Dolichopteryx minuscula, a new species of spookfish (Argentinoidei: Opisthoproctidae) from the Indo-West Pacific

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Received: June 16, 2005 / Revised: October 22, 2005 / Accepted: October 27, 2005

Ichthyological Research

Ichthyol Res (2006) 53: 113–120
DOI 10.1007/s10228-005-0329-8

Abstract A new species *Dolichopteryx minuscula* is described on the basis of three specimens [49.4–59.6 mm in standard length (SL)] collected from the Indo-West Pacific. The new species is characterized by pouchlike eyes with a small lens (lens diameter 2.2% SL), an adipose fin, the anal fin base originating posterior to the dorsal fin base, and 16–17 (= 5–6 + 1 + 10–11) gill rakers. Total fecundity was relatively low, only 658 ova being obtained from one specimen, despite the ovary being mature. Ovarian eggs were clearly subdivided into "undeveloped" (0.1–0.7 mm diameter classes, $n = 561$) and "developed" (1.0–1.3 mm classes, $n = 97$) groups, based on their frequency distribution. Such relatively low fecundity and frequency distributions of ovarian eggs suggest that *Dolichopteryx* species spawn iteratively during spawning season.

Key words *Dolichopteryx minuscula* · New species · Opisthoproctidae · Indo-West Pacific

Members of *Dolichopteryx* Brauer, 1901 (Argentinoidei: Opisthoproctidae), distributed worldwide in oceanic midwater depths, exhibit neotenic characters, the internal organs being enclosed by the peritoneum and skin as a result of the hypaxial musculature being undeveloped along the ventral margin of the body (Cohen, 1964). They are also characterized by an elongate body, tubular or pouchlike, dorsally or anterodorsally directed eyes, two branchiostegal rays, and multiserial vomerine teeth (Brauer, 1901, 1906; Beebe, 1932; Parr, 1937; Cohen, 1964; Ahlstrom et al., 1984; Badcock, 1988; Moser, 1996; Kobylianskii and Fedorov, 2001).

The systematics of *Dolichopteryx* is still unclear (Cohen, 1984; Badcock, 1988; Paxton and Cohen, 1999; Fukui and Kitagawa, 2006). Six species, *Dolichopteryx anascopa* Brauer, 1901, *Dolichopteryx binocularis* Beebe, 1932, *Dolichopteryx longipes* (Vaillant, 1888), *Dolichopteryx parini* Kobyliansky and Fedorov, 2001, *Dolichopteryx trunovi* Parin, 2005, and *Dolichopteryx rostrata* Fukui and Kitagawa, 2006 are currently considered as valid (Badcock, 1988; Moser, 1996; Kobylianskii and Fedorov, 2001; Parin, 2005; Fukui and Kitagawa, 2006), with two additional species briefly described but as yet unnamed (see Fujii, 1984; Moser, 1996). Of the unnamed species, *Dolichopteryx* sp. (sensu Fujii, 1984) from the western North Pacific Ocean, was considered to be *D. parini* by Kobylianskii and Fedorov (2001), but Fukui and Kitagawa (2006) showed that this was incorrect, because dorsal and anal fin ray numbers and relative position of anal fin base to dorsal fin base do not agree between them. This unnamed species is described herein as a new species.

Methods

Counts and measurements followed Cohen (1964) and Nakabo (2002), except for preadipose length (distance from the tip of the snout to the origin of the adipose fin), preanal length (distance from the tip of the snout to the origin of the anal fin), preanus length (distance from the tip of the snout to the posterior edge of the anus), and prepelvic length (distance from the tip of the snout to the origin of the pelvic fin). Body measurements were made to the nearest 0.1 mm. Standard length is abbreviated as SL. Gill rakers were counted on the outer side of the first arch on the right side. Vertebral counts were made from radiographs. Because the urostyle is clearly subdivided into three parts in *Dolichopteryx*, it was here considered as three. After counts, measurements, sketches, and photographs, the gonad and several ova detached from the ovary were removed from USNM 200660, and ova greater than 0.10 mm in diameter were counted and measured. Ovarian egg diameter (maximum length) was measured to the nearest 0.01 mm under a dissecting microscope. Institutional abbreviations follow Eschmeyer (1998).

Dolichopteryx minuscula sp. nov.

(Japanese name: Hina-deme-nigisu)
(Figs. 1–4; Tables 1, 2)

Dolichopteryx sp.: Fujii, 1984: 42, pl. 46-O (western North Pacific; 6 cm SL specimen); Aizawa, 2002: 287 (western North Pacific).

Holotype. NSMT-P 69426, 55.7 mm SL, western North Pacific Ocean, off northern Honshu, Japan (39°11.7′ N, 143°55.2′ E), bottom depth 5050 m, 26 July 1981, IKMT (Isaacs-Kidd midwater trawl) net (wire out 2000 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-81-4.

Paratypes. 2 specimens: NSMT-P 69846, 49.4 mm SL, western North Pacific Ocean, east to Ogasawara Is., Japan (29°00.0′ N, 150°01.9′ E), bottom depth about 5800 m, 19 May 1988, KOC (Kaiyo-maru opening closing) net (capture depth 1000 m to surface), R/V *Kaiyo-maru* cruise; USNM 200660, female, 59.6 mm SL, western Indian Ocean, south to Mauritius (Mauritius) (31°58′ S, 59°45′ E), bottom depth 1360 m, 8 Sept. 1963, *Anton Bruun* cruise.

Diagnosis. Eyes with small lens (lens diameter 2.2% SL), pouchlike; adipose fin present; origin of anal fin posterior to dorsal fin base; gill rakers 16–17 (= 5–6 + 1 + 10–11).

Description. Counts and measurements are presented in Table 1. The holotype is given first, followed by those of paratypes in parentheses when different. Body elongate, cross section oval on head and trunk, compressed and rectangular on caudal peduncle. Head short. Snout short, horizontal distance from tip of snout to anterior margin of eye 1.52 (1.26–1.66) times that from posterior margin of eye to posterior margin of operculum. Body depth increasing from posterior to nostrils, greatest depth just before posterior margin of operculum, thereafter gradually becoming shallow. Body width gradually increasing from tip of snout, greatest width just before posterior margin of operculum, thereafter gradually becoming narrow, about 4/5 of maximum body width at insertion of pelvic fin base and about 1/2 at adipose fin base. Branchiostegal rays two. Gill mem-

Table 1. Counts and proportional measurements of *Dolichopteryx minuscula* sp. nov

	Holotype	Paratypes		Non-type
	NSMT-P 69426 55.7 mm SL	USNM 200660 59.6 mm SL	NSMT-P 69846 49.4 mm SL	Fujii (1984)[a] 6 cm SL
Counts				
Dorsal fin rays	10	9	9	9
Anal fin rays	6	8	8	8
Pectoral fin rays	15	16	16	15
Pelvic fin rays	10	11	10	9
Principal caudal fin rays	10 + 9	Damaged	10 + 10	ND
Gill rakers	17 (= 5 + 1 + 11)	17 (= 6 + 1 + 10)	17 (= 5 + 1 + 11)	ND
Vertebrae[b]	45 (= 28 + 17)	45 (= 27 + 18)	46[c]	ND
Proportional measurements (% SL)				
Head length	28.9	30.9	31.2	ND
Snout length	16.5	17.4	16.0	ND
Body depth	14.7	15.1	15.8	ND
Caudal peduncle depth	7.9	8.2	8.5	ND
Body width	10.8	10.2	10.1	ND
Predorsal length	73.4	72.3	72.9	ND
Prepelvic length	63.4	60.9	63.8	ND
Preanal length	83.7	82.6	83.8	ND
Preadipose length	89.9	89.6	89.9	ND
Preanus length	82.8	81.4	81.6	ND
Pectoral fin length	Damaged	Damaged	16.4	ND
Pelvic fin length	Damaged	Damaged	21.3	ND
Eye diameter	3.6	3.7	3.8	ND
Lens diameter	2.2	2.2	2.2	ND
Interorbital width	1.3	1.2	1.4	ND
Dorsal fin base	5.4	5.5	5.3	ND
Anal fin base	3.4	3.5	4.0	ND
Pectoral fin base	5.4	4.4	5.1	ND
Pelvic fin base	2.3	1.7	2.6	ND

ND, no data

[a] *Dolichopteryx* sp.

[b] Total vertebrae (= abdominal + caudal)

[c] Abdominal/caudal vertebral transition uncertain

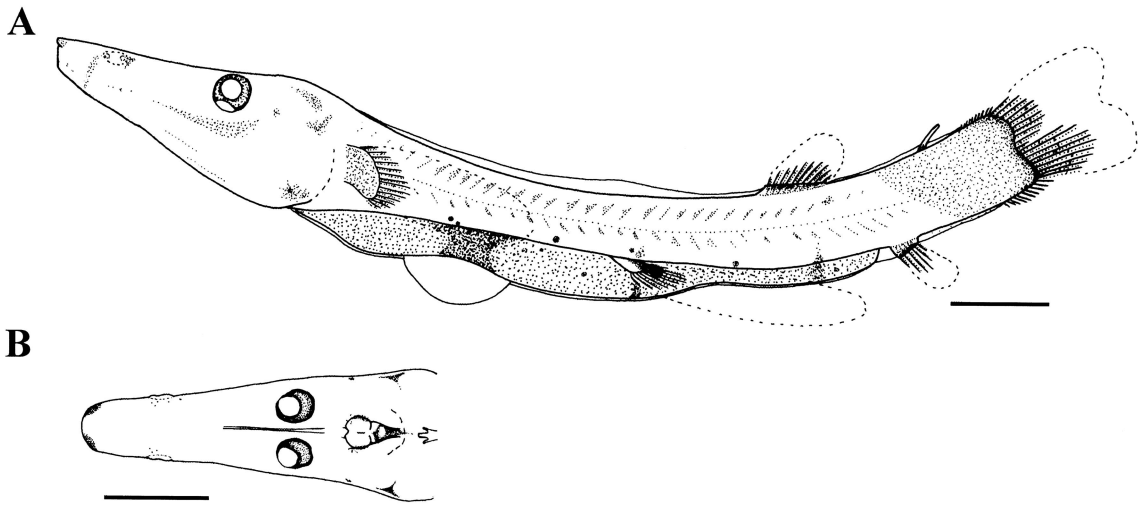

Fig. 1. *Dolichopteryx minuscula* sp. nov., NSMT-P 69426 (holotype), 55.7 mm SL, western North Pacific Ocean, off northern Honshu, Japan. **A** Lateral view. **B** Dorsal view of head. *Bar* 5 mm

Fig. 2. *Dolichopteryx minuscula* sp. nov., NSMT-P 69846 (paratype), 49.4 mm SL, western North Pacific Ocean, east to Ogasawara Is., Japan. *Bar* 5 mm

branes broadly united, separated from isthmus. Mouth terminal, small. Premaxillary appear to be absent. Two to three rows of long conical teeth inwardly directed on vomer; a row of short needle-like teeth upwardly directed on dentary. Nostrils small, with two short papillae, located anterior 1/5 of head length. Eyes small, slightly protruding to pouchlike; a small crescentic opaque layer apparent on ventral aspect after alcohol preservation; lens small, directed anterodorsally. Orbital width relatively narrow, about 1/10 of maximum body width. Gill rakers developed: those on outer side of first arch forming a triangular patch in shape 5 + 1 + 11 (5–6 + 1 + 10–11), those on inner side small, spinous >4 + 9 (>4 + 8–9). Trunk and tail covered by thin transparent skin. Dorsal margin of epaxial and ventral margin of hypaxial in trunk undeveloped, gut and gonad enclosed along ventral margin by peritoneum and skin. Deep cleavage from nape to origin of caudal procurrent ray on dorsal midline; shallow cleavage from just after anus to origin of caudal procurrent ray on ventral midline; both cleavages becoming shallower posteriorly. Anus below 32nd myomere. Dorsal and anal fin pterygiophores extending above dorsal and below ventral margins of body, respectively, being inserted proximally into each cleavage. Dorsal fin base ending before a vertical line from anus. Anal fin base between anus and vertical line from adipose fin. Distal parts of dorsal and anal fin rays damaged. Horizontal distance from posterior end of anal fin base to base of lowest principal caudal fin ray 13.5 (11.9–12.1) % SL. Pelvic fin base with a small knot of musculature, inserted ventrally on 18th (18th or 19th) myomere at midpoint between pectoral fin base and origin of anal fin. Distal parts of pelvic fin rays damaged (tip of longest ray not extending to origin of anal fin in a paratype: NSMT-P 69846). Pectoral fin with a long stalklike base, inserted on a horizontal line from ventral margin of eye lens. Distal parts of pectoral fin rays damaged (tip of longest 7th–10th rays before insertion of pelvic fin base in a paratype: NSMT-P 69846). Caudal fin with 10 upper and 10 lower procurrent rays. Adipose fin distinct, elongate, short based. Scales not found. The most variable body proportion was the ratio of prepelvic length to SL (from 63.8% at 49.4 mm SL to 60.9% at 59.6 mm SL).

Color in alcohol.—Head light yellow (light yellow to light brown) with a pale brownish band and several blotches; body light yellow (light yellow to light brown) with brownish rows and blotches, except brownish to blackish on posterior caudal region; peritoneum silvery-white with blackish blotches (Fig. 2). Melanophores brownish to blackish, punctate or stellate, rarely branched. On head, several clusters of melanophores on anterior half of snout, a short latitudinal line below anterior tip of nostrils, a short, somewhat triangular longitudinal band from behind the latitudinal line from

nostrils, below eye to behind posterior margin of orbit, two short longitudinal lines below the band; three clusters of melanophores on operculum; a dense cluster above brain. In trunk and tail, except posteriormost of latter, many dense rows of melanophores almost centrally on both epaxial and hypaxial sections; melanophores tending to occur along myosepta, those on epaxial portion numbering slightly more than on hypaxial portion until pelvic fin insertion, thereafter numbers similar; along ventral margin, 5 (5 or 6) large punctate or stellate melanophores, and two small clusters just behind pelvic fin base and before anus, expanding onto peritoneum; numerous dense melanophores on tail posteriorly. A blackish line following base of cleavages along dorsal and ventral midlines, from cleavage origins to dorsal fin origin and to origin of caudal procurrent rays, respectively. Many melanophores present on pterygiophore regions of dorsal and anal fins, and knot of pelvic fin base. Many melanophores on outer surface of stalked base of pectoral fin, several on inner surface. Several melanophores on base of adipose fin. Proximal part of pelvic fin rays blackish. External peritoneum silvery-white, blackish internally with numerous large well-developed punctate and stellate melanophores, especially dense in 3 (3–5) approximately equidistant bands. Ovary was light- to reddish-brown in alcohol (Fig. 3).

Etymology. The specific name "*minuscula*" meaning rather small refers to the small body size among *Dolichopteryx*.

Distribution. Known from the western North Pacific and western Indian Ocean.

Reproductive notes. Total fecundity was low, only 658 ova being found, including several developmental stages. Ova could be clearly subdivided into "undeveloped" (0.1–0.7 mm diameter classes, light brown in color) and "developed" groups (1.0–1.3 mm classes, light to reddish-brown), based on their frequency distribution (not all ova size classes represented) (Fig. 4). "Undeveloped" ova numbered 561, having two distribution modes (0.1–0.2 mm and 0.3–0.4 mm classes); "developed" ova numbered 97, having an almost normal distribution with a mode at the 1.2–1.3 mm class, the maximum ova diameter being 1.33 mm. Oil globules were not obvious because all the yolks in all ova were broken.

Remarks. *Dolichopteryx minuscula* sp. nov., *D. parini*, and *D. rostrata* uniquely share to have both pouchlike eyes and adipose fin among the seven valid species of *Dolichopteryx* (Table 2). Among the three species, only *D. minuscula* possesses the anal fin base originating after the end of dorsal fin base (vs. before in the remaining two species). In addition, the dorsal and anal fin ray numbers (9–10 and 6–8) of the new species are lower than those of *D. parini* (11–13 and 10–11), and the vertebral number (45–46) is higher than that of *D. rostrata* (41). On the other hand, *D. minuscula* is similar to *D. trunovi* from southeastern Pacific (Parin, 2005) and *Dolichopteryx* sp. (70.9 mm SL) from off California, eastern North Pacific (Moser, 1996) in having an adipose fin and the anal fin base originating posterior to the dorsal fin base. However, *D. minuscula* clearly differs from *D. trunovi* in having pouchlike eyes and small anal fin ray numbers (6–8) (vs. tubular eyes and 9–10, see Trunov, 1997; Parin, 2005) and from *Dolichopteryx* sp. (sensu Moser, 1996) in having pouchlike eyes and low vertebral number (27–28 + 17–18 = 45–46) (vs. tubular eyes and vertebral number 27 + 20 = 47 in SIO 93-246). In addition, the vertebral number of *D. trunovi* (46–47, see Trunov, 1997: table 2) was not included in urostyles (considered here as three parts). Although the described specimens of the above five species including *Dolichopteryx* sp. (sensu Moser, 1996) range widely between 49.4 and 217.0 mm SL, all meristic counts except both procurrent caudal fin rays and gill rakers are completed in numbers until about 30 mm SL of transformation stage in *Dolichopteryx* (Moser, 1996). The relative position of anal fin to dorsal fin also is almost fixed until the same stage. Accordingly, the aforementioned morphological differences are clearly specific, not ontogenetic, in origin. The description and photograph of an unnamed species in Fujii (1984) (specimen not registered) satisfied the foregoing characters of *D. minuscula*. Only two species, the new species and *D. longipes*, are distributed in the western North Pacific. There are many morphological differences between

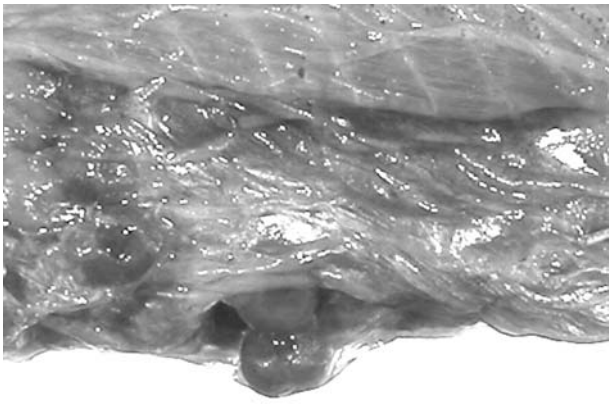

Fig. 3. Lateral view of abdominal region of *Dolichopteryx minuscula* sp. nov., USNM 200660 (paratype), 59.6 mm SL

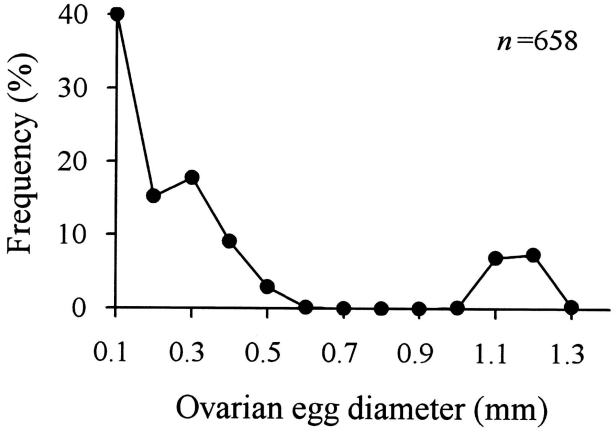

Fig. 4. Frequency distribution of ovarian egg diameters in *Dolichopteryx minuscula* sp. nov., USNM 200660 (paratype), 59.6 mm SL

Table 2. Comparison of characters, counts, and proportional measurements in seven species of *Dolichopteryx*

	D. minuscula sp. nov.	*D. parini*[a]	*D. rostrata*[b]	*D. anascopa*[c]	*D. binocularis*[e]	*D. longipes*[i]	*D. trunovi*[o]
Standard length (mm)	49.4–59.6	125.5–217.0	66.2	36.2	220–242	54.9–127.4	81.4
Eye shape	Pouchlike	Pouchlike	Pouchlike	Tubular	Tubular	Tubular[j]	Tubular[e]
Adipose fin	Present	Present	Present	Absent	Absent	Absent[j]	Present
Relative position of origin of anal fin base to end of dorsal fin base	After	Before	Before	Before	Before	Just below[k]	After
Longitudinal brownish band below eyes	Present (short)	Present (short)	Present (long)	Absent	Absent	Absent[j]	ND
Counts							
Dorsal fin rays	9–10	11–13	9	ND	14–15[f]	10–11	9–11[e]
Anal fin rays	6–8	10–11	8	ND	10–11[f]	9	9–10[e]
Pectoral fin rays	14–16	15	14	14	14[f]	13–14	12–14[e,o]
Pelvic fin rays	10–11	10–11	12	12	7?–9[f]	10	9–10[e,o]
Principal caudal fin rays	10 + 9–10	ND	10 + 9	ND	9 + 1 + 9	10 + 9–10	ND
Gill rakers	16–17 (= 5–6 + 1 + 10–11)	26–28	24 (= 8 + 1 + 15)	ca. 31 (= ca. 8 + 23)	25 (= 7 + 1 + 17)	25 (= 7 + 1 + 17)[l]	11 (= 4 + 7)
Vertebrae	45–46 (= 27–28 + 17–18)	46–47	41 (= 26 + 15)	ND	58 (= 41 + 17)[g]	46–47 (= 28–29 + 17–18)[k]	46–47[e,p]
Myomeres	ND	ND	ND	44	ND	ND	48
Proportional measurements (% SL)							
Head length	28.9–31.2	27.0–31.3	39.7	30.9[d]	26.5	29.4–30.6	25.3
Snout length	16.0–17.4	10.4–14.8	25.4	14.4	10.3	13.9–15.5	12.4–14.6[e]
Body depth	14.7–15.8	10.8–14.5	15.1	ND	11.4–14.5	12.0–13.3	9.5
Caudal peduncle depth	7.9–8.5	6.5–9.2	7.4	ND	7.4–7.9	7.1–8.0	5.5
Body width	10.1–10.8	15.6*	14.0	ND	ND	8.5–10.5	ND
Predorsal length	72.3–73.4	72.1–76.5	83.2	78.4[d]	81.0–81.5	74.3–78.4	72.5
Prepelvic length	60.9–63.8	55.8–60.9	67.7	61.1[d]	80.0–82.6	70.3–72.7	55.1
Preanal length	82.6–83.8	80.5–83.4	85.2	81.3[d]	86.2–86.4	81.1–81.6	87.8*

Table 2. *Continued*

	D. minuscula sp. nov.	*D. parini*[a]	*D. rostrata*[b]	*D. anascopa*[c]	*D. binocularis*[e]	*D. longipes*[i]	*D. trunovi*[o]
Preadipose length	89.6–89.9	86.5–91.5	93.2	—	—	—	93.9*
Preanus length	81.4–82.8	ca. 79	79.8	ND	ca. 82[h]	78.0–79.5	83.5
Pectoral fin length	16.4	38.0–46.4	22.7	ND	57.5–64.1	12.9[m]	ND
Pelvic fin length	21.3	37.5–42.3	27.8	ND	ND	16.4–17.0	ND
Eye diameter	3.6–3.8	6.7–7.6	3.5	5.0[d]	7.9	4.2–6.8	6.7–7.1[e]
Eye height	—	—	—	ND	ND	4.1–5.7[n]	ND
Lens diameter	2.2	3.5*	2.4	ND	5.2*	2.9–3.9	ND
Interorbital width	1.2–2.3	1.8*	2.6	ND	ND	0.6–0.9	ND
Dorsal fin base	5.3–5.5	8.5*	4.8	ca. 7[d]	9.2*	6.0–6.8	7.3
Anal fin base	3.4–4.0	7.0*	4.1	8.6[d]	5.2*	3.5–4.0	6.6
Pectoral fin base	4.4–5.4	6.3*	4.5	ND	2.9*	2.7–4.4	ND
Pelvic fin base	1.7–2.6	4.2*	1.5	ND	2.3*	1.4–2.3	ND

ND, no data

[a] Data from Kobylianskii and Fedorov (2001) and Mecklenburg et al. (2002) [*, from Kobylianskii and Fedorov (2001: fig. 1)]

[b] Data from Fukui and Kitagawa (2006)

[c] ZMB 17428 (holotype, heavily damaged)

[d] Data from Brauer (1901, 1906)

[e] Data from Trunov (1997) [* from Trunov (1997: fig. 2)]

[f] Data from Cohen (1964) and Trunov (1997)

[g] BMNH 1930.1.12.10

[h] Data from Beebe (1932: fig. 8)

[i] BMNH 1969.6.26.534 and IORD 04-63, 86-344, 86-343 (3 specimens)

[j] MNHN 1887-0136 (holotype, damaged, photograph), BMNH 1969.6.26.534, and IORD 04-63, 86-344, 86-343, 02-107, 02-108, 86-342 (6 specimens)

[k] BMNH 1969.6.26.534 and IORD 04-63, 86-344, 86-343, 02-107, 02-108, 86-342 (6 specimens)

[l] IORD 04-63

[m] Data from Cohen (1964: fig. 18)

[n] BMNH 1969.6.26.534 and IORD 04-63, 86-344, 86-343, 86-342 (4 specimens)

[o] Data from Parin (2005) (*, from figure)

[p] Urostyle was not counted

them (e.g., eye shapes, relative position of anal fin to dorsal fin, and prepelvic fin length; see Table 2).

The mature female of *D. minuscula* (paratype, USNM 200660, 59.6 mm SL) was smaller than that recorded for *D. rostrata* (66.2 mm SL; Fukui and Kitagawa, 2006). In addition, the largest specimen of this new species is the least among the currently known species of *Dolichopteryx* [all greater than 66 mm SL, except *D. anascopa* (36.2 mm SL), known only from a juvenile] (Beebe, 1932; Cohen, 1964; Moser, 1996; Trunov, 1997; Kobylianskii and Fedorov, 2001; Fukui and Kitagawa, 2006).

Ovarian eggs of *D. minuscula* were similar to *D. rostrata* in frequency distribution, total fecundity (658 vs. 473) and total number of "developed" ova representing batch fecundity (97 vs. 68). *Dolichopteryx longipes* has also been noted as having more than about 100 "well developed" ovarian eggs (Cohen, 1964). Such relatively low fecundity and frequency distributions of ovarian eggs suggest that *Dolichopteryx* species spawn iteratively during spawning season.

Comparative materials. *Dolichopteryx anascopa*: 1 specimen, ZMB 17428 (holotype, badly damaged), 36.2 mm SL [34.75 mm SL in Brauer (1906)], Indian Ocean, West of Cocos-Islands (10°08.03′ S, 97°14.15′ E), bottom depth 2400 m. *Dolichopteryx binocularis*: 1 specimen, BMNH 1930.1.12.10, 97.6 mm SL, southeast Atlantic Ocean (33°50.00′ S, 16°04.00′ E). *Dolichopteryx longipes*: 8 specimens, MNHN 1887-0136 (holotype, damaged), 45 mm SL, East Atlantic Ocean, off Morocco (29°02.0′ N, 12°29.0′ W); BMNH 1969.6.26.534, 57.1 mm SL, western Atlantic Ocean (16°22.00′ N, 86°40.00′ W); IORD 04-63, 127.4 mm SL, western North Pacific Ocean (15°59.58′ N, 140°45.31′ E), bottom depth 4726 m, 26 June 2004, coll. by IKMT net (wire out 1869 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-04-2; IORD 86-344, 73.1 mm SL, western North Pacific Ocean (15°00.6′ N, 127°10.1′ E), bottom depth about 5000 m, 3 Sept. 1986, coll. by IKMT net (wire out 1500 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-86-4; IORD 86-343, 54.9 mm SL, western North Pacific (16°00.3′ N, 129°35.2′ E), bottom depth about 5500 m, 2 Sept. 1986, coll. by IKMT net (wire out 1500 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-86-4; IORD 02-107, 53 mm SL, western North Pacific Ocean (14°20.00′ N, 137°00.40′ E), bottom depth 4950 m, 2 July 2002, coll. by IKMT net (wire out 1200 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-02-2; IORD 02-108, 51 mm SL, western North Pacific Ocean (15°00.10′ N, 144°00.00′ E), bottom depth 4020 m, 7 Aug. 2002, coll. by IKMT net (wire out 1200 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-02-2; IORD 86-342, 49.2 mm SL, western North Pacific Ocean (20°59.8′ N, 129°35.2′ E), bottom depth about 6000 m, 31 Aug. 1986, coll. by IKMT net (wire out 1500 m, mesh size 0.5 mm), R/V *Hakuho-maru* cruise KH-86-4. *Dolichopteryx* sp.: 1 specimen, SIO 93-246, 70.9 mm SL, eastern North Pacific Ocean (33°47′ N, 119°46′ E), 22 May 1962, coll. by IKMT net (wire out 1062 m).

Acknowledgments We thank S.J. Raredon (USNM), B. Séret (MNHN), J. Maclaine (BMNH), P.A. Hastings and C. Klepadlo (SIO), K. Tsukamoto (ORIT), M. Okiyama (Tokyo, Japan), T. Ozawa (Fukuoka, Japan), and P. Bartsch (ZMB) for specimen loans or radiographs, and the captains and crews of R/V *Hokuho-maru* and R/V *Kaiyo-maru* and scientists on board during Cruises KH-81-4, KH-86-4, KH-02-2, and KH-04-2 for their assistance in sampling. Grateful thanks are also given to G.S. Hardy (Ngunguru, New Zealand) and M. Okiyama for their critical comments on the manuscript and great help with English, and to E. Fujii (Japan Lutheran College) for his great help.

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