

Taxonomy and Distribution of Star Snapper *Lutjanus stellatus* Akazaki, 1983 (Perciformes: Lutjanidae)

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Abstract Star Snapper *Lutjanus stellatus* was redescribed from 32 specimens, including both type and newly-collected Japanese specimens, in order to clarify its diagnostic characters and distribution pattern. *Lutjanus stellatus* differs from a congener, *L. rivulatus*, in having a small white spot above the lateral line (vertically level with the first to third dorsal fin soft rays), a longitudinal blue line between the snout and opercle, the posterior margin of the anal fin rounded, and an area of granulated body scales with a straight posterior margin. A detailed distribution is provided, based on specimens, underwater photographs and a literature survey.

Key words: Japanese specimens, *Lutjanus rivulatus*, *Lutjanus stellatus*, redescription, type series.

Introduction

Indo-Pacific snappers in the genus *Lutjanus* comprise 46 valid species (Allen, 1985; Allen and Talbot, 1985; Iwatsuki *et al.*, 1993, 2015, 2016; Allen *et al.*, 2013), of which two, *Lutjanus stellatus* Akazaki, 1983 and *L. rivulatus* (Cuvier, 1828), are distinct from the remainder in having a small white spot on the body (Allen, 1985; Allen and Talbot, 1985). *Lutjanus stellatus* is further separated from *L. rivulatus* in having a shorter head length, shorter pectoral fin length, posterior margin of anal fin rounded and blue lines on the snout and cheek (Akazaki, 1983).

The distribution of *L. stellatus* (limited to temperate and subtropical Western North Pacific) also differs from that of *L. rivulatus* (widely distributed in the Indo-West Pacific) (Akazaki, 1983; Allen, 1985; Allen and Talbot, 1985). Shimada (2013) included detailed localities of

both species from Japanese waters, and Tashiro *et al.* (2017) recently reported a large specimen of *L. stellatus* from the Sea of Japan, being a new record for that region.

In this study, all distributional information based on Japanese specimens, underwater photographs and literature of *L. stellatus* were reviewed and the species was redescribed.

Materials and Methods

Methods for counts and measurements follow Allen and Talbot (1985) and Iwatsuki *et al.* (1993). Vertebrae were counted on radiographs. Standard length (SL) and head length (HL) are used throughout. Scanning electron microscopy (SEM) was used for observation of body scales. Institutional abbreviations follow Fricke and Eschmeyer (2017), except for Okinawa Churashima Foundation (OCF). Photographic

survey (underwater photographs and specimen images) was made on FishPix: <http://fishpix.kahaku.go.jp/fishimage-e/top.html>. A map of collection sites showing bathymetric imagery was made by GMT 4.5.9 using data from ETOPO1 (Amante and Eakins, 2009).

***Lutjanus stellatus* Akazaki, 1983**

[Japanese name: Fuedai]

[English Name: Star Snapper]

(Figs. 1A–D, 3A, 4A, 5A, 6; Table 1)

Lutjanus sp.: Masuda *et al.*, 1975: 238, plate 64-D (Miyazaki Prefecture, Japan).

Lutjanus stellatus Akazaki, 1983: 367, figs. 2, 3B (original description; Miyazaki and Mie prefectures, Japan); Akazaki, 1984: 164, pl. 156-G, H (Japan); Allen and Talbot, 1985: 74, fig. 33 (Taiwan, Hong Kong and Japan); Allen, 1985: 118, pl. XXII, 79 (Taiwan, Hong Kong and Japan); Iwatsuki *et al.*, 1989: 476, fig. 3GH (Japan); Masuda and Kobayashi, 1994: 154 (Yaeyama Islands and Izu Peninsula, Japan); Hirata *et al.*, 1996: 62 (Kashiwa-jima Island, Kochi Prefecture, Japan); Akazaki, 1997: 329 (southern Japan and Taiwan); Randall *et al.*, 1997: 30, pl. 8E (Ogasawara Islands); Funabashi, 1998: 88 (Ibaraki Prefecture); Fukui, 1999: 123, 270 (Ukui, Wakayama Prefecture, Japan); Allen, 2000: 618 (South China Sea); Sadovy and Cornish, 2000: 123 (Hong Kong); Sakai *et al.*, 2001: 98 (Okinawa Islands, Japan); Yagishita, 2001: 207 (Iburi, Kochi Prefecture, Japan); Senou *et al.*, 2002: 210 (Hachijo-jima Island, Tokyo Prefecture, Japan); Fujiyama, 2004: 86 (Amami-oshima Island, Kagoshima Prefecture, Japan); Senou *et al.*, 2006: 458 (Sagami Bay); Shao *et al.*, 2008: 252 (Pingtung County, Taiwan); Motomura *et al.*, 2010: 120, fig. 213 (Yaku-shima Island, Kagoshima Prefecture, Japan); Chen *et al.*, 2010: 215D (Kenting, Taiwan); Kim *et al.*, 2012: 313, fig. 3 (Jeju Island, South Korea); Sasaki, 2013: 142 (Jeju Island); Iwatsubo *et al.*, 2014: 84 (Ei Town, Kagoshima Prefecture); Kurriwa *et al.*, 2014: 1483 (Zunan Islands, Tokyo Prefecture); Ikeda and Nakabo, 2015: 411, pl. 145-2 (Wakayama Prefecture, Japan); Tashiro *et al.*, 2017 (Maizuru, Kyoto Prefecture, Japan).

Specimens and photographs examined. BSKU 38360, paratype, 233.2 mm SL, Kawaminami Town, Miyazaki Prefecture, Kyushu Island, Japan, 30 July 1978; BSKU 86727, 202.4 mm SL, Iburi, Tosashimizu City, Kochi Prefecture,

Shikoku Island, Japan, 10 October 1999; FAKU S4085, paratype, 227.0 mm SL, Udo, Nichinan City, Miyazaki Prefecture, 11 August 1981; FAKU 139704, 250.1 mm SL, Maizuru City, Kyoto Prefecture, Honshu Island, Japan, 1 December 2015; HUMZ 97092, paratype, 234 mm SL, Udo, Nichinan City, Miyazaki Prefecture, 11 August 1981; MUFS 2533, paratype, 369.3 mm SL, Kawaminami Town, Miyazaki Prefecture, 20 July 1973; MUFS 7406, paratype, 228.4 mm SL, Udo, Nichinan City, Miyazaki Prefecture, 11 August 1981; MUFS 7407, holotype, 304.5 mm SL, Udo, Nichinan City, Miyazaki Prefecture, 10 August 1981; NSMT-P 21489, paratype, 363.7 mm SL, Mihama Town, Mie Prefecture, Honshu Island, Japan, 12 August 1967; NSMT-P 47499, 112 mm SL, Amitori Bashita-Minato, Iriomote-jima Island, Okinawa Prefecture, Ryukyu Islands, Japan, 1 November 1995; NSMT-P 60675, 155.4 mm SL, Suno-saki Point, Tateyama City, Chiba Prefecture, Honshu Island, Japan, 1 November 1991; NSMT-P 77692–77693, 2 specimens, 239.2–386.4 mm SL, Takezaki, Tanega-shima Island, Kagoshima Prefecture, 8 July 2007; NSMT-P 77651, 198.7 mm SL, Nagata, Yaku-shima Island, Kagoshima Prefecture, 11 July 2007; NSMT-P 95323, 305.6 mm SL, Kohama, Ototo-jima Island, Tokyo Prefecture, Ogasawara Islands, 5 September 2009; NSMT-P 95380, 333.1 mm SL, Nihoniwa, Chichi-jima Island, Tokyo Prefecture, Ogasawara Islands, 3 September 2009; NSMT-P 103100, 103289, 103411, 103440, 4 specimens, 353.4–418.8 mm SL, Tori-shima Island, Tokyo Prefecture, Zunan Islands, 19 July 2010; NSMT-P 103292–103293, 2 specimens, Sumisu-jima Island, Tokyo Prefecture, Zunan Islands, 18 July 2010; NSMT-P 111142, 99.5 mm SL, Otsuki, Kashiwa-jima Island, Kochi Prefecture, September 1991 (date unknown); NSMT-P 123845, 450.0 mm SL, Okinotori-shima Island, Tokyo Prefecture, Ogasawara Islands, June 2014 (date unknown); NSMT-P 128439, 105.8 mm SL, Ketten, Setouchi Town, Amami-oshima Island, Kagoshima Prefecture, 5 December 2016; NSMT-P 130226, 378.4 mm SL, Iwo-jima Island,

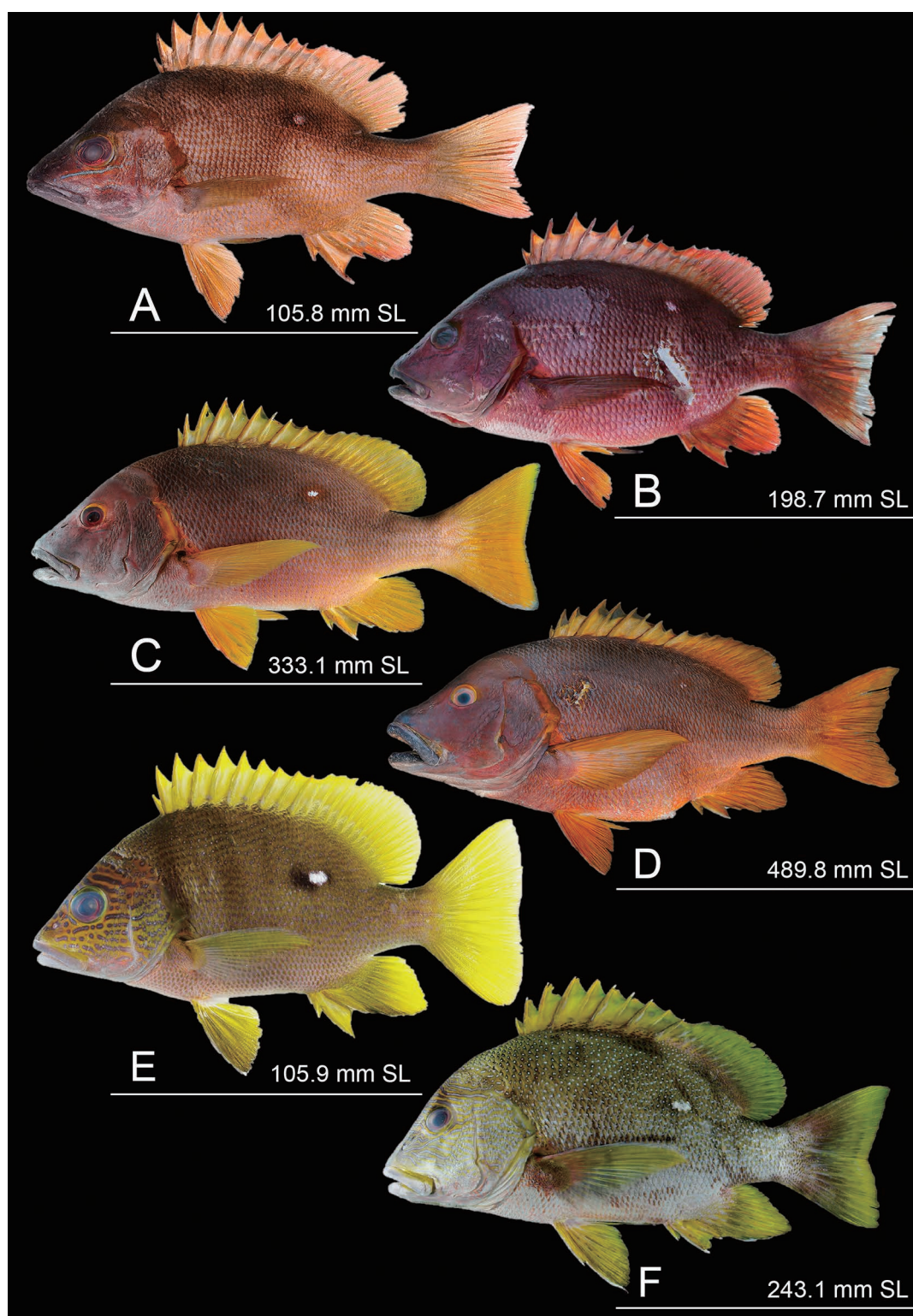


Fig. 1. *Lutjanus stellatus* (A–D) and *L. rivulatus* (E, F) in fresh condition.—A, NSMT-P 128439; B, NSMT-P 77651; C, NSMT-P 95380; D, NSMT-P 103292; E, KAUM-I 83020; F, KAUM-I 66606.

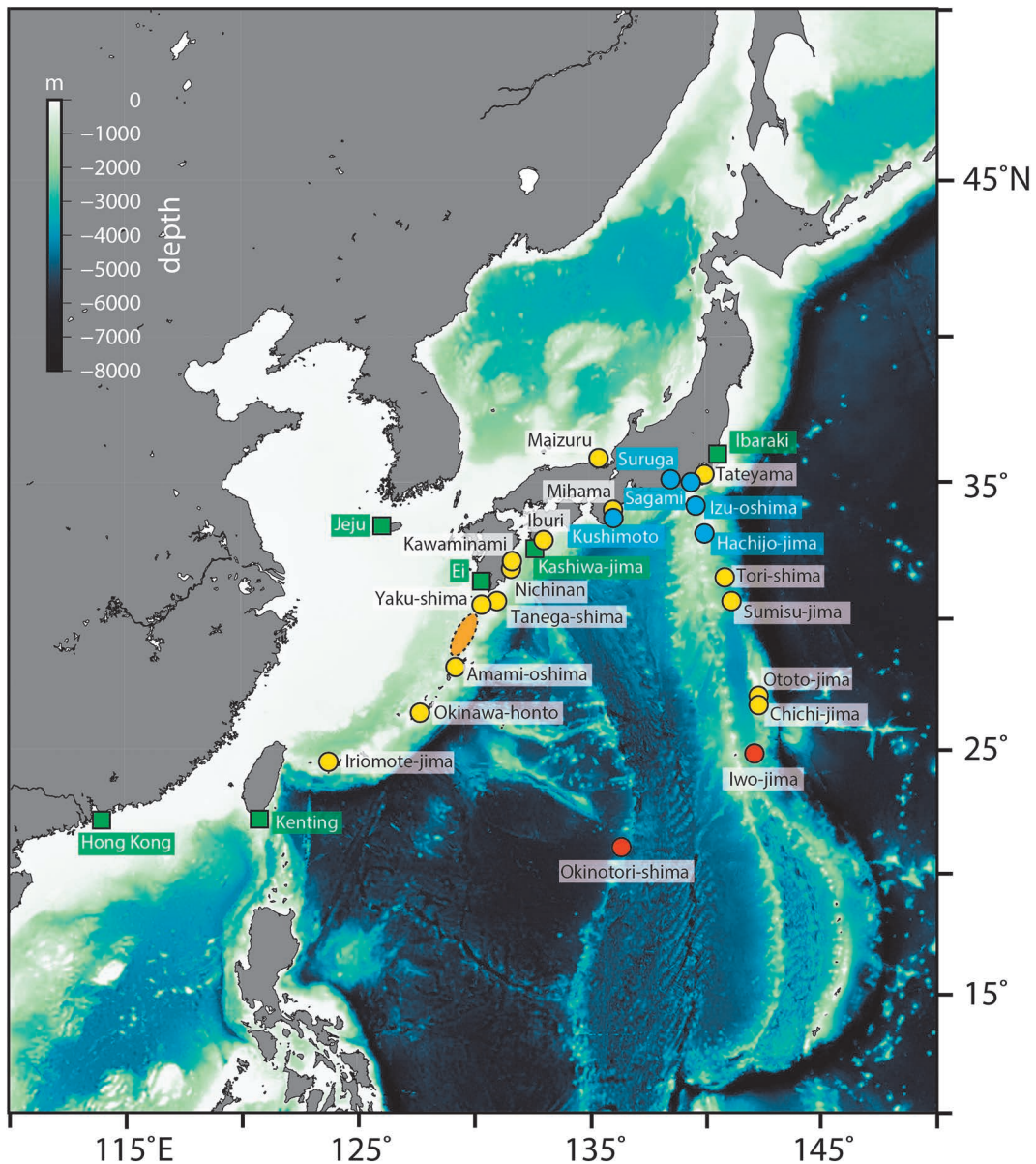


Fig. 2. Distribution of *Lutjanus stellatus* based on specimens (red and yellow circles), underwater photographs (blue circles) and literature records (green squares) with Tokara Islands where matured individuals swarm (orange ellipse).—Red circles indicate new collection localities.

Tokyo Prefecture, Ogasawara Islands, 6 June 2017; OFC 4793 (formally URM-P 4793), 82.9 mm SL, Iriomote-jima Island, Okinawa Prefecture, Ryukyu Islands, 12 September 1982; OFC 4794 (formally URM-P 4794), 96.2 mm SL, Iriomote-jima Island, 17 August 1994; OFC 32359–32360 (formally URM-P 32359–32360),

2 specimens, 58.5–70.0 mm SL, Aja Fishing Port, Okinawa-honto Island, Okinawa Prefecture, 17 August 1994; OFC 8220 (formally URM-P 8220), 396.0 mm SL, Itoman Fishing Port, Okinawa-honto Island, Okinawa Prefecture, date unknown; KPM-NR0004399, underwater photograph, Nazumado, Hachijo-jima Island, Tokyo



Fig. 3. Dorsal and lateral views of head.—A, *Lutjanus stellatus*, NSMT-P 77651, 198.7 mm SL; B, *L. rivulatus*, NSMT-P 127110, 234.5 mm SL.

Prefecture, Izu Islands, Japan, November 1994 (date unknown); KPM-NR0007983, underwater photograph, Osezaki, Numazu City, Suruga Bay, Shizuoka Prefecture, Honshu Island, 3 January

1995; KPM-NR0010491, underwater photograph, Ida, Heda Village, Suruga Bay, Shizuoka Prefecture, 25 August 1996; KPM-NR0040157, underwater photograph, Kushimoto, Nishimuro

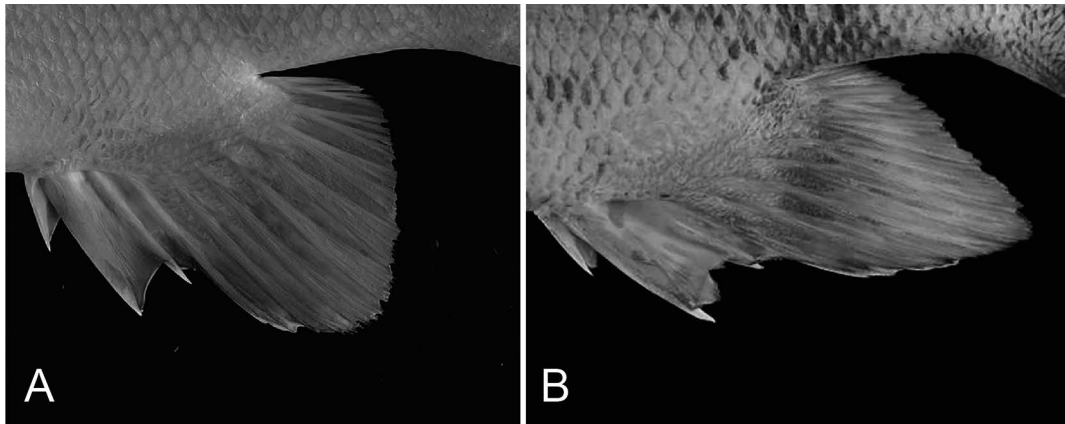


Fig. 4. Anal fin shapes.—A, *Lutjanus stellatus* NSMT-P 95323, 305.6 mm SL; B, *L. rivulatus*. KAUM-I 66606, 243.1 mm SL.

County, Wakayama Prefecture, 12 November 1998; KPM-NR0062050, underwater photograph, Izu-oshima Island, Tokyo Prefecture, Izu Islands, date unknown; KPM-NR0080772, underwater photograph, Matsuwa Beach, Miura City, Sagami Bay, Kanagawa Prefecture, Honshu Island, 13 August 2002.

Diagnosis. A species of *Lutjanus* with the following combination of characters: a small white spot above lateral line, vertically level with first to third dorsal fin soft rays; a longitudinal blue line (brown in preserved specimens) between snout and opercle; posterior margin of anal fin rounded; area of granulated body scales with a straight posterior margin.

Description. Counts and proportional measurements shown in Table 1.

Dorsal fin rays X, 14; anal fin rays III, 8; pectoral fin rays 17–18 (18 in holotype); lateral line scales 47–51 (49); scale rows on cheek 3–6 (5); scale rows above lateral line $9\frac{1}{2}$ – $10\frac{1}{2}$ ($11\frac{1}{2}$), below lateral line $18\frac{1}{2}$ – $20\frac{1}{2}$ ($20\frac{1}{2}$); gill rakers 5–8 (upper) + 11–13 (lower) = 16–21 ($6 + 11 = 17$); vertebrae $10 + 14 = 24$. Proportional measurements (% SL): body depth 39.1–45.6 (40.9 in holotype); body width 15.1–20.2 (18.5); head length 36.0–41.3 (36.7); caudal peduncle depth 11.4–13.8 (12.3); caudal peduncle length 17.0–21.4 (20.7); predorsal length 40.9–47.4

(41.7); preanal length 68.9–74.9 (68.6); prepelvic length 34.9–46.0 (38.3); dorsal fin base length 50.1–54.6 (52.6); anal fin base length 14.1–17.4 (15.1); pelvic fin length 19.1–27.6 (20.2); pectoral fin length 27.4–35.3 (32.7). Proportional measurements (% HL): snout length 31.8–43.2 (40.9 in holotype); orbit diameter 17.4–33.2 (20.4); dermal eye opening 15.7–30.0 (18.2); interorbital width 16.1–26.9 (26.9); upper jaw length 37.3–41.9 (40.6); suborbital depth 12.6–26.2 (26.2); pelvic fin spine length 28.5–36.5 (31.3); 1st dorsal fin spine length 9.5–17.1 (14.2); 2nd dorsal fin spine length 20.6–30.8 (23.4); 3rd dorsal fin spine length 22.5–38.7 (29.8); 4th dorsal fin spine length 30.1–40.4 (32.3); 5th dorsal fin spine length 27.7–41.5 (38.1); 6th dorsal fin spine length 24.8–38.3 (29.6); 1st dorsal fin soft ray length 19.1–36.0 (27.8); 1st anal fin spine length 12.0–22.0 (12.6); 2nd anal fin spine length 24.4–46.6 (30.7); 3rd anal fin spine length 26.5–38.2 (31.1); 1st anal fin soft ray length 30.3–49.7 (38.7).

Body elliptical. Anterior profile of head somewhat concave in nasal region. Dorsal contour of body increasing from snout tip to bases of 4th to 6th dorsal fin spines, decreasing steadily to caudal fin base. Ventral profile of body decreasing from lower jaw tip to pelvic fin origin, more or less horizontal to anal fin, subsequently rising to caudal fin base. Posterior tip of pectoral fin

pointed, reaching just beyond vertical level of 1st anal fin spine origin. Anterior nostril oval, posterior nostril slit-like, just in front of eye. No scales on preopercular flange. Posterior tip of maxilla reaching just beyond vertical level of anterior margin of eye. Snout length greater than orbit diameter. Four small canines on upper jaw, three small canines on lower jaw, a single outer row of small conical teeth on lower jaws, short patch of villiform teeth on lateral inner surface of both jaws. Vomerine teeth in crescentic band. Tongue smooth. Gill rakers elongated at angle and on lower gill arch, others knob-like. Dorsal fin originating above pectoral fin origin. First dorsal fin spine shortest, fourth and fifth longest. Last dorsal fin spine shorter than first dorsal fin soft ray. First anal fin soft ray much longer than third anal fin spine. Dorsal and anal fin bases covered with ctenoid scales. Caudal fin weakly emarginated posteriorly.

Color when fresh (Fig. 1A–D). Body yellowish brown. A small white spot below anterior part of dorsal soft ray base. Fins orange to yellow; pale vermicular blotches conspicuous on dorsal, anal and caudal fins in <200 mm SL specimens (Fig. 1AB). Opercular flap orange dorsally. A small black blotch on upper end of pectoral fin base. Circumorbital region orange in >300 mm SL specimens (Fig. 1CD). A narrow bluish line on suborbital region; inconspicuous on 500 mm SL specimen (Fig. 1D).

Color in alcohol. Body yellowish tan. Grayish white spot on side below anterior part of dorsal soft ray base. A longitudinal dark gray stripe from snout to suborbital.

Distribution. South to Ibaraki (Pacific side) and Kyoto prefectures (Sea of Japan side) in Japan: Miyazaki and Mie prefectures and Okinawa Islands (Akazaki, 1983); Ibaraki Prefecture (Akazaki, 1983; Funabashi, 1998); Wakayama Prefecture (Fukui, 1999); Hachijo-jima Island (Senou *et al.*, 2002); Sagami Bay (Senou *et al.*, 2008); Yaku-shima Island (Motomura *et al.*, 2010), southern Kagoshima Prefecture (Iwatsubo *et al.*, 2014); Maizuru (Tashiro *et al.*, 2017). Outside Japan: Jeju Island in South Korea (Kim *et*

al., 2012; Sasaki, 2013); southern Taiwan (Shao *et al.*, 2008); Hong Kong (Sadovy and Cornish, 2000).

Distributional notes. Occurrence of *Lutjanus stellatus* is limited from the Western North Pacific. This species is recorded from Ibaraki and Kyoto prefectures in the north to Okinotorishima Island in the south, and from Hong Kong (west) to Chichi-jima and Ototo-jima islands (east) (Fig. 2), covering both subtropical and temperate regions along the path of the Kuroshio Current. In comparison with the Pacific coast of Kyushu, Shikoku, western Honshu islands, *L. stellatus* shows a very small number of the collection records from Amami-oshima, Okinawa-honto and Iriomote-jima islands, indicating this species is uniquely and well adapted to temperate zones among the family Lutjanidae. According to Hamamoto *et al.* (1992) *L. stellatus* is presumably a group spawner. The matured females and males (both more than 350 mm SL) are usually observed in Tokara Islands (Fig. 2) from February to May; this phenomena is not seen in the Pacific coast of Kyushu, Shikoku and western Honshu islands (Yukio Iwatsuki, personal communications).

Remarks. Compared to *Lutjanus rivulatus*, *Lutjanus stellatus* has a small white spot above the lateral line vertically level with the first to third dorsal fin soft rays (vs. on the lateral line in *L. rivulatus*; see Fig. 1EF), a longitudinal blue line below the eye (vs. numerous undulating parallel blue lines running horizontally; see Figs. 3B), and the posterior margin of the anal fin rounded (vs. pointed; Fig. 5B). Although Shen and Lin (1984: fig. 10) documented *L. stellatus* (NTUM 05664, 156.3 mm SL) as the first record from Taiwan, the morphological characters of their specimen (small white spot on the lateral line and numerous lines on the head) are, in fact, applicable to *L. rivulatus*.

Lutjanus stellatus is further distinguished from *L. rivulatus* in having an area of granulated body scales with a straight posterior margin (Fig. 6; concave in *L. rivulatus*). This character is now recognized as diagnostic for *L. stellatus*.

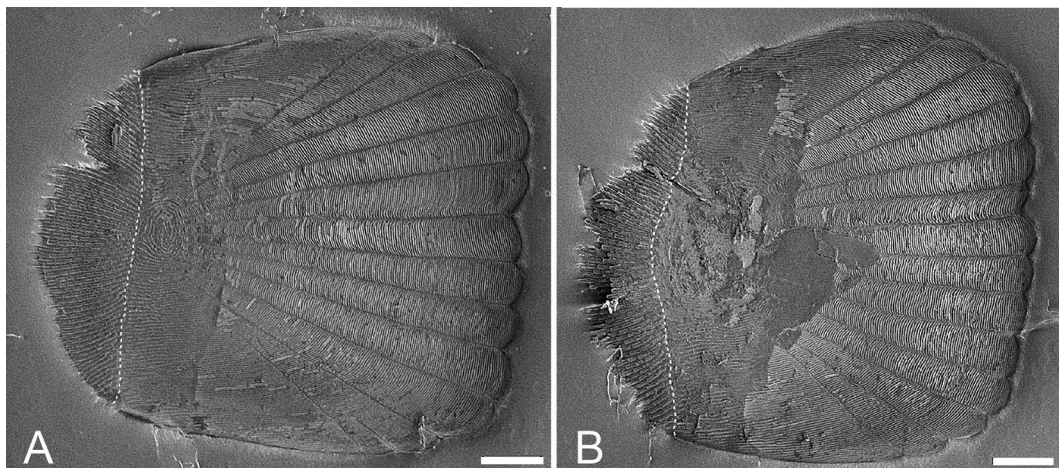


Fig. 5. SEM images of scales on right side of body.—A, *Lutjanus stellatus*, NSMT-P 128439, 105.8 mm SL; B, *L. rivulatus*, NSMT-P 65342, 112.0 mm SL. Artificial dotted lines indicate border between exposed and covered portions. Scale bars 0.5 mm.

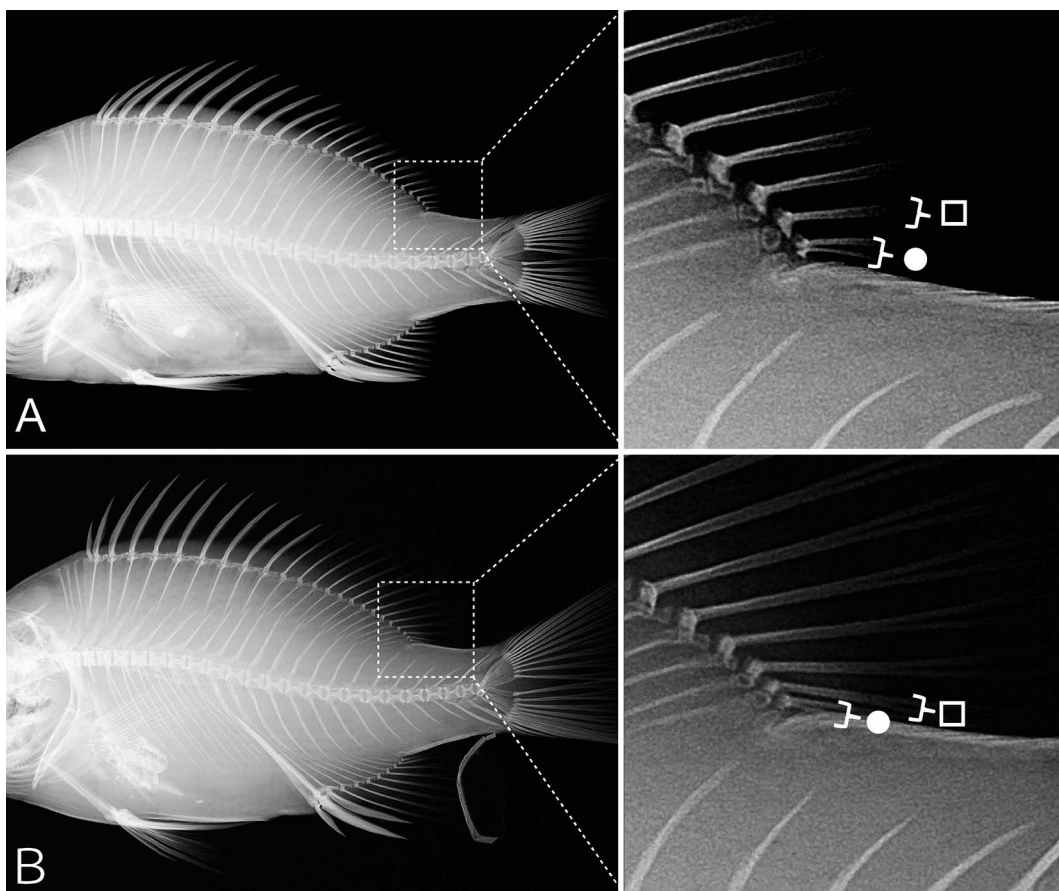


Fig. 6. Radiographs of *Lutjanus stellatus*.—A, BSKU86727, 202.4 mm SL (wide between last 2 dorsal fin soft ray bases); B, FAKU S4085, 227.0 mm SL (narrow). Solid circle, last dorsal fin soft ray; open square, penultimate dorsal fin soft ray.

Table 1. Counts and proportional measurements of *Lutjanus stellatus* and *L. rivulatus*

	<i>Lutjanus stellatus</i>			<i>Lutjanus rivulatus</i>
	Holotype <i>n</i> = 1	Paratypes <i>n</i> = 7	Non-type specimens <i>n</i> = 24	Non-type specimens <i>n</i> = 14
Standard length (mm)	304.5	227.0–369.3	99.5–489.8	78.4–445.6
Counts:				
Dorsal fin rays	X, 14	X, 14	X, 14	XI, 15
Anal fin rays	III, 8	III, 8	III, 8	III, 8
Pectoral fin rays	18	17–18	17–18	17
Lateral line scales	49	47–50	47–50	46–49
Scale rows on cheek	4	3–5	3–6	4–5
Scale rows above/below lateral line	11½ / 20½	9½–10½ / 18½–20½	8½–10½ / 18½–20½	8½–10½ / 18½–20½
Gill rakers (upper + lower)	6 + 11 = 17	5–8 + 11–13 = 16–21	5–8 + 10–12 = 15–20	5–6 + 10–12 = 15–18
As % of standard length:				
Body depth	40.9	40.5–43.5 (42.4)	39.1–45.6 (42.3)	41.0–49.2 (45.9)
Body depth at first anal fin spine origin	36.1	31.7–37.6 (34.8)	31.3–39.3 (35.2)	31.3–42.4 (38.8)
Head length	36.7	37.6–40.9 (39.0)	36.0–41.3 (39.2)	38.6–41.9 (40.5)
Body width	18.5	15.6–20.2 (17.7)	15.1–20.2 (17.0)	13.6–20.2 (17.5)
Snout length	15.0	14.5–16.4 (15.7)	13.0–17.0 (15.2)	12.8–17.4 (14.9)
Orbit diameter	7.5	7.2–9.2 (8.0)	6.8–13.1 (9.4)	7.6–13.1 (10.5)
Dermal eye opening	6.7	6.1–7.7 (6.9)	6.0–12.3 (8.0)	6.3–10.7 (8.8)
Interorbital width	9.9	7.9–9.3 (8.8)	6.5–10.4 (8.4)	7.0–11.7 (8.7)
Interorbital width including membrane	8.8	8.8–9.7 (9.4)	8.4–12.4 (9.8)	7.2–12.4 (9.5)
Upper jaw length	14.9	14.5–15.7 (15.3)	14.3–17.1 (15.8)	14.7–17.1 (15.9)
Suborbital depth	9.6	8.2–9.7 (9.0)	5.1–9.9 (8.2)	5.9–12.0 (8.4)
Caudal peduncle depth	12.3	11.4–13.3 (12.4)	11.6–13.8 (12.4)	12.5–13.9 (13.3)
Caudal peduncle length	20.7	18.1–21.3 (19.2)	17.0–21.4 (19.5)	16.6–21.4 (18.4)
Predorsal length	41.8	42.3–45.4 (43.6)	40.9–47.4 (43.8)	42.9–48.1 (45.3)
Preal length	68.6	70.1–72.1 (70.8)	68.9–74.9 (71.2)	69.6–77.1 (72.5)
Prepelvic length	38.3	38.0–45.8 (42.7)	34.9–46.0 (41.8)	38.0–46.9 (43.0)
Dorsal fin base	52.6	50.7–54.2 (52.0)	50.1–54.6 (52.2)	50.8–58.6 (54.7)
Anal fin base	15.1	15.0–16.8 (16.2)	14.1–17.4 (15.8)	15.4–19.2 (17.0)
Caudal fin length	24.5	25.6–28.6 (26.8)	22.7–30.1 (27.6)	26.0–30.7 (28.3)
Pelvic fin spine length	11.5	10.9–13.4 (12.4)	11.1–14.5 (12.9)	11.7–15.4 (13.5)
Pelvic fin length	20.2	19.6–22.1 (20.8)	19.1–27.6 (21.9)	21.2–29.7 (25.3)
Pectoral fin length	32.7	29.8–34.0 (32.9)	27.4–35.3 (32.4)	27.4–38.2 (33.7)
1st dorsal fin spine	5.2	3.8–5.6 (5.0)	3.9–6.7 (5.2)	4.4–7.7 (6.0)
2nd dorsal fin spine	8.6	9.0–12.6 (10.0)	7.7–12.4 (9.9)	8.4–14.0 (11.1)
3rd dorsal fin spine	10.9	11.1–13.1 (11.9)	9.0–15.4 (12.8)	10.6–18.3 (14.6)
4th dorsal fin spine	11.9	12.3–14.1 (13.1)	11.6–16.2 (13.9)	12.3–18.6 (15.3)
5th dorsal fin spine	11.7	10.8–13.9 (12.7)	11.1–15.9 (13.7)	11.7–17.9 (15.1)
6th dorsal fin spine	10.9	9.5–13.4 (11.7)	10.4–15.4 (12.5)	11.8–15.8 (13.9)
1st dorsal fin soft ray	10.2	7.3–10.7 (9.5)	8.6–14.7 (11.6)	9.8–16.3 (13.2)
1st anal fin spine	4.6	5.0–6.8 (5.9)	4.7–8.9 (6.5)	4.1–9.2 (7.1)
2nd anal fin spine	11.3	10.4–13.1 (11.9)	8.9–18.7 (13.3)	9.7–20.4 (15.4)
3rd anal fin spine	11.4	10.4–12.7 (11.6)	10.4–15.3 (12.2)	10.8–15.9 (13.9)
1st anal fin soft ray	14.2	11.7–15.9 (14.5)	13.4–19.1 (15.9)	14.8–20.4 (17.9)

Mean values in parentheses.

Type series of *L. stellatus* (9 specimens) were involved in the following problems. Catalog number M. 7407 in Akazaki (1983) for the holotype should be fixed as MUFS 7407; three paratypes M. 2533, M. 7406 and M. 7408 should be

MUFS 2533, MUFS 7406 and MUFS 7408. The paratype FRSKU-S-4085 has been deposited in Maizuru Fisheries Research Institute of Kyoto University as FAKU S4085. In addition, two paratypes, MUFS 7408 (230 mm SL) and ZMUT

54350 (243 mm SL), seem to have disappeared (Yukio Iwatsuki of Miyazaki University and Kazuo Sakamoto of the University of Tokyo, pers. comm.); MUFS 7408, unstated in the original description, was probably dissected and used for description of osteological characters (jaws, cranium, orbital bones, suspensorium, anterior abdominal vertebrae and caudal skeleton) because the size matched (230 mm SL).

Akazaki (1983) noted 13–15 (mostly 14–15) dorsal fin soft rays in the original description of *L. stellatus*, subsequently revised to 13–16 soft rays by Allen (1985) and Shimada (2013). Our reexamination (based on the holotype and 6 existent paratypes together with 23 non-type specimens) revealed that existing Japanese voucher specimens consistently showed 14 dorsal fin soft rays. Although this includes BSKU 86727 (from Uburu, Pacific side off Kochi Prefecture) and FAKU 1397042 (from Maizuru, Sea of Japan side off Kyoto Prefecture), erroneously reported by Yagishita (2001) and Tashiro *et al.* (2017) as having 13 dorsal fin soft rays, respectively. It seems to be difficult to count dorsal fin soft rays because of body scales covering the fin ray bases. In addition, an infraspecific variation on the distance between last and penultimate dorsal fin soft ray bases was observed (Fig. 6). The 14 dorsal fin soft rays (vs. 15–16 in *L. rivulatus*) may be a diagnostic character for *L. stellatus*, however, further studies are needed based on more specimens from inside and outside Japan.

Comparative materials examined. *Lutjanus rivulatus*: KAUM-I 22140, 160.0 mm SL, Sabah, Malaysia, 23 August 2009; KAUM-I 65670, 389.0 mm SL, Tanega-shima Island, 28 July 2014; KAUM-I 66606, 243.1 mm SL, Tanega-shima Island, 2 August 2012; KAUM-I 76050, 432.0 mm SL, Tanega-shima Island, 24 June 2015; KAUM-I 82646, 99.0 mm SL, Tanega-shima Island, 25 November 2015; KAUM-I 83020, 105.3 mm SL, Tanega-shima Island, 22 November 2015; KAUM-I 83400, 107.8 mm SL, Tanega-shima Island, 5 December 2015; MUFS 7402, 191.0 mm SL, Ishigaki-jima Island, Oki-

nawa Prefecture, Ryukyu Islands, 20 September 1973; MUFS 30876, 78.4 mm SL, Nichinan City, Miyazaki Prefecture, 14 December 2009; NSMT-P 49397, 87.6 mm SL, Ishigaki-jima Island, 10 December 1995; NSMT-P 81188, 112.0 mm SL, Iriomote-jima Island, Ryukyu Islands, 17 May 1976; NSMT-P 117219, 110.9 mm SL, Guadalcanal Island, Solomon Islands, 25 January 1976; NSMT-P 127110, 234.5 mm SL, Uruma City, Okinawa-honto Island, 26 October 1975; SNFR 20616, 128.7 mm SL, Ishigaki-jima Island, 14 July 2010.

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