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A new genus, *Leptomelanosoma*, for the polynemid fish previously known as *Polydactylus indicus* (Shaw, 1804) and a redescription of the species

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**Abstract** A new genus, *Leptomelanosoma*, is proposed for the polynemid fish, *Polydactylus indicus* (Shaw, 1804). The genus differs from all other genera in the family Polynemidae by the following combination of characters: anterior one-third of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip poorly developed; ethmoid not covered dorsally by frontals; sphenotics visible dorsally between anterior margins of parietal and pterotic; upper and lower caudal fin lobes very long, filamentous; swimbladder with many appendages inserted into lateral walls of abdominal cavity; grayish-black body. The type species, *Polydactylus indicus*, is redescribed as *Leptomelanosoma indicum*.

**Key words** Polynemidae · New genus · Redescription · *Leptomelanosoma indicum*

The circumtropical family Polynemidae, a common inhabitant of coastal, brackish or fresh waters (Smith, 1949; Munro, 1955, 1967; Menon, 1974; Menon and Babu Rao, 1984; Feltes, 1991, 1993; Nelson, 1994), is characterized by 3 to 16 detached lower threadlike pectoral fin rays. This unique character has been considered to operate as a sense organ, enabling polynemids to search for food in muddy waters (Marshall, 1964; Munro, 1967; Smith, 1986; Grove and Lavenberg, 1997).

Feltes (1991, 1993) recognized seven genera, *Eleutheronema* (Bleeker, 1862), *Filimanus* (Myers, 1936), *Galeoides* (Günther, 1860), *Parapolynemus* (Feltes, 1993), *Pentanemus* (Günther, 1860), *Polydactylus* (Lacepède, 1803) and *Polynemus* (Linnaeus, 1758), with a total of 33 species in the family. About half the members were included in *Polydactylus*, characterized by the following combination of characters: large eye, tooth plate on vomer simple or absent, width of tooth band on upper and lower jaws wider than space separating tooth bands on opposing premaxilla, basisphenoid in contact with prootic, pectoral fin insertion well below midline on lateral body, length of uppermost pectoral filaments less than standard length (except *P. macrophthalmus*), pectoral fin base (including base of pectoral filaments) less than upper jaw length and swimbladder not extending beyond anal fin origin (Feltes, 1993).

*Polydactylus indicus* (Shaw, 1804), which is widely distributed in the Indo-Australian Archipelago, shares these characters. However, it is herein considered as a monotypic new genus, on the basis of morphological characters including body coloration. The type species of the new genus is also redescribed.

**Methods**

Methods for counts and measurements generally followed Hubbs and Lagler (1947) and Feltes (1991), being made on the left side wherever possible. In addition, dermal eye opening was taken as the greatest distance between the fleshy margins of the eye. The length of the pectoral fin base was measured from the base of the uppermost pectoral fin ray to the base of the lowermost pectoral filament, and those of the upper and lower caudal fin lobes from middle of the posterior margin of the hypural plate to the posterior tip of the longest caudal fin ray of the upper and lower lobes, respectively. Gill raker counts were made on the first arch, the upper count being given first (lower counts including a raker at angle). Standard length is expressed as SL.

Osteological examinations were based on specimens stained in alizarin red-S and radiographs, in 27 species, representing the seven polynemid genera being ex-
Osteological terminology generally followed Rojo (1991). In addition, terminology of the supraneural bones follows Mabee (1988), and the formula for configuration of the supraneural bones, anterior neural spines and anterior dorsal fin pterygiophores, Ahlstrom et al. (1976). Institutional codes followed Leviton et al. (1985), with additional institutional abbreviations as follows: Fisheries Science Course, Department of Animal Sciences, Miyazaki University, Japan (MUFS); Phuket Marine Biological Center, Thailand (PMBC); Shanghai Fisheries University, China (SFU).

**Leptomelanosoma gen. nov.**

**Type species.** *Polynemus indicus* Shaw, 1804: 155 [type locality: Vizagapatnam, India, based on “Maga Booshee” of Russell (1803: 68, fig. 184)].

**Diagnosis.** A genus of Polynemidae with the following combination of characters: swimbladder with many appendages inserted into lateral walls of abdominal cavity (Fig. 1); anterior one-third of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip poorly developed (Fig. 2); tooth plate of vomer oval (Fig. 3); ethmoid not covered dorsally by frontals (Fig. 4); sphenotics visible dorsally between anterior margins of parietal and pterotic (Fig. 4); upper and lower caudal fin lobes very long, filamentous (Fig. 5); grayish-black body (Fig. 5).

**Remarks.** Although the new genus, *Leptomelanosoma*, shares many characters given by Feltes (1993) for *Polydactylus*, the former differs from *Polydactylus* and other polynemid genera in having a conspicuous swimbladder with many appendages (Fig. 1A,B). In all other polynemid genera, the swimbladder is simple or absent (Table 1). *Leptomelanosoma* has numerous appendages in two rows along the entire and vicinity of middle of lateral surface of the swimbladder (Cuvier in Cuvier and Valenciennes 1829: p. 385; this study: Fig. 1A). The appendages arising along the entire lateral surface are longer than those in the other row, restricted to the vicinity of middle of the swimbladder (Fig. 1A). The appendages of both rows were fully inserted into the lateral walls of the abdominal cavity (Fig. 1C). Such a character has never before been reported in other fishes, although the swimbladder of sciaenid and sillaginid fishes varies in configuration with species (Sasaki, 1989; McKay, 1992). Character condition of swimbladder with many appendages of *Leptomelanosoma* is derivative among the family Polynemidae because other genera of the family and most percoids possess a simple, carrot-shaped swimbladder (Sasaki, 1989; this study).

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**Fig. 1.** Swimbladder and abdominal cavity of *Leptomelanosoma indicum*, URM-P 12700, 198 mm SL. **A** Swimbladder in dorsal view. **B** Swimbladder in ventral view. **C** Abdominal cavity in ventral view (arrows indicate holes into which the swimbladder appendages were inserted). Anterior to left in each case. **Bars** 5 mm

The anterior portion of the lower jaw lip of *Leptomelanosoma* and *Parapolydactylus* (specimen over ca. 70 mm SL) are poorly developed, and the adjacent teeth extend onto the lateral surface of the denticate (Fig. 2A; Table 1). In the remaining genera of the family, except *Eleutheronema*, the lower jaw lip is well developed and the denticate teeth restricted to the dorsal surface (Fig. 2B; Table 1). The lower jaw lip in *Eleutheronema* occurs only on the posterior one-third of the jaw (Table 1).

The vomerine tooth plate of *Leptomelanosoma*, especially in adults, is oval, compared with semicircular or triangular in other polynemids (Fig. 3A,B; Table 1), except for *Eleutheronema*, in which it is triangular in outline with smaller deciduous tooth plates on either side (Marathe and Bal, 1958: Fig. 5a; Feltes, 1993; this study).
Furthermore, the tooth plates of the palatines and ectopterygoids of *Leptomelanosoma* are wider and shorter than those of *Polydactylus* (Fig. 3A,B).

In most polynemids, the ethmoid is covered dorsally by the frontals (Fig. 4B; Table 1), whereas in *Leptomelanosoma*, it is dorsally exposed between the nasals on either side (Marathe and Bal, 1958: fig. 2b; this study: Fig. 4A; Table 1). Furthermore, the sphenotics of *Leptomelanosoma* are dorsally exposed between the anterior margins of the parietal and pterotic (Marathe and Bal, 1958: fig. 2b; this study: Fig. 4A; Table 1), but the sphenotics of other polynemid genera are covered by the frontals (Fig. 4B; Table 1). The sphenotics of all polynemid genera including *Leptomelanosoma* are laterally exposed, being similar to that of the majority of percoids (e.g., Sasaki, 1989; Heemstra and Randall, 1993).

The upper and lower caudal fin lobes of both *Leptomelanosoma* and *Parapolynemus* are extremely long and filamentous (Table 1), although they are easily damaged at the tips. This character is not found in other polynemid genera (Table 1). Despite this similarity, *Leptomelanosoma* differs from *Parapolynemus* in having shorter pectoral fin rays (less than head length vs greater than head length in latter), shorter pectoral filaments (less than SL vs much greater than SL), five pectoral filaments (vs six or seven, usually seven), five infraorbital rays (vs three), basiphenoid present (vs absent) and greater adult size (attaining ca. 100 cm SL vs ca. 10 cm SL).

The characters of lower jaw and caudal fin lobes in *Leptomelanosoma* and *Parapolynemus* are considered to be the homoplasy because each genus belongs to a different lineage in the Polynemidae. There are two major lineages in the family (Feltes, 1991; this study): one, including *Parapolynemus* and *Polynemus*, is characterized...
by a reduction of the size of the orbit and modification of the associated structures (see Feltes, 1993: Fig. 5) and the pectoral fin insertion relatively high on the body; the other, including *Eleutheronema*, *Filimanus*, *Galeoides*, *Leptomelanosoma*, *Pentanemus* and *Polydactylus*, has a moderate to large orbit and the pectoral fin insertion relatively low on the body.

The body color of *Leptomelanosoma* is blackish, compared with that of other genera, in which it is silver or silvery-golden. The genus is currently represented by a single species.

**Etymology.** From the Greek “*lepto*” meaning slender, “*melano*” black and “*soma*” body, in reference to the slender body tinged with black. The gender is neuter.

*Leptomelanosoma indicum* (Shaw, 1804)
(English name: Indian threadfin)
(Figs. 1A–C, 2A, 3A, 4A, 5A, B)

*Polynemus indicus* Shaw, 1804: 155 [type locality: Vizagapatnam, India, based on “Maga Booshee” of Russell (1803: 68, fig. 184)]; Cantor, 1849: 1011 (Malay Peninsula); Bleeker, 1854: 427 (India); Günther, 1860: 326 (east Indian Ocean and Australia); Day, 1876: 179 (India); Weber and de Beaufort, 1922: 205 (Indo-Australian Archipelago); Munro, 1955: 97 (Ceylon); Kagwade, 1970: 5, Fig. 2 (India); Menon, 1974: POLYN Poly 1 (eastern Indian Ocean and western central Pacific Ocean); Jayaram, 1981: 348 (India); Menon and Babu Rao, 1984: POLYN Poly 1 (western Indian Ocean).


*Polynemus uronemus* Cuvier in Cuvier and Valenciennes, 1829: 385 (type locality: unknown, new name for *P. indicus* Shaw, 1804); Bleeker, 1849: 58 (Surabaya, Java, Indonesia).

*Polynemus gelatinosus* McClelland, 1843: 181, pl. 6 (type locality: Bengal, India, new name for *P. sele* Hamilton, 1822).

*Trichidion indicum*; Bleeker, 1868: 293 (Bintan, Indonesia); Bleeker, 1983: 22, pl. 454, fig. 1 (locality unknown, originally Polynemat pl. 2, unpublished plate by P. Bleeker).

*Trichidion indicum*; Fowler, 1905: 501 (mouth of Baram River, Kalimantan, Malaysia).

*Polydactylus indicus*; Smith, 1949: 327 (South Africa); Smith, 1986: 721, fig. 233.2 (South Africa); Talwar and Jhingran, 1992: 910 (India); Mansor et al., 1998: 87, pl. 92, fig. 270 (South China Sea).

**Materials (31 specimens, 97–710 mm SL).** AMS B. 8136, 211 mm SL, Chennai (=Madras), India; AMS I. 27630-004, 27630-034, 2 specimens, 149–160 mm SL, Kuala Kurau, Malaysia (5° N, 100°25’ E); ANSP 88347, 205 mm SL, Mumbai
A new polynemid genus

Description. Counts and proportional measurements as percentages of SL of *Leptomelanosoma indicum* are given in Table 2. Characters given in the generic diagnosis are not repeated.

Body oblong, compressed; obtusely conical snout projecting strongly beyond upper jaw, its length slightly greater than orbit diameter; eye covered with adipose eyelid; upper lip absent; maxilla covered with deciduous scales; posterior margin of preopercle serrated; villiform tooth in broad bands on vomer, palatines and ectopterygoids; posterior margin of maxilla extending far beyond posterior margin of adipose eyelid; all pectoral fin rays unbranched; origin of second dorsal fin base in advance of that of anal fin base; second dorsal fin base longer than anal fin base; anal fin base shorter than upper jaw length; second spine of first dorsal fin very strong in adults; dorsal, anal and caudal fin bases covered with scales; lateral line extending from upper end of gill opening to upper end of lower caudal fin lobe; caudal peduncle depth 2.0–2.3 in caudal peduncle length; highly developed foramina present on pterotic; lower tip of seventh proximal pterygiophore of first dorsal fin directed forward; formula for configura-
tion of supraneural bones, anterior neural spines and anterior dorsal fin pterygiophores /0/0; vertebræe 10 + 14; six epipleural ribs.

**Fresh color notes.**—Based on color transparencies of MUFS 16846, 262 mm SL (Chennai, India) and MUFS 17010, 215 mm SL (Singapore): head and upper sides of trunk tinged slightly blackish-brown, becoming deep black on lower sides; snout and abdominal regions blackish; membranes of first and second dorsal fins and caudal fin blackish, distal part of these fins black; pectoral fin membrane deep black; origin of pectoral filaments dusky-yellowish, grading to blackish posteriorly; pelvic fin origin dusky-yellowish, other parts dusky-white.

**Color of preserved specimens.**—Origin of pectoral filaments and pelvic fin white; other body colors lighter than in fresh specimens.

**Distribution.** _Leptomelanosoma indicum_ is widely distributed in the Indo-West Pacific, being currently known from South Africa (Smith, 1949, 1986), Mozambique, Madagascar, Mauritius, western India, and Sri Lanka (Menon and Babu Rao, 1984), and eastern India, Bangladesh, Myanmar, Thailand, Malaysia,

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**Table 2.** Counts and measurements for _Leptomelanosoma indicum_, expressed as percentages of standard length (n = 31)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Range</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>Standard length (mm)</td>
<td>97–710</td>
<td></td>
</tr>
<tr>
<td>Fork length (mm)</td>
<td>110–761</td>
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Counts (modes)
- Dorsal fin rays: VIII-I, 12–13 (13)
- Anal fin rays: III, 10–11 (11)
- Pectoral fin rays: 12–14 (14)
- Pectoral filaments: 5
- Pelvic fin rays: 1, 5
- Pored lateral line scales: 69–72 (70)
- Scales above/below lateral line: 7–8 (8)/9–12 (10)
- Gill rakers: 8–9 (8) + 10–12 (11) = 18–21 (19)

Measurements (means)
- Head length: 30–34 (32)
- Body depth: 22–25 (23)
- Second body depth: 21–26 (23)
- Body width at pectoral fin base: 11–15 (13)
- Snout length: 5–7 (6)
- Dermal eye opening: 3–5 (4)
- Orbit diameter: 4–6 (5)
- Interorbital width: 7–9 (8)
- Postorbital length: 21–23 (22)
- Upper jaw length: 14–15 (15)
- Pre-1st dorsal fin length: 35–37 (36)
- Pre-2nd dorsal fin length: 58–65 (61)
- Pre-anal fin length: 64–69 (67)
- First dorsal fin origin to anal fin origin: 38–43 (40)
- Pelvic fin base to anal fin base: 28–33 (31)
- Second dorsal fin base length: 15–18 (17)
- Anal fin base length: 13–16 (14)
- Longest pectoral fin length (3rd or 4th): 19–22 (21)
- Longest pectoral filament length (5th): 28–45 (37)
- Pectoral fin base length: 8–10 (8)
- Longest pelvic fin ray length (1st): 13–16 (14)
- Longest 1st dorsal fin spine length (3rd): 17–19 (18)
- Second dorsal fin spine length: 7–10 (9)
- Longest 2nd dorsal fin ray length (2nd): 18–21 (19)
- Longest anal fin spine length (3rd): 7–11 (9)
- Longest anal fin ray length (2nd): 15–19 (17)
- Caudal peduncle length: 21–25 (23)
- Caudal peduncle depth: 10–12 (11)
- Upper caudal fin lobe length: 39–71 (58)
- Lower caudal fin lobe length: 36–78 (60)

*Includes broken caudal fin lobes.
A new polynemid genus with those of given in the original description of characters of five pectoral filaments and long caudal fin lobes (personal communication). However, the diagnostic character is unknown; they are not held in BMNH and related Hamilton’s (1822) types, including the holotype of type specimens. In fact, the present whereabouts of all of India. This description also gave no indication of any selena.

**Ecological note.** Collection sites of the specimens examined indicated that the species occurs in coastal waters and estuaries, being similar habitats to those occupied by other polynemids. Underwater observations (at Underwater World Aquarium, Singapore) of *Leptomelanosoma indicum* indicated that the species usually spread the pectoral filaments, but may also remain motionless on the substrata. Observations (by the authors) were of a specimen in a dimly lit artificial cave.

**Remarks.** *Leptomelanosoma indicum* (Shaw, 1804) can be easily distinguished from other polynemid species by the combination of five pectoral filaments, long caudal fin lobes and a grayish-black body. *Polynemus indicus*, the oldest available name for a polynemid species having the above characters, was proposed by Shaw (1804), for the “Maga Booshee” of Russell (1803), whose description of the species included a correct figure (Fig. 5A) but lacked a formal scientific name and gave no indication of any type specimens. Although the description of *P. indicus* by Shaw (1804) and that earlier by Russell (1803) were very poor, Russell’s drawing clearly indicates five pectoral filaments, long caudal fin lobes and a grayish-black body.

Subsequently, Hamilton (1822) described *Polynemus sele* as a new species from estuaries of the Ganges River, India. This description also gave no indication of any type specimens. In fact, the present whereabouts of all of Hamilton’s (1822) types, including the holotype of *P. sele*, are unknown; they are not held in BMNH and related British and Indian museums (Hora, 1929; A.-M. Hime, personal communication). However, the diagnostic characters of five pectoral filaments and long caudal fin lobes given in the original description of *P. sele* are consistent with those of *L. indicum* (Shaw, 1804). An initial unpublished plate of *P. sele* Hamilton, 1822, subsequently published by McClelland (1843, pl. 6), also shows five pectoral filaments, long caudal fin lobes and a grayish-black body. Furthermore, Hamilton (1822) wrote “The Maga booshee [= *P. indicus* Shaw, 1804] of Russell has certainly a strong resemblance to the Sele [= *P. sele*] of the Ganges.” Although *P. sele* was said to differ from the “Maga Booshee” of Russell (1803) in having seven first dorsal fin spines (vs eight spines in the latter) and 14 second dorsal fin rays (vs 15 rays), the first spine of the first dorsal fin was apparently overlooked by Hamilton (1822) because of its very small size.

Cuvier in Cuvier and Valenciennes (1829) described *Polydactylus uronemus*, being a new name for *P. indicus* Shaw, 1804. Furthermore, McClelland (1843) described *P. gelatinosus*, from Bengal, India, being a new name for *P. sele* Hamilton, 1822, at that time including Hamilton’s (1822) unpublished plate. Both new names, *P. uronemus* and *P. gelatinosus*, have no standing in nomenclature because the names do not have taxonomic priority.

Bleeker (1868, 1983) and Fowler (1905) assigned *Polynemus indicus* to *Trichidion* (Klein), published in 1749. Being a pre-Linnaean name, however, it has no standing in nomenclature. Although Walbaum, in 1792, republished Klein’s *Trichidion*, the International Commission on Zoological Nomenclature (ICZN, Opinion 21) declared the reprinted names of Klein to be unavailable under the Code (Myers, 1936).

**Comparative material examined.** An asterisk indicates that the specimens were dissected. All specimens were X-rayed, except for *Filimanus heptadactyla*, NTM S.14784–007, *F. selei*, AMS IB. 1462–1463, *Galeoides decadactylus*, ZMB 569, and *Polydactylus sextarius*, ZMB 565. *Eleutheronema tetractadactylus*: FRLM 23412, 228 mm SL; MUF* *14465, 14484, 2 specimens, 164–167 mm SL; MUF* *14479, 227 mm SL; MUF* 14997, 213 mm SL; SFU 3837, 194 mm SL; URM-P 10904, 153 mm SL. *Filimanus heptadactyla*: NTM S. 14784–007, 2 specimens, 112–113 mm SL. *F. perplexa*: PMBC 5913, 111 mm SL. *F. selei*: AMS IB. 1462–1463, 2 specimens, 130–147 mm SL; USNM 57844 (holotype of *Polydactylus opercularis* Seale & Bean, 1907), 123 mm SL. *F. similis*: URM-P 12605, *12611, 12639, 3 specimens, 104–115 mm SL. *F. xanthonema*: FRLM 15716, 62 mm SL. *Galeoides decadactylus*: CAS 98606, 126 mm SL; USNM *348379, 2 specimens, 108–110 mm SL; ZMB 569 (holotype of *Polynemus decadactylus*), 175 mm SL. *Parapolynemus verekeri*: AMS 1. 2770 and I. 2771 (lectotype and paralectotype), 2 specimens, 54–72 mm SL; MUF* *18281, 75 mm SL; MUF* 18282−18286, 5 specimens, 63–92 mm SL; NTM S. 14487−005, 10 specimens, 61–82 mm SL. *Pentanemus quinquearius*: CAS *50055, 2 specimens, 135–143 mm SL; ISH 1089–1964 at ZMH, 137 mm SL; ISH 1275–1964 at ZMH, 131 mm SL; ISH 130–1977 at ZMH, 136 mm SL; ISH 1493–1964 at ZMH, 2 specimens, 107–137 mm SL; ISH 158–1962 at ZMH, 7 specimens, 86–170 mm SL; ISH 159–1962 at ZMH, 123 mm SL; ISH 177–1963 at ZMH, 2 specimens, 142–167 mm SL; ISH 307–1959 at ZMH, 2 specimens, 108–184 mm SL; USNM 348378, 2 specimens, 94–110 mm SL.

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**Fig. 6.** Localities of specimens of *Leptomelanosoma indicum* examined in this study.
**Polydactylus approximans:** USNM 65621, 153 mm SL. *P. macrochir:* QM I. *25090, 580 mm SL. *P. microstomus:* MUFS 14159, 154 mm SL. *P. multiradiatus:* FRLM 23414–23417, 4 specimens. 130–144 mm SL; FRLM 23471–23474, 4 specimens. 136–168 mm SL. *P. nigripinnis:* FRLM 21472, 139 mm SL. *FRLM 23413, 161 mm SL.* *P. octonemus:* USNM 739 (syntypes), 2 specimens. 62–79 mm SL; USNM 155666, 130 mm SL. *P. oligodon:* NSMT-P 54096–54107, 11 specimens. 104–174 mm SL; USNM *300465, 122 mm SL.* *P. opercularis:* USNM 41054, 184 mm SL; USNM 119740, 138 mm SL. *P. plebeius:* FRLM 1624, 178 mm SL; MUFs *14124,* 14298, 2 specimens. 165–175 mm SL; SFU 3832, 171 mm SL; URM-P 24672, 132 mm SL; YCM-P 25293, 3 specimens; 103–150 mm SL. *P. quadrifilis:* ISH 298–1959 at ZMH, 214 mm SL. *P. virginiensis:* CAS *104888, 2 specimens. 92–105 mm SL; USNM 133675, 225 mm SL. *Polyneumus dubius:* URM-P 13930, 138 mm SL. *P. hornadayi:* USNM 100632 (holotype), 193 mm SL. *P. melanochir:* FSKU 21007–21008, 2 specimens. 116–137 mm SL; URM-P 29087, 147 mm SL. *P. multifilis:* NSMT-P 54112, 145 mm SL. *P. paradiseus:* BSKU *21200, 139 mm SL; NSMT-P 21776, 132 mm SL; URM-P 10847, 165 mm SL.

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