**Tuamotuichthys marshallensis**, a new species of fish (Ophidiiformes, Bythitidae) from the 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 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;

**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 *Tuamotuichthys marshallensis*. Female, standard length 120 mm. BPBM 19961.


**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 clycloid 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.


Viscera: Most of the viscera of the holotype
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

Submitted 2.i.2006, accepted 3.viii.2006
Table 1. Meristic and morphometric characters of *Tuamotuichthys marshallensis* (HT = holotype; PT = paratype) and *T. bispinosus*.

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<tr>
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<th><em>T. marshallensis HT</em> BPBM 19961</th>
<th><em>T. marshallensis PT</em> ZMUC P771494</th>
<th><em>T. bispinosus</em> BPBM 37130</th>
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<td>111</td>
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<td>Sex</td>
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<td>Male</td>
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<tr>
<td>Dorsal fin rays</td>
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<td>Anal fin rays</td>
<td>62</td>
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<td>Pectoral fin rays</td>
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<tr>
<td>Total vertebrae</td>
<td>11+36 = 47</td>
<td>11+38 = 49</td>
<td>13+39 = 52</td>
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