

Two Newly Recorded Species of Colobometridae and Calometridae (Echinodermata, Crinoidea, Comantulida) in Korea

Sook Shin* and Jung Hye Won¹

(Department of Life Science, Sahmyook University, Seoul 139-742, Korea;

¹Marine Environment and Climate Change Laboratory,

Korea Ocean Research and Development Institute, Ansan 425-600, Korea)

ABSTRACT

Some crinoids collected by scuba divers from Jeju Island, Geomundo Island and Yokjido Island were identified. Of which two species, *Oligometra chinensis* A. H. Clark, 1918 belonging to the family Colobometridae and *Neometra multicolor* (A. H. Clark, 1907) belonging to the family Calometridae, order Comantulida, turned out to be new to the Korean fauna. The Calometridae was reported in Korea for the first time.

Key words: Taxonomy, Colobometridae, Calometridae, Comantulida, Crinoidea, Korea

INTRODUCTION

Comantulida is an order of the subclass Articulata including most of the recent crinoids only attached by a stalk in the larval stage and its adults are free-living but attaching themselves temporarily by a cluster of jointed cirri arising from the centrodorsal (Liao and A. M. Clark, 1995).

The systematic studies of Korean comantulid crinoids were done by Shin (2001, 2002) and Won and Rho (2001) and ten species of three families such as Comantulidae, Colobometridae and Antedonidae have been known in Korean waters. Here, we report primarily the taxonomic study

* To whom correspondence should be addressed

Tel: 02-3399-3562, Fax: 02-971-6812, E-mail: shins@syu.ac.kr

about the colobometrid and calometrid species in the Comantulida.

The specimens used in this work were collected by scuba diving at subtidal zone in Jeju Island, Geomundo Island and Yokjido Island. They were photographed in the sea water and then were preserved in 70% methyl alcohol. The important morphological parts of specimen were photographed by using stereomicroscope. The morphological terms of external features and the systematic scheme on the identified crinoids in A. H. Clark (1947) and Kogo (1998) were followed.

Two species identified as *Oligometra chinensis* A. H. Clark, 1918 belonging to the family Colobometridae and *Neometra multicolor* (A. H. Clark, 1907) belonging to the family Calometridae, order Comantulida were reported in this study. These species turned out to be new to the Korean fauna and their morphological characteristics was redescribed. Therefore twelve species of crinoids have been reported to be distributed in Korea.

SYSTEMATIC ACCOUNTS

Phylum Echinodermata Klein, 1734 극피동물문
 Class Crinoidea Müller, 1821 바다나리강
 Subclass Articulata A. H. Clark, 1908 관절아강
 Order Comantulida A. H. Clark, 1908 바다나리목
 Suborder Oligophreatina A. H. Clark, 1911 협중강아목

Key to the family of Suborder Oligophreatina in Korea

Cirri with a transverse ridge or pair of spines Colobometridae
 Cirri without or with a single spine Calometridae

Family Colobometridae A. H. Clark, 1909 돌기발갯고사리과

Some or most of distal cirrus segments with a transverse dorsal ridge or pair of tubercles; often only ten arms, the second brachial syzygy usually at 9+10; division series aligned obliquely upwards from the radials; pinnules basally prismatic or almost rounded; P₂ often somewhat enlarged.

Genus *Oligometra* A. H. Clark, 1908 범무늬갯고사리속 (신칭)

Small comantulids with ten arms usually 40-60 mm long; cirri stout, with 13-28 segments, usually about as long as broad, with a transverse ridge dorsally; P_a usually, but not always, present, enlarged and strongly prismatic with the angles in distal portion.

Type species: *Antedon serripinna* Carpenter, 1881

1. *Oligometra chinensis* A. H. Clark, 1918 범무늬갯고사리 (신칭) (Figs. 1A-F)

Oligometra chinensis A. H. Clark, 1918, p. 130; Kogo, 1998, p. 81, fig. 66.

Oligometra serripinna chinensis A. H. Clark, 1947, p. 244, pl. 27, fig. 144, pl. 28, fig. 152.

Oligometra serripinna: A. M. Clark, 1972, p. 129; Chen *et al.*, 1988, p. 78, fig. 17; Liao and A. M. Clark, 1995, p. 47, fig. 25.



Fig. 1. *Oligometra chinensis* A. H. Clark, 1918. A, ventral view; B, lateral view; C, cirri and proximal part of arms; D, cirrus; E, centrodorsal and cirri; F, proximal pinnule. Scale bars = 1 cm (A), 2 cm (B), 3 mm (C-F).

Material examined. 1 individual, Deungdaemok, Geomundo Island (at 20 m depth), 18 Jul. 2001, by scuba diving; 1 individual, Seogwipo, Jeju Island (at 20 m depth), 7 Feb. 2002, by scuba diving; 1 individual, Seogwipo, Jeju Island (at 15-30 m depth), 20 Aug. 2002, by scuba diving; 2

individuals, Yokjido Island (at 15 m depth), 13 Sep. 2002, by scuba diving.

Diagnosis. Segments of cirrus broader than long and have a transverse ridges dorsally beyond the one third of cirrus and a small dorsal spine distally. P_2 not greatly enlarged with the distal segments twice as long as broad and becomes delicate distally.

Description. Centrodorsal thin discoidal, 2.5-3.5 mm in diameter, about 1 mm high. Polar area broad and flat. Cirrus sockets compactly arranged in a single regular marginal row, twice as high as broad with straight lateral borders. Cirri rather stout, 22-30 in number, 20-24 segments, 12-14 mm long. All cirrus segments broader than long, first four segments very short, those followings slowly increase in length. Distal ends of segments slightly appeared ventrally, being especially noticeable in proximal third of cirri and diminishing distally, finally almost disappearing. Dorsally distal ends of fourth and following segments produced, becoming a transverse ridge beyond one third of cirrus, becoming a small dorsal spine distally. Arms 10 in number, 4-7 mm long, 1.5-1.8 mm wide at first syzygy. Syzygial pairs occurring irregular, first at 3+4, second at from 9+10 to 14-15, and then at intervals of 3-7 muscular articulations. Radials short, stripe-like, often extended slightly at intertidal angles, with distal edge slightly concave. IBr series 2 with a low and broad synarthrial tubercle; IBr_1 short, three or four times as broad as long, with slightly convex proximal border and a small ventrolateral tubercle in middle of lateral border; IBr_2 short, about twice as broad as long, triangular with broadly truncated lateral angles and a wide synarthrial tubercle occupying proximal third of borders. Proximal pinnules stout, rather strongly prismatic, though their ridges rounded. P_1 13-20, 5.5-7 mm, tapering from a stout base to a delicate tip, armed with very finely spinous distal ends in distal half of segments; P_2 16-21, 6.5-8 mm, slightly stouter than P_1 , tapering gradually to the tip, roundedly prismatic with finely spinous distal ends along end of broad prismatic crest; P_3 13-17, 4-7 mm, about as long as P_1 , distally more flexible than P_2 ; those followings gradually decrease in length to 5 mm and then slightly increase distally. P_a always present.

Colour. When it is alive, the color of a body is brownish yellow with dark purple stripes. Cirri and pinnules also have dark purple stripes.

Remarks. The pinnules have very conspicuous characters compared to descriptions of A. H. Clark (1947). That is, P_1 is armed with very finely spinous distal ends in distal half of segments and P_2 is roundedly prismatic with finely spinous distal ends along the end of the broad prismatic crest.

Distribution. Korea (Korea Strait; Jeju Island); Southern Japan (Ishikawa, Shimane, Chiba, Kanagawa, Wakayama); China (Fuchow, Amoy, Fukien).

Family Calometridae A. H. Clark, 1907 단단한갯고사리과 (신칭)

Distal segments of cirri with median dorsal spines; arms 10-40, usually 20; IBr series joined synarthry; division series aligned obliquely upwards; pinnules prismatic; P_1 very delicate and weak, but with the first two segments enlarged and the rest very small and stiffened.

Genus *Neometra* A. H. Clark, 1912 비단갯고사리속 (신칭)

Arms 15-40; Division series being 2; bases of adjacent IBr_1 ossicles separated widely by interradial extensions of radials; the ossicles of division series narrow without lateral extensions.

Type species: *Antedon multicolor* A. H. Clark. 1907.

2. *Neometra multicolor* (A. H. Clark, 1907) 비단갯고사리 (신칭) (Figs. 2A-F)

Antedon multicolor A. H. Clark, 1907, p. 130.

Antedon thetis: Gislén, 1922, p. 95.

Neometra multicolor Gislén, 1922, p. 94, figs. 75a, 75b, 76, p. 88; A. H. Clark, 1947, p. 369, pl. 36, fig. 192; Utinomi and Kogo, 1968, p. 50; Kogo, 1998, p. 86, fig. 70.

Material examined. 1 individual, Seogwipo, Jeju Island (at 20 m depth), 23 Jan. 2002, by scuba diving; 1 individual, Seogwipo, Jeju Island (at 15-30 m depth), 20 Aug. 2002, by scuba diving.

Diagnosis. Arms 20 in number and 60-75 mm long. The bases of adjacent IBr₁ ossicles separated widely by interradial extensions of radials and the ossicles of division series narrow without lateral extensions. P₁ very delicate, weak, but has the first two segments enlarged and the rest very small and stiffened.

Description. Centrodorsal thick discoidal, 3.5-4.0 mm in diameter, about 1.0 mm high. Polar aea smooth and slightly convex, 2.5 mm across. Cirrus sockets compactly arranged in 1 or 2 rows. Cirri long and fragile, 15-18 in number, 30-33 segments, 17-19 mm long. Proximal cirrus segments smooth, broader than long, increase in length to seventh almost as long as broad, gradually decrease in length so that distal segments about twice as broad as long, each with a blunt dorsal spine. Distal end of segments project somewhat dorsally in proximal half of cirri and then increasing a prominent dorsal spine. Arms 20 in number, short and 55-75 mm long, 1.5 mm wide at first syzygy. Syzygial pairs occurring first at 3+4 with the ends parallel and more or less constricted centrally, second at 12+13 to 17+18... and then at intervals of 3 or 4 muscular articulations in distal arm. First brachials wedge-shaped, second brachials with convex outer side, following brachials more obliquely wedge-shaped. Division series and arms widely separated from neighbors. IBr and IIBr series all 2, smooth and rounded dorsally, a blunt synarthrial tubercle on the line of articulation; IBr₁ oblong, about 3 times as broad as long, separated from each other by interradial extensions; IBr₂ pentagonal, about twice as broad as long. Pinnules stiff and erect. Its segments except for round P₁ prismatic and mostly elongated with fine spines at distal edges. P₁ 23, 6 mm long, composed of excessively small segments, very slender, weak and flexible, with first segment greatly enlarged, over twice as broad as long, oblong with rounded distal edge and second segment also enlarged, about half as broad as first and those followings very small and about as long as broad. P₂ 20, 9 mm, becoming delicate distally, nearly one and half as long as P₁, with first segment enlarged like P₁, second segment trapezoidal rather longer than first one and segments in outer third or half of the pinnule with spinous distal ends. P_a present, resemble P₁, but shorter.

Color. When it is alive, the color of a body is yellowish beige. But the arms are broadly banded with purple. Cirri are purple with yellowish ends.

Remarks. According to A. H. Clark (1947), the number of arms is 10-20 in most collections of the Japanese specimens. However, our specimens in Jeju Island have 20 arms which is same as in the Japanese specimens of Kogo (1998).

Distribution. Korea (Jeju Island); Southern Japan (Goto Islands, Sagami Bay, Toyama Bay, Ishikawa, Shimane, Chiba, Izu Islands, Kagoshima); South China Sea.

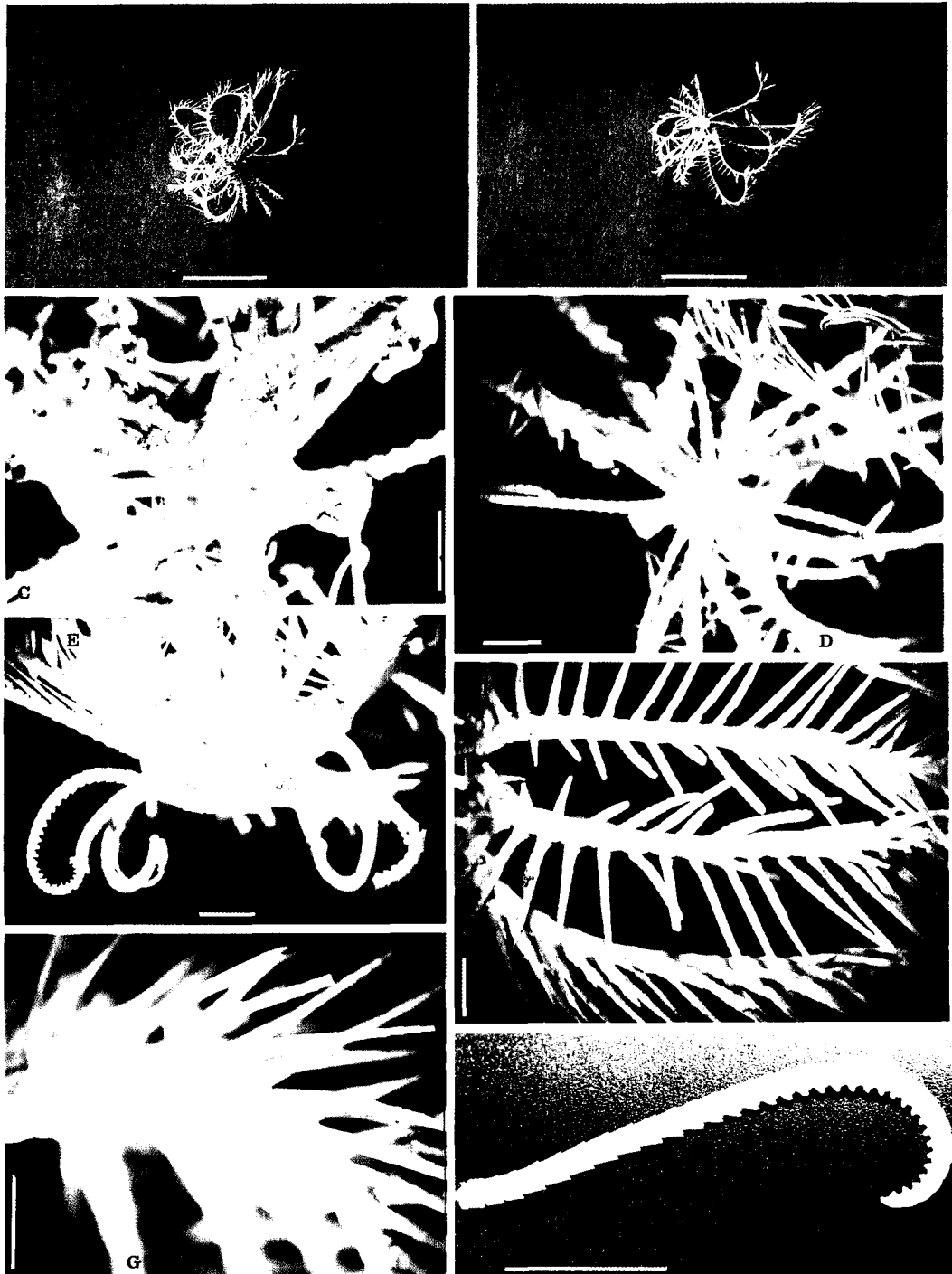


Fig. 2. *Neometra multicolor* (A. H. Clark, 1907). A, C, ventral view; B, dorsal view; D, E, centrodorsal, cirri and proximal part of arms; F, G, pinnuls; H, cirrus. Scale bars = 3 cm (A, B), 3 mm (C-F).

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한국산 돌기발갯고사리류와 단단한갯고사리류
(극피동물문, 바다나리강, 바다나리목)의 2미기록종

신 숙·원 정 혜¹

(삼육대학교 생명과학과; ¹해양연구원 해양환경기후본부)

요 약

제주도와 거문도, 육지도의 조하대에서 채집된 갯고사리류를 동정 분류한 결과, 바다나리목 (Comantulida), 돌기발갯고사리과 (Colobometridae)의 범무늬갯고사리 *Oligometra chinensis* A. H. Clark, 1918와 단단한갯고사리과 (Calometridae)의 비단갯고사리 *Neometra multicolor* (A. H. Clark, 1907)가 한국 미기록종으로 밝혀져 보고한다. 그리고 단단한갯고사리과는 우리나라에서 처음으로 보고된다.