

**A Stichaeid Fish *Chirolophis otohime*,
a Junior Synonym of *Chirolophis
japonicus***

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The genus *Chirolophis* is characterized by two or three pairs of supraorbital tentacles; teeth on jaws forming two alternating rows, incisiform in most species; no teeth on vomer and palatines; pelvic fin with three or four rays; the presence of siphon of gill covering and postcleithrum composed of one or two elements (Makushok, 1958; Shiogaki, 1981). Along the northern coast of Japan, this genus is represented by three species, *C. japonicus*, *C. otohime* and *C. saitone* (Ichthyological Society of Japan, 1981). *C. saitone* is separable from its congeners by its pointed teeth, mossy head and fewer number of dorsal and anal rays. *C. japonicus* is mainly distinguished from *C. otohime* by scaled cheeks.

Although the squamation on cheek among the northern blennies has been believed a specific or even generic character in previous articles (e.g., Jordan and Snyder, 1902), my observations showed that the scales on the cheek of *C. otohime* developed with the growth of fish. In other words, it is doubtful to separate *C. japonicus* from *C. otohime* by this character. The purpose of the present paper is to show that *C. otohime* is a junior synonym of *C. japonicus*.

Methods and material

Proportional measurements were made in accordance with the method of Hubbs and Lagler (1958). Radiographs were used for counting fin rays and vertebrae except for pectoral fin. Osteological nomenclature and counts of the openings in head sensory canals followed those of Makushok (1958), except for the occipital sensory canal which included the posteriormost single opening in front of dorsal fin origin. Scales on cheek were detected and measured in long axis by using a microscope. Scales were stained with KOH and Alizarin-Red solution after the epitheliums of right preopercle were removed.

Specimens examined. *Chirolophis otohime*: holo-

type, SU (Stanford University collection, now at California Academy of Sciences) 7073, 72.0 mm in standard length (SL), Hakodate, 1900; paratypes, USNM (United States National Museum, Smithsonian Institution) 50502 (three specimens), 48.4, 61.8, 63.3 mm SL, Hakodate, 1900. *Chirolophis japonicus*: ACAP (Aquaculture Center of Aomori Pref.) 363, 275 mm SL, Moura, Mutsu Bay, Aomori Pref., Nov. 7, 1974; ACAP 364, 288 mm SL, Moura, Apr. 16, 1978; ACAP 382, 277 mm SL, Moura, Apr. 21, 1976; ACAP 383~384, 270~261 mm SL, Noheji, Mutsu Bay, Nov. 26, 1978; ACAP 385, 117 mm SL, Noheji, Dec. 4, 1978; ACAP 386, 109 mm SL, Moura, May 11, 1973; ACAP 387, 52 mm SL, Moura, Dec. 18, 1978; ACAP 388, 67 mm SL, Moura, Dec. 7, 1978; ACAP 414~419, 232~365 mm SL, Kominato, Mutsu Bay, Jan. 27, 1979; ACAP 420, 242 mm SL, Moura, Feb. 1, 1979; ACAP 421, 274 mm SL, Moura, Feb. 20, 1979; ACAP 422~428, 252~306 mm SL, Kominato, Mar. 9, 1979; ACAP 451, 228 mm SL, Moura, May 26, 1979; ACAP 452~454, 186~279 mm SL, Shirasu, Mutsu Bay, May 27, 1979; ACAP 455, 202 mm SL, Moura, June 20, 1979; ACAP 456, 326 mm SL, Moura, Nov. 16, 1979; ACAP 457~458, 272 mm SL, Moura, Nov. 22, 1979; ACAP 459, 233 mm SL, Moura, Nov. 27, 1979; ACAP 3724, 274 mm SL, Kodomari, Aomori Pref., Japan Sea, June 24, 1981; ACAP 5275, 67.5 mm SL, Minmaya, Aomori Pref., Tsugaru Strait, Aug. 21, 1982.

Results

Table 1 shows the proportional measurements, counts and selected characters of specimens of *C. otohime* and *C. japonicus*.

Proportional measurements and counts. In proportional measurements, head length, eye diameter and the length of the first supraorbital tentacle decrease with growth, while caudal peduncle depth increases. There was no essential difference among specimens in counts for dorsal, anal, pectoral and caudal rays, vertebrae and openings of lateral-line sensory canal.

Development of scales. The scales on preopercular region of *C. japonicus* were developed very slowly in comparing with those of body side. They could not be found with the naked eye in the specimens less than 20 cm SL. In a 109 mm SL specimen (ACAP 386), the scales on preopercle were deeply embedded and elliptical in shape. They were much smaller than those on body side, about 0.3 mm vs. 0.9~1.3 mm in long axis. The scales on the dorsal and anal fins were very

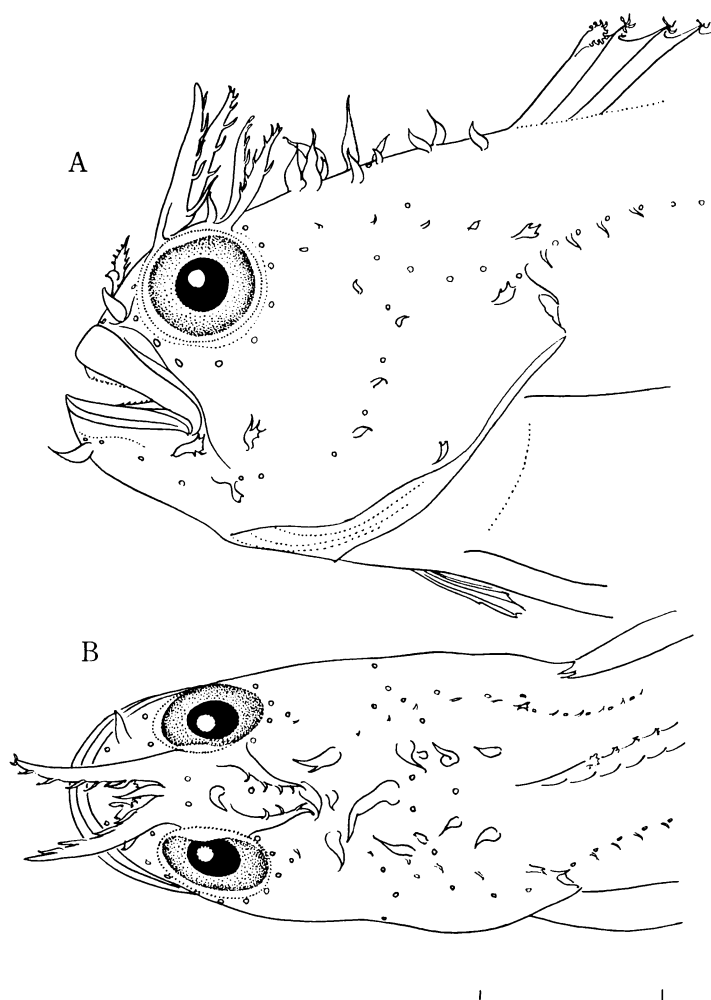


Fig. 1. Head of the holotype of *Chirolophis otohime*, SU 7073, 72 mm SL. A, lateral view; B, dorsal view; first supraorbital tentacles are depressed anteriorly to show openings of interorbital sensory canal. Scale indicating 5 mm.

small and difficult to detect even in large specimens. These scales were expected to have developed in a similar way as in the cheek region.

Dermal appendages. The dermal appendages on the lateral line scales and the preoperculo-mandibular region become large and complicated and increase in number with growth. Although the shape of the tentacles on the supraorbital region showed individual variation, the arrangement of these tentacles was consistent as shown in Shiogaki (1981: fig. 3B). The dermal appendages of the holotype of *C. otohime* were arranged in the same way as in *C. japonicus*,

but they were small both in size and number (Fig. 1). The supraorbital tentacles are simple in young and become multifurcated with growth.

Head sensory canals. The arrangement of openings of head sensory canals was consistent in all specimens examined: nasal 2, interorbital 7, postorbital 7, occipital 5, infraorbital 6, preopercular 6 and mandibular 4 (Fig. 1).

Coloration. In young of *C. japonicus*, the characteristic meandering streaks on the cheek and the blotches on the body are very distinct but become gradually diffused with growth. Finally in mature males, the color of the body become

Table 1. Measurements, counts and selected characters of *Chirolophis otohime* and *C. japonicus*.

Characters	<i>Chirolophis otohime</i>			<i>Chirolophis japonicus</i>					
	Cat. No.	Holotype SU 7073	Paratypes USNM 50302 (n=3)	ACAP 388	ACAP 385	ACAP 452	ACAP 384	ACAP 383	ACAP 419
TL (mm)		81.3	54.0~70.5	76.0	132	206	292	303	408
SL (mm)		72.0	48.4~63.3	67.0	117	186	261	270	365
Sex		not examined	not examined	not examined	♀	♂	♀	♂	♀
Measurements									
In SL:									
Head length		5.3	4.5~5.2	5.2	5.2	6.2	6.1	6.1	6.4
Body depth		5.5	5.5~5.8	6.0	5.9	5.1	5.1	5.2	5.8
Distance from tip of snout to anal origin		2.6	2.5~2.6	2.7	2.5	2.6	2.6	2.7	2.8
In HL:									
Eye diameter		3.6	3.3~3.6	2.9	3.8	3.9	4.7	4.9	5.0
Interorbital width		8.6	9.0~11.4	7.2	8.9	9.4	8.9	10.2	8.1
Snout length		5.5	5.9~6.3	7.0	7.2	7.0	7.1	7.6	5.5
Caudal peduncle depth		3.3	3.4~4.1	3.6	3.6	3.0	2.7	2.6	2.5
Length of the first supraorbital tentacle		2.6	2.9~3.2	2.2	3.2	4.8	5.2	4.4	5.2
Pectoral fin length		1.2	1.0~1.3	1.2	1.3	1.3	1.3	1.1	1.2
Ventral fin length		3.0	2.9~3.3	2.8	3.2	2.7	3.1	2.6	2.8
Counts									
Dorsal rays		LXI	LX~LXII	LX	LIX	LXI	LX	LX	LXI
Anal rays		I, 45	I, 44~46	I, 44	I, 44	I, 45	I, 43	I, 44	I, 45
Pectoral rays		15	14~15	14	14	14	14	14	15
Caudal rays		16	14~16	14	16	14	16	15	15
Ventral rays		I, 4	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4
Vertebrae		16+50=66	17+48~50 =65~67	17+47=64	16+48=64	16+50=66	16+48=64	16+47=63	17+49=66
Openings of lateral line		10	9~11	10	7	10	10	11	10
Dermal flaps on lateral-line scales		4	absent	2	4	5	8	7	10
Dermal flap on preopercular and mandibular canals		4+3	4+3	4+3	8+4	11+5	8+4	9+4	9+4
Blotches along dorsal fin base and anal fin base		10+11	9~11+9~10	9+10	10+10	9+10	10+10	8+10	10+9
Dermal fringes at tip of first supraorbital tentacle		minimal, 0, 3	minimal, 0~4	minimal, 5	4	7	bifurcated, 15	multifurcated, numerous	multifurcated, numerous
Scales on cheeks		absent	absent	absent	embedded	embedded	distinct	distinct	distinct
Length of long axis of cheek scales					0.3~0.4 mm	0.6~0.7 mm	0.5~0.8 mm	0.9~1.1 mm	1.2~1.7 mm

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dusky black. The number of blotches on the body of ACAP specimens is approximately identical with those of type specimens of *C. otohime* (Table 1).

Dentition. In specimens of *C. japonicus* less than about 100 mm SL, somewhat compressed teeth are loosely arranged in two rows anteriorly but in a single row posteriorly. The tips do not form acute cutting edges. In a 67 mm specimen (ACAP 388) compressed larger teeth are arranged in two alternating rows on the dorso-lateral part of the premaxillary, and the small primary teeth on the ventral edge of the premaxillary form two alternating rows anteriorly and a single row posteriorly. In a 109 mm SL specimen (ACAP 386), the anterior teeth are completely replaced by compressed teeth with acute tips and form a strong cutting edge except for the posterior ones. Teeth grow heavily with sharp blades at the tips and form a strong composed cutting edge (Shiogaki, 1983; fig. 6A~E). In the holotype of *C. otohime*, dentition is in the stage of pre-replacement.

Discussion

The small specimens (ACAP 388, 5275: 67.0, 67.5 mm SL) quite agree with the type specimens of *C. otohime* (48.4~72.0 mm SL) in all characters examined. On the other hand, the characters of large specimens (e.g., ACAP 419: 365 mm SL) coincide with those in the original description (Herzenstein, 1890), reexamination of the holotype of *C. japonicus* by Makushok (1958), and in the original description of *Azuma emmion* (= *C. japonicus*) by Jordan and Snyder (1902). The morphological differences between *C. otohime* and *C. japonicus* become indistinct when specimens of intermediate size are taken into account (Table 1). Therefore, the present author concluded that the differences are due to ontogenetic phases of the same species and that *C. otohime* is a junior synonym of *C. japonicus*.

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リュウグウギンボ *Chirolophis otohime* はフサギンボ *Chirolophis japonicus* のシノニムである

塩垣 優

リュウグウギンボの模式標本 (完模式標本, 72.0 mm SL; 副模式標本, 3 個体, 48.4~63.3 mm SL: 全て函館産) と青森県産のフサギンボの各成長段階の多数の標本について, 体各部の計測値, 計数形質, 鱗の発達, 皮質突起の発達, 頭部の感覚管系, 体斑紋および歯の発達について比較検討した。

リュウグウギンボは頭部に鱗がないことにより, 明確にフサギンボとは区別されるとされていた。しかし, フサギンボの頭部の鱗は体側の鱗に比べて, その発達は非常に遅く, 肉眼で識別し得るのはおよそ 200 mm SL 以上の個体であることなど, リュウグウギンボの模式標本は全ての点においてフサギンボの若魚期に相当することが明らかとなった。従って, リュウグウギンボはフサギンボのシノニムであると結論された。

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