

A Case of Pugheadedness in the Rock Fish, *Sebastes oblongus* GÜNTHER¹

MUNEO OKIYAMA

Among three specimens of the rock fish, *Sebastes oblongus* GÜNTHER, caught on October 31st, 1962, by the small set net at the innermost part of the western Nanao Bay, Ishikawa Prefecture, a single specimen measuring 93.5 mm in body length, exhibited a curious feature in the profile at its fore-head region, being referable to a case of the typical fish deformities, namely, the so-called "Pugheadedness" or "Mops-Kopf." (Fig. 1)

MANSUETI (1960), in his recent work, stated "Pugheadedness on striped bass, *Roccus saxatilis* is not an unusual deformity, although pub-

lished references are relatively few." So far as I know, the records of this kind of deformity seems to be rather rare as compared with albinism and ambicoloration and etc.

In this paper, I intended to give a full description of this specimen as well as a brief discussion on the causal factors of this deformity with a summary of the pugheadedness hitherto recorded in Japan.

DESCRIPTION

Counts and measurements are as follows :
Dorsal fin XIII-12 ; anal fin III-6 ; ventral

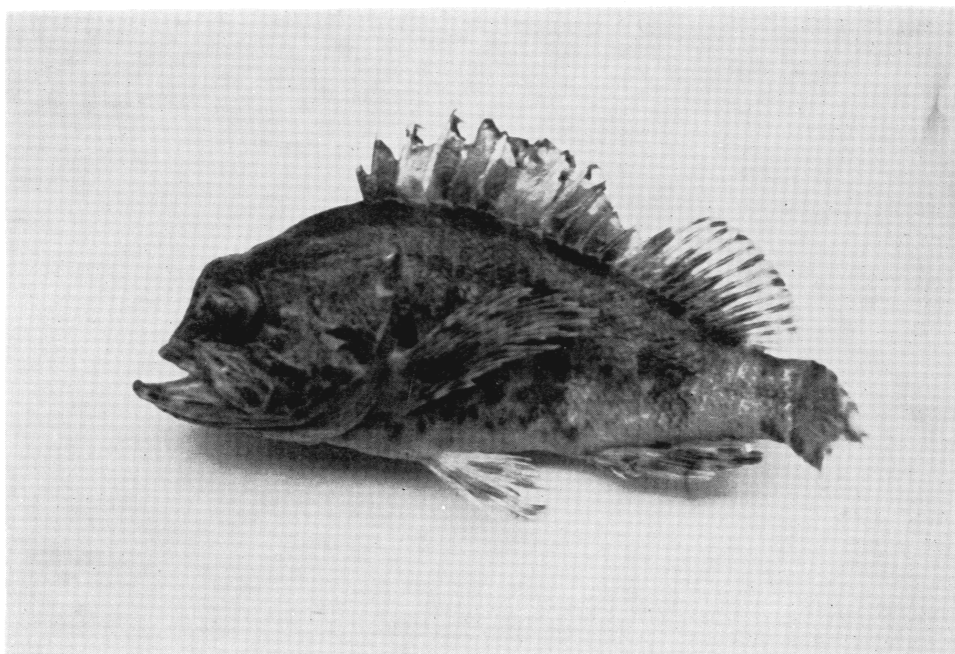


Fig. 1. Pugheaded specimen of the rock fish, *Sebastes oblongus*. (Caudal fin is not deformed at all, but bents through the bad preservation.)

¹ 沖山宗雄: タケノコメバルにみられた狃頭例.

fin I-5 ; pectoral fin 17 (on both sides).

Total length 121.5 (125.5)* ; body length (distance from tip of snout to caudal fin base) 93.5 (102.0) ; maximum body depth 36.5 (36.2) ; head length (distance from tip of snout to rear edge of the opercle exclusive of membranous flap) 34.0 (38.0) ; snout length 7.0 (9.0) ; post-orbital length of head 18.8 (18.2) ; horizontal diameter of eye 9.5 (7.8) ; maxillary length 16.8 (18.0) ; longest dorsal ray (6th) 17.5 (15.5) ; ventral fin length 21.0 (19.5) ; pectoral fin length 29.0(26.5) ; longest anal ray 20.0 (18.0) ; caudal fin length 24.5 (23.5). Body weight 28.4 (36.5).

Snout remarkably reduced in size, lower jaw moderately developed ; lower jaw, when closed, projected about 4 mm in front of the tip of snout. Although no facial bones or cranial

bones are missing, some of them especially those composing the fore-head region are either deformed markedly or located in somewhat irregular manners ; frontal bone deformed strikingly in such a way as the anterior frontal region becomes arched rapidly downward just in front of eyes ; eyes fairly large and with rather protruded appearances ; in profile, tip of the arched frontal and origin of dorsal fin both from snout, form angles of about 65° and 40° respectively, with line from tip of snout to center of caudal fin (figures for normal specimen were 40° and 35° respectively). Anterior and posterior nostrils situated in a very narrow space between the nasal and the orbit ; opening of posterior nostril closed almost completely, whereas that of anterior one, partly bordered by flap, rather normal in

Table 1. Summary of known records of

species	date and place of capture	length	sex	habitat
<i>Channa maculata</i> (LACÉPÈDE)	1937, 8, 7 Kyoto pref.	51.3mm (body length)	?	fresh-water
<i>Muraenesox cinereus</i> (FORSKÅL)	1954, 4 landed on Hiwasa port, Tokushima Pref.	549.0mm (body length)	?	sea
† <i>Oncorhynchus keta</i> (WALBAUM)	1954, 6,14 51°12' N 169°54' E	49.5cm (body length)	?	sea (fresh-water ††)
<i>Erymnus japonica</i> TANAKA	1958, 4,30 Maizuru Bay, Kyoto Pref.	193.0mm (body length)	♀	sea
† <i>Oncorhynchus nerka</i> (WALBAUM)	1958, 7,18 49°33' N 165°37' E	42.1cm (fork length)	♂	sea (fresh-water ††)
<i>Oncorhynchus keta</i> (WALBAUM)	Spring of 1963 Teshio Salmon Hatchery, Hokkaido	30.7mm (total length)	?	fresh water
<i>Sebastes oblongus</i> GÜNTHER	1962, 10, 31 Nanao Bay, Ishikawa Pref.	93.5mm (body length)	?	sea

† These two specimens, although collected from the northern Pacific, are tentatively included in this summary because of being investigated by Japanese workers.

* All measurements are given in mm while that of body weight in gramm, and the figures in parentheses are those of a normal specimen of nearly the same size as the present individual.

shape ; nasal cavity fairly broad and equipped with moderately developed rosette bearing 16 lamella. (Fig. 2)

Maxillary with slight malformation extends beyond the vertical through the hind edge of eye. Teeth on the upper jaw present on premaxillaries, vomer, and palatines ; tooth-bearing areas show more or less irregular patterns most conspicuously on vomer (Fig. 2).

Uppermost spine of opercle largest and directed obliquely upward and backward, reaching beyond the anteriormost portion of lateral line. Brain embeded in yellowish fatty substance (On the other hand, those in the normal specimens covered with transparent colorless fluid) exhibited little malformation externally. Tong as well as gill structure completely normal, while intestine somewhat

shorter ; stomach empty and rather small. Rays in all fins elongated slightly ; tip of dorsal and anal fin, when depressed, extended over the caudal fin base. Vertebrae, 25 in number exclusive of urostyle, display slight anomalies at the part of abdominal vertebrae. Color pattern normal.

DISCUSSION

The hitherto known records of pugheadedness from Japan are summarized in Table 1, with some notes on their characteristics. A glance at it reveals that this deformity can probably arise in a variety of teleost families. Furthermore, among the specimens referable to this deformity, there exists diversities in the extents as well as the respects of malformations.

pugheaded fishes from Japan

head	notes on the features		source
	trunk	other	
maxillary : completely missed	normal		TSUDA & NAKADA (1940)
maxillary : deformed fore-brain : markedly shrunked	normal		HOTTA & HONMA (1958)
maxillary : deformed with irregular location dentition : abnormal		opercle : partially missing on the left side	HIKITA (1955)
maxillary : completely missed	maximum body depth : somewhat lower	stomach : rather small-sized while some food organisms contained	AKAZAKI (1963)
olfactory nerve : slightly abnormal	normal	stomach : rather small-sized, empty growth rate : lower	SANO (1958)
	normal		HIKITA (1961)
maxillary : slightly deformed brain : normal dentition : slightly deformed in tooth-bearing zone etc.	all fin rays : elongated slightly etc.	stomach : empty intestine : rather short	Present article

†† Those in the pharentheses indicate the habitats experienced by them in their early life phases.

In general, however, the following may be available as the common characteristics of the so-called "pugheadedness," that is, remarkable shortage of snout; natural size and sharp of lower jaw; occurrence of symmetrical deformity; and normal coloration.

As already enumerated in the table, the present specimen exhibited peculiarities in some other respects in addition to the common characteristics. Among of them, the elongations of all fins, and deformities both in vertebrae and opercle, are, it is supposed, to be the most conspicuous features in this specimen, because, so far as I am aware, no comments in this connections have ever been suggested. These three features, however, may be closely related with one another, in such manners as all fins, while developed rather naturally, present anomalous features through the poor development in the trunk part surely connected with vertebral deformity, to which also the opercular malformation may be attributable.

Moreover, it is worth noticing that the markedly large eyes detected in this specimen give offensive evidence against GEMMIL's demonstration on the typical pugheaded herrings.

Putting all accounts mentioned above together, it seems to be safely concluded that as compared with other pugheaded specimens, the present one, while the deformities in the fore-head region are rather slight, is severely deformed as a whole, consequently something disadvantageous to the behaviour being probably experienced by it.

By the way, the causal factors inducing this deformity, to which many suggestions have been given (HOTA & HONMA, 1958; HIKITA, 1953 & 1961; MANSUETI, 1960, etc.) remain as yet unsolved. However, the resent observation by HIKITA (1961) that a single larvae of pugheaded salmon surely derived from the phenotypically normal parents was found in the salmon hatchery, not only coincides completely with the finding of MANSUETI (1960) on siblings, but may indicate that the gene-

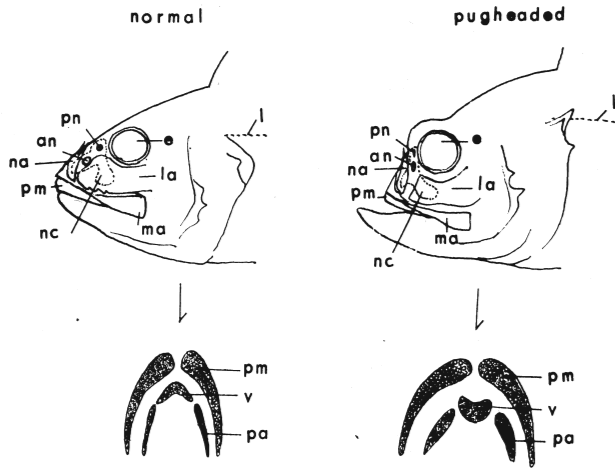


Fig. 2. Side view of the head region showing the arrangement of the olfactory apparatus and some facial bones (upper); diagram of the teeth-bearing areas of the upper jaw (lower).

an. anterior nostril, e. eye, l. lateral line, la. lacrymal, ma. maxillary, na. nasal, nc. nasal cavity, pa. palatine, pm. premaxillary, pn. posterior nostril, v. vomere.

tical factors are greatly responsible for causing this deformity, while environmental factors, of course, may more or less take part in such cases as well. Besides, if we take into account the very high mortalities occurring even in the normal specimens, this deformity, while rather slight as compared with other cases as demonstrated by HIKITA (1960), would easily be understood to afford severe hindrances for the survival of the pugheaded specimens. This is probably the reason of the very rare occurrences of this kind of deformities in the fields.

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