

# *Stenogobius (Insularigobius) keletaona*, a new species of freshwater goby from Futuna Island (Teleostei: Gobiidae)

by

Philippe KEITH (1) & Gérard MARQUET (2)

**ABSTRACT.** - *Stenogobius (Insularigobius) keletaona*, n. sp., a freshwater goby, is described on the basis of six specimens (4 males, 2 females) collected from streams on the island of Futuna, situated in the South Pacific between Samoa and Fiji. It differs from other species belonging to the subgenus *Insularigobius* by a combination of characters including the absence of a short transverse row of sensory papillae in the lower part of the preopercular, the number of scales in lateral series (48-52), the length of the second dorsal, caudal and anal fin in male, the preanal length in male, and the jaw length in female.

**RÉSUMÉ.** - *Stenogobius (Insularigobius) keletaona*, une nouvelle espèce de gobie d'eau douce de l'île de Futuna (Teleostei: Gobiidae).

*Stenogobius (Insularigobius) keletaona*, n. sp., un gobie dulçaquicole est décrit sur la base de six spécimens (4 mâles, 2 femelles) collectés dans les rivières de l'île de Futuna, située dans le Pacifique sud entre les Samoa et Fidji. Il diffère des autres espèces appartenant au sous-genre *Insularigobius* par plusieurs caractères incluant notamment l'absence de rangées transversales de papilles sensorielles dans la partie inférieure du préopercule, le nombre d'écailles en ligne latérale (48-52), la longueur de la seconde nageoire dorsale, de l'anale et de la caudale chez les mâles, la longueur préanale chez les mâles et la longueur de la mâchoire chez les femelles.

Key words. - Gobiidae - *Stenogobius keletaona* - ISE - Futuna Island - Freshwater - New species.

The freshwater ichthyofauna of Futuna, a little island situated between Fiji and Samoa, was not examined until October 2004, when a freshwater survey was conducted by the University of Perpignan, the National Museum of Natural History of Paris (MNHN), and two other French scientific organisations, ETHYCO and CEMAGREF. Futuna (84 km<sup>2</sup>) is partly covered by primary forest with a maximum altitude of 524 m and has short rivers (maximum 3 km long). During the course of this study 18 species of freshwater fishes were collected, including a new species of *Sicyopus* (Keith and Marquet, 2005) and a new species of *Stenogobius*.

Watson (1991) reviewed the genus *Stenogobius* Bleeker, 1874 and found that species could be differentiated by various proportional measurements and/or by certain zones of squamation. Two distinct groups were identified and as a result *Stenogobius* was divided into two subgenera, *Stenogobius* Bleeker, 1874 and *Insularigobius* Watson, 1991. The subgenus *Stenogobius* has obvious external differences in colour or squamation, while *Insularigobius* has strong sexual dimorphic and dichromatic differences.

The new species of *Stenogobius* from Futuna is assigned to the subgenus *Insularigobius*. It has a broad oblique blackish bar extending from below eye to lower edge of preopercular margin; dorsal and anal fins almost always with 11 rays; pectoral fin rays always 15; jaw length sexually dimor-

phic; spines of first dorsal fin usually same height as second dorsal fin, spines with generally no filaments on males, never filaments on females; species sexually dichromatic.

The subgenus *Insularigobius* is divided into two main groups (Watson, 1991): The *Stenogobius polyzona* species group is known by two species, one from the western Indian Ocean [*Stenogobius polyzona* (Bleeker, 1867)] and the other from southern New Guinea [*Stenogobius beauforti* (Weber, 1908)]; the *S. genivittatus* species group is widely distributed from Indonesia, southern Japan and New Caledonia to the Hawaiian Islands and throughout French Polynesia; it comprises 13 species (Keith *et al.*, 2002). *Stenogobius* n. sp. is assigned to the *S. polyzona* species group because the absence of a short transverse row of sensory papillae in the lower part of the preopercular (*sensu stricto* Watson, 1991).

The purpose of this paper is to describe *Stenogobius (Insularigobius) keletaona*, n. sp., a freshwater goby from Futuna island.

## METHODS

Methods follow those utilised by Watson (1991) and Keith *et al.* (2002). Standard lengths (SL) of specimens are measured with a dial caliper to the nearest tenth of a milli-

(1) Muséum national d'Histoire naturelle, DMPA, CP026, Laboratoire d'ichtyologie, 43 rue Cuvier, 75231 Paris CEDEX 05, FRANCE. [Keith@mnhn.fr]

(2) BP 75, Passamainty, 97605 Mamoudzou, MAYOTTE.

metre (mm). Jaw length is measured from anterior tip of upper jaw to posterior edge of maxilla. Scales in lateral series from upper pectoral base and along the middle of the body laterally to the central hypural base. Body depth is measured from anterior base of second dorsal fin to belly, this measurement taken only from males as females varies considerably from gravid to non gravid state.

Abbreviations for institutions and collections cited follow Leviton *et al.* (1985). Abbreviations utilised to represent certain physical characteristics and measurements are: A, anal fin; C, caudal fin; D, dorsal fin; LS, scales in lateral series; P, pectoral fin; PD, predorsal midline scale count; TRB, transverse series back, refers to scales counted from the first scale anterior to second dorsal fin, in a diagonal manner, posteriorly and ventrally to the anal fin base or ventralmost scale. TRF, transverse series forward, refers to scales counted from the first scale anterior to second dorsal fin, in a diagonal manner, anteriorly and ventrally to the centre of belly or ventralmost scale. ZZ, zigzag series, refers to

scales on the narrowest region of the caudal peduncle counted from the dorsalmost scale to the ventralmost scale in a zigzag (alternating) manner.

Counts and morphometrics are summarized in tables I, II, III and IV.

Table I. - Scale counts in *Stenogobius (Insularigobius) keletaona* and related species of the *S. polyzona* species group. [Nombre d'écailles chez *Stenogobius (Insularigobius) keletaona* et chez les espèces proches du groupe *S. polyzona*.]

		Lateral series							
		45	46	47	48	49	50	51	52
<i>Stenogobius</i> n. sp.					1	2	1	1	1
<i>S. beauforti</i>	1	2	4	11	2	1			
<i>S. polyzona</i>			2	11	7	1			

		Predorsal scales						
		13	14	15	16	17	18	19
<i>Stenogobius</i> n. sp.				2	-	1	1	2
<i>S. beauforti</i>	1	1	3	5	3	4	4	
<i>S. polyzona</i>			2	12	3	4		

Table II. - Morphometrics in *Stenogobius (Insularigobius)* and related species of the *S. polyzona* species group expressed to the nearest whole percent of standard length. [Caractères morphométriques chez *Stenogobius (Insularigobius) keletaona* et chez les espèces proches du groupe *S. polyzona*, exprimés en pourcentage de la longueur standard (arrondi à l'entier le plus proche).]

		Jaw length in males				
		9	10	11	12	13
<i>Stenogobius</i> n. sp.			1	3		
<i>S. beauforti</i>		2	5			
<i>S. polyzona</i>		2	2	4	3	2

		Jaw length in females				
		6	7	8	9	10
<i>Stenogobius</i> n. sp.		1	1			
<i>S. beauforti</i>				1	7	5
<i>S. polyzona</i>				2	6	

		Caudal peduncle depth in males		
		9	10	11
<i>Stenogobius</i> n. sp.				4
<i>S. beauforti</i>		5	2	
<i>S. polyzona</i>		6	3	4

		Caudal peduncle depth in females			
		8	9	10	11
<i>Stenogobius</i> n. sp.		1	1		
<i>S. beauforti</i>		2	8	2	1
<i>S. polyzona</i>			6	2	

		Caudal peduncle length					
		12	13	14	15	16	17
<i>Stenogobius</i> n. sp.		1	3	2			
<i>S. beauforti</i>			1	8	10	-	1
<i>S. polyzona</i>		1	1	10	5	4	

		Body depth at second dorsal fin origin in males					
		15	16	17	18	19	20
<i>Stenogobius</i> n. sp.					2	2	
<i>S. beauforti</i>				5	1	1	
<i>S. polyzona</i>		1	1	1	4	5	1

		Head length						
		24	25	26	27	28	29	30
<i>Stenogobius</i> n. sp.			3	1	1	1		
<i>S. beauforti</i>		1	2	8	5	2	1	1
<i>S. polyzona</i>			6	7	5	2	1	

		Predorsal length						
		31	32	33	34	35	36	37
<i>Stenogobius</i> n. sp.				2	2	2		
<i>S. beauforti</i>				2	6	4	5	3
<i>S. polyzona</i>		1	2	5	7	4	1	1

		Preanal length							
		51	52	53	54	55	56	57	58
<i>Stenogobius</i> n. sp.		1	-	2	1	1	1		
<i>S. beauforti</i>				2	6	4	6	2	
<i>S. polyzona</i>				1	6	6	4	2	1

		Trunk bars in male							
		5	6	7	8	9	10	11	12
<i>Stenogobius</i> n. sp.								2	2
<i>S. beauforti</i>		1	1	2	2	-	-	1	
<i>S. polyzona</i>						1	7	4	1

		Trunk bars in female							
		0	1	2	3	4	5	6	7
<i>Stenogobius</i> n. sp.					1	1			
<i>S. beauforti</i>				1	3	3	2	5	
<i>S. polyzona</i>		2	1	-	2	1	-	1	

Table III. - Fin lengths in males *Stenogobius (Insularigobius) keletaona* and related species of the *S. polyzona* species group expressed to the nearest whole percent of standard length. [*Longueur des nageoires chez les mâles de Stenogobius (Insularigobius) keletaona et chez les espèces proches du groupe S. polyzona, exprimée en pourcentage de la longueur standard (arrondi à l'entier le plus proche).*]

		Second dorsal fin length																	
		40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
<i>Stenogobius</i> n. sp.										1	1	-	-	2					
<i>S. beauforti</i>		1	-	1	-	1	-	1	-	-	-	3							
<i>S. polyzona</i>					1	-	1	1	1	1	1	2	-	1	1	-	1	1	

		Anal fin length												
		40	41	42	43	44	45	46	47	48	49	50	51	52
<i>Stenogobius</i> n. sp.						1	-	-	2	-	1			
<i>S. beauforti</i>		2	-	-	-	1	2	2						
<i>S. polyzona</i>			1	-	1	1	-	2	3	1	1	1	1	1

		Caudal fin length														
		28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
<i>Stenogobius</i> n. sp.		1	1	1	-	1										
<i>S. beauforti</i>		1	-	-	-	1	1	-	-	2						
<i>S. polyzona</i>				1	-	1	-	1	2	-	-	3	1	-	3	1

Table IV. - Fin lengths in females *Stenogobius (Insularigobius) keletaona* and related species of the *S. polyzona* species group expressed to the nearest whole percent of standard length. [*Longueur des nageoires chez les femelles de Stenogobius (Insularigobius) keletaona et chez les espèces proches du groupe S. polyzona, exprimée en pourcentage de la longueur standard (arrondi à l'entier le plus proche).*]

		Second dorsal fin length							
		37	38	39	40	41	42	43	44
<i>Stenogobius</i> n. sp.						1	1		
<i>S. beauforti</i>			3	4	3	3			
<i>S. polyzona</i>		2	-	1	1	-	2	2	1

		Anal fin length				
		36	37	38	39	40
<i>Stenogobius</i> n. sp.					1	1
<i>S. beauforti</i>		1	-	7	3	2
<i>S. polyzona</i>		1	4	1	1	1

		Caudal fin length						
		25	26	27	28	29	30	31
<i>Stenogobius</i> n. sp.		1	1					
<i>S. beauforti</i>		1	3	3	5	1		
<i>S. polyzona</i>		1	-	4	1	1	-	1

**Comparative material**

*Stenogobius genivittatus* species group

*Stenogobius (Insularigobius) genivittatus* (Valenciennes in Cuvier & Valenciennes, 1873). - MNHN A.1344, male (52.0 mm SL), Tahiti; MNHN 1927-140, male (46.9 mm SL), Tahiti; MNHN 1984-804, 3 females (39.3-42.9 mm SL), Tahiti, 1984, G. Marquet; MNHN 1987-926, (21.5-68.9 mm SL), 4 males, 7 females, 1 juvenile, Moorea, Society Islands, April 1986, G. Marquet.

*Stenogobius (Insularigobius) yateiensis* Keith, Watson & Marquet, 2002. - MNHN 2001-1 (holotype), male (67.5 mm SL), Tibarama River, New Caledonia, 26 Oct. 1999, CHLOE 2; MNHN 2001-2, male (55 mm SL), same data as holotype; MNHN 2001-3, male (57.4 mm SL), same data as holotype;

MNHN 2001-4, male (48.7 mm SL), same data as holotype; MNHN 2001-5, female (68.5 mm SL), same data as holotype; MNHN 2001-6, female (61.2 mm SL), same data as holotype.

*Stenogobius polyzona* species group

*Stenogobius (Insularigobius) polyzona* (Bleeker, 1867). - MNHN 1933-51, male (66.2 mm SL), Faraony River, Madagascar; MNHN 1960-226, female (62.4 mm SL), Madagascar; MNHN 1966-993, 9 males, 4 females (35.8-79.6 mm SL), Bakora River, Madagascar; MNHN 1982-127, 1 male, 2 females (44.3-50.8 mm SL), Réunion; MNHN 1984-803, 2 males, 1 female (46.2-74.3 mm SL), Étang Bois rouge, Réunion.

*Stenogobius (Insularigobius) beauforti* (Weber, 1908). - ZMA 110.943, female (24.6 mm SL), syntype, West New Guinea; 9 Jul. 1903, De Beaufort and Lorentz; BMNH 1974.5.24:3543-45, 1 male, 2 females, 1 juvenile (15-45.4 mm SL), Murmass River, Papua New Guinea; USNM 270671, 2 males (36.6-40.2), same collection data as BMNH 1974.5.24:3543-45; AMS I.16668-013, 4 males, 10 females (35.6-49.8 mm SL), Maiwara, Papua New Guinea, 20 Jul. 1969, Talbot.

**STENOGOBIUS (INSULARIGOBIUS) KELETAONA**  
**N. SP.**

(Fig. 1, Tabs I-IV)

**Material examined**

Six specimens from a stream on Futuna, totalling 4 males, 2 females; size range 42.8-56 mm SL, largest male 56 mm, largest female 48.8 mm.

*Holotype*. - MNHN 2005-1976, male (43.2 mm SL), Sausau River (S 14.28846, W 178.16761), Futuna Island, 16



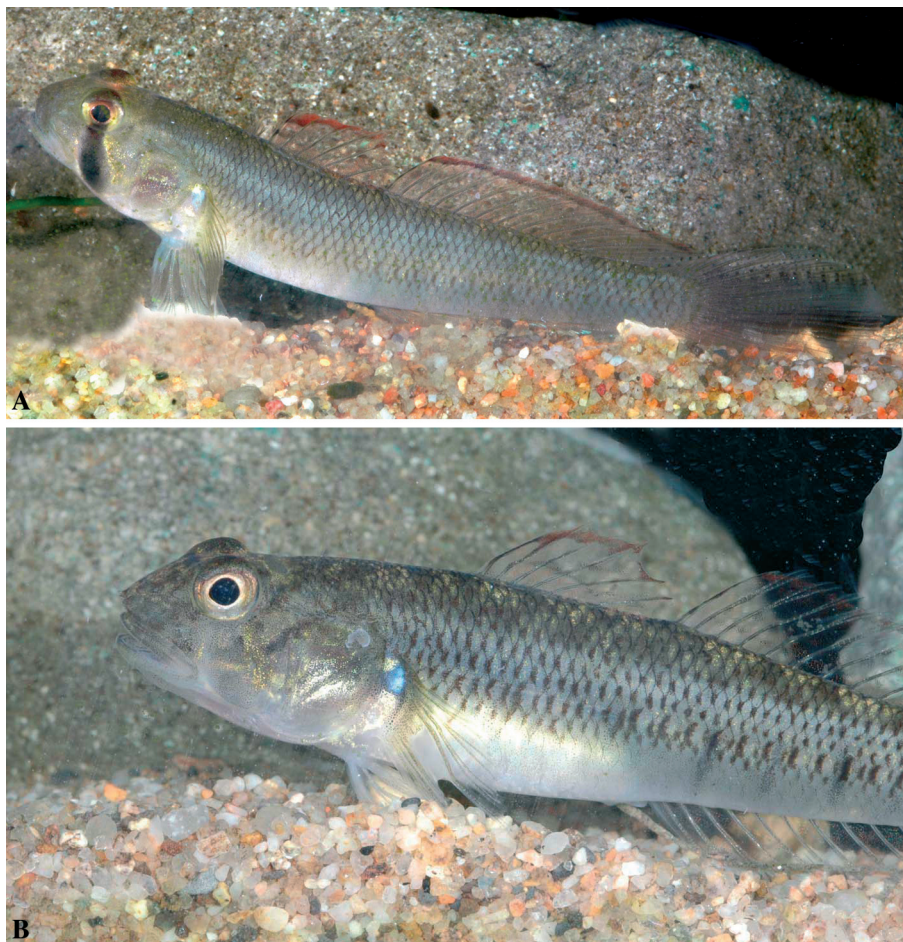


Figure 1. - *Stenogobius (Insularigobius) keletaona*, Futuna Island. **A**: Male (released); **B**: Female. Sausau river, 16/10/04, Keith, Marquet, Sasal, Mary coll. (photos: P. Keith, MNHN). [*Stenogobius (Insularigobius) keletaona*, île Futuna. **A** : Mâle (relâché) ; **B** : Femelle. Rivière Sausau.]

Oct. 2004, (Keith, Marquet, Sasal, Mary, coll.).

*Paratypes*. - MNHN 2005-1977, 2 males, 1 female (42.8-48.8 mm SL), same data as holotype.

*Non types*. - MNHN 2006-752, 1 male, 1 female (48.5-56 mm SL), same data as holotype.

### Diagnosis

A *Stenogobius (Insularigobius)* species, which is distinguished from the other species with the following set of characters: broad oblique blackish bar extending from below eye to lower edge of preopercular margin; dorsal and anal fins almost always with 11 rays; pectoral fin rays always 15; jaw length sexually dimorphic; spines of first dorsal fin usually same height as second dorsal fin, spines with no filaments; species sexually dichromatic; absence of a short transverse row of sensory papillae in the lower part of the preopercular; scales in lateral series (48 to 52); breast scaled; important reddish longitudinal band on outer margin on first and second dorsal fins on males and females; second dorsal, caudal and anal fin length in male, preanal length in male, jaw length in female.

### Description

Scale counts in *Stenogobius* n. sp. and related species are given in table I, morphometrics in table II and fin length in tables III and IV. Below, the holotype counts are given first followed, in brackets, by the paratypes counts, if different.

Body elongate, subcylindrical and slightly compressed; head subcylindrical and slightly compressed; mouth terminal, lower jaw not protruding and slightly oblique; opercle and preopercle without spines and edges smooth. Broad oblique blackish bar extending from below eye to lower edge of preopercular margin.

D VI-I, 11; A I, 11; P 15; LS 50 (48-52); TRB 12 (11-12); TRF 13 (11-13); ZZ 8 (8-10); PD fully scaled, 19 (15-19); C 13; cheek naked; opercle usually naked; upper pectoral base and lower pectoral base almost always naked; breast scaled. Jaw length sexually dimorphic, jaw reaching just under anterior edge of eye in females to beyond middle of eye in males. First dorsal fin more or less same height as second dorsal fin, distal tips of spines in first dorsal flex posteriorly with fin erect, spines not filamentous. Jaw length usually sexually dimorphic, may not be apparent in small and immature

males. Lower preopercular margin without short transverse rows of papillae. Sexual dichromatism well developed; both sexes with short vertical dash-like bars under most scales from midline to dorsal surface, zigzag like pattern formed by black margins on edges of scales along lateral midline from behind pectoral base to caudal fin base. Teeth conical and recurved forming irregular rows, outer row most pronounced, upper jaw teeth in male 2-3+1, lower jaw teeth 3-5+2-3; upper jaw teeth in female 1-2+1, lower jaw teeth 4+2-3.

Pectoral rounded, pelvic fins always I,5, fifth rays of each fin joined together its entire length to form a disk not adherent to belly. Vertebrae 10+16 (including urostyle). Branchiostegal rays five.

Caudal fin oblong, rounded on female, pointed in male.

### Colour in preservation

Sexual dichromatism developed. Basic colour of body tannish or brownish to greyish; blackish trunk bars in males 11(11-12) originate behind pectoral base extending to hypural base, extending from dorsal surface to ventral surface, usually poorly marked on caudal peduncle; in females trunk bars (3-4) between second dorsal and anal fins extending to hypural base, trunk bars in females lack intensity found in males. In both sexes membrane between spines and rays of both dorsal fins with numerous tiny black dots appearing as irregular scribbles, outer margin in both sexes with blackish border. Anal fin in males dusky with light margin along entire base; in females anal fin is dusky with light margin along edge of fin.

### Colour in life

Males (Fig. 1A): life colour of body similar to those described in preservation. Each scale is marked by a brownish spot. Both dorsal fins reddish with a longitudinal red line on outer margin. Anal fin greyish to reddish with a thin blue line on outer margin. Caudal fin hyaline with a thin blue line on outer margin. Pectoral and pelvic fins hyaline.

Females (Fig. 1B): life colour do not differ much from description in preservation. Numerous dark blotch on the dorsal part of the body. Distal margin of both dorsal fins reddish with a longitudinal red line. Distal margin of anal fin bluish; pectoral, pelvic and caudal fins hyaline.

### Distribution

Actually only known from Futuna Island.

### Ecology

*Stenogobius (Insularigobius) keletaona* n. sp. was collected from a freshwater stream mostly under tidal influence. Stream bottom consists of shifting sand and small rocks.

These gobies are known to eat small invertebrates and organic matter contained in the sand. All the perennial rivers of Futuna were prospected and the new species was only found in Sausau River. It is suspected that the population of the species is reduced.

### Comparisons

*Stenogobius* n. sp. appears closest to *S. beauforti* and *S. polyzona*. *Stenogobius* n. sp. differs from *S. beauforti*, restricted to southern New Guinea, in having more scales in lateral series (48-52 versus 45-50), longer second dorsal fin (48-52 vs 40-50) and anal fin (43-47 vs 40-46), a shorter pre-anal length (51-56 vs 53-57), more bars on trunk in males (11-12 vs 5-11), and shorter jaw in female 6-7 vs 8-10. It differs from *S. polyzona* (restricted to the western Indian Ocean) in possessing more scales in lateral series (48-52 vs 47-50), a shorter preanal length (51-56 vs 53-59), more bars on trunk on males (11-12 vs 9-12), and a shorter jaw on female (6-7 vs 8-9).

### Etymology

The name of the species honours the customary authority of the Kingdom of Sigave in Futuna, keletaona, where the species was found. The new name is treated as a noun in apposition.

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