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DEEP-SEA FISHES FROM THE ANDAMAN SEA BY R/V CHAKRATONG TONGYAI DURING 1996–2000. PART 6: ORDERS PLEURONECTIFORMES AND TETRAODONTIFORMES

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ABSTRACT: Pleuronectiform and tetraodontiform fishes collected by the project team of the Biodiversity of the Andaman Sea Shelf (BIOSHELF) during 1996–2000 were examined taxonomically. As a result, the collected fishes were identified as *Cynoglossus suyeni* Fowler, 1934, *Symphurus woodmasoni* (Alcock, 1889), *Symphurus septemstriatus* (Alcock, 1891) and *Symphurus regani* Weber and de Beaufort, 1929 in the Cynoglossidae (Pleuronectiformes), and *Halimochirurgus centriscoides* Alcock, 1899 and *Tydemania navigatoris* Weber, 1913 in the Triacanthodidae (Tetraodontiformes). *Cynoglossus suyeni* and *Symphurus regani* are newly recorded from the Andaman Sea.

Keywords: *Cynoglossus suyeni*, *Symphurus woodmasoni*, *Symphurus septemstriatus*, *Symphurus regani*, *Halimochirurgus centriscoides*, *Tydemania navigatoris*, Thailand, BIOSHELF

INTRODUCTION

Deep-sea fishes collected by the project team of the Biodiversity of the Andaman Sea Shelf (BIOSHELF) (see details in Aungtonya *et al*. 2000) have been studied taxonomically as follows: Scorpaeniformes (*sensu* Nelson 2006) by Kawai *et al*. (2017) and Kishimoto *et al*. (2019), Beryciformes and Stephanoberyciformes (*sensu* Nelson 2006) by Kimura *et al*. (2019a, b), Albuliformes, Ateleopodiformes and Lampriformes (*sensu* Nelson 2006) by Kawai *et al.* (2020a), Argentiniformes (*sensu* Nelson 2006) by Senda *et al*. (2020), and Perciformes (*sensu* Nelson 2006) by Kawai *et al*. (2020b). Following the aforementioned studies, species of the Pleuronectiformes and Tetraodontiformes (*sensu* Nelson 2006) are newly reported in this study.

MATERIALS AND METHODS

All specimens, which were caught by BIOSHELF (Aungtonya *et al*. 2000), have been kept in 70% ethyl alcohol after fixation by 10% formalin, and have been deposited at the Reference Collection of Phuket Marine Biological Center, Phuket, Thailand (PMBC). Comparative materials are deposited at the Hokkaido University Museum, Hakodate, Japan (HUMZ) and PMBC.

Counts and proportional measurements follow Menon (1977) for *Cynoglossus*, Munroe (1992, 1998) for *Symphurus*, and Tyler (1968) for the Triacanthodidae. Pattern of interdigitation of proximal dorsal pterygiophores and neural spines (ID pattern) of *Symphurus* follows Munroe (1992). Total and standard lengths are abbreviated as TL and SL, respectively. Measurements were made to the nearest 0.1 mm with calipers. Vertebrae and caudal skeleton were examined by radiographs.

SPECIES LIST

Order Pleuronectiformes
Family Cynoglossidae
Cynoglossus suyeni Fowler, 1934
Fig. 1

Diagnosis. Dorsal-fin rays 110–126; anal-fin rays 92–109; caudal-fin rays 10; lateral lines three on ocular side, absent on blind side; vertebrae 9 + 48–52 = 57–61; head length 19.4–25.3% SL; body depth 19.3–25.3% SL; snout length 38.5–48.7% of head length; snout rounded; eyes contiguous, 0.6–0.8% SL, 2.5–3.2% of head length; scales on ocular and blind sides ctenoid; angle of mouth nearer to gill opening than to tip of snout (Fowler 1934; Menon 1977; Shen 1993; present study).

Materials. PMBC 3260, 2 specimens, 125.5–147.0 mm SL, St. L6, 6˚45′N 98˚06′E to 6˚44′N 98˚05′E, Agassiz trawl, 303–313 m depth, 23 Feb. 2000.

Comparative materials. HUMZ 191480, 1 specimen, 204.1 mm SL, off Java, Indonesia, 8˚22.5′S 110˚35.5′E to 8˚21.3′S 110˚35.6′E, 300–255 m depth, 11 Sep. 2004; HUMZ 193984, 1 specimen, 220.6 mm SL, HUMZ 193985, 1 specimen, 195.2 mm SL, off Java, Indonesia, 8˚15.5′S 110˚22.0′E to 8˚14.8′S 110˚20.3′E, 295–290 m depth, 11 May 2005; HUMZ 194279, 1 specimen, 185.9 mm SL, off Java, Indonesia, 8˚30.0′S 110˚46.8′E to 8˚30.4′S 110˚45.1′E, 395–400 m depth, 14 May 2005.

Distribution. Taiwan and Philippines through Sulawesi to Timor Sea, and Arnhem Land (Australia) (Menon 1977; Shen 1993; Hoese and Bray 2006; Cabanban *et al*. 2010), and Java and Andaman Sea (present study).

Remarks. Head length in the present specimens is slightly longer than that in previous studies, i.e. 21.3–25.3% SL vs. 19.39–23.23% SL (Fowler 1934; Menon 1977). Body scales and vertebrae of the present specimens could not be counted because most scales of the specimens are decalcified and lost. This species had been known only from the Timor Sea in the Indian Ocean (Menon 1977; Fricke 2019). Therefore, the present specimens represent the first record of the species from the Andaman Sea.

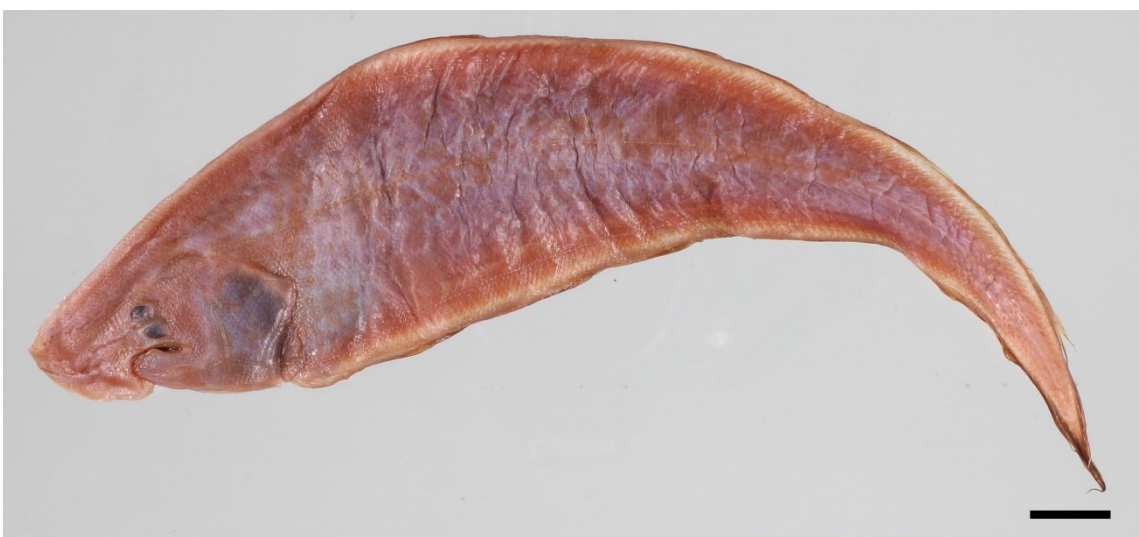

Figure 1. *Cynoglossus suyeni*, PMBC 3260, 147.0 mm SL. Scale bar indicates 10 mm.

***Symphurus woodmasoni* (Alcock, 1889)**
Fig. 2

Diagnosis. Dorsal-fin rays 88–100; anal-fin rays 77–87; caudal-fin rays 14; abdominal vertebrae 3+6; total vertebrae 49–55; hypurals 5; ID pattern 1-1–3-1–3-1–3-1–2 (predominant 1-2-2-2-2) (Alcock 1889, 1899a; Chabanaud 1955; Munroe 1992).

Material. PMBC 3269, 1 specimen, 52.5 mm SL, St. B10, 9˚13′N 96˚12′E to 9˚13′N 96˚12′E, Ockelmann sledge, 687–691 m depth, 11 Feb. 1999.

Distribution. Bay of Bengal, Andaman Sea and Philippines (Alcock 1889, 1899a; Chabanaud 1955; Cabanban *et al*. 2010).

Figure 2. *Symphurus woodmasoni*, PMBC 3269, 52.5 mm SL. Scale bar indicates 10 mm.

***Symphurus septemstriatus* (Alcock, 1891)**
Fig. 3

Diagnosis. Dorsal-fin rays 94–104; anal-fin rays 80–91; caudal-fin rays 12; abdominal vertebrae 3+6; total vertebrae 52–56; hypurals 4; ID pattern 1–2-1–3-2–3-1–2-2 (predominant 1-2-2-2-2); upper head lobe width / lower head lobe width less than 1.0 in TL (Alcock 1891, 1899a; Munroe 1992; Lee *et al*. 2013; present study).

Material. PMBC 3270, 1 specimen, 45.4 mm SL, St. B8, 9˚10′N 96˚18′E to 9˚09′N 96˚16′E, otter trawl, 489–504 m depth, 11 Feb. 1999.

Distribution. Gulf of Mannar, Andaman Sea and Philippines (Alcock 1891, 1899a; Cabanban *et al*. 2010; Satapoomin 2011).

Remarks. The present specimen has 1-3-2-2-2 ID pattern although *S. septemstriatus* was known to have 1–2-1–2-2–3-1–2-2 (predominant 1-2-2-2-2) (Munroe 1992).

Figure 3. *Symphurus septemstriatus*, PMBC 3270, 45.4 mm SL. Scale bar indicates 10 mm.

***Symphurus regani* Weber and de Beaufort, 1929**
Fig. 4

Diagnosis. Dorsal-fin rays 99–105; anal-fin rays 86–92; caudal-fin rays 14; abdominal vertebrae 3+7; total vertebrae 55–58; hypurals 5; ID pattern 1-2-1–2-1–2-1–2 (predominant 1-2-2-1-2); head length 5.4–6.2 in TL; one tubular nostril present on blind side (Weber and de Beaufort 1929; Chabanaud 1955; Munroe 1992; present study).

Materials. PMBC 3263, 1 specimen, 122.7 mm SL, St. K8, 7˚00′N 97˚26′E to 7˚01′N 97˚28′E, Agassiz trawl, 556–520 m depth, 17 Nov. 1999; PMBC 3264, 1 specimen, 102.2 mm SL, St. G8, 8˚00′N 97˚06′E to 8˚00′N 97˚04′E, otter trawl, 508–518 m depth, 20 Nov. 1999; PMBC 3265, 1 specimen, 100.9 mm SL, St. G8, 8˚00′N 97˚11′E to 8˚00′N 97˚13′E, Agassiz trawl, 495–488 m depth, 9 Feb. 2000; PMBC 3266, 4 specimens, 103.5–116.4 mm SL, St. K10, 7˚01′N 97˚20′E to 7˚03′N 97˚20′E, Agassiz trawl, 690–684 m depth, 17 Nov. 1999; PMBC 3267, 1 specimen, 69.3 mm SL, St. J10, 7˚15′N 97˚15′E to 7˚14′N 97˚15′E, Agassiz trawl, 689–687 m depth, 19 Feb. 2000.

Distribution. Flores Sea and Philippines (Weber and de Beaufort 1929; Chabanaud 1955; Cabanban *et al*. 2010), and Andaman Sea (present study).

Remarks. The present specimens have 99–101 dorsal-fin rays (vs. 100–105 in Weber and de Beaufort 1929; Chabanaud 1955; Munroe 1992), 86–88 anal-fin rays (vs. 89–92 in Weber and de Beaufort 1929; Chabanaud 1955; Munroe 1992) and 55–56 total vertebrae (vs. 56–58 in Chabanaud 1955; Munroe 1992). This species is newly recorded from the Andaman Sea in this study.

Figure 4. *Symphurus regani*, PMBC 3266, 116.4 mm SL. Scale bar indicates 10 mm.

Order Tetraodontiformes
Family Triacanthodidae
***Halimochirurgus centriscoides* Alcock, 1899**
Fig. 5

Diagnosis. Snout extremely long and tubular, its length much greater than that of rest of head; mouth slightly wider than snout immediately behind it, its width almost equal to least interorbital width; mouth symmetrically placed, not twisted to one side or the other; teeth conical in both jaws; third dorsal spine usually barely protruding through skin surface, occasionally better developed but still less than half length of second spine; postorbital length (from orbit to upper end of gill opening) relatively long, about two-thirds of orbit diameter; gill opening wide, extending ventrally to below level of lower edge of pectoral base, its length about 1.5 times in orbit diameter; pelvis relatively wide, its width between the pelvic spines about 4.0 times in its length (from base of pelvic spines to posterior end) (Tyler 1968).

Materials. PMBC 30453, 14 specimens, 75.6–119.1 mm SL, St. J8, 7°15′N 97°33′E to 7°15′N 97°30′E, 473–494 m depth, otter trawl, 18 Feb. 2000.

Comparative material. PMBC 30454, 1 specimen, 99.9 mm SL, eastern Indian Ocean, 300–400 m depth, 8 Sep. 1980, collected by R/V F.J. Norman.

Distribution. Kenya, Gulf of Mannar, west of Sri Lanka and Andaman Sea (Alcock 1899b, Tyler 1968, 1970, 1983; Psomadakis *et al*. 2019).

Remarks. PMBC 30453 (119.1 mm SL) lacks the second dorsal spine.

Figure 5. *Halimochirurgus centriscoides*, PMBC 30453, 98.3 mm SL. Scale bar 10 mm.

Tydemania navigatoris Weber, 1913
Fig. 6

Diagnosis. Scales covered ventral surface of pelvis as seen externally flat; snout shorter than rest of head, its length about equal to or shorter than orbit diameter; teeth compressed from front to back, wider than thick, truncated distally; lips thick, swollen and spongy (Tyler 1968).

Materials. PMBC 15831, 3 specimens, 93.7–95.8 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 15832, 1 specimen, 84.2 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 15833, 1 specimen, 103.1 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 15834, 2 specimens, 74.3–79.2 mm SL, St. E7, 8°30′N 97°07′E to 8°29′N 97°04′E, 435–444 m depth, otter trawl, 9 Feb. 2000; PMBC 15835, 2 specimens, 53.7–54.3 mm SL, St. L6, 6°45′N 98°06′E to 6°44′N 98°05′E, 303–313 m depth, Agassiz trawl, 23 Feb. 2000.

Comparative materials. PMBC 30455, 7 specimens, 62.2–69.9 mm SL, eastern Indian Ocean, 300–600 m depth, 8 Sep. 1980.

Distribution. South Africa, Natal, Kenya, Bay of Bengal, Andaman Sea, northwestern Australia, Madura, Philippines, Hong Kong, Taiwan and Japan (Weber 1913; Tyler 1968, 1983; Matsuura 1985; Satapoomin 2011; Hayashi and Hagiwara 2013; Psomadakis *et al*. 2019).

Figure 6. *Tydemania navigatoris*, PMBC 15833, 103.1 mm SL. Scale bar 10 mm.

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