Northernmost Record of the Ovoviviparous Halfbeak, Genus *Zenarchopterus*, from Okinawa Prefecture, Japan, with Some Morphological Notes

Katsusuke Meguro

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After Mohr's (1926a) comprehensive revision of *Zenarchopterus*, Mohr (1926b), Herre (1933), Weed (1933), Fowler (1934, 1937), Smith (1945), Jones and Pantulu (1958), Chang and Chang (1962), Smith and Smith (1963), and Tayler (1964) recorded species belonging to the genus from various localities. These records indicate that all species of *Zenarchopterus* inhabit coastal and fluvial waters. They have not been recorded from north of Philippines or Hainan Island.

Seven specimens of the halfbeak belonging to the genus *Zenarchopterus* were collected at Miyara River in Ishigaki-jima, Okinawa Prefecture, ca. 24°20′N, 124°10′E. These specimens are believed to be northernmost record of the genus *Zenarchopterus*. They are identified as *Z. dunckeri* Mohr.

The halfbeaks of the genus *Zenarchopterus* are ovoviviparous, and one of the anal soft rays is expanded in width as secondary sexual character of the male. According to Breder and Rosen (1966), the use of the modified anal fin rays is not clear, and evidently the transfer of sperm is effected by the rather long genital papilla.

Zenarchopterus dunckeri Mohr
Komochi-sayori (new Japanese name)

Zenarchopterus dunckeri Mohr, 1926 : 257. New Guinea, New Pomerania, New Mecklenburg, Ambonia; Fowler, 1937 : 214, fig. 192, Rayong; Smith, 1945 : 433, Bismarck Archipelago, Dutch East Indies.

Four specimens, ZIUT (Zoological Institute, Faculty of Science, University of Tokyo) 52415～52418, and one juvenile specimen, ZIUT 52419, collected at Ishigaki-jima, Okinawa Prefecture on 9 October, 1968. Two uncatalogued specimens [denoted a (Fig. 1) and b in the present paper] collected at the same station on 27 October, 1971. All specimens were collected from a pool on the sandy bank formed in the center of the Miyara River, about 500 m from the mouth of the river. The water of the pool was perhaps slightly saline, and the pool, about 3 m to 5 m in width and 40 cm in depth, was thought to have been separated from the main flow of the river for a considerable time. The juvenile was probably born in the pool. ZIUT 52415 and the specimen a was dissected and stained with

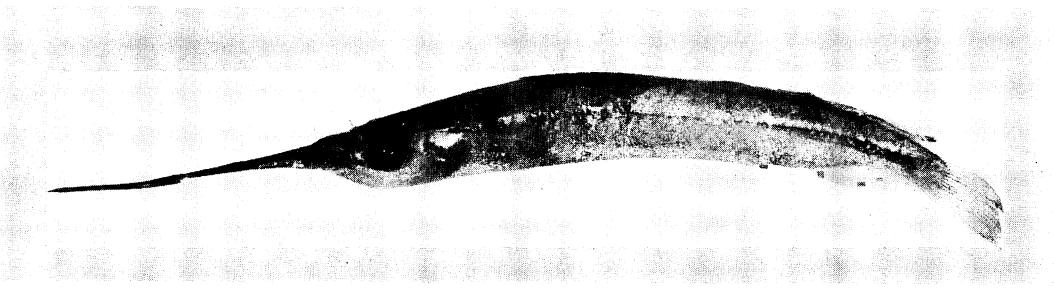

Fig. 1. *Zenarchopterus dunckeri* from Ishigaki-jima, Okinawa Prefecture, 80.0 mm in standard length.

alizarin red for the study of osteological characters.

Description

Measurements and counts are given in Table 1. Other counts are: pectoral rays i+7+ii (left and right in all specimens); pelvic rays i+5 (left and right in all specimens); caudal rays v+11+v (ZIUT 52415); predorsal scales 12~13+1+19; branchiostegal rays 10 (ZIUT 52415); vertebrae 40 (ZIUT 52415).

External characters.—In the present specimens the length of the triangular part of the upper jaw is 1.0~1.1 in its width. The length of the lower jaw in the standard length was 1.9~2.1 in the male and 2.3~2.5 in the female.

Fishes of this genus are known to have a pair of long nasal barbels (Weed, 1933), which were confirmed on the present specimens from Ishigaki-jima (Fig. 2, A). The infraorbital canal is confined anterior to the eye. The sensory canal pores (right side) are three on the infraorbital canal, seven (including the anterior nasal pore) on the supraorbital canal, and about 25 on the preoperculo-mandibular canal (Fig. 2, B). The 6th anal soft ray in the male of *Z. dunckeri* from Ishigaki-jima (80.0 mm in standard length) is thickened as the intromittent organ, and this ray is longer than the other rays. Its length is 16.3 mm, and its maximum width is 2.0 mm.

The anal papilla of the male is pointed at the tip of it, but the genital opening of the female (58.7 mm in standard length) is located near the pointed tip (Fig. 3). The anal papilla of the male is 1.3 as long as that of the female and it is 1.5 as wide as that.

Color.—The body is light brown in life. After it was collected, the species became dark grey all over, but changed to pale grey after preservation in formalin. On the side of the body, a dark brown line runs from the rear of the gill-cover to the middle of the caudal peduncle. The ventral part of the elongated lower jaw and its vicinity are nearly black. The upper margin of the dorsal fin is dark, and all the other fins are nearly hyaline.

The juvenile specimen (Fig. 6). ZIUT 52419 12.6 mm in standard length.—The nasal barbel has not yet been developed. The specimen has a well-developed preanal finfold. The color in formalin is dark brown, and on the body from the dorsal to the middle of the side,

Table 1. Measurements and counts of specimens of *Zenarchopterus dunckeri* from Ishigaki-jima.

	Catalogue number						
	52415	52416	52417	52418	52419	a	b
	♂	♂	♀	♀	juv.	♂	♂
Total length (mm)	88.3	99.4	92.4	75.1	16.0	127.0	109.0
Standard length (mm)	53.0	58.7	58.7	48.6	12.6	80.0	63.0
Head length (mm)	14.0	14.5	15.0	13.9	3.0	20.5	17.5
Diameter of eye (mm)	3.6	4.2	4.2	3.7	1.2	5.0	4.0
Length of triangular part of upper jaw (mm)	2.9	3.3	3.3	2.3	0.7	5.0	3.5
Width of triangular part of upper jaw (mm)	3.0	3.5	3.5	2.4	0.8	5.2	3.8
Width/length of triangular part of upper jaw	1.0	1.1	1.1	1.0	1.1	1.0	1.1
Length of lower jaw (mm)	28.6	37.1	25.6	19.5	2.0	38.0	36.0
Standard length/length of lower jaw	1.9	1.9	2.3	2.5	–	2.1	1.8
Depth of body (mm)	6.3	7.3	7.5	6.8	1.8	11.5	8.5
Dorsal rays	10	11	10	11	10	11	11
Anal rays	13	12	11	11	11	12	12
Scale count (in lateral line)	37	40	40	41	–	40	41

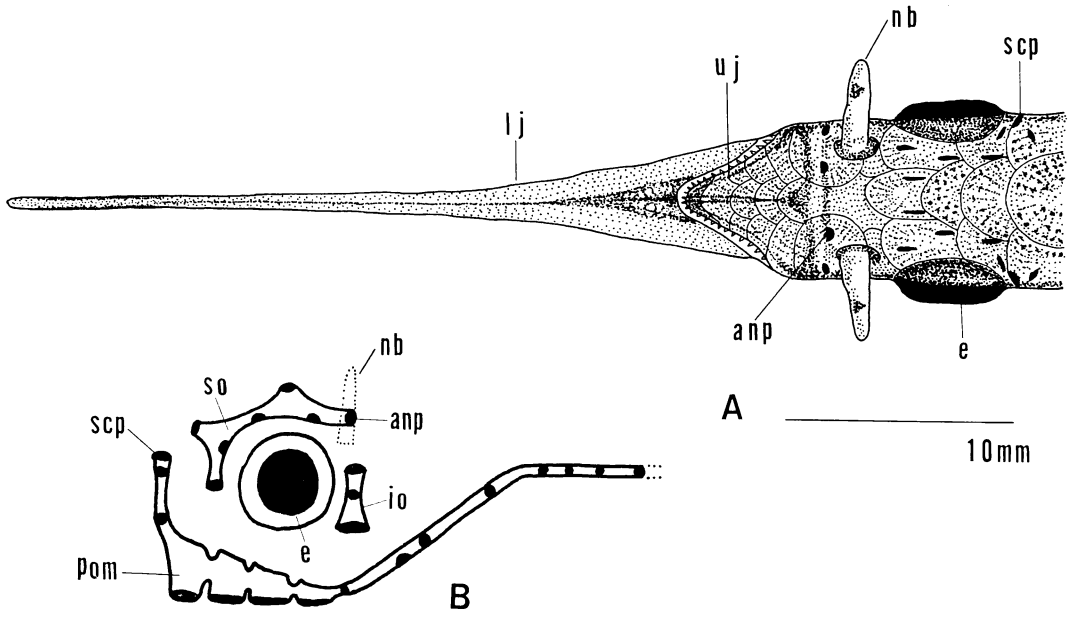

Fig. 2. The dorsal view of the head (A), and the lateral view of the sensory canals and pores (B) of a male *Zenarchopterus dunckeri*, ZIUT 52417, 58.7 mm in standard length. anp, anterior nasal pore; e, eye; io, infraorbital canal; lj, lower jaw; nb, nasal barbel; pom, preoperculo-mandibular canal; scp, sensory canal pore; so, supraorbital canal; uj, upper jaw.

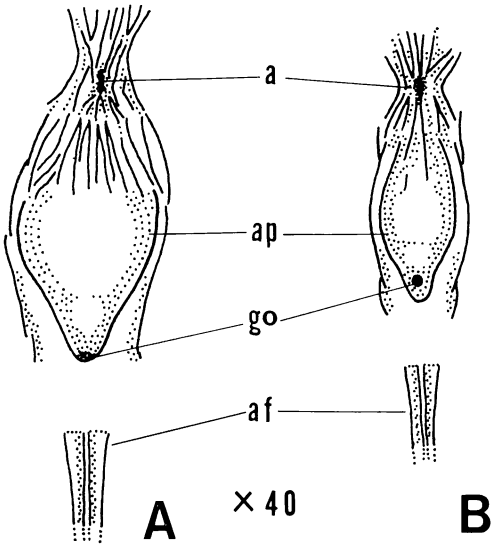

Fig. 3. The urogenital regions of male and female of *Zenarchopterus dunckeri*. A, male, 58.7 mm in standard length ZIUT 52416; and B, female, 58.7 mm, ZIUT 52417. a; anus, af; 1st anal fin ray, ap; anal papilla, go; genital openning.

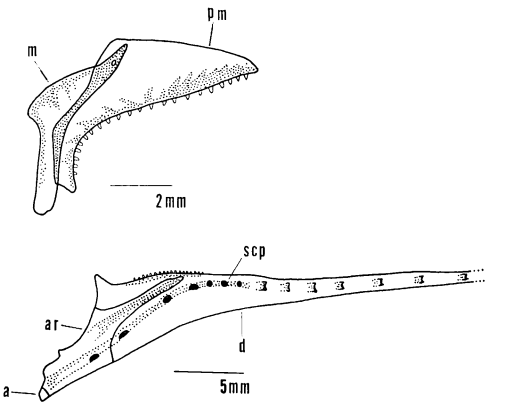

Fig. 4. The upper and lower jaws of *Zenarchopterus dunckeri*. ZIUT 52415, male, 53.0 mm in standard length. a, angular; ar, articular; d, dentary; m, maxillary; pm, premaxillary; scp, sensory canal pore.

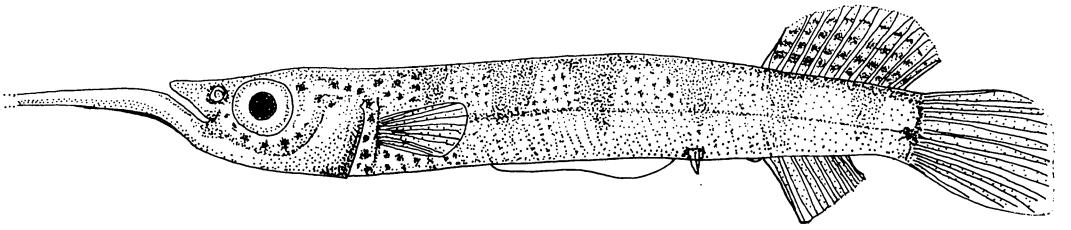

Fig. 5. Juvenile specimen of *Zenarchopterus dunckeri*, showing the preanal finfold. ZIUT 52419, 12.6 mm in standard length.

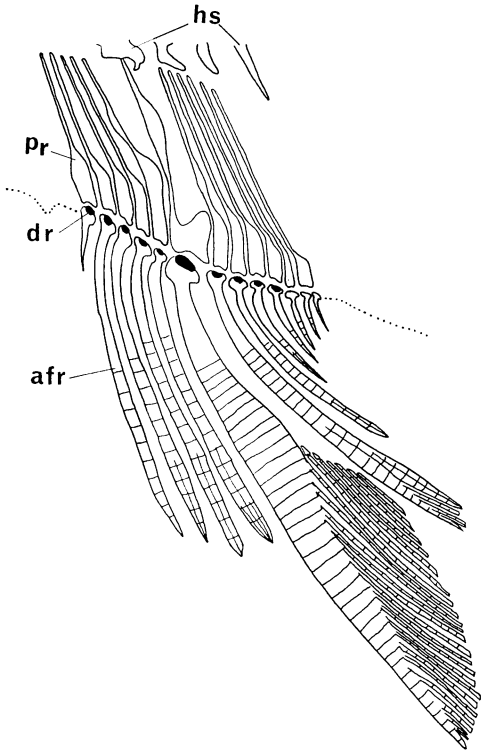

Fig. 6. Anal rays, radials, and haemal spines of *Zenarchopterus dunckeri*. The distal radials are exposed by dislocating the anal soft rays. Male, 80.0 mm in standard length. afr, anal fin ray; dr, distal radial; hs, haemal spines; pr, proximal radial.

there are six dark brown blotches.

Osteological characters based on ZIUT 52415 and the specimen a.—The dentary is five times longer than the premaxillary. There are two or three rows of small teeth along the lower edge of the premaxillary, and two or three rows of conical and very small teeth, on the dentary just below the teeth of the premaxillary. The sensory canal of the dentary (a part of the preoperculo-mandibular canal) runs lengthwise close to the upper edge (Fig. 4).

As mentioned above, the 6th anal soft ray in the adult male is thickened and its shape from the middle to the distal part is feather-like. The distal end of the proximal radial which supports the 6th anal soft ray is also wider than others. The distal radials on the anal rays from the first to the 10th are well recognized by staining by alizarin, but those of the 11th, 12th and 13th are not stained with alizarin (Fig. 6).

Notes.—According to Mohr (1926a), in the males of *Zenarchopterus amblyurus, Z. kampeni, Z. brevirostris, Z. dispar* and *Z. dunckeri*, some of the dorsal soft rays are elongated, but in *Z. caudovittatus, Z. novaeguineae, Z. quadrimaculatus, Z. pappenheimi, Z. beauforti* and *buffoni* such a male character is not developed, and each of the 3rd, 4th and 5th soft rays of the dorsal fin in the former group is 2–3 times longer than other rays, but in the latter group the difference in length of rays is not so conspicuous. In the adult specimens from Ishigaki-jima, the 4th dorsal soft ray is longer than others.

Z. dispar and *Z. brevirostris* are close to *Z. dunckeri* in measurements and counts, but they differ in the following. The 4th dorsal ray of the adult male of *Z. dunckeri* and *Z. brevirostris* is enlarged and elongated, but that of *Z. dispar* is not, and the 6th anal ray (intromittent organ) of *Z. dunckeri* is enlarged and

thickened, but that of *Z. brevirostris* is not enlarged. Accordingly, in the pattern of the adult male dorsal and anal fin rays agree with *Z. dunckeri* in that of the specimens from Ishigaki-jima.

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(The Crown Prince's Palace, Motoakasaka, Minato-ku, Tokyo, Japan)

コモチサヨリ属（新称）の分布の北限として沖縄県で得られたコモチサヨリ（新称）の記載

目黒 勝介

1968 年 10 月 9 日と 1971 年 10 月 27 日との 2 回に亘って，沖縄県石垣島宮良川河口から約 500 m 上流で *Zenarchopterus* 属の 1 種 7 尾が採集され，*Zenarchopterus dunckeri* と同定された．和名をコモチサヨリと名付けた．太平洋域での本属は従来フィリピンと中国南部（海南島）までしかしられておらず，従って今回の記録は最北限の分布を示す．これらの標本について，頭部とその感覚管と感覚管孔，そして，上顎骨と下顎骨について記載した．preoperculo-mandibular の感覚管および感覚管孔は伸びた歯骨の先端近くまで存在する．下顎長，anal papilla，背鰭，臀鰭などの形態で雌雄が区別された．本種の 2 次性徴が現われている雄の臀鰭とその懸垂骨の構造も述べた．雄の羽状の臀鰭は anal papilla の形態から直接に生殖行為に使用されているかは疑問である．

（東京都港区元赤坂　東宮御所）