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Review of the Indo-Pacific labrid fish genus *Hemigymnus*

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Abstract

The labrid fish genus *Hemigymnus* Günther consists of three relatively large coral-reef species: the wide-ranging Indo-Pacific *H. fasciatus* (Bloch) and *H. melapterus* (Bloch), and *H. sexfasciatus* (Rüppell) of the Red Sea and Gulf of Aden, usually regarded as a synonym of *H. fasciatus*. It is treated here as a species, distinguished by color pattern, longer pelvic fins of the terminal male, and fewer gill rakers. These three fishes are generally found as solitary individuals over sand or sand-and-rubble substrata adjacent to sheltered coral reefs within the depth range of 1–30 m. Their principal mode of feeding consists of taking a mouthful of sand and detritus, releasing sand from the gill opening as they swim from the bottom, sorting the fossorial prey within the mouth and pharynx, and ejecting the larger inorganic fragments from the mouth. They also feed opportunistically on larger benthic prey. A maximum total length of 90 cm has been claimed for *H. melapterus*, but the largest specimen reliably reported is only 37 cm long. No specimens of *H. fasciatus* are known that are larger than 30 cm, and the largest *H. sexfasciatus* measures 36.5 cm in total length. A key, literature survey, table of gill-raker counts, and color photographs are provided for the three species.

Key words: *Hemigymnus*, Labridae, Indo-Pacific, fishes, fish, taxonomy, review, Thicklip Wrasses.

Introduction

The labrid fish genus *Hemigymnus* includes three moderately large, Indo-Pacific species, *H. fasciatus* (Bloch), *H. melapterus* (Bloch), and *H. sexfasciatus* (Rüppell). They are called Thicklip Wrasses, or simply Thicklips, in reference to their very large, fleshy lips. Bloch (1791) described the first species of the genus as *Labrus melapterus* in *Naturgeschichte der ausländischen Fische*. He followed in the next year with the description of *Labrus fasciatus*, both species with a type locality of Japan, and both illustrated in color. Figure 1 (top) is a reproduction of Bloch's illustration of *Labrus melapterus* and Figure 1 (middle) of *Labrus fasciatus*, neither very accurate. A better painting of the latter species was published by J.W. Bennett (1830) of a specimen from Sri Lanka described as *Scarus quinquefasciatus* (Fig. 1, bottom). Rüppell (1835) described the third species as *Halichöeres sexfasciatus*, type locality Jeddah, Red Sea; a reproduction of his painting is presented as Figure 2, also inaccurate. Günther (1861: 386) created the genus *Hemigymnus* for *Labrus melapterus* and *L. fasciatus* in his *Preliminary Synopsis of the Labroid Genera*. He included Rüppell's *sexfasciatus* in *Hemigymnus* in volume 4 of his *Catalogue of the Fishes of the British Museum* (1862: 139). He then changed Bloch's name of *H. melapterus* to *H. melanopterus*, apparently in the belief that Bloch had written *melapterus* by mistake. However, the original orthography is maintained.



Figure 1. top: *Labrus melapterus* Bloch 1791, Japan; middle: *Labrus fasciatus* Bloch 1791, Japan; bottom: *Scarus quinquefasciatus* Bennett 1830, Sri Lanka.

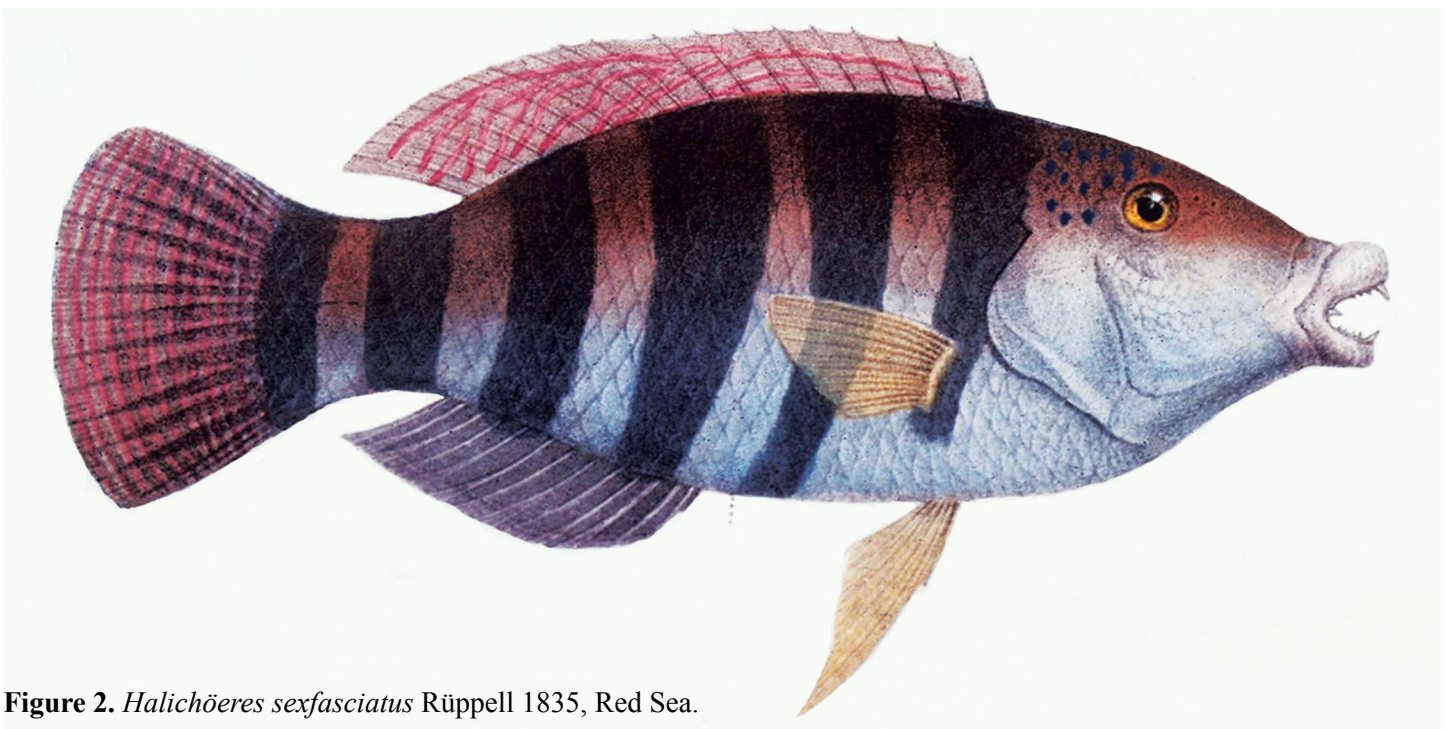


Figure 2. *Halichoeres sexfasciatus* Rüppell 1835, Red Sea.

Hemigymnus sexfasciatus (Rüppell) was not accepted by Klunzinger (1871: 547), who listed it as a junior synonym of *H. fasciatus*. He was followed by others, such as Day (1877: 396), Fowler and Bean (1928: 245), de Beaufort (1940: 143), Smith (1949: 208), Roux-Estève and Fourmanoir (1955: 198), Randall (1983: 122), Dor (1984: 203), Field and Field (1998: 148), Parenti and Randall (2000: 25), and Eschmeyer (2012, online). Only Kuitert (2002: 205) and Lieske and Myers (2004: 160), in their popular books, have accepted *Hemigymnus sexfasciatus* as a valid Red Sea species.

The adults of the three species of *Hemigymnus* are usually seen as solitary individuals over sand or sand-and-rubble substrata adjacent to sheltered coral reefs at a depth range of 1–30 m. Juveniles by contrast are very cryptic, moving quickly from one sheltered locality in the coral reef to another, sometimes hovering near the spines of *Diadema*. Adults have a unique mode of feeding. They take a mouthful of sand and gravel from the substratum, then swim upward with sand streaming from the gill openings (Fig. 3 of *H. melapterus*). After a few moments

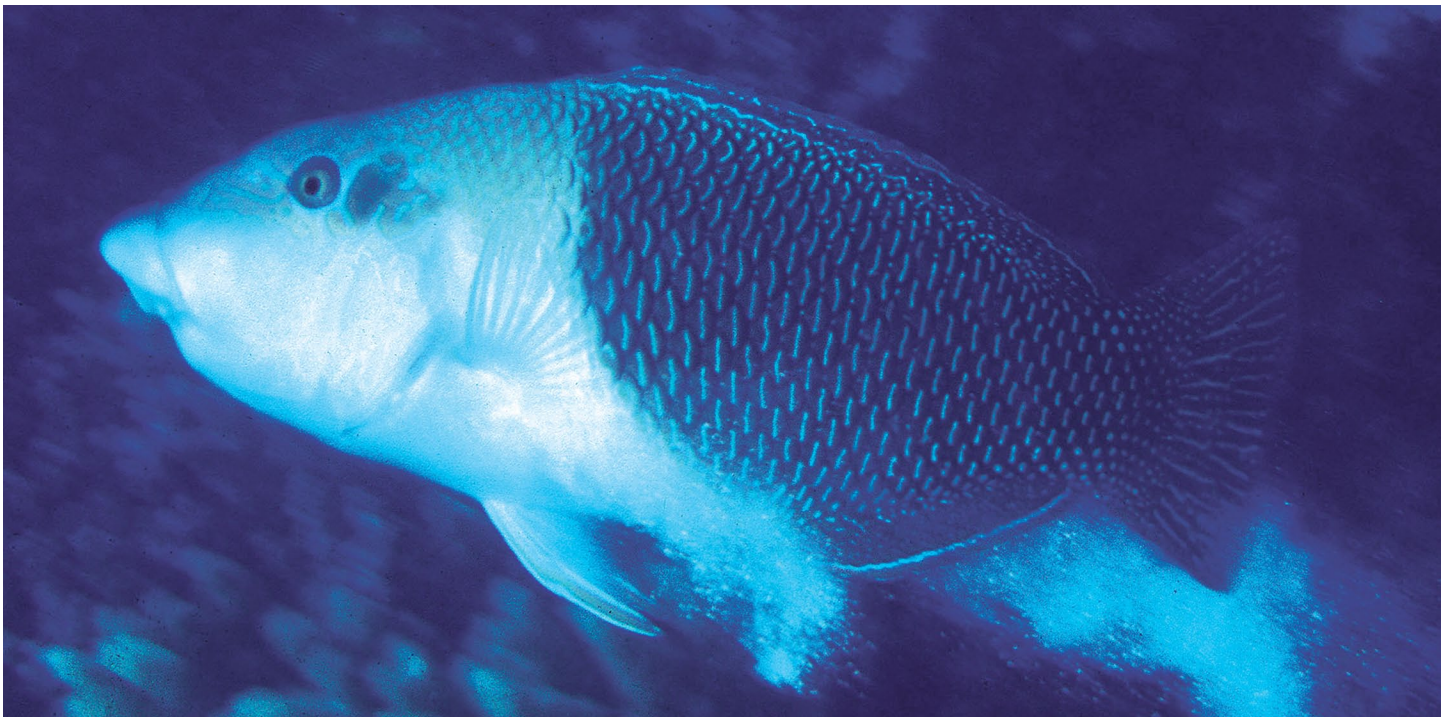


Figure 3. *Hemigymnus melapterus*, Maldives, J. E. Randall.



Figure 4. *Hemigymnus fasciatus*, Maldives, J. E. Randall.

while they sort out the small fossorial prey within the mouth and pharynx, they forcefully eject the inorganic fragments from the mouth (Fig. 4 of *H. fasciatus*). They also feed opportunistically on larger prey, such as crabs, echinoids, molluscs, ophiuroids, and polychaetes.

Specimens of species of *Hemigymnus* examined during this study are housed at the Bernice P. Bishop Museum, Honolulu (BPBM), augmented for gill-raker counts of *H. sexfasciatus* from specimens at the California Academy of Sciences, San Francisco (CAS); the Senckenberg Museum, Frankfurt (SMF); and the United States National Museum of Natural History, Washington, D.C. (USNM). Lengths of specimens are standard length (SL).

Genus *Hemigymnus* Günther 1861

Hemigymnus Günther 1861: 386 (type species *Labrus fasciatus* Bloch).

Diagnosis. Dorsal rays IX,11; anal rays III,11; pectoral rays 14; pelvic rays 1,5; branched caudal rays 12; lateral line continuous, abruptly curving downward below rear part of dorsal fin to straight peduncular part, the pored scales 27 or 28 (including one or two on base of caudal fin); each lateral-line scale with a long horizontal tubule ending in a single pore; scales progressively smaller on nape, ending just posterior to interorbital; no scales on head except for three to five irregular rows of small embedded scales on cheek well below eye; largest scales of chest at most half height of scales on body, becoming progressively smaller anteriorly and ventrally; scales extending progressively smaller onto base of dorsal and anal fins more than halfway to fin margin anteriorly, progressively lower posteriorly; scales basally on caudal fin smaller posteriorly, reaching more than half distance to outer margin; gill rakers 20–29; branchiostegal rays 6; vertebrae 25; body moderately deep, varying from 2.6–3.0 in standard length (SL), and compressed, the width 2.4–2.6 in depth; head large, 2.7–2.9 in SL; dorsal profile of head moderately convex, with a slight flattening above eye; snout forming an angle of about 45° to horizontal axis of body; mouth relatively small; lips large and fleshy, the lower lip divided by a median cleft to two lobes; a pair of moderately large, protruding, canine teeth anteriorly in each jaw, the upper pair slight outflaring, the lower pair slightly converging, fitting in space between upper pair when mouth closed; 9 or 10 slender teeth on side of jaws, close-set with rounded tips, encased in strong tissue to form a firm ridge; a band of very small nodular teeth medial to the outer row of teeth; a forward-projecting canine posteriorly on upper jaw; pharyngeal dentition with numerous small molars except the teeth of the anterior row of upper plate which are bluntly conical (illustrated for *Hemigymnus melapterus* by Al-Hussaini, 1947: fig. 4 A); tongue broadly rounded; gill opening extending forward

to a vertical at rear edge of eye; gill membranes broadly attached to isthmus, without a free fold across; preopercular margin free to within a half eye diameter of eye dorsally and to below anterior margin of orbit ventrally. Spines of dorsal and anal fins progressively longer posteriorly, the rays progressively shorter posteriorly; caudal fin rounded in juveniles, slightly rounded to truncate in adults, 1.5–1.65 in head length; pectoral fins 1.5–1.7 in head length; pelvic fins of juveniles short, about 2 in head length, longer in adults, reaching to or beyond origin of anal fin in large males of *H. melapterus* and *H. sexfasciatus*.

Key to Species of *Hemigymnus*

- 1a. Body of adults mainly whitish to pale green anterior to a line between origins of dorsal and anal fins, blackish to dark green posterior to line; total gill rakers 26–29 (Indo-Pacific)*H. melapterus*
- 1b. Body of adults black with 4 or 5 narrow white bars; total gill rakers 20–25.....2
- 2a. Pelvic fins of adult males not reaching origin of anal fin; head yellow to green with prominent pink bands on cheek and operculum; no curving black bar from nape to eye; first two white bars on body not broader ventrally; gill rakers 23–25, rarely 23 (Indo-Pacific, except Red Sea)*H. fasciatus*
- 2b. Pelvic fins of adult males reaching to or beyond origin of anal fin; head white without prominent pink bands on cheek and operculum; a curving black bar from nape to eye (may contain irregular orange-yellow spots); first two white bars on body broader ventrally; gill rakers 20–23, rarely 23 (Red Sea and Gulf of Aden)*H. sexfasciatus*

Table 1. Distribution of gill-raker counts for Indo-Pacific species of *Hemigymnus*.

Number of gill rakers	20	21	22	23	24	25	26	27	28	29
<i>H. fasciatus</i>				1	6	5				
<i>H. melapterus</i>							3	3	4	2
<i>H. sexfasciatus</i>	1	4	6	1						

Hemigymnus melapterus (Bloch 1791)

Figures 1, 3, 5, 6; Table 1.

Labrus melapterus Bloch 1791: 137 (Japan).

Labrus malapterus Bloch 1792: 29 (Japan).

Labrus melampterus Bloch & Schneider 1801: 247 (Java).

Sparus niger Lacepède 1802: 50, 152 (Japan).

Julis boryii Lesson 1831: 141 (Tahiti).

Tautoga melapterus Valenciennes in Cuv. & Val., 1839: 311 (Java).

Julis beraber Montrouzier 1857: 474 (Woodlark I.).

Hemigymnus melapterus Günther (1861: 386); Bleeker 1862: 142 (Indonesia, Singapore); Day 1877: 396 (seas of India); Peters 1883: 65 (Mauritius); Günther 1881: 253 (Palau); Jordan & Snyder 1902: 634 (Ryukyu Is.); Jordan & Seale 1906: 294 (Samoa); Fowler 1928: 337 (Shortland I, Samoa, Fiji, Guam, Tongaru Is.); Fowler



Figure 5. top: *Hemigymnus melapterus*, juvenile, Ambon, S. Polack; middle: *Hemigymnus melapterus*, juvenile, Sudan, J. E. Randall; bottom: *Hemigymnus melapterus*, female, Papua New Guinea, J. E. Randall.



Figure 6. top: *Hemigymnus melapterus*, female, Maldives, J. E. Randall; middle: *Hemigymnus melapterus*, male, Kenya, R. F. Myers; bottom: *Hemigymnus melapterus*, male, Gulf of Aqaba, S. V. Bogorodsky.

& Bean, 1928: 247 (Philippines, Hong Kong, Sulawesi); Baissac 1953: 229 (Mauritius); Smith 1955: 932 (Aldabra); Randall 1955: 149 (Onotoa Atoll, Tungaru Is.); Smith 1957: 103 (Mozambique); Schultz in Schultz & collaborators 1960: 219 (Bikini and Likiep Atolls, Marshall Is.); Smith & Smith 1963: 38 (Seychelles); Randall 1973: 197 (Tahiti); Masuda *et al.* 1975: 300 (Ryukyu Is.); Jones & Kumaran 1980: 434 (Laccadives); Randall 1983: 122 (Red Sea); Gomon in Fischer & Bianchi 1984 (no pagination; Western Indian Ocean); Randall in Smith & Heemstra 1986: 696 (Inhaca I., Mozambique); Allen & Steene 1988: 113 (Christmas I.); Randall 1992: 127 (Maldives); Allen & Smith-Vaniz 1994: 14 (Cocos-Keeling Is.); De Bruin *et al.* 1994: 227 (Sri Lanka); Myers 1999: 199 (throughout Micronesia); Laboute & Grandperrin 2000: 361 (New Caledonia); Westneat in Carpenter & Niem 2001: 3439 (Indo-Pacific, east to Society Is.); Lieske & Myers 2004: 160 (Red Sea); Allen & Erdmann 2012: 687 (throughout the East Indian region).

Hemigymnus melanopterus Günther 1862: 139 (Singapore, East Indian Arch., Northern Territory and Queensland); Kner 1865: 353 (Singapore); Playfair & Günther 1867: 92 (Zanzibar).

Labrichthys bicolor Day 1871: 696 (Andaman Is.).

Cheilolabrus magnilabrus Alleyne & Macleay 1877: 345 (Darnley I., Qld.).

Diagnosis. A species of *Hemigymnus* with 26–29 gill rakers, colored as follows: small juveniles dark brown, green on snout and interorbital, with a slightly oblique white bar from front of dorsal fin to abdomen, and two narrow pale yellowish bars below soft portion of dorsal fin that fade ventrally; larger juveniles with a white bar from origin of dorsal fin, passing beneath pectoral fin onto abdomen; head and body anterior to bar greyish green, posterior to bar black; posterior caudal peduncle and caudal fin yellow, often with 1 or 2 small black spots centrally near base. Body of small females posterior to a curving demarcation between origins of dorsal and anal fins blackish with a narrow dark greenish bar on each scale, grading to yellow with blue-green spots posteriorly on caudal peduncle and fin. Large females dark green posterior to oblique demarcation on body, the scales rimmed in black, with a vertical green line or spot on each scale; head and anterior body light green dorsally, pale blue-green ventrally, with irregular bands on snout and above eye, and a large complex marking behind eye. Body of males posterior to demarcation dark green, each scale with narrow pale blue-green and black posterior margin; head green dorsally with irregular green to blue-green bands, including a blue ring around eye; cheek and operculum pinkish white with irregular light blue lines and spots, except for a large yellowish green blotch centrally on cheek without markings; lips and ventral part of head mainly pale blue; chest and abdomen pinkish white with a light blue spot or arc on scales.

A maximum length of 75 cm for this species was given by de Beaufort (1940), and 90 cm by Allen and Erdmann (2012). However, it is doubted that the species exceeds 45 cm. Fowler and Bean (1928) gave the lengths of specimens collected from 82 stations by the R/V *Albatross*, mainly in the Philippines; the largest measured 37 cm total length.

Distribution and Ecology. Red Sea, coast of East Africa south to Mozambique, Madagascar, Réunion, and Mauritius, east in the Pacific to the islands of Micronesia and Samoa, north to the Ryukyu and Ogasawara Islands, south to Lord Howe Island and New South Wales; in western Australia north of Shark Bay.

Known from the depth range of 1–30 m; usually seen as solitary individuals. Hiatt and Strasburg (1960) examined the contents of the digestive tracts of three specimens of this species, 129–220 mm SL, from Enewetak Atoll, Marshall Islands. They found mainly small crushed gastropods; the remaining food items included tanaid isopods, shrimp and crab fragments, amphipods, copepods, foraminifera, and in two specimens, filamentous green algae. They added that the algae “may have been taken inadvertently.” The author examined the gut contents of two specimens, 120 and 271 mm SL, also from Enewetak. The fish had eaten, in the order of volume of food material: crabs, polychaetes, shrimps, bivalves, gastropods, amphipods, isopods, ophiuroids, copepods, and foraminifera. All of the prey were very small.

Material Examined. Samoa, Upolu, BPBM 4574, 172 mm. Marshall Islands, Enewetak Atoll, BPBM 8189, 50 mm; BPBM 12205, 120 mm; BPBM 17997, 230 mm; BPBM 31204, 250 mm. Solomon Islands, Shortland Island, BPBM 1103, 165 mm. Mariana Islands, Guam, BPBM 11575, 110 mm. Palau, BPBM 9451, 153 mm; BPBM 10611, 248 mm. Indonesia, Java Sea, Seribu Islands, BPBM 18572, 32 mm. Red Sea, Sudan, Port Sudan, BPBM 20354, 149 mm; BPBM 27394, 40 mm.

Hemigymnus fasciatus (Bloch 1792)

Figures 1, 4, 7, 8; Table 1.

Labrus fasciatus Bloch 1792: 6 (Japan).

Labrus fuliginosus Lacepède 1801: 437, 493 (Madagascar, Mauritius, Réunion).

Labrus malapteronotus Lacepède 1801: 450, 518 (Mauritius).

Labrus zonephorus Lacepède 1802: 51, 55 (unnecessary replacement name for *Labrus fasciatus* Bloch).

Sparus meaco Lacepède 1802: 54, 160 (Japan).

Scarus quinque-fasciatus Bennett 1830: pl. 23 (Sri Lanka).

Tautoga mertensii Valenciennes in Cuv. & Val. 1839: 308 (Caroline Is.).

Tautoga leucomos Bleeker 1858: 239 (Indonesia).

Hemigymnus fasciatus Günther 1861: 386; Bleeker 1862: 141 (Indonesia). Günther 1862: 138 (Mauritius to East Indian Archipelago); Playfair & Günther 1867: 92 (Zanzibar); Day 1877: 396 (seas of India); Jordan & Snyder 1902: 634 (Ryukyu Is.); Fowler & Bean 1928: 245 (Philippines, Halmahera, Okinawa); Fowler 1928: 337 (Polynesia and Micronesia); de Beaufort 1940: 143 (Indo-Australian Arch.); Smith 1949: 289 (Mozambique south to Delagoa Bay); Smith 1955: 932 (Aldabra); Randall 1955: 149 (Onotoa Atoll, Tungaru Is.); Schultz in Schultz & collaborators 1960: 218 (Bikini Atoll, Marshall Is.); Smith & Smith 1963 (Seychelles); Randall 1973: 197 (Tahiti); Masuda *et al.* 1975: 300 (Japan from Wakayama Prefecture southward); Allen *et al.* 1976: 419 (Lord Howe I.); Jones & Kumaran 1980: 453 (Laccadives); Coleman 1981: 215 (both coasts of Australia to 30°S); Gomon in Fischer & Bianchi 1984 (no pagination; Western Indian Ocean); Randall in Smith & Heemstra 1986: 696 (south on East African coast to Inhaca Is.); Allen & Steene 1987: 209 (Maldives); Allen & Steene 1988: 113 (Christmas Is.); Allen & Swainson 1988: 116 (Western Australia from Rottneest Is. north); Winterbottom *et al.* 1989: 54 (Chagos Arch.); Randall *et al.* 1990a: 322 (Great Barrier Reef); Randall *et al.* 1990b: 27 (Rapa); Randall & Anderson 1993: 34 (Maldives); Allen & Smith-Vaniz 1994: 14 (Cocos-Keeling Is.); Randall 1995: 283 (southern Oman); Myers 1999: 199 (throughout Micronesia); Randall 1999: 21 (Pitcairn Is.); Zajonz *et al.* 2000: 134 (Socotra Archipelago); Kemp 2000: 320 (Sikha Island, Gulf of Aden); Randall & Earle 2000: 17 (Marquesas); Laboute & Grandperrin 2000: 361 (New Caledonia); Westneat in Carpenter & Niem 2001: 3438 (Indo-Pacific); Lobel & Lobel 2004: 42 (Wake I.); Satapoomin in Kimura *et al.* 2009: 226 (Andaman Sea); Mundy *et al.* 2010: 16 (Line Is. and Phoenix Is.); Allen & Erdmann 2012: 686 (throughout the East Indian region).

Hemigymnus fuliginosus Jordan & Seale 1906: 295 (Samoa).

Diagnosis. A species of *Hemigymnus* with 22–24 gill rakers and short pelvic fins (1.65–2.0 in head length of adults, smaller in juveniles). Color of juveniles dark brown with six narrow irregular white bars, the first across nape and chest, the next three extending into adjacent dorsal and anal fins, and the last two on caudal peduncle and caudal-fin base; head with pale yellowish lines radiating from eye, lips whitish. Females with black body and four white bars, the first progressively broader ventrally, ending on abdomen, the remaining bars progressively thinner, the last two sometimes faint; head green dorsally, grading to yellow ventrally (covering most of upper lip), with broad blue-edged pink bands, including one from front of snout to eye, with a broader parallel one below that passes ventral to eye, and a still broader one ventrally on head posterior to mouth; pelvic fins black. Males similar in color; the white bars on body may be tinged with green; a dark red to black spot behind eye, smaller irregular black spots on nape, the lower pink band on head suffused with blackish, upper edge of caudal peduncle and fin yellow and lower edge fin half yellow; and pelvic fins green.

Distribution and Ecology. Ranges from Oman, south on East African coast to KwaZulu-Natal, east to the Line Is. and Pitcairn Is.; in the western Pacific from the Ryukyu and Ogasawara Islands to Lord Howe Island and New South Wales. Usually solitary, mainly on sand and rubble substrata near coral reefs, more in protected than exposed areas, generally at depths less than 20 m. Juveniles secretive, often near long-spined species of sea urchins. Adults feed mainly by taking mouthfuls of sand and gravel, releasing sand from the gill opening, sort-

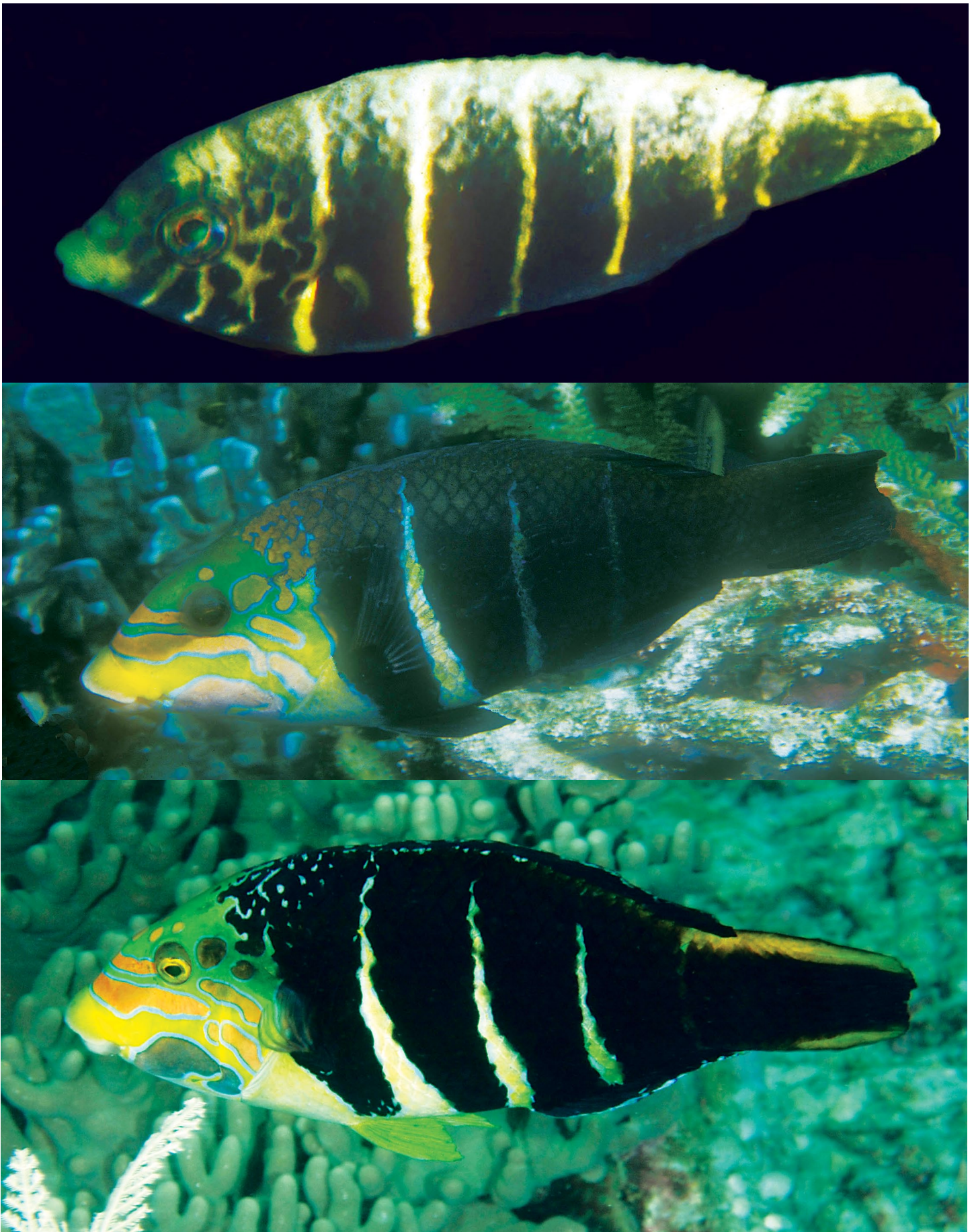


Figure 7. top: *Hemigymnus fasciatus*, 4 cm juvenile, Banda Sea, J. E. Randall; middle: *Hemigymnus fasciatus*, female, Papua New Guinea, J. E. Randall; bottom: *Hemigymnus fasciatus*, male, Wakatobi, Indonesia, D. Polack.

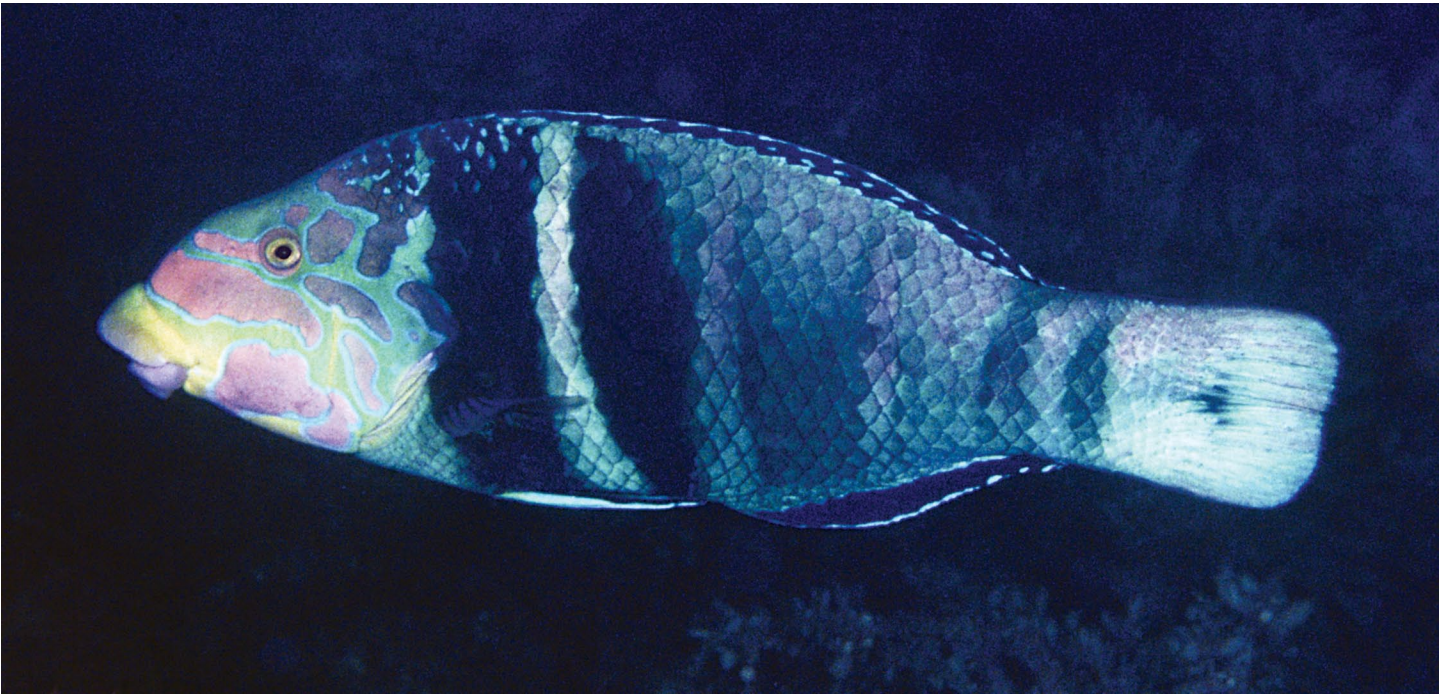


Figure 8. *Hemigymnus fasciatus*, male courtship pattern, Oman, J. P. Hoover.

ing the small animal prey, and ejecting the inorganic fragments from the mouth. However, they may take larger prey; 43% by volume of the stomach and gut contents of a specimen 203 mm SL collected by author at Enewetak, Marshall Islands consisted of shrimps and 25% the crushed remains of the echinoids *Echinometra* and *Diadema*; these were large prey; the remaining food material consisted of very small gastropods, bivalves, crabs, ophiuroids, foraminiferans, and unidentified eggs. A mature female from Tahiti, 168 mm SL, had eaten only a crab and a bivalve. A specimen from Enewetak had more typical gut contents: gastropods, gammarid amphipods, isopods, crabs (including xanthids and portunids), shrimps, galatheids, isopods, polychaetes, and foraminiferans, all very small except for one moderately large gastropod. Males in courtship may exhibit a reversal of the dark and light color pattern of the body (Fig. 8; also illustrated by Myers, 1999: pl. 125 J).

Material Examined. Pitcairn Island, BPBM 12615, 213 mm. Tuamotu Archipelago, Temoe Atoll, BPBM 13508, 71 mm. Marquesas Islands, Fatu Hiva, BPBM 11668, 54 mm; BPBM 11836, 55 mm. Nuku Hiva, BPBM 9107, 72 mm; BPBM 11627, 95 mm; BPBM 12475, 136 mm. Rapa, BPBM 12839, 109 mm. Austral Islands, Rurutu, BPBM 13115, 176 mm. Line Islands, Tabuaeran Atoll (Fanning Island), BPBM 7657, 180 mm. Lord Howe Island, BPBM 14940, 180 mm. Minami-Tori-Shima (Marcus Island), BPBM 7128, 270 mm.

***Hemigymnus sexfasciatus* (Rüppell 1835)**

Figures 2, 9, 10, 11; Table 1.

Halichöeres sexfasciatus Rüppell 1835: 18 (Jeddah).

Hemigymnus sexfasciatus Günther 1862: 139 (Red Sea); Kossman & Räuber 1877: 25 (Red Sea); Kuitert 2002: 204 (Red Sea); Lieske & Myers 2004: 160 (Red Sea).

Hemigymnus fasciatus [non Bloch] Klunzinger 1871: 21 (Red Sea); Fowler & Bean (1928: 245), de Beaufort (1940: 143), Roux-Estève & Fourmanoir 1955: 198 (Abu Latt, Red Sea); Randall 1983: 122 (Red Sea); Dor 1984: 203 (Red Sea); Khalaf & Disi 1997: 159 (Gulf of Aqaba); Field & Field 1998: 148 (Red Sea).

Diagnosis. A species of *Hemigymnus* with 20–23 (rarely 23) gill rakers and long pelvic fins (reaching anus in



Figure 9. top: *Hemigymnus sexfasciatus*, juvenile, Red Sea, H. Sjöholm; bottom: *Hemigymnus sexfasciatus*, female, Sudan, J. E. Randall.

mature females and to or beyond origin of anal fin in males (one to spinous portion of fin). Small juveniles dark green, mottled with light yellowish green, with a white bar from anterior part of dorsal fin to abdomen, four faint narrower bars posteriorly, a pale bar on nape, and two ventrally on chest; larger juveniles dark brown with more distinct pale yellow bars. Body of small females black with five white bars, progressively narrower posteriorly, the last posteriorly on caudal peduncle faint, the first two expanding ventrally; head white with a curving black bar from nape to eye; snout and interorbital green with irregular pink bands radiating from eye; pectoral-fin rays

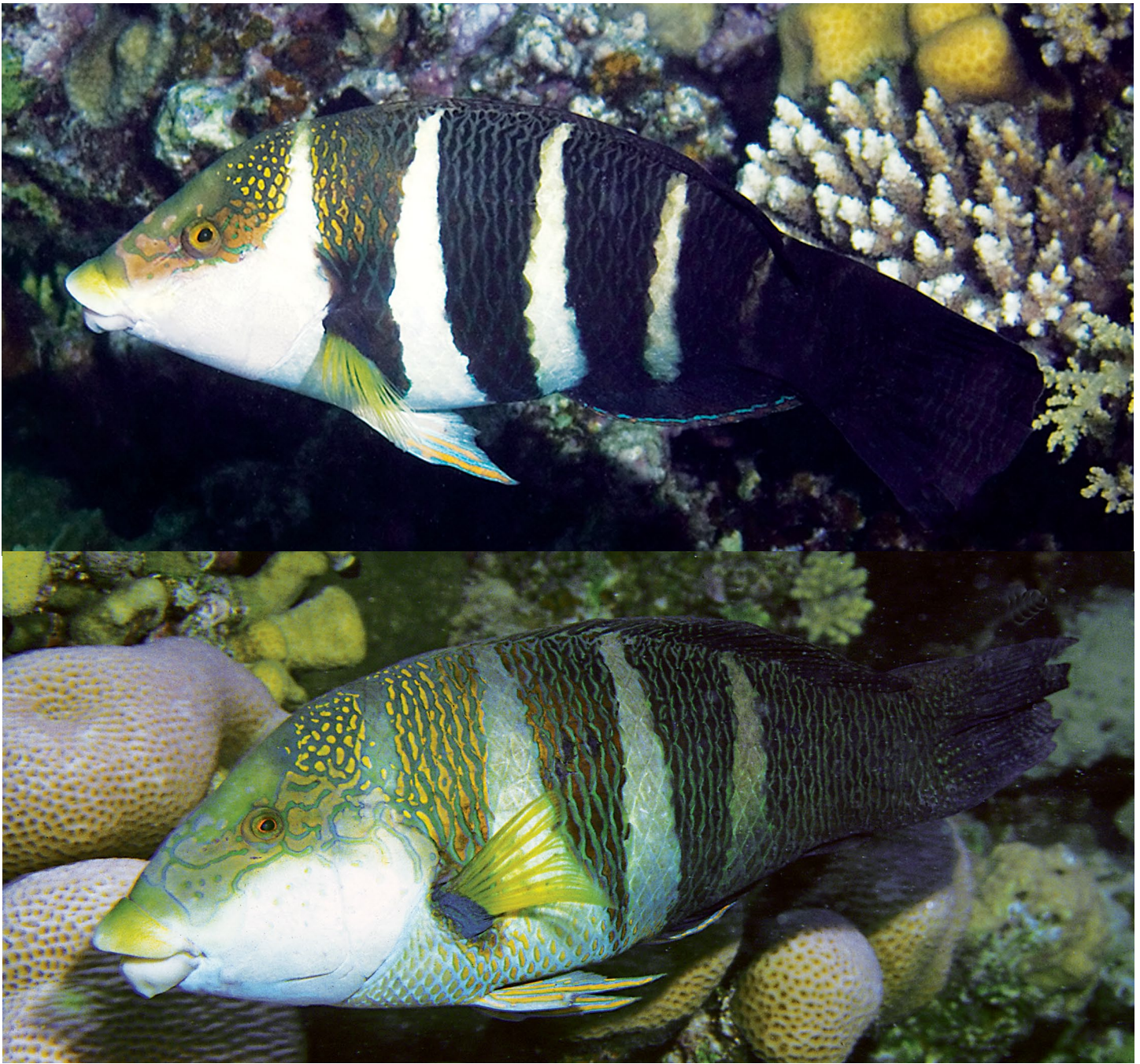


Figure 10. top: *Hemigymnus sexfasciatus*, intersex, Red Sea, S. V. Bogorodsky; bottom; *Hemigymnus sexfasciatus*, male, Red Sea, R. F. Myers.

yellow, the membranes transparent. The large female of Figure 10 (top) appears to be in the process of sex change, as indicated by the golden scale centers dorsally on the first dark bar of the body and on the dark olive bar of the nape; pelvic fins pale blue with orange streaks. Body of males dark green, the spindle-shaped scales edged in light green; three pale gray bars on anterior two-thirds of body that broaden ventrally, the scale edges narrowly light green; first dark bar on body, ending at base of pectoral fin, with green margins and vertically elongate golden centers, many merging above and below, more as irregular vertical green and golden lines than as scale patterns; curving dark green bar of nape with golden scale centers, merging with a broad light yellowish brown band with irregular green bands that passes through eye onto snout; cheek with a broad near-white area, sparsely and faintly spotted with green, shading ventrally to blue; upper lip mainly greenish yellow; chest and abdomen pale blue with orange scale centers; pectoral-fin base in a large deep blue spot.

Distribution and Ecology. This species is known from the Red Sea, Gulf of Tadjoura (two specimens speared by Luiz A. Rocha at the request of the author and curated at the California Academy of Sciences), east in



Figure 11. *Hemigymnus sexfasciatus*, juvenile, SMF 34893, 24 mm, Sikha Island, Yemen, Gulf of Aden, Sven Tränkner.

the Gulf of Aden at least to Sikha Island (13°55'57"N, 48°23'14"E), southwest of Al Mukallah, Yemen. Figure 11 depicts a 24-mm juvenile of *Hemigymnus sexfasciatus* from Sikha Island (SMF 34893) collected by F. Krupp and party, and identified by the gill-raker count of 21 made by Uwe Zajonz. Moteah Sheikh Aideed of Hadrhamout University of Science and Technology at Al Mukallah, a student studying reef fish populations of Socotra under the co-supervision of Zajonz, reported all three species of *Hemigymnus* present on reefs southwest of Al Mukallah, *Hemigymnus fasciatus* the most common and *H. sexfasciatus* rare.

Hemigymnus sexfasciatus is found on coral reefs and adjacent habitats, especially sand and coral rubble, from the depth range of 1 to at least 20 m. It has the same unique mode of feeding as the other two species. Field and Field (1998) observed large breeding males in the Red Sea with a reversal of the black-and-white barred color pattern as noted for *Hemigymnus fasciatus*.

Material examined. Red Sea, Gulf of Aqaba, BPBM 18126, 278 mm. Oman, south coast, Sudh Bay, BPBM 34412, 56 mm. Material examined for author by Shirleen Smith at the U. S. National Museum of Natural History: Red Sea, USNM 167014, 59 mm; USNM 277511, 155 mm; USNM 277513, 2: 93–150 mm; USNM 277538, 2: 89–111 mm; USNM 277539, 35 mm; USNM 277540, 38 mm; USNM 277551, 156 mm; USNM 277552, 147 mm.

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