



First records of the Cocoa Snapper *Paracaesio stonei* (Perciformes: Lutjanidae) from the Satsunan Islands, Japan

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Abstract. Three specimens of *Paracaesio stonei* (Perciformes: Lutjanidae) were collected from the Osumi and Tokara islands, included in the Satsunan Islands, Kagoshima Prefecture, southern Japan. These represent the first records of the species from Tokara Islands, and the Osumi specimen is the northernmost record for the species. A detailed description of the three specimens is provided.

Introduction

The snapper genus *Paracaesio* Bleeker, 1875 is currently represented in Japanese waters by five species, viz., *P. caerulea* (Katayama, 1934) “Aodai”, *P. kusakarii* Abe, 1960 “Shima-aodai”, *P. sordida* Abe & Shinohara, 1962 “Yogore-aodai”, *P. stonei* Raj & Seeto, 1983 “Yambaru-shimaaodai” and *P. xanthura* (Bleeker, 1869) “Umeiro” (Shimada 2013). All except for *P. stonei* have already been recorded from the Satsunan Islands, northern Ryukyu Islands (Ichikawa et al. 1992; Motomura et al. 2010; Meguro 2013; Sakurai 2014; Eguchi & Motomura 2016). Japanese records of *P. stonei* have been limited to the Okinawa Islands and southward (Shimada 2013).

During ichthyofaunal surveys in the Tokara Islands, conducted as a part of the Kagoshima Fish Diversity Project, three specimens of *P. stonei* were collected from Yaku-shima (Osumi Islands), and Taira-jima and Kodakara-jima (Tokara Islands). The present study describes these specimens in detail. This report represents the first records of *P. stonei* from the Satsunan Islands, the Yaku-shima specimen representing the northernmost record of the species. Counts and proportional measurements follow those of White & Last (2012). All measurements were made with digital calipers to the nearest 0.1 mm. Abbreviations: SL (standard length) and KAUM (Kagoshima University Museum, Kagoshima). Specimens of *P. kusakarii* (listed below) were used for comparative purpose to confirm validity of characters of *P. stonei*. Japanese words “-jima” or “-shima” mean “island”.

Record

Paracaesio stonei Raj & Seeto, 1983
Standard Japanese name: Yambaru-shimaaodai
(Fig. 1; Appendix 1)

Material examined. KAUM-I. 54128, 379.7 mm SL, off Kodakara-jima, Tokara Islands, Kagoshima Prefecture, Japan, 22 Apr. 2013, line-fishing (purchased at Kagoshima City Central Fish Market), M. Matsunuma; KAUM-I. 82741, 407.8 mm SL, off Taira-jima, Tokara Islands, Kagoshima Prefecture, Japan, ca. 100 m depth, line-fishing (purchased at Kagoshima City Central Fish Market), 8 Dec. 2015, H. Hata and T. Naito; KAUM-I. 200222, 220.7 mm SL, off Yaku-shima, Osumi Islands, Kagoshima Prefecture, Japan, line-fishing (purchased at Kagoshima City Central Fish Market), 15 Jan. 2015, H. Iwatsubo and T. Tanaka.

Description. Body oblong, compressed laterally, deepest at bases of 2nd to 4th dorsal-fin spines. Dorsal contour of body increasing from snout tip to bases of 3rd to 5th dorsal-fin spines, thereafter decreasing steadily to caudal-fin base. Ventral profile of body decreasing from lower-jaw tip to pelvic-fin origin, thereafter more or less horizontal to anal-fin origin, subsequently rising to caudal-fin base. Uppermost and lowermost points of pectoral-fin insertion anterior to posteriormost point of opercle and dorsal-fin origin, respectively. Posterior tip of pectoral fin pointed, extending beyond line vertical through origin of 1st dorsal-fin soft ray. Dorsal-fin origin posterior to posteriormost point of opercle. End of dorsal-fin base just above that of anal-fin base. Contour of spinous portion of dorsal fin moderately notched. Origin of pelvic fin just below origin of 2nd dorsal-fin spine. Posterior tip of depressed pelvic fin just reaching or slightly short of anus. Anal-fin origin between vertical lines through bases of 1st to 3rd dorsal-fin soft rays. Caudal fin truncate, upper tip slightly extended posteriorly. Body covered with ctenoid scales. Anus situated just anterior to anal-fin origin. All fins, both jaws, snout, pectoral-fin

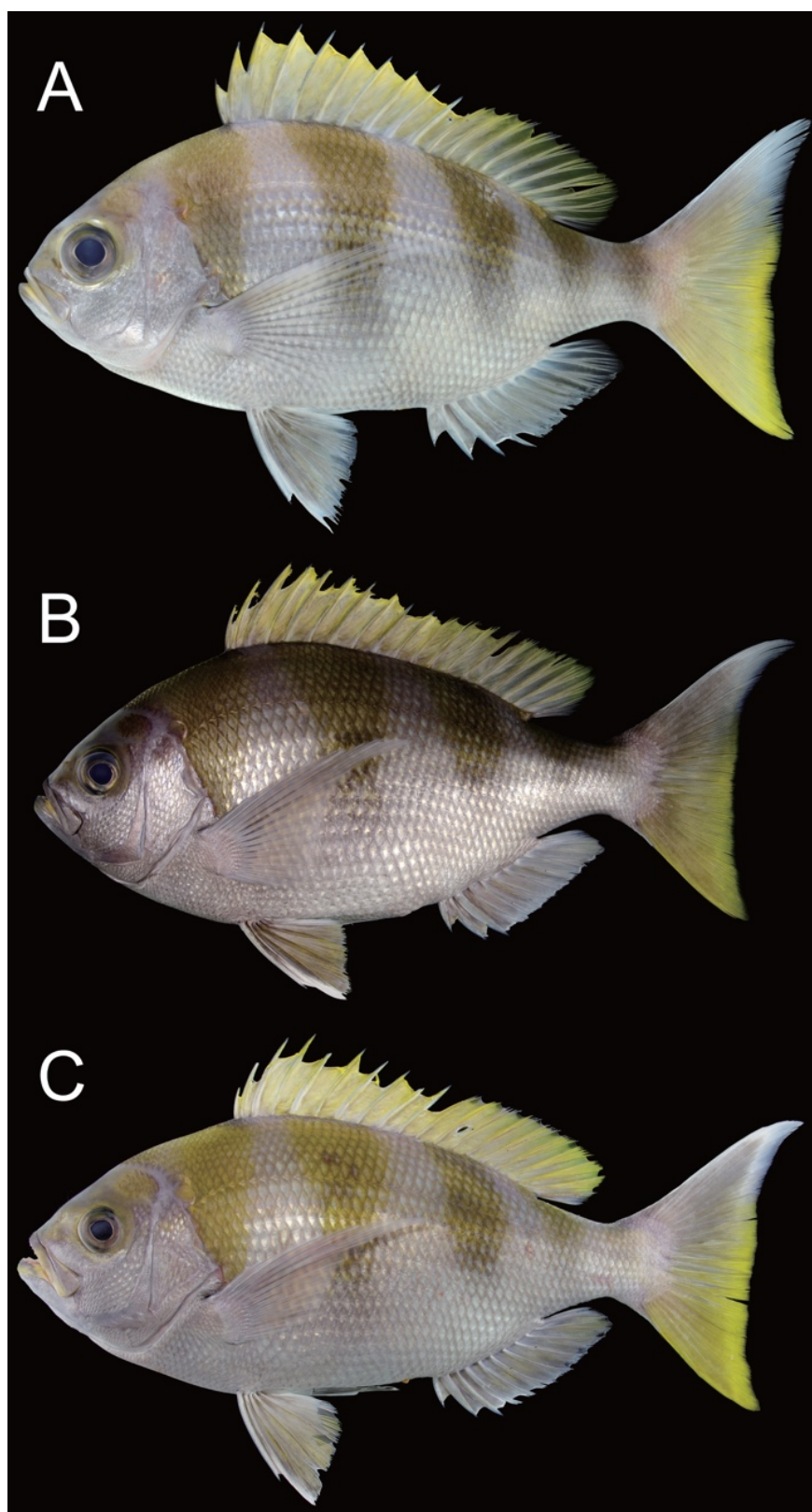


Fig. 1. Fresh specimens of *Paracaesio stonei* (A: KAUM-I. 200222, 220.7 mm SL, Yaku-shima, Osumi Islands, Kagoshima Prefecture, Japan; B: KAUM-I. 54128, 379.7 mm SL, Kodakara-jima, Tokara Islands, Kagoshima Prefecture, Japan; C: KAUM-I. 82741, 407.8 mm SL, Taira-jima, Tokara Islands, Kagoshima Prefecture, Japan).

図 1. ヤンバルシマアオダイ *Paracaesio stonei* (A: KAUM-I. 200222, 標準体長 220.7 mm, 屋久島近海で漁獲; B: KAUM-I. 54128, 標準体長 379.7 mm, 小宝島近海で漁獲; C: KAUM-I. 82741, 標準体長 407.8 mm, 平島近海水深約 100 m で漁獲).

axillary region, part of area around eye and posterior part of preopercle without scales. Eye and iris round. Interorbital space flat, scaleless. Nostrils paired, positioned close together, anterior to orbit. Both nostrils oval. Dermal flap on posterior edge of anterior nostril. Mouth terminal, small, posterior tip of maxilla extending beyond vertical line through anterior margin of eye but not to anterior margin of iris. Lower jaw projecting slightly beyond upper jaw. Posterior and lower edges of preopercle serrated. Posterior edge of opercle smooth. Single spine on opercle. Anterior margin of scales on top of head extending forward to vertical line through iris center. Upper and lower jaws with single outer row of conical teeth and inner band of fine teeth. Triangular patch of villiform teeth on vomer, fairly broad band of villiform teeth on palatines. Tongue edentate. Gill rakers long, slender. Pseudobranchial filaments present. Lateral line complete, running parallel to dorsal body contour.

Color when fresh. Body purplish-gray with five broad olive bands from dorsal surface to body midline. Posteriormost band indistinct in larger two specimens (379.7 and 407.8 mm SL). Dorsal surface olive. Dorsal fin yellow. Upper lobe of caudal fin grayish-white, lower lobe yellow. Pelvic and anal fins dusky yellow. Pectoral fin semi-transparent. Iris copper brown, pupil bluish-black (Fig. 1).

Color in alcohol. Body pale silver, dark purple dorsally. Bands on body blackish.

Distribution. *Paracaesio stonei* has been recorded from southern Japan, southern Taiwan, Philippines, northeastern Australia, eastern Papua New Guinea, Vanuatu, Tuvalu, Fiji and Samoa (Raj & Seeto 1983; Allen 1985; Chapman & Cuack 1990; Kramer et al. 1994; Anderson & Allen 2001; Brewer et al. 2007; Shimada 2013; this study). Previous Japanese records have been restricted to the Okinawa Islands and southward (Yoshino 1984; Shimada 2013); the occurrence of the species at Kodakara-jima and Taira-jima islands (Tokara Islands), and Yaku-shima (Osumi Islands) represent new records from each island.

Remarks. The three specimens examined in this study were identified as *P. stonei* on the basis of the following combination of characters, which closely match the diagnostic features of *P. stonei* given by Raj & Seeto (1983), Allen (1985), Anderson & Allen (2001), White & Last (2012) and Shimada (2013): 48 or 49 pored lateral-line scales; truncate caudal fin; scaleless maxilla; and body with five broad olive colored bands from the dorsum to the body midline. Anderson & Allen (2001) gave the number of total



Fig. 2. Fresh specimen of *Paracaesio kusakarii*, KAUM-I. 77301, 352.0 mm SL, Kuchino-shima, Tokara Islands, Kagoshima Prefecture, Japan.

図 2. シマアオダイ *Paracaesio kusakarii*, KAUM-I. 77301, 標準体長 352.0 mm, 口之島北方で漁獲。

gill rakers on first gill arch of the species as 27–29, but those of the specimens collected from the Satsunan Islands were 25–26. Ranges of the numbers of gill rakers of more than five have been reported in the other congeners (*P. kusakarii*, *P. sordida* and *P. xanthura*; Anderson & Allen, 2001). Therefore, we judged that this difference is intraspecific variation. The genus *Paracaesio* contains nine valid species (Allen 1985; Anderson et al. 1992; White & Last 2012). Although *P. stonei* is most similar to *P. kusakarii* in sharing a similar count of pored lateral-line scales, emarginated caudal fin and broad bands on the body (Allen 1985; Anderson & Allen 2001; White & Last 2012; Shimada 2013), the former is characterized by a scaleless maxilla (vs. maxilla scaled in *P. kusakarii*) and body with five bands, the posteriormost band indistinct in very large individuals (vs. body with four bands; Fig. 2; Allen 1985; Anderson & Allen 2001; Shimada 2013; this study).

Distributional records of *P. stonei* in Japanese waters were reviewed here on the basis of published literature. The first record of the species from Japanese waters was that of Yoshino (1984), who reported *P. stonei* from the Ryukyu Islands, including a color photograph, and proposed the Japanese name “Yambaru-shimaaodai”. However, the collection site of the photographed specimen was not referred. Thereafter, Yoshino & Arakaki (1984) and Isa & Arakaki (1991) reported that *P. stonei* was infrequently collected in Okinawa Prefecture, again without giving precise locality data. Shimada (2013) stated that the species is distributed in the Okinawa Islands and southward, but no evidence was given. No precise locality records in the Ryukyu Islands of the species were found during the present study.

Accordingly, the present specimens represent a

northward extension of the distributional range for the species.

Although large-sized lutjanid fishes including *P. stonei* are important for fisheries in Kagoshima and Okinawa prefectures, detailed distributional information for several Ryukyu Islands species remains limited [e.g., *Etelis radiosus* Anderson, 1981 “Okuchihamadai”, *Pristipomoides flavipinnis* Shinohara, 1963 “Kimmehimedai”, *Pristipomoides multidentis* (Day, 1871) “Nagasakifuedai”; Hata et al. 2015, 2016a–b]. Further taxonomic and faunal studies on lutjanids are necessary.

Comparative material examined. *Paracaesio kusakarii*: KAUM–I. 48824, 364.1 mm SL, off Sata Point, Osumi Strait, Kagoshima Prefecture, Japan, long-line fishing (purchased at Nishinoomote Fish Market), 9 July 2012, M. Takayama; KAUM–I. 54120, 316.9 mm SL, off Amami-oshima, Amami Islands, Kagoshima Prefecture, Japan, ca. 200 m depth, line fishing (purchased at Kagoshima City Central Fish Market), 20 Apr. 2013, M. Matsunuma; KAUM–I. 54129, 456.5 mm SL, off Kodakara-jima, Tokara Islands, Kagoshima Prefecture, Japan, line fishing (purchased at Kagoshima City Central Fish Market), 22 Apr. 2013, M. Matsunuma; KAUM–I. 55566, 292.0 mm SL, off Nakano-shima, Tokara Islands, Kagoshima Prefecture, Japan, more than 100 m depth, line fishing (purchased at Kagoshima City Central Fish Market), 19 July 2013, M. Matsunuma; KAUM–I. 63111, 375.9 mm SL, south of Mage-shima, Osumi Islands, Kagoshima Prefecture, Japan, 110 m depth, line fishing (purchased at Nishinoomote Fish Market), 18 Aug. 2014, M. Takayama; KAUM–I. 65664, 298.1 mm SL, off Nishinoomote Port, Nishinoomote, Tanega-shima, Osumi Islands, Kagoshima Prefecture, Japan, line fishing (purchased at Nishinoomote Fish Market), M. Takayama; KAUM–I. 74386, 204.2 mm SL, KAUM–I. 74387, 202.8 mm SL, off Kumano Fishing Port, Sakai, Nakatane, Tanega-shima, Osumi Islands, Kagoshima Prefecture, Japan, 100 m depth, line fishing (purchased at Nishinoomote Fish Market), 23 June 2015, M. Takayama; KAUM–I. 77301, 352.0 mm SL, north of Kuchino-shima, Tokara Islands, Kagoshima Prefecture, Japan, line fishing (purchased at Kagoshima City Central Fish Market), 31 July 2015, H. Hata; KAUM–I. 91794, 259.8 mm SL, off Iloilo, Panay Island, the Philippines (purchased at fish market in Oton), 11 Sept. 2016; KAUM–I. 200220, 218.5 mm SL, off Tanega-shima, Osumi Islands, Kagoshima Prefecture, Japan, line fishing (purchased at Kagoshima City Central Fish Market), 11 Oct. 2014, H. Iwatsubo and T. Tanaka; KAUM–I.200221, 224.6

mm SL, off Yaku-shima, Osumi Islands, Kagoshima Prefecture, Japan, line fishing (purchased at Kagoshima City Central Fish Market), 11 Oct. 2014, H. Iwatsubo and T. Tanaka.

Paracaesio stonei: KAUM–I. 91795, 249.5 mm SL, off Iloilo, Panay Island, the Philippines (purchased at fish market in Oton), 11 Sept. 2016.

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薩南諸島から得られたフエダイ科ヤンバルシマアオダイ *Paracaesio stonei*

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要旨. 大隅諸島屋久島, トカラ列島平島・小宝島近海においてヤンバルシマアオダイ *Paracaesio stonei* が1個体ずつ, 計3個体採集された. これらは鹿児島県における本種の標本に基づく初めての記録であると同時に, 屋久島産標本は本種の分布の北限を更新する記録となる.

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Appendix 1. Counts and measurements of *Paracaesio stonei* specimens from the Satsunan Islands, Japan.
 附録 1. 薩南諸島産ヤンバルシマアオダイ *Paracaesio stonei* の計数・計測形質.

	Yaku-shima	Kodakara-jima	Taira-jima
	KAUM-I. 200222	KAUM-I. 54128	KAUM-I. 82741
Standard length (mm; SL) 標準体長	220.7	379.7	407.8
Counts 計数形質			
Dorsal-fin spines 背鰭棘数	10	10	10
Dorsal-fin rays 背鰭軟条数	10	10	10
Anal-fin spines 臀鰭棘数	3	3	3
Anal-fin rays 臀鰭軟条数	8	8	8
Pectoral-fin rays 胸鰭軟条数	15	16	16
Pelvic-fin spines 腹鰭棘数	1	1	1
Pelvic-fin rays 腹鰭軟条数	5	5	5
Tubed lateral-line scales 有孔側線鱗数	48	49	49
Predorsal scales 背鰭前方鱗数	19	20	20
Scale rows between middle of spinous dorsal-fin base and lateral line 背鰭棘部中央下の側線上方横列鱗数	8	9	8
Scale rows between anal-fin origin and lateral line 側線下方横列鱗数	16	17	16
Circumpeduncular scales 尾柄周囲鱗数	23	23	24
Gill rakers 鰓耙数	7 + 19	8 + 17	8 + 17
Measurements 計測形質			
As % SL 体各部の体長に対する割合			
Head length 頭長	31.9	31.1	33.1
Snout length 吻長	8.4	9.3	11.0
Orbit diameter 眼窩径	9.8	8.1	7.6
Postorbital length 眼後長	14.0	14.5	16.1
Distance lower jaw to isthmus 下顎先端から峡部にかけての長さ	11.7	11.3	14.4
Upper-jaw length 上顎長	12.2	12.4	14.1
Maxillary width 上顎幅	3.8	3.8	4.1
Interorbital width 眼隔域幅	11.0	11.0	12.1
Suborbital depth 眼窩骨高	2.4	3.1	4.0
Internarial distance 鼻孔間の長さ	0.8	0.6	0.9
Distance posterior nostril to orbit 後鼻孔から眼窩前縁までの長さ	2.4	2.9	3.1
Body depth 体高	45.5	44.8	44.5
Body width 体幅	18.1	18.6	17.4
Pre-dorsal-fin length 背鰭前長	38.6	36.8	37.9
Pre-anal-fin length 臀鰭前長	66.5	67.1	68.4
Pre-pelvic-fin length 腹鰭前長	40.7	39.7	41.6
Caudal-peduncle length 尾柄長	17.6	14.0	17.0
Caudal-peduncle depth 尾柄高	12.3	11.7	12.1
Dorsal-fin base length 背鰭基底長	53.1	50.1	49.3
First dorsal-fin spine length 背鰭第1棘長	7.7	8.4	broken
Second dorsal-fin spine length 背鰭第2棘長	14.0	12.2	broken
Third dorsal-fin spine length 背鰭第3棘長	16.4	16.1	broken
Longest dorsal-fin spine length 最長背鰭棘長	17.0	15.1	15.2
Last dorsal-fin spine length 最後背鰭棘長	12.7	10.9	11.6

Appendix 1. (Continued).
 附録 1. (続き).

	Yaku-shima	Kodakara-jima	Taira-jima
	KAUM-I. 200222	KAUM-I. 54128	KAUM-I. 82741
Longest dorsal-fin soft ray length 最長背鰭軟条長	16.2	15.1	14.6
Penultimate dorsal-fin soft ray length 後方から 2 番目の背鰭軟条長	14.7	13.5	13.7
Last dorsal-fin soft ray length 最後背鰭軟条長	11.8	10.9	11.1
Anal-fin base length 臀鰭基底長	21.5	19.3	20.1
First anal-fin spine length 臀鰭第 1 棘長	6.3	5.2	5.4
Second anal-fin spine length 臀鰭第 2 棘長	9.4	8.6	8.6
Third anal-fin spine length 臀鰭第 3 棘長	12.2	11.0	10.5
Penultimate anal-fin soft ray length 後方から 2 番目の臀鰭軟条長	13.7	12.9	12.6
Ultimate anal-fin soft ray length 最後臀鰭軟条長	11.6	11.3	10.9
Upper caudal-fin lobe length 尾鰭上葉長	36.7	34.2	34.3
Lower caudal-fin lobe length 尾鰭下葉長	34.6	30.7	32.1
Caudal fin concavity length 尾鰭湾入長	5.1	11.0	10.9
Pectoral-fin length 胸鰭長	40.0	36.5	36.7