

## 2.4 Information by Genus and Species

### *Eleutheronema* Bleeker, 1862

*Eleutheronema* Bleeker, 1862a: 110 (type species: *Polynemus tetradactylus* Shaw, 1804).

**Synonyms:** None.

**Diagnostic Features:** Body and head elongate. Adipose eyelid well developed; eye diameter greater than snout length. Anterior parts of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip absent; width of tooth band on upper and lower jaws greater than space (on symphysis) separating tooth bands on opposing premaxillae; teeth villiform in broad bands on jaws, vomer, palatines and ectopterygoids, tooth plates on palatines shorter than those on ectopterygoids. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid. Posterior margin of preopercle serrated. Basisphenoid in contact with prootic; sphenotics not visible dorsally between anterior margins of parietal and pterotic. First dorsal fin with VIII spines; second dorsal fin with I spine and 13 to 15 soft rays; anal fin with III spines and 14 to 16 soft rays; anal-fin base less than head length; pectoral fin with 15 to 19 rays, all unbranched; pectoral-fin insertion well below midline of body; pectoral-fin base (including base of pectoral filaments) less than upper-jaw length; pectoral filaments 3 or 4, not extending beyond level of posterior tip of pelvic fin; caudal fin deeply forked, but upper and lower caudal-fin lobes not filamentous. Pored lateral-line scales 71 to 95; scale rows above lateral line 8 to 14, below 12 to 17. Gillrakers 2 to 8 on upper limb, 2 to 10 on lower limb, 4 to 18 total; gillrakers on anterior parts of upper and lower limbs replaced during fish growth by tooth plates with villiform teeth, each gillraker on both upper and lower limbs becoming shorter with fish growth. Vertebrae 10 precaudal and 15 caudal; supraneural bones 0 to 2. Swimbladder absent.

**Habitat and Biology:** With the exception of *E. tetradactylum*, no information on habitat and biology for members of the genus has been reported, although the genus comprises 3 species. Information on *E. tetradactylum* is given below under the species' account.

**Geographic Distribution:** The genus is distributed in the Indo-West Pacific, but has never been recorded in the Red Sea or off the east coast of Africa (including Madagascar).

**Interest to Fisheries:** The species of *Eleutheronema*, except *E. tridactylum*, are among the most important commercial fishes in the Indo-West Pacific, being the highest priced fishes in local fish markets. *Eleutheronema tridactylum* is of little commercial importance because of its small size.

**Species:** The genus comprises 3 species:

*Eleutheronema rhadinum*: East Asia, Japan, China and Viet Nam.

*Eleutheronema tetradactylum*: Indo-West Pacific, Persian Gulf to Australia.

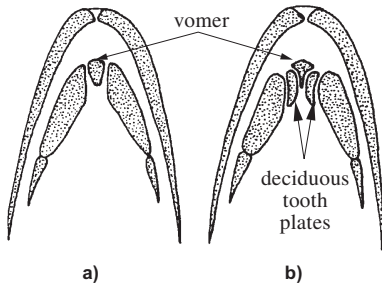
*Eleutheronema tridactylum*: Southeast Asia, Thailand to Indonesia.

**Remarks:** Bleeker (1862a) proposed *Eleutheronema* (name only) for *Polynemus tetradactylus*, but gave neither diagnoses nor descriptions of the genus. Subsequently, Bleeker (1862b) described the genus in detail, including the following characters: body oblong, compressed; scales very small (around 70 in lateral line); lip absent except in corner of lower jaw; vomer, palatines and ectopterygoids with teeth; posterior margin of preopercle serrated; pectoral filaments 3 or 4; anal-fin rays 15 to 17. Two species, *Polynemus tetradactylus* and *Polynemus tridactylus*, were included by Bleeker (1862b).

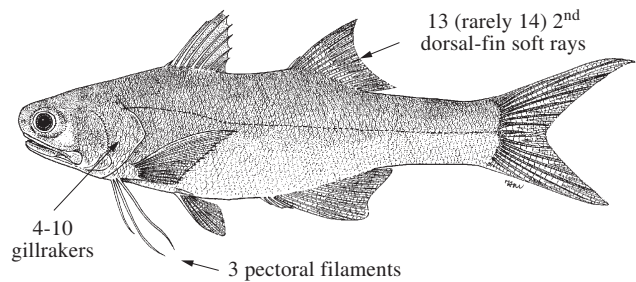
Feltes (1993) redefined the genera of the family Polynemidae, including a key, and suggested that the posterior extension of tooth plates from the lateral margins of the primary vomerine tooth plate was diagnostic for *Eleutheronema*. However, this character is not found in *E. tridactylum* at any life stage and in juveniles (less than about 70 mm standard length) of *E. tetradactylum*. Therefore, the character should be not treated as diagnostic for the genus. The genus was recently redefined by Motomura *et al.* (2002a).

**Key to the Species of *Eleutheronema***

- 1a. Pectoral filaments 3; vomer without tooth plates on either side throughout life (Fig. 31a); second dorsal-fin soft rays 13 (rarely 14); gillrakers 4 to 10 (mode 8) (Fig. 32, Plate Ic) . . . . . ***Eleutheronema tridactylum***  
(Thailand to Indonesia)
- 1b. Pectoral filaments 4; vomer with deciduous tooth plates on both sides (Fig. 31b), except in juveniles (less than about 70 mm standard length); second dorsal-fin soft rays 14 (rarely 13 or 15); gillrakers 6 to 18 (mode 12 or 13) . . . . . → 2

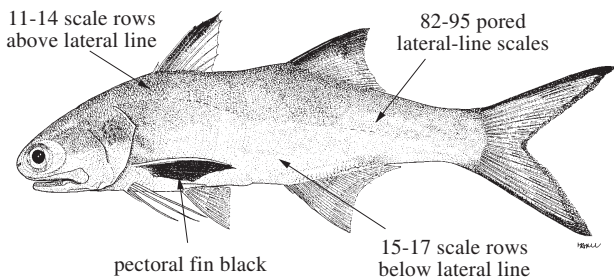


**Fig. 31** Ventral view of dentition of premaxilla and roof of oral cavity of a) *E. tridactylum* and b) *E. tetradactylum* (from Motomura *et al.*, 2002a)

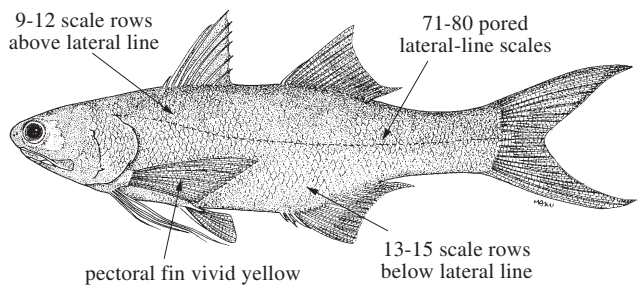


**Fig. 32** *Eleutheronema tridactylum*

- 2a. Pored lateral-line scales 82 to 95; 11 to 14 (mode 12) scale rows above lateral line, 15 to 17 (16) below; pectoral-fin membranes black when fresh (Fig. 33, Plate Ia) . . . . . ***Eleutheronema rhadinum***  
(Japan, China and Viet Nam)
- 2b. Pored lateral-line scales 71 to 80; 9 to 12 (mode 10) scale rows above lateral line, 13 to 15 (14) below; pectoral-fin membranes vivid yellow when fresh, except in large specimens (over about 350 mm standard length) (Fig. 34, Plate Ib) . . . . . ***Eleutheronema tetradactylum***  
(Persian Gulf to Australia)



**Fig. 33** *Eleutheronema rhadinum*



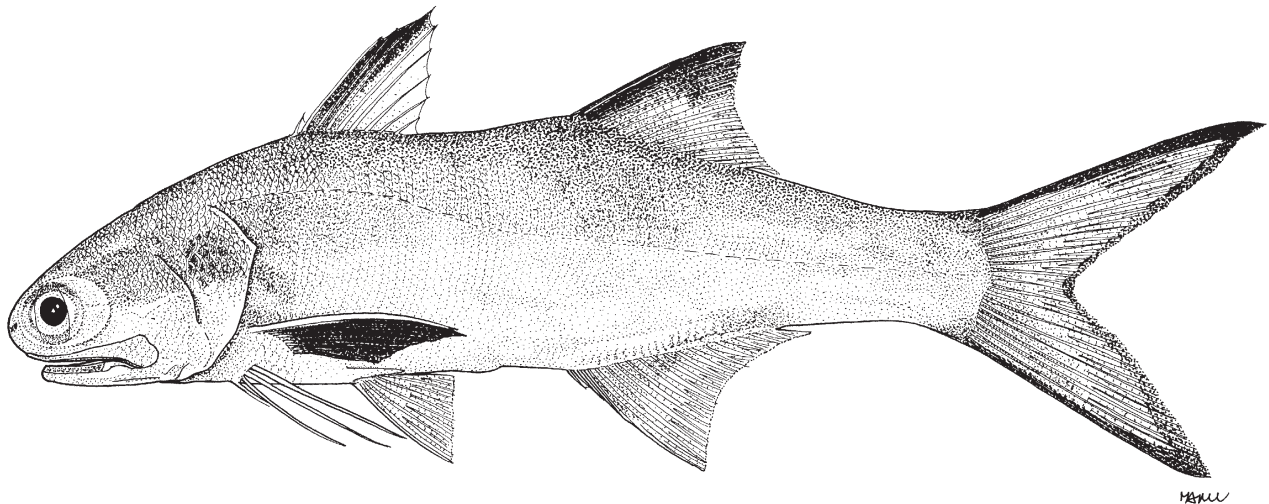
**Fig. 34** *Eleutheronema tetradactylum*

***Eleutheronema rhadinum*** (Jordan and Evermann, 1902)**Fig. 35; Plate Ia**

*Polydactylus rhadinus* Jordan and Evermann, 1902: 351, fig. 20 [type locality: Taiwan Province, China; neotype (ASIZP 60745, 152 mm standard length) designated by Motomura *et al.*, 2002a].

**Synonyms:** None.

**FAO Names:** **En** - East Asian fourfinger threadfin; **Fr** - Barbure à quatre doigts d'Asie; **Sp** - Barbudo cuatro dedos de Asia.



**Fig. 35** *Eleutheronema rhadinum*

**Diagnostic Features:** A large species. Body elongate, body depth at first dorsal-fin origin 23 to 27% (mean 24%) of standard length; head length 28 to 30% (mean 29%) of standard length. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; upper-jaw length 15 to 16% (mean 16%) of standard length; depth of posterior margin of maxilla 3% of standard length; anterior parts of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip absent; tooth plate extension onto lateral surface of lower jaw 8 to 9% (mean 8%) of standard length; teeth villiform in broad bands on vomer, palatines and ectopterygoids; vomer with deciduous tooth plates on both sides; ectopterygoids and 2 deciduous tooth plates becoming wider and larger, respectively, with continued fish growth. Posterior margin of preopercle serrated. First dorsal fin with VIII spines, all spine bases of similar thickness (base of second spine slightly more robust than others in large specimens); second dorsal fin with I spine and 14 (rarely 13 or 15) soft rays; anal fin with III spines and 14 to 16 (mode 15) soft rays, anal-fin base longer than second dorsal-fin base; pectoral fin with 17 or 18 (mode 18, rarely 19) unbranched rays, its length 20 to 22% (mean 21%) of standard length, posterior tip just short of level of posterior tip of pelvic fin; pectoral filaments 4, first filament shortest, not reaching to level of pelvic-fin origin; second filament extending slightly (or well) beyond level of pelvic-fin origin; third filament extending beyond (or just short of) level of pelvic-fin origin; fourth filament longest, its length 15 to 27% (mean 21%) of standard length, not reaching to level of posterior tip of pectoral fin; caudal fin deeply forked, upper and lower caudal-fin lobes not filamentous, upper caudal-fin lobe 32 to 38% (mean 35%) and lower lobe 29 to 36% (mean 33%) of standard length. Pored lateral-line scales 82 to 95 (mode 95); lateral line simple, extending from upper end of gill opening to upper end of lower caudal-fin lobe, or 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; scale rows above lateral line 11 to 14 (mode 12), below 15 to 17 (mode 16). Gillrakers 5 to 8 (mode 5) on upper limb, 5 to 9 (mode 7) on lower limb, 10 to 17 (mode 12) total; gillrakers on anterior parts of upper and lower limbs replaced during fish growth by tooth plates with villiform teeth, each gillraker on both upper and lower limbs becoming shorter with fish growth. Vertebrae 10 precaudal and 15 caudal; supraneural bones 1 to 2. Swimbladder absent. **Colour:** Upper sides of head and trunk with slight darkish silver tinge, becoming lighter on lower sides; anterior margins of first and second dorsal fins blackish, remaining parts translucent and slightly blackish, respectively (both fins uniform dense black in large fish); pectoral fin dense black; pectoral filaments white; pelvic fin white; base of anal fin slightly yellowish, other parts white (pelvic fin uniformly black in large fish); base and posterior margin of caudal fin yellowish and dense black, respectively, other parts blackish.

**Geographical Distribution:** Distributed in East Asia (Japan, China and Viet Nam), being endemic to that area (Fig. 36). The species generally occurs on continental shelves (Chinese mainland, Taiwan Province of China, Japanese mainland), having at no time been reported from the vicinity of oceanic islands (e.g. Ryukyu Islands and Ogasawara Islands). The record from Japan is based only on a single large specimen (MUFS 18880, 923 mm total length) from Aomori, northernmost Honshu Island.

**Habitat and Biology:** No data are available.

**Size:** Maximum standard length at least 739 cm (Motomura, Senou and Iwatsuki, 2001; Motomura *et al.*, 2002a).

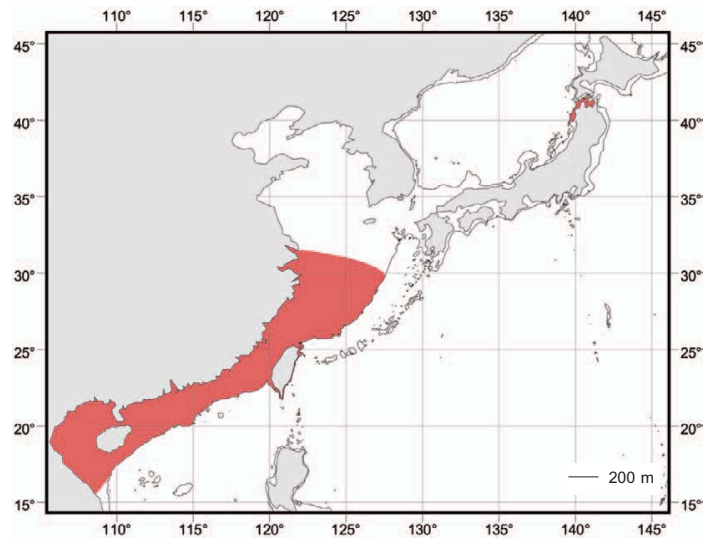
**Interest to Fisheries:** Reliable fishery information for the species is not available.

**Local Names:** CHINA: Shi-jih-ma-fa-yu; JAPAN: Minami-konoshiro; TAIWAN PROVINCE OF CHINA: Shi-jih-ma-fa-yu; Gor-ah.

**Literature:** Motomura, Senou and Iwatsuki (2001, as *Eleutheronema tetradactylum*); Motomura *et al.*, 2002a; Motomura (2003b).

**Remarks:** *Polydactylus rhadinus* was described by Jordan and Evermann (1902) from Taiwan Province of China, China, on the basis of a single specimen (273 mm total length) which has apparently been lost [a neotype was designated by Motomura *et al.* (2002a)]. Since the original description, the species has been treated as a junior synonym of *Eleutheronema tetradactylum* (e.g. Weber and de Beaufort, 1922; Herre, 1953; Kagwade, 1970). However, *E. rhadinus* is clearly distinguished from the latter by the number of pored lateral-line scales (82 to 95 versus 71 to 80 in the latter) and coloration of pectoral-fin membranes (black versus vivid yellow when fresh), although proportional measurements of the 2 species are similar. Accordingly, *E. rhadinus* was recently regarded as a valid species by Motomura *et al.* (2002a).

*Eleutheronema rhadinus* differs from *Eleutheronema tridactylum* by having vomer with 2 deciduous tooth plates in specimens at least over ca. 70 mm standard length (vs. vomer without tooth plates in the latter) and higher counts of second dorsal-fin soft rays [14 (rarely 13 or 15, 3 of 19 specimens) versus 13 (rarely 14, 1 of 34 specimens)], pectoral filaments (4 versus 3) and gillrakers [10 to 17 (mode 12) versus 4 to 10 (mode 8)]. Furthermore, *E. rhadinus* tends to have a slightly deeper posterior margin of the maxilla (3% of standard length) and a slightly shorter tooth plate on the lateral surface of the lower jaw [8 to 9% (mean 8%) of standard length] than *E. tridactylum* [2 to 3% (mean 2%) and 9 to 10% (mean 9%) of standard length, respectively], although the proportional length measurements overlapped among the 2 species.



**Fig. 36** *Eleutheronema rhadinus*  
■ Known distribution

***Eleutheronema tetradactylum* (Shaw, 1804)**

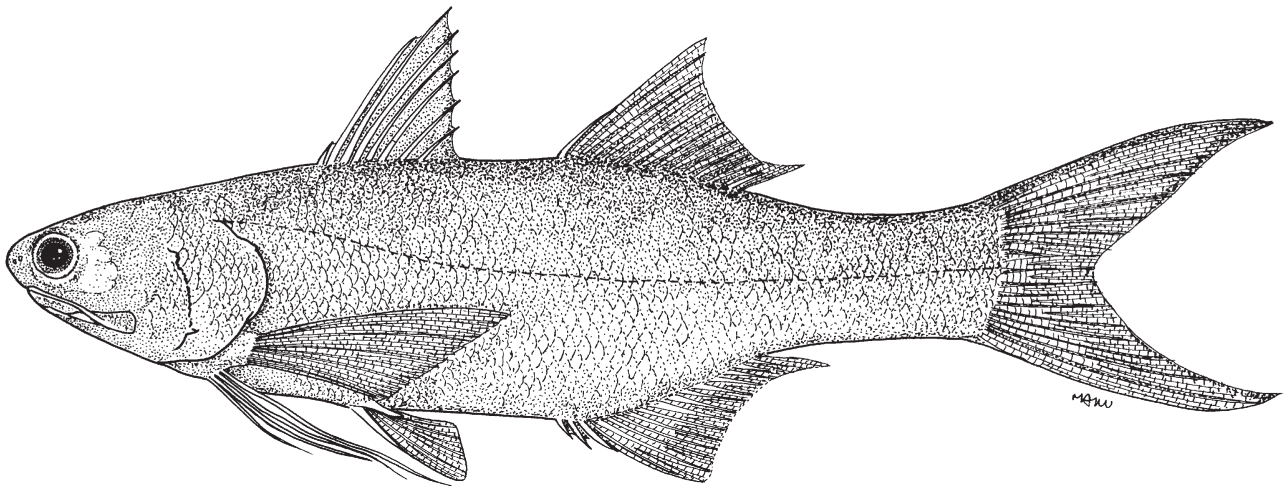
**Fig. 37; Plate Ib**

*Polynemus tetradactylus* Shaw, 1804: 155 [original locality: Vizagapatnam, India, based on "Maga Jellee" of Russell, 1803: 67, fig. 183; type locality: Gariahat, Calcutta, India, based on a neotype (NSMT-P 60912, 189 mm standard length) designated by Motomura *et al.*, 2002a].

**Synonyms:** *Polynemus teria* Hamilton, 1822: 224 (type locality: estuaries of Ganges River, India; no types known, see Motomura *et al.*, 2002a). *Polynemus coecus* Macleay, 1878: 354, pl. 9, fig. 1 [type locality: Darwin, Northern Territory, Australia; 2 syntypes (AMS I. 9791, 369 mm standard length; AMS I. 16295-001, 360 mm standard length)].



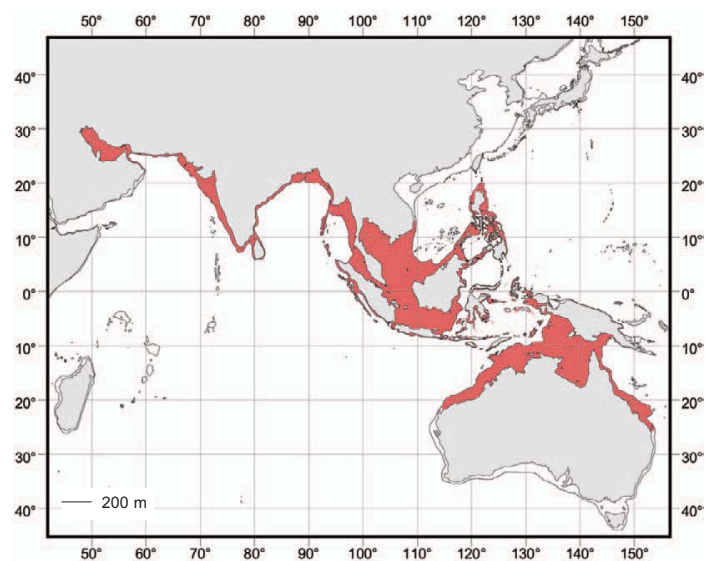
**FAO Names:** **En** - Fourfinger threadfin; **Fr** - Barbure à quatre doigts; **Sp** - Barbudo de cuatro dedos.



**Fig. 37** *Eleutheronema tetradactylum*

**Diagnostic Features:** A large species. Body elongate, body depth at first dorsal-fin origin 23 to 27% (mean 25%) of standard length; head length 28 to 31% (mean 29%) of standard length. Posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; upper-jaw length 14 to 17% (mean 15%) of standard length; depth of posterior margin of maxilla 3 to 4% (mean 3%) of standard length; anterior parts of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip absent; tooth plate extension onto lateral surface of lower jaw 7 to 9% (mean 8%) of standard length; teeth villiform in broad bands on vomer, palatines, and ectopterygoids; vomer with deciduous tooth plates on both sides, except in juveniles (less than about 70 mm standard length); ectopterygoids and 2 deciduous tooth plates becoming wider and larger, respectively, with continued fish growth. Posterior margin of preopercle serrated. First dorsal fin with VIII spines, all spine bases of similar thickness (second spine slightly more robust than others in large specimens, over about 300 mm standard length); second dorsal fin with I spine and 14 (rarely 13 or 15) soft rays; anal fin with III spines and 14 to 16 (mode 15) soft rays, anal-fin base longer than second dorsal-fin base; pectoral fin with 16 or 18 (mode 17, rarely 15 or 19) unbranched rays, its length 20 to 23% (mean 21%) of standard length, posterior tip just short of level of posterior tip of pelvic fin; pectoral filaments 4, first filament shortest, not reaching to level of pelvic-fin origin; second filament extending slightly (or well) beyond level of pelvic-fin origin; third filament (rarely longest) extending beyond level of pelvic-fin origin; fourth filament longest, its length 15 to 28% (mean 24%) of standard length, reaching to (not reaching or extending slightly beyond) level of posterior tip of pectoral fin; caudal fin deeply forked, upper and lower caudal-fin lobes not filamentous, upper caudal-fin lobe 30 to 38% (mean 34%) and lower lobe 26 to 36% (mean 32%) of standard length. Pored lateral-line scales 71 to 80 (mode 73); lateral line simple, extending from upper end of gill opening to upper end of lower caudal-fin lobe, or 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; scale rows above lateral line 9 to 12 (mode 10), below 13 to 15 (mode 14). Gillrakers 3 to 8 (mode 6) on upper limb, 3 to 10 (mode 7) on lower limb, 6 to 18 (mode 13) total; gillrakers on anterior parts of upper and lower limbs replaced during fish growth by tooth plates with villiform teeth, each gillraker on both upper and lower limbs becoming shorter with fish growth. Vertebrae 10 precaudal and 15 caudal; supraneural bones 1 to 2. Swimbladder absent. **Colour:** Upper sides of head and trunk with slight darkish silver tinge, becoming lighter on lower sides; anterior margins of first and second dorsal fins blackish, remaining parts translucent and slightly blackish, respectively; pectoral fin vivid yellow (dusky yellow in large specimens over about 350 mm standard length); pectoral filaments white; anterior margin of pelvic fin yellow, other parts white; base of anal fin yellow, other parts yellowish white; base of caudal fin yellowish, other parts blackish.

**Geographical Distribution:** Distributed in the Indo-West Pacific where it ranges from the Persian Gulf to Papua New Guinea and northern Australia (from mouth of Ashburton River, Western Australia to mouth of Mary River, Queensland) (Fig. 38). The species is not known from East Asia (where it is replaced by the endemic *E. rhadinum*).



**Fig. 38** *Eleutheronema tetradactylum*

Known distribution

**Habitat and Biology:** Generally occurs on continental shelves on muddy and sandy substrata, and frequently enters brackish waters, especially as juveniles. According to Malhotra (1953), larvae from 7 to 30 mm total length feed mainly on copepods and mysids, shrimps and prawn larvae having secondary importance as prey. Juveniles (31 to 60 mm total length) feeds mainly on prawns, shrimps and mysids, and adult fish prey on other fishes, including mugilids, sillaginids and sciaenids, and sometimes smaller conspecifics.

Patnaik (1967) referred to the occurrence of hermaphroditism in 2 examples (404 and 405 mm total length) of the species collected from Chilka Lake, India, and Stanger (1974) studied sexuality and growth of the species in Australian waters. *Eleutheronema tetradactylum* grows very rapidly during the first 6 months. At 1 year old, the species averages 300 mm fork length, and at 3 years old, 450 mm fork length. Males range from 240 to 470 mm fork length, hermaphrodites from 250 to 460 mm fork length, and females from 280 to 720 mm fork length. On the northeast coast of Queensland, Australia, most specimens reported (from 450 to 500 mm fork length) were females. Hermaphroditism develops in 1- to 2-year-old fishes, females first appearing as 2- to 3-year-olds. According to Stanger (1974), males probably commence sex reversal immediately after spawning, the condition possibly persisting until after the next spawning period. The progression from hermaphrodite to female is completed by the following season.

In waters off Townsville, Queensland, Australia, spawning begins in late October (Stanger, 1974), specimens collected from the northeast coast of Queensland in November and December having either recently spawned or being ready to spawn (Kailola and Stewart *in* Kailola *et al.*, 1993). Although the species spawns only once each year in Queensland waters (Stanger, 1974), in the northern Arabian Sea, 2 peak spawning periods occur, during January to April and July to September (Karandikar and Palekar, 1950).

Kagwade (1970) believed that the species first matures at a total length of between 360 and 390 mm in Indian waters. Earlier, Karandikar and Palekar (1950) had described ova sizes in the species from India: immature ovaries contained ova measuring up to 0.4 mm diameter, maturing ovaries with ova between 0.45 and 0.68 mm diameter, and mature ovaries with ova between 0.7 and 1.0 mm diameter. Oil globules in the mature ova measured 0.25 to 0.30 mm diameter. Sarojini and Malhotra (1952) traced the development of larvae of the species from 6.0 mm until the juvenile phase. The swimbladder, well developed in larvae, had become vestigial in juveniles and adults. Body scales were apparent on larvae of about 15 mm.

**Size:** Maximum total length about 2 m; weight 145 kg (Kailola and Stewart *in* Kailola *et al.*, 1993).

**Interest to Fisheries:** One of the most important fisheries species for Kuwait, India, Thailand, Viet Nam, Malaysia, Singapore and Indonesia, and is also a significant component of fisheries off Bangladesh, Myanmar, Cambodia and northern Australia. The species is mainly caught by gill net, sometimes by trawl, averaging about 3% of the total landings in the gill net fishery in the Gulf of Carpentaria, Australia, between 1980 and 1987 (Kailola and Stewart *in* Kailola *et al.*, 1993). The species is also an important sport fish in Australian waters, being caught by rod and reel or handlines. In Queensland, Australia, the fishery for the species is significant from Port Douglas to Gladstone on the east coast, as well as in the Gulf of Carpentaria around the ports of Weipa and Karumba (Kailola and Stewart *in* Kailola *et al.*, 1993).

**Local Names:** AUSTRALIA: Blue threadfin, Blue salmon, Cooktown salmon, Rockhampton salmon, Giant threadfin, Colonial salmon, Blunt-nosed salmon, Blind tassel-fish, Bluenose salmon; BANGLADESH: Tailla; CAMBODIA: Trey pream; INDIA: Salliah, Saccolih; INDONESIA: Baling, Kesumbang, Kurau, Lausan, Sumbal; ISLAMIC REPUBLIC OF IRAN: Rashgoo; KUWAIT: Sheem; MALAYSIA: Genohong, Ikan salangan, Jenohong, Jubal senohong, Kubal, Kurau, Kurau janggut, Kuru janggut, Mancong, Senangin, Senohong, Sinanghi, Selanghi; MYANMAR: Kakuyan, Nga-let-kwa, Za yaw gyi; PHILIPPINES: Bikau, Hugao, Hugau, Kagau, Kugao, Mamali, Pugao; SRI LANKA: Kalawa, Kalemeeen, Pozhakkala, Yevakala; VIET NAM: Cá chét.

**Literature:** Motomura *et al.* (2002a).

**Remarks:** *Eleutheronema tetradactylum* was originally proposed by Shaw (1804) as *Polynemus tetradactylus* for the "Maga Jellee" of Russell (1803), whose description of the species included a figure (fig. 183), but lacked a formal scientific name and gave no indication of any type specimens. Subsequently, Hamilton (1822) overlooked Shaw's (1804) description and described *Polynemus teria* from estuaries of the Ganges River, India, stating it to be the same species as Russell's (1803) "Maga Jellee." The description of *P. teria* also failed to identify any type specimens. In fact, the present whereabouts of all of Hamilton's (1822) types, including the type of *P. teria*, are unknown; they are not held in BMNH or other British or Indian museums (Hora, 1929). *Polynemus teria* is clearly justified as a junior synonym of *E. tetradactylum* because "4 pectoral filaments" were included in the original description of *P. teria* which is consistent with the pectoral filament condition in *E. tetradactylum*. Also, Hamilton (1822) considered *P. teria* to be the same as Russell's (1803) "Maga Jellee" (= *E. tetradactylum*).

*Polynemus coecus* was described by Macleay (1878) from Darwin, Northern Territory, Australia, on the basis of 2 specimens. Examination of these syntypes (AMS I. 9791 and I. 16295-001) showed them both to be conspecific with *E. tetradactylum*. Their meristic and morphological characters are included in Motomura *et al.* (2002a: table 2).

Günther (1860), Day (1876) and Weber and de Beaufort (1922) reported *Polynemus salliah* Cantor, 1838 as a junior synonym of *Polynemus tetradactylus* or *E. tetradactylum*. However, Cantor (1838) wrote only "To the genus *Polynemus*, I shall add a species, called by the natives Salliah, or Saccolih," not following the Principles of Binominal Nomenclature (Article 5.1, ICZN-1999). Furthermore, when Cantor's (1838) "Salliah or Saccolih" was first reported as a scientific name (*Polynemus salliah* Cantor, 1838), it was treated as a junior synonym of *Polynemus tetradactylus*, then considered to be