

Records of the "Mizu-uo-damashi" (New Japanese Name),
Anotopterus pharao, and a Record of the "Etchiopia", *Brama*
raii, from Near the Surface of the North-western Pacific*

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1. *Anotopterus pharao* ZUGMAYER from off Nemuro, Hokkaido

While examining the specimens of the Pacific saury, *Cololabis saira* (BREVOORT), taken by the stick-held dip net of the research vessel "Ibaragi-maru" at 42° 55' N, 145° 42' E (south of Nemuro, Hokkaido) on september 23, 1951, Mr. Masaya KOSAKA of the Tohoku University found among them an unusual elongate sharp-toothed fish which he sent to the present writer for identification through Mr. Ryuhei SATO of the same university. The writer provisionally identifies the fish as *Anotopterus pharao* ZUGMAYER** and wishes to give it a new Japanese name, "Mizu-uo-damashi", which means a fish resembling the "Mizu-uo", *Alepisaurus ferox* LOWE.

The specimen measures 671 mm in total length (from the tip of the conical non-ossified prolongation of the lower jaw to the posterior end of the caudal fin, the mouth being closed), 651 mm in fork length and 640 mm in standard length (S. L.). An almost intact Pacific saury measuring 315 mm in total length and weighing 95 gr (25 mon-me) is contained in the stomach. The following measurements of the specimen of *A. pharao* are expressed in hundredths of S. L.:

	Ratio
Length of head (from tip of conical non-ossified prolongation of lower jaw to vertical through posterior end of opercular flap) (H. L. ¹) 25.2	to S. L. 1 : 3.98
Length of head (from tip of upper jaw to vertical through posterior end of opercular flap) (H. L. ²) 23.8	to S. L. 1 : 4.21
Greatest depth of body (at 40 mm behind ventral fin) 7.0	to S. L. 1 : 14.38
Greatest depth of body after removal of stomach contents (at posterior end of opercular flap) (D. B.) ca. 6.1	to S. L. ca. 1 : 16.41
Greatest width of body (at 40 mm behind ventral fin) 4.1	to S. L. 1 : 24.62
Greatest width of body after removal of stomach contents (halfway between ventral and anal fins) ca. 3.6	to S. L. ca. 1 : 27.83

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** The number and direction of teeth, the relative height of caudal peduncle, the relative size of eye, the relative size of the non-ossified projection of the lower jaw, etc. of the present specimen seem to differ from those of *Anotopterus pharao* ZUGMAYER and *A. antarcticus* NYBELIN. The specimen seems also to differ in the direction of the teeth of lower jaw from *A. vorax* (REGAN) of which only a skull of 150 mm long and a dentary were taken in the trawl at 71° 22' S, 16° 34' W, at a depth of 1410 fathoms. *A. arcticus* NYBELIN, though described only of a head taken from the stomach of *Hippoglossus hippoglossus*, seems to resemble the present specimen more closely than do the other three forms mentioned above.

	Ratio
Least depth of caudal peduncle (at base of upper foremost rudimentary fin ray of caudal)	ca. 1.9
Width of caudal peduncle (")	ca. 1.0
Depth of caudal peduncle at base of last anal fin-ray	2.2
Width of caudal peduncle at "	1.9
Width of bony interorbital space	1.5
Greatest width of head (at posterior end of cranium)	2.7
Length of snout (from tip of upper jaw to vertical through anterior margin of eye)	14.1
	to H. L. ¹ 1 : 1.78 to H. L. ² 1 : 1.68
Length of postocular space (measured parallel to longitudinal axis of body) (PO)	8.3
	to H. L. ¹ 1 : 3.04 to H. L. ² 1 : 2.87
Diameter of eye (measured parallel to longitudinal axis of body) (E)	1.6
	to H. L. ¹ 1 : 16.10 to H. L. ² 1 : 15.20 to SN 1 : 9.05 to PO 1 : 5.30
Depth of snout at anterior margin of eye	3.8
Depth of lower jaw at "	ca. 1.7
Length of conical non-ossified prolongation of lower jaw (from upper corner of insertion to tip)	1.6
" (from lower corner of insetrion to tip)	1.1
Distance between posterior end of opercular flap to anterior end of base of ventral fin	35.9
Distance between posterior end of base of ventral fin to posterior end of vertebral column	39.8
Distance between tip of conical non-ossified prolongation of lower jaw (tlj) and anterior end of base of pectoral fin	25.0
Distance between tlj and anterior end of base of ventral fin	60.9
Distance between tlj and anteriorend of base of anal fin	89.8
Distance between tlj and anterior end of base of adipose fin (measured parallel to longitudinal axis of body)	91.1
Distance between posterior end of base of pectoral fin and anterior end of base of ventral fin	33.8
Distance between posterior end of base of ventral fin and anterior end of base of anal fin	26.9
Distance between posterior end of base of adipose fin and anterior end of base of upper foremost rudimentary caudal fin-ray	5.1
Distance between posterior end of base of anal fin and anterior end of base of lower foremost rudimentary caudal fin-ray	3.3
Length of base of pectoral fin	1.9
Height of pectoral fin (at highest middle ray)	5.6
Length of base of ventral fin	1.3
Height of ventral fin (at highest middle ray)	4.2
	to E. 1 : 1
	to E 1 : 1.43

	Ratio
Length of base of anal fin	6.6
Length of last ray of anal fin	2.0
Length of base of adipose fin	2.5
Height of adipose fin (from anterior end of base to postero-dorsal corner) .	4.4
Distance between posterior end of base of ventral fin and anterior end of vent	1.7
	to E 1 : 0.91

The body is extremely elongate, compressed anteriorly and subcylindrical posteriorly. The upper and lower jaws are long; the former is compressed and curved dorsally at its anterior end; the latter is wider posteriorly than the former and bears at its tip a conical non-ossified projection which is compressed and triangular in shape. The dorsal and ventral contours of the trunk are nearly parallel to each other (after the removal of the stomach contents). The lateral line is composed of two whitish close-set parallel lines and pairs of blackish pores. The number of the pairs of the pores is 75 (counted from above and a little behind the dorsal corner of the gill-opening) on the left side, and 74 on the right; on the posterior half of the caudal peduncle the pores are seemingly lacking. Between the dorsal corner of the hyomandibular and the first pair of the pores mentioned above are 4 single pores on the left side, and 5 single pores on the right. The similar pores are also present just below the dorsal ridge of the cranium (8 or more in number), below the eye (about 4 in number) and in the longitudinal groove of the lower jaw (more than 8 in number). The nostrils are paired on each side of the snout, the anterior one being much smaller than the posterior; a low skinny flap is formed on the septum between the two nostrils. There are a pair of nearly horizontal cutaneous keels between the anteriormost bases of the caudal fin-rays above and below.

The dorsal fin is lacking; an adipose fin is well developed. A. 16. P. 14 on each side. V. 11 on each side. C. xiii/10 + 7/xiv. Branchiostegal rays 8 on the left side, 7 on the right. Gill-rakers are lacking. Gills are 4 in number.

The total number of vertebrae is 79 (counting the hindmost segment as 1)*; the number of the precaudals or caudals have not been counted because of the strong decalcification by formalin of the appendages of the vertebrae. The vent is situated below the 37th or 38th vertebra; the interhaemals are below the 62th to 70th vertebrae. The number of the interhaemals is 15; they are all short, becoming a little longer towards the posterior ones. The ribs, neural and haemal spines are extremely thin and long, resembling pieces of threads. Imbedded near the surface of the dorsal part of the muscles of the trunk are similar bones which lie obliquely. From the posterior end of the cranium, and on either side of the mid-dorsal line, run a pair of cords each of which anteriorly contains thread-like cores. The cords seem to be interrupted at the base of the adipose fin.

The teeth, and more especially those on the palatines, are very remarkable in size,

* The present writer has counted the total number of vertebrae of a specimen of *Alepisaurus ferox* LOWE from the Riu Kiu Islands. The number of the vertebrae was only 49 (counting the hindmost segment as 1)

position and direction. On each palatine is a row of 5 blade-shaped teeth, all compressed and fixed at the base; they occupy a considerable part of the buccal cavity; the posteriormost tooth alone of each row is vertical and the rest are bent forward. The penultimate tooth of each row is the longest. The teeth of the left and right palatines are on alternate places. Attached to the inner side of the left palatine are 2 soft blade-shaped movable teeth; the anterior one lies horizontally, directing its tip backwards, and its base is just below the 5th, namely, the hindmost fixed tooth; the posterior one is a little distance behind the 5th tooth and lies horizontally, directing its tip backwards. On the inner side of the right palatine lies a similar soft tooth at the base of the 5th fixed tooth directing its tip also backwards. The pocket receiving it is a little in advance of the anterior end of the 5th fixed tooth.

The teeth of the upper jaw are very small, more than 50 in number on each side, arranged in a single row. They are attached to the premaxillary.

The teeth of the lower jaw are much larger than the premaxillary teeth, but much smaller than the palatine teeth. Some of the anteriormost teeth of the lower jaw seem to be missing in the present specimen. There seems to be no immovable tooth near the tip of the lower jaw (*cf.* MAUL, 1946, p. 58, fig. 22.). Besides the 11 (on the left dentary) and 12 (on the right dentary) sharp canine-like teeth, which are all immovable, bent backwards and arranged in a row on each dentary (with the exception of the antepenultimate tooth and the one just interior to it), there are 3 (or, a little more) smaller teeth placed just in advance of the anteriormost tooth of the row just mentioned. These smaller teeth are also immovable (*cf.* MAUL, *loc. cit.*).

The color in formalin: The back is dark grey, with bluish and golden metallic tint; the sides and belly are pale; the branchiostegal membrane, the membrane between the two dentaries and the anterior part of the both jaws are blackish.

2. *Anotopterus pharao* ZUGMAYER and *Brama raii* (BLOCH) from off the eastern coast of Kamtchatka

In summer, 1937 (or 1936), Mr. Takao ISAHAYA (then of the Division of Survey, Taiheiyo Gyogyo Co., Hakodate, Hokkaido) found several unusual species of fishes taken by drift-nets for salmons off the eastern coast of Kamtchatka, and sent to the Zoological Institute, Faculty of Science, Tokyo Imperial University*, one specimen of each of these species for identification. Among the collection were a specimen of *Anotopterus pharao* ZUGMAYER** and another of *Brama raii* (BLOCH)** which are here reported upon. The former (Cat. No. 33,999, Zool. Inst., Tokyo Univ.) (figs. 1 and 2) measures 893 mm in total length (from the most anteriorly projecting part of the head to the farthest tip of the caudal fin), 873 mm in fork length and 860 mm in standard length. The specimen is now on loan to Mr. Giles W. MEAD, Natural History Museum, Stanford University, who is now comparing it with specimens of *Anotopterus* spp. from other seas. The

* The name has been changed to Tokyo University since the end of World War II.

** Identified provisionally.

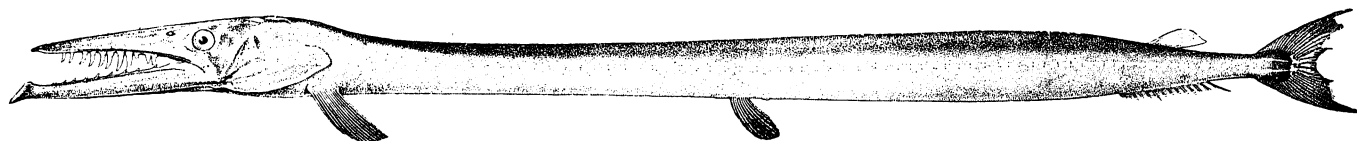


Fig. 1. *Anotopterus pharao* ZUGMAYER from off the eastern coast of Kamtchatka (Cat. No. 38,999, Zool. Inst., Tokyo Univ.). Total length 893 mm. Drawn by M. SHIRAO

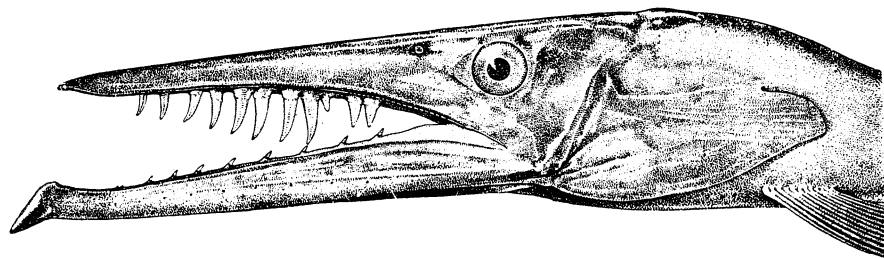


Fig. 2. Head of the specimen depicted in fig 1. Drawn by M. SHIRAO.

present writer wishes to leave the more detailed study of this fine specimen from Kamtchatka in his hands, because he seems to have been much more interested in *Anotopterus* than the present writer and because it was Mr. MEAD who has expedited the writing of the present writer about this specimen and the other described above. It is the purpose of this short paper with figures to circulate it among the Japanese scientists and fishermen who may have opportunities of taking specimens of *Anotopterus* during their fishing of salmons near the Aleutian Islands in summer and fishing of the Pacific saury by stickheld dipnets off the northeastern coasts of the mainland of Japan and off the eastern and southeastern coasts of Hokkaido in autumn.

It may not be out of place here to mention about the frequent appearance of *Brama raii* near the surface off the eastern coast of Kamtchatka in summer, 1937 (or, 1936) (after Mr. ISAHAYA). During the years 1933–1941, and more especially during 1935–1937, this fish was also taken in considerable quantity from the Pacific coasts of Japan. According to Mr. Mitsugi YAMAGUCHI, Tô-to Suisan Co., Tokyo Central Wholesale Market, some 20,000 to 30,000 pounds of *Brama raii* were at times during the years shipped to the market mentioned just above. He saw them usually along with *Scombrops boops* (HOULTUYN)* from Misaki. The fish dealers of the Market had to give a Japanese name to *Brama raii* for their purpose (although Japanese ichthyologists had called it "Hama-shimagatsuo"), and first called it "Kuro-mana" meaning a black *Stromateoides argenteus* (EUPHRASEN). But soon they changed the name to "Etchiopia" which means an Ethiopian fish, because the Japanese relations with Ethiopia became unusually cordial in those years, and because the black color of the fish was suggestive of the people of the tropics. The present writer also saw the fish at retailer's shops in Tokyo in summer of 1937 (or' 1938)**. One day of the same year the late Prof. Naohide YATSU, Tokyo Imperial University, showed him a photograph of many individuals of *Brama raii* displayed at a retailer's shop in Tokyo and inquired about the fish. As he was always interested in learning about every animal he observed around him, the present writer thinks that it was for the first time that the late Prof. YATSU saw *Brama raii* in retailer's shop in Tokyo where he lived for many years.

Since 1942, *Brama raii* has appeared very rarely at Tokyo Central Wholesale Market.

The specimen of *Brama raii* (Cat. No. 38,996, Zool. Inst., Tokyo Univ.) sent by Mr. ISAHAYA from Kamtchatka along with *Anotopterus pharao* measures 430 mm in total length and 380 mm in fork length. D. 34 (=iv+30) (the first 3 rays shorter than the 4th). A. 28 (=iii+25) (the first 2 rays shorter than the 3rd). P. 19 (=ii+17) on each side. Branchiostegals 7 on each side. Gill-rakers 6/1/12 on each side. Predorsal

* This fish is taken by hook and line. According to Mr. YAMAGUCHI, *Brama raii* at times bore a hook in the mouth. According to the Fisheries Experiment Station of Kanagawa Prefecture, Misaki, the fishing grounds of *Scombrops boops* are between off Jogashima and off south-western coast of Susaki, depth being 500 - 600 m, and the fishing grounds of *Brama raii* were between off Jogashima (called Okiyama) and Sagami Bay during 1936 - 1941, at depths of 300 - 400 m. The latter species is rarely taken now.

** The present writer has lost his diaries during the confusion just after the end of the recent war.

scales *ca.* 37; scales from the upper angle of gill-opening to the end of lateral line *ca.* 70. He observed this species often among the salmons taken by drift nets off the eastern coast of Kamtchatka, during summer, 1937 (or, 1936), whereas of *Anotopterus pharao* he saw only 6 or a little more individuals. In summer of the next year also he observed only a few individuals of the latter fish and hundreds of *Brama raii* from the same sea.

Acknowledgement

It is with pleasure that the present writer expresses here his cordial thanks to Mr. Giles W. MEAD mentioned above by name for his suggestions, advices and encouragement. The writer is also very grateful to Mr. Takao ISAHAYA mentioned above for his generosity and valuable information concerning the salmon fishery off the eastern coast of Kamtchatka during 1936-1940. Furthermore, it is the pleasing duty of the writer to acknowledge the debt he owes to Mr. Ryuhei SATO and Mr. Masaya KOSAKA mentioned above for the permission of dissecting the Japanese specimen of *Anotopterus pharao*, to Mr. Nobuo WATANABE, Section of Oceanography, Tokaiku Suisan Kenkyujo, for the information about the oceanographic conditions of the northwestern Pacific during 1932 - 1942, and to Mr. Mitsugi YAMAGUCHI mentioned above for the information concerning the shipment of *Brama raii* to Tokyo Wholesale Market, and to the Fisheries Experiment Station of Kanagawa Prefecture, Misaki, for the information concerning the fishing grounds near Misaki and in Sagami Sea of *Brama raii* and *Scombrops boops*.

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Additional Notes

After this paper went to press, the present writer received an old specimen of *Anotopterus pharao* on loan from Prof. Shin-ichi SATO, Faculty of Fisheries, Hokkaido Univ., Hakodate, Hokkaido, Japan. The specimen reached the writer in good order through kindness of Mr. Hideaki TAKANO, Tokaiku Suisan Kenkyujo, Mr. Masateru ANRAKU, Hokkaido Univ., and Mr. Noriaki OGAWA, Hokkaido Univ. The writer wishes to express here his sincere thanks to the four gentlemen mentioned above.

The specimen measures 900 mm in total length, 870 mm in fork length and 855 mm in standard length. The locality and the date of collecting are unknown. It is supposed that the specimen was taken near Hokkaido or from Kamtchatka. It seems to have been discolored probably because of the exposure to the sun-light; the body is pinkish, with metallic greenish tint, and the back is a little dark. But the large black blotch of the distal part of the pectoral fin and the smaller black blotch of the distal part of the ventral fin are very conspicuous. The upper lobe of the caudal fin (the lower lobe has been damaged), the lower part of the branchiostegal membrane, and the membrane between the dentaries are dark brown. Dorsal fin absent; adipose fin well developed. A. 14. P. ca. 15 on each side. V. 11 on each side.

The palatine teeth are mostly similar in number and shape to those of the specimen of Tohoku University described above. These teeth of the two specimens, however, differ in the following points: i) Of all the palatine teeth, the anteriormost one is that of the right side in the specimen of Hokkaido University whereas in the Tohoku University specimen the anteriormost palatine tooth is that of the left side. ii) In the former specimen the posteriormost 2 fixed teeth of the right palatine are directed to the left and the 2nd to 5th (excepting the 3rd which has been damaged) teeth of the left palatine are directed to the right, these teeth of either palatine crossing with those of the other palatine near their bases.

In Hokkaido University specimen there is only one horizontally lying, movable tooth on the inner side of the right palatine received in a pocket which is situated a little in advance of the posterior end of the base of the 5th fixed palatine tooth.

The premaxillary teeth are arranged in a row at irregular intervals, very small and more than 71 on each side. The anteriormost teeth are much smaller than the posterior ones. The dentary teeth are all fixed (with the exception of the anteriormost

movable tooth of the left dentary), directed backwards, and 15 in number on each dentary. The anterior tip of the upper jaw is bent downwards. The number of the pores of the lateral line is difficult to count because the anterior part of the body has been dried.

A sand lance, *Ammodytes personatus* GIRARD, of 210 mm total length and a very slender malma trout, *Salvelinus malma* (WALBAUM), of 253 mm total length are contained in the stomach. They are with severe wounds (as though cut by a sharp knife), and direct their heads towards the vent of the predatory *Anotopterus pharao*.

— 雜 錄 —

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