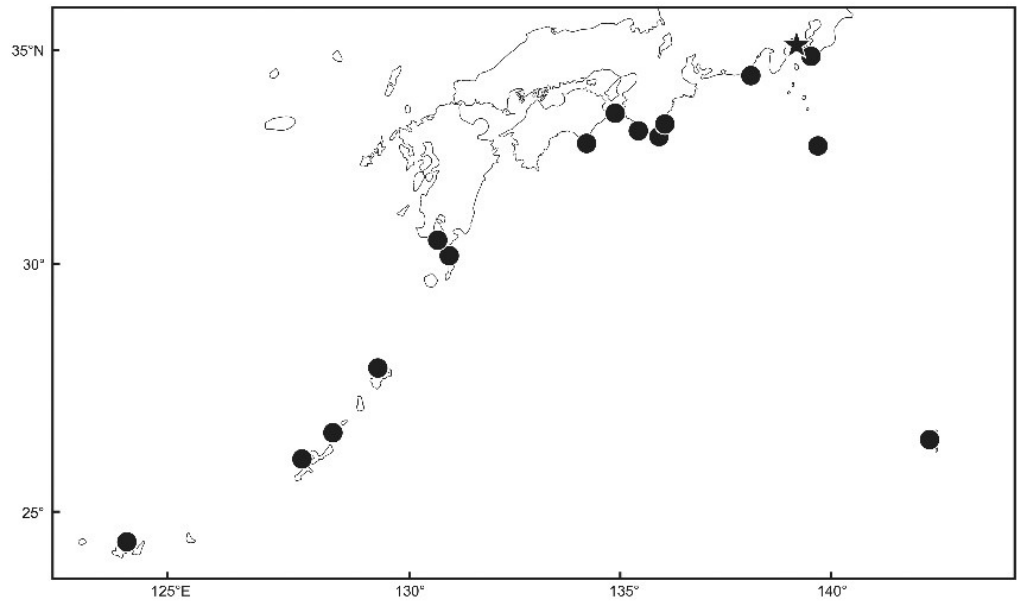

Figure 2. Distributional records of *Evoxymetopon poeyi* in Japanese waters. Star and circles represent localities of the specimens examined in this study, and previous records, respectively. Records from continental slope in East China Sea and Kyushu-Palau Ridge are omitted.

Amami, Osumi, and Yaeyama Islands), Izu Islands (Hachijo-jima Island), Ogasawara Islands (Chichi-jima Island), East China Sea, and Kyushu-Palau Ridge (see synonym list). It is newly recorded from Kanagawa Prefecture in this study (Fig. 2).

Identification The present specimens are assignable to the genus *Evoxymetopon* as defined by Nakamura and Parin (1993), having the following characters: distinctly forked caudal fin; pelvic fin and anal fin spines scale-like; head with a prominent sagittal crest; eye situated laterally; dorsal fin with 93 elements, without a notch on dorsal contour. Moreover, they were identified as *E. poeyi* on the basis of the following combination of characters, which closely matched the diagnostic features of *E. poeyi* given by Nakamura and Parin (1993), Chakraborty et al. (2006), Nakabo and Doiuchi (2013) and Fricke et al. (2014): dorsal fin originating behind posterior m argin of eye; elongated first dorsal-fin spine; slit-like nostril; upper profile of head straight, forming sagittal crest above eye; external anal-fin soft rays 18 and 20; orbit diameter 5.6 to 5.7 times in head length. Although Chakraborty et al. (2006) and Nakabo and Doiuchi (2013) reported external anal-fin ray counts of *E. poeyi* as 20, intraspecific variations in such counts range from 17 to 20 (Hata et al. 2016). As stated in "Description" the number of fang-like teeth on the anterior part of the upper jaw of the present specimens varies from one (NSMT-P 143553) to three (NSMT-P 143460). Because intraspecific variations of the teeth count of some trichiurid fishes, including

E. poeyi, have been reported, and fang-like teeth of *E. poeyi* often fall off (Nakamura 1982; Yamada et al. 2007; Hata et al. 2016; Koeda et al. 2018), differences of the number of fang-like teeth between the present specimens are considered as intraspecific variation.

Remarks The Japanese distribution of *E. poeyi* was detailed by Hata et al. (2016), and is summarized herein (see synonym list and Fig. 2). The previous northernmost record of the species was from waters off Mera (eastern Sagami Bay), Tateyama City, Chiba Prefecture, based on YCM-P 44938, 1430 mm SL and reported by Yamada and Kudo (2012). Therefore, the present specimens represent the northernmost records of the species, being the first records from Kanagawa Prefecture (facing northern Sagami Bay). The records of three specimens only from Sagami Bay, despite the fish fauna of the area having been well investigated (e.g., Senou et al. 2006), is indicative of the rarity of the species in the bay. Since Japanese records of *E. poeyi* have been found from areas strongly influenced by the Kuroshio Current, the species is likely to be additionally recorded off the southern coasts of Japan facing the Kuroshio Current (such as Izu Peninsula, Cape Ashizuri, and the eastern coast of Kyushu), in the future. Because distributional records of the species in Japan are all based on large individuals, commonly ranging from 1300–1800 mm (maximum 2000 mm; Nakamura and Parin 1993), their occurrences are possibly the result of transportation of large individuals by the Kuroshio Current. However, because few records of the species exist outside of Japanese waters, and no records of juveniles are known, present suggestions of Kuroshio Current transportation must remain speculative.

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