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Two New Dragonets of the Genus *Callionymus* (Callionymidae) and a Record of *Callionymus corallinus* from Miyake-jima, Izu Islands, Japan

Ronald Fricke[1] and Martha Zaiser Brownell[2]

[1] Staatliches Museum für Naturkunde, Schloss Rosenstein,
Rosenstein 1, D-7000 Stuttgart 1, Germany
[2] Olympia Bird Farm, Olympia, WA 98503, USA

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Abstract New dragonets are described from Miyake-jima, Izu Islands, Japan. *Callionymus curvispinis* sp. nov. is characterized within the *variegatus*-group of the subgenus *Callionymus* (*Calliurichthys*) by the combination of 5–6 curved points on the dorsal side of the preopercular spine, an upcurved main tip of that spine, no filaments in the male's first dorsal fin, no black blotch in the female's first dorsal fin, and a distal black streak in the male's anal fin. *Callionymus persicus izuensis* subsp. nov., a member of the *japonicus*-group of the subgenus *Callionymus* (*Calliurichthys*), is distinguished from the western Indian Ocean *C. persicus persicus* by the color pattern of the first dorsal fin (in males distally light, without dark blotches, but with 2–3 faint dark lines (additional to two blackish spots distally on second and third spines); in females plain dark gray, without dark brown blotches, but with a few white spots), by the pectoral fin which reaches to base of 3rd anal fin membrane when laid back, and by the male's caudal fin with only the two median rays extremely elongate. *Callionymus corallinus* is redescribed and recorded from Miyake-jima (Japan) and New Caledonia, *C. beniteguri* is recorded from the Izu Islands.

The dragonets (Callionymidae) are a group of benthic fishes occurring worldwide in tropical and temperate oceans. The Japanese dragonets were first revised by Jordan and Fowler (1903), then by Ochiai, Araga and Nakajima (1955; *Callionymus*), and later by Nakabo (1983a) and Fricke (1983). The dragonet fauna of the Izu Islands, located south of Tokyo Bay and southeast of the Izu Peninsula, was unknown until recently. The first species to be recorded from the islands (Fricke and Zaiser, 1982) was *Diplogrammus xenicus*. *Synchiropus ijimai*, described by Tanaka (1928) from the Izu Peninsula (under the name *S. lineolatus* non Valenciennes), was recorded from the Izu Islands by Fricke (1983). In the same paper, *Synchiropus morrisoni* and *S. ocellatus* were described from Miyake-jima, one of the Izu Islands. Fricke and Zaiser (1983) found the new endemic species *Synchiropus kiyoae*, Zaiser and Fricke (1985) described another endemic species, *Synchiropus moyeri* (Table 1).

In 1983 and 1984, the junior author was searching callionymids more thoroughly at Igaya Bay, Miyake-jima. This resulted in the finding of another undescribed, endemic species of *Callionymus*, an undescribed, also endemic subspecies of *Callionymus persicus*, and numerous specimens of *Callionymus corallinus*, a species hitherto known only from the Hawaiian Islands, and most recently recorded from Hachijo-jima, Izu Islands, Japan (Nakabo, 1991). The new species and subspecies are described in the present paper, and *C. corallinus* is redescribed, as additional information to Nakabo's (1991) redescription is available now.

Methods used in the present paper follow Fricke (1983). Standard length is abbreviated as "SL." In descriptions of new taxa, data of paratypes follow those of the holotype in parentheses. Materials deposited in the following institutions have been used for the present study: Bernice P. Bishop Museum, Honolulu (BPBM); National Science Museum, Tokyo (NSMT-P), including the collection of Tatsuo Tanaka Memorial Biological Station, Ako, Miyake-jima (former acronym TMBS); Staatliches Museum für Naturkunde, Stuttgart (SMNS); National Museum of Natural History, Washington D.C. (USNM).

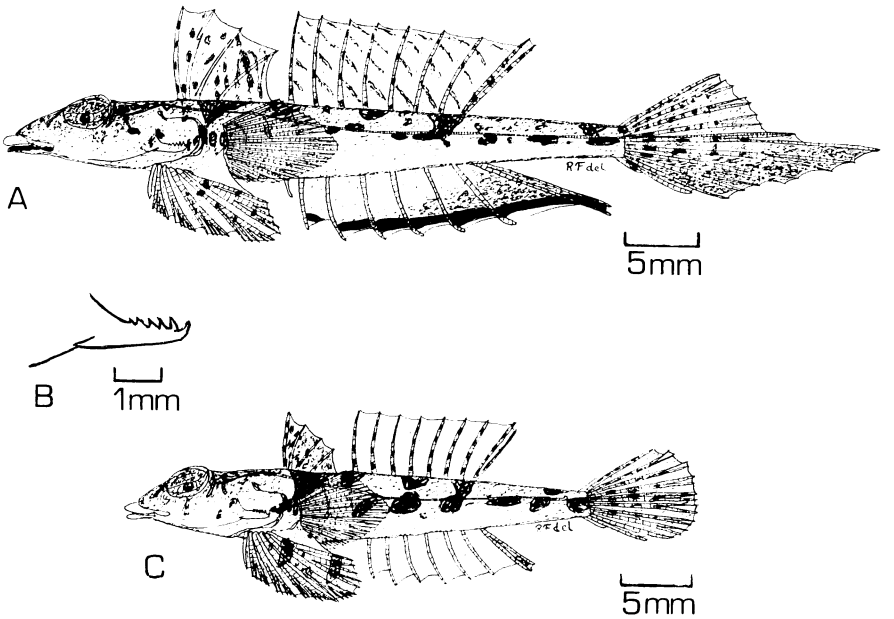

Fig. 1. *Callionymus curvispinis* sp. nov., NSMT-P 35106 (TMBS 840824-1), holotype, male, 42.9 mm SL, Miyake-jima, Japan. A) Lateral view; B) left preopercular spine; NSMT-P 35109 (TMBS 840817-2), female, 31.9 mm SL, Miyake-jima, Japan; C) lateral view.

Callionymus curvispinis sp. nov.
(New Japanese name: Chibi-numeri)
(Fig. 1)

Material examined (total 10 specimens). Japan, Izu Islands, Miyake-jima, Igaya Bay.

Holotype. NSMT-P 35106 (TMBS 840824-1), male, 42.9 mm SL, 18 m, J. T. Moyer, 24 Aug. 1984.

Paratypes. NSMT-P 35107 (TMBS 840816-1), 1 male, 38.2 mm SL, 16 m, J. T. Moyer and M. J. Zaiser, 16 Aug. 1984. NSMT-P 35108 (TMBS 840817-1), 1 male, 40.8 mm SL, 17 m, T. Yoshikawa and K. Asoh, 17 Aug. 1984. NSMT-P 35109 (TMBS 840817-2), 1 female, 31.9 mm SL, 17 m, M. J. Zaiser and J. T. Moyer, 17 Aug. 1984. NSMT-P 35110 (TMBS 840818-5/8), 2 males, 34.5–45.3 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 18 Aug. 1984. NSMT-P 35111 (TMBS 840819-2), 1 male, 35.1 mm SL, 17 m, J. T. Moyer et al., 19 Aug. 1984. SMNS 12078, 1 male, 40.3 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 18 Aug. 1984. SMNS 12079, 1 male (45.2 mm SL) and 1 female (29.2 mm SL), 17 m, J. T. Moyer et al., 19 Aug. 1984.

Diagnosis. A *Callionymus* of the *variegatus*-group of the subgenus *Calliurichthys* with 8 second dorsal rays, 7 anal rays, 17–19 pectoral rays, an upcurved main tip of the preopercular spine, 5–6

Table 1. List of Callionymidae recorded from the Izu Islands

Species	First record
Callionymus beniteguri Jordan et Snyder, 1900	Present paper
Callionymus corallinus Gilbert, 1905	Nakabo, 1991
Callionymus curvispinis sp. nov.	Present paper
Callionymus persicus izuensis subsp. nov.	Present paper
Diplogrammus xenicus (Jordan et Thompson, 1914)	Fricke and Zaiser, 1982
Synchiropus ijimai Jordan et Thompson, 1914	Fricke, 1983
Synchiropus kiyoae Fricke et Zaiser, 1983	Fricke and Zaiser, 1983
Synchiropus morrisoni Schultz, 1960	Fricke, 1983
Synchiropus moyeri Zaiser et Fricke, 1985	Zaiser and Fricke, 1985
Synchiropus ocellatus (Pallas, 1770)	Fricke, 1983

curved dorsal points (preopercular spine formula $1\frac{5-6}{-}1$), an asymmetrical caudal fin in the male, no filaments in the male's first dorsal fin, no black blotch in the female's first dorsal fin, and a distal black streak in the male's anal fin.

Description. D_1 IV; D_2 vii, 1; A vi, 1; P_1 15–17, i (total 17–19); P_2 I, 5; C (i), i, 7, ii, (i).

Body elongate and depressed. Head depressed, 4.2 (3.9–4.6) in SL. Eye 2.9 (2.6–3.2) in head. Preorbital length in the male 2.8 (2.7–2.9) in head, in the female 3.2–3.6 in head. Interorbital distance 24 (15–21) in head. Maxillary length 2.7 (2.6–4.2) in head. Preopercular spine length 4.1 (3.2–4.5) in head. Preopercular spine with an upcurved main tip, a strong antrorse spine at its base, a nearly straight ventral margin, and 5–6 curved spines along its dorsal margin, formula $1\frac{5-6}{-}1$ (Fig. 1B). Body depth 7.7 (6.7–9.7) in SL. Body width 6.7 (5.6–7.3) in SL. Urogenital papilla in the male 7.5 (7.0–9.2) in head, not visible in the female. Caudal peduncle length 4.2 (4.0–4.7) in SL. Caudal peduncle depth 19.0 (19.7–24.3) in SL. Maximum observed SL 45.3 mm (male), 31.9 mm (female).

First dorsal fin relatively low in the male, without filaments, first spine 6.4 (5.5–7.8) in SL, 2nd spine 6.5 (6.3–9.1) in SL, 3rd spine 7.2 (6.0–11.7) in SL, 4 th spine 8.0 (6.7–9.2) in SL; also low in the female, 1st spine 7.7–8.8 in SL, 2nd spine 9.2–9.7 in SL, 3rd spine 11.2–12.4 in SL, 4th spine 13.6–14.9 in SL. Predorsal (1) length 3.7 (3.1–3.7) in SL. Second dorsal fin rays unbranched, the last divided at its base. First ray of second dorsal fin 6.3 (5.8–7.5) in SL, last ray 5.9 (5.6–7.8) in SL. Predorsal (2) length 2.2 (2.1–2.4) in SL. Anal fin beginning on a vertical through 1st membrane of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray 11.3 (9.7–12.3) in SL, last ray elongate in the male, 4.3 (3.8–4.8) in SL, shorter in the female, 7.2–8.7 in SL. Preanal fin length 2.1 (1.9–2.3) in SL. Pectoral fin reaching to 2nd anal fin ray when laid back. Pectoral fin length 5.5 (4.9–5.2) in SL. Prepectoral fin length 2.9 (2.8–3.2) in SL. Pelvic fin reaching to anus or first anal fin ray when laid back. Pelvic fin spine 17.8 (11.7–22.4) in SL; pelvic fin length 4.2 (3.6–4.1) in SL. Prepelvic fin length 4.3 (4.1–4.8) in SL. Caudal fin asymmetrical in the male, lower rays longer than upper rays, distally slightly convex in the female, not asymmetrical; caudal fin length in males 2.4 (2.0–2.5) in SL, in females 4.1–4.3 in SL.

Color in alcohol.—Head and body light brown, back with dark brown saddles, sides with dark brown blotches. Eye dark gray. Thorax in males with a dark brown blotch. First dorsal fin in the male whitish, with small dark brown spots and lines; in the female light, with darker brown mottlings. Second dorsal fin rays with dark brown spots, membranes in males with oblique dark brown lines. Anal fin translucent, in males with a distal blackish streak, posterior membranes distally also dark brown. Caudal fin light, central rays with vertical lines of dark spots, lower half in males brown. Upper half of pectoral fin with 2–3 rows of small dark spots. Pelvic fin with a basal and a distal area of dark spots and blotches.

Sexual dimorphism.—Males have a slightly higher first dorsal fin than females, a longer and asymmetrical caudal fin, a longer last anal fin ray, a longer preorbital, a longer urogenital papilla, and a different color pattern of the first dorsal and anal fins.

Etymology. *curva* (Lat.) = curved; *spina* (Lat.) = spine. The name of the new species refers to its curved preopercular spines.

Distribution. Known only from the type locality, the Izu Islands, Japan.

Habitat. *Callionymus curvispinis* sp. nov. occurs on coarse sand, occasionally with algae or rubble, at depths of 16–18 m.

Relationships. *Callionymus curvispinis* sp. nov. is characterized as a member of the *variegatus*-group of the subgenus *Callionymus* (*Calliurichthys*) by the asymmetrical caudal fin in males and the low number of second dorsal and anal fin rays. It mostly resembles *Callionymus flavus* Fricke (1983: 360–365; fig. 110) from the Red Sea, and *Callionymus marquesensis* Fricke (1989: 48–53; fig. 1) from the Marquesas Islands in the structure of its preopercular spine, which has a large upcurved main tip and large curved points on its dorsal margin. In this character, *C. curvispinis* differs from any other species of the *variegatus*-group. It is distinguished from *C. flavus* in its larger first dorsal fin, which is as high as the second dorsal fin (half as high in *C. flavus*), the lower caudal peduncle depth (14.0–16.5 in SL in *C. flavus*), the shorter prepelvic fin length (3.7–3.9 in SL in *C. flavus*), the lacking dark blotch on the third and fourth membranes of the first dorsal fin, the presence of a distal dark streak in the male's anal fin, and the

presence of dark brown saddle blotches on the back, and from *C. marquesensis* in the lower first dorsal fin, the smaller eye (eye diameter in *C. marquesensis* 2.1–2.6 in head), the lower caudal peduncle depth (14.8–20.3 in *C. marquesensis*), the lacking black blotch on the female's first dorsal fin (present distally around third spine in *C. marquesensis*), the presence of a distal dark streak in the male's anal fin and the absence of such a streak in the female's anal (vice versa in *C. marquesensis*), and in the presence of a dark brown blotch on the male's thorax (absent in *C. marquesensis*).

The new species differs from *Callionymus variegatus* Temminck et Schlegel, 1845 (153, Nagasaki, Japan; Fricke, 1983: 451–455, fig. 133) from southern Japan in the much shorter caudal fin (*C. variegatus* males 1.3–2.8 in SL, females 2.9–3.4 in SL), the absence of filaments in the male's first dorsal fin (two filaments in *C. variegatus*), and the different structure of the preopercular spine (see above); it differs from the widespread Pacific species *Callionymus simplicicornis* Valenciennes, 1837 (303, Guam; Fricke, 1983: 437–441, fig. 130, Philippines to Marianas and Marquesas Islands; Fricke, 1989: 53–54, fig. 3, Society Islands, Marquesas Islands) in the preopercular spine structure (see above), the number of dorsal points on the preopercular spine (7–13 in *C. simplicicornis*), the lacking black blotch on the female's first dorsal fin (*C. simplicicornis*: a black blotch present on 2nd and 3rd membranes), the presence of a black streak on the male's anal fin (*C. simplicicornis*: anal fin translucent), and the presence of a dark brown blotch on the thorax (*C. simplicicornis*: thorax pale).

Remarks. This new species would belong to the genus *Pseudocalliurichthys* Nakabo, 1982 in the system published by Nakabo (1982). In an alternative system of Fricke (1983), that genus equals the *variegatus*-group of the subgenus *Callionymus* (*Calliurichthys*). Nakabo's (1982) generic system is artificial, as he distinguished many new genera in his cladogram on the basis of a single, highly adaptive character, the shape of the urohyal, even if they shared other characters (see Nakabo [1983b: 61], etc.), and never properly characterized the genera otherwise. This urohyal shape is the only character on the basic branch of Nakabo's cladogram. As the shape of the urohyal, i.e. the length of the ventral part, depends on the body shape and especially on the burrowing habits of the species, dragonets are divided into burrowing and non-burrowing groups, rather than into groups founded on a number of independent synapomorphies.

While, on the other hand, the genus *Callionymus* sensu Fricke (1983) might well be split into several smaller genera, Fricke decided not to do so to keep the nomenclature of dragonets stable. In Nakabo's generic system, 90% of the dragonet species would have to change their generic names, while this is necessary for only 15% in Fricke's system. Therefore, we use the system published by Fricke (1983). This results in the generic name *Callionymus* for the new species *C. curvispinis*.

Callionymus persicus izuensis subsp. nov.
(New Japanese name: Izu-numeri)
(Fig. 2)

Material examined (total 11 specimens). Japan, Izu Islands, Miyake-jima, Igaya Bay.

Holotype. NSMT-P 35099 (TMBS 840818-1), male, 56.8 mm SL, 16 m, T. Yoshikawa and K. Asoh, 18 Aug. 1984.

Paratypes. NSMT-P 35101 (TMBS 830825-7), 1 female, 19.3 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 25 Aug. 1983. NSMT-P 35103 (TMBS 830911-4), 1 female, 13.9 mm SL, M. J. Zaiser and J. T. Moyer, 11 Sept. 1983. NSMT-P 35105 (TMBS 840812-2), 1 male, 43.8 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 12 Aug. 1984. NSMT-P 35100 (TMBS 840816-3), 1 female, 29.7 mm SL, J. T. Moyer and M. J. Zaiser, 16 Aug. 1984. NSMT-P 35102 (TMBS 840817-4/5), 2 females, 23.3–35.7 mm SL, 17 m, M. J. Zaiser and J. T. Moyer, 17 Aug. 1984. SMNS 11569, 1 female, 15.5 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 18 Sept. 1983. SMNS 11570, 1 female, 42.8 mm SL, 17 m, M. J. Zaiser and J. T. Moyer, 17 Aug. 1984. SMNS 11571, 1 male, 43.2 mm SL, 17 m, J. T. Moyer and M. J. Zaiser, 16 Aug. 1984. NSMT-P 35104 (TMBS 840907-4), 1 female, 25.8 mm SL, 18 m, J. T. Moyer and M. Sovo, 7 Sept. 1984.

Diagnosis. A *Callionymus* of the *japonicus*-group of the subgenus *Calliurichthys* with 9 second dorsal and 8 anal rays, a preopercular spine formula of $1\frac{3-6}{-}1$, an elongate caudal fin with the two median rays extremely elongate, the first dorsal fin high in males, without filaments, the thorax with a black blotch and ocellate lines in males, the first dorsal with 2 distal black spots in males and with a distal black blotch in females, and the pectoral fin reaching to 3rd anal fin membrane.

Description. D_1 IV; D_2 viii, 1; A vii, 1; P_1 ii, 14–

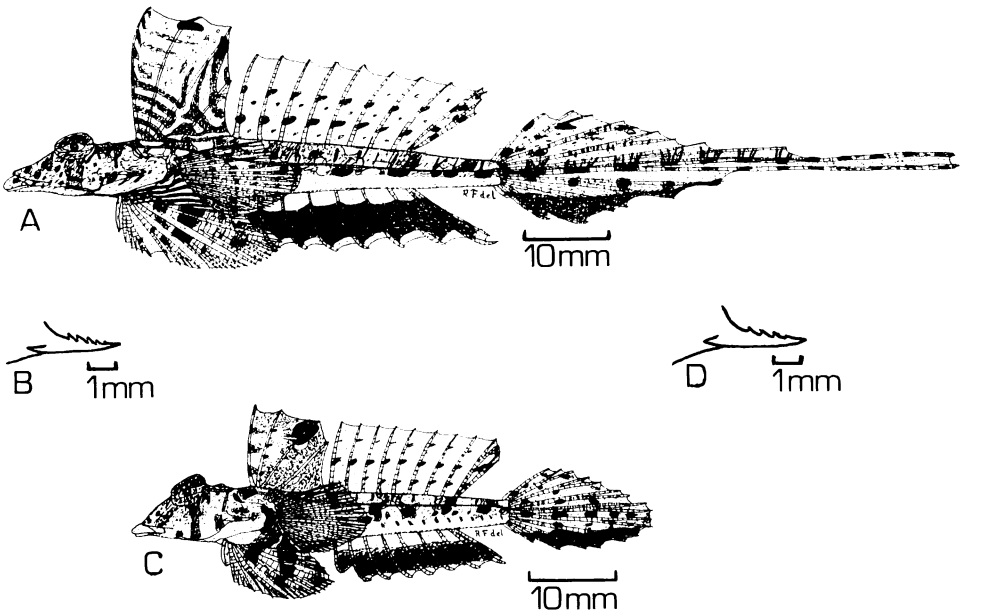

Fig. 2. *Callionymus persicus izuensis* subsp. nov., NSMT-P 35099 (TMBS 840818-1), holotype, male, 56.8 mm SL, Miyake-jima, Japan. A) Lateral view; B) left preopercular spine; SMNS 11570, female, 42.8 mm SL, Miyake-jima, Japan; C) lateral view; D) left preopercular spine.

16, i–ii (total 17–20); P_2 I, 5; C (i), i, 7, ii, (i).

Body elongate and depressed. Head depressed, 4.0 (3.4–4.3) in SL. Eye prominent on the upper surface of the head, eye diameter 3.2 (2.5–3.2) in head. Preorbital length 2.9 (2.6–3.3) in head. Interorbital distance 47 (25–40) in head. Maxillary leagth 3.0 (2.4–3.4) in head. Preopercular spine length 4.4 (2.4–3.6) in head. Preopercular spine with a sharp straight main tip, a strong antrorse spine at its base, a slightly convex ventral margin, and 3–6 small antrorse serrae at its dorsal margin, formula $1\frac{3-6}{-}1$ (Fig. 2B, D). Body depth 8.7 (5.7–9.5) in SL. Body width 6.2 (4.8–6.3) in SL. Urogenital papilla in males 19.8 (15.2–15.4) in head, in females more than 100 in head or not visible. Caudal peduncle length 6.1 (5.9–6.8) in SL. Caudal peduncle depth 20.0 (16.2–19.4) in SL. Maximum observed SL 56.8 mm (male), 42.8 mm (female).

First dorsal fin relatively high in the male, without filaments, first spine 3.7 (4.3–4.6) in SL, 2nd spine 3.6 (3.8–4.2) in SL, 3rd spine 3.6 (3.8–4.2) in SL, 4th spine 6.2 (6.8–8.6) in SL; lower in the female, 1st spine 4.5–6.3 in SL, 2nd spine 4.6–6.5 in SL, 3rd spine 4.2–6.3 in SL, 4th spine 5.3–7.1 in SL. Predorsal (1) length 3.9 (3.0–3.8) in SL. Second dorsal fin rays unbranched, the last divided at its base. First ray of second dorsal fin 5.4 (5.0–6.6) in SL, last ray in the male 4.9 (4.9–5.5) in SL, in the female 5.2–8.1 in SL. Predorsal (2) length 2.2 (1.8–2.2) 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 11.8 (9.9–12.6) in SL, last ray in the male 4.7 (5.2–5.3) in SL, in the female 5.9–9.0 in SL. Preanal fin length 2.2 (1.8–2.1) in SL. Pectoral fin reaching to 3rd anal fin membrane when laid back. Pectoral fin length 4.1 (4.1–4.6) in SL. Prepectoral fin length 2.9 (2.6–3.0) in SL. Pelvic fin reaching to 1st anal fin membrane when laid back. Pelvic fin spine 13.2 (10.2–15.8) in SL; pelvic fin length 2.9 (3.1–3.9) in SL. Prepelvic fin length 4.5 (4.1–4.6) in SL. Caudal fin extremely elongate in males, only the middle two rays reaching the full length, its length 1.1 (1.3–1.7) in SL, shorter in females, its length 2.6–4.1 in SL.

Color in alcohol.—Head and body cream white, dorsally light brown, sides and back with dark brown blotches and saddles, belly white; sides of head in males with ocelli, thorax of male with a black blotch surrounded by ocellate lines which reach the membrane between pelvic and pectoral fins. First dorsal fin in males on the basal half with dark gray lines, distally with a black blotch each at the end of the

second and third spine; in the female gray, centrally lighter, with a few darker spots and a blackish blotch distally on the third spine. Second dorsal fin translucent, with 3–4 dark blotches behind each ray. Distal three fourths of anal fin dark gray, base and tips of fin rays white. Caudal fin with vertical rows of dark brown blotches, lower one fourth dark gray in both sexes. Pelvic fins pale, with rows of dark brown blotches. Pectoral fin translucent, the upper half with 3–4 vertical rows of small dark spots.

Sexual dimorphism.—Males have a higher first dorsal fin than females, a much longer caudal fin with elongate median rays, a longer urogenital papilla, and a different color pattern of the first dorsal fin, the thorax and the membrane connecting pelvic and pectoral fins.

Etymology. The name of the new subspecies refers to the type locality (Izu Islands).

Distribution. *Callionymus persicus izuensis* subsp. nov. is known only from its type locality, the Izu Islands, Japan.

Habitat. The new subspecies occurs on coarse sand, occasionally with broken shells and coral rubble, at depths of 16–18 m.

Relationships. *Callionymus persicus izuensis* subsp. nov. is a member of the *japonicus*-group of the subgenus *Callionymus* (*Calliurichthys*), characterized by the extremely elongate symmetrical caudal fin, the 9 second dorsal and 8 anal fin rays, and the preopercular spine structure with a straight main tip, a strong antrorse spine at the base, and a number of medium sized antrorse serrae along the dorsal margin. It is closest allied to *Callionymus persicus persicus* Regan, 1906 (325–326, pl. 3, fig. 1, Persian Gulf, Mekran Coast, Muscat; Fricke, 1983: 416–423, figs. 122–124, Gulf of Aden and Persian Gulf to Maldives, 15–55 m depth), distinguished by the color pattern of the first dorsal fin in both sexes (*C. persicus persicus* populations have at the distal half of the first dorsal fin in fresh specimens densely covered with numerous dark spots and lines, additional to a blackish blotch distally on the second spine (occasionally on the third spine), except for faded specimens like that illustrated by Fricke (1983: fig. 123), while *C. persicus izuensis* lacks these dark blotches, but possesses a distal black blotch each on second and third spines), and the pectoral fin size (see Table 2). Otherwise, the Izu Islands population turned out to be so similar to Persian Gulf materials that it is given a subspecific status in the present paper.

The new subspecies differs from other members of the *japonicus*-group, especially from *Callionymus japonicus japonicus* Houttuyn, 1782 (312–314, Japan; Fricke, 1983: 380–392, figs. 114–115, Japan and Korea to Papua New Guinea and Australia), in the absence of filaments in the male's first dorsal fin (filaments present in *C. japonicus* and several other species), by the elongate caudal fin with only the median two rays extremely elongate (4–6 rays extremely elongate in *C. japonicus* and some other species), the low number of dorsal serrae on the preopercular spine (6–13 in *C. japonicus*), and the presence of lines on the male's throat and membrane connecting pelvic and pectoral fins (absent in *C. japonicus* and several other species). It differs from the South Japanese *C. variegatus* by its symmetrical caudal fin (asymmetrical in males of *C. variegatus*), and the second dorsal and anal ray numbers (*C.*

Table 2. Characters distinguishing the two subspecies of *Callionymus persicus* Regan, 1906

Characters	*C. persicus persicus*	*C. persicus izuensis* subsp. nov.
D_1 coloration in males (fresh specimens)	Distal parts of 1st and 2nd membranes densely covered with dark brown blotches and lines (also 1 blackish blotch distally on 2nd spine, and occasionally another blackish blotch on third spine)	Distal part of 1st and 2nd membranes light, without dark brown blotches, but with 2–3 faint lines (also 2 blackish blotches distally on 2nd and 3rd spines)
D_1 coloration in females	3rd and 4th membranes light, with many round dark brown blotches, but without white spots	3rd and 4th membranes plain dark gray, without dark brown blotches, but with a few white spots
P_1 reaching to base of...	2nd A membrane	3rd A membrane
Caudal fin in males	Median 4 rays extremely elongate	Median 2 rays extremely elongate

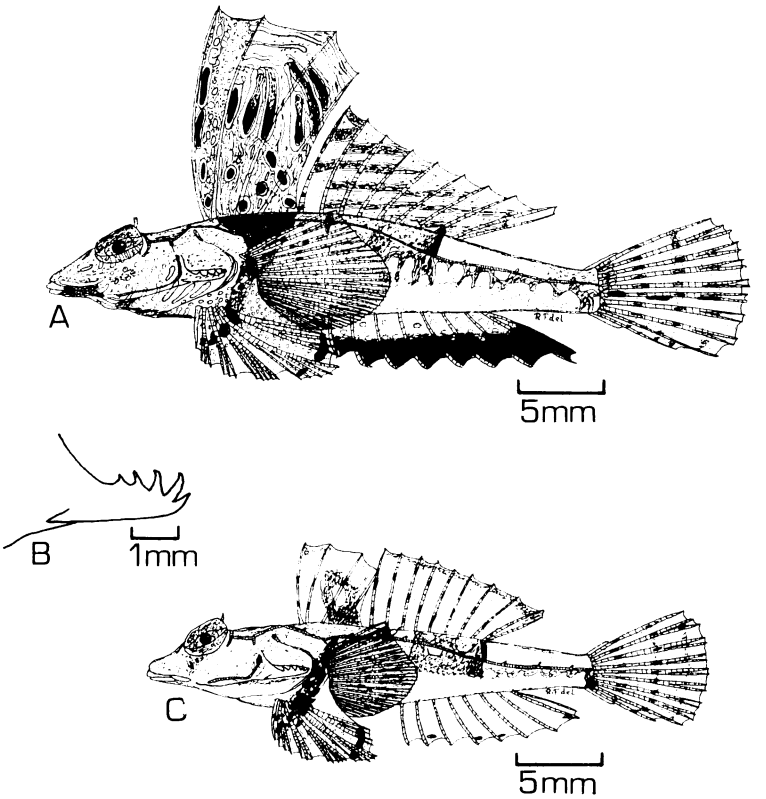

Fig. 3. *Callionymus corallinus* Gilbert, 1905, NSMT-P 35127 (TMBS 830826-2), male, 32.3 mm SL, Miyake-jima, Japan. A) Lateral view; B) left preopercular spine; NSMT-P 35131 (TMBS 830911-2), female, 26.0 mm SL, Miyake-jima, Japan; C) lateral view.

variegatus: D_2 with 8 rays, A with 7 rays).

Remarks. *Callionymus persicus izuensis* subsp. nov. is a surprising finding of a species which was supposed to occur exclusively in the Indian Ocean. It lives on the same coarse sand habitat as *Callionymus curvispinis* sp. nov., the endemic new species described above. The coarse sand habitat is characteristic for the Izu Islands, consisting of volcanic materials.

The new subspecies would belong to the genus *Calliurichthys* Jordan and Fowler, 1903 in the system published by Nakabo (1982). In the present paper, the alternative system of Fricke (1983) is used, where that genus equals the *japonicus*-group of the subgenus *Callionymus* (*Calliurichthys*). The reason is explained in the remarks section of *Callionymus curvispinis.*

Callionymus corallinus Gilbert, 1905
(Japanese name: Sango-hanabi-numeri)
(Fig. 3)

Callionymus corallinus Gilbert, 1905: 649–650, fig. 251 (Avau Channel between Maui and Lanai Islands, Hawaiian Islands; 32–37 fms [58–68 m]). Jordan and Seale, 1906: 415 (Hawaii; after Gilbert). Fowler, 1928: 423 (after Gilbert). Fowler, 1938: 299 (after Gilbert).

Callionymus (*Callionymus*) *corallinus*: Fricke, 1983: 742–745, fig. A1 (Oahu, Makua, Hawaiian Islands, 27 m depth).

Synchiropus (*Synchiropus*) *kiyoae* (part): Fricke and Zaiser, 1983: 122 (Hachijo-jima, Japan).

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

Material examined (total 30 specimens). Igaya Bay, Miyake-jima, Izu Islands, Japan, 34°05′N 139°32′E:

NSMT-P 35124 (TMBS 810726-1), 1 female, 14.8 mm SL, 12 m, M. J. Zaiser and A. Gronell, 26 July 1981; NSMT-P 35125–35126 (TMBS 830825-1/2/4/5), 2 males (23.5–26.2 mm SL) and 2 females (18.7–20.8 mm SL), 16 m, M. J. Zaiser and J. T. Moyer, 25 Aug. 1983; NSMT-P 35127 (TMBS 830826-2), 1 male, 32.3 mm SL, 15 m, M. J. Zaiser and J. T. Moyer, 26 Aug. 1983; NSMT-P 35128–35129 (TMBS 840907-1/2/3), 1 male (34.4 mm SL) and 2 females (28.2–33.8 mm SL), 18 m, J. T. Moyer and M. Sano, 7 Sept. 1984; NSMT-P 35130 (TMBS 830910-4), 1 female, 17.7 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 10 Sept. 1983; NSMT-P 35131–35132 (TMBS 830911-1/2/3), 1 male (24.0 mm SL) and 2 females (22.0–26.0 mm SL), 16 m, M. J. Zaiser and J. T. Moyer, 11 Sept. 1983; NSMT-P 35133 (TMBS 830918-2/3), 2 females (20.4–23.2 mm SL), 16 m, M. J. Zaiser and J. T. Moyer, 18 Sept. 1983; NSMT-P 35135 (TMBS 831001-1/2), 2 males, 23.2–24.2 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 1 Oct. 1983; NSMT-P 35134, 35136 (TMBS 840818-3/4/6/7), 3 males (33.8–37.1 mm SL) and 1 female (30.0 mm SL), 16 m, M. J. Zaiser and J. T. Moyer, 18 Aug. 1984; SMNS 12080, 1 female, 23.7 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 1 Oct. 1983; SMNS 12081, 1 male, 31.0 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 25 Aug. 1983; SMNS 12082, 1 female, 20.8 mm SL, 16 m, M. J. Zaiser and J. T. Moyer, 25 Aug. 1983; SMNS 12083, 1 male, 28.8 mm SL, 16 m, M. J. Zaiser, 24 Aug. 1983. Hawaiian Islands: BPBM 22584, 1 female, 28.0 mm SL, Oahu, Makua, 90 feet (27 m), E. H. Chave, Jan. 1977; NSMT-P 35138, 1 male (15.4 mm SL) and 1 female (20.7 mm SL), Oahu, Lahi-lahi Point, 21°28′N 158°13′W, J. T. Moyer and B. Carlson, 9 Nov. 1984; SMNS 12084, 1 male, 27.2 mm SL, same data as NSMT-P 35138; USNM 51581 holotype, female, 40 mm SL, Avau Channel between Maui and Lanai Islands, 32–37 fms (58–68 m). New Caledonia: SMNS 12270, 1 female, 20.8 mm SL, 40 km SSE Nouméa, 22°31′S 166°29.7′E, 22 m, R/V "Vauban" St. DW 83, 21 Aug. 1984.

Diagnosis. A *Callionymus* of the subgenus *Callionymus* with 4 spines in the first dorsal fin, 9(9–10) second dorsal rays, 8 anal rays, a preopercular spine formula of $1\frac{4-5}{-}1$, 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.

Description. D_1 IV; D_2 viii, 1(viii–ix, 1) or v, 4 or vi, 3 or vii, 2 [total 9(9–10)]; A vii, 1; P_1 i–ii, 14–18, ii–iii (total 19–21); P_2 I, 5; C (i), i, 7, ii, (i). Vertebrae 7 + 14.

Body elongate and slightly depressed. Head slightly depressed, 3.0–3.6 in SL. Eye with a short supraorbital tentacle; eye diameter 2.3–3.0 in head. Preorbital length 2.9–3.5 in head. Interorbital distance 10–23 in head. Maxillary length 2.9–3.3 in head. Preopercular spine length 2.8–4.1 in head. Preopercular spine formula $1\frac{4-5}{-}1$ (Fig. 3B). Body depth 5.0–7.2 in SL. Body width 5.3–6.1 in SL. Urogenital papilla length in males 15–56 in head, 49 or more in head or not visible in females. Caudal peduncle length 4.8–6.8 in SL. Caudal peduncle depth 12.9–18.4 in SL. Maximum observed SL 37.1 mm (male), 33.9 mm (female).

First dorsal fin high in the male, without filaments; first spine 2.4–5.0 in SL, 2nd spine 2.4–5.1 in SL, 3rd spine 2.6–5.4 in SL, 4th spine 2.9–6.7 in SL; in the female lower, 1st spine 5.3–6.3 in SL, 2nd spine 5.3–5.4 in SL, 3rd spine 5.8–6.1 in SL, 4th spine 6.1–9.7 in SL. Predorsal (1) length 2.6–3.7 in SL. Second dorsal fin rays unbranched, the last divided at its base; the 5th to 8th rays may be branched in large specimens. First ray of second dorsal fin in the male 4.5–5.8 in SL, last ray 5.0–7.4 in SL; 1st ray in the female 5.3–7.3 in SL, last ray 6.7–8.8 in SL. Predorsal (2) length 1.8–2.2 in SL. Anal fin beginning on a vertical through 2nd membrane of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray in the male 8.9–13.2 in SL, last ray 5.0–8.5 in SL; 1st ray in the female 9.4–13.1 in SL, last ray 6.0–7.9 in SL. Preanal fin length 1.7–2.1 in SL. Pectoral fin reaching to 2nd or 3rd anal fin membrane when laid back. Pectoral fin length 3.8–5.2 in SL. Prepectoral fin length 2.4–2.7 in SL. Pelvic fin reaching to anus or 1st anal fin membrane when laid back. Pelvic fin spine 8.5–17.4 in SL; pelvic fin length 3.0–4.0 in SL. Prepelvic fin length 3.3–3.8 in SL. Caudal fin distally slightly convex; caudal fin length 3.4–4.1 in SL.

Color in life (based on Miyake-jima specimens).—Head and body dorsally brown, laterally red, ventrally white. Sides of head in the male with blue spots and lines. Body sides with numerous white blotches. Back dorsally with 3 dark brown saddles. First dorsal fin in males yellow, with vertical dark olive lines ocellate with blue; in females whitish, with yellow marblings, third and fourth membranes with dark olive. Second dorsal and caudal fins in males with horizontal dark olive lines surrounded with blue spots, fin distally yellow; in females dark olive, rays with blue spots. Anal fin in males basally whitish, the distal three fourths black, rays blue; in females translucent. Pectoral fin translucent, in males with basal orange spots. Pelvic fin whitish, basally and distally with dark olive spots, in the males basally also with small bluish white ocelli.

Color in alcohol.—Similar to life coloration, except that bluish colors fade to white, yellow changes to light brown, and the red fades to brown.

Sexual dimorphism.—Males have a much higher first dorsal fin than females, a longer urogenital papilla, and a different color pattern of the vertical fins, the pelvic fins and the head.

Distribution. West and Central Pacific; known from the Hawaiian Islands, the Izu Islands of Japan and New Caledonia (new locality record), 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 and 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.

In early 1984, a number of specimens from a coral rubble habitat of Miyake-jima, Izu Islands, Japan was brought to the first author's attention, including several males. The species was thought to be *Callionymus corallinus*, but the authors could not be sure without having seen males from the Hawaiian Islands. In a visit to Oahu later that year, Jack Moyer searched for the species in a habitat similar to that at Miyake-jima, and immediately succeeded in collecting specimens of *C. corallinus*, including two males. The Miyake-jima population turned out to belong to *C. corallinus.*

Also in 1984, a single female of *Callionymus corallinus* was collected in New Caledonia, proving that the species is widespread in the West and Central Pacific.

Callionymus beniteguri Jordan et Snyder, 1900
(Japanese name: Tobi-numeri)

Callionymus beniteguri Jordan and Snyder, 1900: 370–371, pl. 17 (Tokyo Bay). Jordan and Fowler, 1903: 956–957 (Tokyo, Misaki, Otaru, Wakanoura, Kobe, Hakodate, Aomori, Hiroshima, Nagasaki, Matsushima Bay/Japan). Ochiai, Araga and Nakajima, 1955: 123–126, figs. 16–17 (Owase, Miyagi Prefecture, Akita Prefecture, Osaka, Aichi Prefecture, Maizuru, Hokkaido Province/Japan). Fricke, 1983: 81–86, figs. 19–20 (around Japan, Korea, and China, south to Hong Kong).

Repomucenus beniteguri: Nakabo, 1983a: 238–239, fig. 20 (Japan).

Material examined. Additional to that described in Fricke, 1983: NSMT-P 35137 (TMBS 730728-15), 1 female, 51.9 mm SL, Okubo, Miyake-jima, J. T. Moyer, H. Ida and D. Meyer, 28 July 1973.

Distribution. This is the first record of *Callionymus beniteguri* from the Izu Islands. The record is not surprising, however, as the species occurs along the east coast of Japan north and south of Tokyo Bay.

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三宅島からのネズッポ類2新(亜)種とサンゴハナビヌメリの記載

Ronald Fricke・Martha Zaiser Brownell

新種 *Callionymus curvispinis*（チビヌメリ）は前鰓蓋骨棘の先端が上方に曲がり，棘の背縁に 5–6 本の小突起があること，第 2 背鰭条（8 本）と臀鰭条（7 本）が少ないこと，雄の第 1 背鰭条が糸状でなく，尾鰭の形が上下に不相称であるなどの諸特徴を備える．最大の体長は雄で 45.3 mm，雌で 31.9 mm である．

新亜種 *Callionymus persicus izuensis*（イズヌメリ）は前鰓蓋骨棘の先端が真直で曲がらず，背面に 3–6 本の小突起があること，第 2 背鰭条が 9 本，臀鰭条が 8 本であることなどの特徴を持つ．*C. persicus persicus* Regan とは胸鰭条が臀鰭第 3 膜に達すること（*C. p. persicus* では第 2 膜に達する），雄では尾鰭の中央 2 軟条が特別に長く延びること（*C. p. persicus* では中央の 4 軟条が特に延長する）などで区別される．

なお，サンゴハナビヌメリ *C. corallinus* Gilbert を三宅島と New Caledonia からの標本も加えて再記載し，トビヌメリ *C. beniteguri* Jordan et Snyder を伊豆海域から初めて記録した．