

Pisces Teleostei : Callionymidae of New Caledonia with descriptions of new species

Ronald FRICKE

Staatliches Museum für Naturkunde
Schloss Rosenstein, Rosenstein 1
D-70191 Stuttgart 1, Federal Republic of Germany.

ABSTRACT

The Callionymidae of New Caledonia is revised. A total of 13 species are recorded from the archipelago : *Callionymus brevipennis* Fricke, 1983, *C. corallinus* Gilbert, 1905, *C. enneactis* Bleeker, 1879, *C. gardineri rivatoni* new subspecies, *C. keeleyi* Fowler, 1941, *C. moretonensis* Johnson, 1971, *C. pleurostictus* Fricke, 1982, *C. tethys* new species, *Synchiropus altivelis* (Temminck & Schlegel, 1845), *S. novaecaledoniae* new species, *S. ocellatus* (Pallas, 1770), *S. rameus* (McCulloch, 1926), *S. splendidus* (Herre, 1927). The new species are described and illustrated; a key to all New Caledonian species is given.

RÉSUMÉ

Pisces Teleostei : Callionymidae de la Nouvelle-Calédonie. Descriptions de deux espèces et d'une sous-espèce nouvelles.

Les Callionymidae de Nouvelle-Calédonie sont passés en revue. Treize espèces ont été récoltées : *Callionymus brevipennis* Fricke, 1983, *C. corallinus* Gilbert, 1905, *C. enneactis* Bleeker, 1879, *C. gardineri rivatoni* subsp. nov., *C. keeleyi* Fowler, 1941, *C. moretonensis* Johnson, 1971, *C. pleurostictus* Fricke, 1982, *C. tethys* sp. nov., *Synchiropus altivelis* (Temminck & Schlegel, 1845), *S. novaecaledoniae* sp. nov., *S. ocellatus* (Pallas, 1770), *S. rameus* (McCulloch, 1926), *S. splendidus* (Herre, 1927). Les espèces nouvelles sont décrites et figurées. Une clé d'identification pour les espèces de Nouvelle-Calédonie est proposée.

The French overseas territory of New Caledonia comprises three major groups of islands, the Chesterfield Islands in the west, the main island "Grande Terre" with a few small islands north and south, and the Loyalty Islands in the east. The archipelago is zoogeographically relatively isolated from other island groups of Melanesia and from Australia, and has not only an unique land fauna, but also a high degree of endemism in the marine fauna. This suggests a former barrier, and also a long geographical isolation such that the fauna includes a number of relict forms and a high percentage of subsequent speciation.

The dragonets of the family Callionymidae are a group of benthic marine fishes, found in warm and temperate seas from very shallow waters to depths of at least 800 m. Most species live on soft, sandy or muddy substrates. The two largest genera, *Callionymus* and *Synchiropus*, are nearly circumtropical in distribution. The Indo-Pacific species of the family have been revised by FRICKE (1983), distinguishing a total of 82 species of *Callionymus* and 27 species of *Synchiropus*.

The family Callionymidae was not known from New Caledonia until FOURMANOIR and RIVATON (1979 : 417-418) gave a record of a single callionymid fish found at New Caledonia, *Callionymus japonicus*. This record was apparently based on the new subspecies *Callionymus gardineri rivatoni* which is described in the present paper.

Five species of callionymid fishes have been recorded from New Caledonia by FRICKE : *Callionymus moretonensis* (FRICKE, 1981a), *Synchiropus ocellatus* (FRICKE, 1981b), *Callionymus enneactis* and *Synchiropus rameus* (FRICKE, 1983), and *Callionymus corallinus* based on a single specimen (FRICKE & BROWNELL, 1993).

Recent investigations of the New Caledonian ichthyofauna, mostly by ORSTOM Nouméa (J. RIVATON, M. KULBICKI) and by foreign collectors (J.E. RANDALL, BPBM, Honolulu; R. WINTERBOTTOM, ROM, Toronto) revealed a large quantity of additional material. Records in the present paper based on that material, including two new species and a new subspecies, bring the total number of New Caledonian Callionymidae to 13 (Tab. 1).

TABLE. 1. — Check-list of New Caledonian Callionymidae.

Species	Record
<i>Callionymus brevianalis</i> Fricke, 1983	Present paper
<i>Callionymus corallinus</i> Gilbert, 1905	FRICKE & BROWNELL, 1993
<i>Callionymus enneactis</i> Bleeker, 1879	FRICKE, 1983
<i>Callionymus gardineri rivatoni</i> new subspecies	Present paper
<i>Callionymus keeleyi</i> Fowler, 1941	Present paper
<i>Callionymus moretonensis</i> Johnson, 1971	FRICKE, 1981a
<i>Callionymus pleurostictus</i> Fricke, 1982	Present paper
<i>Callionymus tethys</i> new species	Present paper
<i>Synchiropus altivelis</i> (Temminck & Schlegel, 1845)	Present paper
<i>Synchiropus novaecaledoniae</i> new species	Present paper
<i>Synchiropus ocellatus</i> (Pallas, 1770)	FRICKE, 1981b
<i>Synchiropus rameus</i> (McCulloch, 1926)	FRICKE, 1983
<i>Synchiropus splendidus</i> (Herre, 1927)	Present paper

METHODS AND MATERIALS

Methods follow FRICKE (1983). In the present study, fish specimens deposited in the following institutions were examined :

- AMS The Australian Museum, Sydney;
- MNHN Muséum national d'Histoire naturelle, Paris;
- ROM Royal Ontario Museum, Toronto;
- SMNS Staatliches Museum für Naturkunde, Stuttgart.

KEY TO NEW CALEDONIAN SPECIES OF CALLIONYMIDAE

- 1. Operculum with a free flap of skin; sides of body with a ventrolateral fold of skin below the lateral line *Diplogrammus goramensis* (Bleeker, 1858) ¹
- Operculum without a free flap of skin; sides of body without a ventrolateral fold of skin below the lateral line 2

1. Although not yet recorded from New Caledonia, it is most likely to be recovered in future collecting.

- (except *Synchiropus rameus*, which has the first dorsal fin very high but not filamentous, first spine more than 2.5 times in first ray of second dorsal fin)
- genus *SYNCHIROPUS*, 3
- Soft dorsal fin rays unbranched except the last which is divided at its base; preopercular spine base with an antrorse spine at its base; if first dorsal fin not filamentous, less than 2 times longer than first spine of second dorsal fin genus *CALLIONYMUS*, 8
3. Preopercular spine base with an antrorse spine; main tip of preopercular spine straight, dorsal margin with small antrorse serrae *Synchiropus rameus* (McCulloch, 1926)
- Preopercular spine base without an antrorse spine; main tip upcurved, dorsal margin with 1 or more large, curved points 4
4. Dorsal margin of preopercular spine with 2-5 curved points; pectoral fin with 28-35 rays. *Synchiropus splendidus* (Herre, 1927)
- Dorsal margin of preopercular spine with 1 curved point; pectoral fin with 18-23 rays.. 5
5. Main tip of preopercular spine upcurved; caudal fin distally rounded, not elongate; first ray of second dorsal fin not longer than 5th ray. *Synchiropus ocellatus* (Pallas, 1770)
- Main tip of preopercular spine straight; caudal fin distally elongate; first ray of second dorsal fin longer than 5th ray 6
6. First to third spines of D1 filamentous; D1 with wavy dark streaks; D2 with vertical white streaks *Synchiropus novaecaledoniae* sp. nov., male
- Only 1st D1 spine may be filamentous; D1 without wavy dark lines; D2 without vertical white lines 7
7. Preopercular spine with a slightly downcurved main tip; caudal fin base with two dark blotches *Synchiropus novaecaledoniae* sp. nov., female
- Preopercular spine with a straight main tip; caudal fin base without dark blotches..... *Synchiropus altivelis* (Temminck & Schlegel, 1845)
8. Main tip of preopercular spine straight, dorsal margin with small antrorse serrae 9
- Main tip of preopercular spine upcurved, dorsal margin with 1 or more large curved points 14
9. D2 viii,1; A vii,1 10
- D2 vi,1 - vii,1; A v,1 - vi,1 13
10. D1 with 1 or 3 filaments, urogenital papilla visible 11
- D1 without filaments, urogenital papilla not visible 12
11. D1 with 1 filament (1st spine); first dorsal fin mottled with dark, no lines, with an ocellus surrounding the distal part of the third spine; thorax with a faint brown spot, but without surrounding lines ... *Callionymus gardineri rivatoni* new subspecies, male
- D1 with 3 filaments (1st to 3rd spines); D1 with narrow oblique dark lines, 2nd membrane distally with a small dark spot close to 2nd spine, no ocellus; thorax with a dark spot surrounded by lines extending on the membrane between pelvic and pectoral fins *Callionymus tethys* new species, male
12. D1 with a black blotch distally on third spine; ventral margin of preopercular spine straight, dorsal margin with antrorse 4-6 serrae *Callionymus gardineri rivatoni* new subspecies, female
- D1 with a black blotch distally on third membrane; ventral margin of preopercular spine convex, dorsal margin with 5-9 antrorse serrae *Callionymus tethys* new species, female
13. D2 vi,1; A v,1; 2-4 small antrorse serrae on the dorsal margin of the preopercular spine..

13. D2 vi,1; A v,1; 2-4 small antrorse serrae on the dorsal margin of the preopercular spine ..
 *Callionymus brevianalis* Fricke, 1983
 — D2 vii,1; A vi,1; 7-14 small antrorse serrae on the dorsal margin of the preopercular
 spine *Callionymus pleurostictus* Fricke, 1982
14. Dorsal margin of preopercular spine with a small antrorse barb and 1-2 large curved
 points; first dorsal fin with a large ocellus on second and third membranes
 *Callionymus moretonensis* Johnson, 1971
 — Dorsal margin of preopercular spine without an antrorse barb; dorsal fin without a large
 ocellus 15
15. D2 vii,1; A vi,1; cheeks with 2 vertical ocellate black streaks
 *Callionymus enneactis* Bleeker, 1879
 — D2 viii,1; A vii,1; cheeks without vertical ocellate streaks 16
16. First dorsal fin with two long filaments; caudal fin elongate; body depth : 7-10 in SL ...
 *Callionymus keeleyi* Fowler, 1941
 — First dorsal fin high in males; low in females, without filaments; caudal fin distally
 rounded; body depth : 4.5-6 in SL *Callionymus corallinus* Gilbert, 1905

SPECIES ACCOUNT

Genus *CALLIONYMUS* Linnaeus, 1758

Callionymus brevianalis Fricke, 1983

Callionymus brevianalis Fricke, 1983 : 323-328, fig. 98 (West Irian Jaya, Hawaii Island, 00°49'48"S, 130°56'48"E, 0-6 m depth); 1990 : 9-13, fig. 5 (Papua New Guinea, Port Moresby, Motupore Island, 6-7 m depth).

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. 42, 22°17'12"S, 166°17'06"E, 20 km W Nouméa, 25 m depth, 24 May 1984 : 1 specimen (SMNS 12523). — St. 440b, 18°05'12"S, 162°55'E, 39 m depth, 27 Feb. 1985 : 1 specimen (SMNS 12522). — St. 441, 18°03'36"S, 162°55'36"E, 36-37 m depth, 27 Feb. 1985 : 1 specimen (SMNS 12524). — St. 454, 18°30'12"S, 163°09'48"E, 35-36 m depth, 28 Feb. 1985 : 1 specimen (SMNS 12527). — St. 856, 20°36'54"S, 162°51'12"E, 12 Jan. 1987 : 1 specimen (MNHN 1993-118); 1 specimen (SMNS 12521). — St. 900, 20°14'16"S, 164°23'06"E, 20 km NE Pam, 35-40 m depth, 14 Jan. 1987 : 1 specimen (SMNS 12526).

Baie de St. Vincent, 55 km WNW Nouméa, 21°57'24"S, 165°59'54"E, 0-1 m depth, M. KULBICKI coll., 26 Mar. 1990 : 1 specimen (SMNS 12525).

DISTRIBUTION. — This is the first record of the species from New Caledonia. The species was collected at depths of 1-40 m. Otherwise, *Callionymus brevianalis* is known from around New Guinea.

Callionymus corallinus Gilbert, 1905

Callionymus corallinus Gilbert, 1905 : 649-650, fig. 251 (Avau Channel between Maui and Lanai Islands, Hawaiian Islands; 58-68 m). — JORDAN & SEALE, 1906 : 415 (Hawaii). — FOWLER, 1928 : 423; 1938 : 299.

Callionymus (Callionymus) corallinus - FRICKE, 1983 : 742-745, fig. A1 (Oahu, Makua, Hawaiian Islands, 27 m depth). — FRICKE & BROWNELL, 1993 : 7-9, fig. 3 (Izu Islands, Japan; New Caledonia; 12-58 m depth).

Synchiropus (Synchiropus) kiyoeae (part) - FRICKE & ZAISER, 1983 : 122 (Hachijo-jima, Japan).

Paradiplogrammus corallinus - NAKABO, 1991 : 249-253, figs 1-3 (Hachijo-jima, Japan; Hawaiian Islands).

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. DW 83, 22°31'30"S, 166°29'42"E, 40 km SSE Nouméa, 22 m depth, 21 Aug. 1984 : 1 female, 20.8 mm SL (SMNS 12270).

DIAGNOSIS. — A *Callionymus* of the subgenus *Callionymus* with 4 spines in the first dorsal fin, 9 (-10) second dorsal rays, 8 anal rays, a preopercular spine formula of 1 4-5 1, a small supraorbital cirrus present, first dorsal fin high in males, not filamentous, with ocellate vertical dark olive lines, sides of head in males with blue spots and lines.

DISTRIBUTION. — West and Central Pacific; known from the Hawaiian Islands, the Izu Islands of Japan and New Caledonia, at depths of 12-58 m.

HABITAT. — *Miyake-jima, Japan* : On a substrate of mixed volcanic and coral sand, broken shells, and rubble, with low relief and no algal cover (rarely on pure sand); 15-16 m depth (rarely at 12-18 m). *Hawaii* : On coral rubble; 25-58 m depth. *New Caledonia* : On coral rubble; 22 m depth.

RELATIONSHIPS. — This species is unique within the subgenus *Callionymus* in having a small supraorbital cirrus, and the 5th to 9th second dorsal fin rays branched in large specimens. In the latter character, it resembles the genus *Synchiropus*. The species is classified in the genus *Callionymus* because of the usually unbranched second dorsal fin rays and the basal antrorse spine at the base of the preopercular spine. The generic classification of this species needs further examination.

REMARKS. — The original description of *Callionymus corallinus* by GILBERT (1905) was based on a single female specimen. It was the only specimen known when GOSLINE & BROCK (1960) synonymized the species with *Callionymus decoratus* (Gilbert, 1905) without having seen the holotype. FRICKE (1983) resurrected the species, based on a second female from the Hawaiian Islands. FRICKE & BROWNELL (1993) recorded the species from the Izu Islands, Japan and New Caledonia, proving that the species is widespread in the West and Central Pacific.

Callionymus enneactis Bleeker, 1879

Callionymus enneactis Bleeker, 1879 : 95-97 (Singapura = Singapore).

Callionymus (Callionymus) enneactis - FRICKE, 1983 : 122-137, figs 33-34 (Singapore, Gulf of Thailand, Hong Kong, Taiwan, Japan, Western Indonesia, Philippines, Palau Islands, Yap Islands, Eastern Indonesia, Papua New Guinea, Bismarck Archipelago, Trobriand Islands, Western Australia, Northern Australia, Eastern Australia, Solomon Islands, New Caledonia; tide pools to 15 m depth).

MATERIAL EXAMINED. — **Loyalty Islands**. P. FOURMANOIR coll., 1980 : 1 ♂ 21.2 mm SL (MNHN 1980-146).

DISTRIBUTION. — This species was recorded by FRICKE (1983) from the Loyalty Islands. Otherwise, it is distributed between Japan, Singapore, Western Australia, Yap Islands and the Solomon Islands, from the intertidal zone to 15 m depth.

Callionymus gardineri rivatoni new subspecies

Fig. 1

? *Callionymus japonicus* (non Houttuyn, 1782) - FOURMANOIR & RIVATON, 1979 : 417-418 (S New Caledonia, 22°20'S, 167°10'30"E, 180 m depth).

MATERIAL EXAMINED. — **New Caledonia**. LAGON : st. DW 375, 22°31'48"S, 167°07'30"E, 80 km SE Nouméa, 67-71 m depth, 21 Jan. 1985 : 1 ♀ 33.5 mm SL (SMNS 12272). — St. CP 1116, 19°37'18"S, 163°52'24"E, NE île Pott, 37-38 m depth, 26 Oct. 1989 : 1 ♂ 35.0 mm SL (SMNS 12271).

Baie de Saint Vincent, 22°05'S, 166°10'E, 15 m depth, M. KULBICKI coll., 22 Aug. 1989 : ♂ 54.8 mm SL (MNHN 1993-120).

SMB 5 : st. DW 81, 22°38'12"S, 167°34'48"E, île des Pins, 105-110 m depth, 9 Sep. 1989 : 1 ♀ 37.4 mm SL (MNHN 1993-119).

TYPES. — *Holotype* : ♂ 54.8 mm (MNHN 1993-120, New Caledonia, baie de Saint Vincent). *Paratypes* : all the other specimens.

ETYMOLOGY. — This new subspecies is named in honor of Jacques RIVATON (ORSTOM, Nouméa, New Caledonia), who sent these and other specimens of callionymid and tripterygiid fishes for examination.

DIAGNOSIS. — A subspecies of *Callionymus gardineri* Regan, 1908 of the *C. japonicus* species-group of the subgenus *Calliurichthys* with a preopercular spine formula of 1 4-6 1, the first dorsal fin in males with a large distal black spot on the second membrane, the anal fin with a narrow distal black margin in females, the distal half of the anal fin black in males, preorbital length 2.8-4.0 in head, and body depth 9.1-11.9 in SL.

DESCRIPTION. — D1 IV (IV); D2 viii,1 (viii,1); A vii,1 (vii,1); P1 ii,15,i (ii-iii,15-17,i) (total 18-20); P2 1,5 (1,5); C (i),i,7,ii,(i) ((i),i,7,ii,(i)).

Body elongate and depressed. Head depressed, 3.9 (3.3-3.9) in SL. Eye 2.4 (2.5-2.6) in head. Preorbital length 3.0 (2.8-4.0) in head. Interorbital distance 59 (40-41) in head. Maxillary length 3.3 (3.0-3.2) in head. Preopercular spine length 3.3 (3.2-3.6) in head. Preopercular spine with a strong main tip, a strong antrorse spine at its base, a smooth ventral margin, and 4-6 small antrorse serrae along its dorsal margin; preopercular spine formula 1 6 1 (1 4-6 1). Body depth 11.0 (9.1-11.9) in SL. Body width 5.6 (4.8-5.8) in SL. Urogenital papilla in the male 16 (12) in head, in the female not visible. Caudal peduncle length 6.2 (6.4-7.2) in SL. Caudal peduncle depth 25.3 (22.6-25.8) in SL. Maximum observed SL 54.8 mm (male), 37.4 mm (female).

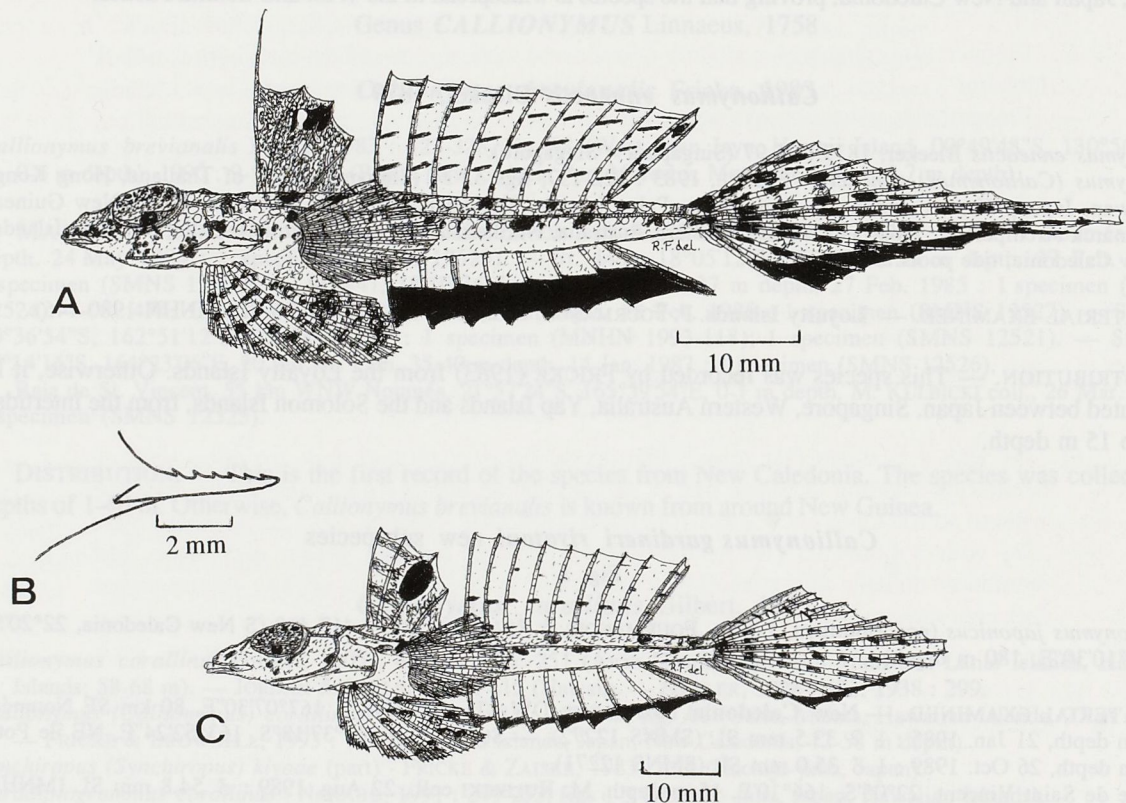


Fig. 1. — *Callionymus gardineri rivatoni* subsp. nov.

A-B : holotype, ♂ 54.8 mm SL (MNHN 1993-120) : A, lateral view; B, left preopercular spine. — C : paratype, ♀ 37.4 mm SL (MNHN 1993-119), lateral view.

First dorsal fin about as high as first ray of second dorsal fin in the male, first spine filamentous, 3.6 (3.9) in SL, 2nd to 4th spines not filamentous, 2nd spine 5.8 (6.0) in SL, 3rd spine 5.8 (7.8) in SL, 4th spine 10.0 (13.9) in SL; in the female similar, but the first spine not filamentous, 1st spine 4.9-5.1 in SL, 2nd spine 5.6-6.0 in SL, 3rd spine 5.8-6.4 in SL, 4th spine 8.8-9.4 in SL. Predorsal(1) length 3.2 (3.0-3.2) in SL. Second dorsal fin rays unbranched, the last divided at its base. First ray of second dorsal fin in the male 5.4 (5.2) in SL, last ray 4.9 (5.7) in SL; 1st ray in the female 5.1-5.2 in SL, last ray 5.4 in SL. Predorsal(2) length 2.0 (2.0-2.1) in SL. Anal fin beginning below 1st membrane of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray in the male 10.3 (10.4-10.6) in SL, last ray 5.8 (6.8-7.4) in SL; 1st ray in the female 10.8 in SL, last ray 6.0 in SL. Preanal fin length 2.0 (1.8-2.0) in SL. Pectoral fin reaching to 2nd anal fin membrane when laid back. Pectoral fin length 4.7 (4.6-4.9) in SL. Prepectoral fin length 2.6 (2.5-2.6) in SL. Pelvic fin reaching to 2nd anal fin ray when laid back. Pelvic fin spine 12.8 (11.8-13.0) in SL; pelvic fin length 3.0 (2.9-3.5) in SL. Prepelvic fin length 4.5 (3.9-4.2) in SL. Caudal fin distally elongate in both sexes, without filaments, but 4 median branches elongate; caudal fin length in the male 1.6 (1.5) in SL, in the female 1.5-2.2 in SL.

Color in alcohol : Head and body light brown above, whitish below. Eye dark blue, with dorsal dark gray blotches. Throat in the male with a vague brown spot, but without surrounding lines; in the female plain white. Suborbital area with a group of dark brown blotches. Back and upper sides of body speckled with white and dark brown. Sides of body with a row of dark brown blotches below the lateral line. First dorsal fin in the male dark gray, with irregular white spots and a black blotch distally on 2nd membrane; in the female whitish, with oblique dark brown lines and a black blotch distally on third spine. Second dorsal fin translucent, each membrane with 1-4 horizontal brown streaks. Distal half of anal fin in the male black; anal fin in the female with a narrow distal black margin. Caudal fin spotted with dark brown. Pectoral fin with vertical lines of small dark brown spots. Lower margin of caudal fin black; fin rays spotted with dark brown, upper one-fourth of the fin with horizontal dark lines.

Sexual dimorphism : Males have a slightly longer caudal fin than females, a much longer and filamentous first spine of the first dorsal fin, a longer urogenital papilla (not visible in females), and a different color pattern of the first dorsal fin, the anal fin and the throat.

DISTRIBUTION. — This new subspecies is hitherto known only from around New Caledonia; it was trawled at depths of 15-110 m.

RELATIONSHIPS. — *Callionymus gardineri rivatoni* is closely related to the nominal subspecies, *Callionymus gardineri gardineri* Regan, 1908 [REGAN, 1908 : 248, pl. 30, fig. 5 (Cargados Carajos, 36-55 m); FRICKE, 1983 : 366-371, fig. 111 (Western Indian Ocean, 30-174 m)] from the Western Indian Ocean, in the general head and body shape, number of fin rays, and general colouration. It differs from that subspecies in a shorter preopercular spine (*C. g. gardineri* : dorsally with 6-12 antrorse serrae), the color pattern of the first dorsal fin (*C. g. gardineri* males : with a small black blotch each on distal 3rd and 4th spines; females : with a large black blotch distally on 3rd membrane), the anal fin (*C. g. gardineri* males : with a narrow distal margin; females : plain whitish), a shorter preorbital length (*C. g. gardineri* : 2.3-3.4 in head), and a smaller body depth (*C. g. gardineri* : 7.3-10.6 in SL). The maximum body size of the New Caledonian subspecies is much smaller (*C. g. gardineri* : 144.7 mm in the male, 113.0 mm in the female).

From other species of the *Callionymus japonicus* species-group, the new subspecies is distinguished by the specific characters of *C. gardineri*, especially the structure of the caudal fin (4 median branches elongate, caudal fin relatively long in males, shorter in females), the shape of the first dorsal fin (only first spine filamentous), and the throat with a dark blotch in males (but without lines surrounding this blotch).

REMARKS. — As few characters distinguish the New Caledonian specimens from Western Indian Ocean *Callionymus gardineri* populations, the New Caledonian fishes are considered as a subspecies of that species. The nominal subspecies, *C. gardineri gardineri*, is distributed from the Red Sea to South Africa, the Seychelles and the Maldives. So far, no specimens of the species have been found in the area between the Maldives and New Caledonia. The depth of collection is similar in the two subspecies, though slightly more shallow for the

New Caledonian specimens (*C. g. rivatoni* : 15-110 m; *C. g. gardineri* : 30-174 m). However, the depth record of the New Caledonian populations may be incomplete, and the subspecies might occur deeper.

Callionymus keeleyi Fowler, 1941

Callionymus keeleyi Fowler, 1941 : 14-16, fig. 9 (Cebu, Philippines).

Callionymus (Callionymus) keeleyi - FRICKE, 1983 : 174-177, fig. 51 (Philippines; Indonesia, Kai Islands; Papua New Guinea; 16-59 m depth, sand bottoms).

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. DW 750, 21°20'S, 165°47'36"E, 5 km E Houallou, 28 m depth, 7 Jan. 1987 : 1 specimen (SMNS 11624). — St. DW 751, 21°18'30"S, 165°46'12"E, 5 km E Houallou, 30 m depth, 7 Jan. 1987 : 1 specimen (SMNS 11623). — St. DW 752, 21°16'S, 165°47'18"E, 10 km E Houallou, 46 m depth, 7 Jan. 1987 : 1 specimen (SMNS 11620). — St. DW 753, , 21°14'54"S, 165°48'24"E, 5 km E Houallou, 53 m depth, 7 Jan. 1987 : 1 specimen (SMNS 11621). — St. DW 815, 21°54'06"S, 165°26'54"E, 28-32 m, 10 Jan. 1987 : 1 specimen (SMNS 11905). — St. DW 847, 20°37'36"S, 165°13'24"E, 28 m depth, 11 Jan. 1987 : 1 specimen (SMNS 11626). — St. DW 860, 20°41'42"S, 165°01'42"E, 22-27 m depth, 13 Jan. 1987 : 1 specimen (SMNS 11627). — St. DW 873, 20°38'30"S, 164°26'E, 24-27 m depth, 13 Jan. 1987 : 3 specimens (SMNS 11622). — St. DW 876, 20°35'S, 164°50'E, 30-70 m depth, 13 Jan. 1987 : 1 specimen (SMNS 11904). — St. CP 1067, 19°55'48"S, 163°53'E, 10 km SE île Art, 27-28 m depth, 24 Oct. 1989 : 2 specimens (SMNS 11902). — St. CP 1068, 19°57'18"S, 163°52'48"E, islands north of Grande Terre, île Art, 25-26 m depth, 24 Oct. 1989 : 1 specimen (SMNS 11616). — St. CP 1069, 19°59'06"S, 163°52'30"E, reef 15 km WNW île Yandé, 24-30 m depth, 24 Oct. 1989 : 2 specimens (SMNS 11618).

Baie de Saint Vincent, M. KULBICKI coll. : 21°58'S, 166°01'E, 10 m depth, 2 Mar. 1989 : 1 specimen (SMNS 11625). — 22°05'30"S, 166°05'E, 17 m depth, 30 Mar. 1989 : 1 specimen (SMNS 12529). — 22°04'S, 166°04'E, 28 June 1989 : 3 specimens (SMNS 11619). — 21°58'30"S, 166°01'E, 15 m depth, 22 Sep. 1989 : 2 specimens (MNHN 1993-121); 3 specimens (SMNS 9887). — 21°57'24"S, 165°59'54"E, 2 m depth, 22 Mar. 1990 : 2 specimens (MNHN 1993-122); 2 specimens (SMNS 11903).

DISTRIBUTION. — This is a new record of the species from New Caledonia. The species was found here at depths of 2-70 m. Otherwise, the species is known from the Philippines, eastern Indonesia and Papua New Guinea.

Callionymus moretonensis Johnson, 1971

Callionymus kaianus moretonensis Johnson, 1971 : 108-113, figs 1-2 (South Queensland).

Callionymus moretonensis - FRICKE, 1981a : 359-360, fig. 7 (Queensland, northwestern Australia, New Ireland, New Caledonia; 150 m depth); 1983 : 223-226, fig. 65 (Queensland, Western Australia; 84-150 m depth).

MATERIAL EXAMINED. — **New Caledonia.** Canal de la Havannah, 22°22'S, 167°01'E, 150 m depth, P. FOURMANOIR coll., Nov. 1979 : 1 specimen (SMNS 12047).

DISTRIBUTION. — This species was found only once in New Caledonian waters. Otherwise, it is distributed around the northern half of Australia, at depths of 84-150 m.

Callionymus pleurostictus Fricke, 1982

Callionymus (Calliurichthys) pleurostictus Fricke, 1982 : 138-141, figs 7-8 (Bay of Nhatrang, Vietnam; Gulf of Thailand); 1983 : 428-433, figs 126-127 (Ambon, Indonesia; Northern Australia; 1-22 m depth); 1989 : 53 (near Rabaul, New Britain; Guadalcanal, Solomon Islands; 0-35 m depth).

MATERIAL EXAMINED. — **New Caledonia.** Baie de la Dumbea, fringing reef on NW arm just E of beach, 22°12'15"S, 166°21'30"E, 2-6 m depth, R. WINTERBOTTOM *et al.* coll., 2 Sep. 1991 : 6 ♂ 20.1-29.3 mm SL; 7 ♀ 14.2-20.0 mm SL (ROM 65536). — Passe de Dumbea, a little west of Récif Laregnère, 22°19'50"S 166°16'50"E, 20-23 m

depth, R. WINTERBOTTOM *et al.* coll., 5 Sep. 1991 : 1 ♂ 23.6 mm SL, 2 ♀ 18.3-21.2 mm SL (ROM 65535). — 300 m N of Seche Croissant, 22°19'30", 166°21'00"E, 7-11 m depth, R. WINTERBOTTOM *et al.* coll., 9 Sep. 1991 : 1 ♀ 17.1 mm SL (ROM 65537). — Baie de St. Vincent, 21°59'12"S, 165°58'18"E, M. KULBICKI coll., 23 Mar. 1990 : 1 specimen (SMNS 12528).

DISTRIBUTION. — This is the first record of the species from New Caledonia; it was collected at depths of 2-23 m. *Callionymus pleurostictus* is apparently widespread in the eastern Indo-Australian Archipelago and the islands of the central Southwest Pacific. It was found at depths of 0-35 m.

Callionymus tethys new species

Fig. 2

MATERIAL EXAMINED. — **New Caledonia.** LAGON : st. DW 7, 22°24'00"S, 166°19'42"E, 20 km S Nouméa, 13-14 m depth, 21 May 1984 : 1 ♀, 25.4 mm SL (MNHN 1993-124). — St. DW 42, 22°18'30"S, 166°13'48"E, 20 km SW Nouméa, 10 m depth, 25 May 1984 : 1 ♀ 43.2 mm SL (SMNS 12268). — St. DW 83, 22°31'30"S, 166°29'42"E, 40 km SSE Nouméa, 22 m depth, 21 Aug. 1984 : 1 ♀ 43.0 mm SL (MNHN 1993-126). — St. DW 158, 22°36'06"S, 166°34'24"E, 35 km SSE Nouméa, 22 m depth, 24 Aug. 1984 : 1 ♂ 42.8 mm SL (MNHN 1993-125). — St. DW 230, 22°37'54"S, 166°41'06"E, 38 km SSE Nouméa, 35 m depth, 22 Oct. 1984 : ♂ 86.1 mm SL (MNHN 1993-136). — St. DW 258, 22°20'42"S, 166° 20'48"E, 30 km S Nouméa, 10 m depth, 7 Nov. 1984 : 1 ♀ 29.7 mm SL (MNHN 1993-127). — St. DW 446, Grand Passage NW of New Caledonia, 18°19'00"S, 163°04'00"E, 36 m depth, 28 Feb. 1985 : 1 ♀ 15.9 mm SL (MNHN 1993-000). — St. DW 447, Grand Passage NW of New Caledonia, 18°20'18"S, 163°05'30"E, 35-36 m depth, 28 Feb. 1985 : 1 ♀ 25.2 mm SL (MNHN 1993-128). — St. DW 469, Grand Passage NW of New Caledonia, 18°28'30"S, 163°10'24"E, 38-39 m depth, 1 Mar. 1987 : 1 ♀ 22.4 mm SL (MNHN 1993-129). — St. DW 541, Grand Passage NW of New Caledonia, 19°06'24"S, 163°13'18"E, 42-43 m depth, 6 Mar. 1985 : 1 ♀ 21.4 mm SL (MNHN 1993-130). — St. DW 570, 22°50'12"S, 167°01'00"E, 20 km W île des Pins, 52-53 m depth, 17 July 1985 : 1 ♀ 30.2 mm SL (MNHN 1993-131). — St. DW 788, Cap Baye, 21°01'36"S, 165°34'42"E, 32-33 m depth, 9 Jan. 1987 : 1 ♀ 36.0 mm SL (SMNS 12266). — St. DW 865, 20°38'12"S, 165°44'12"E, 23-24 m depth, 13 Jan. 1987 : 2 ♂ 44.2-60.2 mm SL (SMNS 12267). — St. DW 892, NW of New Caledonia, 20°18'18"S, 164°32'06"E, 22-26 m depth, 14 Jan. 1987 : 1 ♂ 51.8 mm SL (MNHN 1993-132). — St. DW 902, 20°13'24"S, 164°19'35"E, 30-32 m depth, 14 Jan. 1987 : 1 ♂ 49.2 mm SL (MNHN 1993-133). — St. DW 1126, Grand Passage, NW of New Caledonia, 19°33'00"S, 163°46'00"E, 40-41 m depth, 27 Oct. 1989 : 1 ♀ 22.2 mm SL (MNHN 1993-134). — St. DW 1169, Grand Passage, NW of New Caledonia, 19°18'30"S, 163°10'42"E, 47 m depth, 30 Oct. 1989 : 1 ♀ 36.0 mm SL (MNHN 1993-135). — St. DW 1182, Grand Passage, NW of New Caledonia, 19°27'18"S, 163°16'18"E, 48 m depth, 31 Oct. 1989 : 4 ♂ 16.3-28.0 mm SL (SMNS 12269).

TYPES. — *Holotype* : male 86.1 mm (MNHN 1993-136, LAGON, st. 230). *Paratypes* : all the other specimens.

ETYMOLOGY. — The species is named after TETHYS, the goddess of the sea and the mother of all creatures in the world ocean, in the ancient Greek mythology (since about 1300 BC).

DIAGNOSIS. — A *Callionymus* of the *Callionymus japonicus* group of the subgenus *Callionymus* with 18-20 pectoral fin rays, the ventral margin of the preopercular spine concave, the spine dorsally with 5-9 small antrorse serrae, the median two branches of the male's caudal fin extremely elongate and filamentous, the male's first dorsal fin high, with three filaments, the first spine shorter than the second and third, the male's throat with an elongate heart-shaped black blotch surrounded by wavy ocellate lines, and the distal half of the anal fin black, leaving the tips of the fin rays white.

DESCRIPTION. — D1 IV (IV); D2 viii,1 (viii,1); A vii,1 (vii,1); P1 ii,14-15,ii (i-ii,15-17,i-ii) (total 18-20); P2 I,5 (I,5); C (ii),i,7,ii,(ii) [(i-ii),i,7,ii,(i-ii)].

Body elongate and slightly depressed. Head slightly depressed, 4.6 (3.6-4.4) in SL. Eye 2.9 (2.3-2.9) in head. Preorbital length in the male 2.6 (2.8-2.9) in head, in the female 3.2-4.4 in head. Interorbital distance 40 (34-49) in head. Maxillary length 3.3 (2.6-2.9) in head. Preopercular spine length 3.3 (2.2-3.4) in head. Preopercular spine with a convex ventral margin, a straight main tip, a strong antrorse spine at the base, and 5-9 small antrorse serrae along the dorsal margin; preopercular spine formula 1 $\bar{8}$ 1 (1 $\bar{5}$ - $\bar{9}$ 1). Body depth 9.9 (8.4-11.2) in SL. Body width in the male 6.1 (5.8-6.5) in SL, in the female 4.9-5.3 in SL. Urogenital papilla elongate in the male, 14.3 (8.9-

17.3) in head; not visible in the female. Caudal peduncle length 6.0 (5.7-8.1) in SL. Caudal peduncle depth 22.6 (17.6-23.9) in SL. Maximum observed SL 86 mm (male), 43 mm (female).

First dorsal fin high in the male, first to third spines filamentous, first spine 3.1 (2.0-3.1), 2nd spine 2.4 (2.2-3.8), 3rd spine 2.5 (2.3-4.4), 4th spine 6.9 (5.7-6.6); lower in the female, without filaments, 1st spine 4.5-5.4, 2nd spine 4.9-5.8, 3rd spine 5.4-6.6, 4th spine 6.6-8.5 in SL. Predorsal(1) length 4.0 (3.1-4.3) in SL. Second dorsal fin distally straight. Second dorsal fin rays unbranched, the last divided at its base. First ray of second dorsal fin in the male 5.4 (5.0-5.4), last ray 4.8 (4.8-5.1); in the female, 1st ray 4.5-5.9, last ray 5.2-5.9 in SL. Predorsal(2) length 2.2 (1.9-2.1) in SL. Anal fin beginning on a vertical through first membrane of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray in the male 11.7 (9.8-11.3), last ray 5.1 (4.8-4.9); 1st ray in the female 8.7-11.4, last ray 5.9-6.6. Preanal fin length 2.2 (1.8-2.1) in SL. Pectoral fin reaching to 2nd anal fin membrane when laid back. Pectoral fin length 4.2 (4.0-4.6). Prepectoral fin length 3.2 (2.5-3.0) in SL. Pelvic fin reaching to 1st or 2nd anal fin membrane when laid back. Pelvic fin spine 17.1 (10.5-14.1); pelvic fin length 3.1 (2.6-3.0). Prepelvic fin length 4.9 (3.6-5.0) in SL. Caudal fin elongate in the male, often longer than the rest of the body; one branch of each of the median two rays extremely elongate, filamentous; caudal fin length in the male 1.0 (0.8-1.9) in SL. Caudal fin in the female much shorter, only slightly elongate; its length 2.4-3.6 in SL.

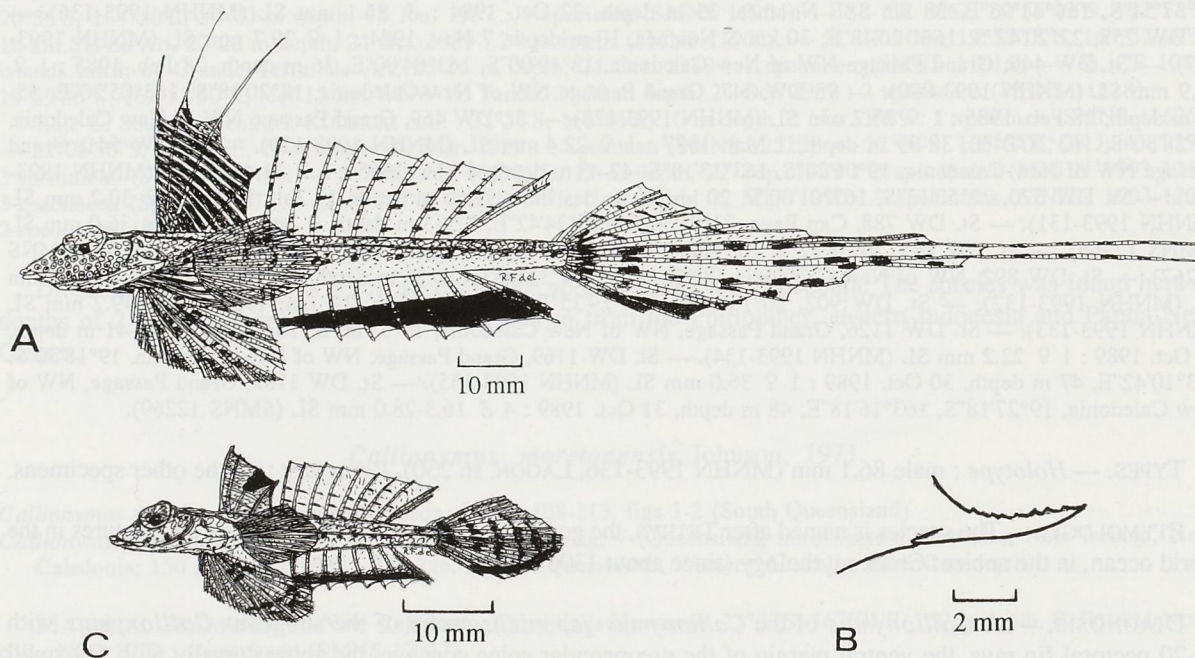


Fig. 2. — *Callionymus tethys* sp. nov.

A-B : holotype, ♂ 86.1 mm SL (MNHN 1993-136) : A, lateral view; B, left preopercular spine. — C, paratype, ♀ 36.0 mm SL (MNHN 1993-135), lateral view.

Color in alcohol : Head and body dorsally rose pink, ventrally yellowish white. Cheeks in the male with ocelli. Eye gray. Thorax in the male with an elongate, heart-shaped black blotch surrounded by ocellate lines which extend to the membrane between the pelvic and pectoral fins. Sides of body with a row of dark brown spots below the lateral line. Back covered with small white blotches.

First dorsal fin in the male whitish, with numerous thin oblique dark gray streaks; the distal anterior portion of the second membrane with a small ocellate black blotch. First dorsal fin in the female dusky, with narrow horizontal white lines and an ocellus distally on third membrane. Second dorsal fin translucent, each membrane with three short horizontal dark streaks. Anal fin with a black band in the distal half; tips of fin rays white. Pelvic fin with two bands of dark spots. Caudal fin in the male with about 14, in the female with about 6 vertical bands of dark spots. Upper membranes in the male with short dark streaks. Lower margin black in both sexes.

Sexual dimorphism : Males have a higher first dorsal fin than females with the first to third spine filamentous, longer last rays of the second dorsal and anal fins, a much longer caudal fin with median filaments, a longer preorbital region, a longer urogenital papilla (females : not visible), and a different colouration of the first dorsal fin and the head (see Fig. 2).

DISTRIBUTION. — This new species is known only from around New Caledonia and the Loyalty Islands. It was found at depths of 10-53 m.

RELATIONSHIPS. — This species is a member of the *Callionymus japonicus* species-group, characterized by a preopercular spine with a straight main tip, a strong antrorse spine at the base, and a high number of small dorsal serrae, 9 second dorsal rays, 8 anal rays and an elongate caudal fin in males. In the structure of the male's caudal fin (two median branches extremely elongate) and the preopercular spine, the new species is closely related to *Callionymus neptunius* (Seale, 1910) and *C. superbus* Fricke, 1983.

Callionymus tethys is distinguished from *C. neptunius* Seale (1910 : 539-540, Balayan Bay, Philippines; FRICKE, 1983 : 411-416, fig. 121, Sri Lanka, Philippines, New Britain, Solomon Islands, 5-37 m depth) in the shape of the first dorsal fin (*C. neptunius* : second spine of first dorsal fin much longer than third spine), the color pattern of the first dorsal fin (*C. neptunius* : vertical stripes and spots instead of horizontal stripes), the colouration of the head (*C. neptunius* with a vertical suborbital dark streak), the median caudal fin rays (*C. neptunius* : not filamentous), and the preopercular spine shape (*C. neptunius* : ventral margin concave). The new species differs from *C. superbus* Fricke (1983 : 442-448, fig. 131, Indonesia) in the proportions of first dorsal fin spines (*C. superbus* males : first spine longer than second spine), the colouration of the male's first dorsal fin (*C. superbus* : dusky, with vertical white streaks), the anal fin colouration (*C. superbus* : distal three-fourths of the fin black, tips of fin rays also black), and the shape of the preopercular spine (*C. superbus* : ventral margin straight or slightly concave).

Genus *DIPLOGRAMMUS* Gill, 1865

Diplogrammus goramensis (Bleeker, 1858)

Callionymus goramensis Bleeker, 1858 : 214 (Goram Archipelago).

Diplogrammus (Diplogrammus) goramensis - FRICKE, 1983 : 493-504, fig. 148 (Vietnam, China, Philippines, Eastern Indonesia, Papua New Guinea, Australia/Queensland, Palau Islands, Caroline Islands, Kapingamarangi Atoll, Mariana Islands, Marshall Islands, Fiji Islands, American Samoa, Cook's Islands; 5-34 m depth).

DISTRIBUTION. — From Vietnam, China and the Philippines to Australia in the south, Marshall Islands in the east, and Cook's Islands in the southeast; the species was collected in lagoons and sand patches around coral reefs at depths of 5-34 m.

REMARKS. — This species has not yet been recorded from New Caledonia, but might occur there as it is known from Queensland, Papua New Guinea, and Fiji.

Genus *SYNCHIROPUS* Gill, 1859

Synchiropus altivelis (Temminck & Schlegel, 1845)

Synchiropus altivelis Temminck & Schlegel, 1845 : 155-156, pl. 79, fig. 1 (Ohomura near Nagasaki, Japan).

Synchiropus (Synchiropus) altivelis - FRICKE, 1981b (part) : 55-60, figs 15-16 (Japan, South China Sea, Java/Indonesia, Philippines); 1983 : 576-583, figs 173-174 (Japan, Taiwan, Philippines).

MATERIAL EXAMINED. — **New Caledonia**. SMIB 5 : st. DW 70, seamount "Aztèque", 23°40'36"S, 168°01'06"E, 270 m depth, 7 Sep. 1989 : 1 specimen (SMNS 11613).

AZTÈQUE : st. 7, seamount "Stylaster", 23°37'30"S, 167°42'06"E, 460 m depth, 14 Feb. 1990 : 1 specimen (SMNS 11612,).

DISTRIBUTION. — This is the first record of the species from the New Caledonian area. It was collected there at a depth of 270-460 m. Otherwise, *S. altivelis* is distributed from Japan east to the Emperor seamounts, southwest to Indonesia and the Philippines, at depths of 71-593 m.

REMARKS. — *Synchiropus* sp. from the Hawaiian Islands and Hancock Seamount (named *S. altivelis* in part by FRICKE, 1981b, 1983) is a new species, different from *S. altivelis* in several fin proportions and color markings. It will be described in the near future.

Synchiropus novaecaledoniae new species

Fig. 3

MATERIAL EXAMINED. — **New Caledonia**. SMIB 3 : st. DW 14, 23°40.1'S, 167°59.7'E, 246 m depth, 22 May 1987 : ♂ 68.9 mm SL (MNH 1993-140); 1 ♀ 45.2 mm SL (MNH 1993-138).

SMIB 5 : st. DW 73, 23°41.4'S, 168°00.6'E, 230-240 m depth, 7 Sep. 1989 : 1 ♀ 27.8 mm SL (MNH 1993-139). — St. DW 76, 23°41.2'S, 168°00.5'E, 240-280 m depth, 7 Sep. 1989 : 2 ♀ 33.7 - ca. 35 mm SL (second specimen head only) (SMNS 12540). — St. DW 101, 23°21.2'S, 168°04.9'E, 225-270 m depth, 14 Sep. 1989 : 1 ♀ 33.1 mm SL (SMNS 12539).

TYPES. — *Holotype* : male 68.9 mm (MNH 1993-140, SMIB 3, st. DW 14). *Paratypes* : all the other specimens.

ETYMOLOGY. — The name *novaecaledoniae* refers to the type locality of the new species, New Caledonia.

DIAGNOSIS. — A *Synchiropus* of the *S. altivelis* group of the subgenus *Synchiropus* with three spines of the first dorsal fin filamentous in males, dark bands on the male's first dorsal fin, the female with an elongate ocellate black blotch on the third membrane, the male's second dorsal fin with vertical white stripes, the back with dark saddles, the caudal fin without filaments in both sexes, and the caudal fin base with a double dark blotch.

DESCRIPTION. — D1 IV (IV); D2 8 (8); A vi,1 (vi,1); P1 i,18-19,i (i,18-20,i) (totally 20-22); P2 I,5; C (ii),i,7,ii,(ii).

Body elongate and slightly depressed. Head slightly depressed, 3.6 (3.1-3.4) in SL. Eye 2.8 (2.1-2.5) in head. Preorbital length 3.4 (3.6-4.5) in head. Interorbital distance 21 (26-40) in head. Maxillary length 3.1 (3.2-3.4) in head. Preopercular spine with a straight main tip and a large recurved point on its dorsal margin; its length 3.7 (3.0-4.1) in head. Preopercular spine formula - $\underline{1}$ 1 (- $\underline{1}$ 1). Body depth 6.3 (5.4-5.8) in SL. Body width 6.0 (4.9-5.6) in SL. Urogenital papilla elongate in the male, conical, 16 in head; in the female very small, 83-108 in head, or not visible. Caudal peduncle length 4.5 (4.5-4.7) in SL. Caudal peduncle depth 19.0 (19.1-21.9) in SL.

First dorsal fin relatively high in the male holotype, first two spines higher than the first ray of the second dorsal fin, first to third spines filamentous; first spine in the male holotype 3.0 in SL, 2nd spine 3.0 in SL, 3rd spine 3.6 in SL, 4th spine 5.4 in SL; in the female similar, but only first spine with a short filament; 1st spine 3.4-4.7 in SL, 2nd spine 3.8-5.0 in SL, 3rd spine 5.6-5.9 in SL, 4th spine 8.2. Predorsal(1) length 3.2 (2.8-3.1). Second dorsal fin rays branched, the last divided at its base. Second dorsal fin high in the male holotype, distally concave, first ray 3.5, last ray 3.8; in the female lower, distally straight, 1st ray 4.9-5.9 in SL, last ray 6.0-7.4 in SL. Predorsal(2) length 2.2 (2.0). Anal fin beginning on a vertical through 2nd to 3rd ray of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray in the male holotype 8.6, last ray 5.7; 1st ray in the female 9.8-13.4 in SL, last ray 6.1-7.6 in SL. Preanal fin length 2.0 (1.7-2.0). Pectoral fin reaching in the male to 4th anal fin membrane when laid back, in the female to second membrane. Pectoral fin length in the male holotype 3.7, in the females 4.6-5.1 in SL. Prepectoral fin length 2.7 (2.3-2.6). Pelvic fin reaching to anal

fin membrane when laid back. Pelvic fin spine 10.0 (9.1-11.2) in SL; pelvic fin length 2.8 (2.8-3.3) in SL. Prepelvic fin length 3.6 (3.4-3.5) in SL. Caudal fin elongate and pointed in the male, distally convex in the female; its length in the male holotype 1.8 in SL, in the females 3.1-3.5 in SL.

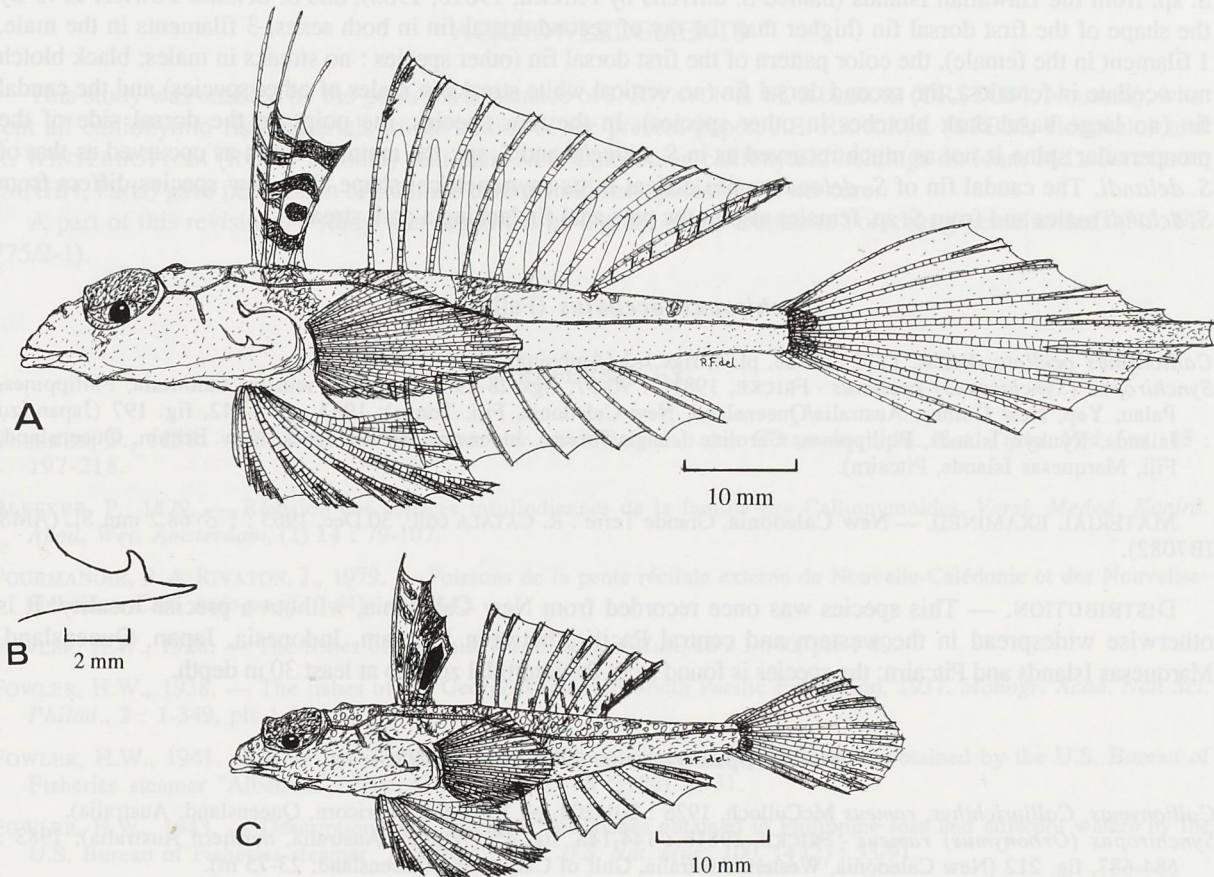


Fig. 3. — *Synchiropus novaecaledoniae* sp. nov.

A-B : holotype, ♂ 68.9 mm SL (MNHN 1993-140) : A, lateral view; B, left preopercular spine. — C, paratype, ♀ 45.2 mm SL (MNHN 1993-138), lateral view.

Color in alcohol : Head and body pale; eye dark gray, back with dark brown saddles. Suborbital region in the male holotype with a dusky blotch. First dorsal fin in the male whitish, with 4 curved horizontal dark bands on the rays and membranes, surrounding a round dark blotch in the lower half of the third membrane. First dorsal fin in the female whitish, the first membrane with dark brown blotches, the second and third membranes mostly dark brown, the third membrane also with an ocellate vertical black blotch. Second dorsal fin translucent, the first ray distally with two small dark blotches, the basal three-fourths with vertical white streaks. Anal, pectoral and pelvic fins colorless in both sexes.

Caudal fin pale whitish, basally with a double dark blotch, in the male distally dusky.

Sexual dimorphism : Males have a slightly higher first dorsal fin than females, with the first to third spines filamentous (females : only first spine with a short filament), longer pectoral and caudal fins, a longer urogenital papilla, and a different colouration of the first and second dorsal fins.

DISTRIBUTION. — This new species is known only from New Caledonian waters; it was found at depths of 225-280 m on the submarine ridge southeast of the île des Pins.

RELATIONSHIPS. — This new species is a member of the *Synchiropus altivelis* species-group of the genus *Synchiropus*, characterized by a combination of 8 branched rays in the second dorsal fin and 7 unbranched rays in the anal fin, the preopercular spine shape with a straight main tip and a recurved dorsal point at the dorsal margin. Within this species group, it is distinguished from the other species, *S. altivelis* (Temminck & Schlegel, 1845), *S. sp.* from the Hawaiian Islands (named *S. altivelis* by FRICKE, 1981b, 1983), and *S. delandi* Fowler, 1943 by the shape of the first dorsal fin (higher than 1st ray of second dorsal fin in both sexes; 3 filaments in the male, 1 filament in the female), the color pattern of the first dorsal fin (other species : no streaks in males; black blotch not ocellate in females), the second dorsal fin (no vertical white streaks in males of other species) and the caudal fin (no large basal dark blotches in other species). In the new species, the point on the dorsal side of the preopercular spine is not as much recurved as in *S. altivelis* and *S. sp.*; the main tip is not as upcurved as that of *S. delandi*. The caudal fin of *S. delandi* males differs in its asymmetrical shape. The new species differs from *S. delandi* males and from *S. sp.* females also in the pale anal fin lacking a dark streak.

Synchiropus ocellatus (Pallas, 1770)

Callionymus ocellatus Pallas, 1770 : 25-28, pl. 4, figs 1-3 (Amboina).

Synchiropus (Synchiropus) ocellatus - FRICKE, 1981b : 90-97, figs 28-29 (Okinawa, Vietnam, Indonesia, Philippines, Palau, Yap, New Guinea, Australia/Queensland, New Caledonia, Fiji, Tonga); 1983 : 635-642, fig. 197 (Japan/Izu Islands, Ryukyu Islands, Philippines, Caroline Islands/Ponape, Indonesia, New Guinea, New Britain, Queensland, Fiji, Marquesas Islands, Pitcairn).

MATERIAL EXAMINED. — New Caledonia. Grande Terre : R. CATALA coll., 30 Dec. 1963 : 1 ♂ 68.2 mm SL (AMS IB7082).

DISTRIBUTION. — This species was once recorded from New Caledonia, without a precise locality. It is otherwise widespread in the western and central Pacific, between Vietnam, Indonesia, Japan, Queensland, Marquesas Islands and Pitcairn; the species is found from the intertidal zone to at least 30 m depth.

Synchiropus rameus (McCulloch, 1926)

Callionymus, Calliurichthys, rameus McCulloch, 1926 : 201-203, pl. 53 (Cape Capricorn, Queensland, Australia).

Synchiropus (Orbonymus) rameus - FRICKE, 1981b : 144-148, fig. 45 (Western Australia, northern Australia); 1983 : 684-687, fig. 212 (New Caledonia, Western Australia, Gulf of Carpentaria/Queensland; 23-75 m).

MATERIAL EXAMINED. — New Caledonia. LAGON : st. DW 175, baie de Saint Vincent, 22°06'12"S, 166°05'48"E, 17 m depth, 18 Sep. 1984 : 1 specimen (SMNS 11908). — St. DW 310, récif du Sud, 22°45'S, 166°45'48"E, 46 m depth, 27 Nov. 1984 : 1 specimen (SMNS 11614). — St. CP 1068, île Art, 19°57'18"S, 163°52'48"E, 25-26 m depth, 24 Oct. 1989 : 1 specimen (SMNS 11615). — St. CP 1069, reef 15 km WNW île Yandé, 19°59'06"S, 163°52'30"E, 24-30 m depth, 24 Oct. 1989 : 1 specimen (SMNS 11617). — St. DW 1073, 35 km ESE île Art, 19°50'48", 164°00'E, 28 m depth, 24 Oct. 1989 : 1 specimen (SMNS 11906). — St. DW 1192, 5 km W île Pott, 19°35'18"S, 163°24'36"E, 48 m depth, 1 Nov. 1989 : 1 specimen (SMNS 11907).

Grande Terre, M.L. BAUCHOT & L.A. MAUGÉ coll., 1980 : 1 ♀ 64.0 mm SL (MNHN 1980-947).

Baie de Saint Vincent : 22°05'05"S, 166°05'E, 15 m depth, M. KULBICKI coll., 20 Nov. 1989 : 2 specimens (MNHN 1993-141) and (SMNS 9888).

DISTRIBUTION. — *Synchiropus rameus* is common around New Caledonia. It was found at depths of 15-48 m. Otherwise, the species is found around the northern half of Australia at depths of 23-75 m.

Synchiropus splendidus (Herre, 1927)

Gallionymus splendidus Herre, 1927 : 416-417, pl. 2 (Bungau, Philippines, 4 m).

Synchiropus (Synchiropus) splendidus - FRICKE, 1981b : 127-132, fig. 40 (Kapingamarangi Atoll, Caroline Islands, Palau Islands, Indonesia, New Guinea, Australia); 1983 : 668-672, fig. 207 (Philippines, Papua New Guinea).

REMARKS. — This species has not been recorded from New Caledonia, but I know of a specimen photographed in Nouméa aquarium which was probably collected there. Otherwise, the species occurs between the Ryukyu Islands, the northern half of Australia and Papua New Guinea; it was collected at depths of 0-18 m.

ACKNOWLEDGMENTS

This study was enabled by the generous assistance of J. RIVATON & M. KULBICKI (ORSTOM, Nouméa), who sent all callionymid fish materials to the author of the present paper. J.E. RANDALL (BPBM, Honolulu) and R. WINTERBOTTOM (ROM, Toronto) sent their New Caledonian callionymid holdings on loan. M.L. BAUCHOT (MNHN, Paris) gave permission to examine callionymid fish specimens in her care.

A part of this revisionary study was supported by a grant of the Deutsche Forschungsgemeinschaft (No. FR 775/2-1).

REFERENCES

- BLEEKER, P., 1858. — Bijdrage tot de kennis der vischfauna van den Goram-Archipel. *Nat. Tijds. Ned.-Ind.*, **15** : 197-218.
- BLEEKER, P., 1879. — Révision des espèces insulindiennes de la famille des Callionymoides. *Versl. Meded. Konink. Akad. Wet. Amsterdam*, (2) **14** : 79-107.
- FOURMANOIR, P. & RIVATON, J., 1979. — Poissons de la pente récifale externe de Nouvelle-Calédonie et des Nouvelles-Hébrides. *Cah. indo-pacif.*, **1** (4) : 405-443.
- FOWLER, H.W., 1928. — The fishes of Oceania. *Mem. Bishop Mus.*, **10** : 1-540, pls 1-49.
- FOWLER, H.W., 1938. — The fishes of the George Vanderbilt South Pacific Expedition, 1937. *Monogr. Acad. Nat. Sci. Philad.*, **2** : 1-349, pls 1-12.
- FOWLER, H.W., 1941. — New fishes of the family Callionymidae, mostly Philippine, obtained by the U.S. Bureau of Fisheries steamer "Albatross". *Proc. U.S. Nat. Mus.*, **90** (3106) : 1-31.
- FOWLER, H.W., 1943. — Descriptions and figures of new fishes obtained in Philippine seas and adjacent waters by the U.S. Bureau of Fisheries steamer "Albatross". *Bull. U.S. Nat. Mus.*, **100**, **14** (2) : 53-91.
- FRICKE, R., 1981a. — The *kaianus*-group of the genus *Callionymus* (Pisces: Callionymidae), with descriptions of six new species. *Proc. Calif. Acad. Sci.*, **42** (14) : 349-377.
- FRICKE, R., 1981b. — Revision of the genus *Synchiropus* (Teleostei: Callionymidae). J. Cramer, Braunschweig, 194 pp.
- FRICKE, R., 1982. — New species of the genus *Callionymus*, with a revision of the *variegatus*-group of that genus (Teleostei: Callionymidae). *J. Nat. Hist.*, **16** : 127-146.
- FRICKE, R., 1983. — Revision of the Indo-Pacific genera and species of the dragonet family Callionymidae (Teleostei). J. Cramer, Braunschweig, x + 774 pp.
- FRICKE, R., 1989. — New species and new records of *Callionymus* from the Pacific Ocean (Teleostei: Callionymidae). *Hydrobiologia*, **183** : 47-57.
- FRICKE, R., 1990. — A new and a rare species of dragonet (Teleostei: Callionymidae) from New Guinea and the Solomon Islands. *Stuttgarter Beitr. Naturk.*, (A) **446** : 1-13.
- FRICKE, R. & BROWNELL, M. Z., 1993. — Two new dragonets of the genus *Callionymus* (Callionymidae) and a record of *Callionymus corallinus* Gilbert, 1905 from Miyake-jima, Izu Islands, Japan. *Jap. J. Ichthyol.*, **40** (1), 1993 : 1-10.
- FRICKE, R. & ZAISER, M.J., 1983. — A new callionymid fish, *Synchiropus kiyoeae* from the Izu Islands, Japan. *Japan. J. Ichthyol.*, **30** (2) : 122-128.
- GILBERT, C.H., 1905. — The deep-sea fishes of the Hawaiian Islands. *Bull. U.S. Fish Comm.*, **23** (2), (1903) : 575-713, pls 66-109.

- GOSLINE, W.A. & BROCK, V.E., 1960. — Handbook of Hawaiian fishes. Univ. Hawaii Press, Honolulu, 372 pp.
- HERRE, A.W.C.T., 1927. — A new genus and three new species of Philippine fishes. *Philipp. J. Sci.*, **32** (3) : 413-419, pls 1-3.
- JOHNSON, C.R., 1971. — Revision of the callionymid fishes referable to the genus *Callionymus* from Australian waters. *Mem. Queensland Mus.*, **16** (1) : 103-140.
- JORDAN, D.S. & SEALE, A., 1906. — The fishes of Samoa. Descriptions of the species found in the archipelago, with a provisional check-list of the fishes of Oceania. *Bull. U.S. Bur. Fish.*, **25** (1905) : 175-455, pls 33-53.
- MCCULLOCH, A.R., 1926. — Report on some fishes obtained by F.I.S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, Tasmania, and south-western Australia; 5. *Biol. Res. F.I.S. "Endeavour" 1909-1914*, **15** (4) : 157-216, pls 43-56.
- NAKABO, T., 1991. — Redescription of a rare callionymid fish, *Paracallionymus corallinus*, from Hawaii and Japan. *Japan. J. Ichthyol.*, **38** (3) : 249-253.
- PALLAS, P.S., 1770. — *Spicilegia zoologica*; **1**, fasc. 8. Pisces. Petropolis.
- REGAN, C.T., 1908. — The Percy Sladen Trust Expedition to the Indian Ocean in 1905 under the leadership of Mr. J. Stanley Gardiner. Report on the marine fishes collected by Mr. J. Stanley Gardiner in the Indian Ocean. *Trans. Linn. Soc. London*, (2), **12** (3) : 217-255, pls 23-32.
- SEALE, A., 1910. — New species of Philippine fishes. *Philipp. J. Sci.*, (A), **4** (6) : 491-541, pls 1-13.
- TEMMINCK, C.J. & SCHLEGEL, H., 1845. — Pisces. Part VII-IX. Pp. 113-172, pls 1-98 + A. In : SIEBOLD, P.F., VON : Fauna Japonica, sive descriptio animalium, quae in itinere per Japoniam, jussu et auspiciis superiorum, qui summum in India Batava imperium tenent, suscepto annis 1823-1830 collegit, notis, observationibus a adumbrationibus illustravit. Lugduni Batavorum.