A New Osmerid Fish, *Hypomesus sakhalinus* new species, Obtained From Lake Taraika, Sakhalin

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During the course of some ecological and taxonomic studies of the pond smelt, *Hypomesus olidus*, the writer was privileged to observe some specimens belonging to *Hypomesus*, obtained from Lake Taraika, southern Sakhalin on Aug. 16, 1935 by Prof. S. SATO.

These specimens resemble the pond smelt in general form, but they are recognized as a species different from the pond smelt in the form of the air-bladder and in a few other characteristics.

Accordingly, the writer reports the present specimens as a new species.

The writer wishes to express his gratitude to Prof. S. SATO for his advice and the kindness in permitting the observation of the valuable specimens; to Prof. S. SAITO and to Asst. Prof. H. NIIYAMA for their guidance throughout the work.

Measurements and counts used in description

All specimens were preserved in about 10 per cent formalin. Body length is the distance from tip of lower jaw to midbase of caudal fin ray. Head length is the distance from tip of lower jaw to end of operculum. Depth is the greatest depth of body. Length of maxillary is the distance from tip of snout to rear edge of maxillary. Snout is the distance from tip of snout to front of eye. Diameter of orbit is the length of diameter in parallel to vertebrae. Interorbital width is the least fleshy distance between eyes. Depth of caudal peduncle is the least dorsoventral distance. The number of fin rays includes branched rays, unbranched rays, and rudiments. In counting fin rays, each ray with a separate base was counted as a single ray. The number of gill-rakers on the first arch (including rudiments) is expressed in the formula 11+20=31, where the first number indicates those on the upper part of the arch, the second, those in the lower part of the arch, and the equal sign indicates that the total number is 31. Scales were counted on the course of the lateral line, for the lateral line of this species was incomplete. The number of vertebrae are expressed in the formula 34+21=55, where the first number indicates the abdominal vertebrae, the second, the caudal vertebrae (including urostyle) and the equal sign indicates that the total number is 55. Length of pectoral fin is the longest ray of fin. Distance from the pectoral insertion to the ventral insertion is expressed by the mark P–V.

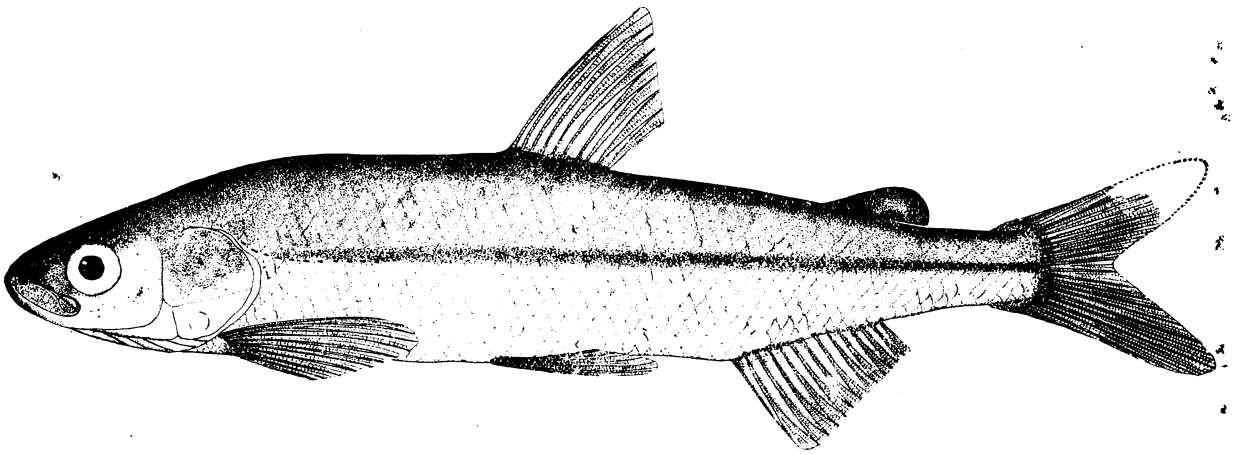


Fig. 1. Holotype of *Hypomesus sakhalinus* n. sp.

Description

Holotype. 111 mm in body length, male, Lake Taraika, southern Sakhalin, USSR, collected by S. SATO, Aug. 16, 1935.

Measurements and counts made on the holotype are recorded in table 1.

Depth 21.7 %; head 24.7 % of body length. Maxillary 34.5 % of head length, with minute canine-like teeth, scarcely reaching the anterior margin of pupil; snout 25 %; orbit 22.1 %; interorbital width 28.6 % of head length. Snout shorter than interorbital width, length of snout 87.3 % of interorbital width. Depth of caudal peduncle 34.0 % of head length. D. 10; A. 14; P. 11; V. 8, inserting just under origin of dorsal; Lat. l. 56; vertebrae 34+21=55; gill-rakers in moderate number, 11+20=31 on first arch; teeth canine-like, minute in number, in nearly biserial arrangement on vomer and palatine bones; pyloric caeca small, 3 in number, one of which being on left side and others right side of stomach. Pneumatic duct inserting ⅓ distance from tip of air-bladder; lateral line incomplete, external opening 11; pectoral length 72.5 % of P–V.

Color in formalin: snout and dorsal dark-brown, with blackish pigments, ventral and fins no color. Dark-brown band, with blackish pigments, on the course of lateral line.

Paratype. 18 specimens; 6 males and 12 females, 46 to 129 mm, taken along with the holotype.

Measurements and counts made on the paratype are recorded with the holotype in table 1. Depth 17 to 22.3%; head 24 to 28% of body length. Maxillary 31 to 41.7 %, with minute canine-like teeth, reaching anterior margin of pupil; snout 21.7 to 26.5 %; orbit 21.9 to 28.4 %; interorbital width 22.4 to 29.5 % of head length. Snout shorter than interorbital width, with the exception of five small sized specimens. In three small sized specimens, 46 to 48 mm in body length, snout longer than interorbital width, and in two specimens, 50 and 52 mm in body length, equal in length to interorbital width. Depth of caudal peduncle 27.8 to 35.8 % of head length. D. 9 to 11; A. 14 to 16; P. 10 to 12; V. 8, inserted just under origin of dorsal; Lat. l. 55 to 59; vertebrae 33 to 34+20 to 23=53 to

56; gill-rakers 10 to 12+20 to 22=30 to 33 on first arch; canine-like teeth on vormer and palatine bones, in biserial arrangement nearly, few in number; pyloric caeca small, 2 or 3 in number, always one on left side and others on right side of stomach, entirely lacking in two specimens. Pneumatic duct inserting 1/5 to 1/6 distance from tip of air-bladder; lateral line incomplete, external opening 11 (not clear). Pectoral length 63 to 74.3% of P-V.

Color in formalin similar to holotype.

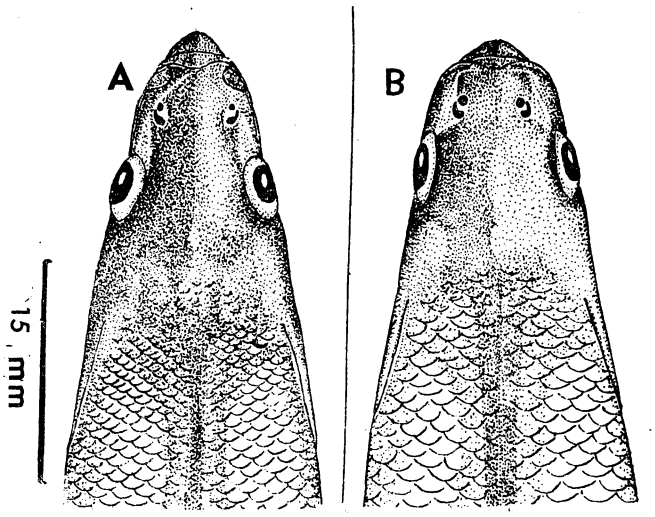
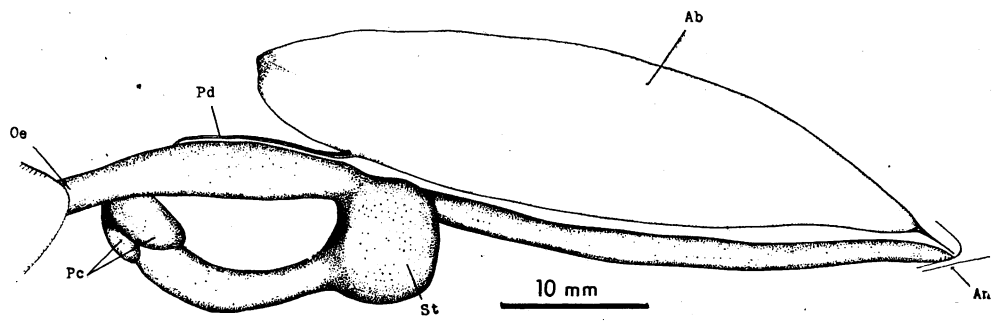


Fig. 2. A; Dorsal view of head of *Hypomesus olidus* (PALLAS), body length 131.5 mm, male fish, taken from Lake Abashiri on Nov. 3, 1953. B: Dorsal view of head of holotype.



Fgi. 3. Air-bladder and stomach of holotype.
Ab: air-bladder, An: anus, Oe: oesophagus, Pd: pneumatic duct, Pc: pyloric caeca, St: stomach.

Remarks

This species seems to be most closely related to the pond smelt, *Hypomesus olidus*. In the young measuring 46 to 57 mm in body length, it is difficult to distinguish the species from the pond smelt on the external form, and it is distinguished only in the form of the air-bladder. The snout of the pond smelt, *H. olidus*, is longer than the interorbital width as was reported by JORDAN and SNYDER (1902) (fig. 2A), whereas it is, on the contrary, shorter than the interorbital width in this species, except the young (fig. 2B). Wide interorbital space gives U shape to the dorsal view of the head of this species (fig. 2B). The snout which is shorter than the pond smelt gives also round shape to the side view of the head (fig. 1). The writer reported previously (HAMADA 1954) that the length of maxillary is 38 to 47 % of the head length in the pond smelt, whereas in the present species, it is 34 to 41.7 % of the length of the head. That is to say, cleft of maxillary of this species is somewhat small. *H. olidus olidus* has 2 to 7 pyloric caeca (TARANETZ 1936, HAMADA 1954, ANDRIYASHEV 1954), and *H. olidus bergi* and *H. olidus drjagini* also have two finger-like pyloric caeca, one on each side of the stomach (TARANETZ 1937). In the present species, they are so few that occasionally they are non-existent; and the number is 3 or less than 3. The diameter of the orbit of *H. olidus bergi* is 32.1 to 36.3 % of the head length and it of *H. olidus olidus* in same size is 28 to 32 % of the head length (TARANETZ 1937). The orbit of this species is 26.6 to 28.4 % of the head length in the small sized specimens, 46 to 52 mm in body length. Namely, the orbit of this species is smaller than *H. olidus bergi* and *H. olidus olidus*. The most remarkable characteristic of this species is the form of the air-bladder. The pneumatic duct of the pond smelt connects with the air-bladder at the anterior tip. That of this specimen connects, however, with the air-bladder at ⅕ to ⅙ distance from the tip of the air-bladder (fig. 3). By this remarkable characteristic, the present species is distinguished easily from the pond smelt and the other fishes belonging to *Hypomesus*.

Ecology

The habit of this species is unknown. Although, the habit may be deduced from the scale structure. The scale structure is like that of the pond smelt. The annulus formed on the scales may indicates the age as the scale of the pond smelt. No annulus is formed on the scale of the specimen less than 57 mm in body length (table 1). Two annuli are observed on the scale of the specimen larger than 103 mm in body length. Thus, the life of this species is estimated 1 to 3 years. The spawning habit is absolutely unknown. The gonad was immature.

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Table. 1. Counts and measurements on the holotype and the paratype, *Hypomesus sakhalinus* n. sp.

Number of specimens	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Total length in mm	—	153.4	137.0	134.0	124.5	109.0	102.0	—	83.2	—	69.0	63.4	—	—	—	58.5	57.9	56.0	55.5
Body length in mm	111.0	129.0	117.0	111.0	103.0	92.0	84.0	84.0	70.0	66.0	57.0	52.0	50.0	49.0	49.0	48.5	48.0	46.5	46.0
Head length in mm	27.0	31.0	29.0	28.5	25.5	23.0	21.1	20.2	18.2	16.5	14.9	13.5	14.0	12.7	13.0	12.5	12.0	12.5	12,8
Depth of body in mm	23.5	24.0	22.0	22.7	22.0	18.0	17.0	16.0	12.8	11.5	11.0	9.6	8.5	9.0	9.5	8.9	9.1	8.5	8.5
Length of maxillary in mm	9.5	10.7	9.0	9.7	9.0	8.0	8.0	6.9	6.9	6.2	6.0	5.4	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Length of snout in mm	6.9	7.3	6.5	7.0	6.1	5.0	5.0	4.9	4.0	4.0	3.9	3.5	3.5	3.0	3.2	3.1	3.0	3.0	3.4
Diameter of orbit in mm	6.1	7.0	6.5	6.5	5.6	6.0	5.5	4.9	4.5	4.6	4.0	3.6	3.8	3.6	3.7	3.5	3.2	3.5	3.5
Interorbital width in mm	7.9	—	8.1	8.4	6.4	5.9	5.6	—	5.0	4.2	4.0	3.5	3.5	3.6	3.4	3.7	2.9	2.8	3.1
Depth of caudal peduncle in mm	9.5	10.0	9.5	9.7	9.0	7.7	6.8	6.6	6.3	5.0	5.0	4.3	3.9	4.1	4.3	4	4.3	4.0	3.8
% of head length of body length	24.7	24.0	24.7	25.6	24.8	25.0	25.6	24.0	26.0	25.0	26.1	26.0	28.0	25.9	26.5	25.8	25.0	25.8	27.8
% of depth of body to body length	21.7	18.6	18.8	22.3	21.7	19.5	21.2	19.5	18.9	17.4	19.3	18.4	17.0	18.3	19.4	18.3	19.0	18.6	18.5
% of length of maxillary to head length	34.5	33.6	31.0	34.0	35.5	34.8	37.8	34.1	37.9	37.6	40.3	40.0	39.3	39.3	38.3	40.0	41.7	40.0	38.7
% of length of snout to head length	25.0	23.6	22.4	24.5	23.9	21.7	23.7	24.2	22.0	24.2	26.1	25.9	25.0	23.6	24.6	24.8	25.0	24.0	26.5
% of diameter of orbit to head length	22.1	22.5	22.4	22.8	21.9	26.0	26.0	24.2	24.6	27.8	26.8	26.6	27.1	28.3	28.4	28.0	26.6	28.0	27,3
% of interorbital width to head length	28.6	—	27.9	29.4	25.1	25.6	26.5	—	27.4	25.4	26.8	25.9	25.0	28.3	26.1	29.5	24.9	22.4	24.2
% of length of snout to interorbital width	87.3	—	80.2	83.3	95.3	84.7	89.2	—	80.0	95.0	97.5	100.0	100.0	83.3	94.1	83.7	103.3	107.2	109.7
% of depth of caudal peduncle to head length	34.0	32.1	32.7	34.5	35.3	33.4	32.1	32.6	34.6	30.3	33.5	31.8	27.8	32.3	33.0	32	35.8	32.0	29.6
Number of dorsal rays	10	10	9	10	10	11	11	10	9	11	11	9	10	10	10	10	10	9	11
Number of anal rays	15	15	16	14	16	16	16	15	16	16	16	15	15	15	15	15	16	14	16
Number of pectaral rays	12	11	11	11	10	12	12	12	11	12	11	12	12	10	12	10	12	12	11
Number of ventral rays	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of gill-rakers	20+11=31	10+21=31	10+21=31	10+21=31	11+22=33	10+21=31	10+21=31	12+21=33	12+21=33	10+20=30	11+22=33	10+21=31	11+20=31	11+20=31	11+21=32	11+20=31	11+20=31	11+21=32	11+20=31
Number ot scales of the course of lateral line	56	58	59	57	56	56	55	56	58	58	55	56	56	55	57	56	55	57	56
Number of vertebrae	34+21=55	34+21=55	34+20=54	33+23=56	34+20=54	34+22=56	34+21=55	34+21=55	34+20=54	34+22=56	33+20=53	34+21=55	33+20=53	34+21=55	34+20=54	34+21=55	34+21=55	33+22=55	33+20=53
Number of pyloric caeca	3	3	3	3	2	2	2	3	3	2	0	2	2	0	2	2	2	2	2
Length of pectoral fin in mm	22.3	23.0	24.0	21.0	18.5	17.0	15.0	14.5	13.0	11.0	11.0	9.0	9.5	9.0	9.0	8.8	8.5	8.9	8.5
Length of P-V in mm	30.0	36.5	34.5	29.0	28.0	25.5	21.0	22.2	19.0	16.5	15.0	13.0	14	12.5	14.0	12.5	12.5	12.0	12.3
% of length of pectoral fin to P-V	72.5	63.0	69.5	72.4	66.2	66.6	72.5	65.2	68.3	66.6	73:3	69.2	67.8	72.0	64.2	70.3	64	74.2	64.1
Number of annuli on scales	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Sex	♂	♀	♂	♂	♂	♂	♀	♀	♀	♀	♀	♂	♀	♀	♀	♀	♀	♂	♀

*Counts and measurements on the holotype.