*Phuket mar. biol. Cent. Res. Bull.***77:** 109–119 (2020)
DOI: 10.14456/pmbcrb.2020.10

DEEP-SEA FISHES FROM THE ANDAMAN SEA BY R/V CHAKRATONG TONGYAI DURING 1996–2000. PART 4: ORDER ARGENTINIFORMES

Tetsuro Senda[1*], Toshio Kawai[2], Fumihito Tashiro[3], Hisashi Imamura[2,3], Charatsee Aungtonya[4] and Surapong Banchongmanee[4]

[1]*Graduate School of Fisheries Sciences, Hokkaido University, Hakodate, Hokkaido 041-8611, Japan*
[2]*Faculty of Fisheries Sciences, Hokkaido University, Hakodate, Hokkaido 041-8611, Japan*
[3]*Fisheries Science Center, The Hokkaido University Museum, Hakodate, Hokkaido 041-8611, Japan*
[4]*Phuket Marine Biological Center, Wichit Subdistrict, Muang District, Phuket 83000, Thailand*
**Corresponding author: ts_304@eis.hokudai.ac.jp*

ABSTRACT: Taxonomy of the order Argentiniformes was studied based on specimens collected by R/V Chakratong Tongyai from the deep-sea waters of the Andaman Sea. These specimens were classified into eight species belonging to three families and seven genera, including a single argentinid *Glossanodon* sp. (*sensu* Psomadakis *et al*. 2019), a single platytroctid *Platytroctes mirus* (Lloyd, 1909), and six alepocephalids *Alepocephalus bicolor* Alcock, 1891, *Alepocephalus owstoni* Tanaka, 1908, *Bajacalifornia calcarata* (Weber, 1913), *Leptoderma* cf. *retropinna* Fowler, 1943, *Microphotolepis schmidti* (Angel and Verrier, 1931) and *Rouleina squamilatera* (Alcock, 1898). The present study represents the first records of *P. mirus*, *A. owstoni*, *B. calcarata* and *M. schmidti* from the Andaman Sea.

Keywords: Thailand, BIOSHELF, Argentinidae, Alepocephalidae, Platytroctidae

INTRODUCTION

Under the support of the Scientific Cooperation Program between Thailand and Denmark, six main cruises were operated by R/V Chakratong Tongyai in the Andaman Sea shelf and deep-sea in the Thai EEZ during 1996–2000 ("BIOSHELF" project) (see Aungtonya *et al*. 2000). More than 1,000 specimens of deep-sea fishes were collected during the project, although they only have been partially identified. In the previous works focusing on specimens from these cruises, nine scorpaeniform species were reported by Kawai *et al*. (2017), and four beryciform and four stephanoberyciform species by Kimura *et al*. (2019a). Additionally, two new species, *Bembradium magnoculum* Kishimoto, Kawai, Tashiro and Aungtonya, 2019 and *Melamphaes brachysomus* Kimura, Kawai and Aungtonya, 2019, were found from the BIOSHELF specimens. In this paper, we provide a species list of the order Argentiniformes (*sensu* Nelson 2006) as a part of the series.

MATERIALS AND METHODS

Specimens examined were collected from deep-sea waters of the Andaman Sea by BIOSHELF. These specimens were fixed with 10% formalin, and then replaced with 70% ethyl alcohol. These specimens have been deposited in the Reference Collection of Phuket Marine Biological Center, Phuket, Thailand (PMBC). Several specimens were donated to the Hokkaido University Museum, Hakodate, Japan (HUMZ). Comparative materials examined in this study are deposited in the Laboratory of Marine Biology, Faculty of Science, Kochi University (BSKU).

Counts and proportional measurements generally follow Hubbs and Lagler (1958). Specialized measurements for specific taxa follow Cohen (1958) for Argentinidae, and Parr (1960) and Matsui and Rosenblatt (1987) for Platytroctidae. In Alepocephalidae, these follow Markle and Merrett (1980) with a modification; interorbital width is measured fleshy width at center of orbit. Standard length and head length were abbreviated as SL and HL, respectively. Measurements were made to the nearest 0.1 mm with digital calipers. Vertebrae were counted from radiographs.

SPECIES LIST

Family Argentinidae
***Glossanodon* sp. (*sensu* Psomadakis *et al*. 2019)**
Fig. 1

Diagnosis. Dorsal-fin rays 11; pectoral-fin rays 19; pelvic-fin rays 12; anal-fin rays 11; gill rakers on first arch 32; vertebrae 46; head length 30–32% SL; eye diameter 25–27% HL; small conical teeth present on vomer, palatine, dentary and tongue; and anterior tip of gular just behind chin without pigmentation (Psomadakis *et al*. 2019; present study).

Material. PMBC 30255, 1 specimen, 101.7 mm SL, St. K6, 7°02′N 98°10′E to 7°04′N 98°09′E, 277–288 m depth, otter trawl, 1 Mar. 2000.

Distribution. Andaman Sea (Psomadakis *et al*. 2019; present study).

Remarks. The present specimen is distinguished from the all valid species of *Glossanodan* in having the combination of taxonomic characters [see diagnosis and Endo and Nashida (2010, 2012)] and identified into *Glossanodon* sp. (*sensu* Psomadakis *et al*. 2019). This species is the only known argentinoid fish in the Andaman Sea.

Figure 1. *Glossanodon* sp., PMBC 30255, 101.7 mm SL. Scale bar 10 mm.

Family Platytroctidae
***Platytroctes mirus* (Lloyd, 1909)**
Fig. 2

Diagnosis. Dorsal- and anal-fin rays 22–25, respectively; body depth 30–43% SL in adults (15–25% SL in young); premaxilla without anteriorly enlarged tooth; cleithral symphysis ending as a barbed spine; dorsal- and anal-fin bases subequal in length and these origins set nearly opposite one another; pelvic fin present; caudal peduncle without dark-lined chambers; and photophores absent on body (Lloyd 1909; Matsui and Rosenblatt 1987; Sazonov and Merrett 2001; present study).

Materials. PMBC 30258, 1 specimen, 89.8 mm SL, St. E9, 8°30′N 95°58′E to 8°28′N 95°58′E, 649–550 m depth, otter trawl, 5 Feb. 1999; PMBC 30259, 1 specimen, 37.6 mm SL, St. U4, 7°06′N 97°05′E, 960 m depth, Ockelmann sledge, 28 Jan. 1999.

Distribution. Arabian Sea and Bay of Bengal (*e.g*., Sazonov 1976; Matsui and Rosenblatt 1987; Sazonov and Merrett 2001), and Andaman Sea (present study).

Remarks. Although Sazonov and Merrett (2001) reported that this species is distributed in the Andaman Sea, they did not provide reference or illustration of voucher specimens. Therefore, the present specimens represent the reliable first record of this species from the Andaman Sea.

Figure 2. *Platytroctes mirus*, PMBC 30259 (above), 37.6 mm SL; PMBC 30258 (below), 89.8 mm SL. Scale bars 10 mm.

Family Alepocephalidae
***Alepocephalus bicolor* Alcock, 1891**
Fig. 3

Diagnosis. Dorsal-fin rays 18–22; anal-fin rays 27–32; upper jaw reaching anterior to a vertical of mid-orbit; supramaxillae two (anterior one sometimes indistinct in young); interorbital width longer than orbital diameter in fishes larger than about 150 mm SL; upper margin of orbit with whitish skin in adults; and anal-fin base longer than dorsal-fin base (Alcock 1891; Okamura 1984a; present study).

Materials. 154 total specimens examined. HUMZ 229576, 5 specimens, 61.5–102.1 mm SL, PMBC 15768, 17 specimens, 50.4–219.1 mm SL, St. G8, 8°00′N 97°06′E to 8°00′N 96°04′E, 508–518 m depth, otter trawl, 20 Nov. 1999; HUMZ 229577–229581, 5 specimens, 72.1–210.3 mm SL, PMBC 15763, 46 specimens, 68.1–248.0 mm SL, St. B8, 9°10′N 96°18′E to 9°09′N 96°16′E, 489–504 m depth, otter trawl, 11 Feb. 1999; PMBC 15764, 4 specimens, 47.7–222.7 mm SL, St. E9, 8°30′N 95°58′E to 8°28′N 95°58′E, 649–550 m depth, otter trawl, 5 Feb. 1999; PMBC 15765, 21 specimens, 61.4–215.8 mm SL, St. Z3, 7°42′N 97°20′E to 7°42′N 97°18′E, 493–322 m depth, otter trawl, 24. Jan. 1999; PMBC 30263, 1 specimen, 214.6 mm SL, Andaman Sea, no further information; PMBC 15766, 12 specimens, 136.5–214.5 mm SL, St. E8, 8°32′N 96°04′E to 8°31′N 96°07′E, 488–478 m depth, otter trawl, 6 Feb. 1999; PMBC 15767, 9 specimens, 190.5–236.4 mm SL, St. J8, 7°21′N 97°26′E to 7°20′N 97°25′E, 520–531 m depth, otter trawl, 27 Jan. 1999; PMBC 15769, 3 specimens, 76.3–176.5 mm SL, St. E7, 8°30′N 97°07′E to 8°29′N 97°04′E, 435–444 m depth, 9 Feb. 2000; PMBC 15770, 2 specimens, 142.4–146.6 mm SL, St. E7, 8°30′N 97°01′E to 8°29′N 97°03′E, 449–446 m depth, Agassiz trawl, 8 Feb. 2000; PMBC 15771, 1 specimen, 212.7 mm SL, St. C8, 9°00′N 96°15′E to 9°00′N 96°13′E, 478–480 m

depth, Agassiz trawl, 3 Feb. 2000; PMBC 15772, 1 specimen, 178.4 mm SL, St. J8, 7°15′N 97°30′E to 7°15′N 97°32′E, 490–479 m depth, Agassiz trawl, 18 Feb. 2000; PMBC 15773, 1 specimen, 223.3 mm SL, St. L8, 6°45′N 97°36′E to 6°44′N 97°34′E, 482–507 m depth, Agassiz trawl, 22 Feb. 2000; PMBC 15774, 3 specimens, 186.9–213.6 mm SL, St. G8, 8°00′N 97°11′E to 8°00′N 97°13′E, 495–488 m depth, Agassiz trawl, 9 Feb. 2000; PMBC 15775, 22 specimens, 65.0–230.3 mm SL, St. L8, 6°46′N 97°33′E to 6°44′N 97°35′E, 513–501 m depth, otter trawl, 22 Feb. 2000; PMBC 30257, 1 specimen, 68.1 mm SL, St. K8, 7°00′N 97°26′E to 7°01′N 97°28′E, 556–520 m depth, Agassiz trawl, 17 Nov. 1999.

Distribution. Arabian Sea, Bay of Bengal, Andaman Sea, northwest coast of Australia, Taiwan and southern Japan (Satapoomin 2011; Nakabo and Kai 2013).

Remarks. This species has been reported as having 21–22 dorsal- and 28–29 anal-fin rays (Alcock 1891; Okamura 1984a), whereas the present specimens (n = 63, 50.4–248.0 mm SL) have 18–22 dorsal- and 27–32 anal-fin rays. The present specimens show that this species has remarkable intraspecific variations with growth in head length (25.6–32.2% SL), orbital diameter (4.8–10.1% SL) and interorbital width (4.5–7.4% SL) (Fig. 4).

Figure 3. *Alepocephalus bicolor*, PMBC 15765 (above), 61.4 mm SL; HUMZ 229580 (below), 210.3 mm SL. Scale bars 10 mm.

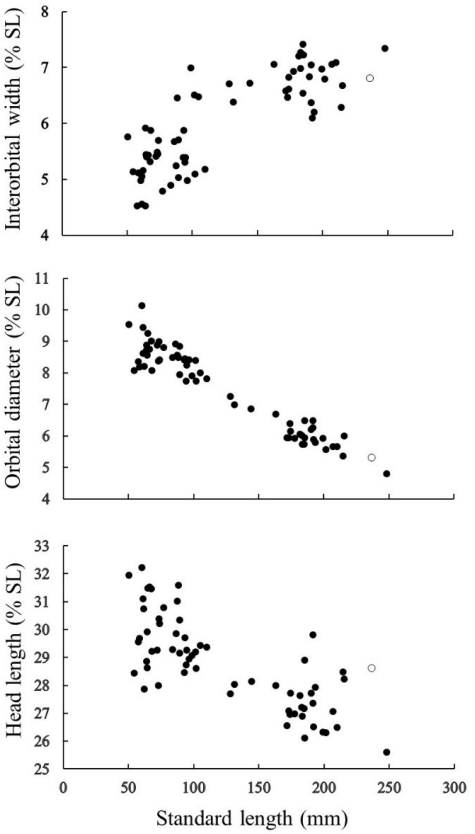

Figure 4. Comparison of head length, orbital diameter and interorbital width of *Alepocephalus bicolor* against standard length in the present specimens (solid circle) and data from Okamura (1984a) (open circle).

Alepocephalus owstoni Tanaka, 1908
Fig. 5

Diagnosis. Dorsal-fin rays 17–21; anal-fin rays 16–22; anterior tip of snout round in dorsal view; upper jaw reaching slightly anterior to a vertical of mid-orbit; anterior tip of lower jaw slightly projected ventrally; developed bony ridge present on upper margin of orbit; and origin of anal fin set a vertical of 4–6th dorsal-fin ray (Tanaka 1908; Okamura 1984b; present study).

Materials. PMBC 30254, 1 specimen, 107.1 mm SL, HUMZ 229583, 1 specimen, 141.7 mm SL, St. C10, 8°59′N 96°08′E to 8°56′N 96°08′E, 691–684 m depth, Agassiz trawl, 4 Feb. 2000; PMBC 30256, 1 specimen, 91.0 mm SL, St. J10, 7°20′N 97°14′E to 7°22′N 97°13′E, 655–651 m depth, otter trawl, 28 Jan. 1999; PMBC 30268, 1 specimen, 264.7 mm SL, St. C12, 8°59′N 96°03′E to 8°56′N 96°01′E, 930–962 m depth, Agassiz trawl, 4 Feb. 2000; PMBC 30269, 1 specimen, 273.3 mm SL, Andaman Sea, no further information.

Distribution. Western Australia, Okinawa Trough and Sagami Bay (Nakabo and Kai 2013), and Andaman Sea (present study).

Remarks. Sixty specimens of *A. owstoni* from the Okinawa Trough have 54–59 total vertebrae including vertebrae, ural centra, and a single hypural plate (Okamura 1984b), whereas those in the Andaman Sea have 52–53 total vertebrae. This study regards the difference as an intraspecific variation. As a

complement to the Okamura (1984)'s description of *A. owstoni*, this study first reports that the number of small denticles scattered on gill rakers varies from 0 to 7 in this species. Because *A. owstoni* has never been reported from the Andaman Sea (*e.g.*, Satapoomin 2011; Rajan *et al*. 2013; Psomadakis *et al*. 2019), the present specimens represent its first record from the area.

Comparative materials. *Alepocephalus owstoni*. BSKU 29700, 1 specimen, 233.0 mm SL, Okinawa Trough, 30°12′N 128°17′E, 780–810 m depth, bottom trawl, 26 Oct. 1979; BSKU 29782, 1 specimen, 228.3 mm SL, Okinawa Trough, 31°30′N 128°46′E, 630–650 m depth, bottom trawl, 5 Nov. 1979.

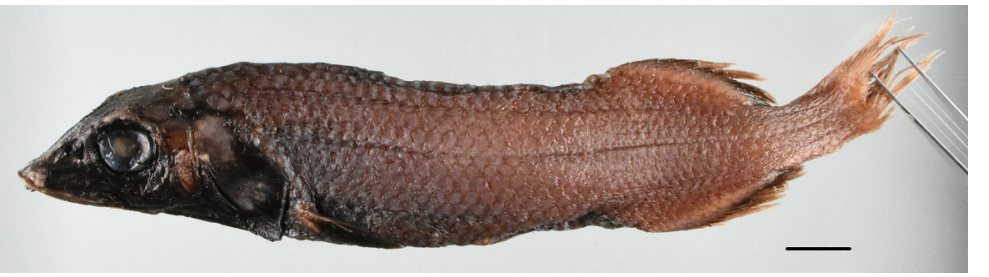

Figure 5. *Alepocephalus owstoni*, PMBC 30269, 273.3 mm SL. Scale bar 20 mm.

***Bajacalifornia calcarata* (Weber, 1913)**
Fig. 6

Diagnosis. Upper jaw reaching posterior to a vertical of mid-orbit; anterior tip of lower jaw slightly projected ventrally; gill filaments free at base; gill rakers 4–7 + 1 + 15–18 = 22–26; and vertebrae 35–39 + 19–23 = 57–60 (Weber 1913; Miya and Markle 1993; Sazonov and Williams 2001; present study).

Materials. HUMZ 230166, 1 specimen, 152.6 mm SL, PMBC 30342, 3 specimens, 170.4–194.4 mm SL, St. E9, 8°30′N 95°58′E to 8°28′N 95°58′E, 649–550 m depth, otter trawl, 5 Feb. 1999.

Distribution. Tropical waters in eastern Atlantic and Indo-West Pacific (*e.g.*, Markle and Krefft 1985; Sazonov and Williams 2001), including Andaman Sea (present study).

Remarks. The present specimens of this species have fewer abdominal vertebrae (35–37 vs. 36–39; Miya and Markle 1993; Sazonov and Williams 2001). Because no specimens of *B. calcarata* has been reported from the Andaman Sea (*e.g.*, Satapoomin 2011; Rajan *et al*. 2013; Psomadakis *et al*. 2019), the present specimens represent its first record from the area.

Figure 6. *Bajacalifornia calcarata*, PMBC 30342, 194.4 mm SL. Scale bar 10 mm.

***Leptoderma* cf. *retropinna* Fowler, 1943**
Fig. 7

Diagnosis. Dorsal-fin rays about 42–49; anal-fin rays about 69; procurrent caudal-fin rays 7–8 on upper and lower sides of caudal peduncle, respectively; vertebrae 72–74; body very elongate, eel-like; eye large; both dorsal- and anal-fin bases confluent with that of caudal-fin; and black papillae arranged on lateral line (present study).

Materials. PMBC 30456–30457, 2 specimens, 73.3–85.8 mm SL, St. J10, 7°20′N 97°14′E to 7°22′N 97°13′E, 655–651 m depth, otter trawl, 28 Jan. 1999.

Distribution. Andaman Sea (present study).

Remarks. The present specimens closely resemble *L. retropinna* by having confluent dorsal-, anal- and caudal-fin bases and black papillae arranged on lateral line (Takami and Fukui 2010). However, because important taxonomic characters of *Leptoderma* (*e.g*., number of dorsal- and anal-fin rays) are incomplete and meristic values are unavailable in the present specimens due to damage, these are treated as *Leptoderma* cf. *retropinna* in this study. Although *L. retropinna* is distributed in Indo-West Pacific (Nakabo and Kai 2013), the species of the genus *Leptoderma* has never been reported from the Andaman Sea (*e.g*., Satapoomin 2011; Rajan *et al*. 2013; Psomadakis *et al*. 2019).

Figure 7. *Leptoderma* cf. *retropinna*, PMBC 30456, 85.8 mm SL. Scale bar 10 mm.

Microphotolepis schmidti
(Angel and Verrier, 1931)
Fig. 8

Diagnosis. Snout blunt, its length shorter than orbital diameter; dorsal- and anal-fin bases comparatively long; pelvic-fin base posterior to middle of body; numerous small scales on body; and photophores present on head, body, fin rays and scale pockets (Angel and Verrier 1931; Sazonov 1995; Sazonov and Williams 2001; present study).

Materials. HUMZ 229582, 4 specimens, 115.0–143.4 mm SL, PMBC 30266, 4 specimens, 121.6–134.1 mm SL, St. Z3, 7°42′N 97°20′E to 7°42′N 97°18′E, 493–322 m depth, otter trawl, 24 Jan. 1999.

Distribution. Equatorial area of Indo-Australian Archipelago, including west coast of Sumatra and east coast of New Guinea (*e.g*., Angel and Verrier 1931; Parin 1978; Sazonov 1995), and Andaman Sea (present study).

Remarks. This species has been known from latitudinally narrow ranges (1°16′S–12°02′S) around the Indo-Australian Archipelago on the basis of a few records (*e.g.*, Angel and Verrier 1931; Parin 1978; Sazonov 1995). Therefore, the present specimens represent the northernmost and first records of *M. schmidti* from the previously known range and the Andaman Sea, respectively.

Figure 8. *Microphotolepis schmidti*, HUMZ 229582, 126.3 mm SL. Scale bar 10 mm.

***Rouleina squamilatera* (Alcock, 1898)**
Fig. 9

Diagnosis. Dorsal-fin rays 18–22; anal-fin rays 15–20; pelvic-fin rays 5–7 (usually 6); supramaxillae two; snout blunt, its length shorter than orbital diameter; body scales absent; ring-like scales arranged on lateral line in adults; whitish nodular photophores present on head and body; and maximum body size less than 230 mm SL (Alcock 1898; Sazonov and Williams 2001; present study).

Materials. PMBC 30253, 1 specimen, 47.1 mm SL, St. Z2, 7°42′N 97°28′E to 7°42′N 97°31′E, 464 m depth, otter trawl, 23 Jan. 1999; PMBC 30265, 1 specimen, 164.2 mm SL, St. Z3, 7°42′N 97°20′E to 7°42′N 97°18′E, 493–322 m depth, otter trawl, 24 Jan. 1999.

Distribution. Continental slopes of tropical waters in eastern Indian Ocean and western Pacific, including Andaman Sea (*e.g.*, Alcock 1898; Sazonov and Williams 2001; Nakabo and Kai 2013).

Remarks. One of the present specimens (PMBC 30265) has fewer abdominal vertebrae (22 vs. 24–26; Okamura and Machida 1986; Sazonov and Williams 2001; present study). Maxillary teeth of the present specimens are considered to be lost because those of this species is deciduous (Machida 1984). In the young of this species, black papillae are arranged on lateral line instead of ring-like scales shown in adults. In addition, its nodular photophores are concentrated ventrally and large against the body like those of *Xenodermichthys copei* (Badcock and Larcombe 1980).

Figure 9. *Rouleina squamilatera*, PMBC 30253 (above), 47.1 mm SL; PMBC 30265 (below), 164.2 mm SL. Scale bars 10 mm.

ACKNOWLEDGMENTS

We are grateful to Dr. Kongkiat Kittiwattanawong (PMBC Director), Dr. Somchai Bussarawit (formerly Specialist at Marine and Coastal Resources and Development Institute, Thailand) and staff of the Reference Collection of PMBC for their kind support with our research at PMBC. We are also grateful to Dr. Hiromitsu Endo (BSKU) for providing comparative specimens and helpful comment on the genus *Glossanodon*. We sincerely thank anonymous referees for critical reading of an early manuscript and English correction.

REFERENCES

Alcock, A. 1891. Natural history notes from H.M. Indian marine survey steamer 'Investigator', Commander R.F. Hoskyn, R.N., commanding. Ser. II., no. 1. On the results of deep-sea dredging during the season 1890–91. Ann. Mag. Nat. His. (Ser. 6) **8:** 119–138.

Alcock, A. 1898. Natural history notes from H.M. Indian marine survey ship 'Investigator', Commander T.H. Heming, R.N., commanding. Ser. II., no. 25. A note on the deep-sea fishes, with descriptions of some new genera and species, including another probably viviparous ophidioid. Ann. Mag. Nat. His. (Ser. 7) **2:** 136–156.

Angel, M.F. and M.L. Verrier. 1931. Etude de quelques poissons des grandes profundeurs. Etude systématique. Ann. Inst. Oceanogr. Monaco **10:** 119–128.

Aungtonya, C., S. Thaipai and O. Tendal. 2000. A preliminary report on the Thai-Danish Bioshelf surveys (1996–2000) of the west coast of Thailand, Andaman Sea. Phuket mar. biol. Cent. Res. Bull. **63:** 53–76.

Badcock, J. and R.A. Larcombe. 1980. The sequence of photophore development in *Xenodermichthys copei* (Pisces: Alepocephalidae). J. Mar. Biol. Assoc. U.K. **60:** 277–294.

Cohen, D.M. 1958. A revision of the fishes of the subfamily Argentininae. Bull. Florida State Mus. Biol. Sci. **3:** 93–172.

Endo, H. and K. Nashida. 2010. *Glossanodon kotakamaru*, a new argentine fish from southern Japan (Protacanthopterygii: Argentinidae). Bull. Natl. Mus. Nat. Sci. (Ser. A) (Supplement) **4:** 119–127.

Endo, H. and K. Nashida. 2012. *Glossanodon microcephalus*, a new argentine fish from Japan and the South China Sea (Protacanthopterygii: Argentinidae). Bull. Natl. Mus. Nat. Sci. (Ser. A) **6:** 17–26.

Fowler, H.W. 1943. Contributions to the biology of the Philippine Archipelago and adjacent regions. Descriptions and figures of new fishes obtained in Philippine seas and adjacent waters by the United States Bureau of fisheries steamer ‘‘Albatross’’. Bull. U.S. Natl. Mus. no. 100. **14:** 51–91.

Hubbs, C.L. and K.F. Lagler. 1958. Fishes of the Great Lakes region. Bull. Cranbrook Inst. Sci. **26:** 1–213.

Kawai, T., F. Tashiro, H. Imamura and C. Aungtonya. 2017. Deep-sea fishes collected from the Andaman Sea by R/V Chakratong Tongyai during 1996–2000. Part 1: order Scorpaeniformes. Phuket mar. biol. Cent. Res. Bull. **74:** 23–32.

Kimura, K., T. Kawai, F. Tashiro, N. Nakayama, C. Aungtonya and S. Banchongmanee. 2019a. Deep-sea fishes from the Andaman Sea by R/V Chakratong Tongyai during 1996–2000. Part 2: orders Beryciformes and Sterphanoberyciformes. Phuket mar. biol. Cent. Res. Bull. **76:** 1–8.

Kimura, K., T. Kawai and C. Aungtonya. 2019b. *Melamphaes brachysomus*, a new species of bigscale (Melamphaidae) from the Andaman Sea. Phuket mar. biol. Cent. Res. Bull. **76:** 85–90.

Kishimoto, S., T. Kawai, F. Tashiro and C. Aungtonya. 2019. Description of a new species of *Bembradium* (Scorpaeniformes: Bembridae) from the Andaman Sea, Thailand. Phuket mar. biol. Cent. Res. Bull. **76:** 9–17.

Lloyd, R.E. 1909. A description of the deep-sea fish caught by the R.I.M.S. ship "Investigator" since the year 1900, with supposed evidence of mutation in *Malthopsis*. Mem. Indian Mus. **2(3):** 139–180.

Machida, Y. 1984. *Rouleina watasei*. **In:** Okamura, O. and T. Kitajima (eds.). Fishes of the Okinawa Trough and the adjacent waters I. Japan Fisheries Resource Conservation Association, Tokyo. pp. 138–139 (In Japanese, English translation in p. 331).

Markle, D.F. and G. Krefft. 1985. A new species and review of *Bajacalifornia* (Pisces: Alepocephalidae) with comments on the hook jaw of *Narcetes stomias*. Copeia **1985:** 345–356.

Markle, D.F. and N.R. Merrett. 1980. The abyssal alepocephalid, *Rinoctes nasutus* (Pisces: Salmoniformes), a redescription and an evaluation of its systematic position. J. Zool. **190:** 225–239.

Matsui, T. and R.H. Rosenblatt. 1987. Review of the deep-sea fish family Platytroctidae (Pisces: Salmoniformes). Bull. Scripps Inst. Oceanogr. **26:** 49–115.

Miya, M. and D.F. Markle. 1993. *Bajacalifornia aequatoris*, new species of alepocephalid fish (Pisces: Salmoniformes) from the central equatorial Pacific. Copeia **1993:** 743–747.

Nakabo, T. and Y. Kai. 2013. Alepocephalidae. **In:** Nakabo, T. (ed.). Fishes of Japan with pictorial key to the species. Third edition. Tokai University Press, Hadano. pp. 351–357.

Nelson, J.S. 2006. Fishes of the world. Fourth edition. John Wiley and Sons, New York. xv + 523 p.

Okamura, O. 1984a. *Alepocephalus bicolor*. **In:** Okamura, O. and T. Kitajima (eds.). Fishes of the Okinawa Trough and the adjacent waters I. Japan Fisheries Resource Conservation Association, Tokyo. pp. 112–113. (In Japanese, English translation in p. 328)

Okamura, O. 1984b. *Alepocephalus owstoni*. **In:** Okamura, O. and T. Kitajima (eds.). Fishes of the Okinawa Trough and the adjacent waters I. Japan Fisheries Resource Conservation Association, Tokyo. pp. 112–113. (In Japanese, English translation in p. 329)

Okamura, O. and Y. Machida. 1986. Additional records of fishes from Kochi Prefecture, Japan. Mem. Fac. Sci. Kochi Univ. (Ser. D) Biol. **7:** 17–41.

Parin, N.V. 1978. New records of deep-sea pelagic fishes off New Guinea and Tonga Islands, with a description of two new species from the genera *Eustomias* (Melanostomatidae) and *Benthodesmus* (Trichiuridae). Tr. Inst. Okeanol. **111:** 156–168.

Parr, A.E. 1960. The fishes of the family Searsidae. Dana Rep. **51:** 1–109.

Psomadakis, P.N., H. Thein, B.C. Russell and M. Tun. 2019. Field identification guide to the living marine resources of Myanmar. FAO Species Identification Guide for Fishery Purposes. FAO, Rome. xvii + 694 p. + 63 pls.

Rajan, P.T., C.R. Sreeraj and T. Immanuel. 2013. Fishes of Andaman and Nicobar Islands: a checklist. J. Andaman Sci. Assoc. **18:** 47–87.

Satapoomin, U. 2011. The fishes of southwestern Thailand, the Andaman Sea - A review of research and a provisional checklist of species. Phuket mar. biol. Cent. Res. Bull. **70:** 29–77.

Sazonov, Y.I. 1976. Materials on the systematics and distribution of fishes of the family Searsiidae (Salmoniformes, Alepocephaloidei). Tr. Inst. Okeanol. **104:** 26–72.

Sazonov, Y.I. 1995. Three rare species of slickheads (Alepocephalidae), found for the first time in Indian Ocean, with remarks about the status of *Microphotolepis schmidti*. J. Ichthyol. **35:** 130–139.

Sazonov, Y.I. and N.R. Merrett. 2001. Alepocephaloid fishes (Argentiniformes, Alepocephaloidei) captured during the cruise of the R/V discovery in the Arabian Sea, with description of a new species of *Normichthys* (Platytroctidae). J. Ichthyol. **41:** S37–S50.

Sazonov, Y.I. and A. Williams. 2001. A review of the alepocephalid fishes (Argentiniformes, Alepocephalidae) from the continental slope of Australia: part I. J. Ichthyol. **41:** S1–S36.

Takami, M. and A. Fukui. 2010. Larvae and juveniles of *Leptoderma lubricum* and *L. retropinnum* (Argentiformes: Alepocephalidae) collected from Suruga Bay, Japan. Ichthyol. Res. **57:** 406–415.

Tanaka, S. 1908. Notes on some Japanese fishes, with descriptions of fourteen new species. J. Coll. Sci. Imp. Univ. Tokyo **23:** 1–54.

Weber, M. 1913. Die Fische der Siboga-Expedition. E. J. Brill, Leiden. xii + 710 p.

Manuscript received: 6 March 2019
Accepted: 26 May 2020