

## Some Lantern Fishes from the North Pacific and Bering Sea

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Hitherto, many studies on Myctophid fishes have been carried out by BOLIN ('39), FRASER-BRUNNER ('49) and others. The lantern fishes are one of the most important foods for the salmon in the North Pacific and adjacent waters. Therefore, it is very significant to clear up the distributions of these species.

Here the author describes the Myctophid fishes collected by larva net in the North Pacific and Bering Sea from 1955 to 1958. The method of collection and the outline of the data obtained by the training ships "Oshoro Maru" and "Hokusei Maru" of the Faculty of Fish., Hokkaido Univ. were published in Data Rec. Oceanogr. Fish. (Hokkaido Univ.) No. 1 ('57) and No. 2 ('58). The specimens are 188 in total number and include examples of 3 genera and 4 species; viz., 184 *Tarletonbeania crenularis*, two *Myctophum californiense*, one *M. affine* and one *Lampanyctus leucopsarus*. The 9 collection-sites are indicated in Fig. 1.

Before going further, the author wishes to express cordial thanks to Prof. S. I. SATO of Faculty of Fisheries, Hokkaido University, under whose guidance and criticism this work has been done. He wishes to acknowledge his indebtedness to Capt. T. FUJII, Officers and crew of the "Oshoro Maru", to Capt. S. MISHIMA, Officers and crew of the "Hokusei Maru", and to leaders of the researches — Prof. S. MOTODA, Prof. I. SAITO, Prof. N. INOUE, Assist. Prof. H. KOTŌ and research members Mr. S. NISHIYAMA, Mr. T. MAEDA and others, in each year, who rendered valuable help in the collection of the specimens.

### *Tarletonbeania crenularis* (JORDAN & GILBERT)

*Tarletonbeania tenua*: EIGENMANN & EIGENMANN, 1890, Proc. California Acad. Sci. 2nd Ser. 3, 6—7.

*Tarletonbeania crenularis*: BOLIN, 1939, Stanford Ich. Bull. 1 (4), 100~105; CLEMENS & WILBY, 1949, Fish. Res. Board of Canada, Bull. 68, 111~113.

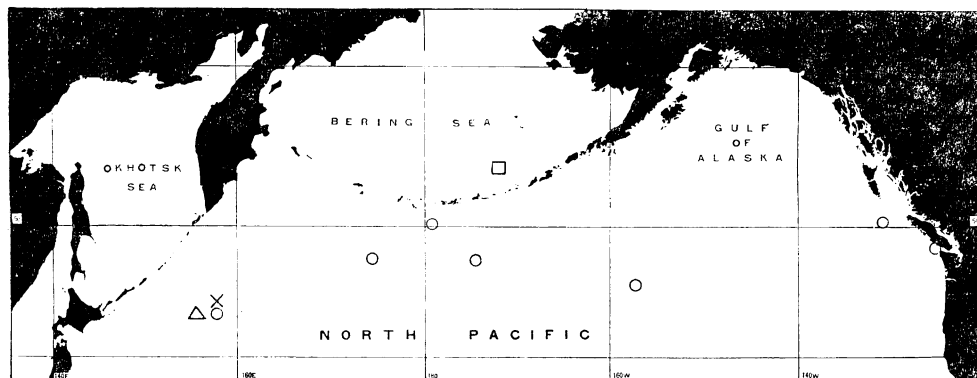


Fig. 1. Collection-sites of the lantern fishes collected by larva net, from aboard the training ships "Oshoro Maru" and "Hokusei Maru" of Hokkaido University, from 1955 to 1958.

- : collection-sites of *Tarletonbeania crenularis*
- × : collection-site of *Myctophum californiense*
- △ : collection-site of *Myctophum affine*
- : collection-site of *Lamppanyctus leucopsarus*

One hundred and eighty-four specimens were collected by "Oshoro Maru" and "Hokusei Maru", during the period from 1955 to 1958. Specimens were taken at 7 positions, viz., 11 specimens were collected at  $50^{\circ}-16'N$ ,  $131^{\circ}-02'W$  at about 8 p. m. July, 26th 1955; one specimen was collected at  $48^{\circ}-37'N$ ,  $125^{\circ}-23'W$  at about 8 p. m. July 28th 1955; one specimen was collected at  $45^{\circ}-49'N$ ,  $157^{\circ}-18'W$  at about 7 p. m. Aug. 15th 1955; one specimen was collected at  $47^{\circ}-52'N$ ,  $174^{\circ}-39'E$  at 9 p. m. July, 21th 1956; one specimen was collected at  $47^{\circ}-52'N$ ,  $174^{\circ}-29'W$  at about half past 7 p. m. Aug. 15th 1956; 4 specimens were collected at  $50^{\circ}-07'N$ ,  $179^{\circ}-13'W$  at about half past 12 a. m. July, 2nd 1957; and 165 specimens were collected at  $43^{\circ}-30'N$ ,  $158^{\circ}-00'E$  at 1 a. m. May, 19th 1958.

#### Specimen No. 493 (Fig. 2)

D. 13; A. 17; P. 13: 13; V. 8: 8; Gill rakers 5+1+10;

Lateral scales about 48

A male, measuring 71.5 mm in total length, collected at  $50^{\circ}-07'N$ ,  $179^{\circ}-13'W$ , on

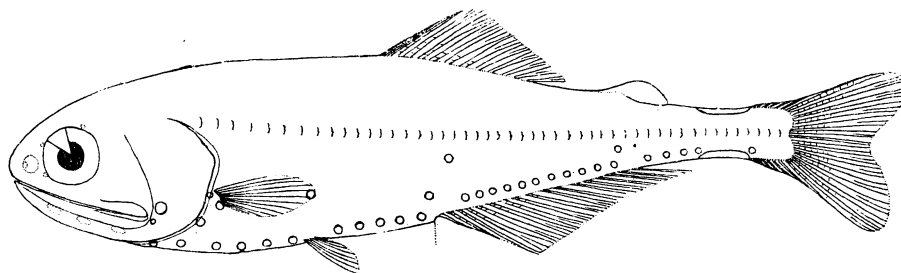


Fig. 2. *Tarletonbeania crenularis* (JORDAN & GILBERT)  
Male, T. L. 71.5 mm (Sp. No. 493)

July, 2nd 1957.

Measurements in percent of 61.4 mm in body length : length of head 28.3; distance from the base of first dorsal ray to the base of first ventral ray 27.2; distance from the base of first dorsal ray to the base of first anal ray 22.8; depth of caudal peduncle 6.3; length of snout 5.0; length of maxillary 19.7; diameter of orbit 8.6; interorbital width 7.9; length of the base of dorsal fin 18.4; length of the base of anal fin 26.7; distance from tip of snout to dorsal 50.3; distance from tip of snout to anal 57.8; distance from tip of snout to adipose 79.5; distance from tip of snout to pectoral 27.3; distance from tip of snout to ventral 38.9.

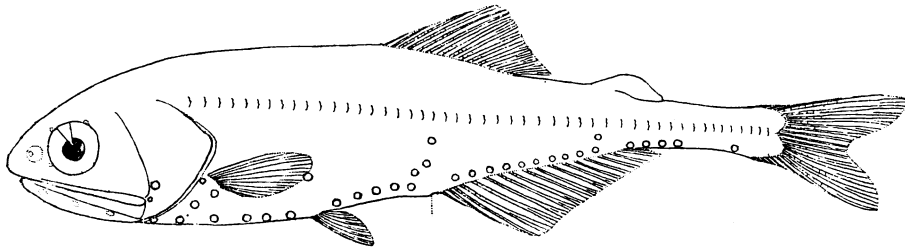
Photophores: Dn 1; Suo 1; Vn 1; Br 3; Op 2; PLO 1; PVO 2; PO 6; VLO 1; VO 6; SAO 2 (Right side 3); AOa 11; AOp 4; POL 1; Prc 1. Supra- and infracaudal luminous glands are developed, but the former does not reach to adipose fin, and it is positioned symmetrically to the latter.

**Specimen No. 957** (Fig. 3)

D. 15; A. 18; P. 12; V. 8; Gill rakers 5+1+10;

Lateral scales about 48

A female, measuring 68.3 mm in total length, collected at 43°-30'N, 158°-00'E, on May, 19th 1958.



**Fig. 3.** *Terletonbeania crenularis* (JORDAN & GILBERT)  
Female, T. L. 68.3 mm (Sp. No. 957)

Measurements in percent of 60.9 mm in body length : length of head 16.2; distance from the base of first dorsal ray to the base of first ventral ray 25.1; distance from the base of first dorsal ray to the base of first anal ray 20.8; depth of caudal peduncle 6.5; length of snout 4.9; length of maxillary 17.2; diameter of orbit 7.8; interorbital width 6.0; length of the base of dorsal fin 17.5; length of the base of anal fin 25.2; distance from tip of snout to dorsal 48.2; distance from tip of snout to anal 54.1; distance from tip of snout to adipose 76.8; distance from tip of snout to pectoral 25.2; distance from tip of snout to ventral 38.2.

Photophores : Dn 1; Suo 1; Vn 1; Br 3; Op 2; PLO 1; PVO 2; PO 6; VLO 1; VO 6; SAO 3; AOa 10 (Right side 11); AOp 4; POL 1; Prc 1. Supra- and infracaudal luminous gland are lacking.

One hundred and nineteen specimens, measuring 27.4~71.5 mm in total length,

of which sixty-four female have no supra- and infracaudal luminous glands and measure 27.4~68.3 mm in total length; the others are male and have supra- and infracaudal luminous glands. The measure 29.5~71.5 mm in total length.

The variation in number of photophores organs PO, VO, AOa, AOp, on 116 specimens, were presented in Table 1.

**Table 1.** Variation in number of photophores organs PO, VO, AOa, AOp, on 116 specimens of *Tarletonbeania crenularis* (JORDAN & GILBERT)

	Number of photophores organs (left-right)									
	Number of specimen									
PO	$\frac{6-6}{111}$	$\frac{6-7}{2}$	$\frac{7-6}{1}$	$\frac{7-7}{2}$						
VO	$\frac{5-5}{2}$	$\frac{5-6}{2}$	$\frac{6-5}{1}$	$\frac{6-6}{96}$	$\frac{6-7}{6}$	$\frac{7-6}{5}$	$\frac{7-7}{4}$			
AOa	$\frac{9-11}{1}$	$\frac{10-10}{22}$	$\frac{10-11}{8}$	$\frac{11-9}{2}$	$\frac{11-10}{3}$	$\frac{11-11}{57}$	$\frac{11-12}{7}$	$\frac{12-11}{3}$	$\frac{12-12}{12}$	$\frac{12-13}{1}$
AOp	$\frac{4-4}{45}$	$\frac{4-5}{3}$	$\frac{5-4}{6}$	$\frac{5-5}{60}$	$\frac{6-6}{2}$					

According to the table, in PO and VO, pair of 6-6 in number of organs predominated. In AOa, pair of 11-11 is most abundant, and next many specimens have pair of 10-10 and 12-12. In AOp, about half of specimens have pair 5-5, and rest half have pair of 4-4. In SAO, only one specimen, No. 493, has 2 organs on left side, whilst all other specimens have 3 organs on each side.

Males of these specimens have supracaudal luminous glands, not reached to adipose fin. And more, infracaudal luminous glands are present in symmetrical position with former one. This character has not yet been described in the previous reports.

*Myctophum californiense* EIGENMANN & EIGENMANN

Nom. Jap. Naga-hadaka

*Myctophum (Myctophum) californiense*: BOLIN, 1939, Stanford Ich. Bull. 1(4), 106~108.

*Myctophum californiense*: CLEMENS & WILBY, 1949, Fish. Res. Board of Canada, Bull. (68), 113~114.

Two males, measuring 81.1~85.1 mm in total length, were collected by "Hokusei Maru" at 43°-30'N, 158°-00'E, at 1 a.m. May, 19th 1958.

**Specimen No. 958** (Fig. 4)

D. 15; A. 21; P. 17: 17; V. 9: 9; Gill rakers 7+1+16;

Lateral scales about 43

Measurements in percent of 72.1 mm in body length: length of head 26.0; distance from the base of first dorsal ray to the base of first ventral ray 20.1; distance from the base of first dorsal ray to the base of first anal ray 25.3; depth of caudal peduncle 8.1; length of snout 4.3; length of maxillary 17.2; diameter of orbit 8.8; interorbital

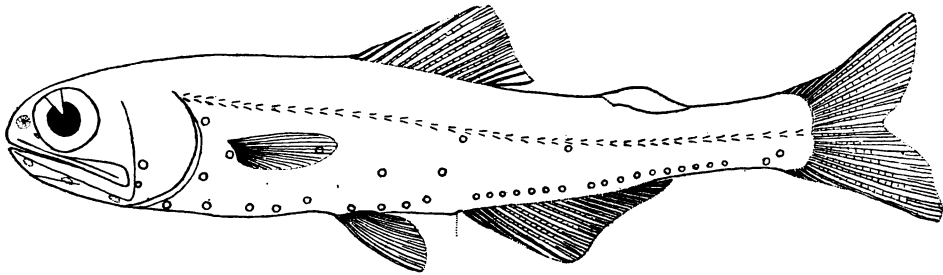


Fig. 4. *Myctophum californiense* EIGENMANN & EIGENMANN  
Male, T. L. 85.1 mm (Sp. No. 958)

width 7.6; length of the base of dorsal fin 17.4; length of the base of anal fin 24.6; distance from tip of snout to dorsal 45.9; distance from tip of snout to anal 59.9; distance from tip of snout to adipose 78.9; distance from tip of snout to pectoral 28.0; distance from tip of snout to ventral 41.7.

Photophores: Vn 1; Br 3; Op 2; PLO 1; PVO 2; PO 5; VLO 1; VO 4; SAO 3; AOa 7 (Right side 5); AOp 10; POL 1; Prc 2; supracaudal luminous glands 7; infracaudal luminous gland lacking.

*Myctophum affine* (LÜTKEN)  
Nom. Jap. Susuki-hadaka

*Myctophum* (*Myctophum*) *affine*: BOLIN, 1939, Stanford Ich. Bull. 1(4), 110~113.

Only one young specimen, measuring 31.0 mm in total length, was collected at 43°-41'N, 155°-42'E of I. G. Y. position of "Oshoro Maru", at about 8 p. m. Sep. 9th 1957.

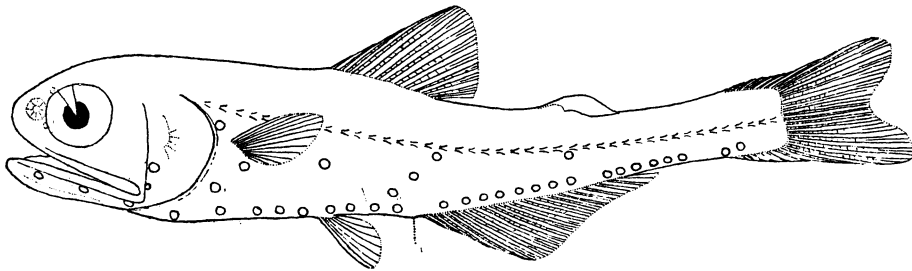


Fig. 5. *Myctophum affine* (LÜTKEN) T. L. 31.0 mm (Sp. No. 647)

**Specimen No. 647** (Fig. 5)

D. 13; A. 23; P. 14: 15; V. 8: 9; Gill rakers 5+1+14;

Lateral scales about 42

Measurements in percent of 26.4 mm in body length: length of head 27.6; distance from the base of first dorsal ray to the base of first ventral ray 19.7; distance from the base of first dorsal ray to the base of first anal ray 23.4; depth of caudal peduncle 8.3; length of snout 5.6; length of maxillary 19.3; diameter of orbit 9.0; interorbital

width 9.4; length of the base of dorsal fin 16.2; length of the base of anal fin 28.4; distance from tip of snout to dorsal 43.1; distance from tip of snout to anal 55.3; distance from tip of snout to adipose 75.7; distance from tip of snout to pectoral 29.1; distance from tip of snout to ventral 42.8.

Photophores: Dn 1; Vn 1; Br 3; Op 2; PLO 1; PVO 2; PO 5; VLO 1; VO 4; SAO 3; AOa 8 AOp 6; POL 1; Prc 2, all organs number the same on each side; supra- and intracaudal luminous gland are lacking.

*Lampanyctus leucopsarus* (EIGENMANN & EIGENMANN)

*Myctophum* (*Stenobranchius*) *leucopsarum*: EIGENMANN & EIGENMANN, 1890, Proc. Cal. Acad. Sci. 2nd Ser. 3, 5~6.

*Lampanyctus leucopsarus*: BOLIN, 1939, Stanford Ich. Bull. 1(4), 129~133.

Only one specimen, measuring 83.5 mm in total length, was collected at 54°-10'N, 172°-00'W of NORPAC position of "Oshoro Maru", at about 2 a. m. Aug. 13th 1956.

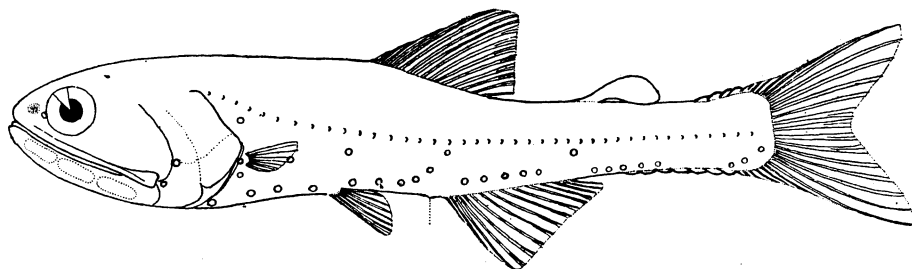


Fig. 6. *Lampanyctus leucopsarus* (EIGENMANN & EIGENMANN)  
T. L. 83.5 mm (Sp. No. 189)

**Specimen No. 189** (Fig. 6)

D. 15; A. 16; P. 10; V. 8; Gill rakers 6+1+13;

Lateral scales about 40

Measurements in percent of 70.0 mm in body length: length of head 30.1; distance from the base of first dorsal ray to the base of first ventral ray 18.4; distance from the base of first dorsal ray to the base of first anal ray 21.0; depth of caudal peduncle 9.0; length of snout 6.1; length of maxillary 21.8; diameter of orbit 6.8; interorbital width 8.2; length of the base of dorsal fin 17.8; length of the base of anal fin 18.0; distance from tip of snout to dorsal 47.7; distance from tip of snout to anal 57.5; distance from tip of snout to adipose 76.4; distance from tip of snout to pectoral 31.0; distance from tip of snout to ventral 42.1.

Photophores: Vn 1; Br 3; Op 2; PLO 1; PVO 2; PO 5; VLO 1; VO 3; SAO 3; AOa 5 (Right side 6); AOp 7 (Right side 6); POL 1; Prc 3; supracaudal luminous glands 4; infracaudal luminous glands 7. But, this specimen has 3 Prc; this character is rather like to *L. nannochir* as described by BOLIN ('39) and FRASER-BRUNNER ('48).

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