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CLUPEIFORMES FISH (ACTINOPTERYGII: TELEOSTEI) IN THE REFERENCE COLLECTION OF PHUKET MARINE BIOLOGICAL CENTER

Harutaka Hata[1*], Thiwapakot Panbow[2] and Charatsee Aungtonya[3]

[1]*National Museum of Natural History, Smithsonian Institution, 10th and Constitution Ave. NW, Washinton, DC 20560, USA*
[2]*Department of Biology, Faculty of Science and Digital Innovation, Thaksin University, Phatthalung 93210, Thailand*
[3]*Phuket Marine Biological Center, Muaeng District, Phuket 83000, Thailand*
**Corresponding author: k2795502@kadai.jp*

ABSTRACT: Clupeiformes fish in the Reference Collection of Phuket Marine Biological Center, Phuket, Thailand (PMBC) was undertaken to verify and update identifications of species. A total of 1,891 specimens in 131 lots of PMBC accession numbers were examined. The present study reported 35 species which include the second record of *Stolephorus babarani* Hata, Lavoué and Motomura, 2020 from Philippines, apart from the type specimens reported from the same area, the first record of *Dussumieria albulina* (Fowler, 1934) from the Andaman Sea, and the first record of *Dussumieria elopsoides* Bleeker, 1849 from the Philippines. Except *Coilia dussumieri*, *Stolephorus babarani*, *S. balinensis*, *S. bataviensis*, *Thrissina mystax*, *Dussumieria elopsoides*, *Ilisha striatula*, *Sardinella aurita* and *S. fimbriata*, twenty-six other species of Clupeiformes occur in Thai waters.

Key words: Clupeomorpha, *Stolephorus babarani*, *Dussumieria albulina*, *Dussumieria elopsoides*

INTRODUCTION

The order Clupeiformes includes more than 400 fish species, the so-called sardines or anchovies (Birge *et al*. 2021). Many are commercially important, the Peruvian Anchoveta (*Engraulis ringens* Jenyns, 1842), the most fished species in the world, accounting for 7% (by live weight) of the world's total catch of commercial fish species over the 13 years to 2020 (FAO 2022). Clupeiform fishes are also a major fishery resource in Thailand, more than 200,000 Tons, primarily species of the genera *Stolephorus* and *Encrasicholina* (Engraulidae), and *Sardinella* (Dorosomatidae), being caught annually (Supongpan *et al.* 2000). Research on clupeiform fishes in Thailand conducted in the 1970's and 1980's, led by the Thai ichthyologist Dr. Thosaporn Wongratana, resulted in the description of many new species, including *Stolephorus dubiosus* Wongratana, 1983 and *Anodontostoma thailandiae* Wongratana, 1983 (Wongratana 1980; 1983; 1987; Wongratana *et al.* 1999). Other sources of clupeiform fishes materials in Thai waters were from the Biodiversity of the Andaman Sea Shelf Project (BIOSHELF) during 1996–2000 (Aungtonya *et al*. 2000) and the Biodiversity of Phang-nga Bay Project during 2001–2002.

However, many phylogenetic and taxonomic problems remain in the order, which has seen major changes in various taxonomic-level classifications, including families, subfamilies, and genera (Lavoué *et al*. 2017a; 2017b; Egan *et al*. 2018; Bloom and Egan 2018). In recent years also, many new species have been described (*e.g*., Stern *et al*. 2016; Mary *et al*. 2017; Loeb *et al*. 2018; Gangan *et al*. 2020; Singh *et al*. 2021), including several from Thailand (Hata *et al*. 2022a; 2022c; 2023b). To aid future taxonomic studies, a list of clupeiform specimens deposited in the Phuket Marine Biological Center is provided below.

MATERIALS AND METHODS

Classification of clupeiform families followed Wang *et al*. (2022). Genera and species represented in this study are arranged in alphabetical order by species name. Nomenclature and identification of PMBC specimens generally followed Whitehead (1985), Whitehead *et al*. (1988), Munroe *et al*. (1999a; 1999b; 1999c) and Wongratana *et al*.

(1999), exceptions being noted under remarks following each species. Contents included in parenthesis following registration numbers are as follows: specimen counts, standard length, collection locality, habitat, depth, gear method, collection date and collector (if applicable). Collection data of specimens are omitted when identical to the next listed specimen. Abbreviations are as follows: SL, standard length; HL, head length; UGR, LGR and TGR, upper limb, lower limb and total gill rakers, respectively, with associated numbers indicating the specific gill arch. "Pelvic scute" refers to a scute joined to the pelvic girdle, and "prepelvic scute," "postpelvic scute," and "predorsal scute" to hard spine-like scutes anterior to the pelvic fin, posterior to the pelvic fin, and just anterior to the dorsal-fin origin, respectively. Ventral-scute counts are shown as numbers of prepelvic scutes + postpelvic scutes = total scutes. D–P1, distance from dorsal-fin origin to pectoral-fin insertion; D–P2, distance from dorsal-fin origin to pelvic-fin insertion; D–A, distance between dorsal and anal fin origins; P1–P2, distance between pectoral- and pelvic-fin insertions; P2–A, distance from pelvic-fin insertion to anal-fin origin. Measurements were made to the nearest 0.1 mm with Digital Vernier Calipers.

RESULTS

The PMBC Reference Collection was found to include 1,891 Clupeiformes specimens. They are reported in 35 species in 131 lots.

SPECIES LIST

Order Clupeiformes Goodrich, 1909
Family Chirocentridae Bleeker, 1849
Chirocentrus dorab (Fabricius. 1775)

Fig. 1

Material examined. Thailand, Andaman Sea: PMBC 6482, 1 specimen, 294.8 mm SL, obtained at market in Phuket, 9 June 1971, coll. D.M. Carlsson. Philippines: PMBC 5566, 1 specimen, 518.9 mm SL, Gubat, Sorsogon Province, 5 June 1954, coll. B. Reyes; PMBC 6502, 1 specimen, 150.4 mm SL, Mindanao, 2 Oct. 1950, coll. P. Escodero.

Diagnosis. Anterior and upper margins of dorsal fin black; pectoral fin short, 11–13% of SL; maxilla short, posteriorly not reaching to anterior margin of preopercle (Luther 1966; Whitehead 1972; 1985; Munroe *et al*. 1999b).

Remarks. Although the registration number is not indicated, Satapoomin (2011) reported the species from Andaman Sea based on PMBC specimen.

Family Engraulidae Gill, 1861
Coilia dussumieri Valenciennes, 1848

Fig. 2

Material examined. Myanmar: PMBC 6754, 3 specimens, 104.7–114.0 mm SL (1 specimen caudal peduncle broken), northern Andaman Sea, 25 m depth, otter trawl, 10 Nov. 1989, coll. W. Pokapunt boarding on RV Chulabhon.

Diagnosis. Light organs present along flanks and abdomen; ventral scutes 5–6 + 7–9 = 12–15; maxilla short, not reaching to posterior margin of opercle; pectoral fin with 6 unbranched long filamentous rays and 9–11 branched rays (Whitehead *et al.* 1988; Wongratana *et al*. 1999).

Remarks. Although the registration number is not indicated, Satapoomin (2011) reported the species from Andaman Sea based on PMBC specimens.

Encrasicholina heteroloba (Rüppell, 1837)

Fig. 3

Material examined. Thailand, Andaman Sea: PMBC 3297, 1 specimen, 65.0 mm SL, Karon Beach, Phuket, 22 Nov. 1972, coll. P.J.P. Whitehead; PMBC 9823, 46 specimens, 36.3–54.8 mm SL, Sapum Fish Landing, Phuket, 8 Oct. 1993, coll. P. Sirimontraporn and S. Bussarawit; PMBC 25637, 1 specimen, 55.3 mm SL, Phang-nga Bay St. 3, 7°55'05"N 98°33'07"E, 22 m depth, otter trawl, 22 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project; PMBC 37416, 1 specimen, 41.0 mm SL, Pu Island, Si Boya Island, Krabi (seagrass bed), 27 Oct. 2004, trawl, coll. S. Intarat. Thailand, Gulf of Thailand: PMBC 9825, 100 specimens, 30.1–53.0 mm SL; Bang Sapha Noi, Prachuap Khiri Khan, 22 Aug. 1993, coll. A. Nateewathana; PMBC 9828, 171 specimens, 28.9–47.5 mm SL, same locality, coll. U. Satapoomin. Philippines: PMBC 6515, 1 specimen, 62.0 mm SL, Rosalio (formerly Salinas), Cavite, Manila Bay, Luzon, 23 Feb. 1958, coll. Bureau of Fisheries. Locality unknown: PMBC

26211, 2 specimens, 54.7–56.0 mm SL, PMBC 26212, 1 specimen, 66.8 mm SL.

Diagnosis. Dorsal and anal fins with three unbranched rays; pseudobranchial filaments 18–22; 1UGR 14–23, 1LGR 20–26, 1TGR 36–49; 2UGR 11–17, 2LGR 19–25, 2TGR 30–40; 3UGR 10–14, 3LGR 10–14, 3TGR 21–28; 4UGR 6–12, 4LGR 8–11, 4TGR 15–23; prepelvic scutes 3–7; head rather long, length 24.9–28.9% of SL; maxilla long, its posterior tip extending beyond posterior margin of preopercle, 14.6–21.3% of SL; lower jaw 14.2–19.6% of SL; first unbranched dorsal and anal fin rays minute, 0.4–1.8% and 0.3–1.8% of SL, respectively; D–P1 rather long, 97.5–126.5% of HL (Hata and Motomura 2015; 2016b; 2017).

Remarks. This species was treated as *Encrasicholina devisi* (Whitley, 1940) by Whitehead *et al*. (1988) and Wongratana *et al.* (1999). See Hata and Motomura (2016b) regarding nomenclature. Satapoomin (2011) reported this species as *E. devisi* from Andaman Sea based on PMBC specimens without giving the registration numbers.

Figure 1. *Chirocentrus dorab*, PMBC 5566, 518.9 mm SL. Scale bar 50 mm.

Figure 2. *Coilia dussumieri*, PMBC 6754, 104.7 mm SL. Scale bar 10 mm.

Figure 3. *Encrasicholina heteroloba*, PMBC 9828, 40.6 mm SL. Scale bar 5 mm.

***Encrasicholina pseudoheteroloba* (Hardenberg, 1933)**
Fig. 4

Material examined. Thailand, Andaman Sea: PMBC 9824, 1137 specimens, 21.3–36.5 mm SL, Yao Yai Island, Phang-nga, 9 Aug. 1993, coll. W. Boonrug; PMBC 37415, 1 specimen, 43.9 mm SL, Pu Island, Krabi (seagrass bed), trawl, 27 Apr. 2004, coll. S. Intarat. Philippines: PMBC 6524, 4 specimens, 57.6–65.8 mm SL, Navotas Fish Landing, Manila, Luzon, 20 Dec. 1955, coll. A.F. Umali; PMBC 37412, 1 specimen, 66.9 mm SL, Rosalio (formerly Salinas), Manila Bay, Luzon, 23 Feb. 1958, coll. Bureau of Fisheries. Locality unknown: PMBC 37411, 6 specimens, 61.8–79.2 mm SL, PMBC 37413, 9 specimens, 37.6–54.9 mm SL.

Diagnosis. Dorsal and anal fins with 2 unbranched rays; pseudobranchial filaments 16–24; 1UGR 19–26, 1LGR 24–30, 1TGR 45–55; 2UGR 14–18, 2LGR 20–27, 2TGR 34–45; 3UGR 11–15, 3LGR 11–15, 3TGR 22–29; 4UGR 9–13, 4LGR 9–13, 4TGR 19–25; prepelvic scutes 3–7; head short, length 22.8–27.5% of SL; maxilla, its posterior tip extending beyond posterior margin of preopercle; first unbranched dorsal and anal fin rays long, length 4.1–8.1% of SL and 2.5–5.5% of SL, respectively; D–P1 long, 101.6–138.6% of HL; anal-fin base long, 13.8–18.7% of SL (Hata and Motomura 2016b; 2020).

Remarks. This species was treated as *E. heteroloba* by Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata and Motomura (2016b) regarding nomenclature. Satapoomin (2011), in his list of fishes of Andaman Sea, reported this species as *E. heteroloba* from Andaman Sea based on PMBC specimens without giving the registration numbers. Satapoomin (2011) also reported *Stolephorus andhraensis* Babu Rao, 1966 based on PMBC specimens. However, no PMBC specimens are identified as *S. andhraensis* in this study and PMBC 9824, identified as *E. pseudoheteroloba* in this study, had been registered and identified as *S. andhraensis* before our examination. Therefore, Satapoomin (2011)'s *S. andhraensis* is considered as misidentification of *E. pseudoheteroloba.*

***Encrasicholina punctifer* Fowler, 1938**
Fig. 5

Material examined. Locality unknown: PMBC 26213, 17 specimens, 48.3–82.7 mm SL.

Diagnosis. Dorsal and anal fins with two unbranched rays; pseudobranchial filaments 16–28; 1UGR 11–20, 1LGR 21–26, 1TGR 34–45; 2UGR 7–14, 2LGR 17–23, 2TGR 25–36; 3UGR 7–11, 3LGR 10–13, 3TGR 18–23; 4UGR 5–10, 4LGR 7–12, 4TGR 13–20; prepelvic scutes 3–5; posterior tip of maxilla not reaching to anterior margin of preopercle; length of first unbranched dorsal-fin ray 3.8–6.8% of SL (Hata and Motomura 2016a).

Stolephorus babarani
Hata, Lavoué and Motomura, 2020
Fig. 6

Material examined. Philippines: PMBC 37414, 1 specimen, 76.3 mm SL, Butauanan Island, Siruma, Province of Camarines Sur, 10 Feb. 1958, coll. P.C. Gonzales.

Diagnosis. Maxilla long, 20.8–22.3% of SL, its posterior tip slightly short of or just reaching posterior margin of opercle; snout short, 3.6–3.9% of SL; no predorsal scute; pelvic scute without spine; 1UGR 16–18, 1LGR 21–23, 1TGR 38–41; 2UGR 10–13, 2LGR 18–21, 2TGR 30–33; 3UGR 8–9, 3LGR 11–13, 3TGR 19–22; 4UGR 7–8, 4LGR 9–11, 4TGR 16–18; gill rakers 4–6 on hind face of third gill arch; prepelvic scutes 4–6; transverse scales 8; pseudobranchial filaments 17–23; paired dark patches on parietal and occipital regions; no dark lines on dorsum; numerous black spots on suborbital area (in adults), snout and tip of lower jaw; head rather short, 23.9–25.5% of SL; pelvic fin relatively long, 8.1–9.4% of SL, depressed pelvic fin usually not reaching posteriorly to vertical through dorsal-fin origin; D–P1 distance 32.8–36.5% of SL, 133.9–151.8% of HL (Hata *et al*. 2020a).

Remarks. Previously, this species had been known only from the type specimens, collected from Panay, Philippines (Hata *et al*. 2020a). The present specimen represents the second record of the species.

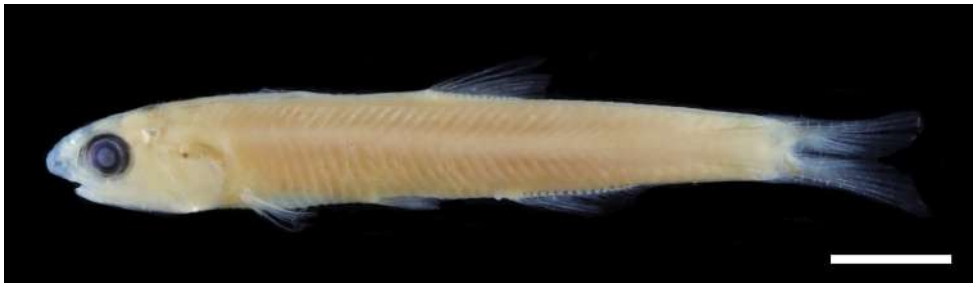

Figure 4. *Encrasicholina pseudoheteroloba*, PMBC 9824, 32.3 mm SL. Scale bar 10 mm.

Figure 5. *Encrasicholina punctifer*, PMBC 26213, 70.5 mm SL. Scale bar 10 mm.

Figure 6. *Stolephorus babarani*, PMBC 37414, 76.3 mm SL. Scale bar 10 mm.

Figure 7. *Stolephorus balinensis*, PMBC 6513, 102.4 mm SL. Scale bar 20 mm.

***Stolephorus balinensis* (Bleeker, 1849)**
Fig. 7

Material examined. Philippines: PMBC 6513, 1 specimen, 102.4 mm SL, Gigantes Islands, Visayas, 9 Sep. 1948, coll. T.N. Gill.

Diagnosis. Maxilla, posterior tip just reaching or slightly beyond anterior border of preopercle, 14.3–17.2% of SL; 1UGR 15–18, 1LGR 20–25, 1TGR 35–43; 2UGR 10–13, 2LGR 18–23, 2TGR 29–34; 3UGR 8–11, 3LGR 10–13, 3TGR 19–24; 4UGR 7–10, 4LGR 8–11, 4TGR 15–21; gill rakers 3–7 on hind face of third gill arch; prepelvic scutes 2–6; transverse scales 8 or 9; vertebrae 41–43; no predorsal scutes; pelvic scute without spines; posterior border of preopercle convex, rounded; two pairs of dark patches on parietal and occipital regions without a following pair of dark lines; no black spots below eye and lower-jaw tip; pelvic fin short, 5.6–9.2% of SL, its posterior tip not reaching to vertical through dorsal-fin origin when depressed; pectoral fin short, 11.3–13.9% of SL; head short, 21.3–25.1% of SL; body elongate, its depth 14.6–20.4% of SL; D–P1 long, 29.9–37.3% of SL; P1–P2 long, 15.1–20.8% of SL (Hata *et al*. 2021a; 2023b; Hata and Motomura 2023a; 2023b).

Remarks. This species was included in *Stolephorus indicus* (van Hasselt, 1823) sensu Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata *et al*. (2021a) regarding nomenclature.

***Stolephorus bataviensis* Hardenberg, 1933**
Fig. 8

Material examined. Philippines: PMBC 6512, 1 specimen, 65.2 mm SL, Butauanan Island, Province of Camarines Sur, 10 Feb. 1958, coll. P.C. Gonzales.

Diagnosis. Maxilla long, 21.8–25.2% of SL, its posterior tip slightly short of or extending beyond posterior margin of opercle; no predorsal scute; pelvic scute without spine; 1UGR 14–17, 1LGR 19–22, 1TGR 33–38; 2UGR 9–13, 2LGR 17–21, 2TGR 27–34, 3UGR 8–10, 3LGR 9–12, 3TGR 18–22; 4UGR 6–10, 4LGR 8–11, 4TGR 15–21; gill rakers 4–7 on hind face of third gill arch; prepelvic scutes 4–7; transverse scales 8–9; pseudobranchial filaments 17–25; a pair of dark patches on parietal region without a following pair of dark lines; numerous black spots on suborbital area (in adults), snout and lower-jaw tip; depressed pelvic fin extending posteriorly beyond vertical through dorsal-fin origin; pelvic fin rather long, 8.5–11.0% of SL; D–P1 short, 30.2–35.1% of SL; fresh specimens with indistinct black markings on hind margins of dorsal scale pockets (Hata *et al*. 2019).

Remarks. This species was included in *Stolephorus waitei* Jordan and Seale, 1926 sensu Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata *et al*. (2019) regarding nomenclature.

***Stolephorus baweanensis* Hardenberg, 1933**
Fig. 9

Material examined. Thailand, Andaman Sea: PMBC 3295, 1 specimen, 78.8 mm SL, Karon Beach, Phuket, 22 Apr. 1972, coll. D.M. Carlsson; PMBC 37417, 1 specimen, 71.3 mm SL, Sapum Fish Landing, Phuket, 8 Sep. 1993, coll. P. Sirimontraporn and S. Bussarawit. Thailand, Gulf of Thailand: PMBC 9827, 1 specimen, 70.2 mm SL, Bang Saphan Noi, Prachuap Khiri Khan, 22 Aug. 1993, coll. A. Nateewathana. India: PMBC 37420, 1 specimen, 37.4 mm SL, Cochin (currently Kochi), Kerala, 6 May 1972, coll. D.M. Carlsson. Locality unknown: PMBC 26230, 10 specimens, 29.9–57.6 mm SL; PMBC 26235, 1 specimen, 58.2 mm SL.

Diagnosis. Maxilla long, 19.9–23.3% of SL, its posterior tip slightly short of or just reaching posterior margin of opercle; no predorsal scute; pelvic scute without spine; 1UGR gill rakers 14–17, 1LGR 19–22, 1TGR 33–38; 2UGR 9–12, 2LGR 17–21, 2TGR 26–32; 3UGR 8–10, 3LGR 9–12, 3TGR 17–21; 4UGR 7–9, 4LGR 8–10, 4TGR 15–19; gill rakers 4–6 on hind face of third gill arch; prepelvic scutes 5–7; transverse scales 8; pseudobranchial filaments 16–23; a pair of dark patches on parietal region without a following pair of dark lines; numerous black spots on suborbital area (in adults), snout, and tip of lower jaw; depressed pelvic fin not reaching posteriorly to vertical through dorsal-fin origin; pelvic fin long, 6.5–9.4% of SL; D–P1 length rather long, 31.9–37.3% of SL; distinct black markings on hind margins of dorsal scale pockets in some fresh specimens (Hata *et al*. 2019).

Remarks. This species was included in *Stolephorus waitei* Jordan and Seale, 1926 sensu Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata

et al. (2019) regarding nomenclature. Satapoomin (2011) reported *S. waitei* from Andaman Sea based on PMBC specimens without giving registration numbers.

Stolephorus eldorado Hata, Lavoué and Motomura, 2022

Fig. 10

Material examined. Thailand, Gulf of Thailand: PMBC 30311, 7 specimens, 38.6–48.2 mm SL, Trat, push net, 14 May 1996, coll. M. Rungratee and R. Munprasit.

Diagnosis. Long maxilla, posterior tip just reaching or slightly short of posterior margin of opercle; 1UGR 16–21, 1LGR 23–28, 1TGR 40–47; 2UGR 10–14, 2LGR 20–24, 2TGR 33–38; 3UGR 8–12, 3LGR 12–14, 3TGR 20–26; 4UGR 7–10, 4LGR 9–12, 4TGR 16–22; prepelvic scutes 5–7; total vertebrae 38–40; predorsal scutes present; pelvic scute without spine; body scales deciduous; posterior border of pre-opercle concave, indented; paired dark patch on parietal area with little following pigmentation; distinct double pigment lines along dorsum posterior to dorsal fin; black spots below eye and on lower-jaw tip absent; anal-fin base long, 19.0–22.3% of SL; orbit rather long, 8.2–9.9% of SL; third dorsal-fin ray short, 15.9–18.6% of SL; pelvic fin rather long, 9.1–11.0% of SL, its posterior tip usually not reaching to vertical through dorsal-fin origin when depressed in individuals > 50 mm SL; distance between posterior ends of supramaxilla and maxilla 5.0–6.3% of SL (Hata *et al*. 2022c).

Remarks. This species was included in *Stolephorus insularis* Hardenberg, 1931 and *Stolephorus bengalensis* Dutt and Babu Rao, 1959 sensu Whitehead *et al*. (1988) and Hata *et al*. (2019), respectively. See Hata *et al*. (2022c) regarding nomenclature.

Stolephorus indicus (van Hasselt, 1823)

Fig. 11

Material examined. Thailand, Andaman Sea: PMBC 3296, 1 specimen, 112.6 mm SL, Karon Beach, Phuket, 22 Nov. 1972, coll. P.J.P. Whitehead; PMBC 9822, 1 specimen, 81.4 mm SL, Sapum Fish Landing, Phuket, 8 Oct. 1993, coll. P. Sirimontraporn and S. Bussarawit; PMBC 9957, 27 specimens, 53.7–94.9 mm SL, Sapum Fish Landing, Phuket, 8 Sep. 1993, coll. P. Sirimontraporn and S. Bussarawit; PMBC 14432, 2 specimens, 60.1–61.7 mm SL, Yongling Beach, Trang, seagrass bed, 26 Nov. 1996, coll. S. Poovachiranon; PMBC 20225, 1 specimen, 65.3 mm SL, Prathong Island, Phang-nga, mangrove area, beach seine, 2 June 2003, coll. U. Satapoomin; PMBC 20615, 1 specimen, 83.3 mm SL, Yao Yai Island, Phang-nga, trammel net, 17 July 2004, coll. U. Satapoomin; PMBC 20841, 1 specimen, 81.7 mm SL, Pa Kholk Village, Phuket, seagrass bed, beach seine, 17 Jan. 2004, coll. U. Satapoomin; PMBC 20897, 1 specimen, 55.2 mm SL, Pakchok Village, Phang-nga, beach seine, 3 July 2003, coll. U. Satapoomin; PMBC 25147, 26 specimens, 78.7–95.3 mm SL, BIOSHELF St. PB3, 7°48'N 98°28'E to 7°49'N 98°32'E, 21 m depth, otter trawl, 21 Apr. 1997, coll. S. Bussarawit, PMBC 25148, 1 specimen, 88.6 mm SL, Phuket, sandy mud bottom, trawl, 10 Nov. 1978, coll. A. Nateewathana and P. Tantichodok; PMBC 25638, 5 specimens, 42.9–57.2 mm SL, Pu Island, Krabi, seagrass bed, trawl, 27 Oct. 2004, coll. S. Intarat; PMBC 25639, 3 specimens, 39.9–44.5 mm SL, Pa Khlok, Phuket, 25 Mar. 2003; PMBC 25640, 5 specimens, 72.2–92.8 mm SL, Phang-nga Bay St. 11, 7°37'07"N 98°57'72"E, 17 m depth, otter trawl, 20 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project. Locality unknown: PMBC 26231, 1 specimen, 73.6 mm SL.

Diagnosis. Short maxilla, posterior tip slightly beyond or just reaching anterior border of preopercle, 15.5–18.6% of SL; 1UGR 15–18, 1LGR 21–24, 1TGR 36–41; 2UGR 11 or 12, 2LGR 19–21, 2TGR 30–33; 3UGR 8–11, 3LGR 11–13, 3TGR 19–23; 4UGR 7–10, 4LGR 8–11, 4TGR 15–21; gill rakers 5–7 on hind face of third gill arch; prepelvic scutes 3–5; transverse scales 8 or 9; vertebrae 40 or 41; no predorsal scutes; pelvic scute without spine; posterior border of preopercle convex, rounded; two pairs of dark patches on parietal and occipital regions without a following pair of dark lines; no black spots below eye and lower-jaw tip; pelvic fin short, 7.2–9.4% of SL, its posterior tip not reaching to vertical through dorsal-fin origin when depressed; pectoral fin short, 11.3–14.6% of SL; head long, 23.0–26.7% of SL; body elongate, its depth 16.0–20.1% of SL; P1–P2 long, 16.0–21.2% of SL (Hata and Motomura 2023a; 2023b; Hata *et al*. 2023b).

Figure 8. *Stolephorus bataviensis*, PMBC 6512, 65.2 mm SL. Scale bar 10 mm.

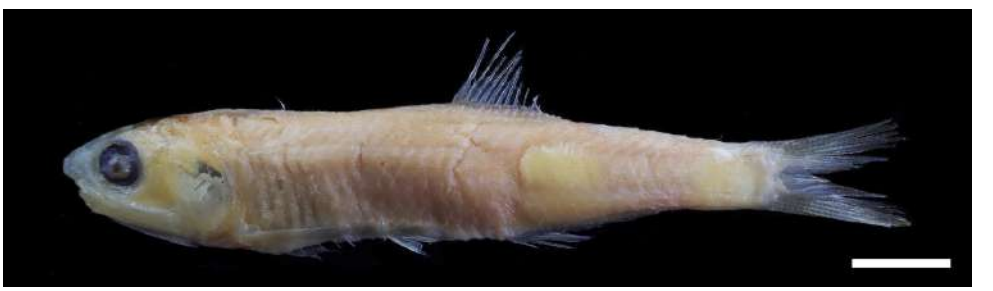

Figure 9. *Stolephorus baweanensis*, PMBC 9827, 70.2 mm SL. Scale bar 10 mm.

Figure 10. *Stolephorus eldorado*, PMBC 30311, 39.4 mm SL. Scale bar 5 mm.

Figure 11. *Stolephorus indicus*, PMBC 3296, 112.6 mm SL. Scale bar 20 mm.

Remarks. See Hata *et al*. (2021a) regarding nomenclature. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Stolephorus oceanicus* Hardenberg, 1933**
Fig. 12

Material examined. Thailand, Gulf of Thailand: PMBC 30310, 1 specimen, 56.9 mm SL, Trat, push net, 14 May 1996, coll. M. Rungratee and R. Munprasit. Locality unknown: PMBC 26236, 2 specimens, 52.1–52.4 mm SL.

Diagnosis. Maxilla long, posterior tip slightly short of or extending slightly beyond posterior margin of preopercle; 1UGR 16–20, 1LGR 24–28, 1TGR 42–47; 2UGR 12–14, 2LGR 21–25, 2TGR 33–39; 3UGR 9–11, 3LGR 12–15, 3TGR 21–26; 4UGR 6–9, 4LGR 9–12, 4TGR 16–21; prepelvic scutes 4–6; transverse scales 8; dorsal-fin base long 15.2–17.6% of SL; D–A long 18.5–24.1% of SL; interorbital area broad 23.3–26.9% of HL; no predorsal scute; pelvic scute without spine; posterior margin of preopercle convex, rounded; posterior tip of depressed pelvic fin not reaching to vertical through dorsal-fin origin; a pair of dark patches behind occiput without a following pair of dark lines; no black spots on suborbital area or lower-jaw tip (Hata *et al*. 2019).

Remarks. See Hata *et al*. (2019) regarding nomenclature.

***Stolephorus rex* (Jordan and Seale, 1926)**
Fig. 13

Material examined. Thailand, Andaman Sea: PMBC 9952, 7 specimens, 80.7–91.8 mm SL, Sapum Fish Landing, Phuket, 8 Sep. 1993, coll. P. Sirimontraporn and S. Bussarawit; PMBC 9985, 1 specimen, 89.0 mm SL, Bang Rong, Phuket, mangrove area, 30 June 1993, coll. S. Poovachiranon. Thailand, Gulf of Thailand: PMBC 9826, 1 specimen, 92.3 mm SL, Bang Sapan Noi, Prachuap Khiri Khan, 22 Aug. 1993, coll. A. Nateewathana. Philippines: PMBC 6508, 2 specimens, 87.3–89.5 mm SL, San Miguel Bay, Luzon, 23 Feb. 1958, coll. Bureau of Fisheries.

Diagnosis. Maxilla relatively long, posterior tip just reaching or slightly beyond posterior margin of preopercle, 19.1–23.1% of SL; 1UGR 16–19, 1LGR 22–24, 1TGR 39–43; 2UGR 11–14, 2LGR 20–24, 2TGR 32–38; 3UGR 9–12, 3LGR 11–15, 3TGR 21–26; 4UGR 7–10, 4LGR 8–12, 4TGR 16–22; gill rakers 3–8 on hind face of third gill arch; prepelvic scutes 2–5; transverse scales 8 or 9; vertebrae 39 or 40; no predorsal scutes; pelvic scute without spine; posterior border of preopercle convex, rounded; two pairs of dark patches on parietal and occipital regions; a pair of dark lines on dorsum from parietal region to dorsal-fin origin; no black spots below eye and lower-jaw tip; posterior tip of depressed pelvic fin reaching to vertical through 2nd to 6th dorsal-fin origin; head short, 24.3–27.6% of SL (Hata *et al*. 2021a; Hata and Motomura 2021a).

Remarks. This species was included in *Stolephorus commersonnii* Lacepède, 1803 sensu Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata *et al*. (2021a) regarding nomenclature. Satapoomin (2011) reported this species as *S. commersonnii* from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Thrissina dussumieri* (Valenciennes, 1848)**
Fig. 14

Material examined. Thailand, Andaman Sea: PMBC 25641, 1 specimen, 105.1 mm SL, Phang-nga Bay St. 4, 7°58'85"N 98°38'84"E, 19 m depth, otter trawl haul 2, 24 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project.

Diagnosis. Maxilla very long, reaching posteriorly to point at least halfway along length of pectoral fin and nearly to pelvic-fin insertion in adults; ventral scutes 15–16 + 6–9 = 24–24; 1LGR 17–19; black blotch on nape (Whitehead *et al*. 1988; Wongratana *et al*. 1999).

***Thrissina malabarica* (Bloch, 1795)**
Fig. 15

Material examined. Thailand, Andaman Sea: PMBC 3291, 3 specimens, 133.9–154.2 mm SL, obtained at local market in Phuket, 9 June 1971, coll. D.M. Carlsson; PMBC 3292, 1 specimen, 97.2 mm SL, obtained at local market in Phuket,

21 June 1972, coll. P.J.P. Whitehead; PMBC 3293, 4 specimens, 112.0–127.2 mm SL, obtained at local market in Phuket, 18 Oct. 1972, coll. P.J.P. Whitehead; PMBC 9979, 1 specimen, 126.6 mm SL, Bang Rong (mangrove area), 30 June 1993, coll. S. Poovachiranon; PMBC 20595, 1 specimen, 132.5 mm SL, Yao Yai Island, Phang-nga, trammel net, 15 July 2004, coll. U. Satapoomin; PMBC 20616, 1 specimen, 150.2 mm SL, Yao Yai Island, Phang-nga, trammel net, 17 July 2004, coll. U. Satapoomin.

Diagnosis. Maxilla length moderate, its posterior tip slightly beyond posterior margin of opercle, but not reaching to pectoral-fin insertion; all teeth on both jaws small, not canine-like; first supramaxilla small, oval (sometimes absent); paired dark lines on dorsum from occipital area to caudal-fin base; distinct black blotch behind upper part of gill opening; no saddle-like blotch on nape; dorsal-fin with 3 unbranched and 9–12 branched rays; anal-fin with 4 unbranched and 31–38 branched rays; pectoral-fin with 1 unbranched and 10–12 branched rays; transverse scales 11 or 12; scale rows in longitudinal series 42 or 43; 1UGR 7–9, 1LGR 11–13, 1TGR 18–22; 2UGR 6–8, 2LGR 12–14, 2TGR 18–22; 3UGR 5–7, 3LGR 7–9, 3TGR 12–16; 4UGR 4–7, 4LGR 6–9, 4TGR 11–16; gill rakers 3–5 on posterior face of third gill arch; abdomen covered with 15–18 + 10 or 11 = 25–29 keeled scutes; body deep, its depth 28.5–32.0% of SL; pelvic-fin short, 6.6–8.4% of SL [Hata *et al*. 2022a (as *T. hamiltonii*) and Hata *et al*. (2023a)].

Remarks. Nomenclature and authorship of the genus *Thrissina* follows Kottelat (2013). The species was included in *Thryssa hamiltonii* (Grey, 1835) sensu Whitehead *et al*. (1988) and Wongratana *et al*. (1999). See Hata *et al*. (2023a) regarding nomenclature. Satapoomin (2011) reported this species as *T. hamiltonii* from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Thrissina mystax* (Bloch and Schneider, 1801)**
Fig. 16

Material examined. India: PMBC 3294, 6 specimens, 95.2–130.0 mm SL, Cochin (currently Kochi), Kerala, pelagic trawl, 6 May 1972, coll. D.M. Carlsson boarding on sardinella vessel.

Diagnosis. Maxilla long, 28.1–31.1% of SL, posteriorly reaching to pectoral-fin insertion; lower jaw relatively long, 18.8–20.3% of SL; head relatively long, 24.9–26.9% of SL; postorbital length 14.9–16.6% of SL; snout tip lower than upper margin of eye; snout short, 3.8–4.2% of SL; all teeth on both jaws small, not canine-like; first supramaxilla small, oval (sometimes absent); second supramaxilla elongate, relatively short, 5.3–6.3% of SL; no dark lines on dorsum; pectoral fin and both jaws without melanophores; dorsal-fin with 3 unbranched and 9–13 branched rays; anal-fin with 4 unbranched and 30–35 branched rays; pectoral-fin with 1 unbranched and 10–12 branched rays; transverse scales 11; scale rows in longitudinal series 41–43; vertebrae 44–46; 1UGR 10–12, 1LGR 14–18, 1TGR 25–30; 2UGR 9–11, 2LGR 16–18, 2TGR 25–29; 3UGR 8–11, 3LGR 9–11, 3TGR 18–22; 4UGR 8–11, 4LGR 10–12, 4TGR 18–22; abdomen covered with 16–18 + 10–12 = 26–30 keeled scutes; pre-dorsal-fin distance short, 50.8–53.3% of SL; body slender, 22.9–26.4% of SL; dorsal-fin base long, 9.6–11.1% of SL; anal-fin base short, 29.4–33.4% of SL; anal fin originating below or posterior to 10th dorsal-fin ray origin (Hata and Lavoué 2024).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Thrissina setirostris* (Broussonet, 1782)**
Fig. 17

Material examined. Thailand, Andaman Sea: PMBC 3289, 1 specimen, 104.3 mm SL, fish landing port at trawler harbor in Phuket, 14 July 1972, coll. P.J.P. Whitehead; PMBC 3290, 3 specimens, 48.9–53.2 mm SL, Karon Beach, Phuket, bottom trawl, 22 Nov. 1972, coll. P.J.P. Whitehead; PMBC 6686, 1 specimen, 112.6 mm SL, Kata Bay, Phuket, 30 Oct. 1965, coll. Prawat; PMBC 25642, 2 specimens, 112.2–125.9 mm SL, Prathong Island, Hang Sung Canal, Phang-nga, 18 June 2003.

Diagnosis. Maxilla extremely long, posteriorly reaching at least pectoral-fin tip, usually pelvic-fin insertion, or even to anal-fin origin; 1LGR 10–12; anal win with 29–36 branched rays; black blotch on cleithrum (Whitehead *et al*. 1988; Wongratana *et al*. 1999).

Figure 12. *Stolephorus oceanicus*, PMBC 30310, 56.9 mm SL. Scale bar 10 mm.

Figure 13. *Stolephorus rex*, PMBC 9826, 92.3 mm SL. Scale bar 10 mm.

Figure 14. *Thrissina dussumieri*, PMBC 25641, 105.1 mm SL. Scale bar 20 mm.

Figure 15. *Thrissina malabarica*, PMBC 20616, 150.2 mm SL. Scale bar 20 mm.

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

Family Dussumieriidae Gill, 1861
***Dussumieria albulina* (Fowler, 1934)**
Fig. 18

Material examined. Thailand, Andaman Sea: PMBC 3261, 1 specimen, 122.1 mm SL, PMBC 3262, 4 specimens, 120.9–133.3 mm SL, Karon Beach, Phuket, bottom trawl, 22 Nov. 1972, coll. P.J.P. Whitehead. India: PMBC 37418, 13 specimens, 102.0–128.3 mm SL, Cochin (currently Kochi), Kerala, pelagic trawl, 4 Sep. 1972, coll. D.M. Carlsson.

Diagnosis. Body rather deep, its depth 20.6–24.4% of SL; scales in longitudinal series 49–58, with numerous striae posteriorly; 1UGR 11–16, 1LGR 22–26, 1TGR 33–41; 2UGR 8–10, 2LGR 19–24, 2TGR 27–34; 3UGR 7–9, 3LGR 13–17, 3TGR 20–26; 4UGR 4–6, 4LGR 8–11, 4TGR 13–17; gill rakers 1–5 on hind face of third gill arch; branchiostegal rays 11–13; vertebrae 54–56; pseudobranchial filaments 17–21; pelvic-fin insertion below 7th to 11th dorsal-fin ray origin; no teeth on parasphenoid; anterior part of palatine teeth band broad, comprising numerous rows of fine conical teeth; distinct melanophores scattered on 3rd to 9th pectoral-fin rays from the uppermost ray; maxilla relatively short, 34.0–34.9% (< 33.3% in individuals > 85 mm SL) of HL; lower jaw relatively short, 44.8–50.6% of SL (Hata *et al.* 2020b; 2021b).

Remarks. This species was included in *Dussumieria acuta* Valenciennes, 1847 sensu Whitehead (1985). See Hata *et al*. (2020b) regarding nomenclature. The PMBC specimens from Phuket (PMBC 3261, 3262) represent the first records of the species from the Andaman Sea. Satapoomin (2011) reported this species as *D. acuta* from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Dussumieria elopsoides* Bleeker, 1849**
Fig. 19

Material examined. Philippines: PMBC 25352, 2 specimens, 99.4–108.4 mm SL, Manila Bay, Luzon, 5 Jan. 1948, coll. F. G. Dayrit. Indonesia: PMBC 37408, 4 specimens, 94.3–110.6 mm SL, Bali, 9 Sep. 1972.

Diagnosis. Body elongate, its depth 18.7–21.8% of SL; scale rows in longitudinal series 55–58; lateral body scales without posterior striae; 1UGR 12–14, 1LGR 22–26, 1TGR 34–39; 2UGR 8–10, 2LGR 19–24, 2TGR 28–33; 3UGR 7–8, 3LGR 13–16, 3TGR 20–24; 4UGR 3–8, 4LGR 9–11, 4TGR 12–17; gill rakers 2–4 on hind face of third gill arch; branchiostegal rays 13–15; vertebrae 55–58; pre-dorsal-fin length 54.6–55.9% of SL, 44.2–45.4% of total length; HL 25.6–27.1% of SL; D–P1 30.7–33.7% of SL; D–A 27.8–32.4% of SL; P1–P2 31.5–35.7% of SL; P2–A 18.9–21.1% of SL; pre-pectoral-fin length 58.4–60.9% of SL; pelvic fin short, 9.5–10.7% of SL; dorsal-fin base short, 12.5–14.8% of SL; distinct melanophores scattered on 3rd to 8th pectoral-fin rays from the uppermost ray; parasphenoid and vomer without teeth; tooth patches on anterior parts of palatine and pterygoid broad, with numerous rows of conical teeth (Hata *et al*. 2022b; Hata 2023).

Remarks. See Hata *et al*. (2022b) regarding nomenclature. Although the species had been regarded as widely distributed in the Indo-West Pacific (Whitehead 1985; Munroe *et al*. 1999c), it has recently been shown to be endemic to Indonesia (Hata *et al*. 2022b; Hata 2023). The present specimens include the first record from the Philippines.

***Dussumieria hasseltii* Bleeker, 1851**
Fig. 20

Material examined. Thailand, Andaman Sea: PMBC 3264, 1 specimen, 127.9 mm SL, off Karong Bay, Phuket, 22 Nov. 1972, coll. P.J.P. Whitehead; PMBC 25612, 1 specimen, 128.1 mm SL; PMBC 25618, 1 specimen, 94.3 mm SL, PMBC 26228, 4 specimens, 88.5–91.8 mm SL, Phang-nga Bay St. 3, 7°55'05"N 98°33'07"E, 22 m depth, otter trawl haul 1, 22 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project.

Diagnosis. Body elongate, its depth 16.7–22.0% of SL; scale rows in longitudinal series 57–60; lateral scales without posterior striae; 1UGR 12–15,

Figure 16. *Thrissina mystax*, PMBC 3294, 125.5 mm SL. Scale bar 20 mm.

Figure 17. *Thrissina setirostris*, PMBC 6686, 112.6 mm SL. Scale bar 20 mm.

Figure 18. *Dussumieria albulina*, PMBC 3261, 122.1 mm SL. Scale bar 20 mm.

Figure 19. *Dussumieria elopsoides*, PMBC 25352, 108.4 mm SL. Scale bar 20 mm.

1LGR 21–25, 1TGR 33–39; 2UGR 8–10, 2LGR 19–23, 2TGR 28–33; 3UGR 7–9, 3LGR 14–16, 3TGR 21–24; 4UGR 4–6, 4LGR 9–11, 4TGR 13–17; gill rakers 2–5 on hind face of third gill arch; branchiostegal rays 13–17; vertebrae 57–60; pre-dorsal-fin length 58.0–60.6% of SL, 46.8–50.3% of total length; D–P1 34.6–39.4% of SL; D–A 25.8–29.4% of SL; P1–P2 33.3–38.8% of SL; P2–A 16.5–19.0% of SL; pelvic fin short, 7.5–8.8% of SL; dorsal-fin base short, 10.2–12.9% of SL; snout to pelvic-fin insertion 61.5–65.6% of SL; maxilla rather short, 7.6–9.8% of SL; lower jaw rather short, 11.8–15.1% of SL; melanophores scattered on 5th to 9th pectoral-fin rays from uppermost ray; parasphenoid and vomer without teeth; tooth patches on anterior parts of palatine and pterygoid broad, with numerous rows of conical teeth in individuals larger than 80 mm SL (Hata *et al*. 2022b; Hata 2023).

Remarks. This species was included in *Dussumieria elopsoides* Bleeker, 1849 sensu Whitehead (1985). See Hata *et al*. (2022b) regarding nomenclature.

Family Dorosomatidae Gill, 1861
***Amblygaster sirm* (Walbaum, 1792)**
Fig. 21

Material examined. Thailand, Andaman Sea: PMBC 3221, 2 specimens, 158.6–165.2 mm SL, obtained at local fish market in Phuket, 18 Oct. 1972, coll. D.M. Carlsson; PMBC 3227, 4 specimens, 134.0–140.9 mm SL, obtained at local fish market in Phuket, 2 Aug. 1972, coll. D.M. Carlsson; PMBC 3231, 2 specimens, 137.3–141.4 mm SL, obtained at local fish market in Phuket, 9 June 1971, coll. D.M. Carlsson ; PMBC 3233, 9 specimens, 138.9–150.8 mm SL, obtained at local fish market in Phuket, 27 Sep. 1972, coll. D.M. Carlsson; PMBC 5619, 3 specimens, 147.1–158.7 mm SL, obtained at local fish market in Phuket, 8 Nov. 1972, coll. T. Abe. Indonesia: PMBC 5599, 16 specimens, 110.8–190.5 mm SL, Bali, 9 Sep. 1972.

Diagnosis. Black spots on flanks (sometimes indistinct); 1LGR 37–42; pre-dorsal-fin length 42.4–47.1% of SL; oblique dark line above maxilla; dorsal side of body bluish-green when fresh (Ishimori *et al*. 2013).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers. *Amblygaster sirm* is known to be a host of the parasitic isopod *Ryukyua globosa* Williams and Bunkley-Williams, 1994 (Williams and Bunkley-Williams 1994). Ishimori *et al*. (2013) reported the parasite in 85% of A. sirm 122.5–221.9 mm SL (66% in specimens 122–140 mm SL; almost 100% from 140 mm SL) collected around Okinawa Island, Ryukyu Archipelago, Japan. Examination of the PMBC specimens showed *R. globosa* parasitic (or indicated by deformed gill openings) on 14 of 20 (70%) *A. sirm* specimens (134.0–165.2 mm SL) from Phuket. Additionally, 3 of 16 (18.8%) specimens of *A. sirm* (106.8–190.5 mm SL) from Bali, Indonesia, were confirmed as similarly parasitized.

***Anodontostoma chacunda* (Hamilton, 1822)**
Fig. 22

Material examined. Thailand, Andaman Sea: PMBC 3282, 3 specimens, 102.3–113.1 mm SL, obtained at local fish market in Phuket, 1 Mar. 1972, coll. U. Bhatia; PMBC 3283, 1 specimen, 103.3 mm SL, obtained at fish landing port at trawler harbor in Phuket, 1 Mar. 1972, coll. U. Bhatia; PMBC 3287, 2 specimens, 112.1–117.0 mm SL, obtained at fish landing port at trawler harbor in Phuket, 16 June 1972, coll. U. Bhatia; PMBC 3308, 1 specimen, 109.3 mm SL, obtained at fish landing port at trawler harbor in Phuket, 24 July 1972, coll. D.M. Carlsson; PMBC 5451, 4 specimens, 114.1–122.5 mm SL, Surin Island, Phang-nga, 21 m depth, bottom trawl, 3 June 1985, coll. W. Pokapunt boarding on RV Fishery Research no. 2; PMBC 9984, 1 specimen, 75.9 mm SL, Bangrong, mangrove area, 30 June 1993, coll. Sombut Poovachiranon; PMBC 20612, 1 specimen, 110.1 mm SL, Yao Yai Island, Phang-nga, trammel net, 17 July 2004, coll. U. Satapoomin; PMBC 21117, 1 specimen, 114.3 mm SL, Lanta Yai Island, Krabi, gill net, 14 July 2004, coll. U. Satapoomin; PMBC 25614, 2 specimens, 110.3–119.7 mm SL, Phang-nga Bay St. 1, 8°01'75"N 98°32'00"E, 10 m depth, otter trawl, 22 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project; PMBC 25615, 1 specimen, 117.1 mm SL, Phang-nga Bay St. 14, 7°21'01"N 99°07'73"E, 22 m depth, otter trwasl, 19 Dec. 2001, Biodiversity of Phang-nga Bay Project. India: PMBC 3268, 1 specimen, 93.0 mm SL, Cochin (currently Kochi), Kerala, pelagic trawl, 4 Sep. 1972, coll. D.M. Carlsson boarding

on sardinella vessel. Philippines: PMBC 37419, 1 specimen, 117.5 mm SL, Manila Bay, Luzon, 5 Jan. 1948, coll. F. G. Dayrit.

Diagnosis. Gill rakers fine and numerous, longest gill rakers on lower part of arch less than corresponding gill filaments; 1LGR 50–96 (in individuals 4–14 cm SL); posterior margins of body scales denticulated in adults, teeth slightly larger than gaps between them; second supramaxilla paddle-shaped (Wongratana 1983; Whitehead 1985; Munroe *et al*. 1999c).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Escualosa thoracata* (Valenciennes, 1847)**
Fig. 23

Material examined. Thailand, Andaman Sea: PMBC 9956, 16 specimens, 62.7–76.2 mm SL, Sapum Fish Landing, Phuket, 8 Sep. 1993, coll. P. Sirimontraporn and S. Bussarawit; PMBC 10004, 7 specimens, 39.8–42.0 mm SL, Bang Rong, Phuket (mangrove area), 30 June 1993, coll. S. Poovachiranon.

Diagnosis. Body deep, its depth 27.3–37.0% of SL; caudal peduncle deep, 10.7–13.2% of SL; pelvic-fin insertion anterior or just below dorsal-fin origin; silver longitudinal stripe on flank broad, about equal to eye diameter (Wongratana 1983; Whitehead 1985; Munroe *et al*. 1999c).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Herklotsichthys quadrimaculatus* (Rüppell, 1837)**
Fig. 24

Material examined. Thailand, Andaman Sea: PMBC 13873, 1 specimen, 82.6 mm SL, Panwa Cape, Phuket (coral reef), 11 Dec. 1997, coll. U. Satapoomin; PMBC 20895, 3 specimens, 77.0–97.6 mm SL, Pakchok Village, Phang-nga, beach seine, 3 July 2003, coll. U. Satapoomin.

Diagnosis. One or two distinct orange spots on cleithrum when fresh; electric blue longitudinal stripe with thin dark blue line below in life; dorsal fin without prominent markings; elongate, wing-likescales present beneath normal paired predorsal scales; 1LGR 30–36 (Whitehead 1985; Munroe *et al*. 1999c).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Sardinella albella* (Valenciennes, 1847)**
Fig. 25

Material examined. Thailand, Andaman Sea: PMBC 20896, 3 specimens, 54.0–71.6 mm SL, Prathong Island, Phang-nga, beach seine, 3 July 2003, coll. U. Satapoomin; PMBC 21118, 1 specimen, 103.1 mm SL, Lanta Yai Island, Krabi, gill net, 14 July 2004, coll. U. Satapoomin.

Diagnosis. Pelvic fin with 8 rays; 1LGR 47−64; black spot on dorsal-fin origin; ventral scutes 18 + 12−13 = 30−31; grooves on lateral body scales discontinuous, not meeting centrally; caudal fin without black spots (Stern *et al*. 2016; Hata and Koeda 2022).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Sardinella aurita* Valenciennes, 1847**
Fig. 26

Material examined. India: PMBC 3242, 10 specimens, 136.6–157.7 mm SL, Cochin (currently Kochi), Kerala, purse seine, 29 July 1972, coll. D.M. Carlsson boarding on M-INP vessel.

Diagnosis. Pelvic fin with 9 rays; 1LGR > 100; no black spot on dorsal fin (Stern *et al*. 2017).

Remarks. See Stern *et al*. (2017) regarding nomenclature.

***Sardinella fimbriata* (Valenciennes, 1847)**
Fig. 27

Material examined. India: PMBC 3579, 1 specimen, 91.6 mm SL, Cochin (currently Kochi), Kerala, pelagic trawl, 4 Sep. 1972, coll. D.M. Carlsson.

Figure 20. *Dussumieria hasseltii*, PMBC 3264, 127.9 mm SL. Scale bar 20 mm.

Figure 21. *Amblygaster sirm*, PMBC 5619, 158.7 mm SL. Scale bar 20 mm.

Figure 22. *Anodontostoma chacunda*, PMBC 25615, 117.1 mm SL. Scale bar 20 mm.

Figure 23. *Escualosa thoracata*, PMBC 9956, 66.4 mm SL. Scale bar 10 mm.

Figure 24. *Herklotsichthys quadrimaculatus*, PMBC 20895, 77.0 mm SL. Scale bar 10 mm.

Figure 25. *Sardinella albella*, PMBC 21118, 103.1 mm SL. Scale bar 20 mm.

Figure 26. *Sardinella aurita*, PMBC 3242, 139.5 mm SL. Scale bar 20 mm.

Figure 27. *Sardinella fimbriata*, PMBC 3579, 91.6 mm SL. Scale bar 10 mm.

Diagnosis. Pelvic fin with 8 rays; 1LGR 71−79; black spot on dorsal-fin origin; ventral scutes 17−18 + 13−14 = 31−32; body scales not deciduous; grooves on lateral body scales discontinuous, not meeting centrally; caudal fin without black spots; lateral scales in longitudinal series 44−46; pseudobranchial filaments 19−22; lower jaw 11.1−12.2% of SL; (Hata and Motomura 2019).

Remarks. Regarding the record of *S. fimbriata* from Andaman Sea by Satapoomin (2011), see the Remarks of *S. gibbosa.*

***Sardinella gibbosa* (Bleeker, 1849)**
Fig. 28

Material examined. Thailand, Andaman Sea: PMBC 3252, 2 specimens, 128.1–131.6 mm SL, obtained at local fish market in Phuket, 7 Nov. 1972, coll. T. Abe; PMBC 3254, 1 specimen, 136.6 mm SL, obtained at local fish market in Phuket, 9 June 1971, coll. P.J.P. Whitehead; PMBC 3255, 1 specimen, 132.7 mm SL, Phi Phi Don Island, Krabi, bottom trawl, 7 Mar. 1972, coll. R. Tantanasiriwong; PMBC 3256, 1 specimen, 107.3 mm SL, PMBC area, Phuket, bottom trawl, 27 June 1972, coll. D.M. Carlsson; PMBC 3257, 4 specimens, 120.4–129.3 mm SL, obtained at local fish market in Phuket, 2 Aug. 1972, coll. D.M. Carlsson; PMBC 20613, 3 specimens, 95.1–100.2 mm SL, Yao Yai Island, Phang-nga, trammel net, 17 July 2004, coll. U. Satapoomin; PMBC 21119, 1 specimen, 123.1 mm SL, Lanta Yai Island, Krabi, gill net, 14 July 2004, coll. U. Satapoomin; PMBC 25138, 2 specimens, 114.5–119.9 mm SL, BIOSHELF St. PB3, 7°48'N 98°28'E to 7°49'N 98°32'E, 21 m depth, otter trawl, 21 Apr. 1997, coll. S. Bussarawit, PMBC 25610, 1 specimen, 100.5 mm SL, Phang-nga Bay St. 3, 7°57'65"N 98°33'43"m, 11–20 m depth, shrimp trawl, 12 June 2002, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project; PMBC 25616, 1 specimen, 110.4 mm SL, Phang-nga Bay St. 14, 7°21'01"N 99°07'73"E, 22 m depth, otter trawl, 19 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project; PMBC 25617, 1 specimen, 107.2 mm SL, Phang-nga Bay St. 2, 8°06'03"N 98°39'44"E, 18–14 m depth, shrimp trawl, 13 June 2002, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project. Malaysia: PMBC 3577, 14 specimens, 101.8–131.5 mm SL, Penang, 9 Sep. 1972, coll. T. Abe. Philippines: PMBC 6510, 2 specimens, 94.3–100.0 mm SL, Gubat, Sorsogon, Luzon, 5 June 1954, coll. B. Reyes. Indonesia: PMBC 37409, 4 specimens, 78.0–135.8 mm SL, Bali, 9 Sep. 1972.

Diagnosis. Pelvic fin with 8 rays; 1LGR 42−69; black spot on dorsal-fin origin; ventral scutes 17−19 + 14−15 = 32−34; grooves on lateral body scales discontinuous, not meeting centrally; caudal fin without black spots (Stern *et al*. 2016; Hata and Motomura 2021b; Hata and Koeda 2022).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers. Satapoomin (2011) also reported *S. fimbriata*, based on PMBC specimen. However, no PMBC specimens are identified as *S. fimbriata* in this study and PMBC 21119, identified as *S. gibbosa* in this study, had been registered and identified as *S. fimbriata* before our examination. Therefore, Satapoomin (2011)'s *S. fimbriata* is considered as misidentification of *S. gibbosa.*

***Tenualosa toli* (Valenciennes, 1847)**
Fig. 29

Material examined. Thailand, Andaman Sea: PMBC 3578, 1 specimen, 235.0 mm SL, obtained at fish landing port at trawler harbor in Phuket, 14 Aug. 1972, coll. D.M. Carlsson

Diagnosis. Caudal fin relatively short, 31–34% of SL; caudal tips of both lobes of caudal-fin relatively rounded; 1LGR 60–100; ventral scutes 28–30; HL 25–27% of SL; no spots on flanks (Whitehead 1985; Munroe *et al*. 1999c).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

Family Pristigasteridae Bleeker, 1872
***Ilisha elongata* (Anonymous, 1830)**
Fig. 30

Material examined. Thailand, Andaman Sea: PMBC 3566, 1 specimen, 224.9 mm SL, obtained at local market in Phuket, 9 Nov. 1972, coll. D.M. Carlsson.

Figure 28. *Sardinella gibbosa*, PMBC 21119, 123.1 mm SL. Scale bar 20 mm.

Figure 29. *Tenualosa toli*, PMBC 3578, 235.0 mm SL. Scale bar 40 mm.

Figure 30. *Ilisha elongata*, PMBC 3566, 224.9 mm SL. Scale bar 20 mm.

Figure 31. *Ilisha megaloptera*, PMBC 6744, 196.6 mm SL. Scale bar 30 mm.

Diagnosis. Ventral scutes 24–25 + 10–15 = 34–42; body slender, its depth 27–31% of SL; 1LGR 19–25; anal fin with 43–53 fin rays, its origin slightly posterior to vertical line through base of posteriormost dorsal-fin ray; swimbladder with a single long tube passing back down right side of body above anal-fin base; no distinct lobe on maxilla (Whitehead 1985; Munroe *et al*. 1999a; Hata and Motomura 2011).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Ilisha megaloptera* (Swainson, 1839)**
Fig. 31

Material examined. Thailand, Andaman Sea: PMBC 3576, 1 specimen, 190.8 mm SL, Karon Beach, Phuket, 22 Nov. 1972, coll. D.M. Carlsson. Myanmar: PMBC 6744, 1 specimen, 196.6 mm SL, northern Andaman Sea, 30–40 m depth, otter trawl, 18 Nov. 1989, coll. W. Pokapunt boarding on RV Chulabhon.

Diagnosis. Ventral scutes 19–23 + 8–12 = 28–35; body deep, its depth 28–39% of SL; 1LGR 18–23; anal fin with 38–53 rays; swimbladder with a single long tube passing back down right side of body cavity above anal-fin base; no distinct lobe on maxilla (Whitehead 1985; Munroe *et al*. 1999a).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Ilisha melastoma* (Bloch and Schneider, 1801)**
Fig. 32

Material examined. Thailand, Andaman Sea: PMBC 3564, 1 specimen, 155.9 mm SL, obtained at fish landing port at trawler harbor in Phuket, 19 June 1972, coll. U. Bhatia and D.M. Carlsson; PMBC 3565, 1 specimen, 140.1 mm SL, obtained at fish landing port at trawler harbor in Phuket, 4 July 1972, coll. D.M. Carlsson; PMBC 6694, 1 specimen, 95.9 mm SL, Yao Yai Island, Phang-nga, 27 July 1965, coll. Prawat; PMBC 9958, 1 specimen, 109.0 mm SL, Bang Rong, Phuket (mangrove area), 29 June 1993, coll. S. Poovachiranon; PMBC 20600, 2 specimens, 81.5–83.3 mm SL, Yao Yai Island, Phang-nga, trammel net, 15 July 2004, coll. U. Satapoomin; PMBC 20626, 1 specimen, 89.0 mm SL, Yao Yai Island, Phang-nga, trammel net, 17 July 2004, coll. U. Satapoomin; PMBC 25613, 1 specimen, 86.3 mm SL, Tha Lane Bay, Krabi, 26 Oct. 2004, coll. S. Intarat; PMBC 26082, 1 specimen, 96.7 mm SL, Phang-nga Bay St. 2, 8°04'57"N 98°40'09"E, 21 m depth, otter trawl, 24 Dec. 2001, coll. V. Vongpanich, Biodiversity of Phang-nga Bay Project. India: PMBC 3575, 1 specimen, 99.3 mm SL, Cochin (currently Kochi), Kerala, 6 May 1972, coll. D.M. Carlsson. Indonesia: PMBC 37410, 1 specimen, 108.5 mm SL, Bali, 9 Sep. 1972.

Diagnosis. Ventral scutes 17–21 + 8 or 9 = 25–30; body deep, its depth 30–42.5% of SL; 1UGR 10–14, 1LGR 19–25; dorsal fin with 3 or 4 unbranched and 12–15 branched rays; anal fin with 35–48 fin rays; vertical grooves on body scales overlapping across centrally; caudal-fin lobes without extended tips; swimbladder with double tubes passing posteriorly into muscles on both sides of haemal spines; no distinct lobe on maxilla (Whitehead 1985; Kailola1986; Munroe *et al*. 1999a).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

***Ilisha striatula* Wongratana, 1983**
Fig. 33

Material examined. India: PMBC 3568, 7 specimens, 101.3–122.8 mm SL, Cochin (currently Kochi), Kerala, trawl, 6 May 1972, coll. D.M. Carlsson boarding on sardinella vessel.

Diagnosis. Ventral scutes 18–21 + 7–9 = 26–29; body deep, its depth 32–39% of SL; 1LGR 21–24; anal fin with 40–47 rays, its origin just below last dorsal-fin ray origin; vertical grooves on body scales discontinuous across center of scale; pectoral fin long, 18.0–20.4% of SL; swimbladder with double tubes passing posteriorly into muscles on both sides of haemal spines; no distinct lobe on maxilla (Wongratana 1983; Whitehead 1985; Munroe *et al*. 1999a).

***Opisthopterus tardoore* (Cuvier, 1829)**
Fig. 34

Material examined. Thailand, Andaman Sea: PMBC 3307, 1 specimen, 85.0 mm SL, Karon Beach,

Figure 32. *Ilisha melastoma*, PMBC 20626, 89.0 mm SL. Scale bar 10 mm.

Figure 33. *Ilisha striatula*, PMBC 3568, 116.3 mm SL. Scale bar 20 mm.

Figure 34. *Opisthopterus tardoore*, PMBC 6745, 165.3 mm SL. Scale bar 20 mm.

Figure 35. *Spratelloides delicatulus*, PMBC 13874, 44.1 mm SL. Scale bar 5 mm.

Phuket, bottom trawl, 22 Nov. 1972, coll. P.J.P. Whitehead; PMBC 10485, 1 specimen, 158.7 mm SL, Bang Tao, Phuket, trawl, 7 Dec. 1990, coll. Jerdjinda. India: PMBC 3567, 1 specimen, 146.3 mm SL, Cochin (currently Kochi), Kerala, 4 Sep. 1972, coll. D.M. Carlsson. Myanmar: PMBC 6745, 4 specimens, 145.9–165.3 mm SL, northern Andaman Sea, 30–40 m depth, otter trawl, 18 Nov. 1989, coll. W. Pokapunt boarding on RV Chulabhon.

Diagnosis. Pectoral fin relatively long (21–26% of SL, greater than or about equal to HL), with 12–14 ryas; 46–51 scale rows in longitudinal series (Whitehead 1972; 1985; Munroe *et al*. 1999a).
Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

Family Spratelloididae Jordan, 1925
***Spratelloides delicatulus* (Bennett, 1832)**
Fig. 35

Material examined. Thailand, Andaman Sea: PMBC 13874, 51 specimens, 35.0–49.1 mm SL, Miang Island, Similan Islands, Phang-nga, 4 m depth, 14 Feb. 1979, coll. G.R. Allen, J.E. Randall, R.C. Steene, A. Nateewathana and P. Tantichodok.

Diagnosis. No bright silvery stripe on flank; maxilla toothless; second supramaxilla symmetrically-shaped; vertical grooves on body scales meeting at center of scale; 35–41 scale rows in longitudinal series; predorsal scales 8–13; posterior margin of scales not denticulated; two prominent streaks of pigment on caudal-fin base (Whitehead 1985; Munroe *et al*. 1999c).

Remarks. Satapoomin (2011) reported this species from Andaman Sea based on PMBC specimens without giving the registration numbers.

SUMMARY

The present study has verified 41 species in 18 genera, which including 5 families, Chirocentridae, Engraulidae, Dussumieriidae, Dorosomatidae and Pristigasteridae. The identification of 63 PMBC accession numbers agree with those previously identified; 55 PMBC accession numbers were misidentifications; specimens were reidentified with 13 new PMBC accession numbers.

Currently, Clupeiformes fish in 35 species are reported in 15 genera 6 families (Chirocentridae: 1 species of *Chirocentrus*; Engraulidae: 1 species of *Coilia*, 3 species of *Encrasicholina*, 8 species of *Stolephorus*, 4 species of *Thrissina*; Dussumieriidae: 3 species of *Dussumieria*; Dorosomatidae: 1 species of *Amblygaster*, 1 species of *Anodontostoma*, 1 species of *Escualosa*, 1 species of *Herklotsichthys*, 4 species of *Sardinella* and 1 species of *Tenualosa*; Pristigasteridae: 4 species of *Ilisha*, 1 species of *Opisthopterus*; Spratelloididae: 1 species of *Spratelloides*) in the PMBC collection.

They are reported from the Thailand (23 species in the Andaman Sea, 5 species in the Gulf of Thailand), India (9 species), Indonesia (4 species), Malaysia (1 species), Myanmar (3 species) and Philippines (10 species).

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