



# First record of *Leptojulius lambdastigma* Randall and Ferraris, 1981 (Perciformes: Labridae) from the Andaman Islands, India

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## Abstract

The present study reveals the occurrence of *Leptojulius lambdastigma* Randall and Ferraris, 1981 from the Andaman Islands, India based on a single specimen caught from Chidiyatapu region, (11°30'21.0"N; 92°41'56.2"E) during October 2018. This species has been reported from Taiwan, Malaysia, Thailand and Philippines and the present document deals with its extended distribution in the Indian Ocean. The detailed information on morphometric and meristic characters are given and discussed. Partial mitochondrial cytochrome oxidase sub-unit I gene information of the species has been generated and submitted to GenBank. Further, information on comparative assessment of the specimen with earlier records is provided.

**Keywords:** *Wrasse, morphometric, meristics, cytochrome oxidase sub-unit I, India*

## Introduction

Labridae, commonly known as wrasses, a diverse group of fishes that vary in body shape, size and colour inhabit in coastal and continental shelf waters of tropical and temperate oceans around the world. Labridae is the fifth largest fish family (Westneat and Alfero, 2005) and the third most, speciose marine fish family, after Gobiidae and Serranidae, which comprises of more than 548 species representing 70 genera (Parenti and Randall, 2018). Fishes belonging to labridae family inhabit shallow waters with a variety of habitats such as coral reefs, rocky reefs, sea grass beds, sand-flats and are rarely found in muddy areas (Westneat, 2001).

Wrasses are characteristic of coral reef fish faunas all over the world (Bellwood and Wainwright, 2002). They occupy various trophic niches, diversely feeding on fish, zooplankton, molluscs, phytoplankton, polychaete, crabs, coral-mucous and detritous, with some serving as ectoparasite cleaners (Randall, 1967). Their diversity suggests that they play significant ecological roles on the coral reef ecosystems of tropical and temperate regions of the world (Choat and Bellwood, 1998; Nelson, 1994; Wainwright and Bellwood, 2002; Price *et al.*, 2011).

The genus *Leptojulius* Bleeker, 1862 comprise of five valid species such as *Leptojulius chrysotaenia* Randall and Ferraris, 1981,

*L. cyanopleura* (Bleeker 1853), *L. lambdastigma* Randall and Ferraris, 1981, *L. polylepis* Randall, 1996 and *L. urostigma* Randall, 1996, which are mainly distributed in the Indo-West Pacific regions (Randall and Ferraris, 1981). However, in India, only two species, *L. chrysotaenia* and *L. cyanopleura* are reported (Randall, 1996; Kumar *et al.*, 2013; Padate *et al.*, 2017). Generally, *Leptojulius* is distinguished from other related genera with a slender body (body depth 4-5 times in standard length (SL)), dark mid-lateral stripe extending from snout to caudal peduncle, two pairs of enlarged caniniform teeth anteriorly in both jaws and canines at the corner of mouth, lateral line scales less than 28 and 4 rows of scales between origin of the dorsal fin and lateral line (Westneat, 2001; Padate *et al.*, 2017).

The present report reveals the extended distribution of *Leptojulius lambdastigma* in the Andaman Sea, part of the Indian EEZ. The species was originally described by Randall and Ferraris, 1981 from Samar Sea, Philippines with subsequent reports from Taiwan, Malaysia and Thailand (Matsunuma *et al.*, 2010). In addition, this document provides detailed morphometric comparison of the specimen with the published records from other locations.

## Material and methods

A specimen of *Leptojulius lambdastigma* was collected by scoop net, whilst diving at Chidiyatapu, Andaman at a depth of 25 m (11°30'21.0"N; 92°41'56.2"E) during October 2018 (Fig. 1).

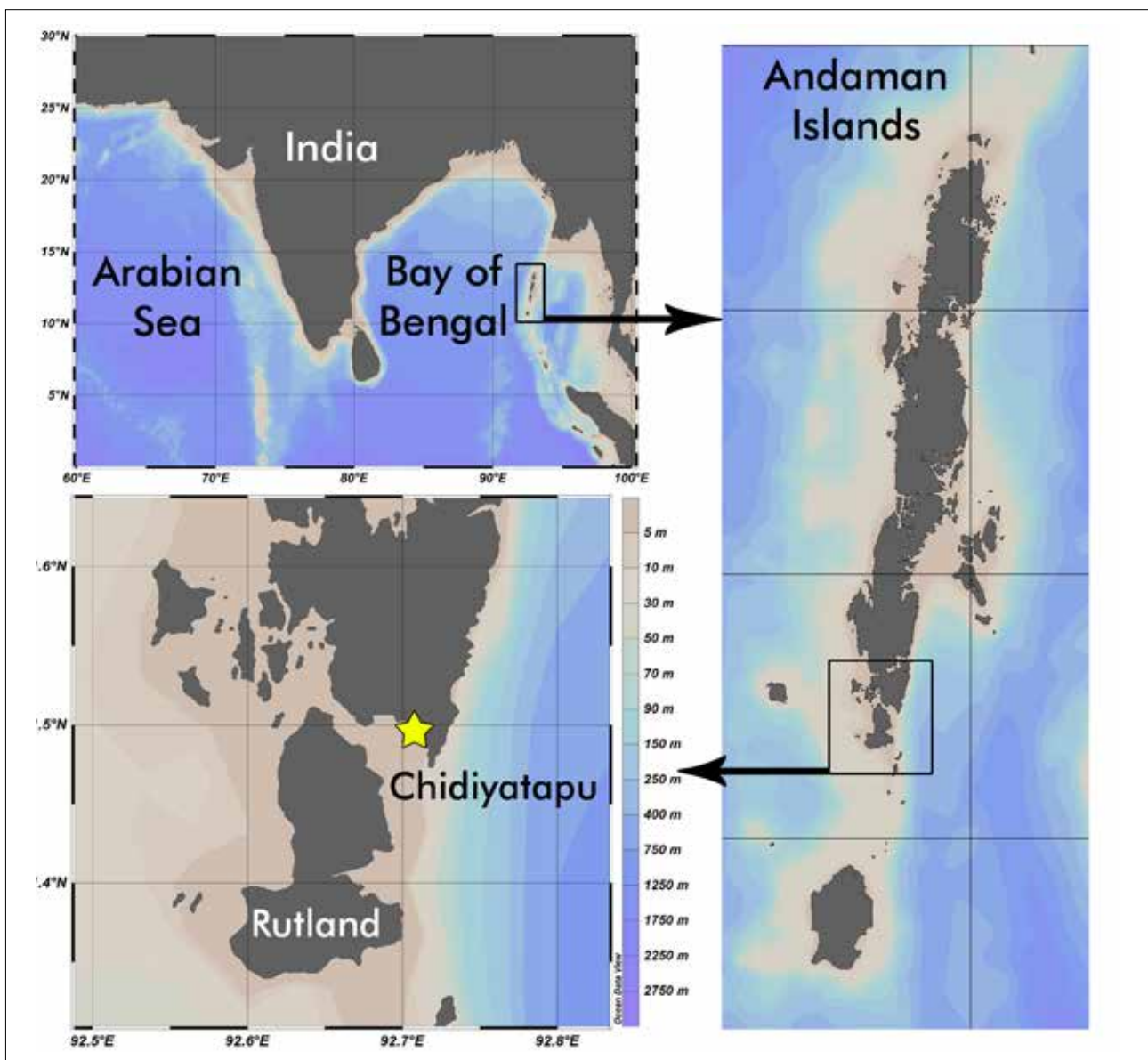


Fig. 1. Sampling location of *Leptojulius lambdastigma* Randall and Ferraris, 1981, Chidiyatapu and bathymetric map of Andaman waters.

Photograph of the fresh specimen was taken and preserved for further investigation. Later, the specimen was identified with the morpho-meristic characters described by Randall, 1996 and all the measurements were taken with a digital Vernier calliper with an accuracy of 0.1 mm. Tissue (muscle) sample was collected and preserved in 95% ethanol for further molecular analyses. The specimen was fixed in 10% formalin and deposited in the National repository at the ICAR- National Bureau of Fish Genetic Resources, Lucknow, India.

The genomic DNA was extracted using Qiagen Kit and the partial mitochondrial cytochrome oxidase I (COI) gene, amplified using universal primers COI F (5'-TCA ACC AAC CAC AAA GAC ATT GGC AC-3') and COI R (5'- TAG ACT TCT GGG TGG CCA AAG AAT CA-3') (Ward *et al.*, 2005). The PCR amplification was performed in 25  $\mu$ l reactions containing 10x assay buffer (100mM Tris, 500mM KCl, pH 9.0) with 20mM MgCl<sub>2</sub>, 10pmoles of each primer, 200 $\mu$ M of each dNTP, 0.25U TaqDNA polymerase and 25ng of template DNA. PCR conditions used were as follows: initial denaturation at 95°C for 5 min, denaturation 94°C for 30 s, annealing 54° C for 45 s, extension 72°C for 1 min (30 cycles) followed by a final extension for 10 min at 72°C. PCR product was sequenced at sequencing facility and sequence was deposited in the NCBI GenBank.

## Results and discussion

### *Systematics*

Order Perciformes  
Suborder Labroidei  
Family Labridae Cuvier, 1816  
Genus *Leptojulis* Bleeker, 1862  
Species *Leptojulis lambdastigma* Randall and Ferraris, 1981 (Fig. 2)

### *Material examined*

ID: LABLL01, male, total length 98.16 mm, off Chidiyatapu, Andaman (11°30'21.0"N; 92°41'56.2"E), India, 25 m depth, October 2018.

### *Diagnostic characters*

Body elongated and moderately compressed; depth 2.81 times in standard length; covered with large cycloid scales; ventral body scales small nearly half of those on body. Head small (HL 3.35 times in SL) and pointed with a nearly straight dorsal profile and slightly convex nape; snout comparatively long; orbit small in size. Mouth terminal with prominent lips, slightly oblique upper and

lower jaws with four large caniniform teeth anteriorly and posteriorly, of which posterior two are larger, strongly re-curved and out-curved. The first pair of caniniform teeth in upper jaw projecting forward; a single caniniform tooth present posteriorly at mouth corner in each sides; a band of small nodular teeth appeared medial to outer row of teeth in both jaws. Gill opening relatively large with short 17 gill rakers; longest raker on first gill arch around one-third length of the longest gill filament. Dorsal fin origin nearly vertical at posterior end of the gill membrane with 9 spines and 12 rays. Anal fin spines 3, anal fin rays 12; origin of anal fin below base of 9<sup>th</sup> dorsal-fin. Pectoral fin rays 13; posterior tip of pectoral fin just reaching the base of 9<sup>th</sup> dorsal-fin spine. Pelvic fin long with posterior tip reaching anus and has 1 spine and 5 rays with 1<sup>st</sup> ray elongate; caudal fin round. Lateral line complete with 27 scales.

### *Colour*

Based on the specimen (Fig.1) head light green dorsally and pale yellow ventrally with two orange stripes, one originating from snout to orbit and other from corner of mouth to base of orbit; dorsal side of body dark greenish and ventral side yellowish with pale white abdomen. A single dark stripe running along lateral line, which start from snout and terminates on the caudal peduncle with a dark spot, which extends to the tail. There is a V-shaped black mark below 3<sup>rd</sup> to 6<sup>th</sup> dorsal spine. Soft-rayed portion of dorsal fin orange distally and greenish proximally. Pectoral fin yellow; pelvic fins translucent; anal fin orange with greenish margin. Caudal fin dark yellow in upper  $\frac{3}{4}$  and pale blue below.

### *Distribution*

Reported from Samar Sea, Philippines, Taiwan (Randall and Ferraris, 1981; Shao, 1986; Randall, 1996; Chen, 2004; Motomura *et al.*, 2017), Thailand and Malaysia (Yoshida *et al.*, 2013; Matsunuma *et al.*, 2010). The specimen collected in the present study is the first record from the Andaman Sea, part of the Indian EEZ at depth of 25 m.

### *Molecular information*

Sequencing of mitochondrial COI gene yielded 605 bp. The sequence was submitted to NCBI (Accession No: MK682605).

### *Remarks*

Previously, the genus *Leptojulis* was represented by two species *L. chrysotaenia* and *L. cyanopleura* in the Indian EEZ, (Randall, 1996; Kumar *et al.*, 2013; Rajan and Vikas, 2016; Padate *et al.*, 2017). The present study has unambiguously confirmed the presence of *L. lambdastigma* in the Andaman Sea. The specimen

was confirmed as *L. lambdastigma* based on the following characters; 27 lateral line scales; dorsal and anal fins with 12 soft rays; pectoral fin longer with 1.47 length in head length and presence of large V shaped black mark above middle of pectoral fin and a dark blotch on caudal fin base. It differs from *L. cyanopleura* which has 27 gill rakers, short pectoral fin, 11 soft rays in dorsal and anal fin, absence of V-shape mark and absence of dark spot on caudal fin base (Matsunuma *et al.*, 2010).

The morphometric and meristic characters of this specimen are compared with the previously published records from different waters, including the type material. All morphometric characters of the specimen fall within the previously reported range for *L. lambdastigma*, except minor variations in head length and length of the longest anal fin ray (Table 1 and 2).

Table 1. Morphometric measurements of *Leptojulius lambdastigma* from the Andaman Islands, India compared with published data on the species from different locations (in percentage of standard length).

| Morphometric Characters            | Present Study (n=1) | Malaysia (n=3)* | Thailand (n=3)* | Philippines (n=6)** |
|------------------------------------|---------------------|-----------------|-----------------|---------------------|
| Standard Length (SL) (mm)          | 83.37               | 101.6-125.3     | 83.6-102.5      | 88.2-136.5          |
| Measurements in % SL               |                     |                 |                 |                     |
| Body depth                         | 28.13               | 27.7-29.7       | 27.0-28.1       | 25.6-27.2           |
| Body width                         | 10.39               | 10.2-11.3       | 9.9-11.2        | 10.0-11.8           |
| Head length (HL)                   | 29.84               | 30.9-31.9       | 30.5-33.1       | 30.5-31.9           |
| Snout length (SL)                  | 10.26               | 10.9-11.4       | 10.5-11.0       | 10.3-11.3           |
| Eye diameter                       | 6.72                | 5.4-5.9         | 6.3-7.4         | 5.2-6.5             |
| Inter orbital width                | 5.25                | 6.2-6.9         | 6.2-6.9         | 5.2-5.6             |
| Upper jaw length                   | 9.43                | 9.1-9.5         | 9.2-9.6         | -                   |
| Predorsal length                   | 30.16               | 30.2-31.5       | 29.3-30.1       | 29.5-30.9           |
| Preanal length                     | 54.06               | 52.8-56.4       | 54.6-57.9       | 52.6-53.3           |
| Prepelvic length                   | 29.69               | 30.6-31.5       | 31.1-32.0       | 29.7-32.2           |
| First dorsal fin spine length      | 5.8                 | 5.4-5.5         | 5.3-6.0         | 5.2-6.5             |
| Second dorsal fin spine length     | 6.34                | 6.1-6.9         | 6.5-7.2         | -                   |
| Ninth dorsal-fin spine length      | 10.51               | 10.1-10.8       | 10.8-11.1       | 10.1-13.3           |
| Longest dorsal fin soft ray length | 15.91               | 15.3-16.4       | 14.4-15.1       | 15.4-18.3           |
| First anal fin spine length        | 4.41                | 4.2-5.8         | 4.4-5.6         | 3.6-4.8             |
| Second anal fin spine length       | 6.88                | 8.3             | 6.9-7.2         | -                   |
| Third anal fin spine length        | 9.13                | 8.5-9.3         | 8.8-9.4         | 8.8-9.3             |
| Longest anal fin soft ray length   | 13.6                | 14.0-16.2       | 14.1-15.6       | 14.9-17.8           |
| Pectoral fin length                | 20.22               | 20.4-22.0       | 20.6-22.2       | 20.1-21.5           |
| Pelvic fin spine length            | 9.96                | 9.9-12.1        | 10.3-10.8       | 8.2-11.5            |
| Pelvic fin length                  | 22.55               | 21.2-21.7       | 18.3-22.0       | 18.1-33.2           |
| Caudal fin length                  | 21.37               | 20.5-22.9       | 20.4-21.1       | 18.8-21.1           |
| Caudal peduncle length             | 8.56                | 7.2-8.3         | 6.5-7.8         | 7.9-8.8             |
| Caudal peduncle depth              | 12.73               | 13.1-13.4       | 11.1-13.2       | 11.8-12.8           |

\*Matsunuma *et al.*, 2010; \*\*Randall and Ferraris, 1981, original description

Table 2. Meristic characters of *Leptojulius lambdastigma* from the Andaman Islands, India compared with published data on the species from different locations

| Meristic Characters       | Present study (n=1) | Malaysia (n=3)* | Thailand (n=3)* | Philippines (n=6)** |
|---------------------------|---------------------|-----------------|-----------------|---------------------|
| Dorsal-fin rays           | IX, 12              | IX, 12          | IX, 12          | IX, 12-13           |
| Anal-fin rays             | III, 12             | III, 12         | III, 12         | III, 12             |
| Pectoral-fin rays         | 13                  | 13              | 13              | 13                  |
| Pelvic-fin rays           | I, 5                | I, 5            | I, 5            | I, 5                |
| Principal caudal rays     | 14                  | 14              | 14              | 14                  |
| Pored lateral-line scales | 27                  | 27              | 27              | 27                  |
| Scales above              | 4                   | 4               | 4               | 4                   |
| Scale below lateral line  | 10                  | 9-10            | 9-10            | 9-10                |
| Circumpeduncular scales   | 18                  | 18-19           | 17-18           | 17-18               |
| Branchiostegal rays       | 6                   | 6               | 6               | 6                   |
| Gill rakers               | 7+10=17             | 7+8-10=15-17    | 5-7+11-12=16-19 | 17-19               |
| Vertebrae                 | 25                  | 25              | -               | -                   |

\*Matsunuma *et al.*, 2010; \*\*Randall and Ferraris, 1981 original description

The differences in measurements may be attributed to the geographic variations. This solicits the need for a comparative genetic and morphometric analysis with adequate sample size. Despite the development of mitochondrial sequence, the molecular confirmation was not done due to lack of sequences available in the public domain for comparison. However, the molecular information developed in the present study will help in carrying out a detailed taxonomic study of the group in the future.

Andaman Sea is geographically part of the eastern Indian Ocean; however, it is connected to the Western Pacific via the Straits of Malacca, resulting in an area of distributional confluence of the biotas of both Indian and Pacific Oceans (Satapoomin, 2011). Hence, long term monitoring is required for better understanding of connectivity patterns along Andaman and Nicobar Islands as well as the possible presence of previously unknown populations of diverse species in the region (Rajan and Vikas, 2016). The present report extends the geographical range of *L. lambdastigma* from the Western Pacific to the Indian waters and is an addition to the ichthyofaunal diversity of India.

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