

Tuamotuichthys marshallensis, a new species of fish (Ophidiiformes, Bythitidae) from the Marshall Islands

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Steenstrupia



Nielsen, J. G., W. Schwarzhans, P. R. Møller & J. E. Randall. *Tuamotuichthys marshallensis*, a new species of fish (Ophidiiformes, Bythitidae) from the Marshall Islands. – *Steenstrupia* 29 (2): 169–173. Copenhagen, Denmark. November 2006. ISSN 0375-2909.

Tuamotuichthys marshallensis is described as a new species of bythitid fish from two specimens collected at Kwajalein Atoll, Marshall Islands. It differs from the only other known species of the genus, *T. bispinosus*, *i. a.* in the lack of scales on top of the head (*vs* scales present), head pores present on occiput and upper operculum (*vs* absent), hypobranchial bone of anterior gill arch with bony plates (*vs* plates absent), ventrally directed part of opercular spine hidden (*vs* spine free), otoliths with high dorsal rim and length-height ratio 2.0 (*vs* low and ratio 2.4) and soft interorbital width 5.8–6.3 % standard length (*vs* 3.8 %).

Keywords: Bythitidae, Bythitinae, *Tuamotuichthys*, new species, Marshall Islands.

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INTRODUCTION

Møller, Schwarzhans and Nielsen (2004) described a new genus and species of bythitid fish, *Tuamotuichthys bispinosus*, from the Tuamotu Archipelago based on a single male specimen. Shortly thereafter, Randall discovered two specimens of an unidentified bythitid fish in the collection of the Bishop Museum in Honolulu that he and colleagues had collected from a marine drop-off with caves in 46–55 m at Kwajalein Atoll, Marshall Islands in 1976. He sent the specimens to the Zoological Museum, Copenhagen, for further examination. They proved to be a second species of *Tuamotuichthys* which we describe in the present paper. As a consequence of the species herein described, the generic diagnosis of *Tuamotuichthys* is modified.

Revised generic diagnosis of *Tuamotuichthys* Møller, Schwarzhans & Nielsen, 2004

The genus has no unique apomorphic characters

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but differs from the other bythitine genera by the following combination:

Head profile above eyes moderately depressed; upper opercular spine strong and pointed; large scales on head and body; neural spines of vertebrae 5–6 to 12–14 with truncate tips; posterior part of maxilla expanded (5.5–5.9 % SL); palatine teeth present; anterior gill arch with three long rakers and the short rakers developed as plates with fine spines; otolith elongate with undivided sulcus; posterior supraorbital blind pore on a prominent skin flap above upper angle of opercle; pectoral fin rays 20–22; caudal fin rays 12–13; vertebrae 11–13 + 36–39 = 47–52.

TAXONOMY

Tuamotuichthys marshallensis n. sp.

Figs 1–3, Table 1

Material examined:

Type material. – **Holotype:** Female, 120 mm SL, Marshall Islands, south end of Kwajalein Atoll, 100 meters northwest



Fig. 1. Holotype of *Tuamotichthys marshallensis*. Female, standard length 120 mm. BPBM 19961.

of small boat passage, outside reef, steep drop-off with caves, rotenone, 46–55 meters, coll. J. E. Randall, N. A. Bartlett, P. Bartlett and K. Burnett, 7 April, 1976, BPBM 19961 (Bernice P. Bishop Museum, Honolulu). **Paratype:** Female, 111 mm SL, same data as for holotype, ZMUC P771494 (Zoological Museum, University of Copenhagen).

Diagnosis of T. marshallensis and differences from T. bispinosus (in brackets)

Downward-directed part of the opercular spine hidden (free); precaudal vertebrae 11 (13); dorsal fin origin above vertebra no. 5 (8); hypobranchial rakers of anterior gill arch developed as one large or five smaller plates provided with small spines (hypobranchial without rakers or plates); soft interorbital 5.8–6.3 % SL (3.8 % SL); maximum head depth 20.0–21.5 % SL (13.5 % SL); body depth at origin of anal fin 18.5–20.5 % SL (14.5 % SL); head pores present on occiput and upper preoperculum (absent); interorbital and occipital head pores present (absent); no scales on top of head (scales present); dorsal rim of otolith high (rim flat). – Differences in lengths of caudal, pectoral and pelvic fins are most probably caused by broken rays.

Description

All the main meristic and morphometric characters are presented in Table 1. The following description is specifically related to the holotype. Observed differences in the paratype are given in parentheses.

Body rather robust, highest just in front of dorsal fin, completely covered with ca. 2 mm long cycloid scales including the predorsal area; lateral line (Fig. 1) interrupted just behind the origin of the anal fin with the anterior, dorsally placed part beginning above the gill slit and the posterior, medially placed part ending at the base of the caudal fin. There are 25–30 scales in a vertical line from the origin of the anal fin and no scales on the vertical fins. Head moderately compressed above the eyes and with chin and opercle scaled, and snout, interorbital and top of head naked. Mouth slightly oblique with upper jaw protruding. Posterior edge of maxilla expanded with upper part sheathed and with a distinct knob just in front of rear ventral corner. Origin of dorsal fin above base of pectoral fins and origin of anal fin under midpoint of fish. Pelvic fins with one ray

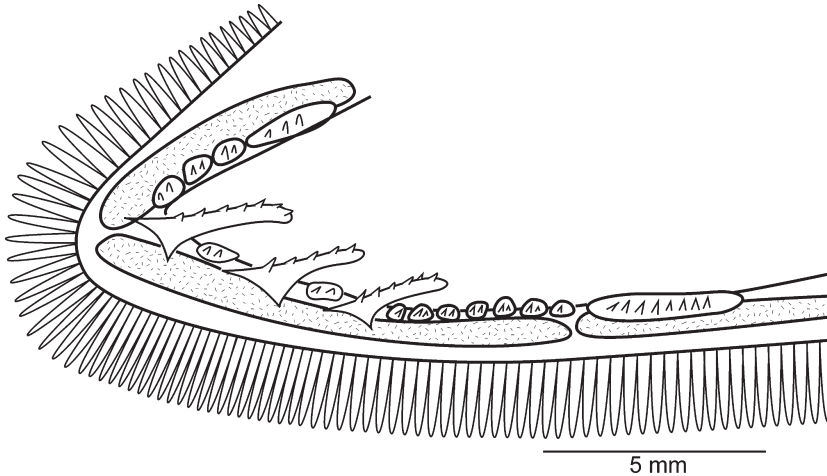


Fig. 2. Holotype of *Tuamotuichthys marshallensis*. Anterior right gill arch.

each almost reaching anus. Pectoral fins placed on midbody with peduncle higher than long. Anterior nostril closer to upper lip than to the larger posterior nostril. Opercular spines forming a V with the backward-directed, pointed spine free and the downward-directed, broad spine hidden under skin. Four concavities behind and two in front of each eye almost the size of the eye (three additional concavities between the eyes). Anterior gill arch (Fig. 2) with 3–4 rakers developed as flat, almost united plates with minute spines on the upper branch and a long raker in the angle between the two branches; the ceratobranchial part of the lower branch with two long rakers interspersed with two small plates followed by 6–7 almost coalescent flat plates and the hypobranchial part with four small and one larger plate on the left and one large plate on the right arch (five small plates on both sides). Longest of the ca. 100 gill filaments on anterior arch almost the size of the longest raker. Pseudo-branchial filaments one (two).

Head sensory pores (Fig. 3): Supraorbital pores 6, 1 on tip of snout, 1 above eye (right missing), 3 in a row behind eye and 1 on prominent skin flap above gill opening. Infraorbital pores 6–7, 3 anterior (number 2 and 3 larger than

number 1) and 3–4 posterior of which the last is larger and placed above posterior end of mandible. Mandibular pores 6, 1 at tip of lower jaw, the next long and slit-like, number 3 hidden from a lateral view at anterior tip of jugular isthmus, number 4 and 5 the smallest and number 6 the largest. Preopercular pores 4, the 2 lower the largest and close together. Occipital pores 2 and 1 interorbital pore.

Dentition: Premaxillaries with many irregular rows of granular teeth in its entire length and no fangs. Vomer boomerang shaped with 2–3 rows of granular teeth and a posterior row with small fangs. Palatines with 2–3 rows of granular teeth and small fangs in inner row. Dentaries with granular teeth in irregular rows, the inner with fangs.

Axial skeleton (from radiographs): Tips of neural and haemal spines thin and pointed except for precaudal vertebrae 5–12 with truncate neural spines; neural spines 3–9 (3–7) slightly depressed; first neural spine half the length of second spine; bases of vertebral spines 5–11 (4–11) enlarged. Parapophyses present on vertebrae 7–11 (8–11). Pleural ribs on vertebrae 5–11 (4–11). Epipleural ribs indistinct.

Viscera: Most of the viscera of the holotype

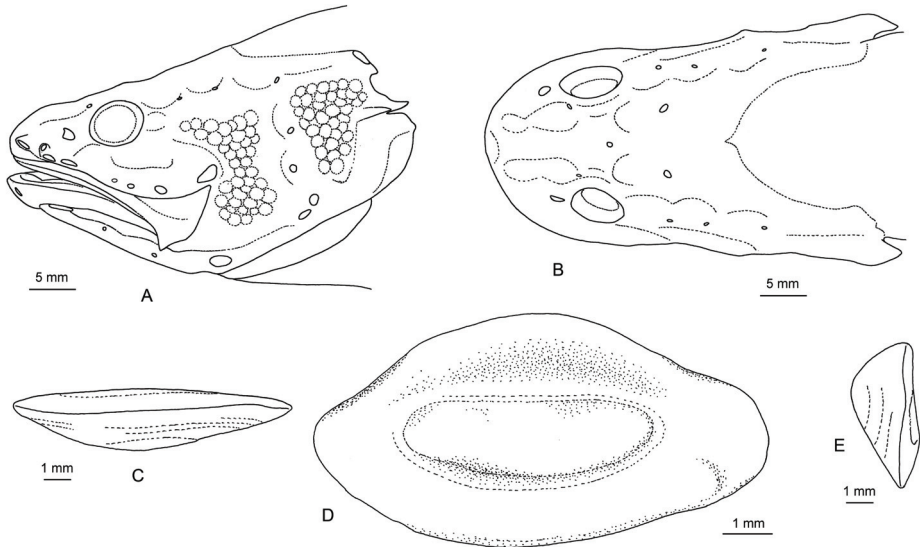


Fig. 3. Holotype of *Tuamotuichthys marshallensis*. A. Lateral view of head. B. Dorsal view of head. C. Ventral view of right otolith. D. Median view of right otolith. E. Frontal view of right otolith.

have been removed. Remaining are the rather thick-walled, white swimbladder, the stomach and part of the ovaries with very unripe eggs (0.3 mm). The paratype showed additionally two small pyloric caeca, a short intestine with two coils, and unripe ovaries which are completely separate from each other only joining at the oviduct.

Otolith (Fig. 3): Shape elongate, length-height ratio 2.0. Dorsal rim high. Anterior tip more pointed than posterior tip. Sulcus long (otolith length to sulcus length 1.9), flat, undivided and with straight dorsal and bent ventral rim. Inner face flat and outer convex.

Coloration: As a consequence of 31 years of preservation both specimens are now light brown with blue eyes and yellow lenses. Fig. 1 is a photo of the holotype taken the day it was caught. Colour in life was brownish grey dorsally shading to white ventrally on head, thorax and abdomen and with orange red median fins.

Etymology

The species name *marshallensis* refers to the type locality, the Marshall Islands.

Distribution

Only known from the type locality in the Marshall Islands on a drop-off at a depth of 46–55 m. The localities of the two known species of *Tuamotuichthys* are about 7,000 km apart and as the types were caught relatively deep (46–536 m) one would expect additional species off the intervening islands.

REFERENCES

- Møller, P. R., W. Schwarzhans & J. G. Nielsen. 2004. *Tuamotuichthys bispinosus*, a new genus and species from off Tuamotu Islands, South Pacific Ocean (Ophidiiformes, Bythitidae). – *Ichthyological Research* 51: 146–152.

Submitted 2.i.2006, accepted 3.viii.2006

Table 1. Meristic and morphometric characters of *Tuamotuichthys marshallensis* (HT = holotype; PT = paratype) and *T. bispinosus*.

	<i>T. marshallensis</i> HT BPBM 19961	<i>T. marshallensis</i> PT ZMUC P771494	<i>T. bispinosus</i> BPBM 37130
Standard length	120	111	88
Sex	female	female	Male
Meristic characters			
Dorsal fin rays	78	81	81
Caudal fin rays	12	12	13
Anal fin rays	62	62	60
Pectoral fin rays	20-21	21	22
Pelvic fin rays	1	1	1
Total vertebrae	11+36 = 47	11+38 = 49	13+39 = 52
Pseudobranchial filaments	1	2	2
Ant. dorsal ray above vertebra no.	5	5	8
Ant. anal ray below dorsal ray no.	18	20	21
Ant. anal ray below vertebra no.	15	15	17
Long gill rakers	3	3	3
Morphometric charac. in % of SL			
Head length	29.5	28.0	24.5
Head width	14.0	13.0	14.0
Head depth	21.5	20.0	13.5
Depth at anal fin origin	20.5	18.5	14.5
Upper jaw length	14.5	14.0	14.0
Height of posterior part of upper jaw	5.5	5.9	5.5
Dia. eye window	4.0	4.0	3.6
Soft interorbital	6.3	5.8	3.8
Postorbital length	20.0	19.0	16.5
Preanal length	51.0	50.0	46.0
Predorsal length	31.0	30.0	29.0
Basis of pelvic to origin of anal fin	28.0	28.0	26.0
Length of pectoral fins	22.0	21.5	17.0
Length of pelvic fins	21.5	20.0	13.5
Length of caudal fin	10.5	19.0	9.7