A new subspecies, *Polynemus melanochir dulcis*, from Tonle Sap Lake, Cambodia, and redescription of *P. m. melanochir* Valenciennes *in* Cuvier and Valenciennes, 1831 with designation of a neotype

Hiroyuki Motomura[1]✉ and Mark H. Sabaj[2]

[1] *Fish Division, Department of Zoology, National Science Museum (Natural History), 3-23-1 Hyakunin-cho, Shinjuku-ku, Tokyo 169-0073, Japan (e-mail: motomura@kahaku.go.jp)*
[2] *Department of Ichthyology, Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103-1195, USA (e-mail: sabaj@discovery.acnatsci.org)*

Received: September 27, 2001 / Revised: December 20, 2001 / Accepted: December 29, 2001

Ichthyological Research

Ichthyol Res (2002) 49: 181–190

Abstract A poorly known threadfin, *Polynemus melanochir* Valenciennes *in* Cuvier and Valenciennes, 1831, is redescribed (as *P. melanochir melanochir*) on the basis of a newly designated neotype and a large number of specimens. *Polynemus melanopus* Sauvage, 1881 and 3 species commonly regarded as valid, *Galeoides microps* Steindachner, 1869, *P. borneensis* Bleeker, 1857, and *Trichidion hilleri* Fowler, 1905, are all considered junior synonyms of *P. m. melanochir*. In addition, a new subspecies, *P. melanochir dulcis*, is described on the basis of 3 specimens. *Polynemus m. dulcis* differs from *P. m. melanochir* in having a greater snout length [7% of SL vs. mean 6% (range 5–6%) of SL in the latter] and shorter upper caudal-fin lobe length [35% (34–35%) of SL vs. 39% (35–44%) of SL]. The former is currently known only from Tonle Sap Lake, Cambodia, whereas the latter is known from the Mekong River (Cambodia and southern Vietnam) and Kalimantan (=Borneo; Malaysia and Indonesia).

Key words Polynemidae · *Polynemus melanochir dulcis* ssp. nov. · *Polynemus melanochir melanochir* · Neotype · Synonymy

Polynemus melanochir was originally described by Valenciennes *in* Cuvier and Valenciennes (1831) on the basis of an anonymous drawing (reproduced in Feltes, 1991). Subsequently, many researchers (e.g., Bleeker, 1849; Myers, 1936; Gloerfelt-Tarp and Kailola, 1984) have misidentified a separate species (later described as *Filimanus perplexa* Feltes, 1991) as *P. melanochir* (Feltes, 1991). Recently, Feltes (1991) and Randall and Lim (2000) correctly identified *P. melanochir* but gave no description of the species and no indication of specimens. Thus, the taxonomic identity of *P. melanochir* remains confusing.

Polynemus borneensis Bleeker, 1857, originally described on the basis of 3 specimens from Banjarmasin, Pontianak and Sampit, Kalimantan (=Borneo), Indonesia, and *Trichidion hilleri* Fowler, 1905, originally described on the basis of a single specimen from Baram River, Sarawak, Kalimantan, Malaysia, have both been regarded as valid species (e.g., Weber and de Beaufort, 1922; Kottelat et al., 1993; Rainboth, 1996 in the former; Kottelat et al., 1993; Kottelat and Lim, 1995 in the latter). However, our examinations of the types of both species and other specimens considered here to be *P. melanochir* showed that they represented a single species diagnosed by the absence of teeth on the vomer and an intense black pectoral fin. Accordingly, *P. borneensis* and *T. hilleri* are herein regarded as junior synonyms of *P. melanochir*.

Galeoides microps Steindachner, 1869, originally described on the basis of a single specimen from China, also has been regarded as a valid species of *Galeoides* (e.g., Fowler, 1935; Myers, 1936; Springer, 1982; Hureau, 1986). Recently, Motomura et al. (2001) examined the holotype of this species and regarded it as a junior synonym of *P. melanochir*.

Polynemus melanopus Sauvage, 1881, originally described on the basis of 4 specimens from Saigon (=Ho-chi-minh), Vietnam, has not been reported since its original description. The defining characters, vomer without teeth and black pectoral fin, of the types of this species were found to be consistent with those of *P. melanochir*. Accordingly, *P. melanopus* also is regarded as a junior synonym of *P. melanochir*.

During examination of specimens of *P. melanochir*, 3 specimens from Tonle Sap Lake, Cambodia, were noted in the BSKU collection. As does *P. melanochir*, these specimens also lack teeth on the vomer and have a black pectoral fin; however, they differed from *P. melanochir* in having a greater snout length and shorter upper caudal-fin lobe length. These specimens are considered to represent a distinct subspecies of *P. melanochir*, herein described as *P. m. dulcis*. The nominal *P. m. melanochir* is redescribed (as a senior synonym of *G. microps*, *P. borneensis*, *P. melanopus*, and *T. hilleri*), and a neotype is newly designated.

Methods

Counts and measurements followed Hubbs and Lagler (1947), Motomura et al. (2000), and Motomura and Iwatsuki (2001). Counts of pectoral filaments began with the anterior or ventralmost element. Standard length and total length were expressed as SL and TL, respectively. Terminology of supraneural bones followed Mabee (1988); the formula for configuration of supraneural bones, anterior neural spines, and anterior dorsal-fin pterygiophores followed Ahlstrom et al. (1976). Osteological characters were confirmed from X-ray photographs taken of all specimens, except the holotype of *Galeoides microps* and syntypes of *Polynemus melanopus*. Institutional codes followed Leviton et al. (1985), with additional institutional abbreviations as follows: Division of Fisheries Sciences, Faculty of Agriculture, Miyazaki University, Japan (MUFS), and Raffles Museum of Biodiversity Research, Department of Biological Sciences, National University of Singapore (ZRC, formerly NMS).

Polynemus melanochir dulcis ssp. nov.

(English name: lake blackhand paradise fish)
(Figs. 1, 2)

Holotype. ANSP 178011, 135 mm SL, Tonle Sap Lake, Cambodia, 12 Jan. 1970, collected by O. Okamura.

Paratypes. AMS I. 40968-001, 126 mm SL, BSKU 14850, 128 mm SL; same data as holotype.

Diagnosis. A subspecies of *Polynemus* with the following combination of characters: 8 first dorsal-fin spines; 16 soft dorsal-fin rays; 7 pectoral filaments (seventh probably longest); 16 or 17 (mode 16) pectoral-fin rays; 3 anal-fin spines; 11 or 12 (12) soft anal-fin rays; 71 or 72 (71) pored lateral-line scales; 7 scale rows above lateral line, 12 or 13 (13) below; 12 gill rakers in upper series, 17–19 (17) in lower, 29–31 (29) total; vomer without teeth; snout long, strongly pointed (7% of SL); upper caudal-fin lobe short [mean 35% (range 34–35%) of SL]; swimbladder absent.

Description. Counts and proportional measurements of the holotype and paratypes of *Polynemus melanochir dulcis* ssp. nov. are given in Table 1. Data for the holotype are presented first, followed by paratype data (if different) in parentheses (diagnostic characters not repeated).

Body oblong, compressed; maxilla covered with scales; lip on lower jaw well-developed; posterior margin of preopercle serrated; posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; teeth villiform in broad bands on palatines and ectopterygoids; all pectoral-fin rays unbranched, inserted near midline of body; posterior tip of pectoral fin not reaching to level of anal-fin origin (same, or just reaching); first (shortest) and second pectoral filaments extending beyond level of pelvic-fin origin but not reaching to level of posterior tip of pelvic fin; third pectoral filament reaching near anal-fin origin; fourth pectoral filament extending slightly beyond level of middle of anal-fin base (or extending beyond level of posterior base of anal fin); fifth pectoral filament extending slightly beyond caudal-fin base (or extending beyond posterior mid-distal margin of caudal fin); sixth and seventh pectoral filaments extending well beyond posterior tips of caudal fin (filament tips easily damaged); all bases of first dorsal-fin spines of similar thickness; lateral line simple, extending from upper end of gill opening to mid-distal margin of caudal fin membrane; formula for configuration of supraneural bones, anterior neural spines, and anterior dorsal pterygiophores /0/0+2/1/1+1/1/1/1/; 10 + 15 vertebrae.

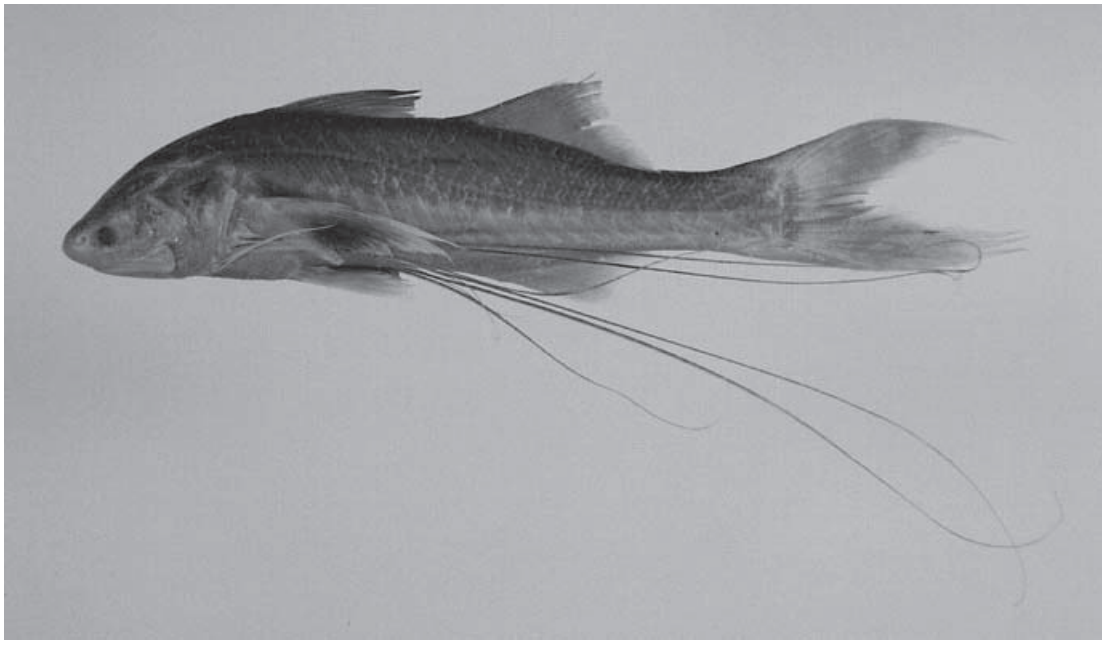

Fig. 1. Holotype of *Polynemus melanochir dulcis* ssp. nov., ANSP 178011, 135 mm SL, Tonle Sap Lake, Cambodia

Table 1. Counts and measurements (expressed as percentages of standard length) of *Polynemus melanochir dulcis* ssp. nov., including the holotype and paratypes

	Holotype ANSP 178011	Paratypes AMS I. 40968-001, BSKU 14850 (n = 2)
Standard length (mm)	135	126–128
Counts		
Dorsal-fin rays	VIII-I, 16	VIII-I, 16
Anal-fin rays	III, 12	III, 11–12
Pectoral-fin rays	16	16–17
Pectoral filaments	7	7
Pelvic-fin rays	I, 5	I, 5
Pored lateral-line scales	71	71–72
Scales above/below lateral line	7/13	7/12–13
Gill rakers	12 + 17 = 29	12 + 17–19 = 29–31
Measurements (means)		
Head length	27	28 (28)
Body depth at 1st dorsal-fin origin	23	23 (23)
Body depth at 2nd dorsal-fin origin	23	23 (23)
Body width at pectoral-fin base	16	15 (15)
Snout length	7	7 (7)
Dermal eye opening	3	3 (3)
Orbit diameter	3	3–4 (3)
Interorbital width	9	9–8 (8)
Postorbital length	18	19 (19)
Upper-jaw length	14	14–15 (14)
Depth at posterior margin of premaxilla	4	3–4 (4)
Pre-1st dorsal-fin length	34	35–36 (35)
Pre-2nd dorsal-fin length	59	59–60 (59)
Pre-anal-fin length	60	59–60 (60)
First dorsal-fin origin to anal-fin origin	40	35–38 (38)
Pelvic-fin origin to anal-fin origin	27	26–28 (27)
Second dorsal-fin base length	21	20–21 (21)
Anal-fin base length	15	15 (15)
Longest pectoral-fin length	31	34–35 (33)
Longest pectoral-filament length (7th)	128	153 (141)
Pectoral-fin base length	12	13–14 (13)
Longest pelvic-fin ray length (1st)	17	18 (18)
Longest 1st dorsal-fin spine length (3rd)	19	19–20 (19)
Second dorsal-fin spine length	7	8–9 (8)
Longest 2nd dorsal-fin ray length (2nd)	19	20–21 (20)
Longest anal-fin spine length (3rd)	8	8–9 (8)
Longest anal-fin ray length (2nd)	17	18–19 (18)
Caudal-peduncle length	27	25–27 (26)
Caudal-peduncle depth	11	10 (10)
Upper caudal-fin lobe length	35	34–35 (35)
Lower caudal-fin lobe length	34	38 (36)

Means in parentheses include holotype data

Color of preserved specimens.—Head and body grayish-black dorsally, pale whitish-yellow ventrally; posterior tip of first dorsal fin intense black, other parts whitish-yellow; posterior margins of second dorsal, pelvic, anal, and caudal fins translucent (posterior margin of second dorsal fin blackish in a single specimen, BSKU 14850), anterior margin of second dorsal fin blackish, other parts whitish-yellow; pectoral fin, except posterior tip and base, intense black (translucent in a single specimen, AMS I. 40968-001); base of pectoral filaments whitish-yellow, becoming blackish posteriorly.

Distribution. *Polynemus melanochir dulcis* is currently known only from Tonle Sap Lake, upper end of the lower Mekong River floodplain, Cambodia (Fig. 2).

Etymology. The subspecific name "*dulcis*" is derived from the Latin meaning "freshwater," in reference to the type locality, Tonle Sap Lake.

Remarks. *Polynemus melanochir dulcis* clearly differs from *P. m. melanochir* in having a longer snout and shorter upper caudal-fin lobe (see Discussion). However, with the exception of certain proportional measurements, the 2 forms are difficult to distinguish because their meristic characters fully overlap (see Table 3). Accordingly, *P. m. dulcis* is proposed as a new subspecific taxon.

Polynemus melanochir melanochir Valenciennes *in* Cuvier and Valenciennes, 1831

(English name: blackhand paradise fish)
(Figs. 2, 3)

Polynemus melanochir Valenciennes *in* Cuvier and Valenciennes, 1831: 513 [mistakenly reported from India, based solely on a drawing sent from Sumatra, Indonesia (see Feltes, 1991, fig. 1); type locality: Kuching Bay, Sarawak, Kalimantan, Malaysia, based on newly designated neotype; see Article 76.3 (ICZN, 1999) and Discussion].

Polynemus macronema Bleeker, 1852 (not of Pel): 419 (type locality: Banjarmasin, Pontianak and Sampit, Kalimantan, Indonesia, primary homonym of *Polynemus macronemus* Pel, 1851).

Polynemus borneënsis Bleeker, 1857: 3 [replacement name for *P. macronema* Bleeker, but incorrect original spelling; see Article 32.5 (ICZN, 1999)].

Polynemus borneensis Bleeker, 1858: 2 [justified emendation of *P. borneënsis* Bleeker; see Article 32.5.2.1 (ICZN, 1999)].

Galeoides microps Steindachner, 1869a: 126 (type locality: China, but probably erroneous; see Distribution); Steindachner, 1869b (more detailed description).

Polynemus melanopus Sauvage, 1881: 101 [type locality: Saigon (=Ho-chi-minh), Vietnam].

Trichidion hilleri Fowler, 1905: 502, fig. 11 (type locality: Baram River, Sarawak, Kalimantan, Malaysia).

Neotype. ZRC 37829, 179 mm SL, Kuching Bay, Sarawak, Kalimantan, Malaysia, Oct. 1966, trawl.

Other material. 39 specimens, 39–194 mm SL. ANSP 114895 (holotype of *Trichidion hilleri* Fowler, 1905), 166 mm SL, Baram River, Sarawak, Kalimantan, Malaysia; BMNH 1880.4.21.146, 134 mm SL, Kalimantan, Indonesia; CAS 132751 (7 specimens), 123–168 mm SL, Kuching, Sarawak, Kalimantan, Malaysia; FSKU-P 21007–21008 (2), 118–134 mm SL, Tawau, Sabah, Kalimantan, Malaysia; MCZ 16307, 167 mm SL, Calcutta, India (probably erroneous, see Distribution); MNHN A. 3048 (2 syntypes of *Polynemus melanopus* Sauvage, 1881),

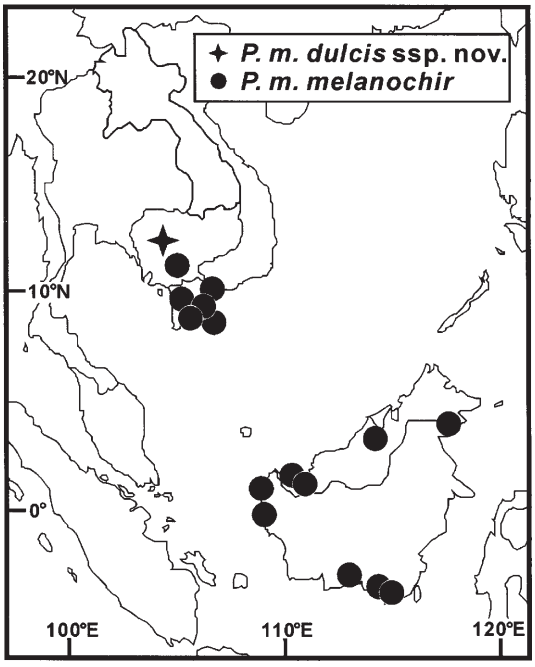

Fig. 2. Localities of specimens of *Polynemus melanochir dulcis* ssp. nov. (*star*) and *P. m. melanochir* (*circles*) examined in this study

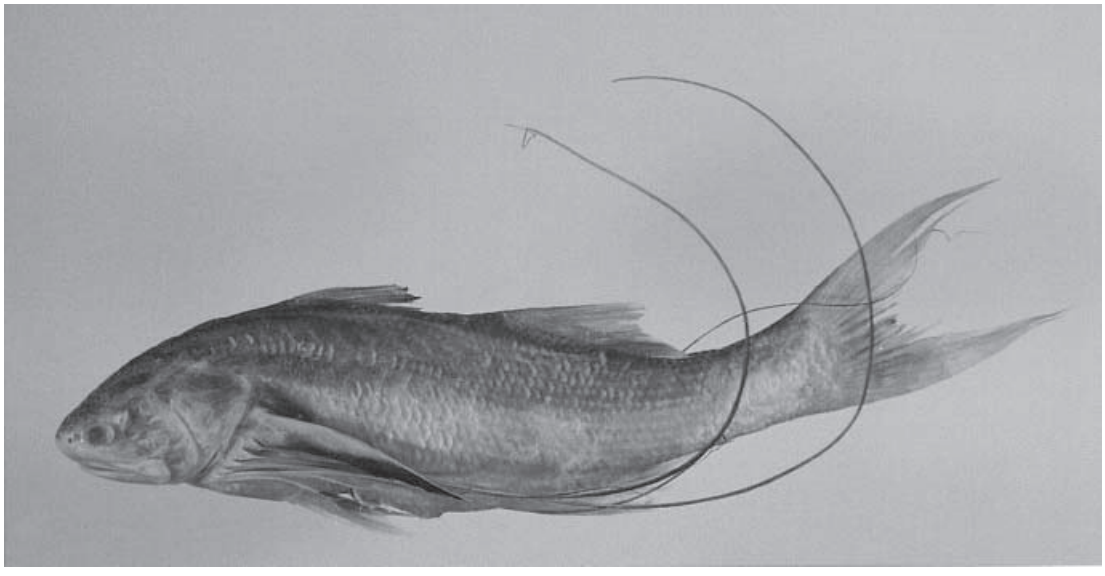

Fig. 3. Neotype of *Polynemus melanochir melanochir* Valenciennes *in* Cuvier and Valenciennes, 1831, ZRC 37829, 179 mm SL, Kuching Bay, Sarawak, Kalimantan (=Borneo), Malaysia

139–160 mm SL, Saigon (=Ho-chi-minh), Vietnam; MNHN A. 3049 (2 syntypes of *P. melanopus*), 130–160 mm SL, Saigon (=Ho-chi-minh), Vietnam; MUFS 21364–21370 (7), 136–194 mm SL, Mekong River at Ho-chi-minh, Vietnam; NMW 77569 (holotype of *G. microps* Steindachner, 1869), 171 mm SL, China (specific locality unknown); RMNH 6013 (3 syntypes of *Polynemus borneensis* Bleeker, 1857), 148–190 mm SL, Banjarmasin, Pontianak and Sampit, Kalimantan, Indonesia; RMNH 34138 (formerly RMNH 6013) (2), 80–150 mm SL, Kahayan and Sinkawang, Kalimantan, Indonesia; UMMZ 213351 (1 of 9), 64 mm SL, mouth of Bassac River, 2.5 km southeast of Truong Binh, Vietnam; UMMZ 213352, 101 mm SL, Long Xuyen, at beginning of west branch of Mekong River, Vietnam; UMMZ 217920 (2 of 115), 86 mm SL, My Tho, Mekong River, Vietnam; UMMZ 224614 (3), 39–75 mm SL, Tho River, Vietnam; UMMZ 225748, 118 mm SL, off mouth of Mekong River, Vietnam; UMMZ 232762, 136 mm SL, Phnom Penh, Mekong River, Cambodia.

Diagnosis. A subspecies of *Polynemus* with the following combination of characters: 8 first dorsal-fin spines; 15 or 16 [mode 16, rarely 18 (1 of 40 specimens)] soft dorsal-fin rays; 7 pectoral filaments (sixth probably longest); 15–18 (mode 17) pectoral-fin rays; 3 anal-fin spines; 11–13 (12) soft anal-fin rays; 68–74 (70) pored lateral-line scales; 6–8 (7) scale rows above lateral line, 11–14 (12) below; 11–14 (13) gill rakers in upper series, 16–20 (18) in lower, 27–33 (31) total; vomer without teeth; snout short, blunt [mean 6% (range 5–6%) of SL]; upper caudal-fin lobe long [39% (35–44%) of SL]; swimbladder absent.

Description. Counts and proportional measurements of the neotype and other material of *Polynemus melanochir melanochir* are given in Table 2. Data for the neotype are presented first, followed by other material data (if different) in parentheses (diagnostic characters not repeated).

Body oblong, compressed; maxilla covered with scales; lip on lower jaw well-developed; posterior margin of preopercle slightly serrated (same, or not serrated); posterior margin of maxilla extending well beyond level of posterior margin of adipose eyelid; teeth villiform in broad bands on palatines and ectopterygoids; all pectoral-fin rays unbranched, inserted near midline of body; posterior tip of pectoral fin just reaching to level of anal-fin origin (same, not reaching or extending slightly beyond); first pectoral filament (shortest) extending beyond level of pelvic-fin origin but not reaching to level of posterior tip of pelvic fin; second pectoral filament extending slightly beyond level of posterior tip of pelvic fin; third pectoral filament reaching near anal-fin origin (same, or extending slightly beyond level of posterior tip of pelvic fin); fourth pectoral filament extending slightly beyond level of posterior base of anal fin (same, or reaching to base of anal fin); fifth pectoral filament extending well beyond caudal-fin base, but not reaching posterior tips of caudal fin (same, or extending slightly beyond caudal-fin base, not reaching to mid-distal margin of caudal fin); sixth and seventh pectoral filaments extending well beyond posterior tips of caudal fin (filament tips easily damaged); all bases of first dorsal-fin spines of similar thickness; lateral line simple, extending from upper end of gill opening to mid-distal margin of caudal-fin membrane; formula for configuration of supraneural bones, anterior neural spines, and anterior dorsal pterygiophores /0/0+2/1/1+1/1/1/1/ (same, or /0/0+2/1+1/1/1/1/1/); 10 + 15 vertebrae.

Color when fresh.—Based on MUFS 21369, 154 mm SL, Mekong River, Vietnam: head and body grayish-black dorsally, yellow ventrally; posterior tip of first dorsal fin intense black, other parts yellow; posterior margin and tip of second dorsal fin black, other parts yellow; pelvic fin uniformly yellow; posterior margins of anal, and caudal fin translucent, other parts yellow; pectoral fin intense black, except for vivid yellow base; base of pectoral filaments vivid yellow, becoming blackish posteriorly.

Color of preserved specimens.—Head and body grayish-black dorsally, pale whitish-yellow ventrally; posterior tip of first dorsal fin black, other parts whitish-yellow; posterior margins of pelvic, anal, and caudal fins translucent, other parts whitish-yellow; posterior margin of second dorsal fin blackish or translucent, other parts whitish-yellow; pectoral fin intense black, except for pale whitish-yellow base; base of pectoral filaments whitish-yellow, becoming blackish posteriorly.

Distribution. *Polynemus melanochir melanochir* is known from the lower Mekong River and related rivers (Cambodia and southern Vietnam), and Kalimantan (Malaysia and Indonesia), based on specimens examined during this investigation (see Fig. 2). Data for 2 of Steindachner's specimens [MCZ 16307, 167 mm SL, and NMW 77569 (holotype of *Galeoides microps*), 171 mm SL], examined in this study, indicated that they were collected from Calcutta, India (mid-1860s) and China (1869), respectively, but detailed locality and collection date for the specimens were not given. Judging from the presently known distribution of the species, the former localities are probably erroneous (omitted from distribution map, Fig. 2).

Valenciennes (*in* Cuvier and Valenciennes, 1831) solely based his description of *P. melanochir* on a fish drawing sent to London from Sumatra, Indonesia, by Finlayson. Valenciennes stated that this species existed in India; however, the origin of the illustrated specimen was not specified on the drawing (reproduced in Feltes, 1991). Recent collections in India and surveys of Indian museums by the senior author failed to find any specimens of *P. melanochir* from the subcontinent. Furthermore, *P. melanochir* has not been known from the neighboring countries of Bangladesh, Myanmar, and Thailand. It appears that Valenciennes mistakenly presumed that the illustrated specimen originated from India.

Remarks. The name, *Polynemus melanochir* Valenciennes *in* Cuvier and Valenciennes, 1831, has been to date used by many researchers [e.g., Bleeker, 1849; Myers, 1936 (as *Filimanus melanochir*); Gloerfelt-Tarp and Kailola, 1984 (as *F. melanochir*); Bleeker, 1983 (as *Trichidion melanochir*)]. However, Feltes (1991) recognized that the polynemid species commonly identified as *P. melanochir* (*F. melanochir* or *T. melanochir*) was not true *P. melanochir* but in fact represented a separate undescribed species (described as *F. perplexa* Feltes, 1991). Feltes (1991) and Randall and Lim (2000) correctly identified *P. melanochir* (=*P. m. melanochir*) but gave no description and no indication of specimens.

Table 2. Counts and measurements (expressed as percentages of standard length) of *Polynemus melanochir melanochir*, including the neotype, other nominal types, and non-type specimens

	Neotype of *Polynemus melanochir melanochir* ZRC 37829	Syntypes of *Polynemus borneensis* RMNH 6013 (n = 3)	Holotype of *Galeoides microps* NMW 77569	Syntypes of *Polynemus melanopus* MNHN A. 3049-A. 3050 (n = 4)	Holotype of *Trichidion hilleri* ANSP 114895	Non-type specimens of *Polynemus melanochir melanochir* (n = 30)
Standard length (mm)	179	148–190	171	130–160	166	39–194
Counts						
Dorsal-fin rays	VIII-I, 16	VIII-I, 15–16	VIII-I, 16	VIII-I, 15–16	VIII-I, 16	VIII-I, 15–18
Anal-fin rays	III, 12	III, 12	III, 12	III, 12	III, 12	III, 11–13
Pectoral-fin rays	17	16–17	15	16–17	18	16–18
Pectoral filaments	7	7	7	7	7	7
Pelvic-fin rays	I, 5	I, 5	I, 5	I, 5	I, 5	I, 5
Pored lateral-line scales	70	69–70	71	69–71	71	68–74
Scales above/below lateral line	7/12	7/12–13	—/—	7/12–14	7/14	6–8/11–13
Gill rakers	13 + 19 = 32	12–13 + 18 = 30–31	11 + 16 = 27	12–13 + 17–18 = 30–31	13 + 18 = 31	11–14 + 16–20 = 28–33
Measurements (means)						
Head length	26	24–26	24	25–27	27	25–27 (26)
Body depth at 1st dorsal-fin origin	25	22–24	19	21–24	25	22–25 (23)
Body depth at 2nd dorsal-fin origin	26	23–27	21	22–25	26	22–28 (24)
Body width at pectoral-fin base	16	13–15	11	12–13	15	11–16 (14)
Snout length	6	5–6	5	5–6	6	5–6 (6)
Dermal eye opening	2	1–2	2	2	2	1–2 (2)
Orbit diameter	2	2	2	3	2	2–3 (2)
Interorbital width	9	8–9	7	8–9	9	7–9 (8)
Postorbital length	19	17–18	17	17–19	20	18–19 (18)
Upper-jaw length	13	13–15	13	13–14	14	12–14 (13)
Depth at posterior margin of premaxilla	4	4	4	4	4	3–5 (4)
Pre-1st dorsal-fin length	34	32–34	33	33–35	36	33–35 (33)
Pre-2nd dorsal-fin length	59	56–59	55	56–58	59	57–60 (58)
Pre-anal-fin length	61	56–62	61	59–61	61	57–62 (60)
First dorsal-fin origin to anal-fin origin	41	38–40	35	37–38	39	36–40 (38)
Pelvic-fin origin to anal-fin origin	29	27–34	29	28–30	29	26–30 (29)
Second dorsal-fin base length	19	19–21	21	19	21	18–20 (20)
Anal-fin base length	17	15–16	15	14–16	15	14–17 (16)
Longest pectoral-fin length	34	29–34	Broken	30–31	32	30–35 (32)
Longest pectoral-filament length (6th)	157	Broken	Broken	134–171	Broken	141–193 (159)
Pectoral-fin base length	13	12–13	12	12–14	13	12–13 (13)
Longest pelvic-fin ray length (1st)	17	14–17	15	16–17	16	15–17 (16)
Longest 1st dorsal-fin spine length (3rd)	Broken	15	19	18–20	19	15–20 (18)
Second dorsal-fin spine length	7	6–7	7	7–9	Broken	7–10 (8)
Longest 2nd dorsal-fin ray length (2nd)	19	16–18	17	18–20	17	17–21 (19)
Longest anal-fin spine length (3rd)	8	7	7	8	Broken	7–9 (8)
Longest anal-fin ray length (2nd)	17	16–18	15	17–18	18	17–19 (18)
Caudal-peduncle length	26	26–28	27	27–28	28	26–29 (27)
Caudal-peduncle depth	11	11–12	10	10–11	11	10–13 (11)
Upper caudal-fin lobe length	40	39	35	38–40	Broken	35–44 (39)
Lower caudal-fin lobe length	35	29	32	35–36	Broken	33–42 (36)

Means in parentheses include type data

Discussion

Although the original description of *Polynemus melanochir* Valenciennes *in* Cuvier and Valenciennes, 1831 was brief, the drawing clearly shows the very black pectoral fin rays (see Feltes, 1991: fig. 1), such being a characteristic of the specimens considered here as *P. melanochir melanochir*. The specimen used for the drawing apparently no longer exists, and its precise origin is unknown. The proposal of a neotype for *P. m. melanochir* is necessary to avoid taxonomic confusion, owing to the similarity of this species to other congeners, including *P. m. dulcis* ssp. nov. A specimen (ZRC 37829, 179 mm SL) collected from Kuching Bay, Sarawak, Kalimantan, Malaysia is herein proposed as the neotype for *P. m. melanochir* and Kuching Bay becomes the type locality under Article 76.3 (ICZN, 1999).

Bleeker (1852) described *P. macronema* as a new species from Banjarmasin, Pontianak and Sampit, Kalimantan, Indonesia. Because the name, *P. macronema* Bleeker, 1852 (primary homonym under Article 57.2, ICZN, 1999), was preoccupied by *P. macronemus* of Pel (1851), Bleeker (1857) proposed a replacement name, *P. borneënsis*, but used an "incorrect original spelling" as defined by Article 32.5 (ICZN, 1999). Subsequently, Bleeker (1858) corrected the name to "*borneensis*," as a justified emendation (see Article 32.5.2.1, ICZN, 1999). Eschmeyer (1998) indicated this species as *P. borneensis* Bleeker, 1860. However, the authorship and date of *P. borneensis* is rightly Bleeker (1857), because the corrected name retains the authorship and date of the original spelling (see Article 33.2.2, ICZN, 1999).

Polynemus borneensis Bleeker, 1857 was described on the basis of 3 specimens, 185–245 mm TL, used for the original description of *P. macronema* Bleeker, 1852. Subsequently, Hubrecht (1879) referred to a total of 8 Bleeker specimens as *Trichidion borneënsis* (group A, 5 specimens; group B, 1 specimen; group C, 1 specimen; group D, 1 specimen). Five Bleeker specimens are presently held at RMNH and registered as RMNH 6013 [80 mm SL (112 mm TL), 148 mm SL (ca. 192 mm TL, caudal fin broken), 150 mm SL (207 mm TL), 162 mm SL (223 mm TL), and 190 mm SL (ca. 247 mm TL, caudal fin broken)]. Although the caudal fin was damaged in 2 specimens (148 and 190 mm SL), the original total lengths of these specimens were estimated from the measurements of 31 undamaged specimens (39–194 mm SL) of *P. m. melanochir* examined during this study (total length 1.3–1.5 times SL). The estimated total lengths (ca. 192 and 247 mm) of these 2 specimens from RMNH 6013 are closest to those (185 and 245 mm) given by Bleeker (1852); therefore, we recognize these specimens as 2 of the 3 syntypes of *P. borneensis*. Of the remaining 3 specimens in RMNH 6013, the smallest (80 mm SL) can be excluded from the syntypic series because its total length (112 mm) is outside the range of lengths (185–245 mm) given by Bleeker (1852). However, the status (syntype or non-type) of the remaining 2 specimens (207 and 223 mm TL) cannot be determined from their total lengths. Notwithstanding, the larger of these 2 specimens has the body scales marked by green ink stains along the scale rows of the lateral line and scales below the lateral line. Because it is believed that Bleeker marked the scales with green ink while counting them (M.J.P. van Oijen, personal communication), it is very likely that the specimen so marked is the remaining syntype. Therefore, the 2 Bleeker specimens measuring 80 and 150 mm SL are herein removed from the syntypes of *P. borneensis* and reregistered as RMNH 34138.

Polynemus borneensis has been regarded as a valid species by many researchers (e.g., Weber and de Beaufort, 1922;

Table 3. Frequency distributions of meristic characters of *Polynemus melanochir dulcis* ssp. nov. and *P. m. melanochir*

		Soft dorsal-fin rays				Soft anal-fin rays			Pectoral-fin rays			
		15	16	17	18	11	12	13	15	16	17	18
P. m. dulcis ssp. nov.	$n = 3$	—	3[a]	—	—	1	2[a]	—	—	2[a]	1	—
P. m. melanochir	$n = 40$	10	29[b]	—	1	2	37[b]	1	1	16	19[b]	4

		Scales above/below lateral line								Pored lateral-line scales						
		6	7	8	/	11	12	13	14	68	69	70	71	72	73	74
P. m. dulcis ssp. nov.	$n = 3$	—	3[a]	—		—	1	2[a]	—	—	—	—	2[a]	1	—	—
P. m. melanochir	$n = 32$[c]	4	27[b]	1		5	22[b]	3	2	2	2	11[b]	9	7	3	1

		Upper gill rakers				Lower gill rakers					Total gill rakers						
		11	12	13	14	16	17	18	19	20	27	28	29	30	31	32	33
P. m. dulcis ssp. nov.	$n = 3$	—	3[a]	—	—	—	2[a]	—	1	—	—	—	2[a]	—	1	—	—
P. m. melanochir	$n = 38$	2	15	20[b]	1	3	7	22	5[b]	1	1	3	4	10	14	5[b]	1

[a] Holotype of *P. m. dulcis* ssp. nov.
[b] Neotype of *P. m. melanochir*
[c] Pored lateral-line scales counted on 35 examples of *P. m. melanochir*

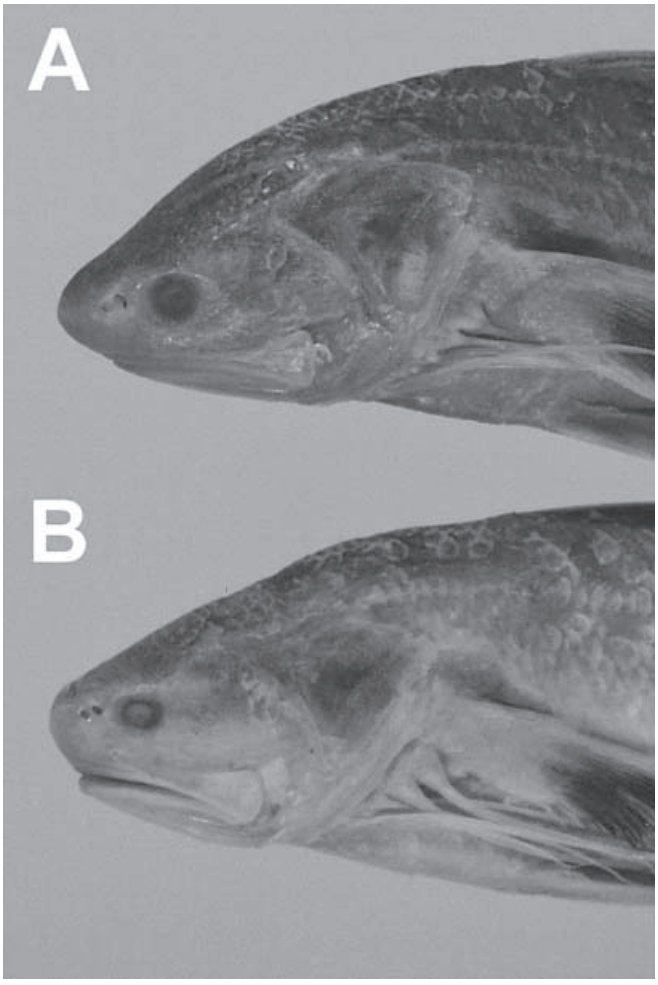

Fig. 4. Heads of **A** *Polynemus melanochir dulcis* ssp. nov. and **B** *P. m. melanochir*. **A** ANSP 178011 (holotype), 135 mm SL, Tonle Sap Lake, Cambodia; **B** UMMZ 232762, 136 mm SL, Phnom Penh, Mekong River, Cambodia

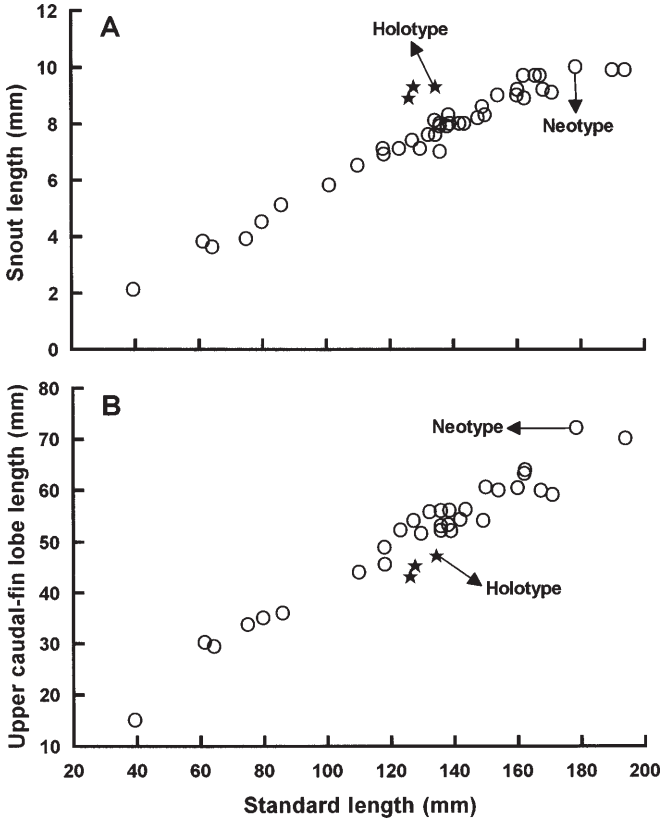

Fig. 5. Relationships of **A** snout length and **B** upper caudal-fin lobe length to standard length in *Polynemus melanochir dulcis* ssp. nov. (*stars*) and *P. m. melanochir* (*circles*)

Kottelat et al., 1993; Rainboth, 1996). However, our examination of the 3 syntypes of *P. borneensis*, the neotype of *P. m. melanochir*, and other specimens showed that they represented a single species (see Table 2). Accordingly, *P. borneensis* is herein regarded as a junior synonym of the latter.

Galeoides microps was described by Steindachner (1869a) on the basis of a single specimen (NMW 77569, 171 mm SL) from China (probably erroneous, see Distribution) and later described in more detail (Steindachner, 1869b). Although there is no indication in the literature that the holotype of *G. microps* has been reexamined since Steindachner's (1869a,b) descriptions (Springer, 1982), the species has been regarded as valid, belonging to the genus *Galeoides* (e.g., Fowler, 1935; Myers, 1936; Springer, 1982; Hureau, 1986). Recently, Motomura et al. (2001) examined the holotype of *G. microps* and regarded it as a junior synonym of *P. melanochir* (=*P. m. melanochir*). The meristic and morphological characters of the holotype of *G. microps* are herein listed in Table 2 and in Motomura et al. (2001).

Polynemus melanopus was described by Sauvage (1881) on the basis of 4 specimens (MNHN A. 3048, 2 syntypes, 139–160 mm SL and MNHN A. 3049, 2 syntypes, 130–160 mm SL) from Saigon (=Ho-chi-minh), Vietnam. The only subsequent reference to the species was by Blanc and Hureau (1971), who listed it in the type catalogue of the Muséum national d'Histoire naturelle. The characters, black pectoral fin, vomer without teeth, and short snout (5–6% of SL), of the 4 syntypes were found to be consistent with those of the specimens considered here as *P. m. melanochir* (see Table 2). Accordingly, *P. melanopus* is also regarded as a junior synonym of the latter.

Trichidion hilleri was described by Fowler (1905) on the basis of a single specimen (ANSP 114895, 166 mm SL) from Baram River, Sarawak, Kalimantan, Malaysia. Although the species has been regarded as valid (as *P. hilleri*) by many researchers (e.g., Kottelat et al., 1993; Kottelat and Lim, 1995), our examination of the holotype of *T. hilleri* and the specimens considered here as *P. m. melanochir* showed that they represented a single species (see Table 2). Accordingly, *T. hilleri* is also regarded as a junior synonym of the latter.

Polynemus m. dulcis and *P. m. melanochir* are uniquely characterized by the absence of vomerine teeth (present in all congeners). Likewise, both subspecies have a very black pectoral fin. Although the pectoral fin of *P. paradiseus* Linnaeus, 1758 is occasionally tinged with black, that species has villiform vomerine teeth.

The vomer and pectoral fin characters of *P. m. dulcis* and *P. m. melanochir* are very similar. Furthermore, the meristic characters of both subspecies completely overlap (Table 3). However, *P. m. dulcis* differs from the latter in having a greater snout length [7% of SL vs. mean 6% (range 5–6%) of SL; Tables 1, 2; Figs. 4, 5] and shorter upper caudal-fin lobe length [35% (34–35%) of SL vs. 39% (35–44%) of SL; Tables 1, 2; Fig. 5]. In addition, the head length [mean 28% (27–28%) of SL], dermal eye opening (3% of SL), orbit diameter [3% (3–4%) of SL], upper-jaw length [14% (14–15%) of SL], second dorsal-fin base length [21% (20–21%) of SL], and longest pelvic-fin ray length [18% (17–18%) of SL] in *P. m. dulcis* are greater than those in *P. m. melanochir* [26% (24–27%), 2% (1–2%), 2% (2–3%), 13% (12–14%), 20% (18–21%), and 16% (14–17%), respectively; Tables 1, 2]. Based on these distinctive characters and the parapatric distribution of their known populations, the 2 forms are treated as separate subspecies, *P. m. dulcis* and *P. m. melanochir*.

Acknowledgments We greatly appreciated receiving specimen loans from the following: M. McGrouther and K. Parkinson (AMS); M. Littmann and D. Dagit (ANSP); J. Maclaine (BMNH); K. Sasaki and Y. Machida (BSKU); W.N. Eschmeyer, T. Iwamoto, D. Catania, and J. Fong (CAS); H. Ida and M. Okamoto (FSKU-P); K.E. Hartel (MCZ); M.J.P. van Oijen, and J. van Egmond (RMNH); D.W. Nelson (UMMZ); and P.K.L. Ng and K.K.P. Lim (ZRC). We are most grateful to E. Mikschi and H. Wellendorf (NMW) for their provision of holotype data and photographs of *Galeoides microps*, M.J.P. van Oijen (RMNH) for providing information on syntypes of *Polynemus borneensis*, P. Pruvost (MNHN) for the opportunity to examine syntypes of *Polynemus melanopus*, and K. Sasaki (BSKU) for providing collection data for *Polynemus melanochir dulcis*. We thank Y. Iwatsuki (MUFS) for supporting this study and E. Yamamoto (Fukuoka, Japan) for collecting *P. melanochir* from Vietnam. We thank Y. Motomura (Miyazaki, Japan) for her assistance and G.S. Hardy (Ngunguru, New Zealand), who read the initial manuscript and offered helpful comments. This study was supported in part by a grant awarded to the first author by Research Fellowships of the Japan Society for the Promotion of Science for Young Scientists (Tokyo, Japan).

Literature Cited

Ahlstrom EH, Butler JL, Sumida BY (1976) Pelagic stromateoid fishes (Pisces, Perciformes) of the eastern Pacific: kinds, distributions, and early life histories and observations on five of these from the northwest Atlantic. Bull Mar Sci 26:285–402

Blanc M, Hureau J-C (1971) Catalogue critique des types de poissons du Muséum national d'Histoire naturelle. (Suite) (Mugiliformes et Polynémiformes). Bull Mus Natl Hist Nat (Sér 3) Zool (15):673–734

Bleeker P (1849) Bijdragen tot de kennis der Percoïden van den Malayo-Molukschen Archipel, met beschrijving van 22 neiuwe soorten. Verh Bat Gen 22:1–64

Bleeker P (1852) Zesde bijdrage tot de kennis der ichthyologische fauna van Borneo. Visschen van Pamangkat, Bandjermassing, Praboekarta en Sampit. Natuurkd. Tijdschr Neder Indië 3:407–442

Bleeker P (1857) Tiende bijdrage tot de kennis der ichthyologische fauna van Borneo. Visschen van de Rivieren Barito, Kahajan en Kapoeas. Act Soc Sci Indo-Neerl 2:1–21

Bleeker P (1858) Elfde bijdrage tot de kennis der ichthyologische fauna van Borneo. Visschen van Sinkawang. Acta Soc Sci Indo-Neerl 3:1–4

Bleeker P (1860) Dertiende bijdrage tot de kennis der vischfauna van Borneo. Acta Soc Sci Indo-Neerl 8:1–64

Bleeker P (1983) Atlas ichthyologique des Indes Orientales Néêrlandaises. Plates for planned tomes 11–14. Smithsonian Institution Press, Washington, DC

Cuvier G, Valenciennes A (1831) Histoire naturelle des poissons, vol 7. Levrault, Paris

Eschmeyer WN (1998) Catalog of fishes, vol 1. California Academy of Sciences, San Francisco

Feltes RM (1991) Revision of the polynemid fish genus *Filimanus*, with the description of two new species. Copeia 1991:302–322

Fowler HW (1905) Some fishes from Borneo. Proc Acad Nat Sci Phila 57:455–523

Fowler HW (1935) A synopsis of the fishes of China. Hong Kong Nat 6:276–284

Gloerfelt-Tarp T, Kailola PJ (1984) Trawled fishes of southern Indonesia and northwestern Australia. Australian Development Assistance Bureau, Directorate General of Fisheries of Indonesia, and German Agency for Technical Cooperation, Jakarta

Hubbs CL, Lagler KF (1947) Fishes of the Great Lakes region. Bull Cranbrook Inst Sci (26):i–xi + 1–186

Hubrecht AA (1879) Catalogue des collections formées et laissées par M.-P. Bleeker. De Breuk & Smits, Leiden

Hureau J-C (1986) Polynemidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the north-eastern Atlantic and the Mediterranean, vol 3. UNESCO, Paris, pp 1205–1206

ICZN (The International Commission on Zoological Nomenclature) (1999) International code of zoological nomenclature, 4th edn. Adopted by the General Assembly of the International Union of Biological Sciences. International Trust for Zoological Nomenclature, London

Kottelat M, Lim KKP (1995) Freshwater fishes of Sarawak and Brunei Darussalam: a preliminary annotated check-list. Sarawak Mus J (New Ser) 48:227–256

Kottelat M, Whitten AJ, Kartikasari SN, Wirjoatmodjo S (1993) Freshwater fishes of western Indonesia and Sulawesi. Periplus, Jakarta

Leviton AE, Gibbs RH Jr, Heal E, Dawson CE (1985) Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985:802–832

Linnaeus C (1758) Systema naturae, 10th edn, vol 1. Laurentii Salvii, Holmiae

Mabee PM (1988) Supraneural and predorsal bones in fishes: development and homologies. Copeia 1988:827–838

Motomura H, Iwatsuki Y (2001) A new genus, *Leptomelanosoma*, for the polynemid fish previously known as *Polydactylus indicus* (Shaw, 1804) and a redescription of the species. Ichthyol Res 48:13–21

Motomura H, Iwatsuki Y, Kimura S, Yoshino T (2000) Redescription of *Polydactylus macrochir* (Günther, 1867), a senior synonym of *P. sheridani* (Macleay, 1884) (Perciformes: Polynemidae). Ichthyol Res 47:327–333

Motomura H, Mikschi E, Iwatsuki Y (2001) *Galeoides* Günther, 1860, a monotypic genus of the family Polynemidae (Perciformes). Cybium 25:269–272

Myers GS (1936) A new polynemid fish collected in the Sadong River, Sarawak by Dr. William T. Hornaday. J Wash Acad Sci 26:376–382

Pel HS (1851) Over eene nieuwe soorte van *Polynemus*. Bijdr Dierkd 1:9–10

Rainboth WJ (1996) Fishes of the Cambodian Mekong. FAO species identification field guide for fishery purposes. FAO, Rome

Randall JE, Lim KKP (2000) A checklist of the fishes of the South China Sea. Raffles Bull Zool Suppl (8):569–667

Sauvage HE (1881) Description de quelques poissons d'espèces nouvelles de la collection du Muséum d'histoire naturelle. Bull Soc Philomath Paris 5:101–104

Springer VG (1982) Pacific plate biogeography, with special reference to shorefishes. Smithson Contrib Zool 367:i–iii + 1–182

Steindachner F (1869a) Eine Abhandlung über neue oder seltene Fische des Wiener-Museums. Anz Akad Wiss Wien 6:125–126

Steindachner F (1869b) Ichthyologische Notizen (VIII). Sitzungsber Akad Wiss Wien 60:120–139

Weber M, de Beaufort LF (1922) The fishes of the Indo-Australian Archipelago, vol 4. Heteromi, Solenichthyes, Synentognathi, Percesoces, Labyrinthici, Microcyprini. EJ Brill, Leiden