

SICYOPUS (SMILOSICYOPUS) CHLOE,
A NEW SPECIES OF FRESHWATER GOBY
FROM NEW CALEDONIA (SICYDIINAE)

by

Ronald E. WATSON (1), Philippe KEITH (2) & Gérard MARQUET (3)

ABSTRACT. *Sicyopus (Smilosicyopus) chloe* n. sp., a carnivorous freshwater goby, is described on the basis of 22 specimens collected from high gradient streams on the eastern coast of North Province, New Caledonia. It differs from most *Sicyopus* species in having canine teeth in both upper and lower jaws, and the absence of labial teeth projecting horizontally from the lower jaw. It differs from other species of the subgenus *Smilosicyopus* by a combination of characters that include 4-7 blackish spots on each side of nape, a broad blackish V-shaped mark ventrally on head being most prominent in males, 14-16 scales in zigzag series and strongly differentiated sexually dichromatism colour patterns. All other species of *Sicyopus (Smilosicyopus)* have sexual dichromatism poorly developed with males being only slightly more dusky than females.

RÉSUMÉ. *Sicyopus (Smilosicyopus) chloe*, une nouvelle espèce de gobie d'eau douce de Nouvelle-Calédonie (Sicydiinae).

Sicyopus (Smilosicyopus) chloe n. sp., un gobie carnivore dulçaquicole, est décrit à partir de 22 exemplaires collectés dans les rivières de la côte Est de la Province Nord de la Nouvelle-Calédonie. Il diffère de la plupart des autres espèces de *Sicyopus* par la présence de dents caniniformes sur les mâchoires supérieure et inférieure et par l'absence de dents labiales horizontales sur la mâchoire inférieure. Il diffère des autres espèces du sous-genre *Smilosicyopus* par plusieurs caractères dont la présence de 4 à 7 points noirs sur chaque côté de la nuque, une marque formant un V noirâtre sur la partie ventrale de la tête et bien marquée chez les mâles, 14 à 16 écailles disposées en zigzag, ainsi qu'un fort dichroïsme sexuel. Les autres espèces de *Sicyopus (Smilosicyopus)* ont en effet un dichroïsme sexuel peu développé, les mâles étant seulement légèrement plus sombres que les femelles.

Key words. Gobioidae - Sicydiinae - *Sicyopus chloe* - New Caledonia - Freshwater - New species.

During the past 25 years many freshwater gobies, including those of the subfamily Sicydiinae Gill, 1860, usually considered to belong to Gobiidae, have been collected and identified from freshwater streams throughout the tropical Indo-Pacific. With this new material the status of some species has been resolved, like *Lentipes concolor* (Gill, 1860), which is known now as endemic from the Hawaiian Islands (Maciolek, 1978) and approximately 40 new species of Sicydiinae have been described from the Pacific region since 1979. Although many new species have been described in the past 20 years, at least 40 more freshwater gobies belonging to the Sicydiinae await description.

(1) **Phylogenie I**, Forschungsinstitut Senckenberg, Senckenberganlage 25, D-60325 Frankfurt am Main, GERMANY. Current mailing address: 3658 NW 41st Lane, Gainesville, Florida 32605-1468, U.S.A.

(2) **Institut d'Écologie et de Gestion de la Biodiversité**, Muséum National d'Histoire Naturelle, 57, rue Cuvier, F-75231 Paris Cedex 05, FRANCE. [keith@mnhn.fr]

(3) **E.R.V.E.M.**, Université Française du Pacifique, BP 4477, Nouméa, NOUVELLE-CALÉDONIE.

From an insular standpoint the freshwater ichthyofauna of New Caledonia is both rich and varied (Jouan, 1861, 1863, 1877; Castelnau, 1873; Ogilby, 1897; Weber and de Beaufort, 1915; Catala, 1950; Dingerkus and Séret, 1992a, 1992b; Séret, 1992; Séret and Dingerkus, 1992; Séret, 1997; Marquet and Mary, 1999; Mary, 1999; Keith *et al.*, 2000). The Sicydiinae from New Caledonia includes five nominal and valid species: *Sicyopterus sarasini* Weber & de Beaufort, 1915, an endemic; *Sicyopterus lagocephalus* (Pallas, 1774) distributed from the Comoro and Mascarene Islands in the western Indian Ocean to the Society Islands in French Polynesia; *Sicyopus (Sicyopus) zosterophorum* (Bleeker, 1857) distributed from the eastern Indian Ocean of Indonesia to Japan and New Caledonia; *Stiphodon atratus* Watson, 1996 and *Stiphodon rutilaureus* Watson, 1996, distributed from eastern Indonesia to New Caledonia. Additionally, there are six new species of Sicydiinae: one of *Lentipes* Günther, 1861, one of *Sicyopus* Gill, 1863, at least three of *Stiphodon* Weber, 1895, and another species of an undetermined genus.

Watson (1999) recently defined three subgenera as belonging to *Sicyopus* Gill, 1863: *Juxtastiphodon*, *Smilosicyopus* and *Sicyopus*. It has been suggested that *Smilosicyopus* is a junior synonym of *Raogobius* Mukerji, 1935 (Kottelat, pers. comm., 1999), based on a single specimen (CMK 14795) collected from the Andaman Islands, but this problem requires study.

The purpose of the current research is to provide a description of *Sicyopus (Smilosicyopus) chloe* n. sp., a freshwater goby found only in New Caledonia.

METHODS

Methods follow Watson (1995). Measurements were taken with a dial caliper to the nearest tenth of a millimeter. All counts were taken from the right side. The size is given in standard length (SL). Teeth were counted to the right of symphysis. Abbreviations for institutions and collections cited follow Leviton *et al.* (1985), except LICPP, which is now BLIH (Biological Laboratory, Imperial Household, Akasaka Imperial Palace, Tokyo) and CMK (Collection of Maurice Kottelat, Cornol, Switzerland). Abbreviations for the cephalic sensory pore system follow Akihito (1986).

Comparative material.—*Sicyopus (Smilosicyopus) bitaeniatus* Maugé *et al.*, 1992. Marquesas Islands: MNHN 1992-113, female (34.4 mm SL) and MNHN 1992-115, 2 males, 8 females (21.3-33.6 mm), Hiva Oa, Vaioa River, 7 Jan. 1987, G. Marquet coll.; MNHN 1992-114, 2 females, 1 unsexed (26.2-28.8 mm), Ua Pou, Paaumea River, 22 Dec. 1986, G. Marquet coll.

Sicyopus (Smilosicyopus) fehlmanni Parenti & Maciolek, 1993. Caroline Islands: Belau, Babelthuap Island, CAS-SU 52024, 13 males, 20 females, 1 juvenile (15.4-40.2 mm), south fork Arakitaoch Stream, 2.2 km southeast of Ngarekeai village, 26 Nov. 1956, Sumang *et al.* coll.; CAS-SU 69693, 16 males, 29 females (18.9-33.4 mm), Ngardmau Municipality, north fork Amekaud River, 10 Oct. 1957, Sumang *et al.* coll.

Sicyopus (Smilosicyopus) leprurus Sakai & Nakamura, 1979. Japan: Ryukyu Islands, Okinawa Prefecture, Ishigaki Island, BLIH 1983170, 5 males, 1 female (31.9-41.4 mm), Ishigaki City, Ara River, 10 Jul. 1983; BLIH 1986407, male (30.5 mm), Ishigaki City, Ara River, 9 Sep. 1986; BLIH 1987587, female (31.8 mm), Ishigaki City, Ara River, 10 Oct. 1987; BLIH 1989135, male (29.5 mm), BLIH 1989136, female (33.2 mm), Ishigaki City, Ara River, 17 Oct. 1989; BLIH 1990727, female (30.1 mm), Ishigaki City, Ara River, 6 Oct. 1990; NSMT P.28619, 2 males, 2 females, Ishigaki Island, Arakawa River, 2 Sep. 1974; URM P4529, female (30.1 mm), 4 Sep. 1982.

Diagnosis

A *Sicyopus (Smilosicyopus)* species with the following set of characters: one or 2 canine teeth on each side of upper and lower jaws. Broad blackish 'V' shaped mark on head ventrally in males, appearing dusky in females. Nape with a row of 4 to 7 blackish spots in small individuals on each side, becoming more numerous on upper surface of head, snout and

Table III. Morphometrics in *Sicyopus chloe* and related species expressed to the nearest whole percent of standard length.

	Predorsal length									
	33	34	35	36	37	38	39	40	41	42
<i>S. chloe</i>			2	3	9	2	5	-	1	
<i>S. bitaeniatus</i>				4	-	3	3	4		
<i>S. fehlmanni</i>			4	8	19	27	12	4	3	1
<i>S. leprurus</i>	1	-	2	1	11	2				
<i>Sicyopus</i> sp.			1	1	-	1	-	2	2	

	Preanal length												
	54	55	56	57	58	59	60	61	62	63	64	65	
<i>S. chloe</i> males						1	2	5					
<i>S. chloe</i> females						1	2	4	2	3	2		
<i>S. bitaeniatus</i> males					1	-	-	-	1				
<i>S. bitaeniatus</i> females					1	-	-	2	4	2	2	1	
<i>S. fehlmanni</i> males		1	-	4	4	11	5	4					
<i>S. fehlmanni</i> females	1	-	-	2	1	8	6	13	15	2	1		
<i>Sicyopus</i> sp. males								2	1				
<i>Sicyopus</i> sp. females				1	1	1	-	-	1				

	Head length						
	22	23	24	25	26	27	28
<i>S. chloe</i>		5	7	8	1	1	
<i>S. bitaeniatus</i>	1	1	5	1	4	1	1
<i>S. fehlmanni</i>	1	17	21	26	12	1	
<i>S. leprurus</i>	1	3	5	4	3	1	
<i>Sicyopus</i> sp.				1	5	-	1

	Jaw length					
	7	8	9	10	11	12
<i>S. chloe</i> males				4	2	2
<i>S. chloe</i> females	6	5	3			
<i>S. bitaeniatus</i> males				2		
<i>S. bitaeniatus</i> females	1	3	4	4		
<i>S. fehlmanni</i> males		8	19	2	1	
<i>S. fehlmanni</i> females	13	31	6			
<i>S. leprurus</i> males		1	2	1	2	4
<i>S. leprurus</i> females	5	2				
<i>Sicyopus</i> sp. males			2	1		
<i>Sicyopus</i> sp. females		2	2			

	Caudal peduncle length							
	16	17	18	19	20	21	22	23
<i>S. chloe</i>	1	1	2	3	11	2	2	
<i>S. bitaeniatus</i>	1	5	6	-	1	-	1	
<i>S. fehlmanni</i>		4	10	28	24	12	1	1
<i>S. leprurus</i>		1	4	6	5	1		
<i>Sicyopus</i> sp.		1	-	3	1	2		

	Caudal peduncle depth			
	7	8	9	10
<i>S. chloe</i>		2	11	9
<i>S. bitaeniatus</i>	1	3	10	
<i>S. fehlmanni</i>	4	19	39	17
<i>S. leprurus</i>			10	7
<i>Sicyopus</i> sp.		1	3	3

	Body depth at second dorsal fin origin in males			
	9	10	11	12
<i>S. chloe</i>		2	2	4
<i>S. bitaeniatus</i>			1	1
<i>S. fehlmanni</i>		12	11	5
<i>S. leprurus</i>	1	3	5	1
<i>Sicyopus</i> sp.		1	2	

on upper opercle in larger specimens. Markings sexually dimorphic, males dorsal to midline blackish with a row of whitish spots or irregular barring and ventral to midline whitish, females with broad dusky bars laterally, being blackish midlaterally.

Description

Number of upper jaw teeth in *S. thloe* and related species are given in table III, scale counts in table III, morphometrics in table III and fin length in Table IV. Below, the holotype counts are given first followed, in brackets, by the paratypes counts.

Dorsal fins (D) D VI-I, 9 (VI-I, 7 (1), VI-I, 9 (20)), spines 3-6 slightly filamentous in males and not in females, first dorsal fin not contacting second dorsal fin basally, one specimen with 7 segmented rays in second dorsal fin with a broad gap between rays 4 and 5 where two additional rays would normally occur. Anal fin (A) I, 10 (I, 10 (21)). Pectoral fin (P) rays 14 (13-15), posterior margin rounded. Caudal fin (C) 13 (12 (6), 13 (9), 14 (5)) branched rays, posterior margin rounded. Pelvic disc (V) with 1 spine and 5 strongly branched rays, disc adherent to abdomen between fifth rays only. Scales in lateral series (LS) 17 (12-37) (Table III), may extend midlaterally to origin of second dorsal fin and posteriorly to hypural base, scales usually cycloid, scales along dorsum usually extend anteriorly along medial base of second dorsal fin (may extend to posterior base of first dorsal fin). Scales in zigzag series (ZZ) 16 (14-16) (Table III). Predorsal midline, head, breast, belly, pectoral base, and trunk naked. Upper jaw teeth mostly conical (range 13-21), 1 or 2 canines present laterally except in small specimens, females modally with fewer teeth than males. Lower jaw teeth conical (range 11-17), single canine tooth usually present laterally (1-2) except in small specimens, females modally with fewer teeth than males (Table III). Rakers on inner edge of outer gill arch 0-1+0-1+1-3, rakers present as short, papillae-like projections without ossification. Cephalic sensory pore system A, B, C, D, F, H, K, L, M and O, D singular, with all others paired, oculoscapular canal separated into anterior and posterior canals between pores H and K (Fig. I). Cutaneous sensory papillae well developed over head and present between pores H and K. Figure I gives the diagrammatic illustration of urogenital papilla. Urogenital papilla in male long with a fairly rounded tip. Urogenital papilla in female somewhat triangular in appearance with distal tip fimbriate.

Colour in preservation

Sexual dichromatism well developed.

Males. Background of head and body creamy. Body blackish dorsal to midline, with 5 or 6 white spots or blotchy bars, along bases of both dorsal fins and caudal peduncle blackish, body ventral to midline whitish. Blackish band posterior to eye and dorsal to pectoral base. Nape grayish with 4 to 7 blackish spots on each side in smaller males, with larger males having spots covering head dorsally to include upper opercle, may be a blotchy band medially, or numerous small black spots, between orbit in males that may extend anteriorly to between anterior nostrils. From tip of snout and upper lip a blackish band extending to posterior edge of opercle. Snout dusky, may have numerous small spots or few larger spots. Branchiostegal rays and membrane with a distinctively blackish V-shaped marking ventrally. First and second dorsal fins slightly dusky with blackish spots, having some streaking prominent on membrane, distal margin slightly dusky. Caudal fin with blackish medial band from base extending to posterior edge, dorsal to medial band mostly dusky with clear margin, ventrally clear. Anal fin clear basally becoming slightly dusky distally with blackish margin. Pelvic disc clear with some dusky pigment. Pectoral fin with blackish band medially becoming slightly dusky dis-

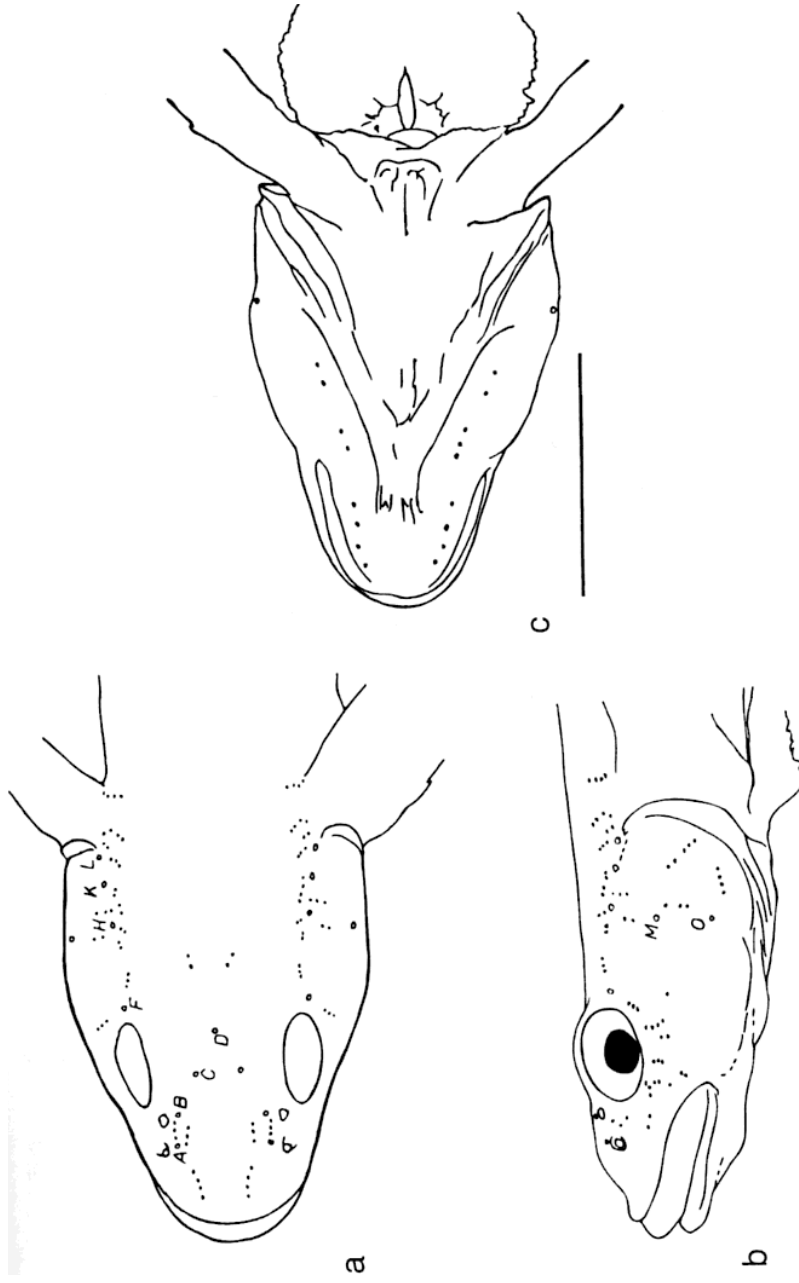


Fig. 1. Diagrammatic illustration of the head in *Sicyopus chloe* (MNHN 2000-671) showing head pores and sensory papillae. **a**: Dorsal view; **b**: Lateral view; **c**: Ventral view. Scale bar 0.5 mm.

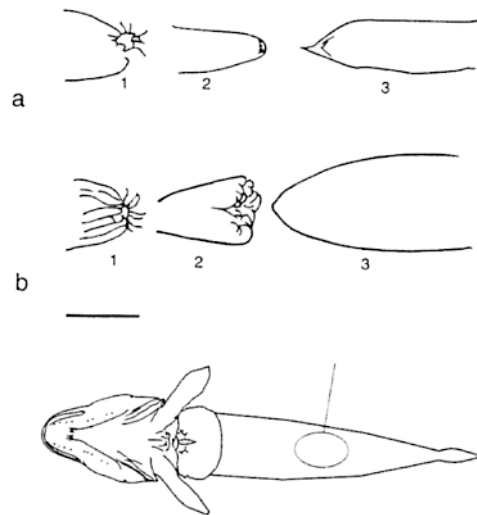


Fig. 1. Diagrammatic illustration of the urogenital papilla (ventral view) in *Sicyopus chloe*. a: Male (MNHN 2000-671); b: Female (UF 112009). 1: anus; 2: urogenital papilla; 3: anal fin. Scale bars 1 mm.

tally, ventrally and dorsally mostly without pigment. Pectoral base blackish medially, slightly dusky dorsally and ventrally.

Females. Background of head and body whitish, laterally with evenly spaced dusky bars becoming blackish midlaterally. Four dusky saddles along base of second dorsal fin and caudal peduncle. First dorsal fin dusky. Nape slightly dusky with 4 or more blackish spots on each side, anterior to first dorsal fin a short blackish band. Background of head whitish, a blackish medially bar from tip of snout and upper lip to posterior edge of opercle, dorsally dusky, ventrally slightly dusky. Ventrally head mostly without pigment, branchiostegal membrane and rays with a dusky V-shaped marking, indistinct in most specimens. Some black subcutaneous pigment present along edge of lower jaw. Blackish pigment present at base of gular region. First and second dorsal fins slightly dusky with short blackish bars on spines. Caudal fin with a blackish C-shaped mark over much of surface. Anal fin with rays and spine mostly without pigment, membrane clear. Pelvic disc clear. Pectoral fin rays dusky, a blackish blotch medially. Pectoral base slightly dusky with a blackish bar medially.

Colour in life

Males (Fig. 1a). Dorsal fins distally and caudal fin dorsally and ventrally yellow. Midline of head and body yellowish to russet. Pectoral fin russet ventrally. Distal margin of anal fin bluish. Pelvic disc russet.

Females (Fig. 1b). Dorsal fins distally yellowish or slightly russet. Laterally body and head may appear russet. Pectoral fin may be yellowish. Caudal fin may be yellowish dorsally and ventrally. Belly bright red in gravid material.

Distribution

Known only from North Province, New Caledonia in eastern slope streams of Mont Panié.

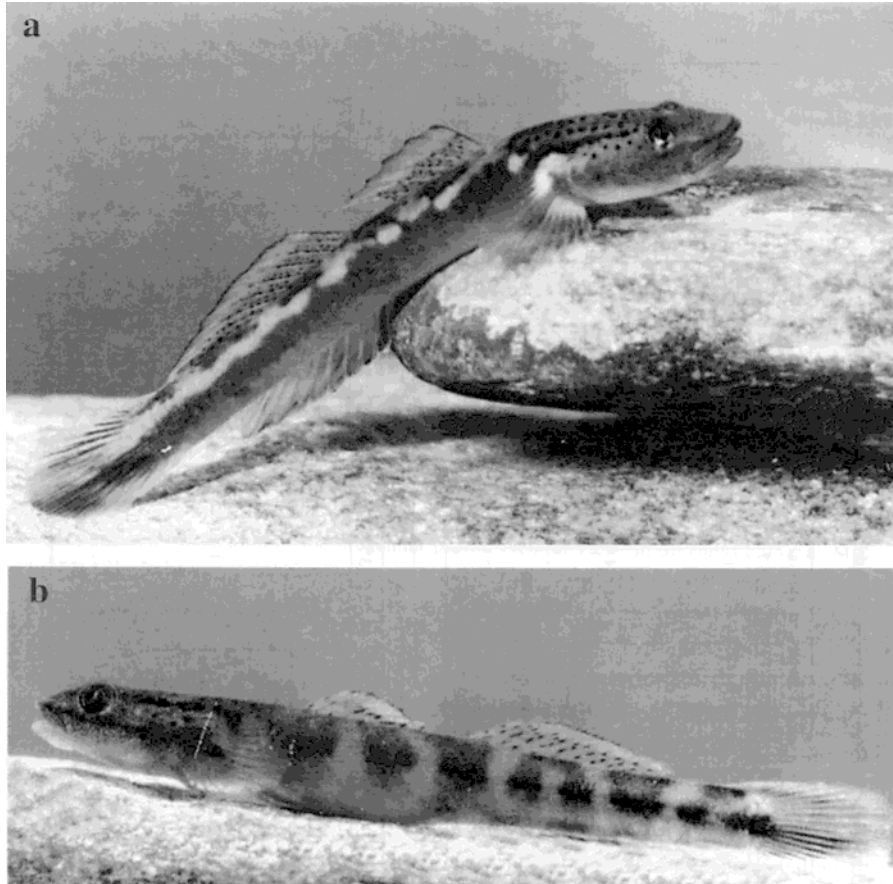


Fig. 3. *Sicyopus chloe*, New Caledonia. a: MNHN 2000-671, paratype, male, 40.4 mm SL, Kokengoné river (photo by É. Vigneux, MNHN/CSP-Chloé II); b: UF 112009, paratype, female, 31.4 mm SL, Napwéimié river (photo by É. Vigneux, MNHN/CSP-Chloé I).

Ecology

Like most Sicydiinae, *Sicyopus chloe* is found in clear, high gradient streams with rocky bottom. Typical of other members of *Sicyopus* it is strictly carnivorous (aquatic insects and crustaceans).

Comparisons

Smilosicyopus differs from all others sicydiine gobies in having well developed canine teeth in upper and lower jaws, pronounced in males. This subgenus is known from eastern Indonesia to the Marquesas islands and southern Japan to New Caledonia in swift clear, high gradient streams with rocky and boulder strewn bottoms. *Smilosicyopus* currently includes 5 species (*S. bitaeniatus* Maugé *et al.*, 1992; *S. phlmanni* Parenti & Maciolek, 1993; *S. aprurus* Sakai & Nakamura, 1979; *S. chloe* n. sp.; *Sicyopus* sp.), although recent collection from the tropical Indo-Pacific indicate there exists more species (Watson, unpublished data).

The conspicuous spots on the nape suggest *S. chloe* may be close to *S. phlmanni*, and

differs substantially from *S. aprurus* and *Sicyopus* sp., especially with regards to colouration (head and body yellowish to russet in males). Lateral markings on females resemble patterns found on *S. bitaeniatus*, but are different from those of *S. aprurus* and *Sicyopus* sp. *Sicyopus chloe* is separated from congeners in having canine teeth in both upper and lower jaws, and the absence of labial teeth projecting horizontally from the lower jaw. It differs from other species of the subgenus *Smilosicyopus* by a combination of characteristics that include 4-7 blackish spots on each side of nape, a broad blackish V-shaped mark ventrally on head being most prominent in males, 14-16 scales in zigzag series and strongly differentiated sexual dichromatic colouration in preservation and well developed colours in life. In all other species of the subgenus *Smilosicyopus* colours are usually tannish with dusky markings with only females having any bright colour, the bright red belly when gravid.

Etymology

The name for the new species (*chloe*) is derived from Chloé, the name of recent expeditions (Chloé Expéditions I and II) to New Caledonia during which most specimens utilised in the description of the new species were collected. The new name is treated as a noun in apposition.

Acknowledgments. We thank the following colleagues for loan of comparative material: A. Iwata (Kyoto University, formerly BLIH), Y. Ikeda (BLIH), G. Shinohara (NSMT), D. Catania (CAS), G. Duhamel (MNHN). For material and information: B. Tibbatts (Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, Mangilao, Guam). For help during Chloé I and II Expéditions : E. Vigneux (High Fisheries Council), E. Feunteun (Université de Rennes), N. Mary (Université de Nouméa), P. Sasal (Université de Perpignan) and J. Manauté (Environmental Department of Province Nord).

REFERENCES

- AKIHITO, 1986. Some morphological characters considered to be important in gobiid phylogeny. *In*: Proc. 2nd Int. Conf. on Indo-Pacific Fishes, pp. 629-639. Tokyo: Ichthyological Society of Japan.
- BLEEKER P., 1857. Nieuwe bijdrage tot de kennis der ichthyologische fauna van Bali. *Natuurk. Tijdschr. Ned. Indië*, 12: 291-302.
- CASTELNAU F. de, 1873. Contribution to the ichthyology of Australia, VII. Fishes of New Caledonia. *Proc. Zool. Acclim. Soc. Victoria*, 2: 110.
- CATALA R., 1950. Étude préliminaire sur les constituants ichtyofaunistiques du cours moyen des rivières néo-calédoniennes, sur l'intérêt alimentaire de certains d'entre eux et sur les modes de pêche s'y rapportant. *In*: Communications du Congrès sur les pêches dans l'Union Française, pp. 60-267. Marseille: Institut Français d'Océanie éd.
- DINGERKUS G. & B. SÉRET, 1992a. *Barioglossus neocaledonicus*, a new species of Microdesmid goby from New Caledonia (Teleostei: Gobioidi: Microdesmidae). *Cybium*, 16(2): 133-136.
- DINGERKUS G. & B. SÉRET, 1992b. First record of *Moringua microchir* (Teleostei: Anguilliformes, Ophichthidae) for New Caledonia and from freshwater. *Cybium*, 16(2): 175-176.
- GILL T.H., 1860. Conspectus piscium in expeditione ad oceanum Pacificum septentrionalem, C. Ringoldio et J. Rodgersio ducibus, a Guielmo Stimpsono collectorum. Sicydianae. *Proc. Acad. Nat. Sci. Philad.*, 12: 100-102.
- GILL T.H., 1863. Descriptions of the gobioid genera of the western coast of temperate North America. *Proc. Acad. Nat. Sci. Philad.*, 15: 262-267.
- GÜNTHER A., 1861. Catalogue of the acanthopterygian fishes in the collections of the British Museum, vol. 3, 586p. London: British Museum ed.

- JOUAN H., 1861. Note sur quelques espèces de poissons de la Nouvelle-Calédonie. *Mém. Soc. Sci. nat. Cherbourg*, 8: 241-308.
- JOUAN H., 1863. Supplément à la description des poissons de la Nouvelle-Calédonie. *Mém. Soc. Sci. nat. Cherbourg*, 9: 177-187.
- JOUAN H., 1877. Quelques mots sur la faune ichthyologique de la côte N.-Est d'Australie et du détroit de Torrès, comparée à celle de la Nouvelle-Calédonie. *Mém. Soc. Sci. nat. Cherbourg*, 21: 328-335.
- KEITH P., WATSON R. & G. MARQUET, 2000. Découverte d'*Awaous ocellaris* (Broussonet, 1782) (Perciformes, Gobiidae) en Nouvelle-Calédonie et au Vanuatu. *Cybium*, 24(4): 395-400.
- LEVITON A.E., GIBBS R.H., HEAL E. & C.E. DAWSON, 1985. Standards in herpetology and ichthyology: part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985: 802-832.
- MACIOLEK J.A., 1978. Taxonomic status, biology, and distribution of Hawaiian *Lentipes*. *Pac. Sci.*, 31: 355-362.
- MARQUET G. & N. MARY, 1999. Comments on some New Caledonian freshwater fishes of economical and biogeographical interest. In: Proc. 5th Indo-Pacific Fishes Conf. (Séret B. & J.Y. Sire, eds), pp. 3-39. Paris: IRD & SFI.
- MARQUET G., SÉRET B. & R. LECOMTE, 1997. Inventaires comparés des poissons des eaux intérieures de trois îles océaniques tropicales de l'Indo-Pacifique (La Réunion, La Nouvelle-Calédonie et Tahiti). *Cybium*, 21(1) suppl.: 27-34.
- MAUGÉ A., MARQUET G. & P. LABOUTE, 1992. Les Sicydiinae (Gobiidae) des eaux douces de la Polynésie française. Description de trois espèces nouvelles. *Cybium*, 16: 213-231.
- MUKERJI D.D., 1935. Notes on some rare and interesting fishes from the Andaman Islands, with descriptions of two new freshwater gobies. *Rec. Indian Mus.*, 37: 259-278.
- OGILBY J.D., 1897. Contribution to the zoology of New Caledonia. *Proc. Linn. Soc. N. S. Wales*, 22(4): 762-770.
- PARENTI L.R. & J.A. MACIOLEK, 1993. New sicydiine gobies from Ponape and Palau, Micronesia, with comments on systematics of the subfamily Sicydiinae (Teleostei: Gobiidae). *Bull. Mar. Sci.*, 53: 945-972.
- SAKAI H. & M. NAKAMURA, 1979. Two new species of freshwater gobies (Gobiidae: Sicydiaphiinae) from Ishigaki Island, Japan. *Jpn J. Ichthyol.*, 26: 43-54.
- SÉRET B., 1992. Poissons d'eau douce du "Caillou". *ORSTOM Actualités*, 37: 2-7.
- SÉRET B., 1997. Les poissons d'eau douce de Nouvelle-Calédonie: implications biogéographiques des récentes découvertes. *Zool. Neocaledonica*, 171(4): 371-378.
- SÉRET B. & G. DINGERKUS, 1992. First record of the rare snake-eel *Lamnostoma kampeni* (Teleostei: Anguilliformes, Ophichthidae) from a river in northeastern New Caledonia. *Cybium*, 16(2): 169-170.
- WATSON R.E., 1992. A review of the gobiid fish genus *Awaous* from insular streams of the Pacific plate. *Ichthyol. Explor. Freshw.*, 3(2): 161-176.
- WATSON R.E., 1995. Gobies of the genus *Stiphodon* from French Polynesia, with descriptions of two new species (Teleostei: Gobiidae: Sicydiinae). *Ichthyol. Explor. Freshw.*, 6: 33-48.
- WATSON R.E., 1996. A review of *Stiphodon* from New Guinea and adjacent regions, with descriptions of five new species (Teleostei: Gobiidae: Sicydiinae). *Rev. Fr. Aquariol.*, 23: 113-132.
- WATSON R.E., 1999. Two new subgenera of *Sicyopus*, with a redescription of *Sicyopus zosterophorum* (Teleostei: Gobiidae: Sicydiinae). *Aqua. J. Ichthyol. Aquat. Biol.*, 3: 93-104.
- WEBER M., 1895. Fische van Ambon, Java, Thursday Island, dem Burnett-Fluss und von der Süd-küste von Neu Guinea. *Denkschr. Med. Naturwiss. Ges., Jena*, 8: 259-276.
- WEBER M. & L.F. de BEAUFORT, 1915. Les poissons d'eau douce de la Nouvelle-Calédonie. In: Nova Caledonia. Recherches scientifiques en Nouvelle-Calédonie et aux Iles Loyalty (F. Sarasin & J. Roux, eds). A. Zoology, 2(1): 17-41. Paris.

Reçu le 30.03.2000.

Accepté pour publication le 06.02.2001.