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First Record of *Bathyphylax omen* Tyler, 1966 from the Western Pacific (Actinopterygii, Tetraodontiformes, Triacanthodidae)

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Abstract A specimen (51.4 mm standard length) of the triacanthodid fish *Bathyphylax omen* Tyler, 1966 collected off central Honshu, Japan is reported with detailed description. This species was previously known only from three specimens collected off Kenya, western Indian Ocean. The present specimen represents the first record of this species from the western Pacific. The newly collected specimen reveals fresh color of this species for the first time. The specimen from Japan was identified as *B. omen* by its color pattern of the body and the dorsal profile of the snout. Taxonomic comments on distinguishing characters of *Bathyphylax bombifrons* Myers, 1934 and *B. omen* are provided.

Key words: spikefish, distribution, Japan, taxonomy, color pattern, *Bathyphylax bombifrons.*

Introduction

A strange looking deep-sea fish was captured off Kii Peninsula, central Honshu, Japan by a bottom trawler, Koei-maru, and brought to the third author by a local naturalist, Nobuo Aikawa. The specimen was then transferred to Kochi University for further study by the first and second authors. Our detailed examinations have revealed that the specimen is the rare triacanthodid *Bathyphylax omen* Tyler, 1966, previously known only from the holotype and two additional specimens collected off Kenya, East Africa (Tyler, 1966, 1968, 1983). The newly collected specimen represents the first record of this species from the western Pacific. It also provides fresh color of this species for the first time.

Methods

Counts and measurements follow Tyler (1968, 1983). Body width was measured between the pectoral-fin bases. Because the gill opening of spikefishes is very small, the counts of gill rakers and pseudobranch lamellae can obtained only when the gill opening is greatly cut downward by scalpel. We counted these characters only on the right side in order to minimize damage to the specimen. Abbreviations are as follows: SL, standard length and BSKU, Department of Biological Science, Kochi University. X-ray photograph was used to count the number of vertebrae.

Bathyphylax omen Tyler, 1966

(New Japanese standard name: Yami-kawamuki)

(Figs. 1–3)

Specimen examined. BSKU 127482, 51.4 mm

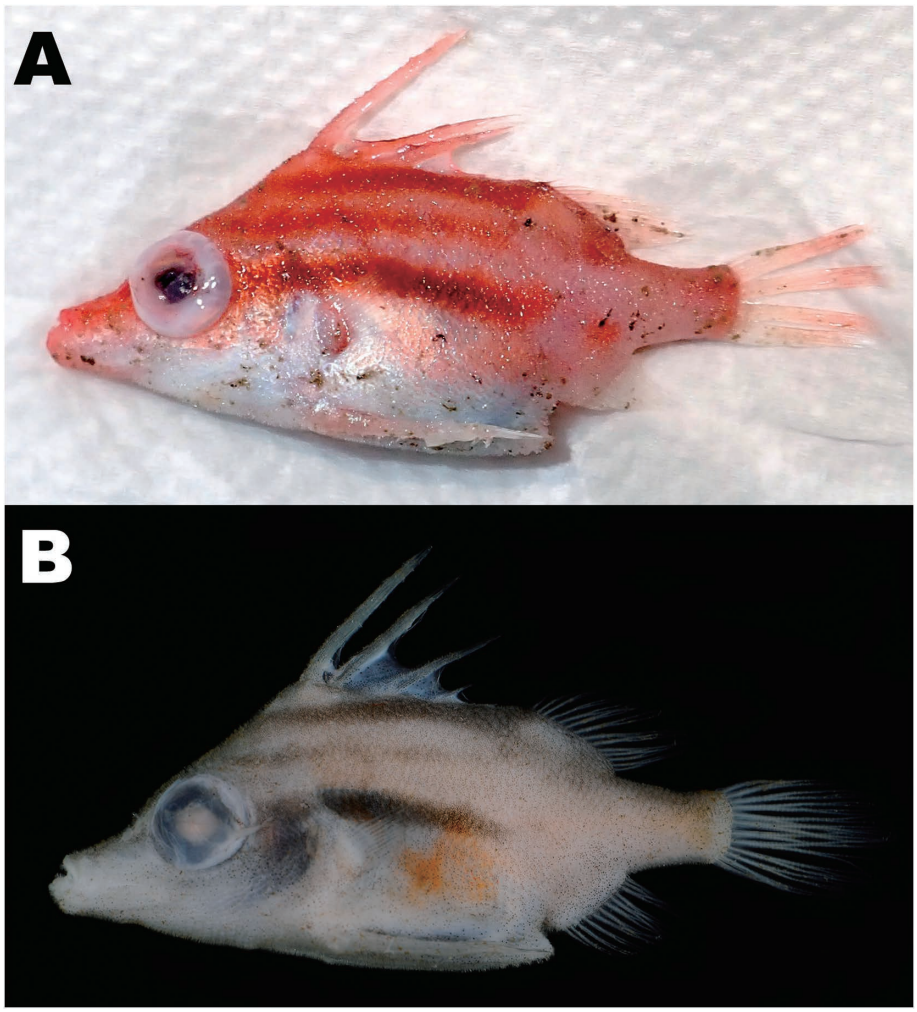

Fig. 1. *Bathyphylax omen*, BSKU 127482, 51.4 mm SL, Pacific coast of Kii Peninsula, southeast of Daiozaki Point, Honshu, Japan, photo by Atsushi Ujihara.

Fig. 2. Ventral view of pelvis of *Bathyphylax omen*, BSKU 127482, 51.4 mm SL, photo by Atsushi Ujihara.

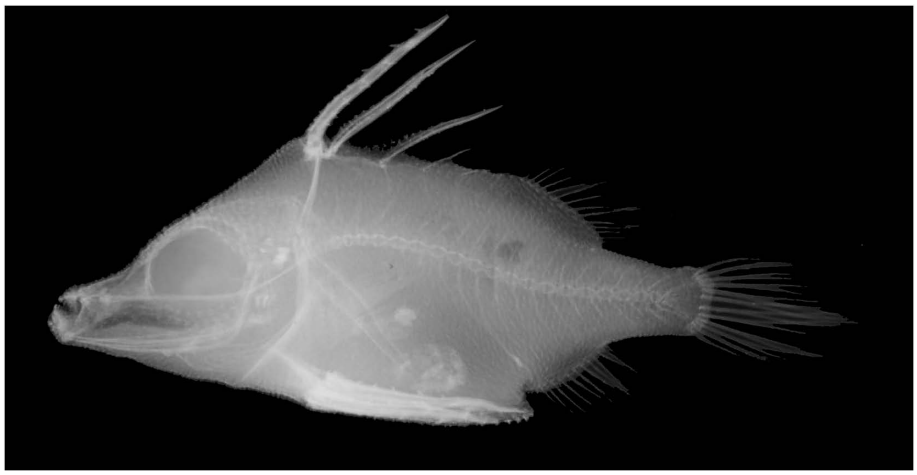

Fig. 3. X-ray photograph of *Bathyphylax omen*, BSKU 127482, 51.4 mm SL.

SL, Pacific coast of Kii Peninsula, southeast of Daiozaki Point, central Honshu, Japan, 360 m depth, bottom trawl, 13 December 2019.

Description. Dorsal-fin rays VI + 14; anal-fin rays 12; pectoral-fin rays 13 (both sides) pelvic-fin rays I + 1 (ray very short on right side, absent on left side); upper jaw teeth 16; lower jaw teeth 19; gill rakers 6 + 1 + 14 = 21 (right side); pseudobranch lamellae 8 (right side); olfactory lamellae 12 (right side); vertebrae 8 + 12 = 20. Head length 38.1% SL, snout length 15.2% SL, snout depth 12.1% SL, eye diameter 15.0% SL, postorbital length 8.4% SL, interorbital width 9.5% SL, mouth width 6.8% SL, gill opening length 4.9% SL, snout to spiny dorsal-fin origin 44.6% SL, body depth 40.3% SL, body width 19.5% SL, first dorsal-fin spine 30.9% SL, second dorsal-fin spine 28.0% SL, third dorsal-fin spine 21.5% SL, fourth dorsal-fin spine 5.8% SL, fifth dorsal-fin spine 1.8% SL, sixth dorsal-fin spine 2.0% SL, soft dorsal-fin base 14.0% SL, longest dorsal-fin ray 18.3% SL, anal-fin base 12.1% SL, longest anal-fin ray14.2% SL, caudal fin length 24.7% SL, caudal peduncle depth 9.9% SL, caudal peduncle length 16.1% SL, pelvic-fin spine 31.3% SL, pelvic-fin ray 2.5% SL, pelvic length 36.4% SL, pelvic width 16.1% SL; pelvic width in pelvic length 2.3 times.

Anterior three dorsal-fin spines long and well developed, the fourth spine much shorter than the third but protruding through the dorsal surface of body and easily seen, the fifth and sixth spines shorter than the fourth and not easily discernible; pelvis thin and basin-like, its ventral surface externally flat; snout shorter than rest of head, dorsal profile of snout slightly concave; mouth slightly supraterminal; teeth conical, arranged in a single series in each jaw; gill opening moderate, reaching ventrally to level of three-fourths down pectoral-fin base; pseudobranch short, reaching ventrally to level slightly above dorsal origin of pectoral-fin base; number of spinules per upper mid-body scale plate 4–8, arranged in a vertical row with an accessory spinule sometimes in front of or behind the major row.

Color when fresh: dorsal half of body pinkish, with three longitudinal distinct red stripes, the first originating around nape coursing along base of spiny dorsal fin to origin of soft dorsal fin, the second originating just behind postero-dorsal edge of orbit and running on side of body to end of soft dorsal-fin base, the third starting just behind posterior edge of orbit, running on mid body, curving very slightly down below third dorsal-fin spine, and ending just above posterior part of anal-fin base with a short disconnection below anterior part of soft dorsal fin; dorsal side of caudal peduncle reddish pink; dorsal half of snout reddish pink; ventral half of head and body anterior to anus white; ventral surface of pelvis

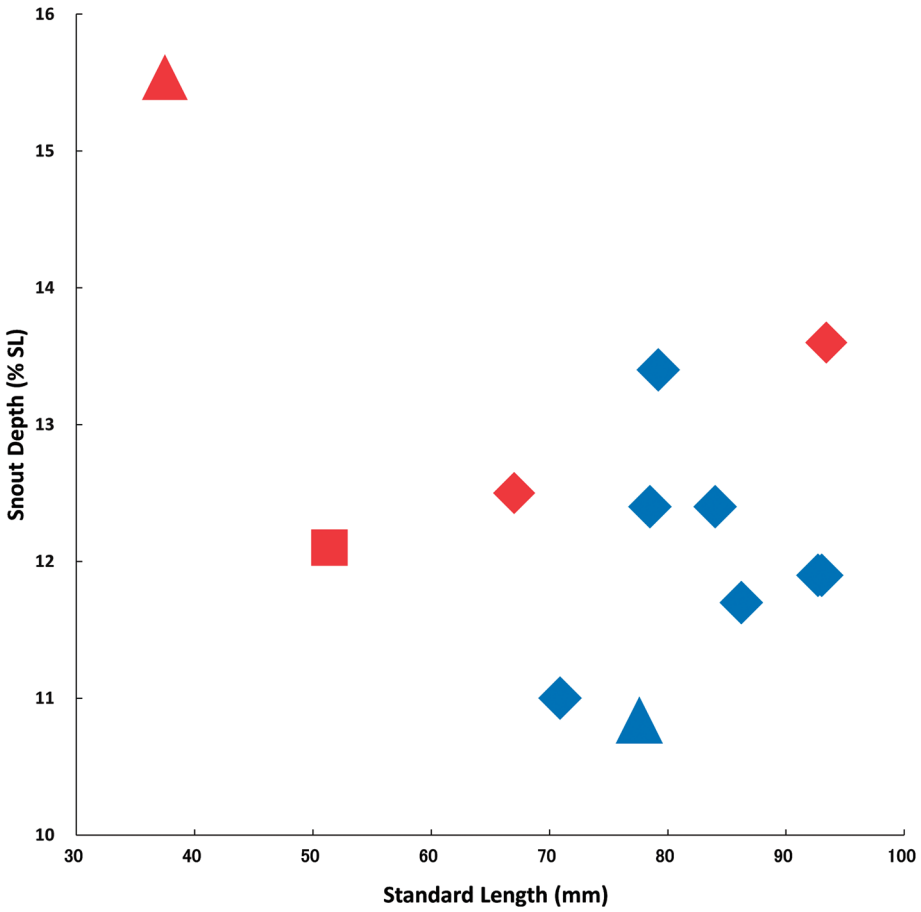

Fig. 4. Relationship of snout depth and standard length of *Bathyphylax bombifrons* (blue symbols) and *B. omen* (red symbols). Triangles: holotypes; square: *B. omen*, BSKU 127482.

white covered with many dark brown spots (Fig. 2); distal half of pelvic-fin spine white and proximal half light pink; dorsal-fin spines pink; rays of soft dorsal and caudal fins light pink; pectoral and anal-fin rays transparent.

Remarks. The spikefish genus *Bathyphylax* Myers, 1934 is differentiated from other spikefishes by the following combination of characters: the anterior three dorsal-fin spines well developed, much longer than the posterior three spines; mouth slightly supraterminal; pelvis thin and basin-like, its ventral surface externally flat and its width 1.3–2.7 times in its length; snout shorter than rest of head; teeth conical, arranged in a single series in each jaw; pseudobranch short, 12–16 lamellae, reaching ventrally to between levels of dorsal origin and very slightly below dorsal origin of pectoral-fin base (Tyler, 1968, 1983; Santini, 2006). *Bathyphylax* is currently known from three species, *B. bombifrons* Myers, 1934 (Indo-West Pacific), *B. omen* Tyler, 1966 (western Indian Ocean) and *B. purvosti* Santini, 2006 (Marquesas Islands).

Santini (2006) showed that *Bathyphylax purvosti* is easily distinguished from the other two species by its long snout (17–28% SL vs 14.9–15.8% SL in *B. bombifrons* and 13.8–15.5% SL in *B. omen*). *Bathyphylax bombifrons* is similar to *B. omen* but the dorsal profile of the snout is concave in *B. bombifrons* and slightly concave or relatively straight in *B. omen* Tyler (1968, 1983). Tyler (1983) tried to quantify the degree of con-

cavity of the snout by measuring the depth of the snout midway between the anterior tip of the dorsal lip and the anterior edge of the orbit. He measured the snout depth of five specimens of *B. bombifrons* and three specimens of *B. omen*. His measurements resulted in small differences between the two species: the snout depth is 10.8–13.4% (average 12.0%) SL in *B. bombifrons* and 12.5–15.5% (average 13.9%) SL in *B. omen* (Tyler, 1983). Matsuura and Tyler (1997) reported additional three specimens of *B. bombifrons* from New Caledonia in which the snout depth is 11.7–11.9% SL.

The newly collected specimen is identified as *Bathyphylax omen* by the fresh coloration clearly showing that the third red stripe originates just behind the posterior edge of orbit, running on the mid body, curving slightly down below the third dorsal-fin spine, and ends just above the posterior part of the anal-fin base with a short disconnection below the anterior part of the soft dorsal fin (Fig. 1A). When it was fixed and transferred to 70% ethanol, the third stripe changed its color from red to dark brown and ends at a level in front of the anal-fin origin (Fig. 1B): there is no dark marking, neither line nor spot, above the anal-fin base where the very short red line (looks like a red spot) is found in the fresh specimen.

Although previous authors did not have opportunities to see the fresh color of either *B. bombifrons* or *B. omen*, Tyler (1968, 1983) and Matsuura and Tyler (1997) reported the difference in the course of the running pattern of the third longitudinal stripe in preserved specimens of these two species. In *B. bombifrons*, the third line starts just behind the eye and courses over the pectoral-fin base, and curves distinctly downward toward the anus, whereas that of *B. omen* does not curve distinctly downward but, rather, continues along the body toward the end of the anal-fin base. In addition to the color, the dorsal profile of the snout of the specimen from Japan is slightly concave, which is another character of *B. omen*.

However, the depth of the snout in the specimen from Japan is 12.1% SL, which figure is included in the range of *B. bombifrons* but very close to the low end of the range of *B. omen*. In spite of Tyler's (1983) efforts to differentiate the two species by the snout depth, it is difficult to clearly separate them by the relationship of the proportional measurements of the snout depth and standard length (Fig. 4). Although we cannot deny the possibility that *B. omen* is a junior synonym of *B. bombifrons*, we identify the specimen from Japan as *B. omen* by the color pattern and the dorsal profile of the snout.

The third dorsal-fin spine of the specimen from Japan is 21.5% SL, longer than that of the previously reported specimens of *B. bombifrons* (13.4–13.8% SL) and *B. omen* (14.3–14.6% SL) (Tyler, 1983). The number of spinules per dorsal mid-body scale plate in the Japanese specimen is 4–8, being arranged in a vertical row, whereas there are 3–8 spinules in the previous specimens of *B. omen* (Tyler, 1983).

Hoese *et al.* (2006) included *Bathyphylax bombifrons* in the "Zoological Catalogue of Australia. Volume 35. Fishes"; however, they gave only distributions of this species in New South Wales and Queensland, without catalogue numbers of voucher specimens. When considering the similarity of *B. bombifrons* and *B. omen*, it is impossible to know which species or both they included in their record. This has led us to exclude Australian records of *B. bombifrons* until Australian specimens are examined.

The new Japanese standard names, "Yami-kawamuki zoku" and "Yami-kawamuki", are proposed for *Bathyphylax* and *B. omen*, respectively. "Yami" means "dark", implying "dark deep sea", the habitat of this species, "kawamuki" refers to spikefish, and "zoku" means genus.

Acknowledgments

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Koei-maru.

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