Revision of the threadfin genus *Polydactylus* (Perciformes: Polynemidae) from the eastern Pacific Ocean

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**Abstract** The taxonomy of the eastern Pacific species of *Polydactylus* was revised, resulting in the recognition of two species: *Polydactylus approximans* (Lay and Bennett, 1839), a senior synonym of *Polynemus californiensis* Thominot, 1886; and *Polydactylus opercularis* (Gill, 1863), a senior synonym of *Polynemus melanopoma* Günther, 1864. Redescriptions of the two species and comparisons with related congeners are presented. The type material status of *Polydactylus approximans* and the type locality of *Polydactylus opercularis* are also discussed.

**Key words** Revision · *Polydactylus approximans* · *Polydactylus opercularis* · Eastern Pacific

Four nominal species of the family Polynemidae, viz., *Polydactylus approximans* Lay and Bennett, 1839, *Trichidion opercularis* Gill, 1863, *Polynemus californiensis* Günther, 1864, and *Polynemus melanopoma* Günther, 1886, have been reported from the eastern Pacific Ocean. Of these, *Polydactylus approximans* and *Trichidion opercularis* have been widely regarded as valid species, both having been regarded to belong to *Polydactylus* (Eschmeyer and Herald, 1983; Allen and Robertson, 1994; Schneider, 1995). Although these two species have been mentioned in numerous brief treatments of general classification and regional faunal studies (Hildebrand, 1946; Bussing and López S., 1994; Grove and Lavenberg, 1997; Chirichigno F. and Vélez D., 1998), they have at no time been reconsidered on the basis of type data and an appropriate range of nontype material. Furthermore, two other nominal species, *Polynemus californiensis* and *Polynemus melanopoma*, have not been reported since their original descriptions, except in a type catalog report of the former, resulting in the taxonomic status of the two species still not being clear.

*Polynemus californiensis* and *Polynemus melanopoma* are herein regarded as junior synonyms of *Polydactylus approximans* and *Polydactylus opercularis*, respectively, following examination of type and nontype material, representing wide distributional ranges. Redescriptions of the latter two are given here, along with a discussion of certain aspects of the type data of both.

**Materials and Methods**

Counts and measurements follow Hubbs and Lagler (1947) and Motomura et al. (2000b, 2002a). Counts of pectoral filaments begin with the anteriormost (ventralmost) element. Standard and total lengths are expressed as SL and TL, respectively. 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 follows Ahlstrom et al. (1976). Institutional codes follow Leviton et al. (1985). The presence of a swimbladder in *Polydactylus approximans* and its absence in *Polydactylus opercularis* were confirmed from seven specimens [USNM 15129, 41393, 46488 (1 of 3 specimens), 46876, 47464, 50343 (2), 65622 (3), 79871, 177799 (1 of 2), 181287 (5), 181320, 200371, 367309 (1 of 18)], respectively, the abdomen of these fish having already been dissected. Osteological characters were confirmed from X-ray photos taken of 11 *Polydactylus approximans* [USNM 43265, 53517, 65621, 127892, 220698, 220779, 220784 (3); BMNH 1863.12.16.30, 1866.1.14.6] and 10 *Polydactylus opercularis* [USNM 177799 (2), 181287 (5), 367308 (2); BMNH 1864.1.26.321].

**Genus Polydactylus** Lacepède, 1803

*Polydactylus plumierii*, described as a new genus and species by Lacepède (1803), is presently regarded as a junior synonym of a western Atlantic species, *Polydactylus virginicus* (Linnaeus). Accordingly, the type species of *Polydactylus* is considered to be the same species as *Polydactylus virginicus* (Talwar and Jhingran, 1992; Castro-Aguirre et al., 1999).

*Polydactylus* differs from seven other valid polynemid genera (listed by Motomura and Iwatsuki, 2001a) in having the following combination of characters (Motomura et al., 2000a,b, 2001a,c,d,g,j, 2002b; Motomura and Iwatsuki,
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2001b): dermal eye opening 1.3 or less in snout length (1.3 or more in Parapolynemus and Polynemus, see Feltes, 1993; Motomura and Sabaj, 2002; Motomura et al., 2002c); width of tooth band on upper and lower jaws wider than space separating tooth bands on opposing premaxilla (narrower in Filimanus and Pentaneumus, see Feltes, 1991; Motomura et al., 2000c, 2001f); lip on anterior part of lower jaw either well or poorly developed (absent in Eleutheronema, see Motomura et al., 2002a); basisphenoid in contact with prootic (not in contact in Filimanus and basisphenoid absent in Parapolynemus and Polynemus, see Feltes, 1991, 1993; Motomura et al., 2001i); pectoral fin base including base of pectoral filaments less than upper jaw length (greater in Galeoides, see Feltes, 1993; Motomura et al., 2001b,e); anal fin soft rays less than 18 (more than 24 in Pentaneumus, see Feltes, 1993); swimbladder absent or simple, not extending beyond anal fin origin (swimbladder with many appendages in Leptomelanosoma, see Motomura and Iwatsuki, 2001a, and swimbladder extending beyond anal fin origin in Galeoides, see Feltes, 1993; Motomura et al., 2001b).

Polydactylus is distributed from tropical to temperate areas worldwide: 14 species currently recognized as valid occurring in the Indo-Pacific (Motomura et al., 2000b, 2001a,c,d,g,i,j, 2002b; Motomura and Iwatsuki, 2001a,b), 2 species in the eastern Pacific (Allen and Robertson, 1994; Schneider, 1995; this study), 3 species in the western Atlantic (Randall, 1978; Robins and Ray, 1986), and 1 species in the eastern Atlantic (Allen, 1981; Njock, 1990).

Polydactylus approximans (Lay and Bennett, 1839)

(English name: blue bobo)
(Spanish name: barbudo seis barbas)
(Figs. 1A, 1B, 2A)

Polynemus approximans Lay and Bennett, 1839: 57 (type locality: San Blas and Mazatlán, west coast of Mexico, based on a brief sketch and description by Mr. Collie).

Polynemus californiensis Thominot, 1886: 161 (type locality: California, USA).

Material examined. 58 specimens, 24–228 mm SL. BMNH 1863.12.16.30 (previously regarded as 1 of 2 syntypes of Polynemus approximans Lay and Bennett, see Remarks), 107 mm SL, Panama; BMNH 1866.1.4.6 (previously regarded as 1 of 2 syntypes of Polynemus approximans Lay and Bennett, see Remarks), 215 mm SL, Panama; CAS 2823, 122 mm SL, Bathing beach, Acapulco Bay, Guerrero, Mexico; CAS SU 6292, 186 mm SL, Lima, Bay of Callao, Peru; CAS SU 35305, 183 mm SL, Monterey Bay, California, USA; MNHN 1884–487 (holotype of Polynemus californiensis Thominot), 179 mm SL, California, USA; USNM 15129, 123 mm SL, Panama; USNM 41054, 179 mm SL, Panama. A MNHN 1884–487 (holotype of Polynemus californiensis Thominot), 179 mm SL, California. B BMNH 1866.1.4.6 (previously regarded as syntype of Polynemus approximans Lay and Bennett), 215 mm SL, Panama. C BMNH 1864.1.26.321 (holotype of Polynemus melanopoma Günther), 263 mm SL, Guatemala. D USNM 41054, 179 mm SL, Panama.

Fig. 1. Polydactylus approximans (A, B) and Polydactylus opercularis (C, D). A MNHN 1884–487 (holotype of Polynemus californiensis Thominot), 179 mm SL, California. B BMNH 1866.1.4.6 (previously regarded as syntype of Polynemus approximans Lay and Bennett), 215 mm SL, Panama. C BMNH 1864.1.26.321 (holotype of Polynemus melanopoma Günther), 263 mm SL, Guatemala. D USNM 41054, 179 mm SL, Panama.