

A new species of *Sicyopterus* (Gobiidae) from Indonesia

by

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Abstract. – A new species of *Sicyopterus*, freshwater goby, is described from Sumatra and Java, Indonesia. It differs from other species belonging to the genus by a combination of characters including two lateral clefts on the crenulated upper lip, a second dorsal fin with one spine and 10 segmented rays, second and third rays of the first dorsal fin filamentous, more lateral, predorsal and transverse back scales, and a reddish caudal fin in male with a slight blue line on the upper and lower parts.

Résumé. – Une espèce nouvelle de *Sicyopterus* (Gobiidae) d'Indonésie.

Une espèce nouvelle de *Sicyopterus*, gobie dulçaquicole, est décrite sur la base de spécimens collectés à Sumatra et Java (Indonésie). Elle diffère des autres espèces du genre par plusieurs caractères incluant deux encoches latérales sur la lèvre supérieure crénelée, une seconde nageoire dorsale avec un rayon épineux et 10 rayons mous, les deuxième et troisième rayons de la première dorsale filamenteux, un plus grand nombre d'écailles en ligne longitudinale, en série prédorsale et transverse postérieure, ainsi qu'une nageoire caudale rouge bordée d'une ligne bleue chez le mâle.

Key words

Gobiidae

Sicydiinae

Sicyopterus

squamosissimus

Indonesia

Freshwater

New species

Recently, a number of expeditions into remote areas of Indonesia (West Papua, Sulawesi, Sumatra, Java, Lombok and Bali) has resulted in the collection of many gobies and the discovery

of several new species (Keith *et al.*, 2011, 2012a, b, 2014a, b; Pouyaud *et al.*, 2012; Larson *et al.*, 2014; Hoese *et al.*, 2015).

In the Pacific area, *Sicyopterus* and *Stiphodon* are the most diverse Sicydiinae genera. The genus *Sicyopterus* occurs in all catchment areas from the lower to the upper reaches of rivers (Lord *et al.*, 2010). It is distributed in the Indo-Pacific from the Western Indian Ocean to the Eastern Pacific (Lord *et al.*, 2010; Keith *et al.*, 2011). *Sicyopterus* is the largest genus of the sub-family. It possesses numerous large tricuspid premaxillary teeth in both sexes. The ascending process on the premaxilla is broad at the dorsal tip. The tongue is fused to the floor of the mouth. The pelvic disc is adherent to the belly between all five rays and it is distinguished by a second dorsal fin I,10-11 (Watson *et al.*, 2000; Keith and Lord, 2011a). Within *Sicyopterus*, the morphology of the upper lip is one of the main diagnostic character. This upper lip has papillae, or is crenulated or smooth, and with 0, 2 (lateral) or 3 (one median and two lateral) clefts.

Two recent studies on Sicydiinae phylogeny (Keith *et al.*, 2011; Taillebois *et al.*, 2014) strongly supports the monophyly of the genus *Sicyopterus* and its sister relationship with the genus *Sicydium*.

The purpose of this paper is to provide a description of one new species of *Sicyopterus* from Sumatra and Java, Indonesia, with two lateral clefts on upper crenulated lip and a second dorsal fin with one spine and 10 segmented rays.

MATERIAL AND METHODS

Counts and measurements were taken from the right side. Measurements were taken with dial callipers and are expressed to the nearest tenth of a millimetre. The size is given as standard length (SL). Teeth were consistently counted to the right of the symphysis.

Abbreviations for institutions and collections cited follow <http://www.asih.org/resources/standard-symbolic-codes-institutional-resource-collections-herpetology-ichthyology>. Abbreviations for the cephalic sensory pore system follow Akihito (1986).

Scale and fin ray counts are reported as in Keith *et al.* (2012b), *i.e.*: A, anal fin elements (includes flexible

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spine and segmented rays); D, dorsal fins (D1, first dorsal fin spines; D2, second dorsal fin elements); P, pectoral fin rays; C, caudal fin rays (only branched rays are reported); LS, scales in lateral series counted from upper pectoral fin base, or anteriormost scale along lateral midline, to central hypural base; PD, predorsal midline scales counted from scale directly anterior to first dorsal fin insertion to the anteriormost scale; TRB, transverse series backward, refers to scales counted from the first scale anterior to second dorsal fin origin, 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 origin, in a diagonal manner, anteriorly and ventrally to the centre of abdomen 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.

***Sicyopterus squamosissimus* n. sp.**
(Figs 1-3, Tabs I-IV)

Comparative material

Sicyopterus squamosissimus n. sp. is compared to the two known valid species with two lateral clefts on a crenulated upper lip and a second dorsal fin with one spine and 10 segmented rays: *Sicyopterus longifilis* de Beaufort, 1912 and *Sicyopterus calliochromus* Keith, Allen & Lord, 2012.

Sicyopterus longifilis de Beaufort, 1912. – Syntypes: ZMA 112562, 2 males, size range 36.7-74.5 mm SL. Upper course of Tubah River, western Ceram, Indonesia. WAM 31041-007, 3 males, 3 females, size range 48.4-62.5 mm SL. Yapen Island, Reifa-

feif River, Papua Province, Indonesia. WAM 31034-005, 1 male, 2 females, size range 66.7-70 mm SL. Yapen Island, Reifafeif River, Papua Province, Indonesia.

Sicyopterus calliochromus Keith, Allen & Lord, 2012. – Holotype: MZB 20009, male, 55 mm SL. Tirawiwa River, 132 km from mouth, Papua; 4 Apr. 1998; G.R. Allen and S. Renyaan coll. Paratypes: WAM P31447.004, 4 males, 1 female, size range 47.1-58.2 mm SL. Same data as holotype; MNHN 2011-0042, 2 males, 1 female, size range 50.3-55.6 mm SL. Same data as holotype.

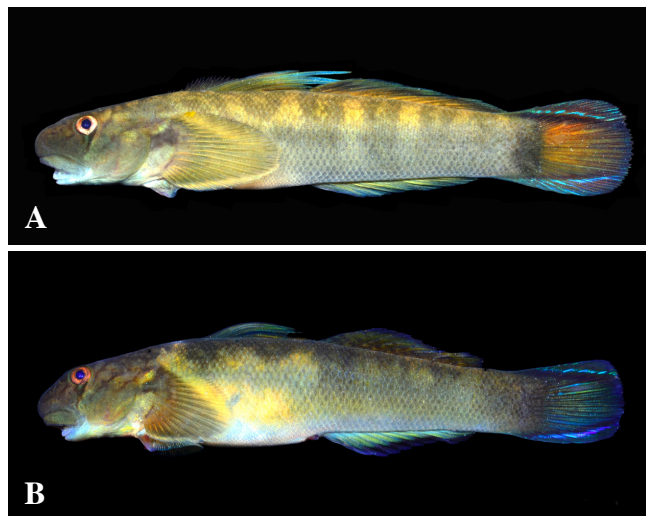


Figure 1. - **A:** *Sicyopterus squamosissimus*, n. sp, holotype MZB 22716, male (BIF 1688); West Java, Indonesia; **B:** *Sicyopterus squamosissimus*, n. sp, paratype MZB 22717, female (BIF 1689); West Java, Indonesia. (Photos N. Hubert).

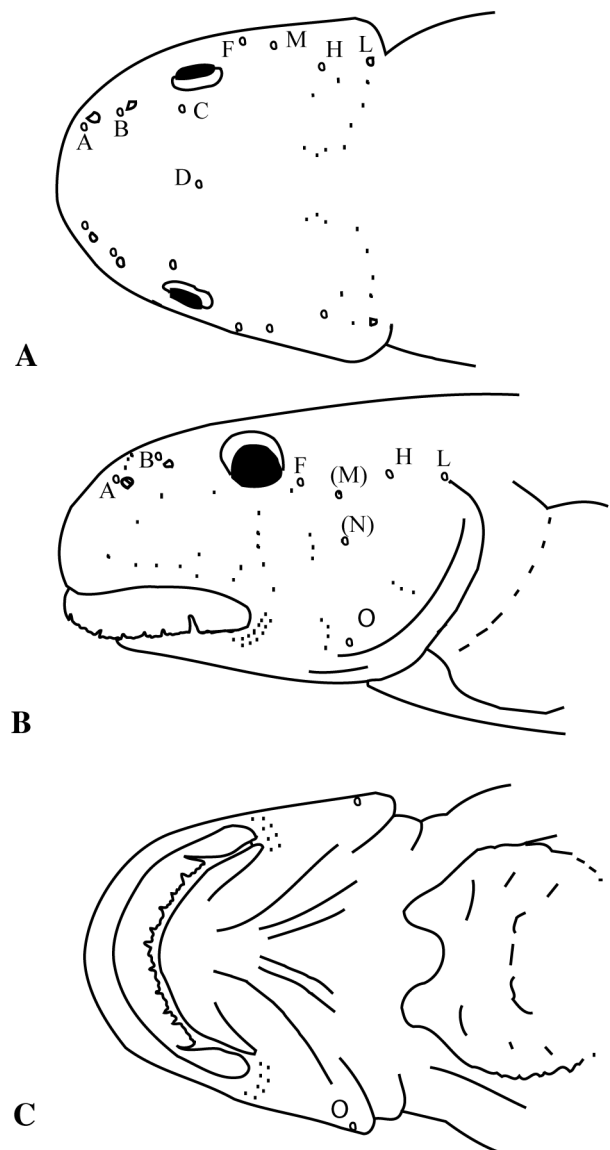


Figure 2. - Diagrammatic illustration of head in *Sicyopterus squamosissimus* showing cephalic sensory pore system and cutaneous sensory papillae. **A:** Dorsal view; **B:** Lateral view; **C:** Ventral view.

Material examined

Nine specimens from streams of Sumatra and Java, Indonesia, totalling five males and four females, size range 33.7-51.4 mm SL.

Holotype. – MZB 22716 male, 42.8 mm SL. Kabupaten Sukabumi, Citiis, West Java, Indonesia; 11 Dec. 2013; Hubert, Busson, Sauri coll.; BIF1688.

Paratypes. – MZB 22717, 1 female, 51.4 mm SL. Same data as holotype; BIF1689. MNHN 2014-148, 1 female 50.5 mm SL. Same data as holotype; BIF1684. MNHN 2014-149, 4 males, 2 females, 33.7-45 mm SL. Palembang, Sumatra, Indonesia; Apr. 2013; M. Negrini coll.

Diagnosis

A *Sicyopterus* with two lateral clefts on crenulated upper lip, a second dorsal fin with one spine and 10 segmented

rays. Second and third rays of the first dorsal fin filamentous, 61-66 lateral scales, 21-26 predorsal scales and 17-22 transverse back scales; a reddish caudal fin in male with a slight blue line on the upper and lower parts.

Description

Scale counts 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 if different, by the paratype counts.

Dorsal fins VI-I,10; first dorsal fin with the second and third rays longest, without membrane, in males usually reaching third or half of the second dorsal fin base. Anal fin I,10 directly opposite second dorsal fin. Caudal fin with 13-14 branched rays and posterior margin rounded. Pelvic disk with one spine and five branched rays on each side, fifth rays joined together over their entire length, a thick frenum between spines; disc adherent to belly between all five rays. Pectoral fins 18-20, posterior margin rounded. LS 61 (61-66), ctenoid scales on flanks and caudal peduncle. TRB 19 (17-22). TRF 22 (16-23). PD usually 21 (21-26). ZZ 16 (15-17). Belly entirely covered with cycloid scales, extending from anus, almost to pelvic base. Nape with cycloid scales. Upper jaw with a single row of flexible tricuspid teeth, lateral cusps rounded, medial cusps shorter than lateral cusps. Dentary with a single straight row of conical teeth 5 (1-6) on each side, not curved and not meeting at symphysis; anterior teeth usually caniniform; horizontal teeth correspond in position with upper jaw teeth. Upper lip crenulated and with two lateral clefts. Crenulae irregular, generally small

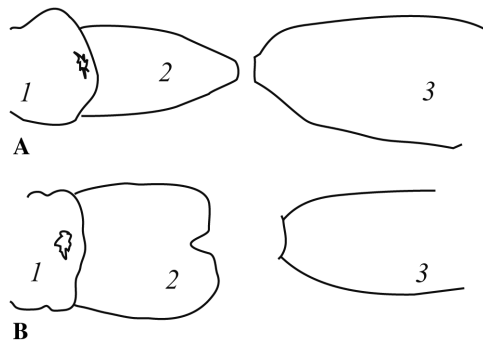


Figure 3. - Diagrammatic illustration of urogenital papilla in *Sicyopterus squamosissimus* (ventral view). 1: anus; 2: urogenital papilla; 3: anal fin. **A:** Male; **B:** Female.

Table I. - Scale counts in *Sicyopterus squamosissimus* and related species.

Lateral series	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
<i>S. squamosissimus</i>											2	2	3	1	–	1
<i>S. longifilis</i>		2	–	2	1	1	5	1								
<i>S. calliochromus</i>	2	2	1	1	1	2										

Predorsal midline series	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
<i>S. squamosissimus</i>												1	2	1	2	2	1
<i>S. longifilis</i>									4	3	2	2					
<i>S. calliochromus</i>	1	–	2	–	2	2	1										

Transverse backward series	14	15	16	17	18	19	20	21	22
<i>S. squamosissimus</i>				1	2	3	2	–	1
<i>S. longifilis</i>	1	4	4	1	1				
<i>S. calliochromus</i>	1	3	3	2					

Transverse forward series	14	15	16	17	18	19	20	21	22	23
<i>S. squamosissimus</i>			1	2	2	1	–	1	1	1
<i>S. longifilis</i>				1	3	3	2	2		
<i>S. calliochromus</i>	1	1	4	2	1					

Zigzag series	12	13	14	15	16	17
<i>S. squamosissimus</i>				1	4	4
<i>S. longifilis</i>		1	6	3	1	
<i>S. calliochromus</i>	1	3	5			

Table II. - Morphometrics in *Sicyopterus squamosissimus* and related species expressed to the nearest whole percent of standard length.

Jaw length	10	11	12	13	14											Caudal peduncle depth							
														9	10	11	12	13	14	15	16		
<i>S. squamosissimus</i>		2	4	2	1									<i>S. squamosissimus</i>	1	1	1	3	2	1			
<i>S. longifilis</i>	1	6	2	1										<i>S. longifilis</i>				1	5	3	1		
<i>S. calliochromus</i>	1	2	5	1										<i>S. calliochromus</i>			1	2	3	-	1	1	

Caudal peduncle length																			Body depth at second dorsal fin origin in males						
	11	12	13	14	15	16	17	18	19	20							14	15	16	17	18	19			
<i>S. squamosissimus</i>	1	-	1	-	1	-	2	2	1	1							<i>S. squamosissimus</i>	3	-	-	-	1			
<i>S. longifilis</i>	1	2	1	2	2												<i>S. longifilis</i>			2	3	1			
<i>S. calliochromus</i>	1	1	2	3	2												<i>S. calliochromus</i>		1	1	-	3	1		

Head length																		Predorsal length									
	19	20	21	22	23	24	25												30	31	32	33	34	35	36	37	
<i>S. squamosissimus</i>	1	-	1	2	3	1	2												<i>S. squamosissimus</i>	1	1	1	2	1	2	1	
<i>S. longifilis</i>		1	1	5	2	1	1												<i>S. longifilis</i>	2	1	1	5	1	-	-	1
<i>S. calliochromus</i>			1	2	2	4													<i>S. calliochromus</i>	1	1	-	2	2	-	1	1

Preanal length														
	46	47	48	49	50	51	52	53	54	55	56	57	58	59
<i>S. squamosissimus</i>	1	1	1	1	-	-	1	2	-	1	1			
<i>S. longifilis</i>					2	-	-	2	1	1	1	3		
<i>S. calliochromus</i>									1	1	2	2	2	1

Table III. - Fin lengths in males of *Sicyopterus squamosissimus* and related species expressed to the nearest whole percent of standard length.

Second dorsal fin length																			
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
<i>S. squamosissimus</i>	1	1	-	-	1	-	1	-	-	-	-	1							
<i>S. longifilis</i>													2	2	-	1	-	-	1
<i>S. calliochromus</i>									1	-	2	2	2	-	-	-	-	1	

Anal fin length										Caudal fin length															
	33	34	35	36	37	38	39	40	41	42							23	24	25	26	27	28	29	30	
<i>S. squamosissimus</i>	1	-	-	1	1	2											<i>S. squamosissimus</i>	1	2	-	-	1	-	-	1
<i>S. longifilis</i>							2	2	-	2							<i>S. longifilis</i>		1	1	2	-	-	1	1
<i>S. calliochromus</i>					1	2	2	1									<i>S. calliochromus</i>			3	-	2	1		

Table IV. - Fin lengths in females of *Sicyopterus squamosissimus* and related species expressed to the nearest whole percent of standard length.

Second dorsal fin length																			
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
<i>S. squamosissimus</i>	1	-	-	-	-	-	1	1	1										
<i>S. longifilis</i>						1	1	1	1	2	1	1							
<i>S. calliochromus</i>											2	-	-	-	1	-	-	-	1

Anal fin length											
	31	32	33	34	35	36	37	38	39	40	41
<i>S. squamosissimus</i>	1	-	1	1	-	-	-	-	1		
<i>S. longifilis</i>	1	1	-	-	-	-	1	2			
<i>S. calliochromus</i>							1	-	-	1	1

Caudal fin length											
	21	22	23	24	25	26	27	28	29	30	31
<i>S. squamosissimus</i>	1	-	-	1	1	1					
<i>S. longifilis</i>			1	-	1	1	2				
<i>S. calliochromus</i>									1	1	1

and shallow, with the exception of 4-5 on each side. Lower lip mostly absent, rudimentary elements present as expanded and folded tissue posterior to lower jaw teeth. Cephalic sensory pore system A, B, C, D, F, H, L, (M), (N) and O (M and/or N sometimes missing). Pore D single with all others paired. Oculoscaphular canal uninterrupted posterior to eye. Cutaneous sensory papillae developed on head (Fig. 2).

Males with an elongate urogenital papilla in appearance with distal tip rounded. Females with bulbous bilobed urogenital papilla (Fig. 3).

Colour of preserved specimens

Sexual dichromatism not developed. Specimens usually brownish to greyish on the head and the back. The flanks are yellowish to brownish with sometimes a slightly longitudinal brownish band from snout to hypural base or with five-six dusky to brownish saddles on dorsum. The snout is black. Caudal fin greyish. Pelvic fins whitish to greyish. First dorsal fin greyish. Second dorsal fin greyish to brownish. Pectoral fin usually greyish.

Colour in life

Males are often brownish to greyish usually with five-six dark saddle bars (often Y or V shaped) between head and tail (Fig. 1A). Cheeks and head greyish to brownish with one to three purple lines. One distinct elongated black blotch under each eye. Belly whitish to greyish. The first dorsal fin is translucent to yellowish; elongated rays bluish. The second dorsal fin is greyish to translucent and is slightly punctuated. The caudal fin is reddish in the central part, surrounded by a slightly blue line on the upper and lower parts. A black spot is present at the base of the caudal peduncle. Pectoral and anal fins translucent to yellowish. The female (Fig. 1B) is duller, the body is brown to yellow and the back may have five-six, more or less distinct, brown transverse small bars (V shaped). The first dorsal fin is greyish to translucent. The second dorsal fin is greyish to translucent and is slightly punctuated. The anal fin is yellowish to translucent. The caudal fin is translucent to bluish in the central part and is surrounded by a slight blue line on the upper and lower parts.

Ecology

Sicyopterus squamosissimus n. sp. was collected in small, rapid and boulder-strewn mountain streams with rocky bottoms with two other Sicydiinae, *Sicyopterus lagocephalus* (Pallas, 1770) and *Stiphodon semoni* Weber, 1895. It is assumed to be amphidromous as are the other members of the subfamily (Keith, 2003; Keith and Lord 2011b).

Distribution

Currently known from Palembang, South Sumatra Province and Kabupaten Sukabumi, West Java (Indonesia).

Etymology

The name of the species refers to the high numbers of scales compared to its congeners having two lateral clefts on crenulated upper lip, a second dorsal fin I10 and second and third rays of the first dorsal fin filamentous.

Comparison

Only two other species are known with two lateral clefts on a crenulated upper lip and a second dorsal fin count of I10, *Sicyopterus squamosissimus* n. sp. thus differs from *S. longifilis* and *S. callichromus* in having more scales in LS (61-66 versus 52-58/51-56), in PD (21-26 versus 18-21/10-16), and in TRB (17-22 versus 14-18/14-17).

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REFERENCES

- AKIHITO P., 1986. - Some morphological characters considered to be important in gobiid phylogeny. *In: Indo-Pacific fish biology: Proc. 2nd Int. Conf. on Indo-Pacific Fishes*, pp. 629-639. Tokyo: Ichthyological Society of Japan Ed.
- HOESE D.F., HADIATY R. & HERDER F., 2015. - Review of the dwarf *Glossogobius* lacking head pores from the Malili lakes, Sulawesi, with a discussion of the definition of the genus. *Raff. Bull. Zool.*, 63(1): 14-26.
- KEITH P., 2003. - Biology and ecology of amphidromous Gobiidae in the Indo-pacific and the Caribbean regions. *J. Fish Biol.*, 63: 831-847.
- KEITH P. & LORD C., 2011a. - Systematics of Sicydiinae. *In: The Biology of Gobies* (Patzner R.A., Van Tassell J.L., Kovacic M. & Kapoor B.G., eds), pp. 119-128. Science Publishers Inc.
- KEITH P. & LORD C., 2011b. - Amphidromy as a life cycle. *In: The Biology of Gobies* (Patzner R.A., Van Tassell J.L., Kovacic M. & Kapoor B.G., eds), pp. 243-277. Science Publishers Inc.
- KEITH P., LORD C., LORION J., WATANABE S., TSUKAMOTO K., CRUAUD C., COULOUX A. & DETTAI A., 2011. - Phylogeny and biogeography of Sicydiinae (Teleostei: Gobioidae) inferred from mitochondrial and nuclear genes. *Mar. Biol.*, 158(2): 311-326.

- KEITH P., HADIATY R. & LORD C., 2012a. - A new species of *Belobranchus* (Teleostei: Gobioidae: Eleotridae) from Indonesia. *Cybium*, 36(3): 479-484.
- KEITH P., ALLEN G., LORD C. & HADIATY R., 2012b. - Five new species of *Sicyopterus* (Teleostei: Gobioidae: Sicydiinae) from Papua New Guinea and Papua. *Cybium*, 35(4): 299-318.
- KEITH P., HADIATY R., BUSSON F. & HUBERT N., 2014a. - A new species of *Sicyopus* (Teleostei: Gobioidae) from Indonesia. *Cybium*, 38(3): 173-178.
- KEITH P., HADIATY R., HUBERT N., BUSSON F. & LORD C., 2014b. - Three new species of *Lentipes* from Indonesia (Teleostei: Gobiidae). *Cybium*, 38(2): 133-146.
- LARSON H.K., GEIGER M.F., HADIATY R. & HERDER F., 2014. - *Mugilogobius hitam*, a new species of freshwater goby (Teleostei: Gobioidae: Gobiidae) from Lake Towuti, central Sulawesi, Indonesia. *Raff. Bull. Zool.*, 62: 718-725.
- LORD C., BRUN C., HAUTECOEUR M. & KEITH P., 2010. - Comparison of the duration of the marine larval phase estimated by otolith microstructural analysis of three amphidromous *Sicyopterus* species (Gobiidae: Sicydiinae) from Vanuatu and New Caledonia: insights on endemism. *Ecol. Freshw. Fish*, 19: 26-38.
- POUYAUD L., KADARUSMAN, HADIATY R., SLEMBROUCK J., LEMAU N., KUSUMAH RUBY V. & KEITH P., 2012. - *Oxyeleotris colasi* (Teleostei: Eleotridae), a new blind cave fish from Lengguru in West Papua, Indonesia. *Cybium*, 36(4): 521-529.
- TAILLEBOIS L., CASTELIN M., LORD C., CHABARRIA R., DETTAI A. & KEITH P., 2014. - New Sicydiinae phylogeny (Teleostei: Gobioidae) inferred from mitochondrial and nuclear genes: insights on systematics and ancestral areas. *Mol. Phyl. Evol.*, 70: 260-271.
- WATSON R.E., MARQUET G. & PÖLLABAUER C., 2000. - New Caledonia fish species of the genus *Sicyopterus* (Teleostei : Gobioidae : Sicydiinae). *J. Ichthyol. Aqua. Biol.*, 4(1): 5-34.