

Taxonomic Study on Marine Sponges of Komundo Island, Korea

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ABSTRACT

The sponge specimens, which were collected by scuba divers from Komundo Island during the years from 1994 to 1995, identified into 36 species in 26 genera of 19 families. Among them four species, *Stelletta japonica* Lebewohl, 1914, *Caminella velata* Lebewohl, 1914, *Stylohalina hirta* Topsent, 1898 and *Esperiopsis rugosa* Thiele, 1905 are newly recorded in Korean waters.

Key words: taxonomy, marine sponge, Komundo Island, Korea

INTRODUCTION

The systematic studies of sponges from Komundo Island have been done by Kim *et al.* (1968), Rho and Yang (1983), Sim and Byeon (1989), Sim *et al.* (1990) and Sim and Kim (1995). By these studies seven species were known from Komundo Island. They are two species in Haplosclerida, two in Halichondrida, two in Astrophorida, and one in Poecilosclerida.

This study on marine sponges is based on specimens were collected from Komundo Island and adjacent areas during the period from July 1994 to September 1995 (Fig. 1). Sponges were collected using SCUBA at depth of 10-30 meters.

The identification were made on the basis of the external features, and the shapes and sizes of spicules. For skeletal arrangement, thin free-hand sections were made with specimens hardened in alcohol using a surgical blade. Spicules were prepared by dissolving a piece of sponge in sodium hypochlorite (bleach). For analysis of microsclere morphology, spicules were prepared using an AKASHI critical pointed drier, then examined with an ISI-SS40 SEM at Hannam University. SEM analysis of spicules followed the procedure of Rützler (1978).

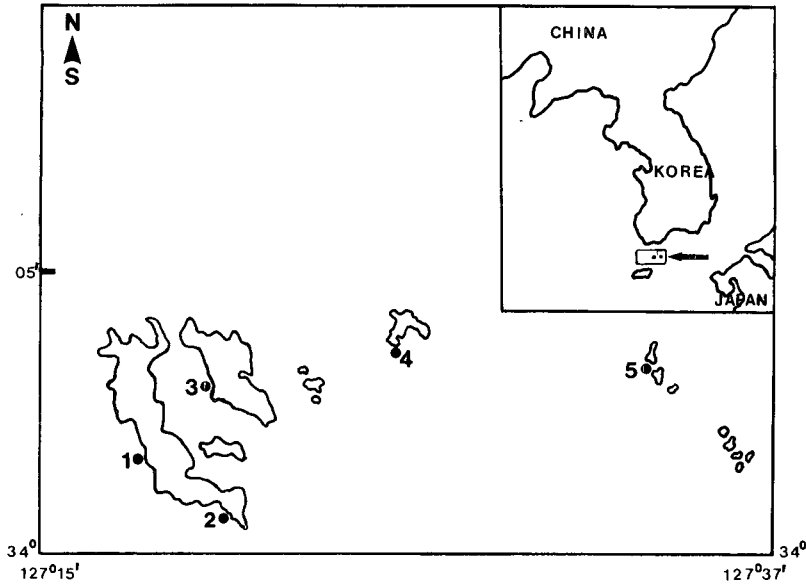


Fig. 1. Map showing the collected localities at Komundo Island, South Sea.

1. Wondo; 2. Kobuksum; 3. Dongdo; 4. Daesambudo; 5. Bacdo.

A total of thirty six species (representing 26 genera, 19 families in seven orders) were identified, of which four species *Stelletta japonica* Lebwahl, 1914, *Caminella velata* Lebwahl, 1914, *Stylohalina hirta* Topsent, 1898 and *Esperiopsis rugosa* Thiele, 1905 are discovered for the first time in Korean waters.

SYSTEMATIC ACCOUNT

The asterisks (*) indicate the species which were newly recorded in Korea.

Phylum Porifera Grant, 1836 해면동물 문
 Class Demospongia Sollas, 1885 보통해면 강
 Order Homosclerophorida Schulze, 1880 동골해면 목
 Family Plakinidae Schulze, 1880 판해면 과

1. *Plakortis simplex* Schulze, 1880 일삼해면

Material examined. Daesambudo, 14 Jul. 1995.

Distribution. Korea (South Sea), Japan (Hiwasa, Tokushima).

Order Astrophorida Levi, 1973 별해면 목
 Family Ancorinidae Schmidt, 1870 닻해면 과

2. *Penares incrustans* Tanita, 1963 껍질닻해면

Material examined. Daesambudo, 1 Nov. 1994, 14 Jul. 1995; Bacdo, 27 Sep. 1995; Dongdo

1 Nov. 1994; Kobuksum, 27 Sep. 1995.

Distribution. Korea (South Sea), Japan (Noto-Peninsula).

***3. *Stelletta japonica* Lebwohl, 1914** 왜별해면 (신칭) (Fig. 2 A-D)

Stelletta japonica Lebwohl, 1914, p. 8, pl. 1, figs. 20-32.

Stelletta japonica Hoshino, 1981, p. 245, fig. 30.

Material examined. Daesambudo, 14 Jul. 1995.

Description. Massive sponge, round shape and size up to 5 × 3.5 × 5 cm. Texture hard.

Surface very rough. Oscules and pores not visible. Colour of outside white, 6 mm thick, and inside beige in alcohol.

Choanosome: Megascleres, oxea and plagiotriaene, and microscleres, strongylaster, scattered in

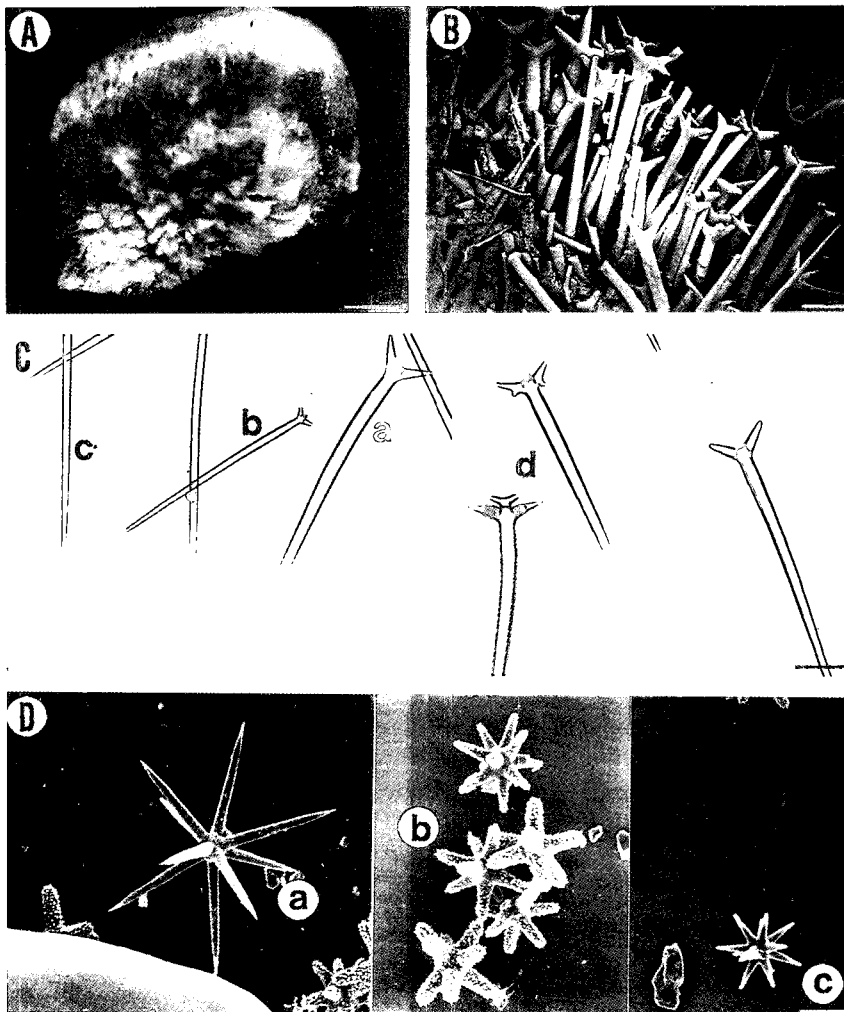


Fig. 2. *Stelletta japonica*. A, side view; B, skeletal structure of choanosome (longitudinal section, SEM); C, megascleres (a, large plagiotriaene, b, small plagiotriaene, c, oxea, d, dichotriaene); D, microscleres (SEM, a, large oxyaster, b, small oxyaster, c, strongylaster). Scale bars = 1 cm (A), 200 μ m (B-C), 10 μ m (D).

the choanosome and they make a bundle and hispid to out of surface.

Endosome: Megascleres, oxea, and microscleres, two kinds of strongylaster.

Choanosome and endosome easily distinguished by brightly white band between them.

Measurements of spicules (μm)

Megascleres

Oxeas	2700-4000 \times 50-90
Large plagiotriaenes	1475-2450 \times 50-95
rabdomes	1325-2225
crads	125-225
Small plagiotriaenes	1000-1125 \times 33-37
rabdomes	950-1050
crads	75-80
Dichotriaenes	1625-2250 \times 80-98
rabdomes	1475-2075
crads	150-200

Microscleres

Large oxyspherasters	32.5-60
Small oxyspherasters	10-25
Strongylospherasters	12.5-20

Remarks. This species resembles with Lebwahl's (1914) species, but varies in the megasclere's form. Lebwahl's species has variously shaped in megascleres but these are not common shape. And megascleres are larger than Hosino's (1981) species. Microscleres of this species are larger than in Lebwahl's and Hoshino's species, which are as follow Table 1.

Distribution. Korea (South Sea), Japan.

Table 1. Comparison of Japanese specimens with Komundo Island specimen (microscleres).

Spicules (μm)	small oxyspherasters	large oxyspherasters	strongylospherasters
Hoshino's specimen	26		12
Lebwahl's specimen	16	36	7-11
Komundo Isl. specimen	10-25	32.5-60	12.5-20

4. *Stelletta misakiensis* Lebwahl, 1914 별해면

Material examined. Bacro, 26 Sep. 1995; Dongdo, 14 Jul. 1995.

Distribution. Korea (South Sea), Japan (Misaki, Sagami Bay, Sado Isl.).

Family Coppatiidae Topsent, 1898 코파티해면 과

5. *Jaspis wondoensis* Sim et Kim, 1995 원도벽옥해면

Material examined. Wondo, 1 Nov. 1994; Bacro, 27 Nov. 1995

Distribution. Korea (South Sea).

Family Geodiidae Gray, 1867 조디아해면 과

6. *Caminatus awashmensis* Tanita, 1969 카미너스해면

Material examined. Dongdo, 14 Jul. 1995.

Distribution. Korea (South Sea), Japan.

***7. *Caminella velata* Lebwahl, 1914** 껍질가마해면 (신칭) (Fig. 3 A-F)

Caminella velata Lebwahl, 1914 p. 33, Taf. II, Fig. 10-36.

Material examined. Bacdo, 27 Sep. 1995.

Description. This sponge massive and size up to 6.5×3.5×3.5 cm. Surface rough, slightly hispid due to long projecting oxeas. Texture hard. Color dark gray in alcohol. Oscules and pores not visible.

Choanosome: It has many debris, because megascleres, oxeas and protriaenes, hispid to out of

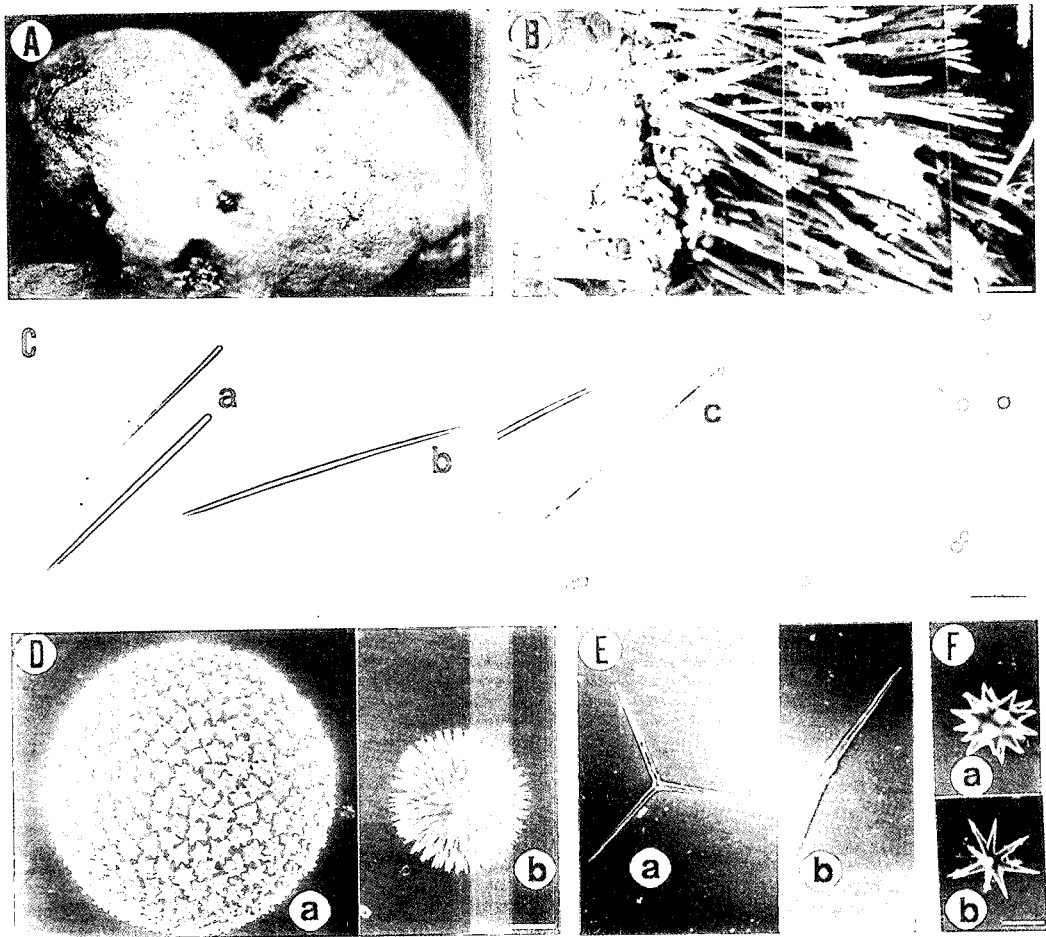


Fig. 3. *Caminella velata*. A, side view; B, skeletal structure of choanosome (longitudinal section, SEM); C, megascleres (a, style, b, oxea, c, protriaene); D-F, microscleres (SEM, D, a, sterraster, b, young stage of sterraster; E, a, plesiaster, b, centrotylote microxea; F, a, euaster, b, oxyaster). Scale bars = 1 cm (A), 200 μ m (B-C), 10 μ m (D,F), 20 μ m (E).

surface. Megascleres arranged side by side. Microscleres not abundant.

Endosome: Megascleres consist of oxeas and styles. Microscleres, oxyasters, euasters, centrotolote microxeas and plesiaster streptaster, scattered in endosome. Texture more soft than choanosome.

Measurements of spicules (μm)

Megascleres	
Oxeas	750-2075 \times 10-40
Styles	1325-1425 \times 38-40
Plagiotriaenes	1300-1550 \times 26-42
rabdomes	1225-1500
crads	50-80
Microscleres	
Sterrasters	50-70
Euasters	20-25
Oxyasters	20-25
Microxeas	70-120 \times 3-4
Plesiaster streptaster	60-90
rays	30-50 \times 4

Remarks. This species is similar to Lebwahl's (1914) specimen, but prototriaene is less various in shape. In this species, the style's head sometimes has a few spines.

Distribution. Korea (South Sea), Japan.

8. *Erylus bahamensis* Finali, 1986 바하마꼭지해면

Material examined. Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea), West Indies (Bahamas, Dominican Republic).

Family Pachastrellidae Carter, 1875 시루해면 과

9. *Pachastrella cribrum* Lebwahl, 1914 체시루해면

Material examined. Kobuksum, 31 Sep. 1994; Dongdo, 1 Nov. 1994; Daesambudo, 14 Jul. 1995.

Distribution. Korea (East Sea, South Sea), Japan.

10. *Pachastrella tenuilaminaris* (Sollas, 1886) 얇은시루해면

Material examined. Dongdo, 1 Nov. 1994.

Distribution. Korea (South Sea), Japan (Sado Isl., Sagami Bay).

11. *Poecillastra wondoensis* Sim et Kim, 1995 원도다성해면

Material examined. Wondo, 1 Nov. 1994; Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea).

Order Hadromerida Topsent, 1984 경해면 목

Family Clionidae Gray, 1867 호박해면 과

12. *Cliona celata* Grant, 1826 호박해면

Material examined. Kobuksum, 31 Oct. 1994; Wondo, 1 Nov. 1994; Dongdo 1 Nov. 1994; Bacdo, 27 Sep. 1995.

Distribution. Korea, Gulf of St. Lawrence to South Carolina, Gulf Coast of Louisiana and Texas, Pacific Coast of North America.

13. *Cliona lobata* Hancock, 1826 입호박해면

Material examined. Wondo, 31 Oct. 1994; Kobuksum, 31 Oct. 1994; Daesambudo 14 Jul. 1995; Dongdo, 14 Jul. 1995.

Distribution. Korea (South Sea), Long Island Sound to South Carolina, Louisiana, Texas, California.

Family Spirastrellidae Ridley et Dendy, 1886 나선별해면 과

14. *Spirastrella insignis* Thiele, 1898 굵은나선별해면

Material examined. Daesambudo, 14 Jul. 1995.

Distribution. Korea (South Sea), Japan.

15. *Spirastrella panis* Thiele, 1898 나선별해면

Material examined. Wondo, 1 Nov. 1994; Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Japan (Sagami Bay).

Family Suberitidae Schmidt, 1870 코르크해면 과

16. *Suberites japonicus* Thiele, 1898 왜코르크해면

Material examined. Daesambudo, 15 Jul. 1995; Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Japan (Seto Inland Sea).

17. *Suberites virgultosa* (Johnston, 1842) 무코르크해면

Material examined. Kobuksum, 31 Oct. 1994.

Distribution. Korea (South Sea), Japan (Kasumi, Hyogo).

Family Tethyidae Gray, 1867 딸기해면 과

18. *Tethya amamensis* Thiele, 1898 바다딸기해면

Material examined. Daesambudo, 2 Nov. 1994.

Distribution. Korea (South Sea), Japan (Amami-Oshima, Kurushima Strait).

19. *Tethya aurantium* (Pallas, 1766) 오렌지둥글해면

Material examined. Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea), North and South America, Africa, Mediterranean, New Zealand, Italy, Brazil.

Order Lithistida Schmidt, 1870 들해면 목

Family Theonellidae Lendenfeld, 1903 꼬는해면 과

20. *Discodermia kiiensis* Hoshino, 1977 키가죽해면

Material examined. Wondo, 1 Nov. 1994; Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea), Japan (Kushimoto, Wakayama).

Order Poecilosclerida Topsent, 1928 다골해면 목

Family Microcionidae Carter, 1875 작은눈해면 과

21. *Clathria (Microciona) minor* Burton, 1959 작은바늘뼈해면

Material examined. Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea, East Sea, West Sea), Japan.

Family Raspailiidae Hentschel, 1912 털해면 과

22. *Raspailia hirsuta* Thiele, 1898 털많은가지해면

Material examined. Daesambudo, 14 Jul. 1995; Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Japan (Sagami Bay).

Family Myxillidae Hentschel, 1923 끈적해면 과

23. *Myxilla setoensis* Tanita, 1961 넓적끈적해면

Material examined. Daesambudo, 14 Jul. 1995; Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea, East Sea), Japan (Seto Inland Sea).

24. *Myxilla productus* Hoshino, 1981 긴끈적해면

Material examined. Daesambudo, 14 Jul. 1995.

Distribution. Korea (South Sea), Japan.

25. *Myxilla bivalvia* Tanita, 1967 덩게끈적해면

Material examined. Dongdo, 1 Nov. 1994.

Distribution. Korea (South Sea), Japan.

26. *Myxilla rosacea* (Leiberkühn, 1859) 장미끈적해면

Material examined. Bacdo, 27 Sep. 1995.

Distribution. Korea (South Sea), Japan.

Family Mycalidae Lundback, 1905 갯해면 과

***27. *Esperiopsis rugosa* Thiele, 1905** 주름발톱해면 (신칭) (Fig. 4 A-H)

Esperiopsis rugosa Thiele, 1905, p. 440, Fig. 60a, b.

Material examined. Bacdo, 27 Sep. 1995.

Description. This sponge branched of solid form, erect and size up to 4.5×5.2×1.4 cm. Texture soft, cushiony. Stalk, height 0.6 cm, thick 2 cm. Surface has many small pores, under 1 mm, not hispid. Color ivory in alcohol. Tops of each branch have 3-8 oscules, 2 mm in diameter, arranged like circle. There is a long narrow groove which starts from the oscule at the top of the each branch.

Skeletal structure: isodictyal arrangement of fibres cored and echinated by styles.

Measurements of spicules (μm)

Megascleres

Thick styles 300-450 × 8-25

Thin styles 230-300 × 2-5

Microscleres

Isochelas 23-30

Remarks. This specimen has two size of styles, but Thiele's (1905) specimen has only one category; mean size 430 × 15 μm. In microscleres, Thiele's specimen is larger than this species.

Distribution. Korea (South Sea), Calbuco.

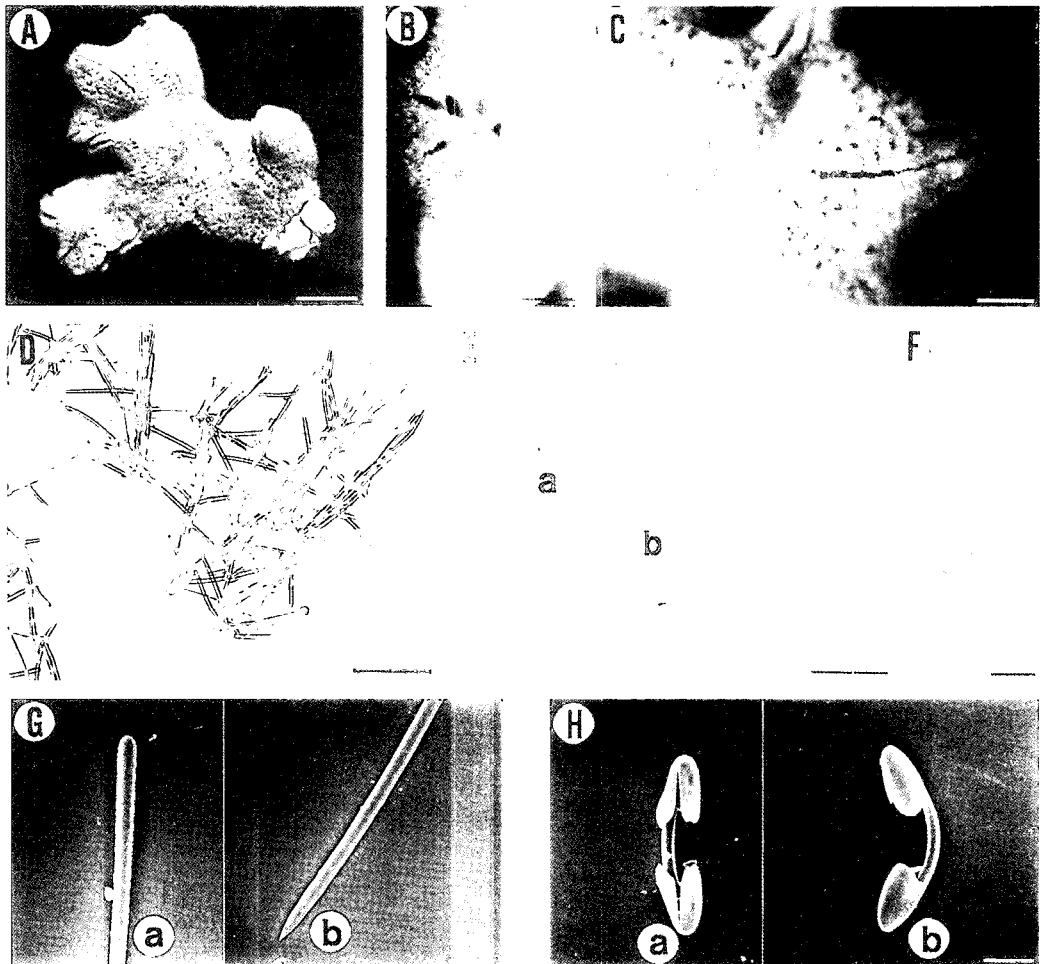


Fig. 4. *Esperlopsis rugosa*. A, side view; B, oscules; C, surface of animal; D, skeletal structure; E, megascleres (a, thick style, b, thin style); F, microsclere; isochela; G, a, head of thin style, b, point of thin style (SEM); H, microscleres (a-b, isochelas, SEM). Scale bars = 1 cm (A), 2.5 mm (B-C), 400 μ m (D), 200 μ m (E), 30 μ m (F), 10 μ m (G-H).

Order Halichondrida Vosmaer, 1885 해변해면 목

Family Axinellidae Ridley & Dendy, 1888 축해면 과

28. *Acanthella branchia* Sim, Kim et Byeom, 1990 빨가지가시해면

Previous records. Komundo Island (Sim *et al.*, 1990).

Distribution. Korea (South Sea).

29. *Phakellia elegans* Thiele, 1898 맵시해면

Material examined. Bado, 25 Sep. 1995.

Distribution. Korea (South Sea, West Sea), Japan (Sagami Bay).

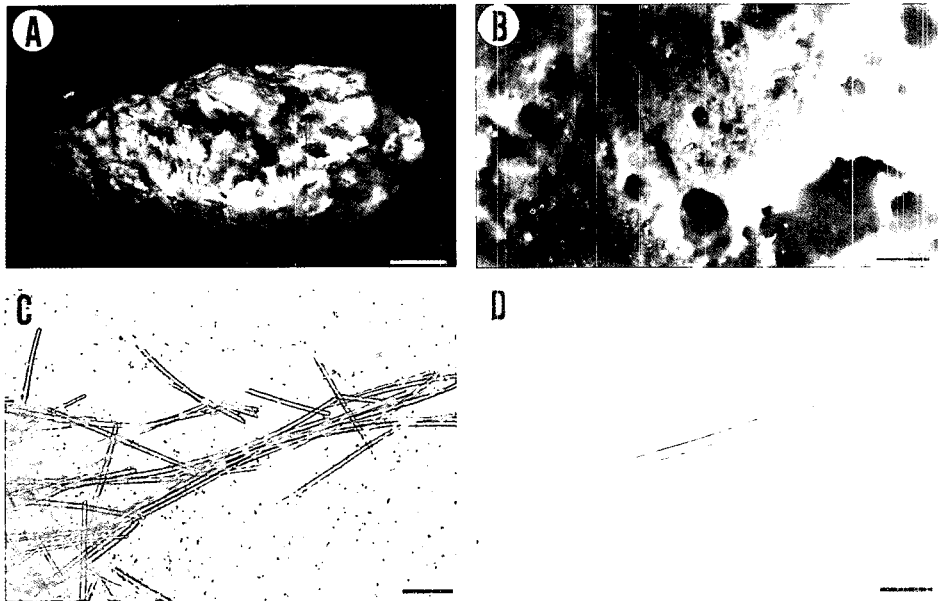


Fig. 5. *Stylohalina hirta*. A, side view; B, base of animal; C, skeletal structure; D, style. Scale bars = 1 cm (A), 2.5 mm (B), 300 μ m (C), 150 μ m (D).

Family Halichondriidae Vosmaer, 1887 해변해면 과

***30. *Stylohalina hirta* (Topsent, 1889) 거친침상해면 (신칭) (Fig. 5A-D)**

Stylohalina hirta, Burton, 1932, p. 331, Fig. 35.

Material examined. Bacdo, 29 Sep. 1995.

Description. This sponge massive and size up to 6.5 \times 2.4 \times 2.3 cm. Surface very roughly hispid like a chestnut bur in morphology. Texture very soft. Color orange in life and dark ivory in alcohol. Oscules and pores not visible. Thin membrane exists on the surface. Endosome with holes. Skeletal structure, styles loose bundle shaped.

Spicules, styles in 800-1030 \times 20-28 μ m.

Remarks. Our specimens have larger styles than Burton's ones (1932).

Distribution. Korea, Gulf of Guinea.

Order Haplosclerida Topsent, 1928 단골해면 목

Family Callyspongiidae de Laubenfelds, 1926 예쁜이해면 과

31. *Callyspongia confoederata* (Ridley, 1884) 보라예쁜이해면

Material examined. Daesambudo, 14 Jul. 1994.

Distribution. Korea (South Sea), Japan (Sado-Aikawa, Wagu, Mie, Tajima, Moroyose), Australia, Malay Area, Penguin Channel.

32. *Callyspongia elegans* (Thiele, 1899) 예쁜이해면

Material examined. Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Japan (Aikawa, Sado Isl.)

Family Chalinidae Gray, 1867 고삐해면 과

33. *Adocia cinera* (Grant, 1872) 재빛아도시해면

Previous records. Komundo Island (Rho and Yang, 1983).

Distribution. Korea (South Sea), Cosmopolitan.

34. *Haliclona permollis* (Bowerbank, 1866) 보라해면

Previous records. Komundo Island (Kim *et al.*, 1968; Sim and Byeon, 1989).

Distribution. Korea (South Sea), Japan (Matsushim Bay), Gulf of Mexico.

35. *Reniera ventilabrum* Fristedt, 1887 판레니에해면

Material examined. Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Atlantic Ocean.

Family Petrosiidae van Soest, 1980 바위해면 과

36. *Petrosia corticata* (Wilson, 1925) 불뚱해면

Material examined. Bacdo, 26 Sep. 1995.

Distribution. Korea (South Sea), Japan (Sagami Bay), Philippine.

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거문도 해산해면류의 분류학적 연구

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요 약

1994년 7월부터 1995년 9월까지 거문도와 부근섬으로부터 잠수부에 의해서 채집된 해산 해면류를 동정, 분류한 결과 1강 7목 19과 26속 36종으로 밝혀졌다. 이 중 4종 *Stelletta japonica* Lebwahl, 1914 (왜별해면), *Caminella velata* Lebwahl, 1914 (깍질가마해면), *Stylohalina hirta* Topsent, 1898 (거친침상해면) 그리고 *Esperiopsis rugosa* Thiele, 1905 (주름발톱해면)이 한국 미기록종으로 판명되었다.