

First Record and Distribution Extension of Two Emperor Fishes, *Lethrinus semicinctus* and *Lethrinus olivaceus* to the East Coast of Peninsular Malaysia
(Rekod Pertama dan Pelunjuran Taburan Dua Ikan Landuk, *Lethrinus semicinctus* dan *Lethrinus olivaceus* ke Pantai Timur Semenanjung Malaysia)

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ABSTRACT

This study reports the occurrence of two species of *Lethrinus* (family Lethrinidae) on the east coast of Peninsular Malaysia. The specimens were caught by commercial bottom trawlers operating in the southern part of the South China Sea and landed at several fish landing ports. *Lethrinus semicinctus* Valenciennes, 1830 and *Lethrinus olivaceus* Valenciennes, 1830, previously known from Borneo, with the latter also occurring in the Straits of Malacca on the west coast of Peninsular Malaysia, are now documented as new records of geographic range in the northeastern coast of Peninsular Malaysia. These records add to published Malaysian literature with photographic records, locality details, collection numbers and preserved specimens. Diagnostic characters for both species are given, as well as detailed morphometric and meristic data.

Keywords: Biogeography; Lethrinidae; marine fish; new record; South China Sea

ABSTRAK

Kajian ini melaporkan kehadiran dua spesies *Lethrinus* (family Lethrinidae) di pantai timur Semenanjung Malaysia. Spesimen telah ditangkap dengan bot pukat tunda dasar komersial yang beroperasi di bahagian selatan Laut China Selatan dan mendarat di beberapa pelabuhan pendaratan ikan. *Lethrinus semicinctus* Valenciennes, 1830 dan *Lethrinus olivaceus* Valenciennes, 1830, sebelum ini diketahui dari Borneo, dengan yang terakhir juga hadir di Selat Melaka di pantai barat Semenanjung Malaysia, kini telah didokumentasikan sebagai rekod baharu bagi julat geografi di pantai timur laut Semenanjung Malaysia. Rekod ini menambah kepustakaan Malaysia yang diterbitkan dengan rekod fotografi, butiran lokaliti, nombor koleksi dan spesimen yang diawet. Sifat diagnostik untuk kedua-dua spesies diberikan, serta data morfometrik dan meristik yang terperinci.

Kata kunci: Biogeografi; ikan marin; Laut China Selatan; Lethrinidae; rekod baharu

INTRODUCTION

Lethrinids are abundant in tropical and subtropical Indo-Pacific Ocean (Carpenter 2001). *Lethrinus* has the highest number of species compared to other confamilial genera (Fricke, Eschmeyer & Van der Laan 2021), is

characterized by scaleless cheeks, nine soft rays in the dorsal fin and eight soft rays in the anal fin (Carpenter 2001). Generally, *Lethrinus* species are known as 'ikan landuk' and are commercially caught in Malaysia using bottom trawls, traps, bottom longlines, and hooks-

and-lines. There are currently 14 species of *Lethrinus* recorded in Malaysian waters but we have not been able to examine their details in terms of localities, collection numbers and preserved specimens, with the exception of photographic records (Ambak et al. 2012; Annie & Albert 2009; Atan, Jaafar & Abdul Majid 2010; Lim et al. 2018; Mansor et al. 1998; Mohsin & Ambak 1996). Almost all Malaysian published records except Annie and Albert (2009) include photographs from neighbouring countries in Southeast Asia and the South China Sea. The occurrence of *Lethrinus semicinctus* Valenciennes, 1830 and *Lethrinus olivaceus* Valenciennes, 1830 in Malaysian waters are thus difficult to confirm, as such photographed specimens were probably not caught in Malaysia. However, we have provisionally agreed on their occurrence as suggested by Carpenter (2001), GBIF (2022a, 2022b) and Froese and Pauly (2022). The present study confirms that *L. semicinctus* is actually common and widely distributed in Malaysian waters, whereas *L. olivaceus* was rarely found throughout the study. Recent scientific papers and books published in the last three years reported 28 new records from the east coast of Peninsular Malaysia (Mat Jaafar et al. 2019; Motomura et al. 2021; Okamoto et al. 2019; Seah, Mat Jaafar & Ali 2020; Seah et al. 2021; Yusuf et al. 2021). Herein, we report additional first records and distribution extensions of *L. semicinctus* and *L. olivaceus* from the east coast of Peninsular Malaysia, as well as morphological information on these specimens from Malaysian waters.

MATERIALS AND METHODS

Specimens were collected from Lembaga Kemajuan Ikan Malaysia (LKIM) landing ports situated at Kuantan (3.7872°N; 103.3172°E), Pulau Kambing (5.3220°N; 103.1326°E), Kuala Besut (5.8312°N; 102.5619°E) and Tok Bali (5.8762°N; 102.4581°E) between 2019 and 2020. These specimens were caught using commercial bottom trawlers that operated off the east coast of Peninsular Malaysia. A total of 47 specimens including 42 *Lethrinus semicinctus* and five *L. olivaceus* were deposited at the South China Sea Repository and Reference Centre, Universiti Malaysia Terengganu, Malaysia (UMTF). In addition, four individual specimens of *Lethrinus semicinctus* were deposited at the Kagoshima University Museum (KAUM-I) and Fish Biodiversity Collection, Graduate School of Bioresources, Mie University (FRLM) after the Terengganu Ichthyofauna Expedition in 2015 and 2017, a joint survey under Japan Society for the Promotion of Science: Core-to-Core Program, Research and Educational Network on Coastal Ecosystems in Southeast Asia (JSPS-CCore-RENSA).

Each specimen was photographed with a tag number, fixed and preserved followed Seah et al. (2011). Morphometric measurements and meristic counts followed Hubbs and Lagler (2004). Terminology of morphological characteristics and descriptions followed Carpenter (2001) and Shibuya et al. (2022). Specimens were measured to the nearest 0.01 mm using a digital



FIGURE 1. *Lethrinus semicinctus*, UMTF 9589, 194 mm SL, Pulau Kambing, Terengganu, Malaysia

calliper. The measurements of total length, standard length and fork length were presented in millimeters (mm). Standard length is abbreviated as SL. Species distribution information was taken and referred from Eschmeyer's Catalog of Fishes, Global Biodiversity Information Facility, FishBase and Malaysian fish identification books as mentioned in the taxonomy section.

RESULTS AND DISCUSSION

TWO NEW RECORDS OF EMPEROR FISHES

Lethrinus semicinctus Valenciennes, 1830 (Figure 1)
Blackblotch Emperor (English name); Landuk Gertah
(Local valid name)

TABLE 1. Counts and proportional measurements (as percentage of standard length and head length) of specimens of *Lethrinus semicinctus*

| | <i>Lethrinus semicinctus</i> | | | | | |
|--|--|------------|-------------------------------|------------------------------|------------------------------|------|
| | East Coast of Peninsular Malaysia, Malaysia | Terengganu | Setiu Wetlands, Terengganu | Bidong Island, Terengganu | Bidong Island, Terengganu | |
| | (Current study; n=42) | FRLM-55010 | KAUM-105817 | KAUM-80031 | FRLM-51744 | |
| Total length, mm | 186-290 | 206.50 | 101.00 | 258.00 | 246.50 | |
| Standard length, mm | 151-240 | 164.82 | 80.50 | 219.90 | 209.00 | |
| Fork length, mm | 164-261 | 187.20 | 90.90 | 227.30 | 230.80 | |
| Counts | Modes | | | | | |
| Dorsal-fin rays | X, 9 | X, 9 | X, 9 | X, 9 | X, 9 | |
| Anal-fin rays | III,8 | III,8 | III, 7 | III,8 | III, 7 | |
| Pectoral-fin rays | 12-13 | 13 | 12 | 13 | 13 | |
| Pelvic-fin rays | I, 5 | I, 5 | I, 5 | I, 5 | I, 5 | |
| Supratemporal patch scales | 4-6 | 4 | 4 | 4 | 5 | |
| Lateral-line scales | 46-49 | 49 | 47 | 48 | 47 | |
| Scales above lateral line | 5-6 | 5 | 5 | 5 | 5 | |
| Scales below lateral line | 14-16 | 15 | 14 | 15 | 14 | |
| Upper gill rakers (left) | 3-5 ^a | 4 | 5 | 4 | 2 | 3 |
| Upper gill rakers (right) | 3-5 ^b | 4 | - | - | - | - |
| Lower gill rakers (left) | 5-7 ^c | 5 | 5 | 5 | 5 | 6 |
| Lower gill rakers (right) | 5-6 ^b | 5 | - | - | - | - |
| Total lower gill rakers (left and right) | 10-12 ^d | 10 | - | - | - | - |
| Snout angle (°) | 55-70 | 65 | 59 | 59 | 58 | 54 |
| Measurements | Means | | | | | |
| As % of standard length | | | | | | |
| Snout length | 17.5-20.4 | 19.1 | 19.6 | 16.4 | 19.4 | 19.7 |
| Snout length excluding lips | 15.7-18.2 | 16.9 | 17.6 | 13.5 | 17.1 | 17.5 |
| Head length | 33.7-37.1 | 35.6 | 36.1 | 36.1 | 33.9 | 36.1 |
| Head width | 13.1-17.7 | 15.1 | 15.5 | 15.9 | 14.3 | 15.4 |
| Cheek length | 13.0-15.4 | 14.4 | 14.8 | 12.7 | 14.8 | 14.5 |
| Body depth | 29.9-34.3 | 32.1 | 35.3 | 37.4 | 32.5 | 33.4 |

| | | | | | | |
|------------------------------|-----------|------|--------|------|------|------|
| Preopercle length | 26.0-30.7 | 28.7 | 29.3 | 27.6 | 28.2 | 28.4 |
| Predorsal-fin length | 33.8-41.9 | 39.9 | 42.9 | 44.0 | 40.1 | 42.4 |
| Dorsal-fin base length | 42.2-46.6 | 44.9 | 48.0 | 44.1 | 44.4 | 46.2 |
| Prepectoral-fin length | 33.3-37.7 | 35.8 | 36.9 | 37.8 | 34.7 | 35.3 |
| Pectoral-fin length | 22.0-27.3 | 25.3 | 26.5 | 28.0 | 24.9 | 27.0 |
| Prepelvic-fin length | 35.5-43.8 | 38.7 | 39.9 | 42.9 | 38.4 | 40.0 |
| Pelvic fin length | 20.3-24.5 | 21.9 | 25.3 | 24.6 | 21.5 | 21.1 |
| Preanal length | 60.2-65.9 | 63.4 | 63.9 | 68.2 | 59.4 | 64.7 |
| Anal-fin base length | 15.0-17.8 | 16.4 | 16.7 | 16.6 | 17.6 | 17.6 |
| Caudal-fin length | 19.0-25.2 | 21.9 | 17.9 | 27.5 | 23.8 | 22.2 |
| Caudal-fin median ray length | 7.9-11.4 | 9.2 | 14.3 | 15.7 | 11.5 | 12.0 |
| 1st dorsal-fin spine length | 4.4-10.1 | 6.9 | 6.2 | 7.1 | 6.4 | 6.6 |
| 2nd dorsal-fin spine length | 7.9-12.3 | 9.7 | 9.5 | 8.7 | 9.6 | 9.4 |
| 3rd dorsal-fin spine length | 9.5-14.4 | 11.6 | 11.4 | 13.5 | 11.1 | 11.7 |
| 4th dorsal spine length | 8.4-14.3 | 11.3 | 11.9 | 13.8 | 10.2 | 11.6 |
| Pelvic spine length | 9.8-14.9 | 13.3 | 14.7 | 15.0 | 11.3 | 12.9 |
| 1st anal-fin spine length | 4-6.2 | 5.2 | 5.2 | 8.3 | 4.6 | 5.7 |
| 2nd anal-fin spine length | 6.3-8.5 | 7.5 | broken | 12.3 | 7.1 | 7.5 |
| 3rd anal-fin spine length | 7.7-10.0 | 8.7 | broken | 12.4 | 8.4 | 8.6 |
| Caudal-peduncle depth | 10.1-12.1 | 11.1 | 10.8 | 12.7 | 11.1 | 10.5 |
| <hr/> | | | | | | |
| As % of head length | | | | | | |
| Snout length | 49.9-56.5 | 53.6 | 54.2 | 45.4 | 57.1 | 54.5 |
| Snout length excluding lips | 44.1-50.7 | 47.5 | 48.8 | 37.5 | 50.5 | 48.4 |
| Head width | 37.0-50.6 | 42.3 | 42.9 | 44.0 | 42.1 | 42.5 |
| Upper-jaw length | 30.7-39.5 | 36.6 | 36.0 | 34.4 | 38.1 | 35.8 |
| Lower jaw length | 28.4-37.8 | 35.1 | 35.9 | 32.3 | 36.2 | 36.5 |
| Eye diameter | 22.3-26.7 | 24.1 | 25.1 | 30.6 | 23.9 | 25.3 |
| Interorbital width | 23.4-30.1 | 26.6 | 29.6 | 25.4 | 26.9 | 31.2 |

^a, ^b, ^c and ^d based on 40, 34, 41, 33 specimens, respectively

Lethrinus semicinctus Valenciennes, 1830: 294. Type locality: Buru Island, Indonesia; Mohsin and Ambak 1996: 333, 715, fig. 240; Carpenter 2001: 3043; Atan, Jaafar & Abdul Majid 2010: 122b; Lim et al. 2018: 123. *Material examined* FRLM 51744, 209 mm SL, Bidong Island, Terengganu, 1 October 2015. KAUM-I 80031, 220 mm SL, Bidong Island, Terengganu, 3 October 2015.

KAUM-I 105817, 81 mm SL, Setiu Wetlands, August 2017. FRLM 55010, 165 mm SL, Terengganu, 13 August 2017. UMTF 9553–9561, 9: 176–263 mm SL, LKIM Kuantan, Pahang, 10 April 2019. UMTF 9562–9673, 12: 159–212 mm SL, LKIM Kuantan, Pahang, 11 April 2019. UMTF 9574–9587, 14: 193–225 mm SL, LKIM Kuala Besut, Terengganu, 20 June 2019. UMTF 9588, 194

mm SL, LKIM Kuantan, Pahang, 23 August 2019. UMTF 9589, 194 mm SL, LKIM Pulau Kambing, Terengganu, 18 October 2019. UMTF 9591–9593, 3: 190–216 mm SL, LKIM Pulau Kambing, Terengganu, 12 December 2019. UMTF 9594, 178 mm SL, LKIM Pulau Kambing, Terengganu, 24 December 2019. UMTF 9595, 174 mm SL, LKIM Tok Bali, Kelantan, 16 January 2020.

Diagnosis Longitudinal scale rows between lateral line and middle of dorsal fin base modally 5. Number of lower gill rakers at first gill arch 5–7 (modally 5, left) and 5–6 (modally 5, right); the sum of the above-mentioned rakers on both sides 10–12 (modally 10). Supratemporal patch scales 4–6 (modally 4). Lateral-line scales 46–49 (modally 49). Dorsal profile above eye convex. Snout angle 55–70° (modally 65). Eye is situated close on straight dorsal profile, its diameter is 3.8–4.5 times its head length. Body is brownish-grey with scattered irregular small black blotches. A large oblong black blotch is below the soft-rayed portion of dorsal-fin base and bordering below the lateral line.

General description Body is compressed and moderately elongate, with depth 2.9–3.3 times its standard length. Dorsal profile above eye convex without a distinct bump. Pointed snout profile, with length 1.8–2.0

times its head length. Terminal mouth shape with conical lateral on jaws. Canines in front of jaws almost straight. Outer margin of maxilla smooth. No scales on cheek and inner surface of pectoral fin base. Upper posterior margin of opercle is scaly. Moderate sized ctenoid scales on the body and a complete lateral line. Single dorsal fin, pectoral fins located high, pelvic fins thoracic and caudal fin forked. Third and fourth dorsal spines are longer than the second, with length 2.2–3.5 times the body depth. Counts and measurements are shown in Table 1.

Colour in fresh specimens. Body tanned or brownish-grey with a large oblong black blotch below soft-rayed portion of dorsal fin. Irregular small black blotches scattered laterally on body with pale or pinkish fins.

Distribution All known specimens of the species were well-distributed along the east coast of Peninsular Malaysia including Kelantan, Terengganu and Pahang (Figure 2). *Lethrinus semicinctus* is known to be widely distributed in the East Indian Ocean and West Pacific, including Sri Lanka, Indonesia, Northern Australia, Ryukyu Islands to the Marshall, Solomon Islands and Borneo Island (Carpenter 2001; Fricke, Eschmeyer & Van der Laan 2021; Froese & Pauly 2022).

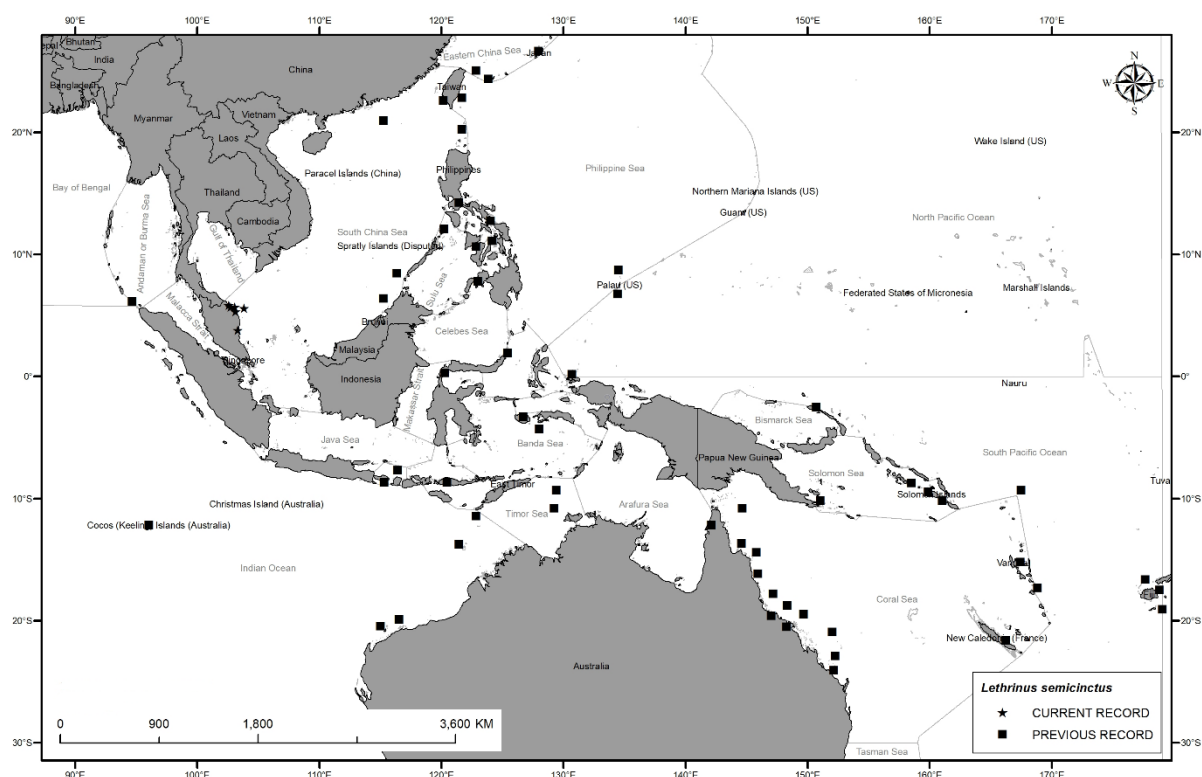


FIGURE 2. Map showing previous records of *Lethrinus semicinctus* (square) (GBIF 2022a) and the new records found on the east coast of Peninsular Malaysia (star)

Remarks The characteristics of the specimens collected from the east coast of Peninsular Malaysia concur with the diagnostic features of *L. semicinctus* defined by Carpenter (2001). *Lethrinus semicinctus* is distinguished from congener *Lethrinus ravus* Carpenter and Randall (2003) in having a prominent oblong black blotch below the lateral line under the soft-rayed portion of the dorsal fin (vs. oblong blotch absent), distinct darkened scales in front of the pectoral-fin base (vs. darkened scale absent), and 4–6 supratemporal patch scales (vs. 6–10 scales) (Carpenter & Randall 2003; this study). Previously, based on existing literature, *L. semicinctus* had only been recorded through photographic records but with no information provided on localities (Atan, Jaafar & Abdul Majid 2010; Lim et al. 2018; Mohsin & Ambak 1996). This study demonstrated that the species can be found in northeastern Peninsular Malaysia. Carpenter (2001), GBIF (2022a) and Froese and Pauly (2022) reported that *L. semicinctus* was only known to exist in Malaysian Borneo (Sabah). This thus indicates that our study has proven an extension of the known geographical distribution of the species. The 42 specimens featured in this paper thus represent the geographical distribution extension of *L. semicinctus* from Peninsular Malaysia, for which the LKIM Tok Bali, Kelantan specimen is the northernmost record for the species on the east coast of Peninsular Malaysia. These Malaysian specimens represent the westernmost records of *L. semicinctus* in the Western Pacific Ocean.

Lethrinus olivaceus Valenciennes, 1830 (Figure 2)
Longface Emperor (English name); Landuk Ketambak (Local valid name)

Lethrinus olivaceus Valenciennes, 1830: 295. Type locality: Anyer, Jawa Barat, Java Island, Indonesia; Mansor et al. 1998: 186; Carpenter 2001: 3039; Annie and Albert 2009: 181 (Sarawak); Ambak et al. 2010: 143; Atan, Jaafar & Abdul Majid 2010: 121d; Lim et al. 2018: 124; Shibuya et al. 2022: 56 (Sabah).

Material examined UMTF 9590, 264 mm SL, LKIM Kuantan, 11 April 2019. UMTF 9597, 292 mm SL, LKIM Pulau Kambing, 29 November 2019. UMTF 9598, 195 mm SL, LKIM Kuala Besut, 16 January 2020. UMTF 9599–9600, 2: 229–253 mm SL, Merang, 16 January 2020.

Diagnosis Longitudinal scale rows between lateral line and middle of dorsal fin base modally 6. Number of lower gill rakers at first gill arch 6–8 (modally 7, left) and 7–8 (modally 7, right); the sum of the above-mentioned rakers on both sides 13–16 (modally 14). Supratemporal patch scales moderate 6. Dorsal profile above eye almost straight. Snout angle 45°–55° (modally 45°). Lateral-line scales 48–50 (modally 49). Eye is close to straight dorsal profile, its diameter is 5.0–6.2 times its head length. Body greenish-grey with scattered irregular dark bands and wavy dark streaks at the snout.



FIGURE 3. *Lethrinus olivaceus*, UMTF 9600, 229 mm SL, Merang, Terengganu, Malaysia

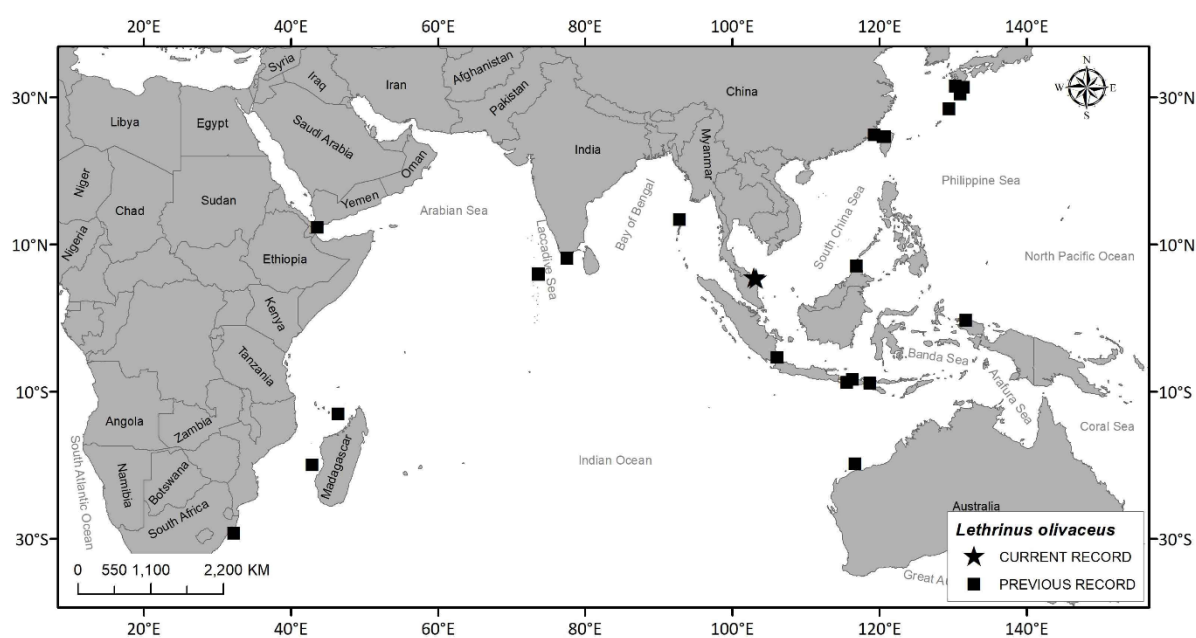


FIGURE 4. Map showing previous records of *Lethrinus olivaceus* (square) (Shibuya et al. 2022) and the new records found on the east coast of Peninsular Malaysia (star)

TABLE 2. Counts and proportional measurements (as percentage of standard length and head length) of specimens of *Lethrinus olivaceus*

| | <i>Lethrinus olivaceus</i> | | |
|----------------------------|--|---|---|
| | East Coast of Peninsular Malaysia, Malaysia | Ryukyu Islands, Japan (Shibuya et al., 2022) | Sabah, Malaysia (Shibuya et al., 2022) |
| | (Current study; n=5) | n=44 | KAUM-I. 80093 |
| Total length, mm | 241-349 | - | - |
| Standard length, mm | 195-292 | 177.7-780.0 | 203.90 |
| Fork length, mm | 213-315 | - | - |
| Counts | | Modes | Modes |
| Dorsal-fin rays | X, 9 | X, 9 | X, 9 |
| Anal-fin rays | III,8 | III,8 | III,8 |
| Pectoral-fin rays | 13 | 13 | 13 |
| Pelvic-fin rays | I, 5 | I, 5 | - |
| Supratemporal patch scales | 6 | 6 | - |
| Lateral-line scales | 48-50 | 49 | 48 |
| Scales above lateral line | 5-7 | 6 | 6 |
| Scales below lateral line | 16-17 | 17 | 17 |
| Upper gill rakers (left) | 4-5 | 4 | 5 |
| Upper gill rakers (right) | 4 | 4 | - |

| | | | | |
|--|-----------|-------|-------|--------|
| Lower gill rakers (left) | 6-8 | 7 | 8 | 6 |
| Lower gill rakers (right) | 7-8 | 7 | 8 | 8 |
| Total lower gill rakers (left and right) | 13-16 | 14 | 16 | 14 |
| Snout angle (°) | 45-55 | 45 | - | - |
| Measurements | | | | |
| As % of standard length | | Means | Means | |
| Snout length | 19.7-22.0 | 20.5 | 23.4 | 20.7 |
| Snout length excluding lips | 15.8-18.1 | 16.8 | 19.6 | 17.6 |
| Head length | 35.9-38.6 | 37.3 | 39.5 | 38.3 |
| Head width | 11.8-13.6 | 12.9 | - | - |
| Cheek length | 11.2-11.8 | 11.5 | - | - |
| Body depth | 28.0-32.5 | 29.7 | 31.1 | 32.4 |
| Preopercle length | 27.8-30.9 | 29.1 | - | - |
| Predorsal-fin length | 39.2-42.2 | 40.7 | - | - |
| Dorsal-fin base length | 42.5-44.5 | 43.3 | 44.3 | 47.1 |
| Prepectoral-fin length | 36.1-38.0 | 37.1 | - | - |
| Pectoral-fin length | 21.9-23.5 | 22.8 | 23.0 | 24.9 |
| Prepelvic-fin length | 38.9-40.6 | 39.9 | - | - |
| Pelvic fin length | 20.1-22.9 | 21.5 | 20.2 | broken |
| Preanal length | 60.6-66.1 | 62.6 | - | - |
| Anal-fin base length | 16.5-17.7 | 17.1 | 17.2 | 17.9 |
| Caudal-fin length | 18.9-23.1 | 20.6 | - | - |
| Caudal-fin median ray length | 8.2-8.6 | 8.4 | - | - |
| 1st dorsal-fin spine length | 4.2-6.8 | 6.1 | - | - |
| 2nd dorsal-fin spine length | 9.1-10.2 | 9.6 | - | - |
| 3rd dorsal-fin spine length | 10.3-11.8 | 11.4 | - | - |
| 4th dorsal spine length | 8.8-11.5 | 10.7 | - | - |
| Pelvic spine length | 9.2-14.4 | 12.8 | - | - |
| 1st anal-fin spine length | 3.8-4.4 | 4.1 | - | - |
| 2nd anal-fin spine length | 6.6-7.6 | 7.0 | - | - |
| 3rd anal-fin spine length | 7.5-8.8 | 8.5 | - | - |
| Caudal-peduncle depth | 9.7-11.1 | 10.4 | - | - |
| As % of head length | | | | |
| Snout length | 52.1-57.0 | 54.8 | - | - |
| Snout length excluding lips | 41.2-47.0 | 45.0 | - | - |
| Head width | 33.1-38.0 | 35.5 | - | - |
| Upper-jaw length | 34.3-35.9 | 35.2 | - | - |
| Lower jaw length | 34.1-36.1 | 34.9 | - | - |
| Eye diameter | 16.2-20.1 | 18.1 | - | - |
| Interorbital width | 19.5-23.7 | 21.9 | - | - |

General description Body is compressed and moderately slender, depth is 3.1–3.6 times its standard length. Dorsal profile above the eye is almost straight. Pointed and moderately long snout profile, with length 1.8–1.9 times of head length. Terminal mouth shape with conical lateral teeth on jaws. Canines in front of jaws almost straight. Outer margin of maxilla smooth. No scales on cheek and inner surface of pectoral fin base. Upper posterior margin of opercle scaly. Moderate size ctenoid scale on the body and a complete lateral line. Single dorsal fin, pectoral fins located high, pelvic fins thoracic and caudal fin forked. Third dorsal spines longer than other, its length 2.4–2.8 times in body depth. Counts and measurements are shown in Table 2.

Colour of fresh specimens. Body greenish-grey with scattered irregular dark bands. Snout with wavy dark streaks. Fins are yellowish with red markings except pectoral, pelvic and anal fins.

Distribution All known specimens of the species were rarely found on the east coast of Peninsular Malaysia. *Lethrinus olivaceus* is known to be widely distributed in the Indo-West Pacific, including the Red Sea, East Africa to the Ryukyu Islands, to Samoa and Polynesia (Carpenter 2001; Fricke, Eschmeyer & Van der Laan 2021; Froese & Pauly 2022).

Remarks The characteristics of the specimens collected on the east coast of Peninsular Malaysia concur with the diagnostic characters of *L. olivaceus* defined by Carpenter (2001). *Lethrinus olivaceus* is distinguished from two related species, *Lethrinus microdon* and *Lethrinus longirostris*. *Lethrinus microdon* Valenciennes, 1830 has 5 longitudinal scale rows between lateral line and middle of dorsal-fin base (vs. 6 longitudinal scale rows), a snout with 3 dark streaks radiating anteriorly from eye (vs. a snout with wavy dark streaks), and 7–11 scales on supratemporal patch (vs. 6–9 (modally 6, this study) scales on supratemporal patch) (Carpenter 2001; this study). In recent years, Borsa et al. (2013) has provided an up-to-date information about the hidden diversity within the species '*Lethrinus olivaceus*'. Accordingly, the taxonomy of the species has been revised in Shibuya et al. (2022). The *Lethrinus longirostris* Playfair, 1867, previously regarded as a junior synonym of *Lethrinus olivaceus* Valenciennes 1830, is now resurrected. *Lethrinus longirostris* Playfair, 1867 has a snout with red transverse bands on the snout and interorbital area (vs. snout with 3 dark streaks radiating anteriorly from eye), red blotches on the upper opercle (vs. no red blotches on the upper opercle), 5–7 (modally 6, left and right, respectively) gill rakers count

on the lower limb at first gill arch (vs. 6–8 (modally 7, left) and 7–8 (modally 7, right) gill rakers count on the lower limb at first gill arch), and the sum of the above-mentioned rakers on both sides 11–14 (modally 12) (vs. 13–16 (modally 14)) (Shibuya et al. 2022; this study). Previously, based on existing literature, *L. olivaceus* had only been recorded through photographic records but with no information provided on localities (Ambak et al. 2012; Atan, Jaafar & Abdul Majid 2010; Lim et al. 2018; Mansor et al. 1998) with the exception Annie and Albert (2009) and Shibuya et al. (2022) from Malaysia Borneo (Sarawak and Sabah). This study demonstrated that the species can be found in northeastern Peninsular Malaysia. Carpenter (2001), GBIF (2022b) and Froese and Pauly (2022) reported that *L. olivaceus* was only known to exist in Malaysian Borneo, the southern part of the east coast of Peninsular Malaysia and the Straits of Malacca. This thus indicates that our study has proven an extension of the known geographical distribution of the species. These 5 specimens featured here thus represent new records that extend the range and distribution of *L. olivaceus* on the east coast of Peninsular Malaysia, with the specimen from LKIM Kuala Besut, Terengganu, being the northernmost record of the species.

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REFERENCES

- Ambak, A.A., Isa, M.M., Zakaria, M.Z. & Ghaffar, M.A. 2012. *Fishes of Malaysia*. 2nd edition. Terengganu: Penerbit Universiti Malaysia Terengganu. p. 301.
- Annie, P.K.L. & Albert, C.G. 2009. *Field Guide to Marine and Estuarine Fishes of Sarawak*. Sarawak: Fisheries Research Institute Bintawa, Kuching. p. 316.
- Atan, Y., Jaafar, H. & Abdul Majid, A.R. 2010. *Ikan Laut Malaysia: Glosari Nama Sahih Spesies Ikan*. Kuala Lumpur: Dewan Bahasa dan Pustaka. p. 290.
- Borsa, P., Hsiao, D.R., Carpenter, K.E. & Chen, W.J. 2013. Cranial morphometrics and mitochondrial DNA sequences distinguish cryptic species of the longface emperor (*Lethrinus olivaceus*), an emblematic fish of Indo-West Pacific coral reefs. *Comptes Rendus Biologies* 336: 505-514. <http://dx.doi.org/10.1016/j.crv.2013.09.004>
- Carpenter, K.E. 2001. Lethrinidae. In *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific. Volume 5. Bony Fishes Part 3 (Menidae to Pomacentridae)*, edited by Carpenter, K.E. & Niem, V.H. Rome: FAO. pp. 3004-3050.
- Carpenter, K.E. & Randall, J.E. 2003. *Lethrinus ravus*, a new species of emperor fish (Perciformes: Lethrinidae) from the western Pacific and eastern Indian Oceans. *Zootaxa* 240(1): 1-8. <https://doi.org/10.11646/zootaxa.240.1.1>
- Fricke, R., Eschmeyer, W.N. & Van der Laan, R. 2021. *Eschmeyer's Catalog of Fishes: Genera, Species, References*. <https://www.calacademy.org/scientists/projects/eschmeyers-catalog-of-fishes>. Accessed on 6 June 2021.
- Froese, R. & Pauly, D. 2022. FishBase, Version 02/2022. <https://www.fishbase.se/search.php>. Accessed on 19 May 2022.
- Global Biodiversity Information Facility Occurrences (GBIF). 2022a. <https://www.gbif.org/species/2374875>. Accessed on 22 December 2022.
- Global Biodiversity Information Facility Occurrences (GBIF). 2022b. <https://www.gbif.org/species/2374850>. Accessed on 22 December 2022.
- Hubbs, C.L. & Lagler, J.F. 2004. *Fishes of Great Lakes Region*. Revised edition by Smith G.R. Michigan: University of Michigan Press. p. 332.
- Lim, A.P.K., Ahmad, A., Nor Azman, Z. & Mohd Saki, N. 2018. *Field Guide to Fishes and Crustaceans of the Southeast Asian Region*. Terengganu: SEAFDEC/MFRDMD/39. p. 246.
- Mansor, M.I., Kohno, H., Ida, H., Nakamura, H.T., Aznan, Z. & Abdullah, S. 1998. *Field Guide to Important Commercial Marine Fishes of the South China Sea*. Terengganu: SEAFDEC/MFRDMD/SP/2. p. 287.
- Mat Jaafar, T.N.A., Lee, J.N., Mazlan, A.G., Sheikh Abdul Kadir, S.T. & Seah, Y.G. 2019. *Opistognathus nigromarginatus* Rüppell, 1830 (Perciformes, Opistognathidae), Bridled Jawfish: A first record from Malaysia. *Check List* 15(5): 883-886. <https://doi.org/10.15560/15.5.883>
- Mohsin, A.K.M. & Ambak, M.A. 1996. *Marine Fishes and Fisheries of Malaysia and Neighbouring Countries*. Serdang: Universiti Pertanian Malaysia Press. p. 744.
- Motomura, H., Kimura, S., Seah, Y.G., Sheikh Abdul Kadir, S.T. & Ghaffar, M.A. 2021. *Reef and Shore Fishes of Bidong Island, Off East Coast of Malay Peninsula*. Kagoshima: The Kagoshima University Museum. p. 80.
- Okamoto, J., Sheikh Abdul Kadir, S.T., Motomura, H., Mat Jaafar, T.N.A. & Seah, Y.G. 2019. First records of the sole, *Aseraggodes kobensis* (Steindachner, 1896) (Pleuronectiformes, Soleidae), from Malaysia. *Check List* 15(6): 991-995. <https://doi.org/10.15560/15.6.991>
- Seah, Y.G., Mat Jaafar, T.N.A. & Ali, M.S. 2020. *Field Guide to Trawl Fishes Near Bidong Island*. Terengganu: Penerbit Universiti Malaysia Terengganu. p. 144.
- Seah, Y.G., Ali, M.S., Ghaffar, M.A. & Mat Jaafar, T.N.A. 2021. *Marine Fishes of Kuantan, Malaysia Biodiversity Information System (MYBIS)*. Terengganu: Penerbit Universiti Malaysia Terengganu. p. 172.
- Seah, Y.G., Mazlan, A.G., Sayed, A., Zaidi, C., Gires, U. & Che Abd Rahim, M. 2011. Feeding guild of the dominant trawl species in the southeastern waters of Peninsular Malaysia. *Journal of Biological Sciences* 11(2): 221-225. <https://doi.org/10.3923/jbs.2011.221.225>
- Shibuya, S., Maekawa, T., Sakurai, T. & Motomura, H. 2022. Redescription of *Lethrinus longirostris* Playfair, 1867 (Perciformes: Lethrinidae), previously regarded as a junior synonym of *Lethrinus olivaceus* Valenciennes, 1830, on the basis of morphological and molecular evidences. *Ichthy, Natural History of Fishes of Japan* 17: 50-66.
- Yusuf, Y., Seah, Y.G., Izarenah, M.R. & Lee, J.N. 2021. First record of Spotted Knifejaw, *Oplegnathus punctatus* (Temminck & Schlegel, 1844) (Oplegnathidae) in the southern South China Sea. *Check List* 17(4): 1195-1198. <https://doi.org/10.15560/17.4.1195>

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