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ON A RARE FISH, *Bathymaster signatus* COPE, TAKEN FROM THE NORTHERN
PACIFIC, AND NOTES ON ALLIED SPECIES

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The rare fishes, so-called Searcher or Ronquil, known from the Northern Pacific are included in the family *Bathymasteridae*, being represented throughout the world by three genera and five species, and differing from other JUGULARES of the North Pacific in many remarkable characters. However, the origin and relation of this family have yet been uncertainment.

The genus *Bathymaster* was established by COPE in 1873 for the accommodation of his new species, *Bathymaster signatus*, collected by Prof. G. DAVIDSON from Sitka, Alaska.

Another species, *B. caeruleofasciatus*, was added to this genus by GILBERT & BURKE in 1910 based on several specimens taken from Agattu Is. and Petrel Bank, Aleutian Chain. Furthermore, an unknown species which was referable to this genus was collected by Prof. K. M. DERJUGINI from Peter the Great Bay, Maritime Prov., Soviet Far-East on September 25, 1925, and reported as a new species under the name of *B. derjugini* for dedication to the collector by SOLDATOV & LINDBERG in 1930.

Since that date, the senior author reported in 1940 on two species of this genus: *B. caeruleofasciatus* and *B. derjugini*, from the waters of Northern Japan and South Saghalien, but *B. signatus* has not yet been described by Japanese ichthyologists up to the present times. Recently, the present authors had an opportunity to observe the specimen of *B. signatus* which caught by hand-line of the research vessel "Tenyo-maru" at the depth of about 50 fathoms, from the waters off the south-west of Agattu Is., Aleutian Chain on 1st July, 1952.

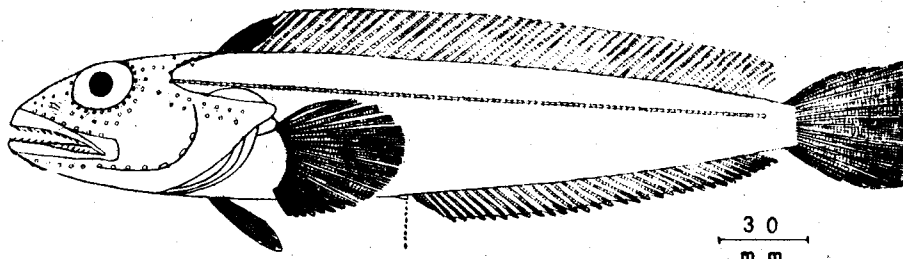


Fig. 1 Lateral view of *Bathymaster signatus* COPE

The purpose is, therefore, to give here a detailed description of this species based on the above mentioned specimen, which is male, 293 mm in total length, No. 12001, Ichthyological Laboratory, Hokkaido University.

Bathymaster signatus COPE

D. 49; A. 34; P. 21; V. I. 5; Lateral scales 98.

The body elongate, compressed. Head rather large, entirely naked. Snout gently sharp, its upper profile slightly convex, as long as the diameter of orbit. Eye large, elliptical, its longitudinal diameter twice as the interorbital space, and equal to the depth of caudal peduncle, former is shallowly concave. A small nostril on each side, forming a short tube, closer to front of eye than to tip of snout. Mouth oblique, jaws subequal, lips thickened.

Table I Measurements of specimen

The following measurements of bodily parts of *B. signatus* are expressed in ratio to body length (B.L.) or head length (H.L.)

Items	Measurement (mm)	Ratio to B. L.
Body length	252	
Length of head	77	3.34
Greatest depth of body	45	5.71
Greatest width of head	36	7.00
Dist. from tip of snout to origin of dorsal fin	61	4.13
Dist. from tip of snout to origin of anal fin	123	2.05
Dist. from tip of snout to outer base of ventral fin	63	4.00
Length of postorbital part of head	43	5.85
Highest dorsal ray	28	9.00
Highest anal ray	21	12.00
Longest pectoral ray	42	6.00
Longest ventral ray	27.5	9.12
Longest caudal ray	38	6.57

Items	Measurement (mm)	Ratio to H. L.
Length of snout	18	4.28
Length of maxillary	35	2.20
Diameter of orbit	18	4.28
Diameter of eye-ball	15	5.06
Width of interorbital space	10	7.70
Least depth of caudal peduncle	18	4.28
Length of caudal peduncle	13	5.92
Greatest width of head	36	2.14
Length of postorbital part of head	43	1.79
Highest dorsal ray	28	2.75
Highest anal ray	21	3.69
Longest pectoral ray	42	1.83
Longest ventral ray	27.5	2.80
Longest caudal ray	38	2.03
Length of naked stripe on nap	15	5.13
Length of dermal fold on shoulder girdle	17	4.53
Dist. between lower base of pectoral to outer base of ventral fin	9	8.52

Maxillary reaches to vertical through the posterior margin of orbit. Teeth on upper jaw consist of a broad band of small, sharp, conical teeth, and those of outer row are enlarged, canine like; lower jaw with double rows of conical teeth at side, those of inner row are enlarged and canine like; symphysis of lower jaw with a broad band of smaller conical teeth, but of inner row are somewhat enlarged; narrow bands of well-developed teeth on vomer and palatine. Tongue rather large, its tip round, spatuli-form.

Gill opening continued forward to below the middle of eye. Branchiostegal membranes united, entirely free from the isthmus, its rays are 6 in number. Pseudobranchiae well-developed. Preopercular margin free, and with 5 conspicuous mucous pores on it, 3 of them in upper part are larger than lower 2, and furnished with a short dermal flap on their posterior margin. Gill rakers moderately long, comb-teeth like, their tips pointed, being armed with minute prickles on each inner margin, 7+18 in number on outer side, and 5+12 on inner side of first arch of right side; 7+18 on outer and 5+13 on inner of left side. A thin, flat, leather like dermal fold clings to the shoulder girdle. Many small mucous pores scattered on top and side of head, suborbital, postorbital and near the tip of snout, another 5 larger pores on mandible. No tentacle, but a narrow naked stripe on head, extending from nape to front of dorsal fin.

Dorsal inserted just above gill opening, anterior 4 rays simple, and somewhat shorter than after rays, which are about equal in height, others segmented and branched, tips of a few hinder most rays scarcely reach to the base of caudal fin. Anal fin inserted under the 17th dorsal ray, anterior 3 rays hard, spine like, but segmented; others are all flexible, the first ray shortest, the last ray placed in opposite of the last of dorsal. Pectoral round, fan like shape, its lower 7 rays fleshy thickened, the middle rays longest, and their tips scarcely reach to the vent, but not quite to the anal fin. Ventral placed before the lower base of pectoral fin for a distance equalling the diameter of pupil, spine is short, strong, and 2.47 in diameter of orbit. Posterior margin of caudal fin nearly truncated, its length twice that of diameter of orbit.

Body entirely covered with small ctenoid scales except the median line of nape; basal one third of dorsal and caudal, basal half of pectoral covered by minute scales; ventral and anal fins scaleless. Lateral line placed high, running from upper angle of opercle to the middle of caudal peduncle along the back, not extending to the base of caudal fin.

Color of body in formaline is uniformly warm brown, and darker on back; head brown; all fins somewhat mottled with yellowish, anal and ventral darker than other fins; a black blotch on front of dorsal, anterior 4 rays covered by the blotch.

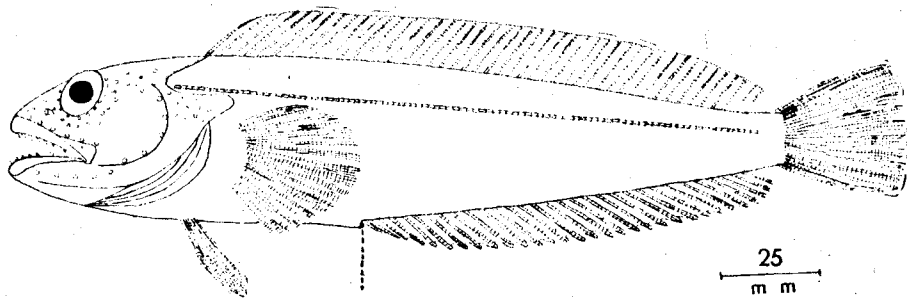


Fig. 2 Lateral view of *Bathymaster caeruleofasciatus* GILBERT & BURKE

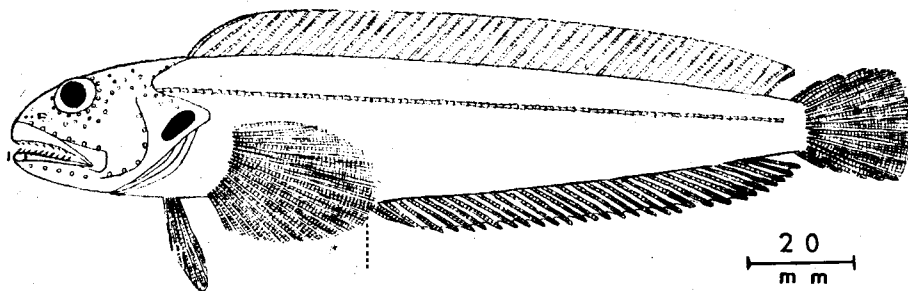


Fig. 3 Lateral view of *Bathymaster derjugini* LINDBERG

COMPARISON OF THE THREE SPECIES

Next is offered a comparison of these three species which belong to the genus *Bathymaster* known from the North Pacific. Some remarkable discrepancies in several characters are found as follows.

Teeth: Lower jaw of *B. signatus* and *B. derjugini* consists of double rows of conical teeth at side regularly, while those of inner row are enlarged, canine like. But in *B. caeruleofasciatus*, teeth of lower jaw are arranged in four rows at side irregularly, and symphysis is broader than that of others. Vomer and palatine own a single row of conical teeth in *B. derjugini*, but consist of a narrow band of villi-form teeth in *B. caeruleofasciatus*. In *B. signatus* as previously mentioned, well developed conical teeth are arranged in a narrow band on vomer and palatine.

Tongue: Those of *B. derjugini* and *B. caeruleofasciatus* are triangular, while in *B. signatus*, it is a spatulate shape.

Scales: Prickles on the surface of scales are shorter or more undeveloped in *B. caeruleofasciatus* than in the other two species. Basal one third of dorsal fin membrane of *B. signatus* is covered with many small scales, in other two species, entirely smooth or nearly naked. Pectoral fin of *B. signatus* is covered with small scales about half-way up the fin, only one third of it in others.

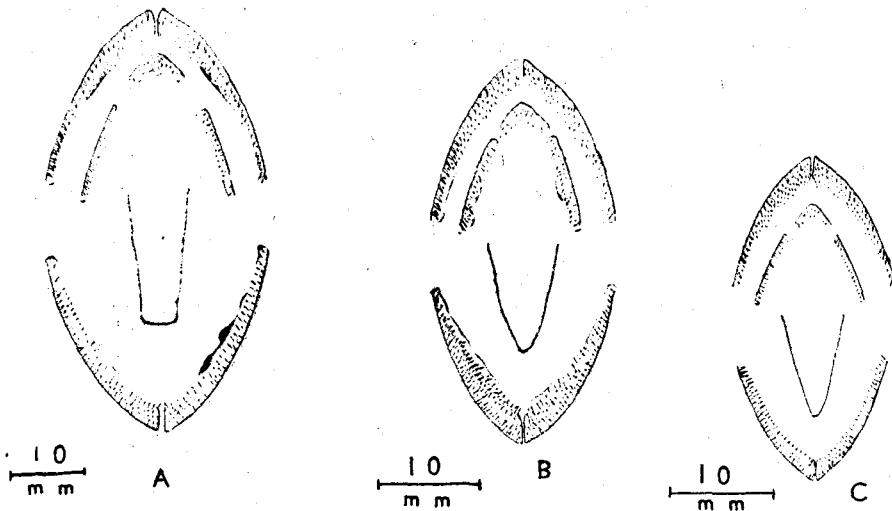


Fig. 4 Teeth on both jaws, vomer and palatines of each species, and showing difference with form in tongue. A.....*B. signatus*; B.....*B. caeruleofasciatus*; C.....*B. derjugini*

Gill rakers: Number of gill rakers more in *B. signatus* than in either *B. caeruleofasciatus* and *B. derjugini*, 25 in number on the first arch of *B. signatus*, however, 17 or 19~20 in latter two species respectively. Furthermore, gill rakers on outer side of the first arch of *B. caeruleofasciatus* are rather short, and no prickles on the inner margins, those of *B. signatus* are armed with many prickles on the inner margins, inner side ones are broad and flat tubercles, having about 10 sharp prickles on their tops, all are directed insideward. Gill rakers of outer side of *B. derjugini* are slender, furnished with several plickles on their inner margins.

Fins: Posterior end of dorsal fin in *B. signatus* does not reach to base of caudal fin, also that of pectoral does not reach to the insertion of anal fin. In *B. caeruleofasciatus*, end of dorsal fin reaches to the base of caudal fin, but that of pectoral does not reach to the anal. The extremity of both dorsal and anal of *B. derjugini* are well over the base of caudal fin, pectoral reaches to the origin of anal fin. Length of ven-

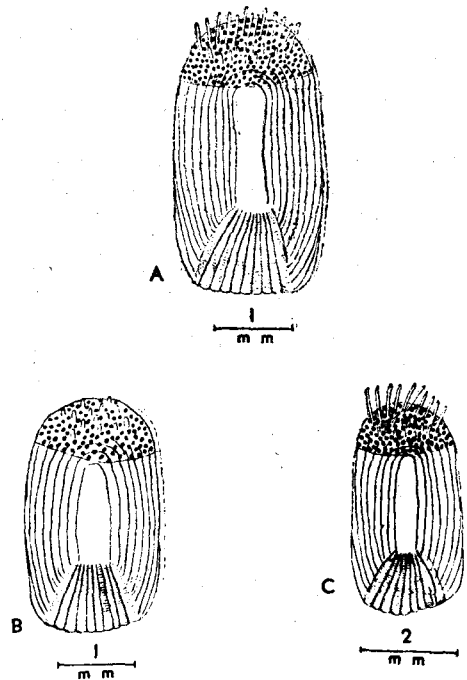


Fig. 5 Scales of each species on the left side of body above the lateral line (above part of pectoral fin) A.....*B. signatus* B.....*B. caeruleofasciatus* C.....*B. derjugini*

tral fin is less than double the diameter of orbit in *B. signatus*, but twice that diameter in *B. caeruleofasciatus*, and more than twice that in *B. derjugini*. Posterior margin of caudal fin is truncate in *B. signatus*, those margins are round in other two species.

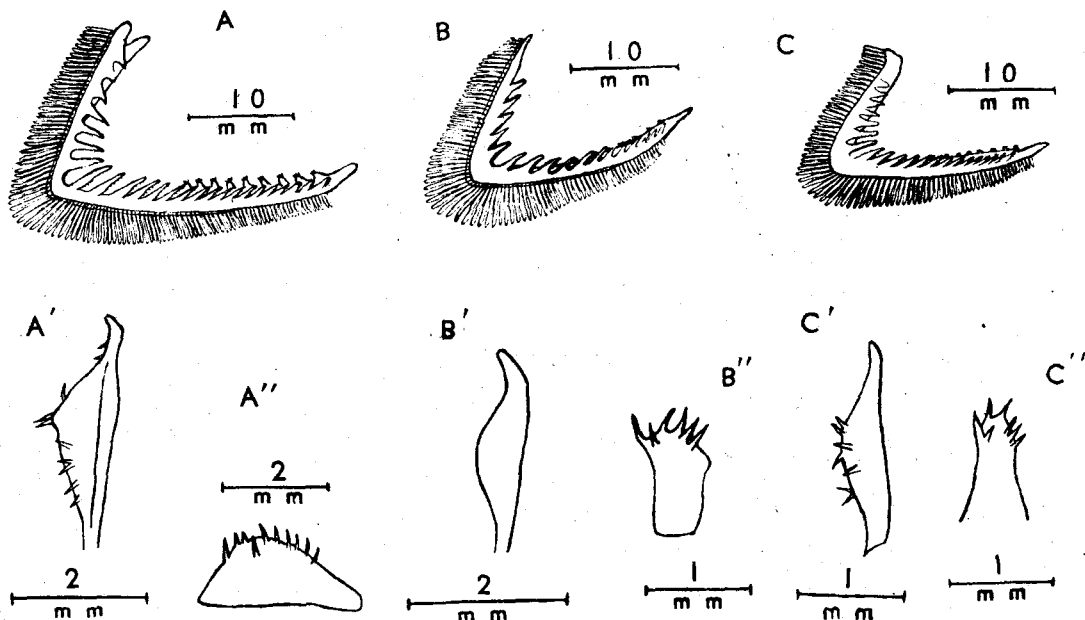


Fig. 6 Comparison of gill rakers on the first arch of each species, and enlarged figure of the first gill raker on both outer (A'B'C') and inner (A''B''C'') side of lower limb. A~A'.....*B. signatus*; B~B'.....*B. caeruleofasciatus*; C~C'.....*B. derjugini*

Table II Comparison of proportionate measurements and counts of bodily parts in four specimens of *Bathymaster*

Items	<i>B. signatus</i>	<i>B. caeruleofasciatus</i>	<i>B. derjugini</i>	<i>B. derjugini</i>
Localities	Agattu Is.	Akkeshi Bay	Maaka	Maaka
Specimen's number	12001	12621	12622	12623
Total length (mm)	293	225	172	167
Body length (mm)	252	196	148	142
Dorsal rays	49	45	42	42
Anal rays	34	31	33	31
Pectoal rays	21	18	18	18
Ventral rays	1.5	1.5	1.5	1.5
Lateral scales	98	93	85	81
Gill rakers	7+18	5+12	5+14	6+14
Head in body length	3.34	4.17	3.47	3.46
Depth in body length	5.71	4.90	4.56	5.09
Dist. from snout to anal fin in body length	2.05	2.13	2.08	2.04
Dist. from snout to ventral fin in body length	4.00	4.35	4.59	4.14
Width of head in body length	7.00	6.32	8.28	7.83
Snout in head length	4.28	4.70	4.60	4.10

Maxillary in head length	2.20	2.35	2.10	2.10
Diameter of orbit in head length	4.28	3.91	4.66	5.12
Interorbital space in head length	7.70	8.34	6.86	6.83
Depth of caudal peduncle in head length	4.28	3.13	3.36	3.41
Highest dorsal ray in head length	2.75	2.08	2.10	1.95
Highest anal ray in head length	3.69	2.57	2.80	2.41
Longest pectoral ray in head length	1.83	1.20	1.35	1.24
Longest ventral ray in head length	2.80	1.95	2.21	1.95
Longest caudal ray in head length	2.03	1.62	1.61	1.64
Length of naked stripe in head length	5.13	4.73	5.20	5.71
Length of shoulder fold in head length	4.53	4.33	3.55	3.81
Length of caudal peduncle in head length	5.92	4.00	5.57	5.71
Length of postorbital part in head length	1.79	1.85	1.86	1.78

Colorations: Body color of *B. caeruleofasciatus* is most darkest among them, and many white spots of irregular size and form are scattered on the dorsal fin membrane, no black blotch on front of dorsal fin or opercular flap. A conspicuous black spot exists on front of dorsal fin in *B. signatus*. A similar one on the opercular flap in *B. derjugini*.

These three species also may be distinguished by the following artificial key:

Key to the species of the genus *Bathymaster*

A. Gill rakers on lower limb of first arch more than 15, (usually 15~18); basal one third of dorsal fin membrane covered by small scales; pectoral fin rays numerous, 19~21 in number, and lower 7 or 8 rays flesh thickened; a conspicuous black ocellated blotch on front of dorsal fin.

..... *B. signatus*

A'. Gill rakers on lower limb of first arch less than 15, (usually 11~14); dorsal fin membrane entirely smooth; pectoral fin rays fewer, 18~19 in number, and lower rays not thickened; no black blotch on front of dorsal fin.

B. ... Snout smaller than eye; dorsal rays numerous, 44~49 in number; lateral scales also 87~98; length of ventral fin as much as twice the diameter of orbit; no black blotch on the opercular flap.

..... *B. caeruleofasciatus*

B'. ... Snout larger than eye; dorsal rays fewer, 41~42 in number; lateral scales also 81~85; length of ventral fin more than double the diameter of orbit; a large black blotch on the opercular flap.

..... *B. derjugini*

In this paper, the authors wish to propose newly to give a Japanese name "MEDAMA-UO" meaning big eyed fishes to the genus *Bathymaster*. Also for each species the following Japanese names are proposed. The localities reported up to the present by many authors are appended.

Bathymaster signatus COPE

New Japanese name "SOKO-MEDAMA-UO"

Localities: Puget Sound, Queen Charlotte Is., Carter Bay, etc. (Canada); Sitka Is., Killisnoo Is., Loring Is., Mary Is., Redfish Bay, Pablof Harbor, Kadiak Is., Schumagin Is., Illiuliuk Is., etc. (Alaska); Unimark Is., Unalaska Is., Agattu Is., Petrel Bank, etc. (Aleutian Chain); Pribilof Islands; Wrangel Is., (Arctic Sea); Komandor Islands; Olytorsky, Peteropavlovsky, Darnebstchink, etc. (Kamchatka).

Table III Synopsis of three species of *Bathymaster* as described by many authors

Species	<i>E. signatus</i>			<i>B. caeruleofasciatus</i>		<i>B. derjugini</i>
	Jordan & Evermann	Taranetz	Andriashev	Gilbert & Burke	Taranetz	Lindberg
Authors	Jordan & Evermann	Taranetz	Andriashev	Gilbert & Burke	Taranetz	Lindberg
Years	1898	1933	1937	1910	1933	1930
Localities	Alaska	Pribilof Is. Komandor Is.	Olytorsky Komandor Is.	Agattu Is.	Medny Is. Okhotsk	Peter the Great Bay
Specimens	1	6	4	1	5	4
Total length(mm)	277	218-301	92-310	293	77-160	67.8-107
Dorsal	47	46-49	46-47	49	44-45	41-42
Anal	34	32-35	34-35	36	30-33	30-32
Pectoral		19-21	21	18	18-19	18
Lateral scales	95	89-104	100	98	87-93	83-84
Gill rakers	7+18	6~7+15~17	6~7+16~17	5+12	5+11~12	5+12
Head in B.L.	3.5			3.6		3.6
Depth in B.L.	5.0			5.2		6.0
Orbit in H.L.	4.3			4.7		3.7
Maxillary in H.L.	2.3			1.9		2.3
Snout in H.L.	4.3			5.0		4.4
Pectoral in H.L.	1.8			1.3		1.2
Ventral in H.L.	2.5			2.2		1.8
Dorsal in H.L.	2.6			2.4		1.6
Anal in H.L.	3.5			3.3		2.3
Caudal in H.L.	2.4			2.2		1.7
Snout : Eye	S=E			S<E		S>E

Bathymaster caeruleofasciatus GILBERT & BURKE

New Japanese name "MADARA-MEDAMA-UO"

Localities: St. Johns Is., (Okhotsk Sea); Kardakov Bay, (Kamchatka); Komandor Islands; Akkeshi Bay, (Hokkaido).

Bathymaster derjugini LINDBERG

New Japanese name "SUMITSUKI-MEDAMA-UO"

Localities: Peter the Great Bay, (Japan Sea); Tartary Strait, Maoka, (Saghalien).

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