

Sexual Dimorphism Observed in *Chionodraco myersi*

DEWITT and TYLER

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Chionodraco myersi DEWITT and TYLER において
観察された性的二型について

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要旨：ロス海で採集した *Chionodraco myersi* 49 個体の外部形態の変異を調査した。同時に生殖巣の検査が可能な31個体に関しては、肉眼もしくは組織学的所見に基づき性別を調べた。その結果、第一背鰭最長棘条長の標準体長に対する割合が9.0%から30.0%と、かなりの変異を示した。雌と確認された23個体における第一背鰭最長棘条長の標準体長に対する割合は、9.4%から16.3%、雄と思われる8個体では22.5%から30.0%とふたつのグループに分離することができた。このことから、第一背鰭最長棘条長における変異は、性的二型現象と考えられた。

Ch. myersi の雄の形態は、1961年に記載された *Chionodraco markhami* のそれと比べてよく似ており、この学名は、1960年に記載された *Ch. myersi* の雄に付けられたものと考えられる。これまでに、*Ch. markhami* を *Ch. myersi* のシノニムとする考えがあり、本研究の結果はこの考えを支持する事実と思われる。

Abstract: External morphological characters and sexes of *Chionodraco myersi* which was caught in the Ross Sea were examined.

The relative length of the longest dorsal spine to the standard length of fish varied from 9.0% to 30.0% of the standard length.

A histological observation revealed that twenty-three female specimens had the lower dorsal fin (9.4%~16.3% of the standard length) and eight male specimens had the higher dorsal fin (22.5%~30.0% of the standard length).

As the morphological characters of the types of *Chionodraco markhami* resemble those of the "high dorsal" group, it seems that the species name of *Ch. markhami* should be given to males of *Ch. myersi*. The present results support the opinion that *Ch. markhami* is a synonymy of *Ch. myersi*.

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1. Introduction

During an exploratory fishing of the Antarctic bottom fishes carried out in the Ross Sea by Japan Marine Fishery Resource Research Center from December 1978 to February 1979, specimens of *Chionodraco myersi* were collected as reported by IWAMI and ABE (1981).

Morphological examination of specimens has shown the remarkable variation in the relative length of the first dorsal fin to the standard length as in the case of *Champscephalus gunnari* (OLSEN, 1955), *Chionodraco hamatus* and *Chionodraco rastrispinosus* (DEWITT and HUREAU, 1979).

Ch. myersi was described by DEWITT and TYLER (1960) with a single specimen 255 mm in standard length as a holotype taken in the southeastern Ross Sea. MILLER and RESECK (1961) described *Ch. markhami* with two male specimens as types (holotype, 297 mm in standard length; paratype, 274 mm in standard length) obtained from the vicinity of the type locality of *Ch. myersi* without referring to the original description of *Ch. myersi*. DEWITT (1971) suggested the possibility that *Ch. markhami* was a junior synonym of *Ch. myersi* without critical examination. However, DEWITT and HUREAU (1979) concluded that *Ch. markhami* should be placed in the synonymy of *Ch. myersi* on the basis of the agreement in the canal system of the head.

In this paper the external morphological characters of *Ch. myersi* are examined with a large number of samples, and the dimorphism in relation to the sex is suggested. The taxonomical relation between *Ch. myersi* and *Ch. markhami* is also discussed.

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2. Materials and Methods

Forty nine specimens of *Ch. myersi* listed in Table I have been examined. All of the specimens were frozen on board the DAINI BANSU-MARU (2406 tons)

Table 1. List of the specimens examined. Abbreviations in the table are as follows: Cat. No., ABE's catalogue number; DFH, relative length of the first dorsal fin (% of the standard length); F, female; M, male; SL, standard length; Stn. No., station number listed below; U, sex undetermined. Positions of collecting stations are as follows: Stn. 2, 75°30.0' S, 169°55.3' E~75°33.0' S, 169°50.5' E; Stn. 3, 73°27.7' S, 173°52.0' E~73°30.5' S, 173°46.9' E; Stn. 4, 72°29.5' S, 172°56.0' E~72°30.4' S, 172°56.6' E.

Cat. No.	SL	DFH	Sex	Stn. No.	Cat. No.	SL	DFH	Sex	Stn. No.
18959	306	13.2	U	4	19053	267	18.2	U	2
18963	131	11.2	U	4	19054	265	11.6	U	2
18964	139	10.3	U	4	19055	259	18.9	U	2
18966	93.7	9.0	U	4	19056	281	19.9	U	2
18967	256	18.6	U	4	19057	305	28.2	M	2
18968	282	22.5	M	4	19058	331	11.6	F	2
18969	272	23.0	M	4	19075	271	19.2	U	4
18970	291	30.0	M	4	19076	315	10.0	F	4
18971	278	30.0	M	4	19078	267	10.3	F	4
18972	296	28.8	M	4	19079	294	12.6	F	4
18977	276	20.4	U	4	19080	290	13.5	F	4
18979	315	11.9	F	4	19081	291	11.7	F	4
18980	210	15.6	U	4	19083	331	10.9	F	4
18981	293	10.5	F	4	19084	290	10.5	F	4
18983	332	12.1	U	4	19085	292	11.2	F	4
18984	297	12.4	F	4	19087	240	15.5	U	4
18985	332	11.5	F	4	19088	252	11.9	F	4
18987	293	12.4	F	4	19090	331	15.9	F	4
18989	331	16.3	F	4	19091	318	14.0	F	4
18991	254	16.1	U	4	19092	300	13.4	U	4
18992	204	9.4	F	4	19093	315	12.1	F	4
19012	297	27.3	M	3	19094	263	23.4	M	4
19013	302	13.5	F	3	19095	251	18.7	U	4
19017	309	11.6	U	3	19096	312	13.6	F	4
19018	313	13.5	F	3					

at about -20°C . After thawing in running water, these specimens were catalogued and fixed in 10% formalin for one month, and then transferred into 70% ethyl alcohol for preservation.

Prior to the examination of gonads, viscera were partly or mostly removed for the examination of stomach contents by other investigator. Therefore, no trace of gonad was found in eighteen specimens. For the histological study of gonads, thirty-one specimens were used. Gonads were removed as small

cubics and were washed in 70% ethyl alcohol, dehydrated with ethanol-xylol series and were prepared as serial paraffin sections of $8\mu\text{m}$ thick. These sections were stained with MAYER'S acid hemalum and eosin.

3. Results and Discussion

The observation results of external morphological characters of the specimens are given in Tables 1 and 2. The relative length of the first dorsal fin to the standard length varied from 9.0% to 30.0% (Fig. 1).

Ovaries of nine specimens were easily recognized with the naked eye and the chorion was detected in fourteen specimens by means of the hematoxylin and eosin staining. Therefore, these twenty-three specimens were thought to be female. In eight specimens, the chorion and oocyte-like structures were not recognized, but basophilic particles were observed. Compared with the body size of other matured females, these eight specimens were thought to have developed ovaries if they were females. Therefore, it is concluded that the eight specimens are not females. The sex of eighteen specimens was not determined because their gonads had been removed.

Twenty-three female specimens have the relatively low dorsal fin which is from 9.4% to 16.3% of the standard length, and eight male specimens appear

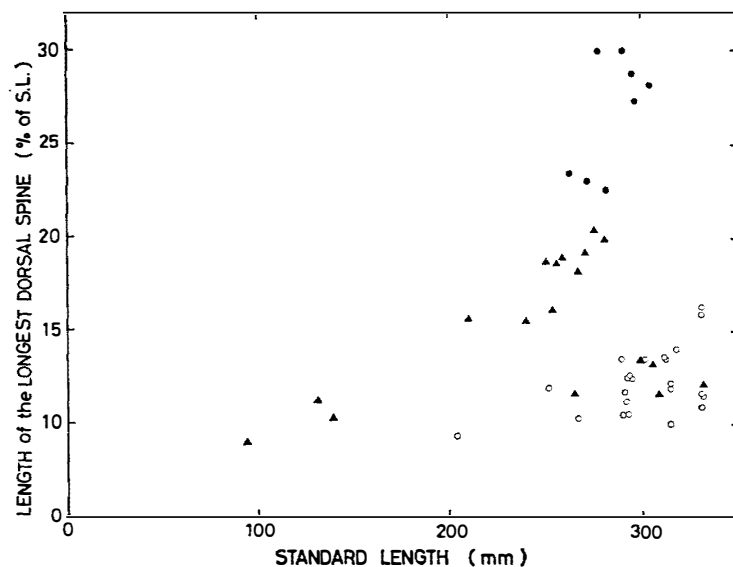


Fig. 1. *Chionodraco myersi* DEWITT and TYLER. The relative length of the first dorsal fin to the standard length. Open circles, females; closed circles, males; triangles, specimens of undetermined sex.

Table 2. Morphological characters of *Chionodraco myersi*.

Characters	Ranges (mm)	Number of Individuals
Standard length (SL.)	93.7—332	49
Total length	102 —380	49
Characters	Ranges (% of SL.)	Number of Individuals
Head length	34.6—40.1	48
Snout length	12.4—18.7	48
Orbit diameter	7.9— 8.7	48
Interorbital width	7.8—10.3	48
Postorbital head length	10.1—14.7	48
Upper jaw length	15.7—20.7	48
Peduncle depth	3.4— 4.6	48
Peduncle length	5.8— 8.7	48
Body depth at anal fin origin	12.3—20.0	48
Snout to 1st dorsal fin origin	33.4—38.7	48
Snout to anal fin origin	50.4—58.3	44
Snout to ventral fin origin	27.5—39.7	44
Snout to pectoral fin origin	33.4—40.3	40
Snout to nostril	11.8—14.2	43
Snout to anus	49.7—57.1	48
Base length of 2nd dorsal fin	40.5—49.0	48
Base length of anal fin	36.0—43.9	48
Pectoral fin length	19.0—23.0	47
Ventral fin length	20.2—33.5	47
Last spine to first ray of dorsal fin	2.7— 6.6	39
Characters	Counts	Number of Individuals
1st dorsal fin rays	V	2
	VI	26
	VII	14
	VIII	2
2nd dorsal fin rays	36	2
	37	11
	38	21
	39	8
	40	2
Anal fin rays	34	9
	35	18
	36	13
	37	4
Pectoral fin rays	20	8
	21	30
	22	6
Number of vertebrae	57	4
	58	5
	59	1

to have the relatively high dorsal fin which is from 22.5% to 30.0% of the standard length.

MILLER and RESECK (1961) described *Ch. markhami* based on two type specimens without referring to the original description of *Ch. myersi* (DEWITT and TYLER, 1960). Both of the types of *Ch. markhami* were males with the longer dorsal fin (23.4% and 25.4% of the standard length). The relative length of the first dorsal fin to the standard length of the holotype of *Ch. myersi* was 16.0% of the standard length, but the sex of the holotype was not mentioned.

One of the remarkable differences between *Ch. myersi* and *Ch. markhami* is that of the relative length of the first dorsal fin to the standard length, but the difference is included within the range of the intraspecific variation of *Ch. myersi*. The other difference between the two species is that of the color pattern of the body. MILLER and RESECK (1961) mentioned the pattern of the paratype of *Ch. markhami* as follows: "In paratype the pattern is essentially accentuated and with markings of sides merging into one long blotch." The pattern of the holotype of *Ch. markhami* seems to resemble that of *Ch. myersi*. Ten specimens show the presence of one long blotch on each side of the body and at least six of the ten specimens are male. *Ch. markhami* resembles the "high dorsal (male)" group of *Ch. myersi*. The results of the present examination support the opinion of DEWITT and HUREAU (1979) that *Ch. markhami* is to be synonymized with *Ch. myersi*.

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