

# First Record of the Pygmy Shark, *Euprotomicrus bispinatus* (Dalatiiformes: Dalatiidae) from Fiji

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The pygmy shark *Euprotomicrus bispinatus* (New Japanese name: Tsumari-kobito-zame) is one of the world's smallest living sharks, along with *Squaliolus aliae* and *S. laticaudus*. The maximum body length reaches only 27 cm in adults. During the 2nd Joint National Fisheries University and the University of the South Pacific Fisheries and Oceanography Research Cruise using T/S Koyo-maru (3-7 December 1997, Fiji), one specimen of *E. bispinatus* (TL 105.3 mm) was collected from Kadavu Passage, Fiji Islands. This is the first occurrence of this species from the tropical southwestern Pacific including Fijian waters.

## 1 Introduction

The pygmy shark *Euprotomicrus bispinatus* is one of the world's smallest living sharks along with *Squaliolus aliae* and *S. laticaudus* and its maximum body length reaches only 27cm in adults.<sup>1)</sup> Although the species is widely distributed in the temperate and tropical waters of the central to eastern Pacific, Atlantic and Indian Oceans,<sup>1-5)</sup> no records were obtained from tropical southwestern Pacific including Fijian waters.

During the 2nd Joint National Fisheries University and the University of the South Pacific Fisheries and Oceanography Research Cruise, one specimen of *E. bispinatus* was collected from Kadavu Passage, Fiji Islands. We report the first occurrence of this species from Fijian waters.

## 2 Materials and Methods

A female specimen of *Euprotomicrus bispinatus* (105.3 mm in Total Length) was collected by surface ring net (1.3 m diameter, 0.3mm mesh), from near Solo Lighthouse, Kadavu Island, Kadavu Passage, station # 12-2 (18°-32.2'S, 178°-30.3'E to 18°-32.0'S, 178°-28.5'E) (Fig. 1) on 4 December 1997, by Training Ship Koyo-maru (2,342GT) of National Fisheries University, Japan. The net was towed at night time from 20:54 to 21:26 on the sea surface. The water depth was about 2050 m.

The specimen is deposited in the Fish Reference Collection held by Marine Studies Programme, The University of the South Pacific, Fiji as a catalogue number USP 4582. Measurements were taken from point to point following Hubbs et al.<sup>1)</sup> Terminology of measurements follows Compagno<sup>2)</sup> except for body height and width. Measurements were made after preservation.

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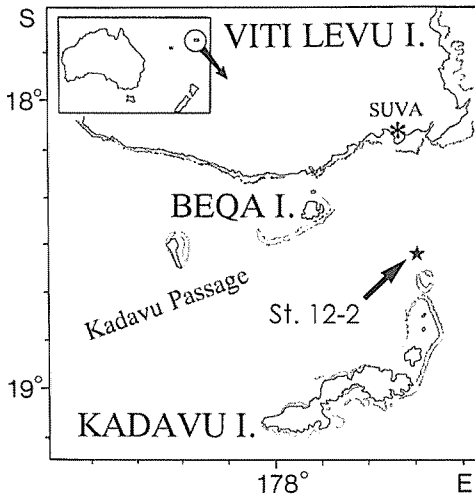


Fig. 1. Map showing sampling location of *Euprotomicrus bispinatus* (USP 4582).

The following seven specimens were also observed for comparisons: SIO (Scripps Institution of Oceanography) 63-1086, 70-399, 72-4, 76-119, 76-235, 76-236, 76-237.

### 3 Systematics

Genus *Euprotomicrus* Gill, 1865

(New Japanese Name: Tsumari-kobito-zame)

*Euprotomicrus bispinatus*  
(Quoy & Gaimard, 1824)

(New Japanese Name: Tsumari-kobito-zame)  
(Fig. 2)

*Synonymy*<sup>2-6)</sup>

*Scymnus bispinatus* Quoy & Gaimard, 1824  
(type locality: Mauritius).

*Scymnus (Laemargus) labordii* Müller & Henle, 1841.

*Euprotomicrus bispinatus*: Hubbs et al., 1967; Bass et al., 1976; Compagno, 1984; Bass et al., 1986; Castro-Aguirre & Garcia-Dominguez, 1988; Paxton et al., 1989; Springer, 1990; Last and Stevens, 1994.

### Description

Measurements and proportions of the specimen are indicated in Table 1 and fall within the ranges reported in Hubbs et al.<sup>1)</sup>

Body is cigar-shaped with bulbous head portion; caudal peduncle with no keels and notches; five small gill slits.

Two spineless dorsal fins present; first dorsal fin located posteriorly to the center of the whole body and closer to pelvic fin than pectoral fin; the origin of the second dorsal fin is just above the posterior end of the pelvic fin base; the base length of the second dorsal fin is clearly longer than those of the first dorsal and pelvic fins; anal fin absent. The margin of the pectoral fin is rounded. Both upper and lower lobes of the caudal fin are nearly symmetrical.

Mandibular teeth 9 (right) + 10 (left). Lip of the

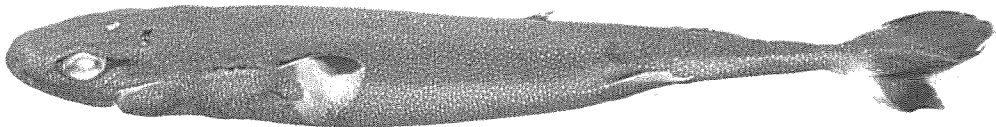


Fig. 2. *Euprotomicrus bispinatus* (USP 4582, TL 105.3 mm, female)

Table 1. Measurements of *Euprotomicrus bispinatus*

	USP 4582					USP 4582											
	Proportion (% TL)					Proportion (% TL)											
	USP 4582 (mm)	SIO 70-76-76-72-4	SIO 76-76-76-72-4	SIO 76-76-76-72-4	SIO 76-76-76-72-4	USP 4582 (mm)	SIO 70-76-76-72-4	SIO 76-76-76-72-4	SIO 76-76-76-72-4	SIO 76-76-76-72-4	Hubbs et al. <sup>1,4</sup>						
Total length	105.3	160.1	133.1	208.9	210.9	196.2	215.6	105-265	4.3	4.1	3.4	2.4	3.8	3.9	3.6	3.0	2.5-3.8
Pre-First dorsal length	54.4	51.7	52.2	52.6	51.9	53.7	53.8	50.0-55.1	3.5	3.3	2.6	2.0	3.0	1.6	2.0	2.0	1.8-3.8
Pre-Second dorsal length	70.0	66.5	68.3	68.0	66.3	68.9	70.2	65.4-71.0	8.9	8.5	7.8	8.5	9.7	8.4	9.6	7.9	7.0-10.7
Prebranchial length	21.9	20.8	19.7	21.0	18.4	20.3	20.0	15.8-21.1	1.5	1.4	1.6	1.7	1.6	2.0	1.7	2.5	1.3-2.6
Preorbital length	8.0	7.6	6.9	7.3	6.8	7.1	6.5	4.9-7.1	5.0	4.7	4.7	4.1	5.0	5.0	4.2	4.6	2.1-5.0
Prepectoral length	28.6	27.2	25.3	26.7	24.9	24.9	24.2	25.8	11.6	11.0	9.9	10.0	11.0	11.0	10.4	9.6	8.1-12.3
Prepelvic length	62.9	59.7	60.6	60.1	60.4	60.7	60.6	64.1	4.8	4.6	5.0	5.1	5.6	5.4	5.1	4.5	4.5-6.1
Interdorsal space	13.5	12.8	14.9	14.7	12.2	15.7	13.3	14.1	5.2	4.9	4.6	4.5	4.8	3.7	4.9	4.7	4.7-6.8
Prenarial length	3.3	3.1	2.9	2.9	2.7	2.8	2.4	3.2	3.7	3.5	3.5	5.3	5.8	6.8	6.2	5.9	1.6-4.5
Preoral length	12.4	11.8	10.5	11.6	10.3	11.0	10.0	11.1	6.0	5.7	3.5	3.9	6.1	6.5	6.1	5.8	4.7-8.2
Eye length	4.8	4.6	4.1	4.8	4.0	4.0	4.1	4.0	12.3	11.7	11.9	12.2	10.1	11.0	11.6	11.2	10.3-14.2
Eye height	2.8	2.7	3.6	4.1	3.2	3.3	2.8	3.2	2.7	2.6	2.1	2.4	2.1	2.2	2.4	2.3	17.0-25.0
Intergill length	5.7	5.4	5.4	5.7	5.6	5.3	5.5	6.0	0.8	0.8	0.7	0.6	0.6	0.5	0.7	0.7	
Pectoral anterior margin	10.3	9.8	10.3	10.2	9.9	9.9	10.8	9.3	6.1	5.8	5.7	6.5	5.5	5.2	5.6	5.6	5.8-7.6
Pectoral base	3.1	2.9	3.9	4.1	3.7	3.8	4.1	4.1	3.5	3.3	2.8	3.2	2.9	3.0	2.4	3.0	2.0-3.6
Pectoral inner margin	7.4	7.0	6.9	7.8	6.3	8.5	6.8	7.2	3.1	2.9	2.2	2.6	2.4	2.6	2.7	2.8	1.9-2.9
Pectoral posterior margin	8.8	8.4	8.5	8.3	9.0	7.4	7.6	8.9	10.1	9.6	8.5	10.0	8.3	8.9	9.0	9.0	6.3-9.6
Dorsal caudal margin	18.4	17.5	15.3	15.1	15.4	15.7	15.4	14.6	0.8	0.8	2.5	2.9	1.9	1.8	1.9	2.0	1.7-2.8
Preventral caudal margin	13.2	12.5	12.5	13.8	12.3	12.3	12.2	12.2	8.8	8.4	11.5	12.9	10.3	11.0	11.3	12.4	10.1-12.8
Ist dorsal base	2.4	2.3	2.0	2.4	2.5	2.3	2.3	2.7	2.4	2.3	2.4	1.9	2.2	1.9	2.0	2.0	1.6-2.9
Ist dorsal height	2.7	2.6	1.7	1.7	1.3	2.6	2.1	2.1	2.4	2.3	2.4	1.9	2.2	1.9	2.0	2.0	1.6-2.9

\* a total 21 specimens including SIO 63-1086

upper jaw has no papillae.

Upper half of the body dark gray (char coal gray), lower half reddish gray (rose gray); first dorsal fin white with black blotch on its anterodorsal part (Fig. 3A); second dorsal fin white; caudal fin black with white posterior margin, anterior part of the lower lobe of the caudal fin white (Fig. 3B); pectoral fin white with a black blotch on its posterodorsal part (Fig. 3C), whereas in larger specimens the blotch is faint or slender (Fig. 3D); pelvic fins white.

#### Distribution

The species is almost circumglobal in distribution, in temperate to tropical waters.<sup>1-5)</sup> The present specimen is the first occurrence of the species from tropical southwestern Pacific region.

#### Remarks

*Euprotomicrus bispinatus* is one of the smallest living sharks and a member of subfamily Euprotomicrinae<sup>7)</sup> along with *Squaliolus aliae* (Japanese name: Tsuranaga-kobitozame<sup>8)</sup>) and *S. laticaudus* (Oome-kobitozame<sup>8)</sup>). The species reaches

maturity between 17 and 19 cm in males, 22 and 23 cm in females and the size at birth is greater than 6cm and less than or about 10cm.<sup>2)</sup> Accordingly the present specimen is considered to be a juvenile.

*E. bispinatus* is externally similar to both *S. aliae* and *S. laticaudus*. It, however, can be distinguished from these two species by examination of the first dorsal fin. *E. bispinatus* has a spineless first dorsal fin located close to the pelvic fin, whereas the first dorsal fins of *S. aliae* and *S. laticaudus* have spines and are located closer to the pectoral fins. *Squaliolus* occurs in coastal waters, whereas *E. bispinatus* has a more oceanic distribution.

The present specimen slightly differs from previous descriptions and from other specimens. Although Last and Stevens mentioned the presence of low keels on the caudal peduncle,<sup>3)</sup> no keels were observed in the present specimen and other comparative specimens. The position of the first dorsal fin of the present specimen is slightly more anterior than that of SIO63-1086 (TL 104.5mm, Pre-First dorsal length 53.9%).

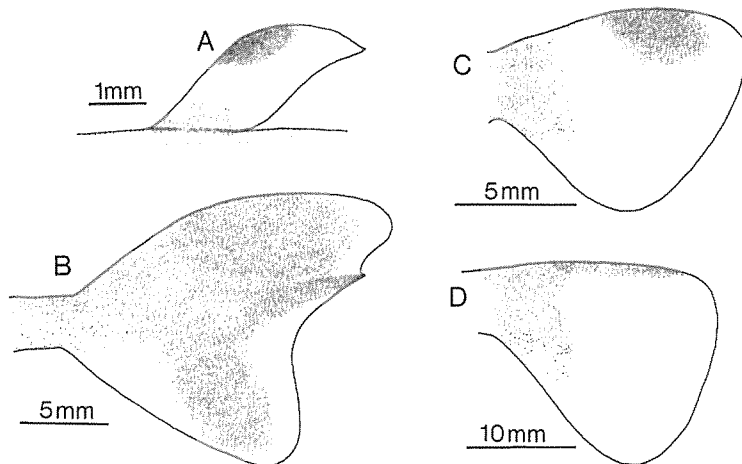


Fig. 3. Pattern of blotches on the first dorsal fin (A), caudal fin (B), pectoral fin (C) (USP 4582), and pectoral fin (D) (SIO 76-235, TL 206.4 mm, male).

### Acknowledgments

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### ツマリコビトザメ *Euprotomicrus bispinatus* (ヨロイザメ科) のフィジーからの初記録

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南太平洋フィジーのピチレヴ島とカンダヴ島の間のカンダヴ水道において、丸稚ネット（径1.3m）の夜間表層曳きにより1個体のツマリコビトザメ（新称和名）*Euprotomicrus bispinatus*（ヨロイザメ科）が採集された（TL 105.3 mm メス、USP 4582；1997年12月4日 20:54-21:26、18°-32.2'S, 178°-30.3'E to 18°-32.0'S, 178°-28.5'E；第2回水産大学校-南太平洋大学共同水産・海洋調査、水産大学校練習船耕洋丸、1997年12月3-7日実施）。本種は中部～東部太平洋、大西洋、インド洋の温帯、熱帯海域に広く分布するが、これまでフィジーも含めた南西太平洋熱帯海域からの記録はなかった。本個体は同海域からの初めての記録になる。

ツマリコビトザメは同じくヨロイザメ科のツラナガコビトザメ（*Squaliolus aliae*）、オオメコビトザメ（*S. laticaudus*）とともに世界で最小のサメ類の一種であり、成魚でも全長は30cmに満たない。本種の外形は黒褐色の葉巻状を呈し、これら2種と類似するが、背鰭には棘がないこと、第1背鰭は胸鰭よりも腹鰭に近く位置することで、これら2種と区別できる。