

Two new species and three new records of gobiid fishes from the Marshall Islands

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Abstract—The new gobiid fish *Eviota partimacula* is described from 10 specimens, 7.0–17.9 mm SL, from Majuro Atoll, Marshall Islands, collected from silty sand at the edge of a dense bed of *Halimeda* at depths of 7–23 m. Specimens were also collected from Palau but not regarded as paratypes due to slight difference in life color. The species is most similar to *E. lachdeberi* (Giltay), differing in having a longer snout, modally 15 instead of 14 pectoral rays, and in color. A second new goby, *Silhouettea capitlineta*, is described from five specimens, 12.2–21.4 mm SL from Marshall Islands lagoons on open sand bottom from 2–7 m. It is distinct in having four large scales on the chest, body depth 5.05–5.9 in SL, small eye, short first dorsal fin, and four dark lines extending ventrally from the eye. Also reported as first records of gobiid fishes for the Marshall Islands: *Eviota cometae* Jewett & Lachner, *Exyrias akihito* Allen & Randall, and *Vanderhorstia dorsomacula* Randall.

Introduction

The publication of the three volumes of *Fishes of the Marshall and Marianas Islands* by Leonard P. Schultz and collaborators (1953, 1960, 1966) changed the fish fauna of the Marshall Islands from one of the poorest known of the archipelagoes of the Pacific to one of the best known. Over 50,000 specimens of fishes were collected from the northern atolls (mainly Enewetak and Bikini) and more than 15,000 from southern atolls. Most of these fishes were collected in 1946 and 1947 as preliminary to and following the atom bomb tests of Operation Crossroads. The majority of the specimens were deposited in the U.S. National Museum of Natural History in Washington, D.C. One family was not included in Schultz and collaborators, the Gobiidae. It was to be reported by Ernest A. Lachner and Christine Baer, but their manuscript was never completed. Ichthyological field research continued in the Marshall Islands, largely as a result of the establishment of the Mid-Pacific Research Laboratory on Enewetak Atoll in 1954, which continued to 1987 (Helfrich & Ray in Devaney et al., 1987). Also of importance, the field work of resident scuba divers at Kwajalein Atoll and the development of scuba diving facilities at Majuro Atoll.

Randall (1986) reported 106 new records of fishes from the Marshall Islands, none of which were gobies. Randall & Randall in Devaney et al. (1987) published a checklist of 817 species of fishes of the Marshall Islands, which included a preliminary list of 80 gobies provided by E.A. Lachner and C. Baer. Fifteen of the gobies were listed only as undescribed species in the genera *Callogobius*, *Ctenogobiops*, *Eviota*, *Heteroleotris*, *Silhouettea*, *Trimma*, *Valenciennea*, and *Vanderhorstia*. The checklist was restricted to shore fishes (to 200 m). It was noted that there had not been adequate sampling of the deeper water fishes of the archipelago.

Winterbottom (1996) described *Trimma benjamini* from many western Pacific Islands, the most eastern from the Marshall Islands based on nontype material from the Bishop Museum.

In the third edition of his book *Micronesian Reef Fishes*, Myers (1999) included the Marshall Islands in the distribution of the gobiid fishes *Eviota albolineata* Jewett & Lachner, *Trimma caesiura* Jordan & Seale, *Trimmatom eviotops* (Schultz), and *Valenciennea parva* Hoese & Larson. He also included *Heteroleotris* sp. A., but this was based on the record in Randall & Randall (in Devaney et al. 1987) as *Heteroleotris* sp. (Robert F. Myers, pers. comm.). No specimens of this genus from the Marshall Islands could be found in the collections of the Bishop Museum, California Academy of Sciences, or the National Museum of Natural History, so the material of *Heteroleotris* sp. in the checklist by Randall & Randall was either lost or misidentified.

Randall et al. (2003) reported *Ctenogobiops feroculus* Lubbock & Polunin, *C. pomastictus* Lubbock & Polunin, and *C. tangaroai* Lubbock & Polunin as records for the Marshall Islands.

Randall et al. (2005) added 91 additional records of fishes for the Marshall Islands, 18 of which are gobies. They listed the following six gobiid genera with undescribed species from the islands: *Callogobius*, *Ctenogobiops*, *Exyrias*, *Trimma*, *Tryssogobius*, and *Vanderhorstia*.

Randall et al. (2007) described *Ctenogobiops mitodes* from the South China Sea (type locality) and the atolls of Enewetak and Majuro in the Marshall Islands, with records from Flores, New Caledonia, and Fiji based on underwater photographs. This is the species Randall et al. (2005) mistakenly identified as *C. pomastictus*.

Trimma flavatrum and *T. hayashii* were described by Hagiwara and Winterbottom (2007), mainly from western Pacific localities. Bishop Museum specimens provided the record of each of these gobies for the Marshall Islands.

Richard Winterbottom (pers. comm.) has specimens of another undescribed species of *Trimma* from the Marshall Islands, as well as ones currently identified as *T. okinawae* (Aoyagi), and *T. tevegae* Cohen & Davis; however, he stated that these two nominal species are complexes that need further study.

The species of *Callogobius* and *Tryssogobius* from the Marshall Islands remain undescribed. The genus *Callogobius* is under study by Naomi Delventhal,

and new species of *Tryssogobius* are being described by Koichi Shibukawa and coauthors.

A new species in each of the genera *Eviota* and *Silhouettea* are described in the present paper, and new records are given for *Eviota cometa* Jewett & Lachner, *Exyrias akihito* Allen & Randall, and *Vanderhorstia dorsomacula* Randall for the Marshall Islands.

Materials and Methods

Type specimens of the new species are deposited in the Bernice P. Bishop Museum, Honolulu (BPBM); the Natural History Museum, London (BMNH); and the U. S. National Museum of Natural History, Washington, D.C. (USNM). Loans of specimens were obtained from the California Academy of Sciences, San Francisco (CAS) and the Royal Ontario Museum, Toronto (ROM).

Lengths of specimens are given as standard length (SL), measured from the median anterior point of the upper lip to the base of the caudal fin (posterior end of the hypural plate); body depth is measured at both the origin of pelvic fins and the origin of the anal fin, and body width at the axil of the pectoral fins (as viewed from the ventral side); head length is taken from the median anterior point of the upper lip to the posterior end of the opercular membrane, and head width over the posterior margin of the preopercle; orbit diameter is the greatest fleshy diameter, and interorbital width the least fleshy width; snout length is measured from the median anterior point of the upper lip to the nearest fleshy edge of the orbit; upper-jaw length from the same anterior point to the posterior end of the maxilla; cheek depth is the least depth perpendicular from the ventral edge of the suborbital to the fleshy edge of the orbit; caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of spines and rays are measured to their extreme bases; caudal- and pectoral-fin lengths are the length of the longest ray; pelvic-fin length is measured from the base of the pelvic spine to the tip of the longest pelvic soft ray. Morphometric data presented in Tables 1 and 2 are given as percentages of the standard length. Proportional measurements in the text are rounded to the nearest 0.05. Data in the description in parentheses refer to paratypes.

The diagnosis given for the new records of gobiid fishes is based on Marshall Islands specimens.

Eviota partimacula, new species

Figures. 1, 2; Table 1

Eviota lachdeberiei (non Giltay) Lachner & Karnella (in part) 1980: 105 (Chuuk, Caroline Islands).

Table 1. Proportional measurements of type specimens of *Eviota partimacula* as percentages of the standard length

	Holotype		Paratypes			
	BPBM 39648	BPBM 40877	BMNH 07.5.4.1	BPBM 40877	USNM 389929	BPBM 39663
Standard length (mm)	13.0	12.8	13.7	14.8	14.9	17.9
Sex	male	female	female	male	male	female
Body depth (at P ₂ origin)	23.0	23.4	22.1	23.8	22.8	22.4
Body depth (at A origin)	22.2	21.8	20.4	20.6	20.5	19.5
Body width	12.3	12.5	11.9	12.1	12.8	12.4
Head length	38.4	37.3	37.5	38.2	37.5	37.4
Head width	16.1	16.0	15.7	17.2	15.4	15.2
Snout length	10.5	10.2	10.9	10.3	10.7	10.2
Orbit diameter	10.8	10.8	10.7	10.3	10.2	9.9
Interorbital width	3.0	2.7	3.3	3.4	3.3	2.7
Cheek depth	2.8	2.8	3.3	2.9	3.2	3.0
Upper-jaw length	14.5	14.0	15.3	14.6	14.1	14.5
Caudal-peduncle depth	13.8	10.2	13.2	13.7	13.5	11.3
Caudal-peduncle length	24.3	24.5	25.5	25.3	25.2	23.1
Predorsal length	39.9	40.5	40.1	40.6	39.8	38.9
Preanal length	61.3	63.3	62.8	62.0	61.7	61.4
Prepelvic length	34.6	34.1	35.2	33.8	33.6	34.9
Base of dorsal fins	40.0	40.2	38.4	38.0	38.2	39.2
First dorsal spine	broken	29.0	38.3	25.7	23.5	broken
Second dorsal spine	31.4	28.1	34.8	21.9	21.7	broken
Spine of second dorsal fin	16.1	16.3	16.7	17.6	17.1	17.5
Longest dorsal ray	19.6	19.5	19.0	19.3	19.5	22.0
Base of anal fin	15.3	14.9	15.7	14.7	14.2	14.5
Anal spine	14.4	14.6	14.5	13.9	14.7	14.0
Longest anal ray	19.3	19.8	20.5	20.2	20.2	22.1
Caudal-fin length	30.8	31.1	31.2	30.4	29.4	28.0
Pectoral-fin length	34.2	35.1	35.0	33.1	33.5	34.1
Pelvic-spine length	13.4	12.5	11.6	11.7	12.8	11.8
Pelvic-fin length	38.3	39.2	37.8	33.5	33.6	37.5

HOLOTYPE: BPBM 39648, male, 13.0 mm, Marshall Islands, Majuro Atoll, Uliga Island, lagoon side, 7°6'33.2"N, 171°22'7.1"E, *Halimeda* bed overgrown by cyanobacteria, adjacent to silty sand, 7 m, rotenone, J. E. Randall and B. D. Greene, 7 January 2005.

PARATYPES: BMNH 2007.5.4.1, 13.7 mm, BPBM 40877, 4: 7.0–14.8 mm, USNM 389929, 14.9 mm, all with same data as holotype; BPBM 39663, 3: 10.5–17.9 mm, same locality as holotype, but depth 24 m, *Halimeda* bed, rotenone, J. E. Randall and B. D. Greene, 9 January 2005.



Figures 1–3. Fig. 1. Underwater photograph of holotype of *Eviota partimacula*, BPBM 39648, male, 13.0 mm SL, Majuro Atoll (J. E. Randall). Fig. 2. Nontype specimen of *Eviota partimacula*, ROM 81729, 18.7 mm SL, Palau (R. Winterbottom). Fig. 3. Underwater photograph of *Eviota lachdeberiei*, Palau (J. E. Randall).

NONTYPE SPECIMENS: BPBM 40520, 15.2 mm, Palau, Koror, east side, off T pier, 3–10 m, rotenone, J.E. Randall, 5 July 1986 (collected with 29 specimens of *E. lachdeberiei*, BPBM 31379); ROM 81731, 2: 15.0–15.4 mm, Palau, Babeldaob, west coast, 7°29'20.3"N, 134°28'3.0"W, coral reef (*Porites*, *Goniopora*), 9.1–15.2 m, rotenone, R. and D. Winterbottom, B. Hubley, and A. Bauman, 19 May 2004; ROM 81729, 3: 8.2–18.7 mm, Palau, Babeldaob, west coast, 7°33'2.2"N, 134°30'30.7"W, dead coral and rubble, 2–12 m, rotenone, R. and M. Winterbottom, M. Westneat, J. Cooper, and A. Rice, 25 March 2006; ROM 81730, 14: 5.3–17.5 mm, Palau, southeast of channel between Garreru and Babeldaob, 7°20'30.7"N, 134°31'49.8"W, 70° reef slope, mostly coral rubble, 10.7–16.2 m, rotenone, R. and M. Winterbottom, W. Holleman, J. Dendy, and M. Mesubed, 16 April 2006.

DIAGNOSIS: Dorsal rays VI + I; anal rays I,7; pectoral rays 13–15, unbranched; maximum body depth 4.2–4.15 in SL; snout long, 3.45–3.75 in head length; dorsal profile of snout forming an angle of about 30° to horizontal axis of body; cephalic sensory pore system lacking supraotic and intertemporal pores; body pale with a broad dusky stripe passing posteriorly from base of pectoral fin, ending in a vertically oval black spot on base of caudal fin, the spot about half height of fin base and partially divided by a pale dash; a thin black line from upper end of gill opening to basicaudal black spot; no blackish spot dorsally at base of pectoral fin; one or two small pale blue spots on abdomen in life, and a triangular red spot above and below basicaudal black spot. Largest specimen, 18.7 mm SL.

DESCRIPTION: Dorsal rays VI + I,8; anal rays I,7; dorsal and anal soft rays branched except first, the last ray branched to base; pectoral rays 14 (13–15; six counts of 13, nine with 14, and one with 15), none branched; pelvic rays I,5, the first three soft rays typically with two branches and the long fourth ray with one; slender fifth ray unbranched, only 30–40% length of fourth ray; pelvic fins joined by membrane only at extreme base; no pelvic frenum; segmented caudal rays 16; branched caudal rays of adults 11 (10–12); upper and lower procurrent caudal rays 4 (4–5); scales in longitudinal series 24 (24–25); transverse scale rows 7; circumpeduncular scales 12; gill rakers 2 + 10 (one count, largest paratype); branchiostegal rays 5; vertebrae 26; dorsal pterygiophore formula 3-22110 (Fig. 1A of Birdsong et al., 1988).

Maximum body depth (at origin of pelvic fins) 4.35 (4.2–4.55) in SL; body very compressed, the width 1.85 (1.7–1.8) in body depth; head length 2.6 (2.55–2.7) in SL; head width 2.4 (2.2–2.45) in head length; snout long, the length 3.65 (3.45–3.75) in head length; dorsal profile of snout forming an angle of 30° to horizontal axis of body; orbit diameter 3.55 (3.45–3.8) in head length; interorbital space narrow, the least width 12.8 (10.4–13.9) in head length; cheek depth 13.7 (11.4–13.3) in head length; caudal-peduncle depth 2.8 (2.85–3.65) in head length; caudal-peduncle length 4.1 (3.9–4.35) in SL.

Mouth oblique, forming an angle of about 40° to horizontal axis of body, the lower jaw projecting; mouth large, the maxilla extending to between verticals at anterior edge of orbit and slightly posterior to anterior edge of pupil, the upper-jaw length 2.65 (2.45–2.65) in head length; each side of upper jaw with an outer row of well-spaced, slender, incurved canine teeth, the longest about half way to end of jaw, and an inner band of 3 rows of small slender incurved teeth at front of jaw, the innermost teeth a little larger, narrowing to a single row along side of jaw; each side of front of lower jaw with an outer row of 4 or 5 slender incurved canine teeth, becoming longer laterally, a middle band of small teeth in two to three rows, and an inner row of longer slender teeth that continue well-spaced along side of jaw medial to a row of small teeth; no mental flap; no barbels on chin.

Gill opening extending forward to a vertical slightly anterior to posterior edge of preopercle; gill membranes attached anteriorly to isthmus, without a free fold; gill filaments short and lobular; gill rakers very short.

Posterior nostril a small aperture with a slight rim at level of dorsal edge of pupil more than half distance to upper lip; anterior nostril a slender tubule, its base near edge of groove above upper lip, the tubule overlapping half of upper lip, its length nearly equal to internarial distance; cephalic sensory pores include the paired nasal pores, four pores forming a square in mid-interorbital space (in some specimens one very large pore with the four smaller pores); paired supraotic pores, paired anterior otic pores, and upper and lower preopercular pores (terminology following Lachner & Karnella, 1980); sensory papillae similar to that illustrated for *Trimma grammistes* in Masuda et al. (1984: fig. 59), with an irregular row of papillae above upper lip, curving around posterior end of maxilla; a short horizontal row of prominent papilla below eye meeting at near right-angles with two rows descending from posterior part of eye; three irregular rows of papillae extending posteriorly from upper half of eye, the uppermost passing posteriorly above operculum to meet with short vertical rows above pectoral-fin base; middle row posterior to eye curving downward, passing posterior and parallel to edge of preopercle, and bifurcating ventrally; a row of papillae along posterior margin of preopercle, and a short horizontal one ending in middle of opercle at level of lower edge of pupil.

Scales on body progressively smaller anteriorly; scales finely ctenoid, becoming cycloid on chest; no scales on head, nape, or pectoral-fin base; no scales on fins except a vertical row of large scales on base of caudal fin.

Origin of first dorsal fin above base of pectoral fins, the predorsal length 2.5 (2.45–2.55) in SL; dorsal spines slender and flexible; first or second dorsal spines longest (first spine broken in holotype), 3.2 (2.6–4.6) in SL (longer in females than males; first two spines of largest female paratype extended beyond base of anal fin, but were broken before they could be measured); last membrane of first dorsal fin reaching origin of second dorsal fin; spine of second dorsal fin 2.4 (2.15–2.3) in head length; longest dorsal soft ray 1.95 (1.7–2.0) in head length; origin of anal fin below base of second or third dorsal soft rays, the preanal

length 1.65 (1.6–1.65) in SL; anal spine 2.65 (2.55–2.75) in head length; longest anal soft ray 2.0 (1.7–1.95) in head length; caudal fin rounded, 3.25 (3.2–3.55) in SL; base of pectoral fins beneath posterior end of opercular flap; eighth pectoral ray usually longest, reaching to below base of fourth to sixth dorsal soft rays, 2.9 (2.85–3.0) in SL; origin of pelvic fins below pectoral-fin base, the prepelvic length 2.9 (2.85–3.0) in SL; pelvic spine 2.85 (2.95–3.2) in head length; fifth pelvic ray longest, reaching or extending posterior to origin of anal fin, 2.6 (2.55–3.0) in SL; genital papilla of male as long as pupil diameter, compressed fore and aft, finely fimbriate, with an angular lobe at each side of tip.

Color of holotype in alcohol: pale yellowish, the scale edges narrowly dark brown, with a broad dusky stripe passing posteriorly from upper two-fifths of eye (darkest behind upper part of eye), ending in a vertically oval black spot on base of caudal fin, the spot about half height of fin base and partially divided by a pale dash; a thin black line from upper end of gill opening to basicaudal black spot; a triangular dusky spot on side of snout, the narrow anterior part enclosing anterior nostril; a narrow dark streak dorsally on upper lip and ventrally on lower lip; no blackish spot dorsally at base of pectoral fin; second dorsal and anal fins with dusky membranes and clear spines and rays; remaining fins similar but less pigmented; a dark brown spot at base of each spine of first dorsal fin; similar but less distinct spots at base of spines and rays of second dorsal and anal fins.

Color of holotype in life shown in Fig. 2; noteworthy are two pale blue spots on abdomen and a triangular red spot above and below the black basicaudal spot.

ETYMOLOGY: This species is named *Eviota partimacula* from the Latin *partio* for divide and *macula* for spot, in reference to the large black spot on the base of the caudal fin that is nearly divided by a midlateral pale dash.

REMARKS: When first photographed and collected at Majuro Atoll in the Marshall Islands, *Eviota partimacula* was identified as *E. lachdeberiei* (Giltay), type locality Banda Neira and Gunung Api in the Banda Sea, and reported by Lachner & Karnella (1980) from Kabaena Island (Sulawesi), Papua New Guinea, Palau, Guam, and Truk (now Chuuk). Comparison of Majuro specimens with ones of *E. lachdeberiei* from Palau revealed species-level differences. *Eviota lachdeberiei* has a shorter snout with a steeper dorsal profile; the snout length of 10 specimens from Palau (BPBM 31379, 11.2–16.9 mm SL) ranged from 7.9–8.9% SL, compared to 10.2–10.9% SL for *E. partimacula*. It also has a deeper body at the pelvic-fin origin, 24.1–26.4% SL, compared to 22.1–23.8% SL for *E. partimacula*, and modally 14 instead of 15 pectoral rays. The most obvious color difference is the shape of the black spot on the base of the caudal fin. It is nearly square in *E. lachdeberiei* or with the upper and lower edge indented for the adjacent round red spot (translucent in preservative). The spot is vertically oval in *E. partimacula*, and the red spots in life, one above and one below, are triangular and angle anteriorly (but leave no trace as pale spots in the preserved specimens). In addition, *E. partimacula* lacks the elongate blackish spot on the

upper half of the pectoral-fin base that is well formed on *E. lachdeberiei*, and it lacks a pair of small dark spots on the isthmus that can be seen on the smaller specimens of *E. lachdeberiei*.

One of 30 specimens of BPBM 31379 from Palau labeled as *E. lachdeberiei* proved to be *E. partimacula*. Richard Winterbottom of the Royal Ontario Museum was asked if he had any specimens of *E. partimacula* from Palau, and he sent three lots on loan, along with a photograph which we reproduce here as Fig. 2. All were collected with a majority of *E. lachdeberiei*. Although these specimens match the Majuro ones in counts and measurements, there are some differences in color, so they are not designated as paratypes.

An underwater photograph of *Eviota lachdeberiei* from Palau is shown in Fig. 3. The underwater photograph of this species in Myers (1999: pl. 159 L) was taken in Guam (R.F. Myers, pers. comm.), thus its presence in the Mariana Islands is confirmed. The six specimens from Guam, UG 5346, reported by Lachner & Karnella (1980: 105) as *E. lachdeberiei* are missing from the collection of the University of Guam (T. Donaldson, pers. comm.).

COMPARATIVE MATERIAL OF *EVIOTA LACHDEBEREI*: PALAU: Koror, BPBM 31369, 17 mm; BPBM 31379, 29: 8.5–18 mm; CAS 43735, 4: 13.4–19.6 mm; CAS 54743: 6.0–17.2 mm. Malakal, BPBM 37677, 6: 7.8–14.4 mm. Babelthuap, CAS 43779, 92: 5.8–17.5 mm. Kaibakko, CAS 43782, 3: 9.0–15.6 mm. Sanryo, CAS 43790, 1: 12.9 mm; CAS 54756, 48: 5.9–20.2 mm. Ngarahelngael Pass, CAS 43776, 19.3 mm. CAROLINE ISLANDS: Kosrae, BPBM 28229, 15 mm. PAPUA NEW GUINEA: Madang Province, BPBM 32589, 12 mm.

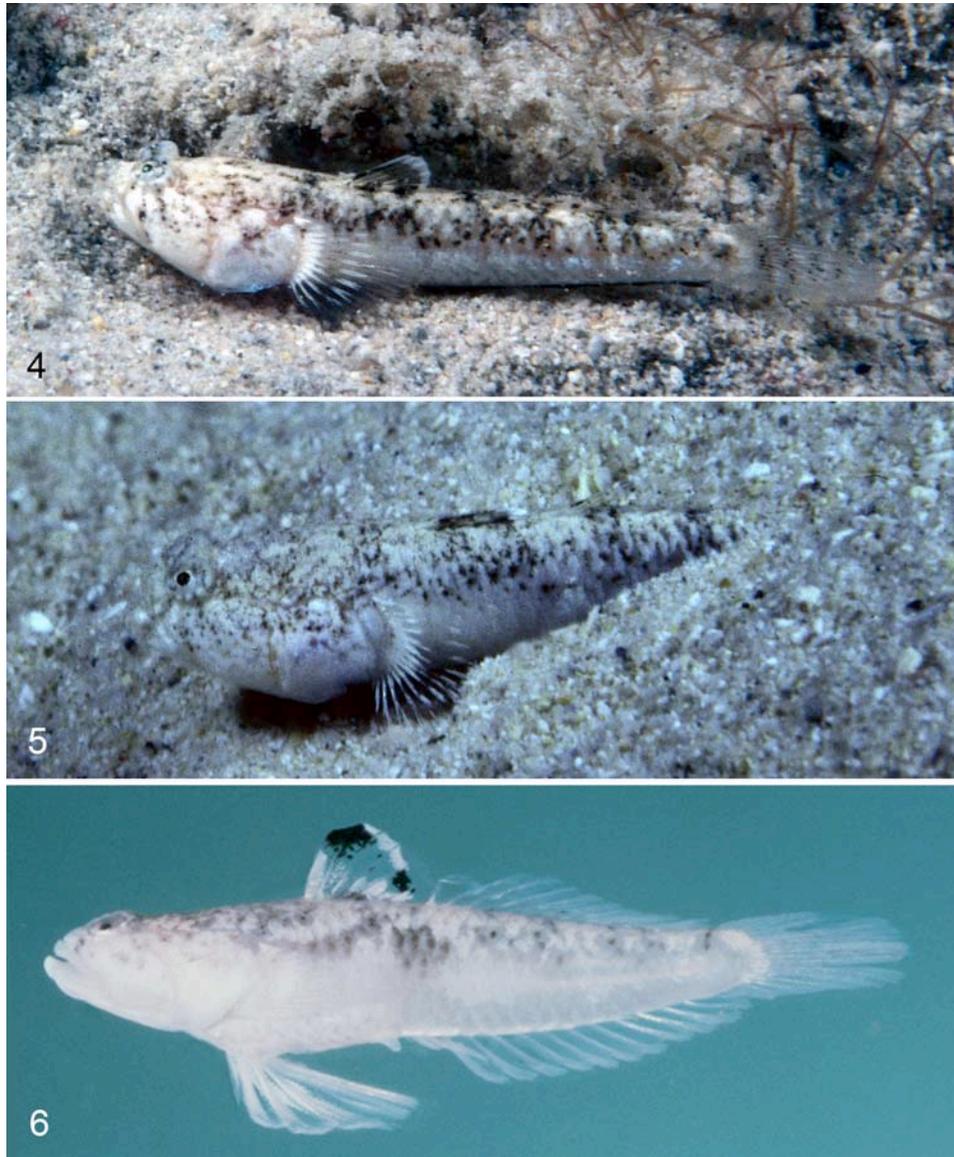
***Silhouettea capitlineata*, new species**

(Figures. 4–6; Table 2)

HOLOTYPE: BPBM 39679, female, 21.4 mm, Marshall Islands, Majuro Atoll, Uliga Island, lagoon side, 7°6'33.2"N, 171°22'7.1"E, silty sand, 7 m, rotenone, J.E. Randall, Y. Yoshitsugu, and W. August, 11 January 2005.

PARATYPES: BPBM 29132, 19.0 mm, Marshall Islands, Enewetak Atoll, lagoon off Mid-Pacific Research Laboratory, sand bottom near coral head, 2 m, rotenone, J.E. Randall, 6 October 1982; BPBM 40514, 12.2 mm; BMNH 2007.5.4.2, 16.1 mm; USNM 389930, 21.1 mm, same data as holotype.

DIAGNOSIS: Dorsal rays VI + I,10 or I,11; anal rays I,12; pectoral rays 13 or 14; longitudinal scale series 25 or 26; chest with 4 large scales; maximum body depth 5.1–5.8 in SL; spines of first dorsal fin short, not or just reaching origin of second dorsal fin when depressed; whitish with small dark brown blotches and flecks on upper two-fifths of body; a black spot distally on last two membranes of first dorsal fin; a narrow black band at base of anal fin. Largest specimen, 21.4 mm SL.



Figures 4–6. Fig. 4. Underwater photograph of holotype of *Silhouettea capitlineata*, BPBM 39679, female, 21.4 mm SL, Majuro Atoll (J. E. Randall). Fig. 5. Underwater photograph of *Silhouettea capitlineata* emerging from sand, Majuro Atoll (J. E. Randall). Fig. 6. Paratype of *Silhouettea capitlineata*, BPBM 29132, 19 mm SL, Enewetak Atoll (J. E. Randall).

Table 2. Proportional measurements of the type specimens of *Silhouettea capitlineas* as percentages of the standard length

	Holotype		Paratypes		
	BPBM 39679	BPBM 40514	BMNH 2007.5.4.2	BPBM 29132	USNM 389930
Standard length (mm)	21.4	12.2	16.1	19.0	21.1
Sex	female	?	male	female	female
Body depth (at P ₂ origin)	19.7	17.3	18.7	19.0	19.8
Body depth (at A origin)	18.9	16.8	18.4	18.3	19.2
Body width	15.2	10.7	12.8	14.2	16.5
Head length	35.7	34.9	35.4	35.4	35.5
Head width	23.4	20.5	22.1	24.6	24.0
Snout length	5.6	5.5	6.0	5.8	5.7
Orbit diameter	5.7	7.3	6.2	6.0	5.7
Interorbital width	1.8	1.6	1.7	1.6	1.9
Cheek depth	3.3	2.8	3.1	3.2	3.1
Upper-jaw length	13.8	14.0	13.4	13.4	14.1
Caudal-peduncle depth	9.5	8.9	9.7	9.5	9.1
Caudal-peduncle length	9.8	9.9	10.2	9.3	9.5
Predorsal length	37.0	35.5	37.3	35.9	36.7
Preanal length	52.5	51.0	50.6	50.3	52.2
Prepelvic length	28.2	26.9	27.4	26.6	28.5
Base of dorsal fins	48.3	48.5	47.8	47.4	49.8
First dorsal spine	14.8	14.0	13.8	15.4	14.5
Third dorsal spine	14.1	13.8	13.7	14.5	14.2
Spine of second dorsal fin	9.8	10.1	9.3	broken	9.0
Longest dorsal ray	16.7	15.3	16.8	15.9	16.9
Base of anal fin	41.5	42.0	42.6	41.7	41.6
Anal spine	10.5	9.7	11.2	broken	10.1
Longest anal ray	14.3	15.3	14.9	15.2	14.1
Caudal-fin length	26.4	broken	26.6	broken	25.0
Pectoral-fin length	28.2	27.7	27.9	27.5	28.0
Pelvic-spine length	9.5	8.7	9.4	9.0	9.5
Pelvic-fin length	26.0	28.6	25.8	27.2	26.4

DESCRIPTION: Dorsal rays VI + I,11 (I,10); anal rays I,12; all dorsal and anal rays branched, the last to base; pectoral rays 14 (13–14), the uppermost and lowermost unbranched; pelvic rays I,5, all soft rays double or triple-branched, the membranes of fifth rays joined medially; branched caudal rays 12, 10 of these in adults with at least one branch divided; upper and lower procurrent caudal rays 6, the posterior two segmented; scales in longitudinal series 25 (25–26); transverse scale rows 7; median prepelvic scales 9; transverse scale rows across occiput 6 or 7; cheek naked; embedded scales dorsally on opercle; a symmetrical cluster of 4 large scales anterior to pelvic fins; gill rakers small, 2 + 10; pseudobranch with

10 short fleshy lobes; branchiostegal rays 5; vertebrae 26; dorsal pterygiophore formula 3-22110 (Fig. 1A of Birdsong et al., 1988).

Body not elongate, the maximum depth (at origin of pelvic fins) 5.1 (5.1–5.8) in SL; body compressed, the width 1.25 (1.15–1.55) in body depth; head length 2.8 (2.8–2.85) in SL; head broader than body width or body depth, the head width 4.25 (4.05–4.9) in SL; snout short, the length 6.3 (5.9–6.35) in head length; eyes dorsally on head; orbit diameter 6.25 (5.7–6.25) in head length; interorbital space very narrow, the least width 19.85 (18.7–22.1) in head length; cheek depth 10.8 (11.05–12.5) in head length; caudal-peduncle depth 3.75 (3.65–3.9) in head length; caudal-peduncle length 3.65 (3.45–3.8) in head length.

Mouth oblique, forming an angle of about 40° to horizontal axis of body, the lower jaw projecting; mouth large, the maxilla nearly or just reaching a vertical at posterior edge of orbit, the upper-jaw length 2.6 (2.5–2.65) in head length; jaws with three to four rows of slender, incurved, conical teeth, narrowing to two rows posteriorly, the outer row at front of jaws slightly larger than inner rows; no teeth on vomer or palatines; edge of lips smooth; tongue broad, truncate with rounded corners and a slight median indentation, the surface smooth; no mental flap; no barbels on chin.

Gill opening extending forward to a vertical at posterior edge of preopercle; gill membranes attached to isthmus, with no free fold; gill filaments short and lobular; gill rakers very small.

Posterior nostril a small aperture with a slight rim in front of eye at fleshy edge of orbit; anterior nostril a short tubule ventroanterior to posterior nostril about two-thirds distance to groove above upper lip; anterior oculoscapular canal with the following sensory pores: nasal, anterior and posterior interorbital, supraotic, anterior otic, and intertemporal; preopercular canal with three pores; posterior oculoscapular canal with two pores. Sensory papillae are most similar to those of *Silhouettea evanida* Larson & Miller, as illustrated by Miller (1988: fig. 3 C): one row of papillae rims lower edge of orbit, another passes obliquely from above upper lip to behind corner of mouth, then continues about half way across cheek; two closely parallel rows pass between upper and lower rows (but closer to lower); a close-set vertical row of papillae anteriorly on opercle with a branch curving posteroventrally from the top (the pattern on the opercle thus resembling a scythe).

Scales on body progressively smaller anteriorly; scales finely ctenoid, becoming cycloid on chest; no scales on prepectoral area; fins without scales except for two large scales, one above the other, on base of caudal fin, with a smaller more anterior scale above and below.

Origin of first dorsal fin on a vertical two scales posterior to base of pectoral fins, the predorsal length 2.7 (2.7–2.8) in SL; dorsal spines slender and flexible, not extending posterior to spine of second dorsal fin when depressed; first dorsal spine slightly longer than second to fifth spines, 2.4 (2.3–2.55) in head length; third dorsal spine 2.55 (2.45–2.6) in head length; last membrane of first dorsal fin nearly reaching origin of second dorsal fin; spine of second dorsal fin 3.65 (3.45–

3.95) in head length; longest dorsal soft ray 2.15 (2.1–2.3) in head length; origin of anal fin below base of first to second dorsal soft rays, the preanal length 1.9 (1.9–2.0) in SL; anal spine 3.4 (3.15–3.6) in head length; longest anal soft ray 2.5 (2.3–2.5) in head length; caudal fin rounded, 3.8 (3.75–4.0) in SL; base of pectoral fins anterior to posterior end of opercular flap; sixth or seventh pectoral rays longest, reaching to below origin of second dorsal fin, 3.55 (3.55–3.65) in SL; origin of pelvic fins below base of lower pectoral rays, the prepelvic length 3.55 (3.5–3.75) in SL; pelvic spine 3.75 (3.75–4.0) in head length; fifth pelvic ray longest, just reaching or slightly posterior to origin of anal fin, 3.85 (3.5–3.9) in SL; pelvic frenum well developed, curving forward from tips of pelvic spines.

Color of holotype in alcohol: body whitish, becoming pale yellowish on head, upper two-fifths of body with scattered small dark brown blotches, most smaller than pupil, and many dark brown dots, especially at scale edges; upper half of head with dark brown dots, mostly at scale edges, some forming four dark lines extending ventrally from eye (the fourth from its posterior edge); dorsal fins translucent with scattered black dots, mostly on or adjacent to rays; a black spot distally on fifth interspinous membrane, some pigment extending onto sixth membrane; first dorsal spine largely dark brown; anal fin with a narrow dark brown band at base, most dark pigment on membranes; caudal fin with vertical rows of small dark brown spots forming four faint narrow dark bars; paired fins with some dark brown dots on rays, those in pectorals tending to form indistinct bars.

Color of holotype in life shown in Fig. 4. Figure 6 provides the color of the BPBM paratype from Enewetak Atoll shortly after collection. Much of the dark pigment is lost in preserved specimens.

ETYMOLOGY: This species is named *Silhouettea capitlineata* from the Latin for the four dark lines that extend ventrally from the eye.

REMARKS: The genus *Silhouettea* was named by Smith (1959) for the type locality, the island of Silhouette in the Seychelles. The type species, *S. insinuans* Smith, was also collected from other islands of the Seychelles, as well as from Kenya, Zanzibar, and Mozambique.

Miller (1988) published a valuable revision of the genus in which he recognized the following seven species in addition to *S. insinuans*: *S. aegyptia* (Chabanaud), originally described as a subspecies of *Gobius lesueuri* Chabanaud, type locality, Lake Timsah, Suez Canal; *S. nuchipunctatus* (Herre) from Negros, Philippines; *S. dotui* (Takagi) from Saga Prefecture, Japan; *S. sibayi* Farquharson from Lake Sibaya, South Africa; *S. indica* Rao from Godavari Estuary, India; *S. evanida* Larson & Miller from Darwin, Northern Territory, Australia; and *S. hoesei* Larson & Miller from Cobourg Peninsula, Northern Territory. *Ctenogobiops villadolidi* Herre was placed in the synonymy of *S. nuchipunctatus*, and *Minictenogobiops sinaii* Goren in the synonymy of *S. aegyptia*.

Miller also provided a key to the species of *Silhouettea* and a detailed account of the osteology of the genus. One of the characters that he used to

define the genus was the species having more anal than dorsal soft rays. However, one of three specimens of *S. aegyptia* from the Red Sea, BPBM 19838, has 10 dorsal and 10 anal soft rays.

The author collected a single unidentified specimen of the genus *Silhouettea* from sand in 5 m in the lagoon of Enewetak Atoll, Marshall Islands in 1982. Additional specimens of this species were not obtained until 2005, when four were collected with rotenone from sand in the lagoon of Majuro Atoll at a depth of 7 m. The underwater photograph of the holotype (Fig. 4) was taken after it emerged from the sand from the effect of the rotenone.

Silhouettea capitlineata is one of five species of the genus with scales on the chest. It keys to *S. dotui* in Miller (1988), but the latter species is easily distinguished by having 15 or 16 instead of 13 or 14 pectoral rays, a more elongate body, four dorsal spines extending posterior to the spine of second dorsal fin when depressed, and in color pattern. In the counts of fin rays, *S. capitlineatus* is closest to *S. evanida* and *S. hoesei* (though modally one higher in pectoral-ray counts). It is clearly different from both of these species in its much smaller eye and in color.

Eviota cometa Jewett & Lachner

Eviota cometa Jewett & Lachner, 1983: 796, figs. 8, 9 (type locality, Totoya Island, Fiji).

MATERIAL EXAMINED: Marshall Islands, Majuro Atoll, BPBM 39508, 3: 8.5–10.5 mm.

DIAGNOSIS: Dorsal rays VI + I,8 or I,9; anal rays I,7 or I,8; pectoral rays 13 or 14, unbranched; pelvic rays I,4 or I,5; longitudinal scale series 23; cephalic sensory system complete for a species of *Eviota*, except for absence of the paired intertemporal pore (Lachner & Karnella, 1980: fig. 4 B); body slender, the depth at origin of anal fin 6.3–6.55 in SL; first three dorsal spines of male (largest specimen) elongate, the first longest, reaching midlength of caudal peduncle; pelvic fins long, reaching midbase of anal fin; color in alcohol pale yellowish with a vertically oval to diamond-shaped blackish spot larger than pupil midlateral at rear of caudal peduncle, followed on caudal-fin base by an adjacent narrow black bar of greater height than peduncular spot.

REMARKS: This species was described from 71 specimens, 10.3–18.5 mm SL from Fiji, Phoenix Islands, Caroline Islands, and Kiribati. Its occurrence in the Marshall Islands was not unexpected. The three specimens reported here from Majuro were collected by the author from an isolated rock in the lagoon off Kolalan Island at a depth of 21 m on 16 May 2004. *Eviota cometa* is well illustrated in color by Senou et al. (2004: 133) from localities in the Ryukyu Islands.



Figures 7–8. Fig. 7. *Exyrias akihito*, BPBM 39688, 62.5 mm, Majuro Atoll (J. E. Randall). Fig. 8. *Vanderhorstia dorsomacula*, male (with black markings in dorsal and anal fins) and female pair with *Alpheus cf. rapacida* at burrow entrance, Majuro Atoll (S. Yoshii).

***Exyrias akihito* Allen & Randall**
(Figure 7)

Exyrias akihito Allen & Randall, 2005: 232, figs. 1-6 (type locality, Yaeyama Islands, Okinawa Prefecture, Japan).

MATERIAL EXAMINED: Marshall Islands, Majuro Atoll, BPBM 39688, 62.5 mm.

DIAGNOSIS: Dorsal rays VI + I,9; anal fin damaged; pectoral rays 16 or 17; segmented caudal rays 17; branched caudal rays 14 (one very thinly branched); longitudinal scale series 28; four longitudinal rows of scales on cheek, the upper and lower rows divided from the middle two by papillae; body depth at anal-fin origin 4.5 in SL; head length 3.3 in SL; orbit diameter 4.55 in head length; first dorsal spine long and filamentous, 2.15 in SL; second to fourth dorsal spines very short (from probable injury); longest dorsal ray 2.15 in SL; caudal fin broadly rounded, 2.7 in SL; pectoral rays 2.85 in SL; pelvic fins joined medially, the frenum well developed; pelvic fins reaching origin of anal fin, 3.7 in SL; color in alcohol pale gray with a longitudinal row of four small double dark brown spots at level of upper third of pectoral-fin base, with a single spot in alignment at caudal-fin base; a broad dusky bar below eye. Color in life as in Fig. 7.

REMARKS: *Exyrias akihito* was described from 15 specimens collected in the Ryukyu Islands, Philippines, New Guinea, Indonesia, and the northern Great Barrier Reef. The one record from Palau was based on an underwater photograph. The species is typically found in clear water in the vicinity of coral reefs, generally on rubble or sand substrata in the depth range of 10–43 m.

The Marshall Islands record is based on a single specimen speared by the author at a depth of 33.5 m in the lagoon of Majuro Atoll off the Marshall Islands Resort Hotel near a mooring and a small silty patch reef (7°5'27.4"N, 171°22'17.9"E) on 13 January 2005.

This specimen differs from the type specimens of *Exyrias akihito* by having 9 dorsal soft rays, instead of 10, the ray count that is reported for all the species of the genus (Murdy, 1985). One of 14 Bishop Museum specimens of *E. belissimus* (Smith) from Pohnpei, Caroline Islands has 9 dorsal soft rays, so this count is probably a comparable variant for *E. akihito*.

***Vanderhorstia dorsomacula* Randall**
(Figure 8)

Vanderhorstia dorsomacula Randall, 2007: 98, fig. 5) (type locality, Tab Island, New Britain).

MATERIAL EXAMINED: Marshall Islands, Majuro Atoll, BPBM 39682, 5: 28.0-42.2 mm.

DIAGNOSIS: Dorsal rays VI + I,17 or I,18; anal rays I,18 or I,19; branched caudal rays 14; pectoral rays 18 or 19; scales in longitudinal series 75–81; no scales on head, nape, or prepectoral area; body depth at origin of pelvic fins 6.1–7.0 in SL; depth at origin of anal fin 7.2–8.9 in SL; head length 3.55–3.75 in SL; orbit diameter 3.6–3.7 in head length; fourth dorsal spine longest, 3.9–4.55 in SL; caudal fin long and pointed, but large specimens with fifth and eighth branched rays a little longer than sixth and seventh rays, the fin length 2.9–3.3 in SL; pectoral fins reaching to above anus, 3.9–4.5 in SL; pelvic fins nearly or just reaching anus, 4.7–5.6 in SL; color in alcohol pale yellowish, the edges of scales faintly dusky; a black streak in groove above upper lip from below anterior edge of pupil to below nostrils; membranes of second dorsal and anal fins finely dotted with small melanophores, with a slight concentration forming a longitudinal band near base of anal fin. Color in life of a male and female pair shown in underwater photograph of Fig. 10 (the male with a black spot in first dorsal fin and a black stripe in anal fin).

REMARKS: The holotype and only previous specimen of this species was collected by the author in 1987 at Tab Island, Madang Province on the north coast of Papua New Guinea, at a depth of 25 m. An underwater photograph was taken of the species at Lolobau Island, New Britain in 20 m in 2002, but no specimens were collected; the photograph was published as *Vanderhorstia* sp. by Randall, 2003.

The five specimens reported here from 38 m in the lagoon of Majuro Atoll, Marshall Islands represent an unexpected eastern range extension to Micronesia.

Alpheus cf. *rapacida* is the symbiotic snapping shrimp that shares the burrow with *Vanderhorstia dorsomacula* in both Papua New Guinea and Majuro (alpheid identification by Arthur Anker).

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