沖縄島周辺海域から初めて記録されたフエダイ科フエダイ属魚類の2稀種イモトフエダイLutjanus madrasとハスジマタルミ L. dodecacanthoides

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First records of two rare snappers, *Lutjanus madras* and *L. dodecacanthoides*, from Okinawan waters

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Abstract: Single specimens of two lutjanid species, *Lutjanus madras* and *L. dodecacanthoides*, were recently purchased from Okinawa-jima Island, Ryukyu Archipelago, Japan. Both species had only been previously recorded from Iriomote-jima Island and the Yaeyama Islands in Japan, and were never subsequently reported after these first Japanese records. Thus, these specimens are the first distributional records from around Okinawa-jima Island, and are the second records of both species from Japan. The two species belong to genus *Lutjanus*, and most species in this genus are known as common commercial fish. Our current findings indicate that understanding of marine biodiversity is still insufficient in the Ryukyu Archipelago.

Introduction

The fishes of the genus *Lutjanus* are commonly consumed in Okinawa Prefecture. They are mostly caught by shallow water longline, and abundantly landed and appear at local fish markets. Five *Lutjanus* species are most commonly seen; *L. vitta* (Quoy & Gaimard, 1824) "Tate-fuedai", *L. fulviflamma* (Forsskål, 1775) "Nisekurohoshi-fuedai", *L. quinquelineatus* (Bloch, 1790) "Rokusen-fuedai", *L. kasmira* (Forsskål, 1775) "Yosuji-fuedai", and three additional species are rarely caught; *L. bengalensis* (Bloch, 1790) "Bengaru-fuedai", *L. rufolineatus* (Valenciennes, 1830) "Kyusen-fuedai", *L. lutjanus* Bloch, 1790 "Kinsen-fuedai", and *L. decussatus* (Cuvier, 1828) "Amime-fuedai". All of these species are particularly commercially important for local consumers and are lumped together under the local name of "Bitaro" without clear species distinctions.

Twenty-four species of genus *Lutjanus* are known from Japan, and most of them are distributed in southern Japan (Shimada 2013). In particular, five species have been recorded only from Iriomote-jima Island.

A single specimen of *L. madras* (Valenciennes, 1831) was collected from Twudwumari-hama Beach, Iriomote-jima Island, where Tanaka et al. (2010) collected the species from Japan for the first time. In addition, one specimen of *L. madras* was purchased from a fish retailer at Katsuren Peninsula, Okinawa Island, and was most probably landed at Henza Fishing Port, Henza Island, located off Katsuren Peninsula, or perhaps Awase Fishing Port, Okinawa Island. Furthermore, from a total of 12,153 lutjanid fishes recorded during a 136 day-survey of landed fishes at Henza Fishing Port by our research team (Ichthyological laboratory in University of the Ryukyus), a single specimen of *L. dodecacanthoides* (Bleeker, 1854) was purchased. The present paper reports these two species from Japan for the second time and from the waters around Okinawa Island for the first time.

Sizes of specimens are shown as standard length (SL). Methods of counting and measuring generally follow Allen & Talbot (1985). Materials examined are deposited at the Okinawa Churashima Foundation (URM-P; formerly Department of Marine Sciences, University of the Ryukyus). A photograph of the holotype of *Lutjanus dodecacanthoides*, kindly provided by R. Ruiter (Naturalis, formerly Rijksmuseum van Natuurlijke Histoire, Leiden, Netherlands (RMNH)), was also examined.

Species account

***Lutjanus madras* (Valenciennes, 1831)**
Standard Japanese name: Imoto-fuedai
(Fig. 1, Table 1)

Materials examined. URM-P 47594, 192.8 mm SL, purchased from Shindate Fresh Fish Retailer, Katsuren Peninsula, Okinawa Island (probably landed at Henza Port, Port), by H. Nishinomiya, 7 December 2013; URM-P 47593, 150.8 mm SL,

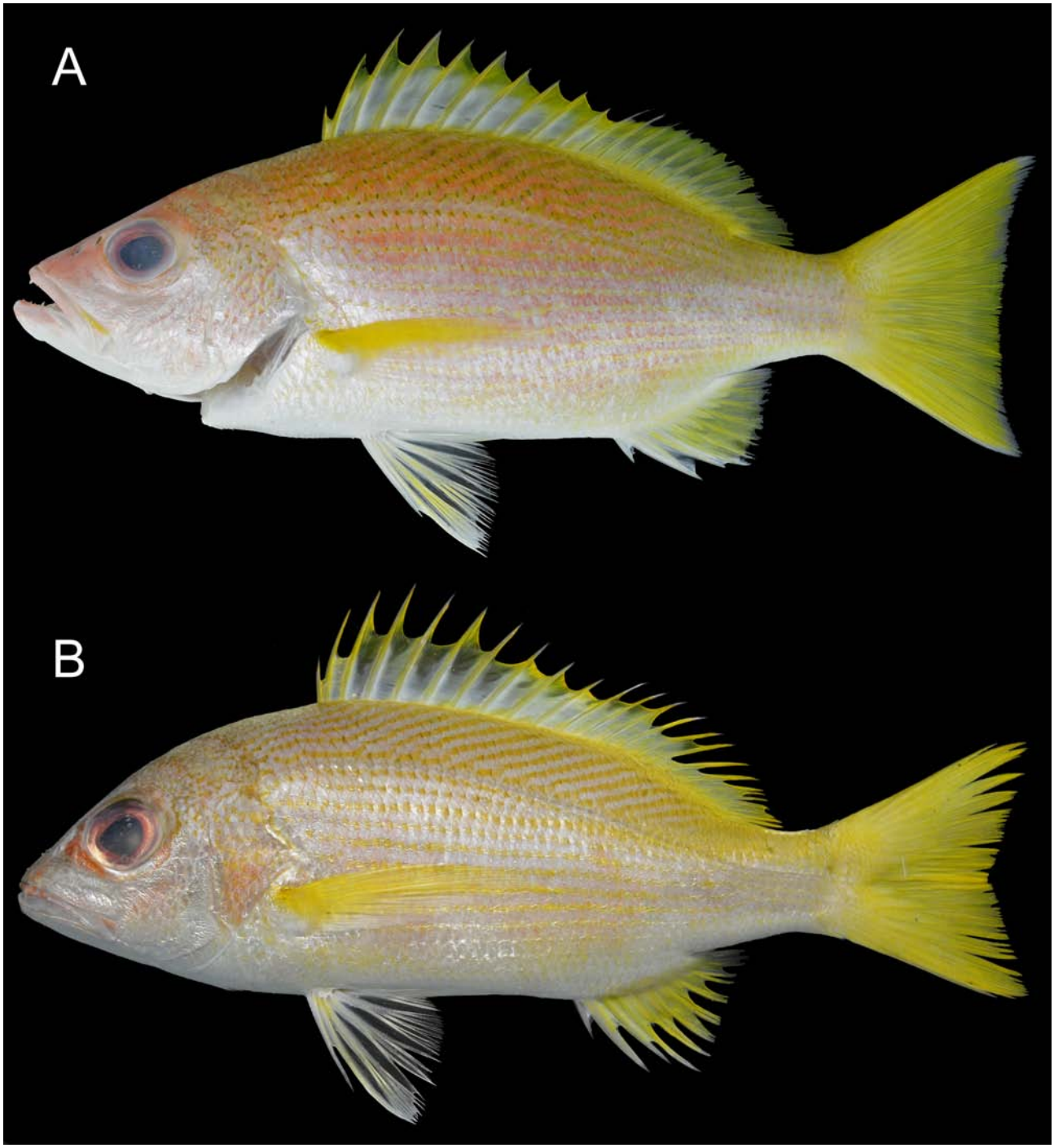

Fig. 1. A: *Lutjanus madras* (URM-P 47594, 191.8 mm SL), purchased at Shindate Fresh Fish Market (probably landed on Henza Port), Okinawa-jima Island, Japan, 7 December 2013; B: *L. madras* (URM-P 47593, 149.2 mm standard length), collected from Twudwumari-hama Beach, Iriomote-jima Island, Japan, 1 m depth, 16 July 2013.
図1. A: イモトフエダイ*Lutjanus madras* (URM-P 47594, 標準体長191.8 mm), 新立鮮魚店にて購入 (平安座港で水揚げされた可能性が高い), 沖縄島, 2013年12月7日; B: イモトフエダイ*L. madras* (URM-P 47593, 標準体長149.2 mm), トゥドゥマリ浜, 西表島, 水深1 m, 2013年7月16日.

Twudwumari-hama Beach, Iriomote-jima Island, Japan, 1 m depth, coll. K. Koeda & N. Hayashida, 16 July 2013.

Morphological features. Narrow longitudinal yellow stripes in body side below lateral line without dark band; narrow yellow stripes rising diagonally above lateral line without blackish spot; fins yellow, except pelvic fins which are frequently white or faintly yellow and lower half of pectoral fins are translucent; predorsal scales extending to

Table 1. Counts and measurements of two *Lutjanus* fish collected from Okinawa-jima Island and Iriomote-jima Island.
表 1. 沖縄島および西表島で採集されたフエダイ属 2 種の計数・計測形質.

	URM-P47594 *L. madras* Okinawa-jima I.	URM-P47593 *L. madras* Iriomote-jima I.	URM-P47595 *L. dodecacanthoides* Okinawa-jima I.
Standard length (mm)	192.8	150.8	240.1
Body depth at greatest depth	69.1	53.6	96.7
Body depth at pelvic insertion	68.8	52.7	95.4
Body depth at 1st anal fin spine origin	63.6	47.2	84.9
Head length	71.0	55.4	91.7
Body width behind gill opening	31.6	26.0	39.3
Snout length	23.6	19.9	39.6
Preorbital depth	10.1	8.2	18.7
Eye diameter	18.5	16.1	22.9
Upper jaw length	30.0	23.0	35.4
Bony Interorbital width	12.4	10.0	17.0
Interorbital membrane width	16.6	13.1	21.0
Least caudal peduncle depth	22.8	17.6	28.4
Caudal peduncle length	29.8	25.4	38.7
Snout to origin of dorsal fin	75.0	64.4	103.4
Snout to origin of anal fin	143.9	102.8	172.8
Snout to origin of pelvic fin	87.8	56.6	95.8
Snout to prescales area on head	37.4	28.8	65.8
Dorsal fin base	98.7	76.0	132.3
Anal fin base	29.2	23.1	35.2
Pelvic spine length	26.6	20.5	30.6
First pelvic ray length	39.6	31.4	45.1
Pectoral fin length	59.1	45.4	78.3
First dorsal spine length	9.4	9.1	12.3
Second dorsal spine length	22.4	18.2	21.7
Third dorsal spine length	29.2	22.3	27.2
Forth dorsal spine length	29.7	24.2	30.3
Last dorsal spine length	18.0	16.7	19.6
Longest dorsal ray length	20.5	17.2	26.6
First anal spine length	7.2	8.6	12.8
Second anal spine length	21.6	18.6	27.2
Third anal spine length	21.7	19.3	26.0
Longest anal ray length	21.7	21.5	29.4
Dorsal fin rays	X, 12	X, 12	XII, 12
Anal fin rays	III, 8	III, 8	III, 8
Pectoral fin rays	I, 15	I, 15	I, 15
Pelvic fin rays	I, 5	I, 5	I, 5
Lateral-line scale rows	46	47	48
Scale rows above lateral line	7 1/2	7 1/2	9 1/2
Scale rows below lateral line	14	14	20
Cheek and opercle scale rows	6+7	5+7	6+9
Number of gill rakers	7+13=20	6+14=20	6+11=17

mid-interorbital level; dorsal fin soft rays 12; anal fin soft rays 8; gill rakers 6–7+13–14=20; body depth 35.5–35.8% of SL; eye diameter 26.1–29.1% of HL; bony interorbital width 17.5–18.1% of HL.

Distribution. Offshore of Okinawa-jima Island (Present study), Iriomote-jima Island (Present study; Tanaka et al. 2010), Taiwan (Wang 2011), Philippines, Indonesia, Thailand, Sri Lanka, India, Seychelles, Zanzibar (Allen & Talbot 1985; Shimada 2013).

Remarks. The specimens collected in the present study basically agree well with the description and figures of Allen (1985), Allen & Talbot (1985), and Tanaka et al. (2010). The

photograph of *L. madras* from India (Allen & Talbot 1985: pl. 7D) has a right longitudinal yellow stripe on the body side, but the examined specimens in the present study lack this character. Tanaka et al. (2010) indicated that the difference in coloration between specimens from the Pacific and Indian Oceans might be attributed to a geographical variation within a single species.

Lutjanus madras can be clearly distinguished from other lutjanid species recorded from Japan in having the following characters: the absence of black spot from body side; the absence of longitudinal stripe above lateral line; and the presence of yellow longitudinal stripes below lateral line. Among *Lutjanus* species recorded from Japan, *L. vitta*, *L. lutjanus* and *L. ophuysenii* are relatively similar to *L. madras* in their morphology, but *L. madras* can be easily distinguish from *L. lutjanus* by the fin ray counts (X, 12–13 dorsal fin rays in *L. madras* vs. X–XII, 12 in *L. lutjanus*) and from *L. vitta* and *L. ophuysenii* by their colorations (no wide stripe on body side in *L. madras* vs. wide dark yellow stripe present in *L. vitta* and black spot and wide dark yellow stripe present in *L. ophuysenii*) (Iwatsuki et al. 1993; Shimada 2013). *Lutjanus mizenkoi*, which is distributed from Indonesia to Samoa, also has a similar morphology with *L. madras*, but the former can be distinguished from the latter in having predorsal scales that are extending to the level of rear part of the orbit (vs. predorsal scales extending to mid-interorbital level in *L. madras*), the absence of blunt spine above central opercle spine (a blunt, flattened spine present on upper margin of opercle, above the main centrally located spine), and by the number of total gill rakers on the first arch (15–16 vs. 18–21) (Allen & Talbot 1985, Iwatsuki et al. 1993).

Lutjanus dodecacanthoides (Bleeker, 1854)
Standard Japanese name: Hasujima-tarumi
(Fig. 2, Table 1)

Materials examined. URM-P 47595, 240.1 mm SL, landed at Henza Port, Henza Island, Japan, purchased by N. Hayashida, 18 January 2012.

Morphological features. Dorsal profile of head steeply sloped; sides slightly pink with silver sheen, grading to white on belly and underside of head; a series of 6 bright yellow or orange horizontal and diagonal stripes on body side, 4 uppermost slanted posteriorly toward dorsal fin base; dorsal, anal, caudal fins yellow with reddish narrow margin in dorsal and caudal fins; pectoral fin pale pink; scales rows on body side rising obliquely; deep body, depth 40.1% SL; dorsal profile of head steeply sloped; dorsal fin rays XII, 12; anal fin rays, III, 8; gill rakers 6+11=17.

Distribution. Okinawa-jima Island (Present study), Yaeyama Islands (Shimada & Yoshino 1987), Taiwan (Wang 2011), Phillipinnes, Spratly Islands, Indonesia (Allen & Talbot 1985; Shimada 2013).

Remarks. Bleeker (1854) described the number of horizontal stripes on body side of *L. dodecacanthoides* as 7. We examined the photograph of the holotype of *L. dodecacanthoides* (RMNH 27705; Fig. 2B), but were not able to confirm the number of stripes as the holotype lacks body coloration. In contrast, our specimen had 6 stripes on the body side (Fig. 2A). Shimada & Yoshino (1987) also reported that the number of stripes varies between 5 and 6 and concluded that it might be due to a change along the stages of growth or the disappearance of a lowermost stripe. We follow Shimada & Yoshino's (1987) opinion and identified the specimen as *L. dodecacanthoides*.

Lutjanus dodecacanthoides can be clearly distinguished from other lutjanid species by the characteristic stripes pattern on the body side, deep body, and the number of dorsal fin spines being 12 (Allen 1985; Shimada 2013). *Lutjanus rufolineatus*, which is widely and commonly distributed in the Indo-Pacific Ocean, shares similar pink and yellow body coloration with *L. dodecacanthoides*. The stripes of *L. rufolineatus* are, however, narrower and more horizontal than those of *L. dodecacanthoides.* The number of dorsal spines also differs between the two species (11 in *L. rufolineatus* vs. 12 in *L. dodecacanthoides*) (Shimada 2013).

In their book of the fishes of the Japanese Archipelago, Masuda et al. (1984) presented a photograph of *L. dodecacanthoides* (as *L. rufolineatus*, see Shimada 2013). Allen & Tablot (1985) cited Masuda et al. (1984) and included southern Japan within a distributional range of *L. dodecacanthoides*. The photographed specimen in Masuda et al. (1984), however, turned out to be caught from southeastern Asia (see personal communication of M. Akaki in Shimada & Yoshino 1987). Therefore, Shimada & Yoshino's (1987) record of *L. dodecacanthoides* from Yaeyama Islands represents the first record of the species from Japan.

Conclusion

The present study recorded two lutjanid species

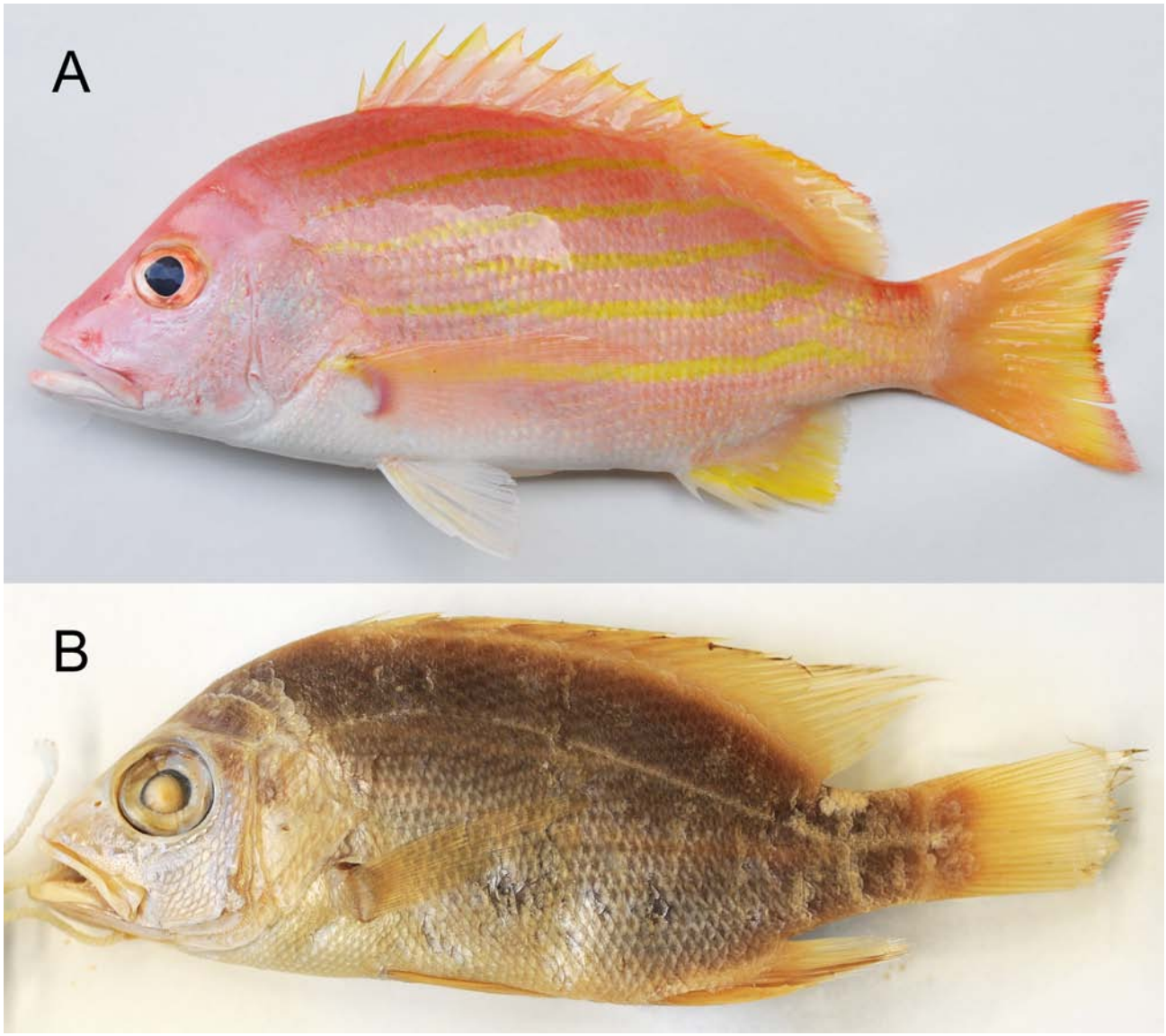

Fig. 2. A: *Lutjanus dodecacanthoides* (URM-P 47595, 240.1 mm SL), purchased at Henza Port, Okinawa-jima Island, Japan, 18 January 2012; B: *L. dodecacanthoides* (holotype, RMNH 27705, 76.3 mm SL), Ambon Island, Molucca Islands, Indonesia.
図2. A: ハスジマタルミ*Lutjanus dodecacanthoides* (URM-P 47595, 標準体長240.1 mm), 平安座港で購入, 沖縄島, 2012年1月18日; B: ハスジマタルミ*Lutjanus dodecacanthoides* (ホロタイプ, RMNH 27705, 標準体長76.3 mm), アンボン島, モルッカ諸島,インドネシア.

from off Okinawa-jima Island for the first time. The two species belonging to commercially common fish group, but they might have been overlooked for a longtime. Shimose & Nanami (2013) surveyed the species composition of landed fishes at Hama and Awase Fishing Ports for 148 days (including 8,866 lutjanid fishes) in Okinawa-jima Island, but they did not record *L. madras* and *L. dodecacanthoides*. This fact indicates that the biodiversity levels of marine waters around the Ryukyu Archipelago are still underestimated; further taxonomic works combined with extensive field work are strongly required.

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要旨. 沖縄島東岸の漁港で水揚げされたイモトフエダイ *Lutjanus madras* (Valenciennes, 1831) とハスジマタルミ *L. dodecacanthoides* (Bleeker, 1854) が各 1 標本採集された. 本邦における両種の採集例は, 西表島と八重山諸島からの日本初記録に限られ, それ以降の記録はない. 本研究で得られた両種の標本は, 我が国からの 2 例目の記録であるとともに, 沖縄島周辺海域からの初めての記録となるため, その詳細を記録した. これら 2 種は, いずれも沖縄県で水産重要種として取引されるフエダイ属に属する. このような分類群からも初記録となる種がみられることは, 琉球列島の海洋生物多様性が未だ過小評価されていることを意味している.

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