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Redescription of the Stichaeid Fish *Chirolophis saitone*

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Abstract *Chirolophis saitone* (Jordan et Snyder, 1902) is redescribed based on newly collected specimens, i. e., six specimens (55.0～82.0 mm SL) from Mutsu Bay, Aomori and two specimens (61.3, 71.0 mm SL) from Hokkaido, northern Japan and on the holotype. It is diagnosed from its congeners mainly by teeth with pointed tips, smaller numbers of occipital sensory canal openings and the mossy head.

Chirolophis saitone was described by Jordan and Snyder (1902) based on a single damaged specimen collected from Aomori, Japan in 1900. Unfortunately the holotype was in a bad state of preservation, i. e., the caudal fin was missing, the head and other parts were damaged. Therefore the description was incomplete. Since Jordan and Snyder (1902) described this species, no other additional specimens have ever been reported.

Since 1973, the author has been studying the life history of the coastal fishes of Mutsu Bay, and has been able to collect 20 specimens including planktonic life stage (26.3～82.0 mm SL) of the present species. He has also been able to examine two specimens deposited in the Laboratory of Marine Zoology of Hokkaido University.

Here the author will redescribe *Chirolophis saitone* based on the relatively large specimens newly collected from Mutsu Bay and Hokkaido, Japan.

Methods and materials

Counts and proportional measurements were made in accordance with the method of Hubbs and Lagler (1958). Fin rays and vertebrae were counted from radiographs. Vertebral counts included the urostylar centrum. Terminology of bones and head sensory canals followed that of Makushok (1958) except for infraorbital bones. Osteological descriptions were made from cleared and stained specimens.

Specimens examined were recorded as follows: abbreviation of depository, catalogue number, standard length, collection locality and date. Abbreviations of depository are as follows: ACAP, Aquaculture Center of Aomori Prefecture; HUMZ, Laboratory of Marine Zoology, Hokkaido University; NMC, National Museum of Natural Sciences, Museums of Canada, Ottawa; SU, Stanford Zoological Museum (California Academy of Sciences).

Chirolophis saitone (Jordan et Snyder, 1902)
(Japanese name: Aki-ginpo)

(Fig. 1)

Bryostemma saitone Jordan et Snyder, 1902: 467, fig. 13 (type locality, Aomori); Taranetz, 1937: 153 (after Jordan and Snyder, 1902); Matsubara, 1955: 759 (after Jordan and Snyder, 1902).

Chirolophis saitone: Makushok, 1958: 61 (after Jordan and Snyder, 1902); Ueno, 1966: 439 (after Jordan and Snyder, 1902); Lindberg and Krasyukova, 1975: 77, fig. 55 (after Jordan and Snyder, 1902).

Specimens examined. SU 7072, holotype, 95 mm, Aomori, 1900; ACAP 474, 66.0 mm, off Kominato, Mutsu Bay, Sep. 29, 1977; ACAP 592 (cleared and stained), 55.0 mm, off Moura, Mutsu Bay, Nov. 26, 1979; ACAP 1658～1661 56.0～82.0 mm, off Yokohama, Mutsu Bay, Oct. 7～8, 1973; HUMZ 3927, 71.0 mm, Hokkaido; HUMZ 3929, 61.3 mm, Hokkaido.

Comparative materials. *Chirolophis japonicus*: ACAP 382, 277 mm, Moura, Mutsu Bay, Apr. 21, 1976; ACAP 385, 121 mm, Noheji, Mutsu Bay, Dec. 4, 1978; ACAP 386 (cleared and stained), 109 mm, Moura, Mutsu Bay, May 11, 1973; ACAP 388 (cleared and stained), 67 mm, Moura, Mutsu Bay, Dec. 7, 1978; ACAP 414～419,

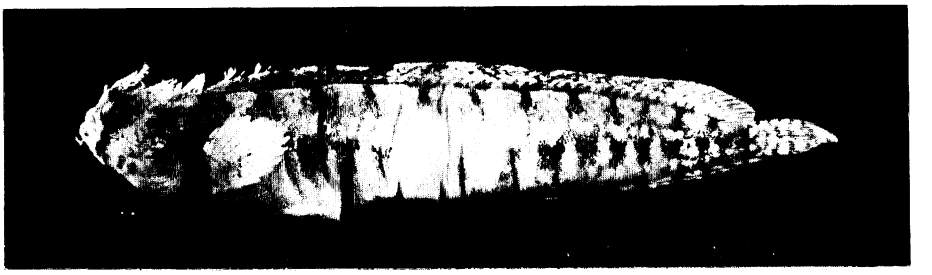

Fig. 1. *Chirolophis saitone*, ACAP 474, 66.0 mm SL, collected from off Kominato, Mutsu Bay, Aomori, on Sep. 29, 1977.

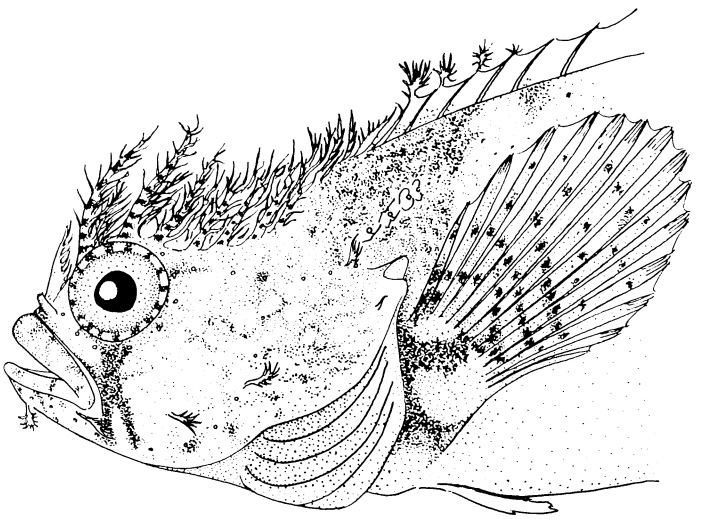

Fig. 2. Head of *Chirolophis saitone*, ACAP 474, 66.0 mm SL.

232～372 mm, Kominato, Mutsu Bay, Jan. 27, 1979.

Chirolophis nugator: NMC 78-81 (two specimens), 42.5 and 67.3 mm, Jacinto Is., British Columbia, Canada, Aug. 16, 1974.

Diagnosis. Tentacles on head numerous; three long pairs on supraorbital, numerous middle-sized and short mossy ones densely matted along postorbital to just in front of dorsal origin. Teeth slender with pointed tips, arranged in alternating two rows forming a single cutting edge. Ocelli on dorsal fin absent. Openings of occipital sensory canal only three, and those of upper branch of lateral line, 2～6.

Chirolophis nugator has strong resemblances to the present species in the mossy matted head and general appearance, but is distinctive in the presence of dorsal ocelli, more openings of the occipital sensory canal (5), those of lateral line (12～13) and compressed and truncated teeth. *C. japonicus* is very distinctive in the relatively poorly developed dermal processes on head (Fig. 3B), only two pairs of long tentacles on supraorbital, highly compressed teeth and scaled cheeks.

Description. Proportional measurements and counts are shown in Table 1. Body deep and compressed posteriorly. Head moderate. Snout very short, its length smaller than eye diameter. Eye large, placed far forward and upward. Interorbital very narrow and flat. Mouth moderate, maxillary just extending to middle to posterior edge of pupil. Lower jaw a little longer than upper jaw. Both jaws with fleshy lips. Head and nape just in front of dorsal origin naked entirely and body covered with minute overlapping cycloid scales. Pectoral fin large, rounded, its rays branched and thicken-

Table 1. Proportional measurements and counts of *Chirolophis saitone*. Vertebral numbers in parentheses show those of preanal plus caudal vertebrae.

Characters	SU 7072 Holotype	ACAP 592	ACAP 1658	HUMZ 3929	ACAP 1659	ACAP 474	ACAP 1660	HUMZ 3927	ACAP 1661
TL (mm)	damaged	62.0	65.5	71.0	75.0	76.0	80.3	80.3	94.0
SL (mm)	95	55.0	56.0	61.3	65.0	66.0	69.2	71.0	82.0
Measurements									
In SL									
Head length	5.7	4.9	5.0	5.6	4.9	5.4	5.1	5.8	4.8
Body depth	6.8	6.8	5.6	6.7	5.9	5.3	6.1	6.0	5.6
Distance from tip of snout to anal origin	2.5	2.3	2.5	2.4	2.3	2.4	2.4	2.4	2.2
In HL									
Snout length	6.6	7.0	7.5	6.9	6.7	6.5	8.1	6.9	7.7
Eye diameter	4.0	3.9	4.0	3.8	4.0	3.5	3.7	4.1	4.4
Interorbital width	11.0	11.2	12.4	12.2	13.3	11.3	11.4	13.5	11.3
Pectoral fin length	damaged	1.3	1.3	1.3	1.4	1.2	1.2	1.2	1.3
Ventral fin length	3.1	3.5	2.5	2.6	2.7	2.8	2.9	2.6	3.3
Length of the longest dorsal spine	2.6	2.3	2.2	2.6	2.1	2.5	2.4	2.5	2.6
Caudal peduncle depth	3.6	3.5	2.9	3.3	3.2	3.0	3.2	3.3	3.5
Length of the first supraorbital tentacle	damaged	3.3	2.5	2.9	2.7	2.5	2.6	2.8	2.6
Counts									
Dorsal rays	LI	LII	LI	LIV	LII	LI	LI	LIV	L
Anal rays	I, 36	I, 37	I, 37	I, 37	I, 37	I, 36	I, 36	I, 38	I, 36
Ventral rays	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4	I, 4
Pectoral rays	14~15	14	14	14	14	13	14	15	13~14
Caudal rays	damaged	15	14	14	14	14	15	14	13
Vertebrae	(15+42)57	(16+41)57	(15+41)56	unexamined	(16+40)56	(15+42)57	(15+41)56	unexamined	(15+40)55
Gill rakers	12	13	13	13	14	13	unexamined	12	unexamined
Openings of sensory canal in upper branch of lateral line	damaged	3~4	5~6	2	4	4~5	4	5~6	4

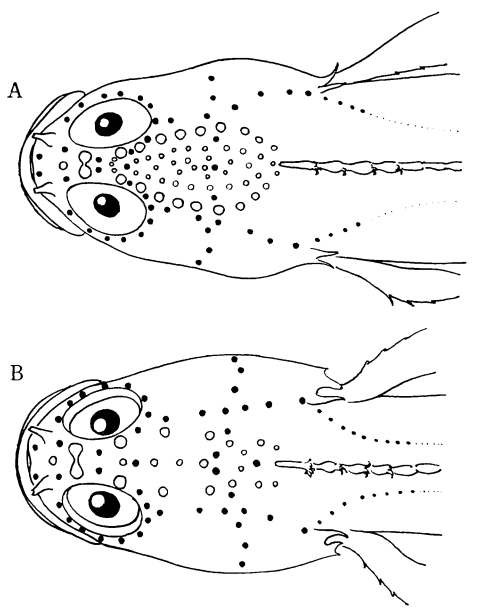

Fig. 3. Arrangement of openings of head sensory canals and dermal appendages on head. A: *Chirolophis saitone*, ACAP 474, 66.0 mm SL. B: *C. japonicus*, ACAP 385, 121 mm SL. Solid blacks indicating openings of head sensory canals; open circles indicating dermal appendages.

ed. Ventral fin small, its rays branched. Dorsal fin base long, its origin located a little before gill opening, continuing to caudal fin base but clearly incised. Dorsal spines in equal stoutness, slightly curved and a little higher in the posterior except for several spines in the posteriormost. Anal fin low, with a slender spine, its end slightly connected to caudal fin by membrane. Caudal fin rounded and its 11～13 rays branched. Anal origin located conspicuously anterior to midpoint of body and on the vertical through 15th dorsal spine.

Teeth small and slender with pointed tips and recurved inward, arranged in two alternating rows so as to form a closely set single cutting edge (Fig. 4E, F) (in smaller specimens, teeth arranged sparsely, alternating rows are underdeveloped and appear arranged in an irregular single row; Fig. 4B, C). Vomer and palatines smooth. Gill rakers short and blunt, sparsely arranged. Pseudobranchiae present. Branchiostegals 6. Gill membranes broadly united with each other and free from the isthmus. Gill membrane at the uppermost of gill opening forming a dermal siphon. Nostril with a single tube.

On head numerous matted tentacles present along supraorbital to nape just in front of dorsal origin in a cluster of variously sized tentacles with minute branchlets: on snout, an unpaired and broad one; on supraorbital, three long pairs, in which first one longest and longer than eye diameter, attached to each other at the base; 7～8 middle sized tentacles continuing in an oblique line in a close set to just in front of dorsal origin on either side and between these tentacles there are numerous minute and mossy ones arranged in about 4～5 rows in transverse on postorbital region (Figs. 2, 3A). Along preopercular and mandibular bones, several minute tentacles with branchlets at ends and first to fourth dorsal spines with small ones at tips (Fig. 2).

Lateral line replaced by a line of pit organs except for the beginning of upper branch, in a form of an upper short branch and a straight median one. Upper branch having 2～6 openings of sensory canal at the beginning, ascending over the pectoral fin and running parallel to dorsal fin base, ending over anal origin.

Head sensory canals well developed and the number of openings in each canal restrictly consistent; nasal 2, interorbital 7, postorbital 7, occipital 3, infraorbital 6, preopercular 6 and mandibular 4 (Fig. 3A). Suborbital bones complete, with four tube-like elements and first suborbital bone sutured with simple long tube-like lachrymal bone, these two bones with weakly developed suborbital shelves (Fig. 4A).

Postcleithral bone, a slender element. Last interneural and interhaemal spines supporting two rays respectively. Hypural of penultimate vertebra coaleses with its centrum. Epurals three. Minimal hypural absent.

Coloration of fresh specimens: Body red tinged olive brown, with 11～12 dark brown blotches along dorsal fin base, anteriormost one largest, located over pectoral fin base and these blotches diffused ventrally, sometimes branched and forming irregular reticulations. On dorsal fin near its base pinkish small oblong rounded blotches as large as eye diameter, arranged in an

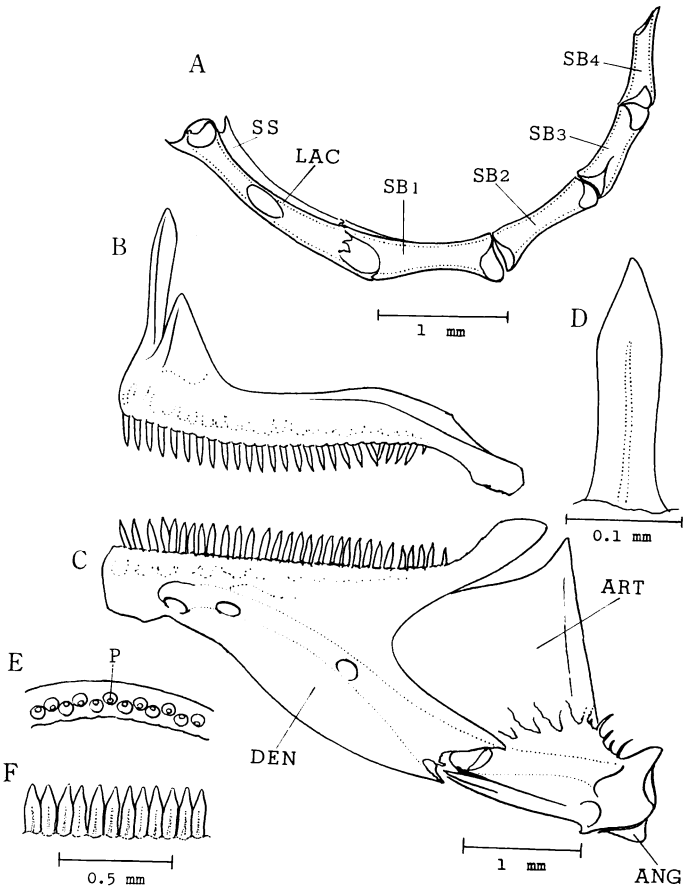

Fig. 4. Infraorbital bones and dentition of *Chirolophis saitone*. A: Outer view of left infraorbital bones. B: Outer view of left premaxillary bone. C: Outer view of left dentary bone. D: A tooth of dentary bone. E: Dorsal view of dentary bone. F: Inner view of teeth on dentary bone. A～D, ACAP 592, 55.0 mm SL; E～F, ACAP 1661, 82.0 mm SL. ANG, angular bone; ART, articular bone; DEN, dentary bone; LAC, lachrymal bone; P, point of a tooth; $SB_{1\sim4}$, suborbital bones; SS, suborbital shelf.

equal interval, these corresponding in position with dorsal dark brown blotches. Dorsal fin membrane pale olive, with dusky mottles. Anal fin light yellow with 13～14 dark bars. Pectoral fin white, with 4～5 vertical rows of dark spots, its base silverly white in contrast with dark brown broad bars at median. Caudal fin light yellow, with 5 vertical dark bands. Under the eye, a dark brown bar extending directly downward and branched ventrally. Orbit and larger tentacles on head spotted. Several small black spots scattered around opercular region. Belly white to light yellow. Ventral fin white.

The present species is a relatively deep dweller in Mutsu Bay, occurring at a depth of more than 30 meters and living on muddy bottoms. Four specimens, ACAP 1658～1661, were all nearly mature in both sexes.

Remarks. The description of the genus *Chirolophis* by Makushok (1958: 70, 81) disagrees with *C. saitone* in the following points: (1) supraorbital tentacles two pairs (three pairs in *C. saitone*), (2) teeth on jaws highly compressed (in *C. saitone*, slender with pointed tips), (3) postcleithral bones two elements (in *C. saitone*, a single element), (4) occipital sensory canal

having five openings (Makushok, 1958 erroneously described four, and may have overlooked the posteriormost one; see Fig. 3B) (in *C. saitone* three).

However, the present species should be included in the genus *Chirolophis* Swainson, 1839, because teeth on jaws are arranged in alternating two rows and form a closely set single cutting edge, though their tips are pointed. Other disagreeing points are considered to be specific differentiations.

Acknowledgments

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タウエガジ科の1種アキギンポ *Chirolophis saitone* の再記載

塩垣　優

青森県産の不完全な標本に基づき記載されたアキギンポ *Chirolophis saitone* (Jordan et Snyder, 1902) はその後の採集例がなく，不完全な記載のままであった．筆者は青森県陸奥湾から新たに得られた6個体，北海道沿岸から採集された2個体および模式標本に基づき，本種の再記載を行った．本種は頭部背面に密生する多数の皮弁を有すること，眼上皮弁が3対と多いこと，後鎖骨は1片の小骨片に退化していること，後頭部の感覚管 (occipital sensory canal) の開口が3個と少ないこと，歯は強く側扁せず，先端が尖る等の著しい特徴を有する．

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