

Stiphodon sapphirinus, a new species of freshwater goby from New Caledonia (Gobioidei: Sicydiinae)

by

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ABSTRACT. - *Stiphodon sapphirinus*, new species, is described on the basis of material collected from New Caledonia. It is distinguished from all other congeners in having nine segmented rays in the second dorsal fin, an elongate and filamentous fourth dorsal spine that lacks membranous tissue, usually 14 pectoral rays, 31-51 fine tricuspid premaxillary teeth, and sexual differences related to symphyseal teeth (0-2 small teeth in females vs 1-4 stout teeth in males), predorsal midline (usually absent in males and conspicuous in females), scales in transverse forward series, distribution of belly scales (absent in males and cycloid scales present in females) and colour pattern (males with a blue head and cobalt blue sides).

RÉSUMÉ. - *Stiphodon sapphirinus*, une espèce nouvelle de gobie d'eau douce de Nouvelle-Calédonie (Gobioidei: Sicydiinae).

Stiphodon sapphirinus, espèce nouvelle, est décrite à partir de matériel collecté en Nouvelle-Calédonie. Il se distingue des autres espèces du genre en ayant neuf rayons segmentés dans la seconde nageoire dorsale, une première dorsale avec un quatrième rayon long, filamenteux et sans membrane, 14 rayons à la nageoire pectorale, 31 à 51 dents prémaxillaires tricuspides, 0 à 2 petites dents symphyséales chez les femelles et 1 à 4 chez les mâles, des écailles cycloïdes dans la région prédorsale (0-6 pour les mâles et 0-12 pour les femelles) et plus d'écailles en série transverse postérieure. La répartition des écailles sur le ventre présente un dimorphisme sexuel : les mâles sont souvent sans écailles tandis que les femelles possèdent des écailles cycloïdes. Les mâles ont une tête bleue et une bande latérale bleue au-dessus de la ligne latérale.

Key words. - Gobiidae - *Stiphodon sapphirinus* - New Caledonia - Freshwater - New species.

Stiphodon Weber, 1895 is a genus of freshwater goby that is widely distributed and species have been described from Sri Lanka in the Indian Ocean (Watson, 1998) to broad areas of the tropical Pacific extending from western Indonesia (Watson, 1994) to French Polynesia (Ryan, 1986; Parenti and Maciolek, 1993; Keith *et al.*, 2002a; Watson, 1995) and from southern Japan (Watson and Chen, 1998) to Australia (Watson, 1996). *Stiphodon* was established with *S. semoni* Weber, 1895 the type species but was later placed into synonymy with *Stiphodon elegans* (Steindachner, 1880) by Weber and de Beaufort (1915), however *S. semoni* is a species distinct from *S. elegans* (Watson, 1996; Watson *et al.*, 1998). *Vailima stevensoni* Jordan & Seale, 1906 was described on the basis of material collected in Samoa but it is synonymous with *S. elegans* (Watson, 1995, 1996; Watson and Kottelat, 1995). The next species that can be assigned to *Stiphodon* are *Microsicydium atropurpureum* Herre, 1927, *M. formosum* Herre, 1927 and *M. pulchellum* Herre, 1927 described from material collected in the Philippines. Of the three species described in Herre (1927), Koumans (1940) placed one into synonymy with *S. elegans* but was uncertain of placement for the remaining two. Watson and Kottelat (1995) discuss the *Stiphodon* from the Philippines. *Stiphodon pelewensis* Herre,

1936 was described on the basis of a single specimen said to be collected from a marine environment on the island of Koror (Palau Islands) but later placed into synonymy with *S. elegans* in Koumans (1940), but it too is a distinct species occurring only in freshwater streams in the Republic of Palau. *Stiphodon elegans ornatus* Meinken, 1974 was established as a subspecies but Watson (1994) found it distinct from *S. elegans* and is currently known from streams entering the Indian Ocean. *Stiphodon astilbos* Ryan, 1986 was reported from relatively quiet streams at near sea level in Vanuatu. *Stiphodon elegans multisquamus* Wu & Ni (1986) was described on the basis of material collected from Hainan Island, China; although established as a subspecies of *S. elegans* it is a distinct species.

In Koumans (1940, 1953) the assessment of *Stiphodon* and synonymy of species was apparently based largely on the colouration in females because a female is illustrated as representative of the genus. Although colour patterns in females are very similar in all species and indeed almost indistinguishable, a situation addressed in Watson (1995), females have characteristics identifiable to each species (fin ray counts, scales, number of teeth, size, habitat preference, etc.) and once these factors are considered it becomes diffi-

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cult to accept that these widely differing populations as all belonging to *S. elegans* especially in view of the fact that more than one form may occur together but do not interbreed.

Although many new species have been described over the past decade some are extremely rare. A recent survey of freshwater environments in Australes Islands in French Polynesia (Keith *et al.*, 2002b) failed to yield a single specimen of *S. discotorquatus* Watson, 1995, despite intensive collection efforts, and is feared extinct. *Stiphodon allen* Watson, 1996 remains Australia's rarest freshwater fish, despite numerous efforts to locate a living population, the holotype remains the only known example. Other species are currently common within their natural range but pressures by human development coupled with their restricted distribution ranges make many extremely vulnerable to environmental pressures that could result in a rapid decline of current known populations or even extinction.

Stiphodon are unique among the Sicydiinae Gill, 1860 in having three anal pterygiophores prior to the first haemal spine (Birdsong *et al.*, 1988). In all other genera belonging to the group the number is two. *Stiphodon* shares with *Sicyopus* Gill, 1863 and an unnamed genus from Vanuatu and Fiji a pelvic disc that is short based, being adherent to the belly between the fifth rays only. In all other Sicydiinae the disc is broad based (Sakai and Nakamura, 1979) being adherent to the belly between all five rays with the belly visible inside the disc. The only other genus within the Gobioidae so far known to have a pelvic disc adherent to the belly is *Rhinogobius* Gill, 1859, which is short based, but differs significantly in most other respects (osteology; morphology; dentition) and is placed provisionally into Chaeturichthyinae Bleeker, 1874 (*Acanthogobius*-group of Birdsong *et al.*, 1988).

Stiphodon, like most sicydiine gobies, generally occurs in moderately fast flowing or swift mountainous streams, often above large waterfalls (Buden *et al.*, 2001). The genus is herbivorous, selectively feeding on algal-encrusted rock surface, usually within 1-2 m of the surface.

Stiphodon has been said to be most closely related to *Sicydium* Valenciennes, 1837 and *Sicyopterus* and thought to be among the most derived within Sicydiinae based upon dental morphology in cladistic analysis (Harrison, 1993; Parenti and Maciolek, 1993) but this research disagrees with those assessments based largely on the nature of the pelvic disc (short based *vs* broad based), the premaxilla ascending process (terminates dorsally as a sharp point *vs* terminates dorsally with a broadly expanded process), in having fewer and generally larger scales in all areas and always with fewer pectoral rays (14-16 *vs* 18-22).

The purpose of this paper is to describe a new species of *Stiphodon* found in relatively small high gradient streams on New Caledonia.

MATERIALS AND METHODS

Methods follow those in Watson (1995). Abbreviations used to represent the cephalic sensory pore system follow Akihito (1986). Abbreviations used to represent collections and institutions cited follow Leviton *et al.* (1985), except BLIH (Biological Laboratory, Imperial Household, Chiyo-da-ku, Tokyo, Japan) formerly LICPP.

In most recent accounts of Sicydiinae those animals with only two preopercular pores have been referred to as M and O. An examination of many hundreds of specimens belonging to all genera in Sicydiinae reveals that those species possessing only two preopercular pores are actually N and O as illustrated and labelled in Watson *et al.* (2002). Pore M is situated close to the oculoscapular canal slightly below and between pores F and H.

Diagrammatic illustrations of head and the urogenital papilla are not provided in this research because morphologically little variation exists among the many species so far described from streams entering the Pacific Ocean. The only obvious distinction so far demonstrated has been for *Stiphodon martenstyni* Watson, 1998 from Sri Lanka. Some variation exists with cutaneous sensory papillae but this is limited to the number of papillae in a row and not their arrangement with the tendency being the smaller the species the fewer the papillae in each row.

Comparative material

The new species is compared in text and tables with *S. birdsong* Watson, 1996, *S. hydoreibatus* Watson, 1999, *S. surrufus* Watson & Kottelat, 1995 and *S. tuivi* Watson, 1995 because these usually have 14 pectoral rays, nine segmented rays in the second dorsal fin and a small size.

Material for *S. birdsong*, *S. surrufus*, *S. hydoreibatus* and *S. tuivi* is that listed in Watson (1995, 1996, 1999), Watson and Kottelat (1995) and Watson *et al.*, (1998).

STIPHODON SAPPHIRINUS, NEW SPECIES

(Figs 1, 2; Tabs I-III)

Synonymy. - *Stiphodon* sp. Marquet *et al.* (2003).

Material examined

44 specimens collected from New Caledonia totalling 30 males and 14 females with a size range of 16.9-30.4 mm SL, largest male 30.4, largest female 28.8 and smallest gravid female 23.1.

Holotype. - MNHN 2004-850, male (30.4 mm SL); New Caledonia: North Province: Tité River; 2 Nov. 1999, Chloé II Expedition.

Table I. - Premaxillary teeth in *Stiphodon sapphirinus* and related species. [Dents prémaxillaires chez *Stiphodon sapphirinus* et les espèces proches.]

	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
<i>S. sapphirinus</i>							1	3	5	1	3	-	4	5	7	1	3	2	1	2	-	-	1	1	1	-	1		
<i>S. birdsong</i>				1	-	2	6	8	10	14	8	3	7	2	1	3	-	-	1	-	1	-	-	-	-	-	-	-	-
<i>S. hydoreibatus</i>											2	-	2	1	3	3	1	1	1	-	1	2	-	-	-	1	-	1	
<i>S. surrufus</i>	1	1	1	-	-	-	-	1	-	2	-	1																	
<i>S. tuivi</i>										2	-	1	6	1	12	7	14	7	11	6	6	7	4	4	2	2	-	1	1

Table II. - Meristic characters in *Stiphodon sapphirinus* and related species. M: Male; F: Female. [Caractères méristiques chez *Stiphodon sapphirinus* et les espèces proches. M : Mâle ; F : Femelle.]

	Lateral scales																												
	12	13	14	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
<i>S. sapphirinus</i>										1	1	2	2	4	5	5	9	3	3	3	2	1	1	1					
<i>S. birdsong</i>	1	-	2	6	3	7	5	8	6	5	4	2	4	2	-	2	2	2	-	1	1	1							
<i>S. hydoreibatus</i>												1	-	-	2	2	1	2	2	2	3	1	-	1					
<i>S. surrufus</i>								1	-	-	1	-	-	1	1	-	-	-	-	1	1	-	-	-	1				
<i>S. tuivi</i>											1	6	5	3	8	6	9	11	7	6	8	4	7	3	2	1	1		
	Transverse back scales																												
	2	3	4	5	6	7	8	9	10	11	12	13	14	15															
<i>S. sapphirinus</i>									40	1	1																		
<i>S. birdsong</i>	1	-	-	1	-	-	4	3	3	14	16	14	7	1															
<i>S. hydoreibatus</i>								3	13																				
<i>S. surrufus</i>								2	-	2	2	1																	
<i>S. tuivi</i>								7	43	26	7	1																	
	Transverse forward scales																												
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19									
<i>S. sapphirinus</i>									2	3	6	7	8	6	5	3	2												
<i>S. birdsong</i>	2	-	2	6	2	7	7	13	9	5	4	4	1	1	-	-	-	-	1										
<i>S. hydoreibatus</i>											2	3	3	3	4														
<i>S. surrufus</i>	1	-	-	-	1	-	-	-	-	3	-	-	2																
<i>S. tuivi</i>												2	8	7	29	20	18	4	1										
	Predorsal scales																												
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14														
<i>S. sapphirinus</i> M	27	-	1	-	-	-	1																						
<i>S. sapphirinus</i> F	3	-	-	1	-	-	1	3	2	-	1	1	1																
<i>S. birdsong</i> M	32																												
<i>S. birdsong</i> F		55																											
<i>S. hydoreibatus</i> M		5	-	-	1																								
<i>S. hydoreibatus</i> F			2	-	-	3	-	-	1	-	2	2	2	2	1														
<i>S. surrufus</i> M	3																												
<i>S. surrufus</i> F		2	-	1																									
<i>S. tuivi</i> M	10	6	7	8	6	2	7	6	8	4	5	1	-	2	1														
<i>S. tuivi</i> F		1	-	-	-	-	4	2	2	2	5	5	2	3	1														

Paratypes. - MNHN 2004-851, female (28.8 mm SL); same collection data as holotype. - MNHN 2004-852, 4 males, 3 females (22.1-23.7 mm SL); New Caledonia: North Province: Tibarama River (2); 26 Oct. 1999, Chloé II Expedition. - MNHN 2004-853, 3 males (19.4-22.9 mm SL); New Caledonia: North Province: Wé Cot River; 1 Nov. 1999, Chloé II Expedition. - MNHN 2004-854; 14 males, 8 females (21.9-25.8 mm SL), UF 146949, 3 males, 3 females (18.4-24.9); New Caledonia: North Province: Narûma River; 27 Oct. 1999, Chloé II Expedition. - SMF 28326, male (28.4

mm SL); New Caledonia: North Province: Tao River; 9 Oct. 1996, G. Marquet.

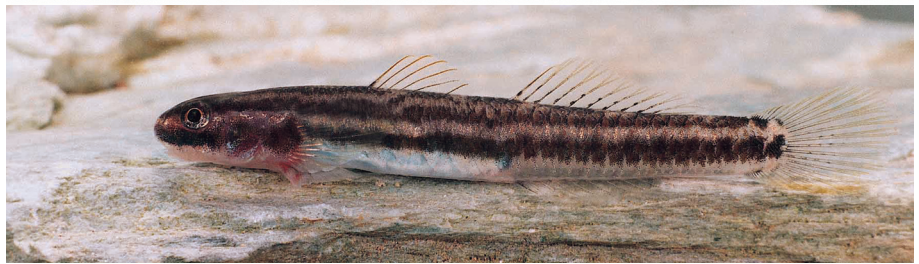
Diagnosis

A combination of characters distinguishes *Stiphodon sapphirinus*. The first dorsal fin in males is with fourth spine long, filamentous and without membrane beyond the fin. The males are usually without scales (0-6) in predorsal midline, whereas females usually have predorsal scales (0-12). The males have more and larger symphyseal teeth, 2 (0-4) vs 2

Figure 1. - *Stiphodon sapphirinus*, paratype, MNHN 2004-854, male; New Caledonia: North Province: Narûma River; 27 Oct. 1999, Chloé II Expedition (photo E. Vigneux).



Figure 2. - *Stiphodon sapphirinus*, paratype, MNHN 2004-851, female; New Caledonia: North Province: Tité River; 2 Nov. 1999, Chloé II Expedition (photo E. Vigneux).



(0-2) in females. It has 7-15 scales in transverse forward series. The colouration in males is somewhat variable: the head and body are cobalt blue that is especially prominent above the midline, the dorsal fins are generally clear with cobalt blue present on spine and often membrane close to base and anal fin whitish or bluish basally.

Description

Dorsal fins VI-I, 8 (1), VI-I, 9 (43), first dorsal fin separate from and same height as second dorsal fin in females and slightly higher than second dorsal fin in males, adult males with a filamentous fourth spine without membrane extending beyond fin, females without filamentous spines. Anal fin I, 10 (44) is directly opposite to second dorsal fin. Pectoral fin is almost always with 14 rays (13-15), uppermost rays extending beyond membrane but not appearing feathery or silky, lowermost 1 or 2 rays simple, fin oblong with posterior margin rounded. Caudal fin usually with 13 branched rays (11-13), posterior margin rounded. Pelvic disc always with 1 spine and 5 stout and heavily branched segmented rays, fifth rays joined together their entire length forming a strong adhesive disc, disc adherent to belly between fifth rays only, between spines a strong fleshy frenum with blood vessels clearly visible along ventral edge.

Scales in lateral series 21-35 with females generally having more scales than males (25-35 vs 21-34), those on caudal peduncle are ctenoid becoming cycloid and smaller closer to pectoral base, scales at hypural base almost always ctenoid with some small cycloid scales posterior to hypural base. Scales in transverse backward series almost always 10 (10-12) in both sexes, cycloid scales present along bases of second dorsal and anal fins. Scales in transverse forward series variable in number (7-15) in both sexes with scales well developed at origin of second dorsal fin with scales becoming smaller and fewer closer to belly. Scales in predorsal

midline sexually dimorphic in number with males usually having no scales in this region (0-6) and females usually with some scales present (0-12), scales when present always cycloid. Scales in zigzag series are almost always 9 (9-10) in both sexes. Distribution of scales on belly sexually dimorphic, males usually without scales and females usually have a few small cycloid scales close to urogenital papilla and anus. Head, except for nape, breast and pectoral base are without scales.

Premaxillary teeth 31-51, fine and tricuspid, tridentiform with central cusp longer than lateral cusps. Dentary symphyseal teeth in males usually 2 (0-4), conical to caniniform, much stronger and larger when contrasted with females. Symphyseal teeth in females usually 2 (0-2), small and conical; horizontal teeth fine and in a thin fleshy sheath with a rather pectiniform appearance and a number similar to and corresponding in position with premaxillary teeth.

Gill rakers 1-3, on inner edge of outer gill arch appearing as short fleshy projections lacking ossification on lower arm. Edge of shoulder girdle smooth and without projections. Gill opening restricted close to shoulder girdle. Cephalic sensory pore system always A, B, C, D, F, H, K, L, N and O, pore D is singular, all others are paired. Oculoscapular canal separated into anterior and posterior canals between pores H and K. Cutaneous sensory papillae well developed over lateral and dorsal surfaces of head.

Sexual dimorphism well developed with adult males always having longer second dorsal and anal fins. Urogenital papilla in males somewhat triangular with a rounded distal tip, while in females rectangular with tiny fimbriate projections distally.

Colour in preservative. - Bright, colours and sexually dichromatic. In males background of body brownish grey; a thin blackish medial band from below origin of first dorsal fin to below middle of second dorsal fin; belly light grey, scales

Table III. - Morphometric characters in *Stiphodon sapphirinus* and related species expressed to the nearest whole percent of standard length. M: Male; F: Female. [Caractères morphométriques chez *Stiphodon sapphirinus* et les espèces proches, exprimés en pourcentage de la longueur standard et arrondis au nombre entier le plus proche. M : Mâle ; F : Femelle.]

	Predorsal length										Preanal length																		
	31	32	33	34	35	36	37	38	39	40	49	50	51	52	53	54	55	56	57	58	59	60	61						
<i>S. sapphirinus</i>				4	7	12	10	6	-	2				3	2	11	6	6	8	2	2	-	1						
<i>S. birdsong</i>			2	7	20	23	13	2				1	-	3	9	6	10	9	11	10	7								
<i>S. hydoreibatus</i>		1	-	3	2	5	-	1							2	2	2	2	2	2									
<i>S. surrufus</i>					2	1	2	1						1	2	2	-	-	1										
<i>S. tuivi</i>	10	12	16	20	15	11	2				3	5	7	13	24	10	10	9	4	2	1								
Head length												Jaw length																	
	18	19	20	21	22	23	24	6	7	8	9	10	11																
<i>S. sapphirinus</i>			11	18	9	3			11	26	4																		
<i>S. birdsong</i>		5	25	22	11	5		6	37	23	1																		
<i>S. hydoreibatus</i>		1	4	3	4			1	6	3	1																		
<i>S. surrufus</i>				2	-	4			1	2	2	1																	
<i>S. tuivi</i>	1	1	22	35	27	10	2		18	37	23	9	1																
Caudal peduncle length								Caudal peduncle depth				Body depth at second dorsal origin in males																	
	17	18	19	20	21	22	23	24	25	8	9	10	11	12	11	12	13	14	15	16									
<i>S. sapphirinus</i>			6	5	15	9	4	1	1	2	14	20	5		2	11	11	2											
<i>S. birdsong</i>	1	5	12	25	15	10	2				3	36	33	2	20	11	-	1											
<i>S. hydoreibatus</i>				2	2	7	1				7	5				1	1												
<i>S. surrufus</i>			1	1	-	4					1	-	4	1	1	-	1	1											
<i>S. tuivi</i>	3	6	12	28	22	10	5	-	1	4	17	54	13		3	6	20	22	7	4									
Second dorsal fin length														Caudal fin length															
	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	19	20	21	22	23	24	25	26	27	28
<i>S. sapphirinus</i> M	1	-	-	1	-	3	2	-	1	7	3	3	3	3	1					2	-	2	3	5	11	2	2	-	1
<i>S. sapphirinus</i> F		3	3	5	1	1														1	-	2	5	2	3	1			
<i>S. birdsong</i> M				1	-	3	5	8	6	4	2	1	-	1							1	3	3	2	2	2			
<i>S. birdsong</i> F	2	9	9	9	5	-	1														1	1	8	6	1	-	-	-	1
<i>S. hydoreibatus</i> M							1	-	-	-	-	-	1											1	-	-	-	-	1
<i>S. hydoreibatus</i> F	1	-	4	1	2	-	1														1	-	3	3	1	1	-	1	
<i>S. surrufus</i> M										1	1	1																	
<i>S. surrufus</i> F		1	1	-	1																			1	-	2			
<i>S. tuivi</i> M					1	-	-	-	1	9	8	7	11	13	5	4	5	1	1	1	1	2	19	13	14	10	4	-	1
<i>S. tuivi</i> F		1	5	4	7	4	1													2	6	8	4	-	2				
Anal fin length																													
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46									
<i>S. sapphirinus</i> M					1	1	-	1	-	-	5	1	4	5	5	3	-	2											
<i>S. sapphirinus</i> F				1	1	3	3	3	-	2																			
<i>S. birdsong</i> M									1	6	8	7	6	4															
<i>S. birdsong</i> F	1	-	-	-	1	4	12	12	5	1																			
<i>S. hydoreibatus</i> M														1	-	-	-	-	1										
<i>S. hydoreibatus</i> F					1	-	1	2	2	3	-	-	1																
<i>S. surrufus</i> M												1	-	2															
<i>S. surrufus</i> F		1	1	-	-	1																							
<i>S. tuivi</i> M								4	3	3	8	13	8	13	7	2	3	-	1										
<i>S. tuivi</i> F			2	2	5	2	2	2	4	1	-	2																	

laterally with a thin vertical bar especially prominent over medial surface. Background of head greyish; snout dusky; upper lip blackish, lower margin free of pigment, below a broad blackish bar approximately same width as eye; opercle with a dusky blotch medially situated between preopercular pores and adjacent to anterior margin of opercle; nape brown-

ish grey; ventrally mostly free of markings, branchiostegal rays and membrane slightly dusky, breast dusky; dusky blotch on chin. First and second dorsal fins with blackish rays and spines with membrane in between dusky, adjacent and anterior to each ray a series of small black spots originating close to base extending close to distal margin. Caudal fin greyish,

distally rays dusky, upper caudal fin base usually with a blackish blotch. Anal fin is dusky, distal margin whitish, next to whitish distal margin a thin black band. Pelvic disc has black bars on each side extending from spine medially to ray 4, becoming diffuse and dusky distally in ray 5. Pectoral fin rays are dusky, basally membrane slightly dusky while distally mostly without pigment, pectoral base slightly dusky with a dusky spot on anterior half. In females background colouration of head and body mostly cream; a bold but rather blotchy black band extends from tip of snout terminating close to medial region of the hypural base where a black spot occurs; a second blotchy black band originates as a bar between nostrils and continues through the eye to dorsal surface of caudal peduncle just posterior to second dorsal fin, a black spot posterior to this on procurrent rays and upper caudal peduncle; nape and dorsal surfaces are with dusky saddles being most prominent anterior to caudal peduncle; head and body ventral to midline are without markings.

Colour in life. - In males (Fig. 1) bright cobalt blue, shimmers in sunlight, with dorsal and anal fins generally clear except basally which is bluish, rays and spines bluish that is especially strong basally, anal fin and pelvic disc whitish. Females (Fig. 2) yellowish with black markings; dorsal margin of second dorsal fin may appear whitish or bluish, anal fin and pelvic disc may appear powder blue or whitish.

Distribution

Stiphodon sapphirinus is found throughout New Caledonia in both the North Province and South Province (Marquet *et al.*, 2003).

Ecology

Stiphodon sapphirinus occurs in clear swift streams and has been observed in streams from near sea level to well above small waterfalls at higher elevations. The preferred habitat is usually one of boulders and slab bottom streams usually with little or no sand and gravel, but exceptions have been noticed. *Stiphodon sapphirinus* has been known to occur in the same streams as *S. atratus* Watson, 1996 and *S. rutilaureus* Watson, 1996 on New Caledonia but the last two prefer the lower part of the river and they were not found at high elevation. *Stiphodon sapphirinus* generally occurs in riffles but has on occasion been collected in swift waters above waterfalls.

Resemblance

Stiphodon sapphirinus differs from *S. birdsong* and *S. surrufus* because these lack filamentous spines in the first dorsal fin in males and *S. sapphirinus* has more scales in transverse forward series (7-15 vs 0-13/0-12) and more scales in the predorsal midline in females (0-12 vs 1/1-3). *S. sapphirinus* differs from *S. tuivi* in having fewer scales in

the predorsal midline in males (0-6 vs 0-14) and more scales in transverse forward series (7-15 vs 2-19). It differs from *S. hydoreibatus* in second dorsal, anal caudal fin length and coloration in males (Tab. III).

Etymology

The name for the new species, *sapphirinus*, is a Latin word meaning of sapphire; this alludes to the bright blue colouration and jewel like appearance of males, especially when viewed in sunlight. An adjective.

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