

Systematic Study on Marine Sponges in Korea
10. Demosponges of Cheju Island

Sim, Chung-Ja, Kim, Young-Sam and Kim, Young-Hae
(Department of Biology, Han Nam University, Daejeon 300-791, Republic of Korea)

한국산 해산해면류의 계통분류학적 연구
10. 제주도의 보통해면류

심 정 자 · 김 영 삼 · 김 영 혜
(한남대학교 이과대학 생물학과)

적 요

제주도 연안과 부근 섬을 1991년 3월 부터 10월까지 5회에 걸쳐 채집한 재료와 그동안 한남대학교 생물학과와 이화여자대학교 생물학과에 보관되어 있던 제주도 표본들을 동정. 분류한 결과 30 과 40 속 67 종이 분류 되었고, 이 중 11 종은 한국 미기록종이었다. 특기를 요하는 기록종에는 간단한 기재를 하였고, 미기록종에 대하여는 기재와 도판을 첨가 하였다.

Key words: systematics, marine sponges, Demospongia, Cheju Island, Korea.

INTRODUCTION

The present study on marine sponges is based on materials, from Cheju Island, Korea. A systematic survey of the sponge of this Island was begun by Sim in 1980. Sim (1982a) reported 83 species in 28 families from Cheju Island. Among them 74 species were Demospongiae. 140 species in 35 families have

been reported so far, as a result of systematic studies of Korean sponges (Kim *et al*, 1968; Rho *et al*, 1969; Rho and Sim, 1972a, b; 1976; 1979a, b, c, d; 1981; Sim, 1981a, b, 1982a, b; 1985; Sim and Kim, 1988; Sim and Byeon, 1989; Sim *et al*, 1990).

The material used were collected from 18 localities (Fig. 1) in the Cheju Island during the period from 1970 to 1991. Materials were collected by fish net, fishing reel with long lines and SCUBA diver.

67 species, 40 genera and 30 families were identified, of which 11 species were new to Korea; *Oxeostilon fernaldi*, *Microciona gradalis*, *Tedania ignis*, *Haliclona koremella*, *Adocia neens*, *Callyspongia variabilis*, *Suberites axinelloides*, *Anthosigmella raromicrosclera*, *Epipolasis kushimotoensis*, *Acanthella insignis*, and *Spongosorites salomonensis*. A total 140 species of Demospongiae are now known to Cheju Island by adding the 11 more species reported in this paper. The systematic scheme of Bergquist(1978) were consulted in this study.

SYSTEMATIC ACCOUNT

The asterisk (*) indicates the species which were recorded only in Cheju Island and double asterisk (**) indicates the species which were newly recorded in Korea.

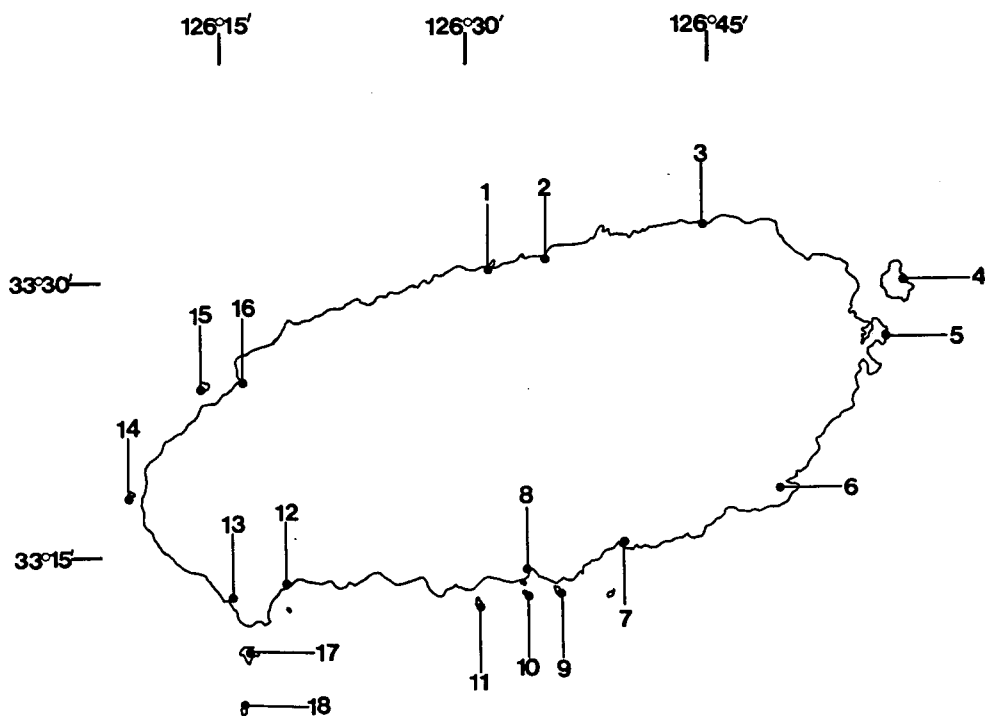


Fig. 1. A map showing the localities where the materials were collected.

- 1, Chejuhang; 2, Samyang 1 dong; 3, Kimnyŏng; 4, Udo; 5, Sŏngsan'o; 6, P'yosŏn; 7, Wimi; 8, Sŏgwip'o; 9, Supsŏm; 10, Munsŏm; 11, Pŏmsŏm; 12, Sanbangsan; 13, Mosŭlp'o; 14, Ch'agwido; 15, Piyangdo; 16, Hallim; 17, Kap'ado; 18, Marado.

- Class Demospongiae Sollas, 1885 보통해면 강
 Subclass 1. Ceractinomorpha Lévi, 1953 일축해면 아강
 Order 1. Keratosa Grant, 1861 각질해면 목
 Family 1. Spongiidae Gray, 1867 각질해면 과

1. *Spongia officinalis* Linné, 1759 간각질해면
 Material examined: Söngsanp'o, 13/VII/1983; Kimnyöng (reel fishing), 25/VI/1991.

- Order 2. Halichondrida Vosmaer, 1885 해변해면 목
 Family 2. Halichondriidae Vosmaer, 1885 해변해면 과

2. *Halichondria panicea* (Pallas, 1766) 회색해변해면
 Material examined: Sögwip'o (fish net), 19/VII/1987; Piyangdo, 6/II/1986; Ch'agwido (SCUBA), 23/X/1991.

3. *Halichondria okadai* (Kadota, 1922) 검정해변해면
 Material examined: Sanbansan, 10/VII/1991.

4. *Halichondria oshoro* (Tanita, 1961) 황록해변해면
 Material examined: Sanbansan, 10/VII/1991.

- Family 3. Hymeniacidonidae De Laubenfels, 1934 주황해변해면 과

5. *Hymeniacidon sinapium* De Laubenfels, 1930 주황해변해면
 Material examined: Piyangdo, 6/II/1986; Samyang (SCUBA), 9/VII/1991; Sanbansan, 10/VII/1991; Pömsöm (SCUBA), 22/X/1991; Ch'agwido (SCUBA), 23/X/1991; Söngsanp'o (SCUBA), 24/X/1991; Marado (SCUBA), 25/X/1991.

* * 6. *Oxeostilon fernaldi* Sim and Bakus, 1986 간사해면(신칭) (Pl. 3, Figs. 3-4)

Oxeostilon fernaldi Sim and Bakus, 1986 (p. 14-15, figs. 2-1, 2-2)

Material examined: Mosulp'o (fish net), 6/IX/1988.

Remarks: This sponge is massive. Size up to 12×8.5×5cm. Texture is hard but friable. Surface is irregularly undulate. The oscules are sparse, 2 - 5 mm in diameter, dermal membrane is present. Color in life is yellow, in alcohol it is ivory.

- Spicules: Large oxeas 676-1015×12-30 μm.
 Small oxeas 139-435×16-18 μm.
 Styles 568-846×18-36 μm.
 Strongyles 507-604×24 μm.

Distribution: Korea (Cheju Island); California.

- Order 3. Poecilosclerida Topsent, 1928 다골해면 목
 Family 4. Anchinoidea Topsent, 1928 안키노해면 과

7. *Anchioe novaezealandiae* Dendy, 1924 안키노해면

Material examined: Supsöm, 14/VII/1987.

Family 5. Myxillidae Hentschel, 1923 끈적해면 과

8. *Myxilla setoensis* Tanita, 1961 넓적끈적해면

Material examined: Piyangdo, 19/VI/1985; Sögwip'o, 9/X/1986; Mosülp'o, 19/VII/1987; Pömsöm (SCUBA), 22/X/1991; Söngsanp'o (SCUBA), 24/X/1991.

9. *Myxilla bivalvia* Tanita, 1967 덩게끈적해면

Material examined: Mosülp'o (fish net), 18/VII/1987; Kimnyöng (reel fishing), 10/VIII/1991.

10. *Myxilla incrustans* (Johnston, 1942) 껍질끈적해면

Material examined: Kap'ado, 15/VI/1985; Mosülp'o, 19/VII/1987; Kimnyöng (reel fishing), 25/VI/1991; Kimnyong (reel fishing), 15/VII/1991; Pömsöm (SCUBA), 22/X/1991.

*11. *Myxilla productus* Hoshino, 1981 긴끈적해면

Material examined: Piyangdo, 20/VI/1985; Mosülp'o, 9/IX/1988; Kimnyong (reel fishing), 25/VI/1991; Kimnyong (reel fishing), 15/VII/1991.

*12. *Lissodendoryx firma* (Lambe, 1895) 뇌산호끈적해면

Material examined: Kap'ado, 17/VI/1985; Kimnyöng (reel fishing), 15/VII/1991.

Family 6. Ophlitaspongiidae De Laubenfels, 1936 바늘뼈해면 과

13. *Ophlitaspongia noto* Tanita, 1963 바늘뼈해면

Material examined: Sögwip'o, 18/VII/1987; Sanbangsan, 10/VII/1991; Pömsöm (SCUBA), 22/X/1991; Söngsanp'o (SCUBA), 24/X/1991; Marado (SCUBA), 25/X/1991.

*14. *Neofolispa dianchora* (De Laubenfels, 1935) 두닷바늘뼈해면

Material examined: Kimnyöng (reel fishing), 15/VII/1991.

Family 7. Clathridae Hentschel, 1923 침유령해면 과

*15. *Clathria dayi* Lévi, 1963 데이침유령해면

Material examined: Mosülp'o (fish net), 9/IX/1988; Kimnyöng (reel fishing), 25/VI/1991.

16. *Clathria spinspicula* Tanita, 1968 침유령해면

Material examined: Mosülp'o (fish net), 9/IX/1988; Kimnyöng (reel fishing), 25/VI/1991.

17. *Clathria toxipraedita* Topsent, 1913 화살유령해면

Material examined: Sögwip'o, 25/X II/1971; Piyangdo, 20/VI/1985; Chejuhang, 6/II/1986; Mosülp'o,

18/VII/1987.

* * 18. *Microciona gradalis* Topsent, 1925 관상유령해면(신칭) (Pl. 4, Figs. 1-2)

Microciona gradalis Topsent, 1925.

Microciona gradalis: Lévi, 1960 (p.175).

Material examined: Mosŭlp'o (fish net), 9/IX/1988.

Remarks: This sponge is encrusting over the sponge *Discodermia kiiensis*. Texture is tough and compressible. Body surface is a little velvety with the protruding spicules. Pore and oscules are invisible. Color in life is light purple, in alcohol it is beige.

Spicules: Large styles 664-761 × 24 μm.
 Small styles 302-471 × 12-18 μm.
 Subtylostyles 265-580 × 2-5 μm.
 Acanthostyles 60-241 × 6-12 μm.
 Isochela 11-12 μm.

Distribution: Korea (Cheju Island) ; Mediterranean.

Family 8. Desmacidae 띠해면 과

* 19. *Desmacella rosea* Fristedt, 1887 장미띠해면

Material examined: Chejuhang, 6/III/1986; Mosŭlp'o (fish net), 9/IX/ 1988.

Family 9. Eaperiopsidae Hentschel, 1923 발톱해면 과

20. *Esperlopsis uncigera* Topsent, 1928 관발톱해면

Material examined: Kimnyong (reel fishing), 15/VII/1991.

Remarks: Long tube, 37cm height, 2.5cm diameter, surface is smooth.

Family 10. Plocamiidae Topsent, 1928 곱슬해면 과

21. *Lissoplocamia tocushima* Tanita, 1970 미끈이해면

Material examined: Sŏgwip'o, 30/VII/1984; Samyang 1 dong (SCUBA), 9/VII/1991; Kimnyŏng (reel fishing), 15/VII/1991; Kimnyŏng (reel fishing), 20/IX/ 1991.

Remarks: Branch, tip of branch is flat.

Family 11. Tedaniidae Riedly and Dendy, 1886 테다니해면 과

* 22. *Tedania tubulifera* Lévi, 1963 관테다니해면

Material examined: Kap'ado, 10/VI/1985; Piyangdo, 5/III/1986.

* * 23. *Tedania ignis* (Duchassing and Michelotti, 1864) 환상테다니해면(신칭) (Pl. 5, Figs. 1-2)

Thalysias ignis Duchassing and Michelotti, 1864.

Tedania ignis: De Laubenfels, 1936 (p.89-92); 1949 (p.16-17); 1950 (p.21-22); 1951 (p.260); 1954 (p.129); Little,

1963 (p.48); Hechtel, 1965 (p. 37-39, pl. 5, fig. 4); Simpson, 1968 (p. 72, pl. 16, fig. 1, t-figs. 9-10); Wiedenmayer, 1977 (p. 133-135, pl. 28, fig. 3, pl. 29, fig. 1, t-fig. 14); Pulitzer-Finali, 1986 (p.147).

Material examined: Sögwip'o, 10/IX/1988.

Remarks: This specimen is incrusting on the rock with bryozoans. Surface is smooth. Texture is very soft and fragile. No osculum visible but pore is scattered on the surface. Color in life is orange.

Spicules: Styles 175-278 × 3-8 μm .
 Substrongyles 151-236 × 3-6 μm .
 Raphid 115-185 × 2 μm .
 Small raphid 47-75 × 1 μm .

Distribution: Korea (Cheju Island); Jamaica; Bahama; Dominica Republic; Puerto Rico.

Order 4. Haplosclerida Topsent, 1928 단골해면 목

Family 12. Halicionidae De Laubenfels, 1932 보라해면 과

24. *Haliclona densaspicula* Hoshino, 1981 뽕뽕침보라해면

Material examined: Kimnyöng (reel fishing), 1/VI/1991.

*25. *Haliclona perlucida* (Griessinger, 1971) 진주보라해면

Material examined: Kimnyöng (reel fishing), 1/VI/1991.

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

Material examined: Söngsanp'o, 15/VI/1981; Sögwip'o (fish net), 2/VII/1984; Piyangdo, 6/II/1986; Pömsöm (SCUBA), 22/X/1991; Marado (SCUBA), 25/X/1991.

**27. *Haliclona koremella* De Laubenfels, 1954 앞사귀보라해면(신칭) (Pl. 5, Figs. 3-4)

Haliclona koremella De Laubenfels, 1954 (p. 59-60, t-fig. 34).

Material examined: Mosülp'o (fish net), 19/VII/1987.

Remarks: This sponge is leaf-like shape and erect, with short stalk attached to the substratum, measures 4.3cm high. Texture is soft. Surface is even. Oscules are 1.5 - 2.5mm in diameter at the top. Color in alcohol is beige. Laubenfels species is ramose shaped.

Spicules: Strongyles 82-105 × 2-3 μm .

Distribution: Korea (Cheju Island); Iwayama Bay

Family 13. Adocidae De Laubenfels, 1936 아도시해면 과

**28. *Adocia neens* Topsent, 1918 님스아도시해면(신칭) (Pl. 2, Figs. 1-2)

Reniera neens Topsent, 1918.

Adocia neens: De Laubenfels, 1936 (p. 67-68, pl. 12, fig. 1); Little, 1963 (p.43).

Material examined: Sögwip'o, 10/IX/1988.

Remarks: This sponge is massive, size up to 4.5 × 2.5 × 1.2 cm. Oscules are slightly elevated with oscular rims. Surface is smooth. Texture is fragile. Color in life is violet but in alcohol it is beige.

Spicules: Oxeas 90-145 × 1-6 μm .

Styles 95-136 × 5-6 μm.
 Strongyles 80-110 × 5-6 μm.

Distribution: Korea (Cheju Island); Antarctic Ocean.

29. *Strongylophora corticata* Wilson, 1925 불뚱해면

Material examined: Sōgwip'o, 8/VIII/1981; Munsōm, 18/X II/1986; Mosūl-p'o, 24/VII/1989; Pōmsōm (SCUBA), 22/X/1991; Ch'agwido (SCUBA), 23/X/1991; Sōngsanp'o (SCUBA), 24/X/1991; Marado (SCUBA), 25/X/1991.

Remarks: Mushroomshape, hard like stone. Color is purple in life.

Family 14. *Callyspongiidae* De Laubenfels, 1936 예쁜이해면 과

30. *Callyspongia elongata* (Ridley and Dendy, 1886) 길쭉예쁜이해면

Material examined: Piyangdo, 19/VI/1985; Chejuhang, 21/VI/1985; Sogwip'o, 9/X/1986; Wimi, 10/X/1986; Mosūlp'o, 9/IX/1988; Kimnyōng (reel fishing), 1/VI/1991; Kimnyong (reel fishing), 25/VI/1991.

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

Material examined: Sōngsanp'o, 15/VII/1981; Mosūlp'o, 9/VII/1991; Kimnyōng (reel fishing), 15/VII/1991; Pōmsōm (SCUBA), 22/X/1991; Ch'agwido (SCUBA), 23/X/1991; Sōngsanp'o (SCUBA), 23/X/1991.

32. *Callyspongia confederata* (Ridley, 1884) 보라예쁜이해면

Material examined: Sōgwip'o, 8/VIII/1981; Udo, 2/ /1984; Munsōm, 29/IX/1986; Mosūlp'o, 9/IX/1988; Sōngsanp'o (SCUBA), 24/X/1991.

33. *Callyspongia variabilis* (Dendy, 1890) 변덕예쁜이해면(신칭) (Pl. 4, Figs. 3-4)

Pachychalina variabilis Dendy, 1890 [cited from Hoshino, 1981 (p.109-110, t-fig. 39)].

Callyspongia variabilis: De Laubenfels, 1936 (p.39); Tanita, 1967 (p. 114); 1981 (p. 109-110, t-fig. 39).

Material examined: Mosūlp'o(fish net), 9/IX/1988.

Remarks: This sponge is ramose and has long slender branches, size up to 12 × 5.7cm. Surface is even, oscules open on the surface of the only one side, 0.5 - 1.5mm in diameter. Texture is compressible. Color in life is orange, in alcohol it is beige.

Spicules: Oxeas 109-160 × 6-9 μm

Distribution: Korea (Cheju Island); Japan (Takeno Inland sea of Japan) ; Bahamas.

34. *Callyspongia bispicula* Tanita, 1961 얇은예쁜이해면

Material examined: Mosūlp'o, 9/VII/1991.

35. *Callyspongia ramosa* (Gray, 1843) 가시예쁜이해면

Material examined: Kimnyōng, 25/VI/1991.

Subclass 2. *Tetractinomorphā* Lévi, 1953 사축해면 아강

Order 5. Choristida Sollas, 1880 코리스티다해면 목
Family 15. Stellettidae Carter, 1875 별해면 과

*36. *Stelletta crassipicula* (Sollas, 1886) 두꺼운별해면
Material examined: Söngsanp'o (SCUBA), 24/X/1991.

*37. *Papyrula metastrosa* Lebwahl, 1914 변갈대해면
Material examined: Sögwip'o (fish net), 30/IX/1978; P'yosön, 9/X/1985.

Family 16. Ancorinidae Schmidt, 1870 닻해면 과

38. *Penares incrustans* Tanita, 1963 꺾질닻해면
Material examined: Ch'agwido (SCUBA), 23/X/1991.

Family 17. Geodiidae Gray, 1867 조디아해면 과

*39. *Erylus nobilis* Thiele, 1900 유명꼭지해면
Material examined: Pömsöm (SCUBA), 22/X/1991.

Family 18. Pachastrellidae Carter, 1875 시루해면 과

*40. *Pachastrella doederlein* (Thiele, 1898) 털시루해면
Material examined: Kimnyöng (reel fishing), 10/X/1991.

41. *Pachastrella cribrum* Lebwahl, 1914 체시루해면
Material examined: Sögwip'o, 1/VII/1984; Kimnyöng (reel fishing), 15/VII/1991; Söngsanp'o (SCUBA), 24/X/1991.

*42. *Pachastrella japonica* Thiele, 1898 시루해면
Material examined: Sögwip'o, 31/VII/1975; Mosülp'o, 18/VII/1987; Kimnyong (reel fishing), 15/VII/1991.

Family 19. Jaspidae De Laubenfels, 1936 벽옥해면 과

*43. *Asteropus simplex* (Carter, 1879) 자루별해면
Material examined: Marado (SCUBA), 25/X/1991.
Remarks: Encrusting, cover the barnacle.

Order 6. Lithistida Schmidt, 1870 리티스티다해면 목
Family 20. Kaliapsidae De Laubenfels, 1936 들해면 과

*44. *Discodermia japonica* Döderlein, 1883 판가죽해면
Material examined: Sögwip'o (fish net), 10/X/1986; Mosülp'o, 9/IX/1988; Kimnyong (reel fishing), 15/VII/1991.

45. *Discodermia calyx* Döderlein, 1883 킵가죽해면

Material examined: Hallim, 7/VII/1972; Sögwip'o, 10/X/1986; Pömsöm (SCUBA), 22/X/1991; Ch'agwido (SCUBA), 23/X/1991; Söngsanp'o (SCUBA), 24/X/1991.

*46. *Discodermia kitensis* Hoshino, 1977 키가죽해면

Material examined: Sögwip'o, 12/IV/1975; Mosülp'o, 24/VII/1989; Mosülp'o, 9/VII/1991; Kimnyong, 15/VII/1991; Pömsöm (SCUBA), 22/X/1991.

*47. *Discodermia emarginata* Dendy, 1905 유두가죽해면

Material examined: Munsöm, 26/X II/1986; Söngsanp'o (SCUBA), 24/X/1991.

Remarks: Massive, 4 × 5 × 2cm, color is gold yellow in life.

Order 7. Hadromerida Topsent, 1894 경해면 목

Family 21. Suberitidae Schmidt, 1870 코르크해면 과

*48. *Suberites axinelloides* Brøndsted, 1924 축코르크해면(신칭)

(Pl.1, Figs. 3-4)

Suberites axinelloides Brøndsted, 1924.

Suberites axinelloides: Bergquist, 1968 (p.26-27, fig. 7).

Material examined: Mosülp'o (fish net), 9/IX/1988.

Remarks: This sponge is thinly encrusting over the dead sea squirt root, 1-2mm thick. The texture is soft and easily torn. Pore and oscules are not apparent. Color in life is orange, in alcohol it is beige. Bergquist's specimens are growing over a shell.

Spicules: Large tylostyles 248-821 × 6-18 μm.

Small tylostyles 115-211 × 3-6 μm.

Distribution: Korea (Cheju Island) ; East of North Cape.

Family 22. Clonidae Gray, 1867 호박해면 과

*49. *Cliona lobata* Hancock, 1826 입호박해면

Material examined: Sögwip'o (fish net), 3/X II/1978; Mosülp'o, 24/VII/1989; Ch'agwido (SCUBA), 23/X/1991.

Family 23. Spirastrellidae Ridley and Dendy, 1886 나선별해면 과

*50. *Spirastrella panis* Thiele, 1898 나선별해면

Material examined: Sögwip'o, 5/IX/1985; Mosülp'o, 29/ /1988; Samyang (SCUBA), 9/VII/1991; Pömsöm (SCUBA), 22/ /1991; Ch'agwido, 23/X/1991.

51. *Spirastrella abata* Tanita, 1961 가는나선별해면

Material examined: Munsöm, 26/X II/1986; Samyang (SCUBA), 9/VII/1991; Kimnyöng (reel fishing), 15/VII/1991; Ch'agwido (SCUBA), 23/X/1991; Marado (SCUBA), 25/X/1991.

52. *Spirastrella insignis* Thiele, 1898 굵은나선별해면

Material examined: Kimnyöng (reel fishing), 1/VI/1991; Samyang (SCUBA), 9/VII/1991; Kimnyöng (reel fishing), 15/VII/1991.

Family 24. Tethyidae Gray, 1867 테티아해면 과

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

Material examined: Söngsanp'o. 2/X II/1978; Songsanp'o (SCUBA), 24/X/1991.

Remarks: Itching to touch.

Family 25. Chondrosiidae Schulze, 1877 알해면 과

***54. *Chondrilla mixta* Schulze, 1877** 검정알해면

Material examined: Söngsanp'o, 30/VI/1984; Söngsanp'o (SCUBA), 24/X/1991; Marado (SCUBA), 25/X/1991.

Remarks: Encrusting like colony Ascidian, color is black in life.

Family 26. Choanitidae De Laubenfels, 1936 코에니티해면 과

***55. *Anthosigmella raromicrosclera* (Dickinson, 1945)** 가지꽃해면(신칭) (Pl. 3, Figs. 1-2)

Anthosigmella raromicrosclera Dickinson. 1945.

Anthosigmella raromicrosclera: Hoshino. 1981 (p. 218-219, pl. 2, fig. 1, pl. 4, fig. 1-2, t-fig. 9).

Material examined: Mosülp'o (fish net), 6/IX/1988; Samyang 1 dong (SCUBA), 9/VII/1991.

Remarks: This sponge is massive, 10 × 8 × 4 cm. Texture is compressible but hard. Surface is lightly, papillate. Pores invisible but oscules 0.5-1.5 mm in diameter. Colour in life is black, in alcohol it is dark gray.

Spicules: Tylostyles 236-447 × 6-12 μm.

Spirraster 18-33 μm.

Distribution: Korea (Cheju Island); California; Japan (Voshna Mitsukue Shonashi)

Family 27. Sollasellidae Lendenfeld. 1887 솔라시해면 과

***56. *Epipolasis kushimotoensis* Hoshino, 1977** 쿠시모곶질해면(신칭) (Pl. 5, Figs. 5-6)

Epipolasis kushimotoensis Hoshino. 1977 (p. 11, pl. 4, figs. 3-5, t-fig. 4).

Epipolasis kushimotoensis: Hoshino. 1981 (p. 240-241, t-fig. 27).

Material examined: Mosülp'o (fish net), 19/VII/1987.

Remarks: This sponge is irregular massive, size up to 9 × 7.8 × 4.8 cm. Texture is hard as stone, incompressible. Surface is uneven, thin dermal membrane is present. Oscules are rare 1-2 mm in diameter but pore is invisible. In alcohol is beige.

Spicules: Large oxeas 720-900 × 6-24 μm.

Small oxeas 483-680 × 6-12 μm.

Distribution: Korea (Cheju Island); Japan (Kushimote)

Order 8. Axinellida Bergquist, 1970 축해면 목
 Family 28. Axinellidae Ridley and Dendy, 1888 축해면 과

57. *Axinella copiosa* Thiele, 1898 축해면

Material examined: Hallim, 7/VII/1972; Sögwip'o (fish net), 9/X/1986; Mosülp'o, 9/IX/1988; Kimnyöng, 15/VII/1991; Kimnyöng (reel fishing), 20/IX/1991.

°58. *Axinella hispida* Koltun, 1959 털많은축해면

Material examined: Chejuhang, 6/II/1986.

°59. *Acanthella simplex* Thiele, 1898 민가지가시해면

Material examined: Sögwip'o (fish net), 11/V/1974; Kimnyong (reel fishing), 15/VII/1991.

Remarks: Branch or fan shape but texture is very hard. Height is similar all specimen.

°60. *Acanthella insignis* Thiele, 1898 가지가시해면(신칭) (Pl. 1, Figs. 1-2)

Acanthella insignis Thiele, 1898 (p. 54, pl. 3, fig. 10, pl. 8, figs. 37 a-c).

Material examined: Mosülp'o (fish net), 9/IX/1988.

Remarks: This sponge is flabelliform, size up to 5 × 4 × 1 cm. It is attached to the substratum by a short stalk. The surface is hispid with numerous spicules projecting. The texture is very hard and incompressible. Color in life is orange, in alcohol it is ivory.

Spicules: Styles 326-1345 × 12-18 μm.

Strongyles 435-1129 × 6-12 μm.

Distribution: Korea (Cheju Island) ; Japan (Sagami Bay).

61. *Phakellia elegans* Thiele, 1898 랩시해면

Material examined: Sögwip'o, 1/X II/8; Mosülp'o (fish net), 6/ 1988; Kimnyöng (reel fishing), 25/VIII/1991; Kimnyöng (reel fishing), 20/IX/1991.

°62. *Ceratopsis ramosa* Thiele, 1898 가지뿔해면

Material examined: Sögwip'o (fish net), 30/IX/1978; Kimnyöng (reel fishing), 25/VI/1991.

°63. *Spongosorites salomonensis* Dendy, 1921 진주별해면(신칭) (Pl. 2, Figs. 3-4)

Spongosorites salomonensis Dendy, 1921 (p. 125-126, pl. 17, figs. 6 a-c).

Material examined: Sögwip'o, 26/X II/1971; Mosülp'o (fish net), 9/IX/1988.

Remarks: This specimens are massive, size up to 3.7 × 3.5 × 2.2 cm. Texture is hard but fragile. Surface is slightly uneven because of protrudin spicules. Dermal membrane is present. Pores are visible yellowish green, in alcohol it is beige.

spicules: Large oxeas 930-1290 × 18-36 μm.

Middle oxeas 390-795 × 12-18 μm.

Small oxeas 54-360 × 3-12 μm.

Styles 760-1140 × 18-36 μm.

Strongyles 420-1020 × 24-42 μm.

Distribution: Korea (Cheju Island) ; Ceylon

Family 29. Raspailiidae Hentschel, 1912 털해면 과

°64. *Raspailia folium* Thiele, 1898 앞사귀해면

Material examined: Sögwip'o, 15/VII/1982; Mosülp'o, 10/IV/1987; Kimnyöng (fishingreel), 15/ /1991.

65. *Raspailia hirsuta* Thiele, 1898 털많은가지해면

Material examined: Kap'ado, 15/VII/1985; Sögwip'o (fish net), 9/X/1986; Wimi, 10/X/1986; Mosulp'o, 30/VI/1988.

°66. *Raspailia koreana* Rho and Sim, 1979 긴털가지해면

Material examined: Kimnyöng (fishing reel), 15/VII/1991.

Subclass 3. Homoscleromorpha 동골해면 아강

Order 9. Homoscleropherida Dendy, 1905 동골해면 목

Family 30. Halinidae De Laubenfels, 1934 바다해면 과

67. *Plakortis simplex* Schulze, 1880 일삼해면

Material examined: Ch'agwido (SCUBA), 23/X/1991; Marado (SCUBA), 25/X/1991.

DISCUSSION

Sixty seven species of Demospongiae in 30 families were identified from 18 localities in Cheju Island and its adjacent waters. As shown in Table 1, 31 species collected in Mosülp'o, 28 species in Kimnyöng and 26 species in Sögwip'o. *Hymeniacion sinapium* and *Strongylophora corticata* were found from 7 localities. *Myxilla setoensis*, *Oplitaspongia noto*, *Haliclona permolis*, *Callyspongia elongata*, *Callyspongia elegans*, *Callyspongia confoederata*, *Discodermia calyx*, *Spirastrella panis* and *Spirastrella abata* were collected from 5 to 6 localities. 35 species are not collected from East Sea and Yellow Sea but reported only in Cheju Island, Korea.

ABSTRACT

A large number of Demospongiae have been collected from 18 localities in Cheju Island and its adjacent waters during the period from 1970 to 1991.

The identified Demospongiae consist of 67 species, 40 genera and 30 families. Among them 11 species were new to Korea; *Oxeostilon fernaldi*, *Microciona gradalis*, *Tedania ignis*, *Haliclona koremella*, *Adocia neens*, *Callyspongia variabilis*, *Suberites axinelloides*, *Anthosigmella raromicrosclera*, *Epipolasis kushimotoensis*, *Acanthella insignis*, and *Spongosorites salimonensis*.

Table 1. Species of class demospongiae occurred from the 18 localities of the Cheju Island, Korea.

| Species | Localities | | | | | | | | | | | | | | | | | | |
|----------------------------------|------------|----------------|----------|-----|------------|---------|------|----------|--------|--------|--------|-----------|----------|----------|----------|--------|---------|--------|---|
| | Chejuhang | Samyang 1 dong | Kimnyōng | Udo | Songsanp'o | P'yōsōn | Wimi | Sōgwip'o | Munsōm | Supsōm | Pōmsōm | Sanbansan | Mostip'o | C'agwido | Piyangdo | Hallim | Kap'ado | Marado | |
| <i>Spongia officinalis</i> | | | + | | + | | | | | | | | | | | | | | |
| <i>Halichondria panicea</i> | | | | | | | | + | | | | | | | + | + | | | |
| <i>Halichondria okadai</i> | | | | | | | | | | | | | | + | | | | | |
| <i>Halichondria oshoro</i> | | | | | | | | | | | | | + | | | | | | |
| <i>Hymeniacidon sinapium</i> | | + | | | + | | | | | | + | + | | + | + | | | | + |
| <i>Oxeostilon fernaldi</i> | | | | | | | | | | | | | | + | | | | | |
| <i>Anchioe novaezealandiae</i> | | | | | | | | | | + | | | | | | | | | |
| <i>Myxilla setoensis</i> | | | | | + | | | + | | | + | | | | + | | | | |
| <i>Myxilla bivalvia</i> | | | | + | | | | | | | | | | + | | | | | |
| <i>Myxilla incrustans</i> | | | | + | | | | | | | + | | | + | | | | | + |
| <i>Myxilla productus</i> | | | | + | | | | | | | | | | + | + | | | | + |
| <i>Lissodendoryx firma</i> | | | | + | | | | | | | | | | | | | | | + |
| <i>Ophlitaspongia noto</i> | | | | | + | | | + | | | + | + | | | | | | | + |
| <i>Neofolispa dianchora</i> | | | | + | | | | | | | | | | | | | | | |
| <i>Clathria dayi</i> | | | | + | | | | | | | | | | + | | | | | |
| <i>Clathria spinspicula</i> | | | | + | | | | | | | | | | + | | | | | |
| <i>Clathria toxipraedita</i> | | + | | | | | | + | | | | | | + | + | | | | |
| <i>Microciona gradalis</i> | | | | | | | | | | | | | | + | | | | | |
| <i>Desmacella rosea</i> | | + | | | | | | | | | | | | + | | | | | |
| <i>Esperiopsis uncigera</i> | | | | + | | | | | | | | | | | | | | | |
| <i>Lissoplocamia tocushima</i> | | + | + | | | | | + | | | | | | | | | | | |
| <i>Tedania tubulifera</i> | | | | | | | | | | | | | | | | + | | | + |
| <i>Tedania ignis</i> | | | | | | | | + | | | | | | | | | | | |
| <i>Haliclona densaspicula</i> | | | | + | | | | | | | | | | | | | | | |
| <i>Haliclona perlucida</i> | | | | + | | | | | | | | | | | | | | | |
| <i>Haliclona permollis</i> | | | | | + | | | + | | | + | | | | + | | | | + |
| <i>Haliclona koremella</i> | | | | | | | | | | | | | | + | | | | | |
| <i>Adocia neens</i> | | | | | | | | + | | | | | | | | | | | |
| <i>Strongylophora corticata</i> | | | | | + | | | + | + | | + | | + | + | | | | | + |
| <i>Callyspongia ramosa</i> | | | | + | | | | | | | | | | | | | | | |
| <i>Callyspongia elongata</i> | | + | + | | | | | + | + | | | | | + | | + | | | |
| <i>Callyspongia elegans</i> | | | + | | + | | | | | | + | | + | + | | | | | |
| <i>Callyspongia confoederata</i> | | | | | + | + | | + | + | | | | + | | | | | | |
| <i>Callyspongia variabilis</i> | | | | | | | | | | | | | + | | | | | | |

Table 1. Continued

| Species | Localities | | | | | | | | | | | | | | | | | | |
|--------------------------------------|------------|---------------|----------|-----|------------|--------|------|----------|--------|--------|--------|-----------|----------|----------|----------|--------|---------|--------|---|
| | Chejuhang | Samyang 1dong | Kimnyong | Udo | Songsanp'o | P'yson | Wimi | Sogwip'o | Munsom | Supsom | Pomsom | Sanbansan | Mosulp'o | C'agwido | Piyangdo | Hallim | Kap'ado | Marado | |
| <i>Callyspongia bispicula</i> | | | | | | | | | | | | | + | | | | | | |
| <i>Stelletta crassipicula</i> | | | | | + | | | | | | | | | | | | | | |
| <i>Papyrula metastrosa</i> | | | | | | + | | + | | | | | | | | | | | |
| <i>Penares incrustans</i> | | | | | | | | | | | | | | + | | | | | |
| <i>Erylus nobilis</i> | | | | | | | | | | | + | | | | | | | | |
| <i>Pachastrella doederlein</i> | | | + | | | | | | | | | | | | | | | | |
| <i>Pachastrella cribrum</i> | | | + | | + | | | + | | | | | | | | | | | |
| <i>Pachastrella japonica</i> | | | + | | | | | + | | | | | + | | | | | | |
| <i>Asteropus simplex</i> | | | | | | | | | | | | | | | | | | | + |
| <i>Discodermia japonica</i> | | | + | | | | | + | | | | | + | | | | | | |
| <i>Discodermia calyx</i> | | | | | + | | | + | | | + | | + | | + | | | | |
| <i>Discodermia kiiensis</i> | | | + | | | | | + | | | + | | + | | | + | | | |
| <i>Discodermia emarginata</i> | | | | | + | | | | + | | | | | | | | | | |
| <i>Suberites axinelloides</i> | | | | | | | | | | | | | + | | | | | | |
| <i>Cliona lobata</i> | | | | | | | | + | | | | | + | + | | | | | |
| <i>Spirastrella panis</i> | | + | | | | | | + | | | + | | + | + | | | | | |
| <i>Spirastrella abata</i> | | + | + | | | | | | + | | | | | + | | | | | + |
| <i>Spirastrella insignis</i> | | + | + | | | | | | | | | | | | | | | | |
| <i>Tethya aurantium</i> | | | | | + | | | | | | | | | | | | | | |
| <i>Chondrilla mixta</i> | | | | | + | | | | | | | | | | | | | | + |
| <i>Anthosigmella raromicrosclera</i> | | + | | | | | | | | | | | + | | | | | | |
| <i>Epipolasis kushimotoensis</i> | | | | | | | | | | | | | + | | | | | | |
| <i>Axinella copiosa</i> | | | + | | | | | + | | | | + | | | + | | | | |
| <i>Axinella hispida</i> | + | | | | | | | | | | | | | | | | | | |
| <i>Acanthella simplex</i> | | | + | | | | | + | | | | | | | | | | | |
| <i>Acanthella insignis</i> | | | | | | | | | | | | | + | | | | | | |
| <i>Phakellia elegans</i> | | | + | | | | | + | | | | + | | | | | | | |
| <i>Ceratopsis ramosa</i> | | | + | | | | | + | | | | | | | | | | | |
| <i>Spongosorites salomonensis</i> | | | | | | | | + | | | | | + | | | | | | |
| <i>Raspailia folium</i> | | | + | | | | | + | | | | + | | | | | | | |
| <i>Raspailia hirsuta</i> | | | | | | | + | + | | | | + | | | | | + | | |
| <i>Raspailia koreana</i> | | | + | | | | | | | | | | | | | | | | |
| <i>Plakortis simplex</i> | | | | | | | | | | | | | | + | | | | | + |
| Total number of species | 4 | 6 | 28 | 1 | 14 | 1 | 2 | 26 | 4 | 1 | 11 | 4 | 31 | 10 | 8 | 2 | 5 | 8 | |

ACKNOWLEDGEMENTS

The authors are specially grateful to Dr. Boon Jo Rho, Department of Biology, Ewha Womans University for providing a part of specimens for this work.

REFERENCES

- Bergquist, P. R., 1968. The marine fauna of New Zealand: Demospongiae, Part 1. (Tectactinomorpha and Lithistida). *N. Z. Dep. Sci. Ind. Res. Bull.*, 133: 1-106.
- Brøndsted, H. V., 1924. Sponges from New Zealand, part 1. Papers from Dr. Th. Mortensen's Pacific Expedition 1914-16. *Vidensk. Meddr. Dansk. Naturh. For.*, 76: 117-167.
- Dendy, A., 1890. Observations on the West Indian Chalininae with description of new species. *Trans. Zool. Soc. London*, 12: 349-368. cited from Hoshino, 1981 (p.109-110).
- Dendy, A., 1895. Catalogue of non-calcareous sponges collected by J. Bracebridge Wilson, Esq., M. A., in the neighbourhood of Port Philipp Heads Part 1. *Proc. Roy. Soc. Victoria*, 7: 232-263.
- Dendy, A., 1921. No.1. Report on the sigmatotetraxonida collected by H.M.S "Sealark" in the Indian Ocean. *Trans. Linn. Soc. London*, 18(1): 1-164.
- Dickinson, M. G., 1945. Sponges of the Gulf of California. *Allan Hancock Pac Exped.*, 11(1): 1-57.
- Duchassing, F. P. De. and Michelotti, G., 1864. Spongiaires de la mer Caraïbe. *Natuurk. Verh. Holl. Mij. Wetensch. Harlem*(2), 2(3): 1-124.
- Hechtel, G. J., 1965. A systematic study of the Demospongiae of part Royal, Jamaica. *Peabody Mus. Nat. Hist. Bull.*, 20: 1-103.
- Hentschel, E., 1912. Kiesel-und Hoynschwamme der Aru und kei-Insln: *Abh Senckenb. Naturf. Ges.*, 34: 291-448.
- Hoshino, T., 1971. Sponges fauna of Seto Island Sea(Demospongiae, Calcarea) *Bull. Biol. Soc. Hiroshima Univ.*, 38: 21-30.
- Hoshino, T., 1974. Demospongiae of Hiryu-jima(Biro-jima), an islet in the Ariake Sea. *Calanus*, 4: 8-15.
- Hoshino, T., 1977. Demosponges from the Kii Channel and its environs western Japan. *Proc. Jap. Soc. Syst. Zool.*, 13: 5-15.
- Hoshino, T., 1981. Shallow - water Demosponges of western Japan, I. *J. Sci Hiroshima Univ. Ser. B, Div. 1*, 29(1): 47-205.
- Hoshino, T., 1981. Shallow - water Demosponges of western Japan, II. *Ibid.*, 29(2): 207-283.
- Kim, H. S., B. J. Rho and C. J. Sim, 1968. Marine sponges in South Korea (1) *Korea J. Zool.*, 11(2): 1-11.
- Koltun, V. M., 1959. Silicospongia sponges of the northern and far eastern seas of the USSR-keys to the fauna of the USSR. *Opred. Faune USSR.*, 67: 1-227.
- Laubenfels, M. W. De., 1936. A discussion of the sponges fauna of the Dry Tortugas in particular and the West Indies in General, with material for a revision of the families and orders of the Porifera. *Pub. Carnegie Inst. Tortugas Lab.*, 30: 1-225.
- Laubenfels, M. W. De., 1949. The sponges of the western Bahamas. *Pub. Amer Mus. Nat. Hist.*, 143: 1-25.
- Laubenfels, M. W. De., 1950. The sponges of Kaneohe Bay, Oahu. *Pac. Sci.*, 4(1): 3-35.
- Laubenfels, M. W. De., 1951. The sponges of the Island of Hawaii. *Ibid.*, 5(3): 256-271.
- Laubenfels, M. W. De., 1954. The sponges of the west Central Pacific. *Ore St. Monogr. Zool.*, 7: 1-306.
- Lee, J. J., 1990. Marine benthic macroinvertebrate fauna of the 7 uninhabited islets near coast of Cheju Island. 제주 무

- 인도학술조사, 제주문화방송주식회사, 159-170
- Lévi, C., 1960. Les eemospongies des cotes de France, I. Les Clathriidae *Cah. de Biol. Mar.*, **1**: 47-87.
- Little, E. J., 1963. The sponges fauna of the St. George's sound, Apalachee Bay, and Panama City regions of the Florida Gulf Coast. *Tulane Stud. Zool.*, **11**(2): 3-71.
- Pulitzer-Finali, G., 1986. A collection West-Indian Demospongiae(Porifera) In appendix, a list of the demospongiae hitherto recorded from the West Indies. *Ins. Zool. Univ. Genoa. Via. Balbi* **5**, 16126 Genova Italia.
- Ridley, S. O., 1884. Spongiida. Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of N. M. S. 'Alert' 1881-1882 *Brit. Mus. Nat. Hist. London*, 366-482, 582-630.
- Rho, B. J., H. S. Kim and C. J. Sim, 1969. Marine sponges in South Korea(2) *J. Korea Res. Inst. Bet. Liv., Ewha Womans Univ.*, **3**: 153-160.
- Rho, B. J. and C. J. Sim, 1972a. Marine sponges in South Korea(3) *J. Korea Res. Inst. Bet. Liv., Ewha Wamans Univ.*, **8**: 181-192.
- Rho, B. J. and C. J. Sim, 1972b. Faunal studies on the sponges in Korea. R72-82. *Min. Sci. Tech.*, 121-138.
- Rho, B. J. and C. J. Sim, 1976. On the classification and the distribution of the marine benthic animals in Korea 4. Sponges. *J. Kor. Res. Inst. Bet. Liv., Ewha Womans Univ.*, **16**: 67-87.
- Rho, B. J. and C. J. Sim, 1979a. A taxonomic study on the Korean Sponges 6. Calcarea. *Korea J. Zool.*, **22**(1): 11-18.
- Rho, B. J. and C. J. Sim, 1979b. Three new species of Tetractinomorpha(Choristida, Hadromerida and Axinellida) from Jeju Island in Korea. *Korea J. Zool.*, **22**(3): 125-133.
- Rho, B. J. and C. J. Sim, 1979c. A taxonomic study on the Korean Sponges 1 Poecilosclerina. *J. Korea Res. Inst. Liv., Ewha Wamans Univ.*, **23**: 61-67.
- Rho, B. J. and C. J. Sim, 1979d. Comparative morphology on parent and embryo of *Tetilla australe* in Korea. *J. Kor. Res. Inst. Liv., Ewha Womans Univ.*, **24**: 25-30.
- Rho, B. J. and C. J. Sim, 1981. A taxonomic study on the marine sponges in Korea 3. Choristida. *J. Kor. Res. Inst. Liv., Ewha, Womans Univ.*, **28**: 55-65.
- Rho, B. J. and C. I. Yang, 1983. A systematic study on the marine sponges in Korea 2. Ceractinomorpha. *J. Kor. Res. Inst. Bet. Liv., Ewha Womans Univ.*, **32**: 25-45.
- Sim, C. J., 1981a. A taxonomic study on the marine sponges in Korea 2 Hadromerida. *Kor. J. Zool.*, **24**(1): 9-17.
- Sim, C. J., 1981b. A systematic study on the marine sponges in Korea 1 Ceractinomorpha and Tetractinomorpha. *Soong Jun Univ., Eassays and papers*, **11**: 83-105.
- Sim, C. J., 1982a. A systematic study on the marine sponges from Jeju Island *Ibid*, **12**: 187-210.
- Sim, C. J., 1982b. A taxonomic study on the marine sponges in Korea 4. Choristida(Geodidae). *Kor. J. Zool.*, **25**(1): 1-8.
- Sim, C. J., 1985. A systematic study on the marine sponges from the South Sea and the Yellow Sea of Korea. *Kor. J. Sys. Zool.*, **1**(1-2): 1-9.
- Sim, C.J. and G.J. Bakus, 1986. Marine sponges of Santa Catalina Island, California. Published by the *Allan Hancock Found. Univ. South. California*, **5**:1-23.
- Sim, C. J. and M. H. Kim, 1988. A systematic study on the marine sponges in Korea 7. Demospongia and Hexactinellida. *Kor. J. Syst. Zool.*, **4**(1):21-42.
- Sim, C. J. and H. S. Byeon, 1989. A systematic study on the marine sponges in Korea 9. Ceractinomorpha. *Kor. J. Syst. Zool.*, **5**(1): 33-57.
- Sim, C. J., H. Y. Kim and H. S. Byeon, 1990. A systematic study on the marine sponges in Korea 8. Tetractinomorpha. *Kor. J. Syst. Zool.*, **6**(1): 123-144.
- Simpson, T. L., 1968. The structure and Function of Sponge Cells. New criteria for the taxonomy of Poecilosclerid

- Sponges(Demospongiae). *Bull Peabody Mus. Nat. Hist. Yale Univ.*, 25: 1-75.
- Tanita, S., 1967. Report on the sponges obtained from Tajima District, South Western region of the Japan Sea. *Bull. Jap. Sea Reg. Fish. Res. Lab.*, 17: 111-126.
- Thiele, J., 1898. Studien ber Pazifische spongien I. *Zool.*, 24: 1-72.
- Topsent, E., 1897. Spongiaires de la Baie D'Amboine. Voyage de M.M.M. Dedot et C. pictet dans L'archipel malais. *Rev. Suisse Zool.*, 4: 421-87.
- Topsent, E., 1918. Eponges de San Thome. Essai sur les genres *Spirastrella*, *Donatia* et *Chondrilla*. *Arch. Zool. Exp. Gen.*, 57(6): 536-618.
- Topsent, E., 1925. Etude des spongiaires du Golfe de Naples. *Arch. Zool. Exp. Gen.*, 53: 623-725.
- Wiedenmayer, F., 1977. Shallow-water sponges of the western Bahamas, pp 113-135. *Birkhauser Verlag, Basel und Stuttgart*.

RECEIVED: 16 OCTOBER 1992

ACCEPTED: 14 NOVEMBER 1992

Explanation of Plates

Plate 1.

- Figs. 1, 2.** *Acanthella insignis* Thiele
1. Entire animal
 2. Megascleres : A, Style; B, Strongyle.
- Figs. 3, 4.** *Suberites axinelloides* Brøndsted
3. Entire animal
 4. Megascleres : A, Large tylostyle; B, Small tylostyle,

Plate 2.

- Figs. 1, 2.** *Adocia neens* Topsent
1. Entire animal
 2. Megascleres : A, Oxea; B, Style; C, Strongyle.
- Figs. 3, 4.** *Spongisorites salomoensis* Dendy
3. Entire animal
 4. Megascleres : A, Oxea; B, Style; C, Strongyle; D, Small oxea,

Plate 3.

- Figs. 1, 2.** *Anthosigmella raromicroscleres* Dickinson
1. Entire animal
2. Megascleres : A, Tylostyle; B, Spirrastrer
- Figs. 3, 4.** *Oxeostilon fernaldi* Bakus and Sim
3. Entire animal
4. Megascleres : A, Oxea; B, Style; C, Strongyle; D, Small oxea

Plate 4.

- Figs. 1, 2.** *Microcionia gradalis* Topsent
1. Entire animal
2. Megascleres : A, Style; B, Subtylostyle; C, Acanthostyle
Microscleres : D, Toxa; E, Small toxa; F, Isochella.
- Figs. 3, 4.** *Callyspongia variabilis* Dendy
3. Entire animal
4. Megascleres : A, Oxea; B, Slander oxea.

Plate 5.

- Figs. 1, 2.** *Tedania ignis* Duchassing and Michelotti
1. Entire animal
2. Megascleres : A, Style; B, Strongyle
Microscleres : C, Raphid; D, Small raphid.
- Figs. 3, 4.** *Haliclona koremella* De Laubenfels
3. Entire animal
4. Megascleres : A, Strongyle
- Figs. 5, 6.** *Epipolasis kushimotoensis* Hoshino
5. Entire animal
6. Megascleres : A, Large oxe; B, Small oxea.

PLATE 1

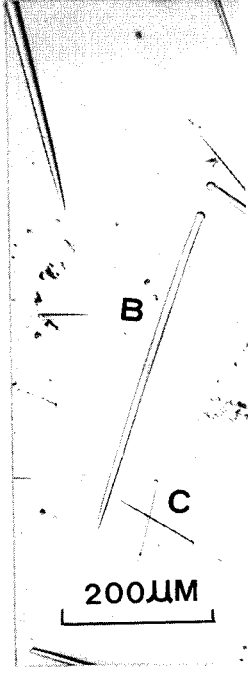
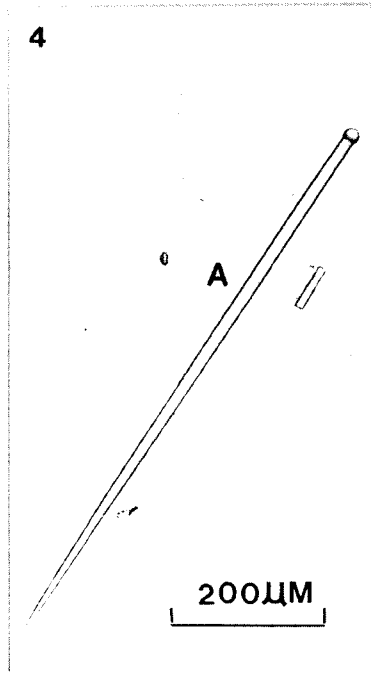
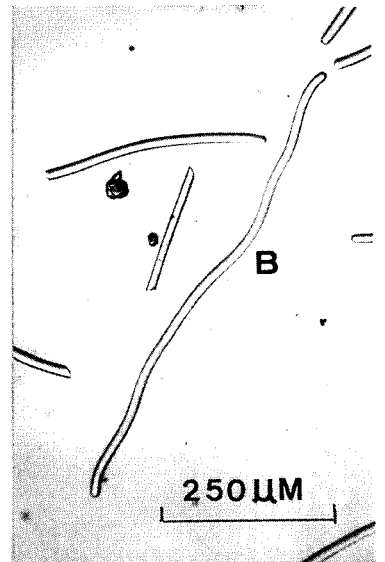
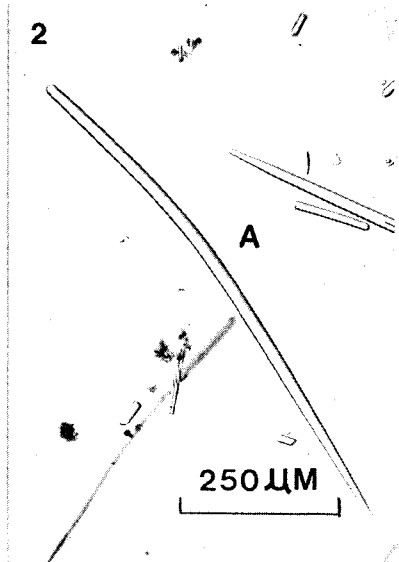


PLATE 2

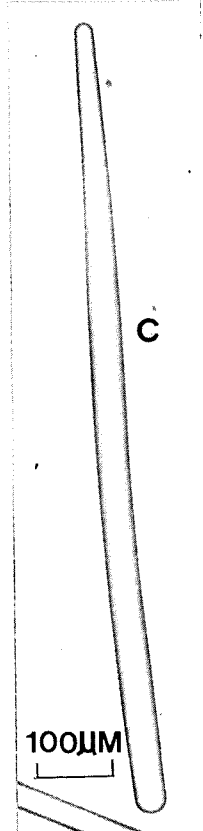
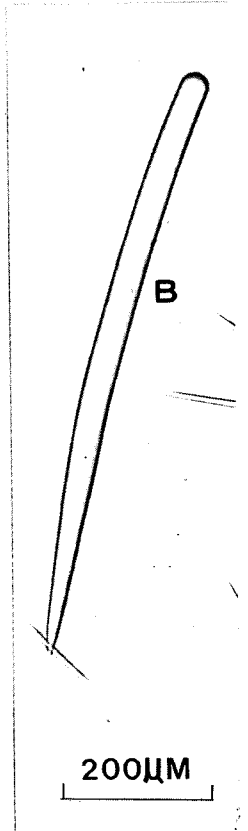
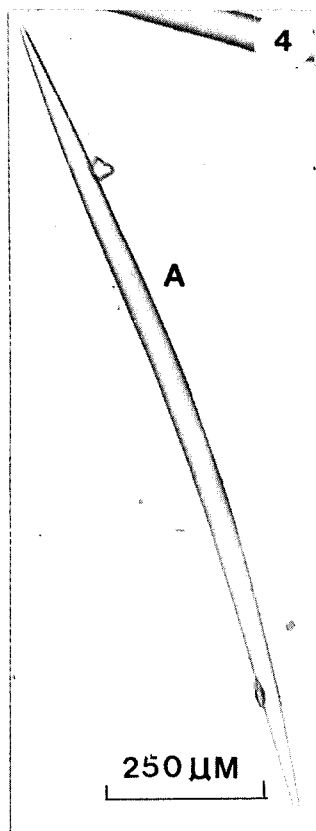
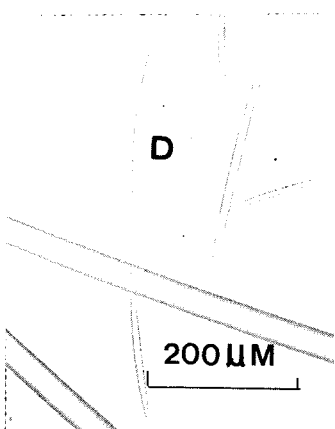
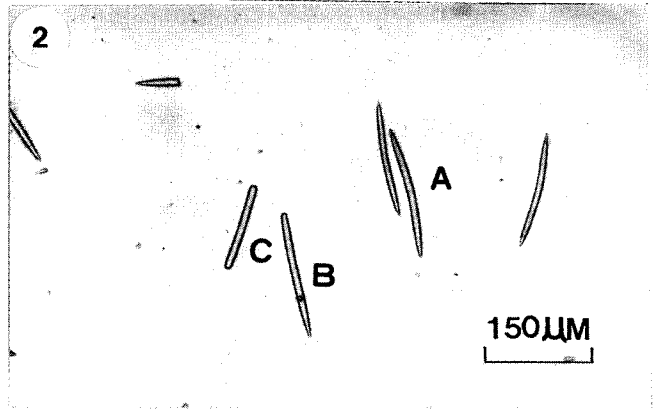
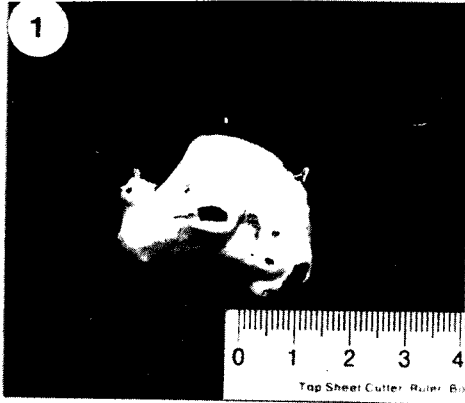


PLATE 3

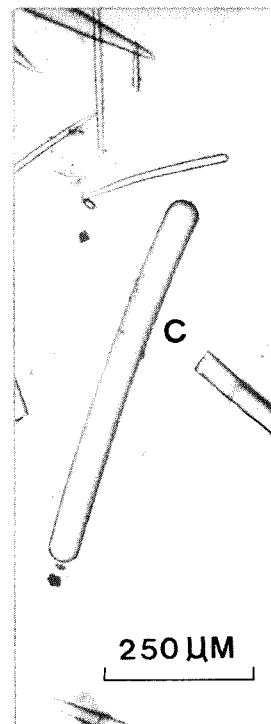
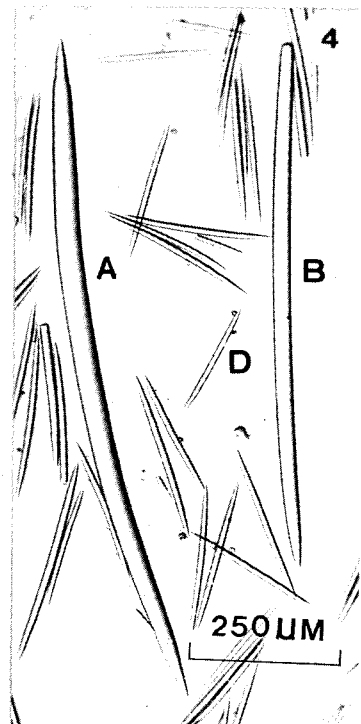
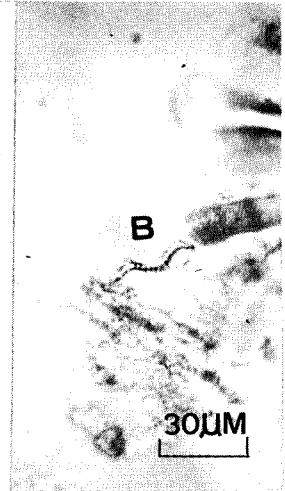
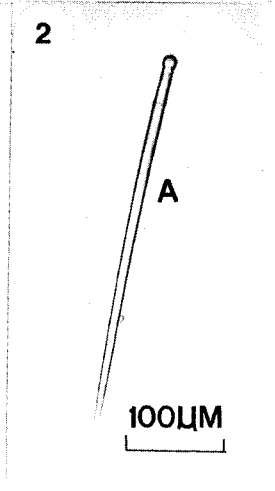
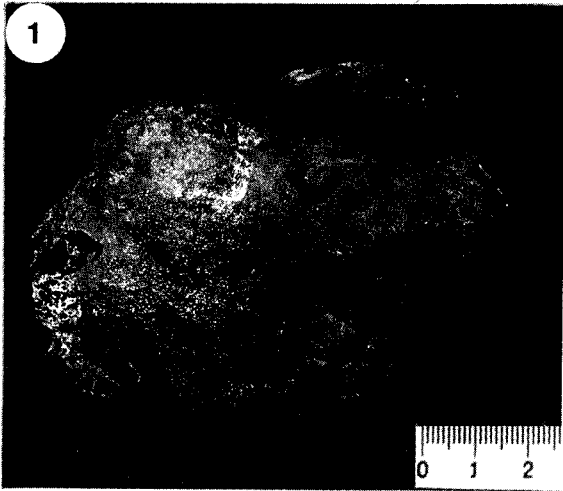


PLATE 4

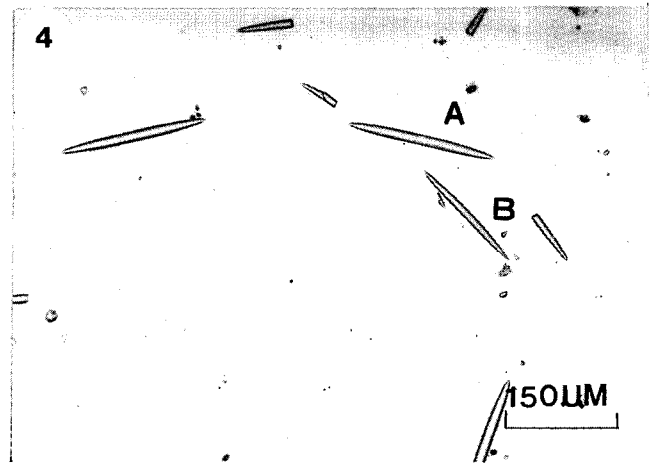
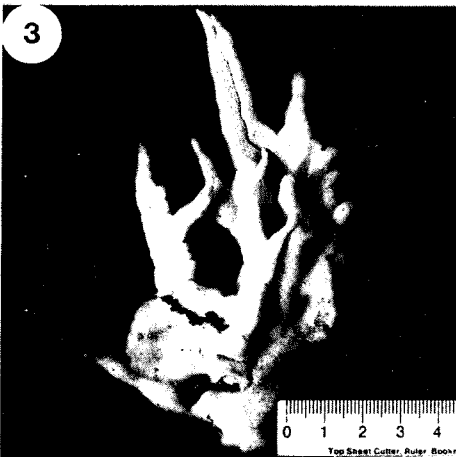
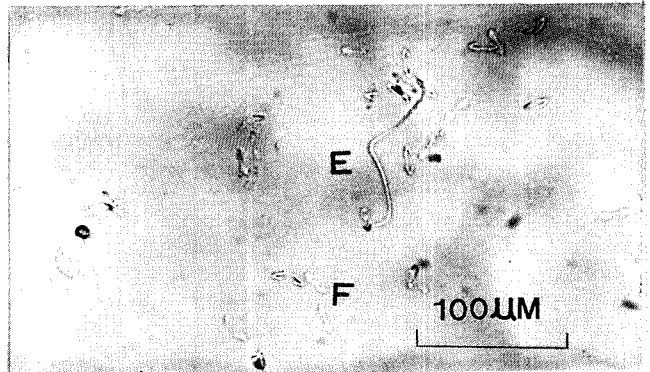
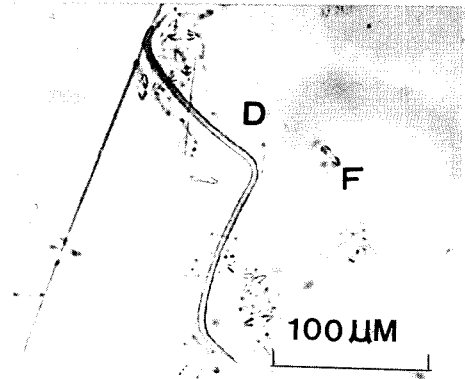
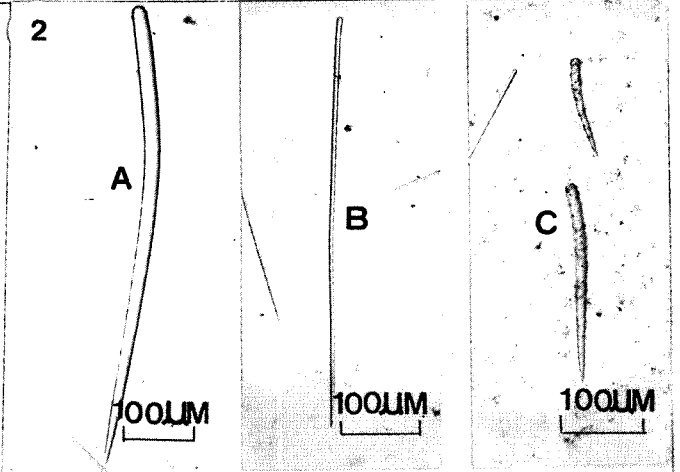
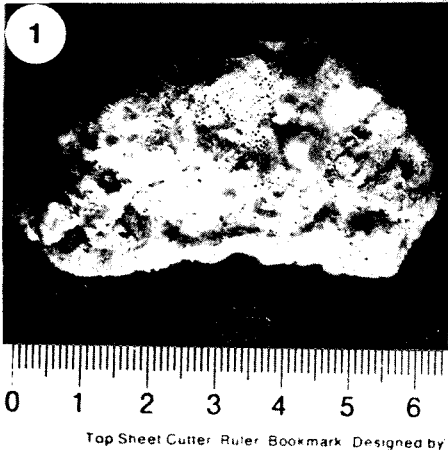


PLATE 5

