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The Validity of the Haemulid Fish *Pomadasys quadrilineatus* Shen and Lin, 1984 with the Designation of the Neotype of *Pomadasys stridens* (Forrskål, 1775)

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Abstract A valid haemulid fish, *Pomadasys quadrilineatus* Shen and Lin, 1984, is redescribed. It is distributed on the East Asian Shelf, including Taiwan, Okinawa Island, and Miyazaki Prefecture (southeastern part of Kyushu Island, Japan). This species has been synonymized with *P. striatum* (Gilchrist and Thompson, 1908) and *P. stridens* (Forsskål, 1775), but differs in color pattern, meristic characters and geographic distribution. *Pomadasys quadrilineatus* is distinguished from the other two species by having five rather than four stripes on the body and lower counts (5-6 versus more than 6) for upper limb gill rakers. *Pomadasys stridens* is distributed off South Africa, in the Red Sea, in the eastern Mediterranean and off India, whereas *P. striatum* is distributed only off South Africa and in the Red Sea, including the Gulf of Suez. A neotype of *P. stridens* (Forsskål, 1775) is designated on the basis of a specimen collected from the type locality, the Red Sea.

Shen and Lin (1984) described a small new grunter, *Pomadasys quadrilineatus*, based on specimens from Taiwan, which were previously identified erroneously as *Pomadasys striatum* (Gilchrist and Thompson, 1908) by Chu (1957) and Chen (1969). In the same year, Yoshino (1984) reported and provided a color photograph (pl. 162C) of a specimen from Japan, which he identified as *P. stridens* (Forsskål, 1775). The following year, in Lee's (1985) revision of haemulid fish of Taiwan, he placed *P. quadrilineatus* in the synonymy of *P. stridens*. Chen and Yu (1986) followed Lee (1985) by considering *P. quadrilineatus* to be a junior synonym of *P. stridens*.

After comparison of a paratype of *P. quadrilineatus* and six additional specimens from Japanese waters with the holotype of *P. striatum* and other material from the type locality (Red Sea) of *P. stridens*, we regard *P. quadrilineatus* as a valid species. A specimen from the type locality, the Red Sea, is designated as the neotype of *P. stridens* (Forsskål, 1775).

Materials and Methods

Counts and measurements followed Weber and de Beaufort (1931). Terminology of the family Haemulidae follows Johnson (1981). Standard lengths are expressed as SL. Institutional codes were used as follows: The Hebrew University of Jerusalem, Israel (HUJF), Fisheries Science Course, Miyazaki University, Japan (MUFS), National Science Museum, Tokyo, Japan (NSMT), National Taiwan University, Taiwan (NTUM), J. L. B. Smith Institute of Ichthyology, South Africa (RUSI), South African Museum, South Africa (SAM) and University of the Ryukyus, Japan (URM).

Pomadasys quadrilineatus Shen and Lin, 1984
(Japanese name: Suji-mizoisaki)
(New English name: Yellow-lined grunter)
(Fig. 1)

Rhonciscus striatum (not of Gilchrist and Thompson) Chu,

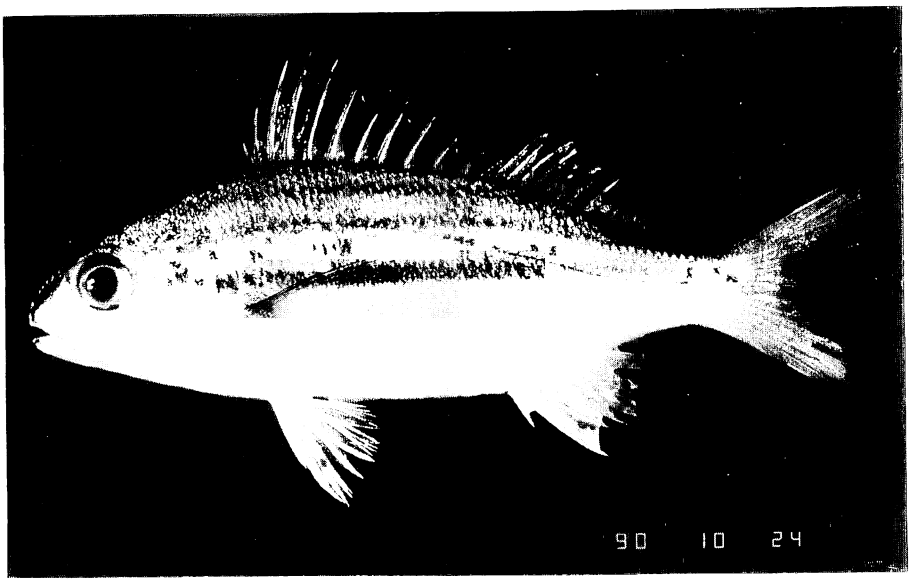

Fig. 1. *Pomadasys quadrilineatus*, MUFS 8779, 102.0 mm SL.

1957: 19.

Pomadasys striatum (not of Gilchrist and Thompson) Chen, 1969: 398.

Pomadasys quadrilineatus Shen and Lin, 1984: 6, fig. 2; Shen, 1984: 65, fig. 65 (323-1).

Pomadasys stridens (not of Forsskål) Yoshino, 1984: 167, pl. 162(C); Lee, 1985: 260, fig. 1 (as *Pomadasy* [sic.]); Chen and Yu, 1986: 557; Shimada, 1993: 735.

Materials. HUJF 17734, 116.0 mm SL, set net, Oshima, Nango, Miyazaki, Japan, 21 Dec. 1990; MUFS 8658, 123.0 mm SL, set net, Meitsu, Nango, Miyazaki, Japan, 18 May 1983; MUFS 8779, 102.0 mm SL, set net, Meitsu, Nango, Miyazaki, Japan, 24 Oct. 1990; NSMT-P 45903, 99.5 mm SL, Naha, Okinawa Island, Japan, 31 Mar. 1973; NSMT-P 45904, 119.0 mm SL, set net, Akamizu, Nobeoka, Miyazaki, Japan, 30 June 1989; NTUM 05689 (paratype), 117.0 mm SL, Tachi, Taiwan, 8 April 1978; URM-P 4286, 109.0 mm SL, Haneji Fish Market, Okinawa Island, Japan, 20 Jan. 1979.

Description. D XII, 12–13; A III, 6–7; P_1 15–16: P_2 I, 5; pored lateral-line scales 52–54+5–6 more pored scales on scaly sheath of caudal fin; scales above and below lateral-line 9–11 and 13–14, respectively; gill rakers 5–6 (including 0–3 very short gill rakers)+1+12–13(including 0–1 very short gill raker)=19–20(including 0–3 very short gill rakers). Body moderately slender and compressed, covered with ctenoid scales. Lateral line continuous. Eye diameter subequal to interorbital. Suborbital depth in eye diameter 2/3. Head covered with scales, excepting anterior part of snout, lips and chin. A central longitudinal groove below chin, with two pores anteriorly. Lips thick. Jaws with small, conical pointed teeth in narrow bands anteriorly, outermost row generally much enlarged. No large canines. Palate edentate. Single notched dorsal fin. First anal spine very small, second spine longer and stronger than third. Dorsal and anal fins each with a low scaly sheath. Pectoral fin tip reaching or not reaching to pelvic fin tip. Caudal fin forked or weakly forked. One pseudobranchial filament present on each side.

Fresh coloration.—Back light brown, abdomen silvery. Dorsal fin yellowish tan. Pelvic and anal fins whitish hyaline, slightly yellow. Pectoral fins semitransparent but brown at base and upper part. Opercle without blotch. Five separate five golden-yellow stripes on body in life, first stripe from nape to anterior spinous dorsal profile, often indistinct; second stripe from nape to base of anterior soft dorsal fin; third stripe from uppermost opercle, following curve of lateral line to below posterior spinous dorsal, and then to base of posterior soft dorsal fin; fourth stripe on mid-axis, from behind eye, over upper part of pectoral fin to upper portion of caudal fin; fifth stripe from behind lower part of pectoral fin to lower caudal peduncle, being lighter goldish-yellow than other stripes (first to fourth).

Coloration of preserved material.—Light brown

with three distinct dark longitudinal stripes, the first and fifth stripes (see above) often having disappeared.

Distribution.—This species is distributed only on the East Asian Shelf, including Taiwan, Okinawa Island, and Miyazaki Prefecture which is the northernmost record of this species. According to Shen and Lin (1984), and Lee (1985), the species was collected at Hualien, Kaoshiung Gaoxiong, Tachi, Hengchun, and Tungkang, Taiwan. Only 19 specimens are known from Taiwan (Chu, 1957; Chen, 1969; Shen and Lin, 1984; Lee, 1985; Chen and Yu, 1986) and six specimens from Japan (Yoshino, 1984 and this study).

Ecological note.—All the specimens of this apparently rare species were collected from less than 30 m depth by set net and gill net.

Comparisons. Diagnostic characters of the three apparently closely related species are given in Table 1. These three species are characteristically small with longitudinal stripes on the abdomen.

Pomadasys quadrilineatus is easily distinguished from the other two species by five separate goldish-yellow stripes in life, and lower counts (5–6) of upper limb gill rakers. The other two species have four dark brown stripes (first stripe always unclear, running along uppermost dorsal profile), with the third stripe along the lateral-line below anterior soft dorsal nearly meeting the fourth and higher counts (7 or more) of upper limb gill rakers. *Pomadasys stridens* differs from the other species in having a

Table 1. Diagnostic characters and geographic distribution of three haemulid fishes, *Pomadasys quadrilineatus*, *P. stridens* and *P. striatum*

	P. quadrilineatus paratype (NTUM 05689), 117.0 mm SL and 6 other Japanese specimens, 99.5–123.0 mm SL	*P. stridens* neotype (HUJF 6708), 114.5 mm SL and 16 other specimens, 46.0–125.0 mm SL	*P. striatum* holotype (SAM 9950), 153.0 mm SL and 9 other specimens, 96.0–164.0 mm SL
Dorsal spines and rays	XII, 12–13	XII, 13–14	XII, 13–14
Anal spines and rays	III, 6–7	III, 7	III, 7
Gill rakers*	5–6(0–3)+1+12–13(0–1)	7–8+1+14–15(0–1)	8–10+1+9–13(2–5)
Pored lateral-line scales+pored scales on scaly sheath of caudal fin	52–54+5–6	49–53+5–6	52–54+4–6
Number of scales above/below lateral-line	9–11/13–14	11–13/19–23	13–15/21–23
Depth in standard length	2.84–3.16	3.14–3.34	2.48–2.84
Scale rows below lateral-line	horizontal	obliquely running in lower abdomen	obliquely running in lower abdomen
Suborbital depth in eye diameter	2/3	1.0 or slightly over 1.0	4/5
Pectoral fin tip (when vented)	usually not reaching to pelvic fin tip but sometimes equal	equal or reaching to over pelvic fin tip	reaching to over pelvic fin tip
A dark blotch on upper opercle	absent but yellow stripe present in life	present and stripe also present	absent but stripe present
Stripe pattern on body	five, separate, and goldish-yellow stripes, with the third stripe not meeting the fourth stripe	four dark brown stripes (but first stripe always unclear, running along uppermost dorsal profile, or none), with the third stripe nearly meeting the fourth	four dark brown stripes (but first stripe always unclear, running along uppermost dorsal profile, or none), with the third stripe nearly meeting the fourth
Distribution	Taiwan, Okinawa Island and Miyazaki, southern Japan	India, South Africa, Red Sea and eastern Mediterranean	South Africa, Red Sea, Gulf of Suez

* Gill-raker counts are of range of total number (upper+middle+lower); very short gill rakers (*P. quadrilineatus* and *P. stridens*) and minute rudiments (*P. striatum*) are shown in parentheses.

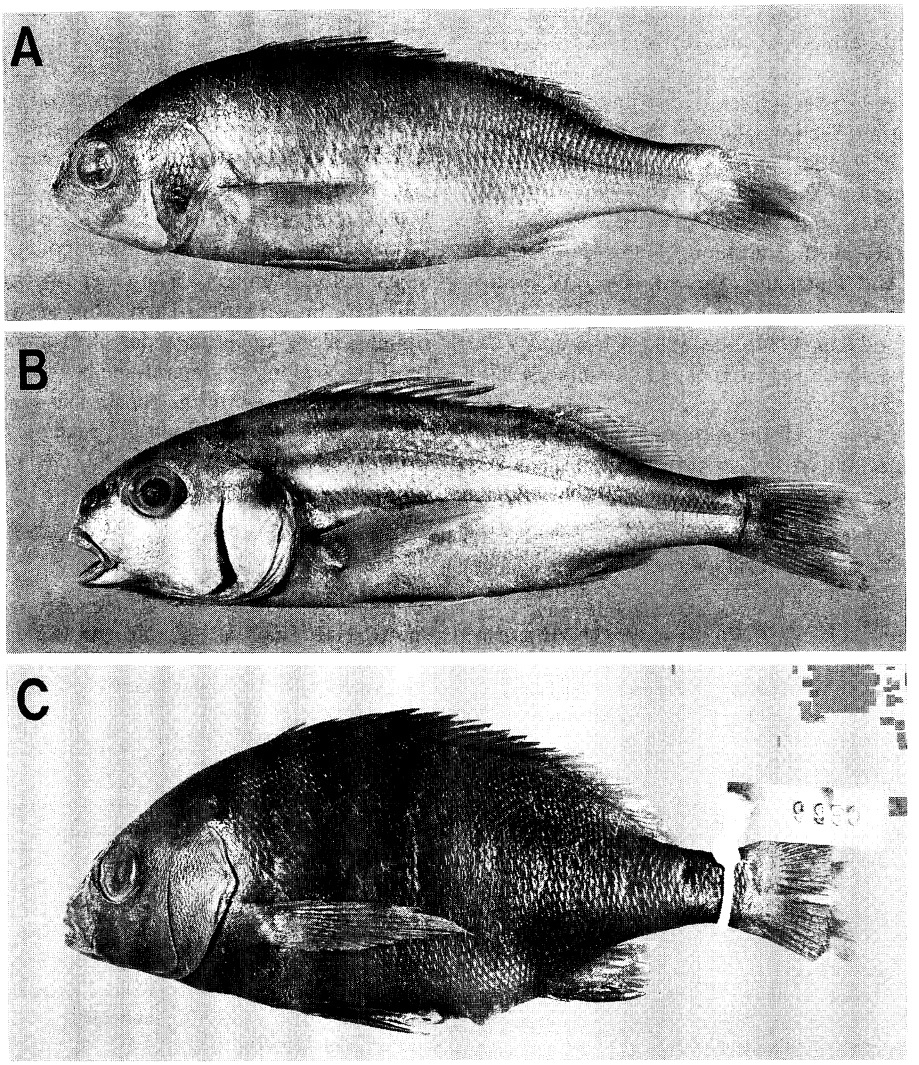

Fig. 2. Type materials of three haemulid fishes. A) *Pomadasys quadrilineatus*, paratype (NTUM 05689), 117.0 mm SL; B) *P. stridens*, neotype (HUJF 6708), 114.5 mm SL; C) *P. striatum*, holotype (SAM 9950), 153.0 mm SL.

dark round blotch on the upper opercle (Fig. 2B) and shallower body depth in SL (3.14–3.34 compared to 2.84–3.16 in *P. quadrilineatus* and 2.48–2.84 in *P. striatum*). Pectoral fin tip in *P. quadrilineatus* reaches or does not reach to pelvic fin tip, compared with reaching to or beyond in *P. stridens* and beyond in *P. striatum*. In addition, *P. quadrilineatus* has a shallower suborbital depth in ca. 2/3 eye diameter as compared to equal to or greater than eye diameter in *P. stridens* and around 4/5 in *P. striatum*.

Remarks. The holotype of *Pomadasys stridens* (Forsskål, 1775) is lost (Klausewitz and Nielsen, 1965). However, we examined specimens of *P. stridens* from Ras Sudar and Massawa, Ethiopia, Red Sea. We also examined a paratype (NTUM 05689), among 10 type specimens, of *P. quadrilineatus* Shen and Lin, 1984, and the holotype (SAM 9950) of *P. striatum* (Gilchrist and Thompson, 1908).

Pomadasys quadrilineatus has distinct characters —different number, coloration, and pattern of longitudinal stripes on body compared with the other two species. Furthermore, *P. quadrilineatus* is distributed only on the East Asian Shelf, (Taiwan to

southern Japan) in comparison with the widespread western Indian Ocean distribution, South Africa to the Red Sea, of *P. striatum* and *P. stridens*. In addition, *P. stridens* has colonized the eastern Mediterranean presumably *via* the Suez Canal (Golani, 1993). These distribution patterns support our conclusion that *P. quadrilineatus* is different from *P. striatum* and *P. stridens* and a valid species of the genus *Pomadasys*.

Designation of the Neotype of *Pomadasys stridens* (Forsskål, 1775)

Neotype. HUJF 6708, 114.5 mm SL, Massawa, Ethiopia, Red Sea, A. Ben-Tuvia, 4 Dec. 1957.

Description of the neotype. D XII, 13; A III, 7; P_1 16; P_2 I, 5; lateral-line pored scales 49+5 more pored scales on scaly sheath on caudal fin base; scales above and below lateral-line 11/21; gill rakers 7+1+14 (left side dissected and counted on right side; last lower gill raker rather shorter than penultimate). Body slender and compressed, covered with ctenoid scales. Lateral line continuous. Eye diameter larger than interorbital. Suborbital depth in eye diameter slightly over 1.0. Head covered with scales, excepting anterior part of snout, lips and chin. A central longitudinal groove below chin, with two pores anteriorly. Lips moderately thick. Jaws with small, conical pointed teeth in narrow bands anteriorly, outermost row generally much enlarged. No large canines. Palate edentate. Single notched dorsal fin. First anal spine very small, second spine generally subequal to and slightly shorter than third. Dorsal and anal fins each with a low scaly sheath at its base. Pectoral fin tip reaching slightly beyond pelvic fin tip when appressed. Caudal fin weakly forked. One pseudobranchial filament present on each side. Data of proportional measurements of the neotype of *Pomadasys stridens* are shown in Table 2.

Fresh coloration.—Information live coloration of this species is based on color slides of two specimens, HUJF 12741, 134.0 mm SL, and HUJF 12353, 119 mm SL. Back very light brown, abdomen silvery. Dorsal fin hyaline with very narrow black margin. Pelvic and anal fins whitish. Pectoral fins blackish brown in upper 2/3 but hyaline in lower 1/3. Upper posterior of opercle with distinct black blotch. Four dark brown stripes present: first stripe indistinct, running along uppermost dorsal profile; second stripe from temporal to base of posterior part of soft dorsal fin; third stripe from uppermost opercle, along the lateral-line to below middle of soft dorsal, nearly meeting the fourth; fourth stripe on mid-axis, from behind eye, over upper part of pectoral fin to upper portion of caudal fin. Caudal fin slightly brownish black and with very narrow black margin. In HUJF 12353, uppermost and lowermost caudal fin tips rather black.

Coloration of preserved material.—Based on the neotype. Dark brown with three clear dark longitudinal stripes; the first stripe indistinct.

Distribution.—This species is distributed in the western Indian Ocean, off South Africa, the Red Sea (including eastern Mediterranean Sea) and off western India (Smith, 1953; Dor, 1984; Smith and McKay, 1986).

Ecological note.—This species is very common along the waters over sandy bottom in the northern Red Sea.

Table 2. Propotional measurements of the neotype (HUJF 6708) of *Pomadasys stridens*, expressed in percents of standard length (114.5 mm)

Body depth at pelvic origin	30.7
Body depth at first anal spine origin	25.4
Head length	34.1
Body width at pectoral origin	65.6
Snout length	11.4
Eye diameter	8.8
Interorbital width	7.4
Upper jaw length	9.5
Caudal peduncle depth	9.5
Caudal peduncle length	12.1
Predorsal length	38.3
Preanal length	64.0
Prepelvic length	40.1
Dorsal fin base	51.4
Anal fin base	12.6
Caudal fin length	27.5
Pelvic spine length	13.3
First pelvic ray length	21.0
Pectoral fin length	27.9
First dorsal spine length	3.3
Second dorsal spine length	9.7
Third dorsal spine length	16.8
Last dorsal spine length	6.9
First dorsal ray length	14.8
First anal spine length	2.7
Second anal spine length	10.7
Third anal spine length	11.3
First anal ray length	14.2

Remarks. We have designated a neotype in order to avoid taxonomic confusion of the three closely related species. The holotype of *Pomadasys stridens* (Forrskål, 1775) was reported as lost by Klausewitz and Nielsen (1965).

Comparative materials examined. *Pomadasys striatum*: MUFS 9078–9087, 9 specimens, 96.0–164.0 mm SL, Natal, South Africa, 4 Aug. 1992; SAM 9950 (holotype), 1 specimen, 153.0 mm SL, Natal, South Africa, collection date unknown. *P. stridens*: HUJF 6707, 4 specimens, 110.0–125.0 mm SL, Abu Zneima, Gulf of Suez, Red Sea, 30 Apr. 1970; HUJF 12741, 1 specimen, 134.0 mm SL, Haifa, eastern Mediterranean Sea, 8 Dec. 1987; MUFS 9689, 1 specimen, 102.0 mm SL, Red Sea, collection date unknown; MUFS 10238, 10 specimens, 46.0–56.0 mm SL, Ras Sudar, Red Sea, collection date unknown, 1970.

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スジミゾイサキ *Pomadasys quadrilineatus* の有効性及び *P. stridens* (Forsskål) の新模式標本の指定

岩槻幸雄・吉野哲夫・Daniel Golani・神田　猛

台湾から報告されたイサキ科魚類スジミゾイサキ *Pomadasys quadrilineatus* Shen and Lin は，南アフリカから紅海におよぶ西部インド洋から報告されている *P. striatum* (Gilchrist and Thompson) や *P. stridens* (Forsskål) の同種異名とされてきた．しかし，前者と後者2種は，体側の縦線の数と色，縦線の走り方及び地理分布が異なっており，*P. quadrilineatus* は有効である．スジミゾイサキでは，生時には金色がかった黄色の5本の縦線（1番目の縦線は，頭部の項部から第1背鰭棘基部に向かって走る）がほぼ平行に走るのに対し，後者2種では不明瞭な1本の茶色の縦線（体側背部外縁に沿って走る）と明瞭な3本の濃い合計4本の縦線がある．なお，後者2種では，3番目の縦線は側線に沿って走り，4番目の縦線と尾柄部付近でつながるようにみえる

ことで，スジミゾイサキとは明らかに異なる．従って，スジミゾイサキは，後者2種とは異なる東アジアの大陸棚にのみ生息する固有種と判断される．本種は，これまでに台湾からの19個体及び日本からの6個体の25個体のみが知られている．本報告はスジミゾイサキの日本からの2番目の記録である．宮崎県からの記録は本種の最北限の記録になる．学名の安定のために *P. stridens* (Forsskål) の新模式標本の指定を行った．

(岩槻：〒889-21 宮崎県宮崎市学園木花台西1-1　宮崎大学農学部動物生産学科；吉野：〒903-01 沖縄県中頭郡西原町千原1　琉球大学理学部海洋学科；Golani：イスラム国　エルサレム　ヘブライ大学；神田：〒889-05 宮崎県延岡市赤水町376-6　宮崎大学農学部附属水産実験所)