

## **Taxonomy on Marine Sponges from Geojedo Island, Korea**

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### **ABSTRACT**

The sponge specimens were collected from Geojedo Island, Korea during from 1994 to 1998 with fishing nets or by scuba divers. They were identified into 34 species of 25 genera in 15 families, of which the one species, *Tedania rhoi* is a new species, and *Clathria (Axociella) simae* is new to the Korean fauna. This species were redescribed.

Key words: taxonomy, marine sponges, Geojedo Island, Korea

### **INTRODUCTION**

Sponges from Geojedo Island, Korea are so far poorly known. To date, only six species have been reported by Rho and Sim (1972, 1981) and Sim (1981). From 1994 through 1998, sponges were collected from Geojedo and its adjacent water by scuba divers and with fishing nets. 34 sponge species of 25 genera in 15 families were found from this Island, of which the one new species, *Tedania rhoi* was discovered. The species *Clathria (Axociella) simae* (Hooper, 1996) was redescribed.

Sponges were identified on the basis of overall shape, coloration and texture of the sponge, and on spicule shape and size. For skeletal arrangement, thin free-hand sections were made with a surgical blade from specimens hardened in alcohol. Spicules were examined by dissolving a piece of sponge in sodium hypochlorite (bleach). For the morphological analysis of microsclere, spicules were prepared using an AKASHI critical pointed drier, then viewed with an ISI-SS40 SEM at Hannam University. SEM analysis of spicules followed the procedure of Rützler (1978).

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## SYSTEMATIC ACCOUNT

Phylum Porifera Grant, 1836 해면동물 문  
 Class Demospongiae Sollas, 1885 보통해면 강  
 Order Homosclerophorida Dendy, 1905 동골해면 목  
 Family Plakinidae Schulze, 1880 판해면 과

**1. *Plakoritis simplex* Schulze, 1880** 일삼해면

**Previous records.** Geojedo (Rho and Sim, 1981).

**Distribution.** Korea (Korea Strait), Japan (Hiwasa, Tokushima).

Order Astrophorida Levi, 1973 별해면 목  
 Family Geodiidae Gray, 1867 조디아해면 과

**2. *Caminus awashimensis* Tanita, 1969** 카미너스해면

**Material examined.** Ssanggeun (scuba diver), 8 July 1996.

**Distribution.** Korea, Japan.

**3. *Geodia reniformis* Thiele, 1898** 잎조디아해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1996.

**Distribution.** Korea (Cheju Island), Japan (Sagami Bay, Enoshima).

Order Hadromerida Topsent, 1894 경해면 목  
 Family Clionidae Gray, 1867 호박해면 과

**4. *Cliona celata* Grant, 1826** 호박해면

**Previous records.** Geojedo (Rho and Sim, 1972).

**Material examined.** Ssanggeun (scuba diver), 8 July 1996.

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

Family Suberitidae, Schmidt, 1870 코르크해면 과

**5. *Suberites ficus* Johnston, 1842** 집게코르크해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994; Ssanggeun (scuba diver), 8 July 1996.

**Distribution.** Korea (Korea Strait and East Sea), Japan (Seto Island Sea).

**6. *Suberites japonicus* Thiele, 1898** 왜코르크해면

**Previous records.** Geojedo (Sim, 1981).

**Material examined.** Ssanggeun (scuba diver), 8 July 1996; Heungnam (scuba diver), 30 Jan. 1997.

**Distribution.** Korea (Geojedo), Japan (Seto Island Sea).

**7. *Terpios fugax* Dachassing and Michelotti, 1864** 피터오즈해면

**Material examined.** Ssanggeun (scuba diver), 8 July 1996.

**Distribution.** Korea (Cheju Island), West Central Pacific (Marshall Island, Ponape Island), Carribbean Sea (Caragao Island, Carcas Bay), Bermuda (Bermudas).

Order Poecilosclerida Topsent, 1928 다골해면 목

Family Microcionidae Carter, 1875 작은눈해면 과

**8. *Clathria (Clathria) mosulpia* Sim and Byeon, 1989** 모슬침유령해면

**Material examined.** Daepo (fishing-net), 3 Oct. 1994.

**Distribution.** Korea (Cheju Island).

**9. *Clathria (Clathria) spinispicula* Tamita, 1968** 침유령해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994, 3 Oct. 1994.

**Distribution.** Korea (Korea Strait, Cheju Island), Japan.

**10. *Clathria (Axociella) simae* (Hooper, 1996)** 등근축털해면 (Fig. 1 A-G)

*Clathria (Microciona) simae* Hooper, 1996, p. 224

*Axociella cylindrica* Sim and Byeon, 1989, p. 39, Pl. 5, figs. 1-2

**Material examined.** Maemuldo (fishing-net), 9 July 1996.

**Description.** Sponge erect and dichotomous flattened branching, 17.5 cm high, 10 cm wide, 1.5 cm stem diameter, surface hispid with spicules. Oscules rare 0.4-0.8 mm in diameter. Texture firm, colour beige in spirit.

Ectosome: Erect spicule brushes.

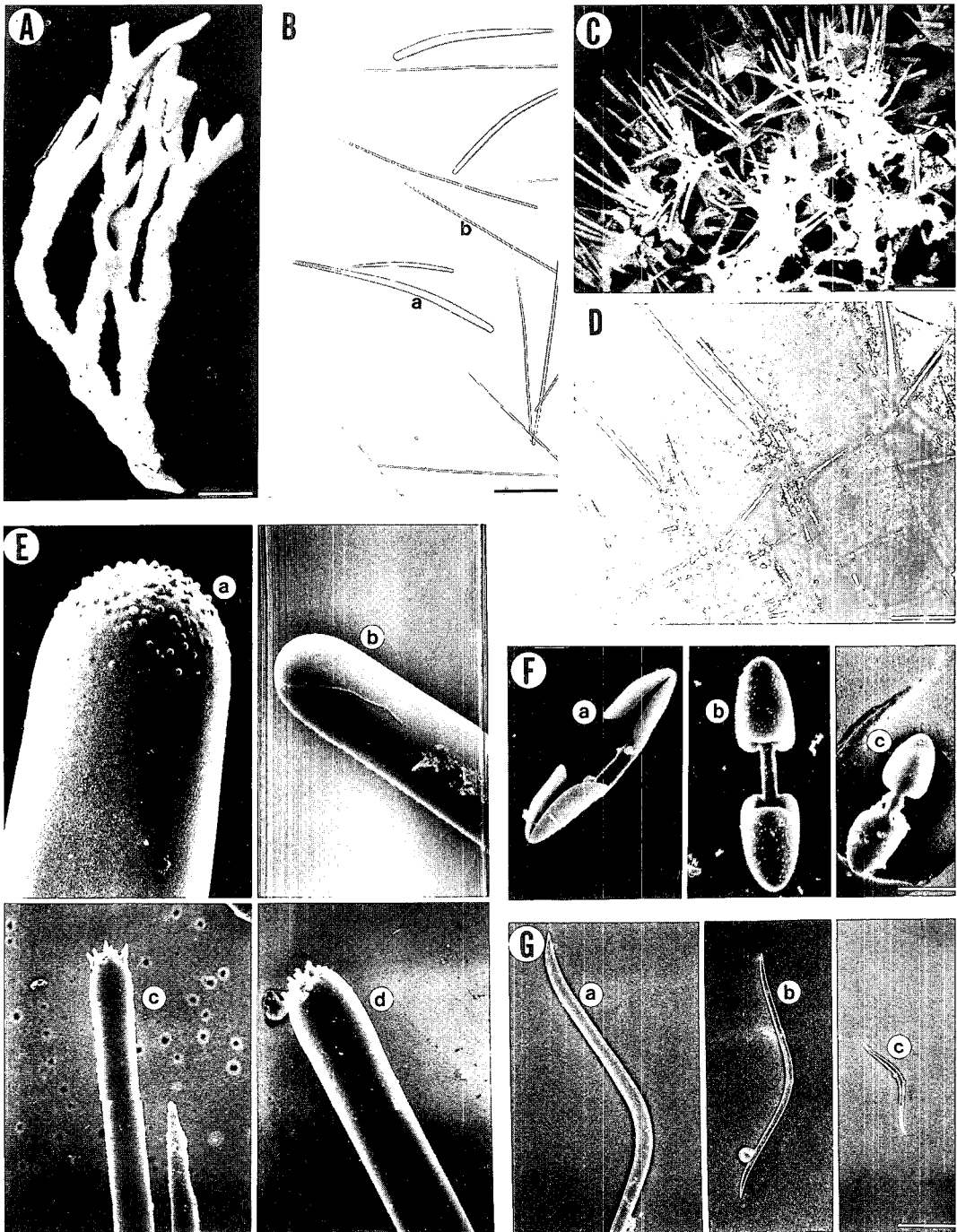
Choanosome: Fibroreticulation fibres cored by one to two styles, thin subtylostyle found interstitially.

Spicules:	Megascleres,	Thick styles	.....	300-750 × 15-30 μm
		Subtylostyles	.....	260-650 × 3-7 μm
	Microscleres,	Texas (large)	.....	100-130 × 2-4 μm
		(medium)	.....	70-90 × 1-2 μm
		(small)	.....	25-40 × 0.5-1 μm
		Isochelas (large)	.....	18-25 μm
		(small)	.....	10-12 μm

Remarks: This species was described as a new species, *Clathria (Microciona) simae* by Hooper (1996). However, subgenus *Microciona* and *Axociella* have quite different skeletal architecture. *Axociella* displays well differentiated axial and extra-axial components of the spicules. Such axial differentiation is not found in *Microciona*. This sponge has fibroreticulate cored thick style spicules. Echinating acanthostyles are absent. Thick styles have microspined or smooth bases. Thin tylostyles also have microspined bases. Accordingly, this *Clathria (Microciona) simae* is reassigned to the

**Table 1.** Spicule dimensions of *Clathria (Axociella) simae*.

Localities	Spicules Thick styles (μm)	Subtylostyles (μm)	Texas (μm)			Isochelas (μm)	
			large	medium	small	large	small
Moseulpo (Cheju Island) Fishing-net, 1987	290-730 × 15-30	265-610 × 3-8	100-120 × 2-4	60-90 × 1-2	25-45 × 1	16-27	9-12
Maemuldo (Geojedo) Fishing-net, 1996	300-750 × 15-30	260-650 × 3-7	100-130 × 2-4	70-90 × 1-2	25-40 × 0.5-1	18-25	10-12



**Fig. 1.** *Clathria (Axociella) simae*. A, Side view; B, Styles: a, thick style, b, subtylostyle; C, Skeletal structure (SEM); D, Skeletal structure; E, Megascleres; a-b, head of thick style, c-d, head of subtylostyle (SEM); F-G, Microscleres; F, a, side view of large isochela, b, large isochela, c, small isochela (SEM); G, a, large toxa, b, medium toxa, c, small toxa (SEM). Scale bars = 2 cm (A), 100  $\mu$ m (B), 30  $\mu$ m (C), 200  $\mu$ m (D), 50  $\mu$ m (E-G).

subgenus *Axociella*. Hooper (1996) erroneously recorded the type locality of this sponge as the South China Sea. The actual type locality of this species was Cheju Island, in the South Sea of Korea. Table 1 shows that the spicule dimensions of these species is very similar in both localities.

**Distribution.** Korea (Korea Strait, Cheju Island), Port Jackson.

**11. *Lissoplocamia tocushima* Tanita, 1970** 미끈이해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994; 9 July 1996

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

**12. *Ophlitaspongia noto* Tanita, 1963** 바늘뼈해면

**Previous records.** Geojedo (Rho and Sim, 1981).

**Material examined.** Gudo (scuba diver), 6 Feb. 1996.

**Distribution.** Korea (Korea Strait), Japan (Aikawa, Seto Island, Noto-peninsula).

Family Raspailiidae Hentschel, 1923 털해면 과

**13. *Raspailia folium* Thiele, 1898** 잎사귀해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994.

**Distribution.** Korea (Korea Strait, Cheju Island), Japan(Enoshima).

**14. *Raspailia hirsuta* Thiele, 1898** 털많은가지해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994; 9 July 1996.

**Distribution.** Korea (Korea Strait, Cheju Island), Japan (Sagami Bay).

**15. *Ceratopsis ramosa* Thiele, 1898** 가지뿔해면

**Material examined.** Daepo (fishing-net), 9 July 1996.

**Distribution.** Korea (Cheju Island), Japan (Sagami Bay).

Family Coelosphaeridae Hentschel, 1923 강해면 과

**16. *Lissodendoryx firma* Lambe, 1895** 뇌산호끈적해면

**Material examined.** Daepo (fishing-net), 3 Oct. 1994.

**Distribution.** Korea (Cheju Island), California, San Juan Archipelago, Washington, Western Canada.

**17. *Lissodendoryx isodictyalis* Carter, 1882** 두드럭끈적해면

**Previous records.** Geojedo (Rho and Sim, 1972).

**Distribution.** Korea (Korea Strait), North America, Caribbean Sea.

Family Myxillidae Hentschel, 1923 끈적해면 과

**18. *Myxilla incrustans* Johnston, 1942** 껍질끈적해면

**Material examined.** Daepo (fishing-net), 2 July 1994, 9 July 1996, Heungnam (scuba diver), 30 Jan. 1997, 13 Jan. 1998.

**Distribution.** Korea (Korea Strait, East Sea, South sea), Japan (Ariake Sea).

**19. *Myxilla productus* Hoshino, 1981** 긴끈적해면

**Material examined.** Daepo (fishing-net), 9 July 1996.

**Distribution.** Korea, Japan.

**20. *Myxilla setoensis* Tanita, 1961** 넓적끈적해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994.

**Distribution.** Korea (Korea Strait, East Sea), Japan (Seto Island Sea).

Family Tedaniidae Ridley and Dendy, 1886 테다니해면 과

**21. *Tedania rhoi* n. sp.** 로이테다니해면 (신칭) (Fig. 2 A-E)

**Material examined.** Holotype: Por. 25 (NHM, Hannam Univ.), Gudo (scuba diver 5 m), 6 Feb. 1996. Paratype: Por. 25-1, Por. 25-2, Por. 25-3 (Dept. of Biology, Hannam Univ.); Por. 25-4, Por. 25-5 (NHM, Ewha Womans Univ.), Ssanggeun (scuba diver 5 m), 8 July 1996.

**Description.** Commonly massive, sometimes cushion shaped measuring up to  $75 \times 77 \times 20$  mm; surface uneven bearing very low papillae. Smooth to the touch, sometimes very slimy. Rare oscules 0.5 mm in diameter. Texture hard and compressible. Live specimen appear fleshy-pink, creamy-beige in spirit.

**Ectosome:** Thin dermal membrane, 1 mm thick, smooth with a skin like membrane. Tylotes arranged at an angle to the surface, mixed with many onychaetes.

**Choanosome:** A series of ascending tracts of styles, connected by much spongin, tylota occur in small amounts.

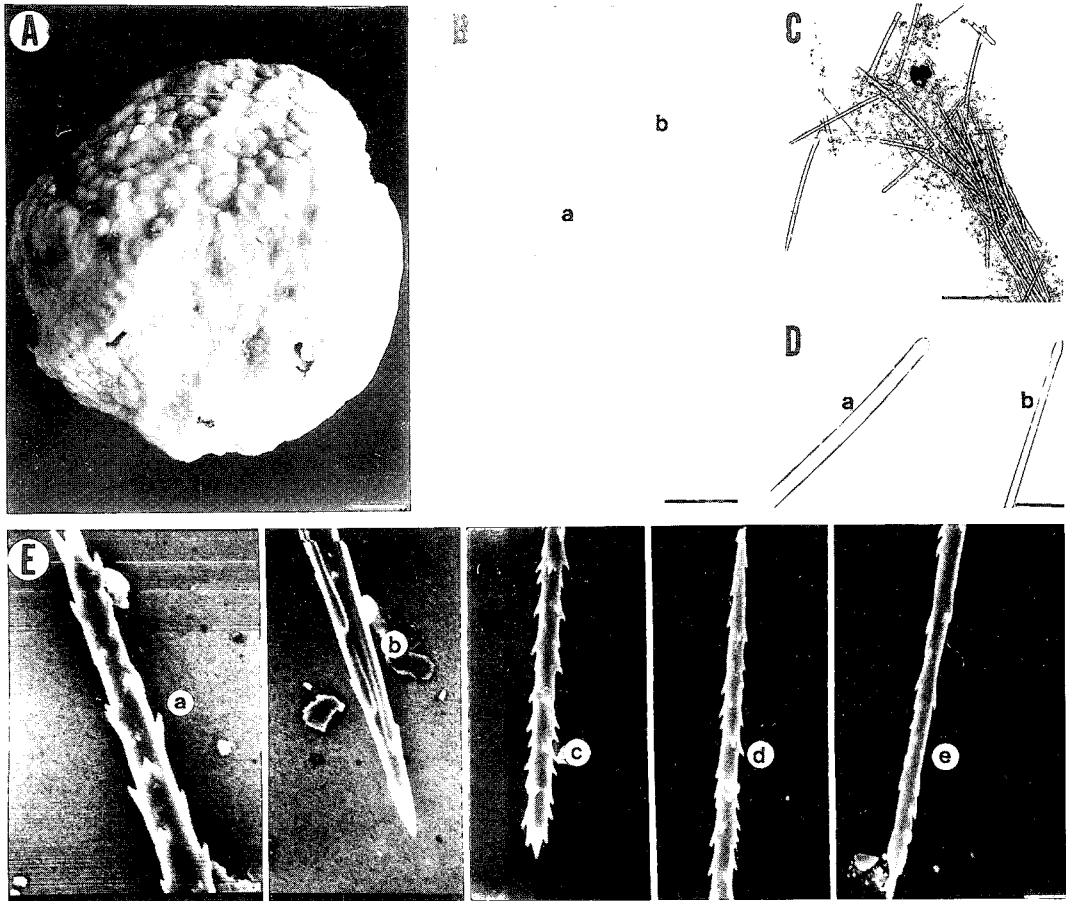
Spicules: Megascleres, Styles ..... $270-340 \times 8-10 \mu\text{m}$   
 Tylotes ..... $230-290 \times 4-5 \mu\text{m}$   
 Microscleres, Long thin onychaetes ..... $160-170 \times 1 \mu\text{m}$   
 Short thin onychaetes ..... $40-50 \times 1 \mu\text{m}$   
 Thick onychaetes ..... $120 \times 3 \mu\text{m}$

**Ectymology.** This species is named for Dr. Boon Jo Rho, who has contributed greatly to sponge taxonomy since 1966.

**Remarks.** This new species is similar in spicule morphology to *Tedania diversirhaphideophora* Brønsted, 1923. This species was redescribed by Bergquist (1961) and by Bergquist and Fromont (1988). *T. diversirhaphideophora* has two size categories of onychaetes, whereas this new species usually has three size categories of onychaetes. No other species of *Tedania* has been described that has three categories of onychaetes. We found 18 specimens from two localities (Gudo and Ssanggeun), all have papillae on the surface of the sponges. The ends of the tylotes are smooth, without acanthose. Table 2 shows the spicule dimension of this new species.

**Table 2.** Spicule dimensions of *Tedania rhoi* n. sp.

Localities	Spicules	Styles ( $\mu\text{m}$ )	Tylotes ( $\mu\text{m}$ )	Onychaetes ( $\mu\text{m}$ )		
				large thin	Small thin	Thick
Gudo						
SCUBA, 5m		$270-340 \times 8-10$	$230-290 \times 4-5$	$160-170 \times 1$	$40-50 \times 1$	$120 \times 3$
6 Feb. 1996						
Ssanggeun						
SCUBA, 5m		$280-320 \times 8-10$	$220-280 \times 4-5$	$160-170 \times 1$	$40-50 \times 1$	$120-130 \times 3$
8 July 1996						



**Fig. 2.** *Tedania rhoi* n. sp. A, Side view; B, Megascleres: a, style, b, tylole; C, Skeletal structure; D, a, head of style, b, head of tylole; E, Microsccleres: a, base of thick onychaete, b, point of thick onychaete, c, base of long thin onychaete, d, point of long thin onychaete, e, point of short thin onychaete (SEM). Scale bars = 1 cm (A), 100  $\mu$ m (B), 150  $\mu$ m (C), 200  $\mu$ m (D), 5  $\mu$ m (E).

Family Mycalidae Lundbeck, 1905 깃해면 과

**22. *Mycale plumosa* Carter, 1882** 깃바늘뻘해면

**Material examined.** Ssanggeun (scuba diver), 8 July 1996; Hakdong (scuba diver), 29 Jan. 1997.

**Distribution.** Korea (Korea Strait), Japan (Matsushima Bay), Indian Ocean.

**23. *Oxymycale rhoi* Sim and Lee, 1998** 로이간상바늘뻘해면

**Material examined.** Daepo (fishing-net), 3 Oct. 1994, 9 July 1996.

**Distribution.** Korea (Geojedo).

**24. *Oxymycale koreana* Sim, 1982** 한국간상바늘뻘해면

**Material examined.** Daepo (fishing-net), 3 Oct. 1994.

**Distribution.** Korea (Cheju Island).

**25. *Esperiopsis uncigera* Topsent, 1928** 관발톱해면

**Material examined.** Daepo (fishing-net), 9 July 1996.

**Distribution.** Korea (Korea Strait, East Sea), Japan (Sagami Bay).

Order Halichondrida Vosmaer, 1885 해변해면 목

Family Dictyonellidae van Soest, Diaz and Pomponi, 1990 수정해면 과

**26. *Dactylella hilgendorfi* Thiele, 1898** 수정해면

**Material examined.** Daepo (fishing-net), 9 July 1996.

**Distribution.** Korea (Korea Strait, East Sea), Japan (Seto Island Sea).

Family Axinellidae Ridley and Dendy, 1888 축해면 과

**27. *Acanthella vulgata* Thiele, 1899** 보통가시해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994.

**Distribution.** Korea (Korea Strait), Japan (Sagami Bay).

**28. *Axinella copiosa* Thiele, 1898** 축해면

**Material examined.** Daepo (fishing-net), 9 July 1996.

**Distribution.** Korea (Cheju Island), Japan (Hakodate).

**29. *Phakellia elegans* Thiele, 1898** 맷시해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994.

**Distribution.** Korea (Korea Strait), Japan (Sagami Bay).

Family Halichondriidae Vosmaer, 1885 해변해면 과

**30. *Halichondria oshoro* Tanita, 1961** 황록해변해면

**Previous records.** Geojedo (Rho and Sim, 1972).

**Distribution.** Korea (Korea Strait), Bristol Bay.

**31. *Halichondria panicea* Pallas, 1776** 회색해변해면

**Material examined.** Gudo (scuba diver), 6 Feb. 1996.

**Distribution.** Korea (Korea Strait, East Sea), Japan (Matsushima, Oginohama Bays), Gulf of Mexico.

**32. *Hymeniacion sinapium* De Laubenfels, 1930** 주황해변해면

**Material examined.** Gudo (scuba diver), 6 Feb. 1996; Gabae, 8 July 1996; Haegeumgang, 4 Sep. 1997; Haksan (scuba diver), 14 Jan. 1998.

**Distribution.** Korea (Korea Strait, East Sea, West Sea), Japan.

Order Haplosclerida Topsent, 1928 단골해면 목

Family Callyspongiidae De Laubenfelds, 1936 예쁜이해면 과

**33. *Ceraochalina differentiata* Dendy, 1921** 뽕예쁜이해면

**Material examined.** Gabae, 6 Feb. 1996.

**Distribution.** Korea (Korea Strait), Japan (Funakawa, Akita Prefecture, Noto-peninsula).

Family Chalinidae Gray, 1867 고삐해면 과

**34. *Gellius angulatus* Bowerbank, 1866** 솜덩이해면

**Material examined.** Daepo (fishing-net), 2 Oct. 1994, 3 Oct. 1994.

**Distribution.** Korea (Cheju Island), Guernsey, Rev. A.M. Norman Bay of Naples.



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## 거제도 해산 해면류의 분류학적 연구

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## 요 약

1994년부터 1998년까지 거제도에서 어망과 잠수부에 의해서 채집된 해면류는 15과 25속 34종으로 동정, 분류되었다. 이중 *Tedania rhoi* 로이테다니해면은 신종으로 밝혀졌고, *Clathria (Axociella) simae* 둥근축털해면은 한국 미기록종으로 판명되었다.