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An East Asian Endemic Threadfin, *Eleutheronema rhadinum* (Perciformes: Polynemidae); First Record from Vietnam

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Abstract. A single specimen (161 mm in standard length) of polynemid fish, *Eleutheronema rhadium* (Jordan and Evermann, 1902), collected in Long Chau Bay, the Long Chau Islands, off southeast Hai Phong, northern Vietnam, represents the first reliable record from Vietnam and the southernmost record for the species. Intraspecific variations in lateral squamation on the caudal fin membrane in the species are also discussed.

Key words: Polynemidae, *Eleutheronema rhadinum*, distribution, Vietnam, lateral line squamation.

The Indo-West Pacific threadfin genus *Eleutheronema* Bleeker, 1862 (Perciformes: Polynemidae) was revised by Motomura *et al.* (2002), who recognized three valid species: *E. rhadinum* (Jordan and Evermann, 1902), distributed in East Asia (China and Japan), *E. tetradactylum* (Shaw, 1804), distributed in the Indo-West Pacific where it ranges from the Persian Gulf to Australia, and *E. tridactylum* (Bleeker, 1845), distributed in Southeast Asia, where it ranged from Thailand to Indonesia.

During a survey of marine biodiversity in the shallow waters of Vietnam, a single specimen of *Eleutheronema* was collected in Long Chau Bay, the Long Chau Islands, off southeast Hai Phong, northern Vietnam. The specimen herein identified as *E. rhadinum* on the basis of meristic and proportional measurements, represents the first reliable record from Vietnam and the southernmost record for the species. Intraspecific variations in lateral squamation of the caudal fine membrane in the species are also discussed.

Counts and measurements followed Motomura *et al.* (2002). Pectoral fin ray counts included only those interconnected by a membrane, the lower free rays being considered separately; counts of pectoral filaments begin with the anterior element. Standard length is expressed as SL. Institutional codes follow Leviton *et al.* (1985), with an additional institutional abbreviation as follows: Division of Fisheries Sciences, Miyazaki University, Japan.

Eleutheronema rhadinum (Jordan and Evermann)

(English name: East Asian fourfinger threadfin)
(Japanese name: Minami-konoshiro)
(Fig. 1; Table 1)

Polydactylus rhadinus Jordan and Eversmann, 1902: 351, fig. 20 (type locality: Linkou, Taipei, Taiwan Province, China, based on a neotype designated by Motomura *et al.*, 2002).

Eleutheronema tetradactylum (not of Shaw): Shen, 1984: 98, pl. 98, figs 361-1a, b (Taiwan Province of China); Senou, 2000: 968 (East China Sea); Motomura *et al.*, 2001, 41, fig. 1 (Aomori Prefecture, Japan).

Eleutheronema rhadinum: Motomura *et al.*, 2002: 50, figs 2, 3, 7, 9, 11 (Japan and China including Taiwan Province); Senou, 2002: 968 (Japan).

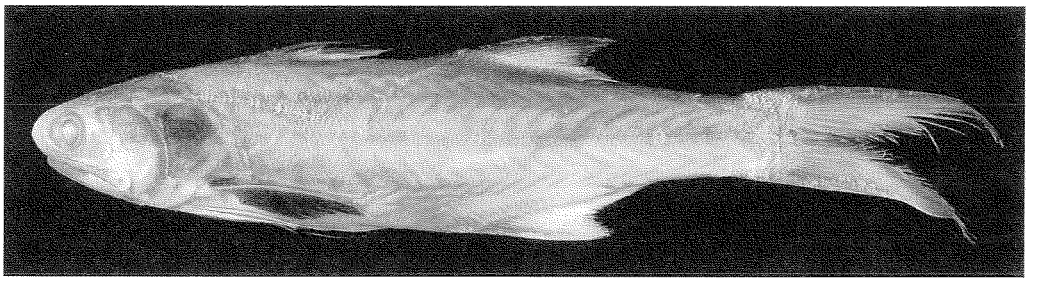

Fig. 1. *Eleutheronema rhadinum*, NSMT-P 65566, 161 mm standard length, inside of Long Chau Bay, the Long Chau Islands, off southeast Hai Phong, northern Vietnam.

Material examined. NSMT-P 65566, 1 specimen, 161 mm standard length, inside of Long Chau Bay, the Long Chau Islands, off southeast Hai Phong, northern Vietnam (20° 37′162″–40′ 933″ N, 107° 04′ 118″–06′ 035″ E), 14 Dec. 2001, collected by Nghia.

Description. Counts and proportional measurements as percentages of SL of the specimen examined during this study of *Eleutheronema rhadinum* are given in Table 1. Body oblong, compressed; maxilla covered with scales; lip on upper jaw absent; posterior margin of preopercle serrated; posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; width of tooth band on upper and lower jaws greater than space (on symphysis) separating tooth bands on opposing premaxiellae; anterior parts of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip absent; teeth villiform in broad bands on vomer, palatines and ectopterygoids; vomer with deciduous tooth plates on both sides; fourth pectoral filament longest, just short of level of posterior tip of pectoral fin; third pectoral filament extending well beyond level of pelvic fin origin; second pectoral filament just reaching level of pelvic fin origin; first pectoral filament shortest, not reaching to level of pelvic fin origin; posterior tip of pectoral fin not reaching level of posterior tip of pelvic fin; pectoral fin insertion well below midline of body; all pectoral fin rays unbranched; base of second spine in first dorsal fin slightly more robust than other spines; lateral line bifurcating on caudal fin base, upper branch extending to lower end of upper caudal fin lobe and lower branch secondarily bifurcating on middle of lower caudal fin lobe; upper and lower caudal fin lobes not filamentous; 10+15 vertebrae; swimbladder absent.

Color in preservative. Head and body brown dorsally, pale yellowish-silver ventrally; anterior margins of first and second dorsal fins dense black, other parts with scattered melanophores; lower two rays and base of pectoral fine white, other parts of pectoral fin dense black; pectoral filaments and pelvic and anal fins white; upper and posterior margins of caudal fin dense black, other parts grayish-black.

Remarks. *Eleutheronema rhadinum*, originally described as *Polydactylus rhadinus* by Jordan and Evermann (1902) from Taiwan Province of China, has long been treated as a junior synonym of *E. tetradactylum* (Shaw, 1804) (*e. g.* Weber and de Beaufort, 1922; Kagwade, 1970; Motomura *et al.*, 2001). Recently, *E. rhadinum*, however, was redescribed as a valid species by Motomura *et al.* (2002). *Eleutheronema rhadinum* is distinguishable from other *Eleutheronema* species, *viz. E. tetradactylum* and *E. tridactylum*, in having the following combination of characters: 17 or 18 (mode 18, rarely 19) pectoral fin rays; 14 (rarely 13 or 15) second dorsal fin soft rays; 82–95 (mode 95) pored lateral line scales; 11–14 (12) scale rows above lateral line, 15–17 (16) below; 5–8 (5) upper series gill rakers, 5–9 (7) lower, 10–17 (12) total; vomer with

Table 1. Counts and measurements of the specimens of *Eleutheronema rhadinum*, expressed as percentages of standard length. Modes or means in parentheses include neotype data.

	Present study	From Motomura *et al.* (2002)	
	Specimen of *E. rhadinum* NSMT-P 65566 (Vietnam)	Neotype of *Polydactylus radinus* ASIZP 60745 (Taiwan Prov. of China)	Non-type specimens of *E. rhadinum* *n*=18 (Japan and China including Taiwan Prov.)
Standard length (mm)	161	152	82–739
Counts			
Dorsal fin rays	VIII–I, 14	VIII–I, 14	VIII–I, 13–15 (14)
Anal fin rays	III, 15	III, 15	III, 14–16 (15)
Pectoral fin rays (exclusive of filaments)	18	17	17–19 (18)
Pectoral filaments	4	4	4
Pelvic fin rays	I, 5	I, 5	I, 5
Pored lateral line scales	90	95	82–95 (95)
Scales above/below lateral line	12/–	12/16	11–14 (12)/15–17 (16)
Gill rakers	6+9=15	6+7=13	5–8 (5)+5–9 (7) =10–17 (12)
Measurements (means)			
Head length	29	30	28–30 (29)
Body depth	23	26	23–26 (24)
Second body depth	24	26	24–27 (25)
Body width	10	12	10–15 (13)
Snout length	4	5	4–5 (4)
Dermal eye opening	5	6	5–6 (6)
Orbit diameter	6	7	6–7 (7)
Interorbital width	6	7	6–7 (6)
Postorbital length	19	20	19–20 (19)
Upper jaw length	15	16	15–16 (16)
Depth of maxilla	3	3	3 (3)
Length of tooth plate	8	8	8–9 (8)
Pre-1st dorsal fin length	34	36	34–36 (35)
Pre-2nd dorsal fin length	58	63	59–63 (61)
Pre-anal fin length	60	58	58–63 (60)
Origin of 1st dorsal fin to origin of anal fin	36	37	35–38 (37)
Origin of pelvic fin to origin of anal fin	23	22	22–26 (24)
Base of 2nd dorsal fin	16	16	14–17 (15)
Base of anal fin	18	18	17–19 (18)
Length of longest pectoral fin ray (2nd)	21	21	20–22 (21)
Length of longest pectoral fin filament (3rd)	23	23	15–27 (21)
Base of pectoral fin	7	7	6–7 (7)
Length of longest pelvic fin ray (1st)	14	13	12–13 (13)
Length of longest 1st dorsal fin spine (4th)	17	18	15–18 (17)
Length of 2nd dorsal fin spine	9	7	7–9 (7)
Length of longest 2nd dorsal fin ray (2nd)	20	19	15–21 (19)
Length of longest anal fin spine (3rd)	8	7	6–8 (7)
Length of longest anal fin ray (2nd)	17	17	16–19 (17)
Caudal peduncle length	25	24	24–26 (25)
Caudal peduncle depth	11	11	10–12 (11)
Length of upper caudal fin lobe	34	37	32–38 (35)
Length of lower caudal fin lobe	32	36	29–36 (33)

deciduous tooth plates on both sides; posterior portion of maxilla deep (3% of SL); short tooth plate extension onto lateral surface of lower jaw [mean 8% (range 8–9%) of SL]; and pectoral fin membranes black (Motomura *et al.*, 2002). Characters of the present specimen, from Vietnam, agreed closely with those of neotype and non-type specimens of *E. rhadinum* redescribed by Motomura *et al.* (2002) (see Description, Table 1 and Fig. 1).

Eleutheronema rhadinum has to date been reported only from Japan and China (including Taiwan Province). Accordingly, the present specimen (NSMT-P 65566) represents the first reliable record from Vietnam on the basis of specimen collected and the southernmost record for the species.

Two patterns of lateral line squamation on the caudal fin membrane exit in *Eleutheronema* species (Motomura *et al.*, 2002: fig. 6). The lateral line of *E. tridactylum* is unbranched, extending from the upper end of the gill opening to the upper end of the lower caudal fin lobe, whereas it is either unbranched or branched (divided into three lines on the caudal fin membrane; see Motomura *et al.*, 2002; fig. 6A) in *E. rhadinum* and *E. tetradactylum*. According to Motomura *et al.* (2002), of 19 specimens of *E. rhadinum* examined, one only (the largest examined: MUFS 18880, 739 mm SL, Japan) had the lateral line divided into three lines on the caudal fin membrane. Because the remaining 18 specimens (82–246 mm SL) were much smaller than the former, it was suggested that such branching of the lateral line squamation pattern was growth-related. However, the lateral line of the present specimen (NSMT-P 65566, 161 mm SL), being divided into three lines on the caudal fin membrane, indicates that differences in lateral line squamation in *E. rhadinum* simply represent individual variations.

Comparative material examined. *Eleutheronema rhadinum*: 19 specimens (including neotype of *Polydactylus rhadinus* Jordan and Evermann, 1902), 82–739 mm SL, East Asia (Japan and China including Taiwan Province). *E. tetradactylum*: 113 specimens (including neotype of *Polynemus tetradactylus* Shaw, 1804), 48–375 mm SL, Indo-West Pacific (Persian Gulf to Papua New Guinea and northern Australia). *E. tridactylum*: 34 specimens (including holotype of *Polynemus tridactylus* Bleeker, 1845), 60–255 mm SL, Southeast Asia (Thailand to Japan). Each of the above specimens is listed in Motomura *et al.* (2002).

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