한국동물분류학회지 제8권 제2호
The Korean Journal of Systematic Zoology
Vol. 8, No. 2: 331-336 (December 1, 1992)

A Short Note on *Enoploteuthis (Paraenoploteuthis) chunii* (Cephalopoda: Enoploteuthidae) from the Korean Waters

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韓國産 반딧불오징어, *Enoploteuthis* (*Paraenoploteuthis*) *chunii*에 관한 短報

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적 요

韓國 東海에서 채집된 반딧불오징어, *Enoploteuthis* (*Paraenoploteuthis*) *chunii*의 형태학적 記載中 지금까지 보고되지 않은 交接팔 保護膜의 형태적변이, 精包의 형태 및 채집水深을 記載하며, 이러한 기록들을 과거 연구자들의 보고와 비교고찰하였다.

Key words: *Enoplotuethis (Paraenoploteuthis) chunii*, morphology, spermatophore, protective membranes, collecting depth.

Enoploteuthis (Paraenoploteuthis) chunii Ishikawa, 1914 is a small mesopelagic squid (Burgess, 1982) that was originally described by Ishikawa (1914) from Toyama Bay, Sea of Japan. Since then, the species has been recorded from various localities from the warm to the cool temperate waters of the Atlantic and the Pacific (Sasaki, 1916; Tsuchiya and Okutani, 1988).

Biological knowledge of the species in the Korean waters are few. In the Korean waters *E. (P.) chunii* was reported for the first time by Yamamoto (1942) who compiled a list of all cephalopod species known from the Korean waters. However, he did not mention any biological aspects such as morphology or ecology on the species.

Eight individuals of *Enoploteuthis (Paraenoploteuthis) chunii* were collected by a mid-water trawler at 36° 40′ 20″N, 129°50′ 35″E.

The purpose of the present study is to report the occurrence of *E. (P.) chunii* in the Korean waters and to add some morphological and ecological information of the species.

Family Enoploteuthidae Pfeffer, 1900
Subfamily Enoploteuthinae Chun, 1910
Genus *Enoploteuthis* d'Orbigny, 1839
Subgenus *Paraenoploteuthis* Tsuchiya and Okutani, 1988

Enoploteuthis (Paraenoploteuthis) chunii Ishikawa, 1914

Enoploteuthis chunii Ishikawa, 1914 (pp. 401-413); Sasaki, 1929 (pp. 238-242, pl. 21, figs. 1-5); Okutani *et al.*, 1987 (pp. 106-107).

Enoploteuthis theragrae Taki, 1964 (pp. 277-291, Textfigs. 11-20).

Enoploteuthis (Paraenoploteuthis) chunii: Tsuchiya and Okutani, 1988 (pp. 119-121, Figs. 4-5)

Material Examined: 2 Males (Dorsal mantle length: 71.3-72.8mm), 6 Females (Dorsal mantle length: 71.5-83.3mm); deposited at the Museum of Institute of Marine Sciences, National Fisheries University of Pusan, Korea.

The specimens were well agreed with the descriptions of Ishikawa (1914), Sasaki (1929) and Okutani *et al.* (1987). However, some morphological discrepancies between the previous descriptions and the present materials were found in the arm formula and the hectocotylized arm. The length of the arms shows variation (Tables 1, 2). Morphology of the distal protective membrane in the hectocotylized arm also revealed some variation (Fig. 1). Sasaki (1929) stated that "the narrow protective membranes of both sides are equal in breadth and length" (Fig. 1 A); Okutani *et al.* (1987) showed it as somewhat prominent semi-lunar membranes in both sides (Fig. 1 B). The distal protective membranes of the present specimens (Fig. 1 C) are less prominent than those of Okutani *et al.* (1987) and unequal in length.

Table 1. Measurement of the left arm length of *Enoploteuthis (Paraenoploteuthis) chunii* collected in the eastern coast of Korea.

Sex	DML*(mm)	Left Arm Length (mm)				Arm Formula
		I	II	III	IV	
Male	71.3	37.5	43.3	44.8	48.3	4>3>2>1
	72.8	40.6	42.8	43.4	46.3	4>3>2>1
Female	71.5	39.5	43.4	43.6	48.2	4>3>2>1
	74.0	39.0	39.0	39.2	43.0	4=3>2>1
	76.8	41.2	42.3	42.3	46.4	4>3=2>1
	77.5	39.3	42.1	44.0	44.9	4>3>2>1
	82.1	39.0	39.8	44.4	47.1	4>3>2>1
	83.3	36.6	44.2	47.6	51.4	4>3>2>1

*DML: Dorsal Mantle Length

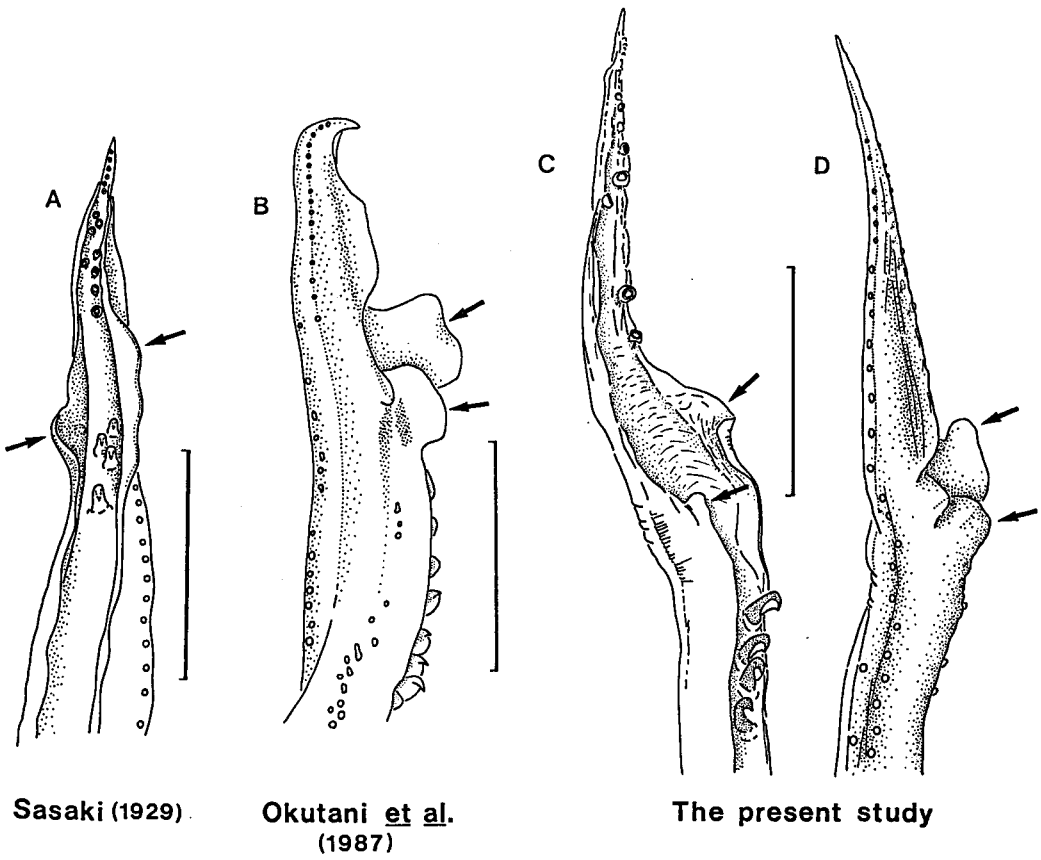

Fig. 1. The protective membrane of the hectocotylized arm of *Enoploteuthis (Paraenoploteuthis) chunii*. A, adopted from Sasaki (1929); B, adopted from Okutani *et al.* (1987); C,D, the present study. Arrows indicate the protective membrane. Scale bars = 0.5mm.

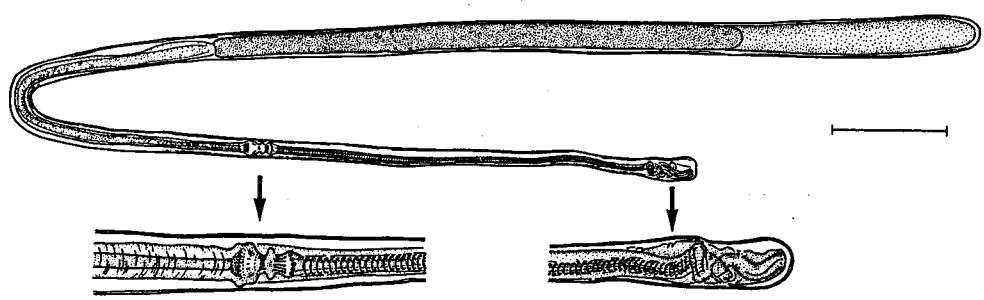

Fig. 2. A spermatophore of *Enoploteuthis (Paraenoploteuthis) chunii*. Scale bar = 1.0mm.

The spematophore (Fig. 2) is moderately large (Total length: 12.2-15.0mm, mean = 12.5mm, n = 8) with long sperm mass, cement body of medium length, and moderately short ejaculatory apparatus.

The scientific data on bathymetric distribution of *E. (P.) chunii* are very limited. Based on these data (Table 2), it seems that *E. (P.) chunii* distributes in depth of 200-800m.

Table 2. Comparision of some characters of *Enoploteuthis (Paraenoploteuthis) chunii*

	Ishikawa (1914)	Sasaki (1920)	Sasaki (1929)	Taki (1964)	Okutani (1967)	Okutani *et al.* (1987)	Tsuchiya and Okutani (1988)	The present study
Number of materials examined	5 (Sex was not reported.)	1♀, 1♂	3♀, 2♂	7 (Sex was not reported.)	–	9♀, 2♂	1♂	6♀, 2♂
DML* (mm)	68-69	–	60-87	20-80	–	57-98	76.7	71.3-83.3
Sampling locality	Toyama Bay	Bungo Strait (from the the stomach of fish)	Toyama Bay; Bungo Strait (from the stomach of fish)	Japan Sea (off Fukui and Hyogo Prefs.) (from the stomach of Alaska pollack)	Sagami Bay: around Izu-Oshima Island (from the stomach of porpoises)	Suruga Bay; Toyama Bay	30°04'60"N; 134°27'90"E	Eastern coast of Korea (36°40'20"N, 129°50'35"E)
Sampling depth (m)	–	*ca.* 787	–	–	700; 2 larvae from surface layer	–	530-560	*ca.* 200
Arm formula	4-2-3-1 or 4-3-2-1	–	4-2-3-1	–	–	4-2=3-1	–	4-3-2-1
Morphology of distal protective membrane in hectocotylized arm	–	–	equal in breadth and length (Fig. 1A)	The inner swelling is shorter than the outer one.	–	prominent semilunar shape (Fig. 1B)	–	less prominent than Okutani *et al.* (1987); unequal in length (Fig. 1 C,D)

* DML: Dorsal Mantle Length

The hyphen (-) means that the author did not report on the relevant items.

ABSTRACT

The occurence of *Enoploteuthis (Paraenoploteuthis) chunii* in the Korean waters, and the following points were reported: 1. morphological variation of the protective membrane in the hectocotylized arm and 2. morphology of the spermatophore.

ACKNOWLEDGMENT

We wish to extend our sincere thanks to Mr. Lee, Tong Woo, National Fisheries Research and Development Agency (NFRDA), Korea, for his generous donation of the eight cephalopod specimens.

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RECEIVED: 2 NOVEMBER 1992
ACCEPTED: 14 NOVEMBER 1992