Marine Sponges in South Korea (I)

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南韓의 海産 海綿動物의 分類 (I)

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摘 要

著者들이 1956年부터 1967年까지의 期間에 南韓의 海岸 一帶에서 採集한 海綿動物을 同定 分類한 結果 다음과 같이 10科 14屬 17種을 얻었다. 17種中 *Halichondria japonica* Kadota 以外의 16種은 韓國未記錄種이다.

Family Haliclonidae : 1. *Haliclona permollis*; Family Callyspongiidae : 2. *Callyspongia elegans*, 3. *C. ramosa*, 4. *Ceraochalina differentiata*; Family Halichondriidae: 5. *Halichondria japonica*, 6. *H. okadai*, 7. *H. oshoro*, 8. *H. panicea*; Family Suberitidae: 9. *Suberites ficus*; Family Myxillidae : 10. *Myxilla setoensis*, 11. *Lissodendoryx isodictyalis*; Family Ophlitaspongiidae : 12. *Ophlitaspongia noto*, 13. *Mycale plumosa*; Family Ancorinidae : 14. *Penares incrustans*; Family Tethyidae : 15. *Tethya japonica*; Family Grantiidae : 16. *Leucandra tuba*; Family Heteropiidae. 17. *Vosmaeropsis japonica*.

INTRODUCTION

Since only one species, *Halichondria japonica* (Kadota) was reported from Inchun Bay by Kamita and Sato in 1941, no other survey of Korean marine sponge fauna has been done.

The purpose of the present investigation is to classify the marine sponges in South Korea. This paper deals with the sponges obtained by the authors mainly on the coasts of the East Sea, the Korea Strait and the Yellow Sea in South Korea during the period from July 1956 to July 1967. The results of the identification turned out to be 17 species, 14 genera, and 10 families, of which two species are Calcarea and the other fifteen are Demospongiae.

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MATERIALS AND METHODS

The authors had collected sponges from the dead lamellibranch shells, the surfaces of rocks or sea-weeds mainly on intertidal and subtidal zones at 14 localities as is shown in Text-fig. 1. Sometimes woman divers helped them to collect the animals. All the specimens have been preserved in alcohol. All of these specimens are kept in the specimen room of the Department of Biology, Ewha Womans University. For the identificatcn of the animals, spicule mounts of the specimens were prepared according to the following methods:

1. Small pieces of sponges were boiled in 40% KOH

or NaOH solution. 2. Were put on slides thin sections which were cut out from sponges with a blade of safty razor, and then creosorte was droped on the slides to dissolve spongin. 3. Paraffin mounts and microtome sections were made on some specimens. The paraffin was removed by xylene.

The forms and arrangements of spicules were observed and spicules were measured under the microscope. The external appearances and colourations were also observed.

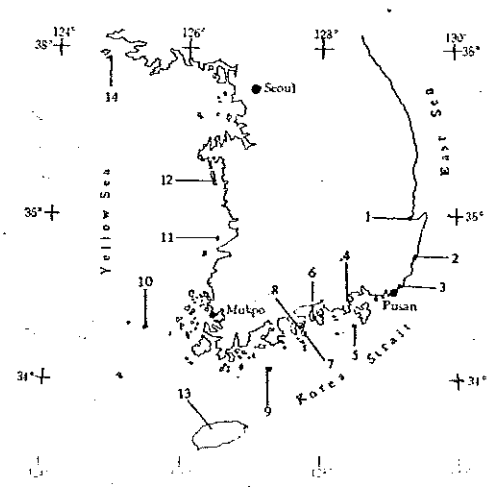

Fig. 1. A map showing localities where the materials were collected by the authors.

1. Pohang (浦 項) 8. Changun-do (將軍島)
2. Pangojin (方魚津) 9. Komun-do (巨文島)
3. Haeundae (海雲台) 10. Tae-Huksan-do (大黑山島)
4. Tangdong (塘 洞) 11. Munyo-do (巫女島)
5. Pijin-do (比珍島) 12. Anmyon-do (安眠峰)
6. Namhae-do(南海島) 13. Cheju-do (濟州島)
7. Tolsan-do (突山島) 14. Taechong-do (大靑島)

DESCRIPTION OF SPECIES

Class Demospongiae

Order Haplosclerina

Family Haliclonidae

1. *Haliclona permollis* (Bowerbank, 1866)
(Pl. 1, Fig. 1; Text-fig. 2)

Isodictya permollis Bowerbank, 1866, p. 278.

Haliclona permollis: Tanita, 1958, p. 130, pl. 1, figs. 3-4, Text-fig. 2; 1961b, p. 338; Tokioka, et al., 1958 p. 218, pl. 109, fg. 4; Utinomi, 1962, p. 2, pl. 1, fig. 10; Little, 1963, p. 40; De Laubenfels, 1961, p. 193.

Material examined: Tangdong, July 8, 1964; Komun-do, Aug. 8, 1965; Tae-Huksan-do, July 10, 1966; Tolsan-do, May 23, 1967; Changun-do, May 24, 1967; Namhae-do, July 19, 1967.

Distribution: Korea Strait; Japan (Matsushima Bay); Friday Harbor; Gulf of Mexico, etc.

Description: The sponge is extremely common and encrusts or grown into a mass, irregular in shape, with numerous pores and oscular tubes, 1cm in height. Osculum is nearly circular with 4mm in diameter. Spicules are oxeote type—cylindrical, slightly bent at the middle and sharply pointed at both ends; size, 80-120μ by 6-9μ.

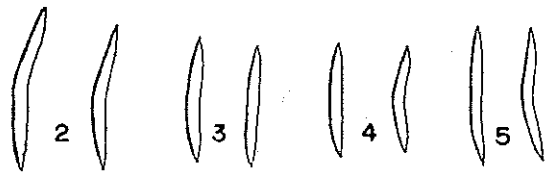

Fig. 2. *Haliclona permollis* (Bowerbank,) Oxeas.
Fig. 3. *Callyspongia elegans* (Thiele), Oxeas.
Fig. 4. *Callyspongia ramosa* (Gray), Oxeas.
Fig. 5. *Ceraochalina differentiata* Dendy, Oxeas.

Family Callyspongiidae

2. *Callyspongia elegans* (Thiele, 1898)
(Pl. 1, Fig. 2; Text-fig. 3)

Spinosella elegans Thiele, 1898, p. 23, pl. 3, fig. 2; pl. 5, fig. 19.

Callyspongia elegans: Tanita, 1965b, p. 46, pl. 1, fig.2.

Material examined: Cheju-do, July 8, 1965; Namhae-do, July 19, 1967.

Distribution; Korea Strait; Japan(Aikawa, Sado Island); Celebes.

Description: The sponge is composed of numerous tubular bodies and the orifice is funnel-shaped. The wall of the tube is 2cm in thickness, and the length of the entire specimen from Cheju-do is 23cm and nearly 25cm in breadth. In dry specimens, pale brownish-yellow in colour.

Spicules are oxeote type—small, straight, curved and slender; size, 80-95μ by 2-4μ.

3. *Callyspongia ramosa* (Gray, 1843)

(Pl. 1, Fig. 3; Text-fig. 4)

Spongia ramosa Gray, 1843, p. 295.

Callyspongia ramosa: Burton, 1934, p. 17, pl. 2, fig. 3; Tanita, 1961b, p. 341, pl. 2, fig. 5.

Material examined: Pijin-do, July 9, 1964.

Distribution: Korea Strait; Japan; New Zealand; Victoria Land; Falkland Islands.

Description: This species has many branches of finger-like shape, branches erect upright from a common base. The surface of the sponge is nearly smooth and oscula are small, round and measuring 1-2mm in diameter. The pores are very small and scattered. The colour in alcohol is yellowish-brown. Spicules are oxeote type; size, 78-80μ by 5μ.

4. *Ceraochalina differentiata* Dendy, 1921

(Pl. 1, Fig. 4; Text-fig. 5)

Ceraochalina differentiata Dendy, 1921, p. 34, pl. 3, fig. 7; pl. 12, fig. 11; Tanita, 1964, p. 17; 1965b, p. 47, pl. 1, fig. 3.

Material examined: Pangojin, July 23, 1963; Pijin-do, July 9, 1964; Haeundae, June 13, 1967.

Distribution: Korea Strait; Japan (Funakawa, Akita Prefecture, Noto-Peninsula); Amirante.

Description: The sponge has short, subcylindrical branches. The oscula are more or less circular openings, these average about 0.5-1 cm in diameter. The colour is light brown in alcohol. Spicules are oxeote type—small, slender; size, 74μ by 4-5 μ.

Order Halichondrina

Family Halichondriidae

5. *Halichondria japonica* (Kadota, 1922)

(Pl. 1, Fig. 5; Text-fig. 6)

Reniera japonica Kadota, 1922, p. 705, fig. 1.

Reniera japonica: Kamita & Sato, 1941, pp. 1-3; Utida, 1956, p. 1681, fig. 4706; Tokioka et al., 1958, p. 218, pl. 109, fig. 11.

Halichondria japonica: Utinomi, 1962, p. 2, pl. 1, fig. 8; Okata et al., 1965, p. 157,

Material examined: Anmyon-do, July 20, 1956; Taechong-do, May 29, 1958; Munyo-do, June 21, 1960; Taehuksan-do, July 20, 1963; Tangdong, July 8, 1964; Komun-do, Aug. 8, 1965; Tolsan-do, May 23, 1967; Haeundae, June 10, 1967; Namhae-do, July 19, 1967.

Distribution: Korea Strait, Yellow Sea; Japan (South of cental part of Honshu).

Description: This species is one of the most common species in the demosponges, an irregular massive body, and numerous vents. The oscula are nearly circular with 2-3mm in diameter. The colour is orange in living. Spicules are style type; size, 238-343μ by 13.2μ.

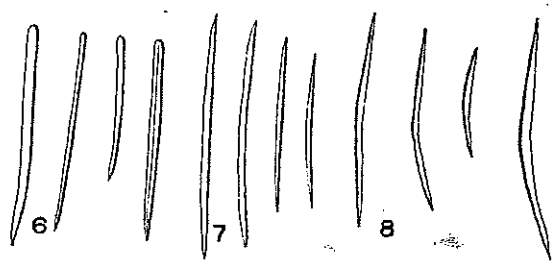

Fig. 6. *Halichondria japonica* (Kadota), Styles.
Fig. 7. *Halichondria okadai* (Kadota), Oxeas.
Fig. 8. *Halichondria oshoro* Tanita, Oxeas.

6. *Halichondria okadai* (Kadota, 1922)

(Pl. 1, Fig. 6; Text-fig. 7)

Reniera okadai Kadota, 1922, pp. 704-705, fig. 2.

Reniera okadai: Utida, 1965, p. 1681, fig. 4707.

Halichondria okadai: Okata et al., 1965, p. 157.

Material examined: Tolsan-do, May 23, 1967; Namhae-do, July 20, 1967.

Distribution: Korea Strait; Japan.

Description: The species is irregular in shape. The oscula open on the upper side of the body, with 2-3mm in diameter. The colour is black in living. The spicules are long oxeote type; size, 145-396μ by 5-11μ.

7. *Halichondria oshoro* Tanita, 1961

(Pl. 2, Fig. 7; Text-fig. 8)

Halichondria oshoro Tanita, 1961a, pp. 185-186, text-figs. 3-4.

Material examined: Tolsan-do, May 22, 1967 Namhae-do, July 20, 1967.

Distribution: Korea Strait; Bristol Bay.

Description: The species is cylindrical and some amorphous in shape. The surface of the sponge is uneven, very minutely hispid, with more or less circular, oscula scattered irregularly all over the surface. The colour is yellowish-green in living. Spicules are oxeote type; size, 238-396μ by 4-13μ.

8. *Halichondria panicea* (Pallas, 1766)

(Pl. 2, Fig. 8; Text-fig. 9)

Spongia panicea Pallas, 1766, p. 388.

Halichondria panicea: Tanita, 1958, p. 134-135, pl. 3, figs. 12-15, text-fig. 6; Little, 1963, p. 51.

Material examined: Pohang, July 21, 1963; Komun-do, Aug. 8, 1965; Tolsan-do, May 23, 1967; Changun-do, May 24, 1967; Haeundae, June 10, 1967; Namhae-do, July 19, 1967.

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

Description: The species is the most abundant. It is an amorphous mass in shape. The osculum is nearly circular or elliptical in shape with diameter of 0.4-0.6 mm. The colour in living is yellow. Spicules are oxeote type; size, 303-396μ by 11μ.

Order Hadromerina

Family Suberitidae

9. *Suberites ficus* (Johnston, 1842)

(Pl. 2, Fig. 9; Text-fig. 10)

Halichondria ficus Johnston, 1842, p. 144.

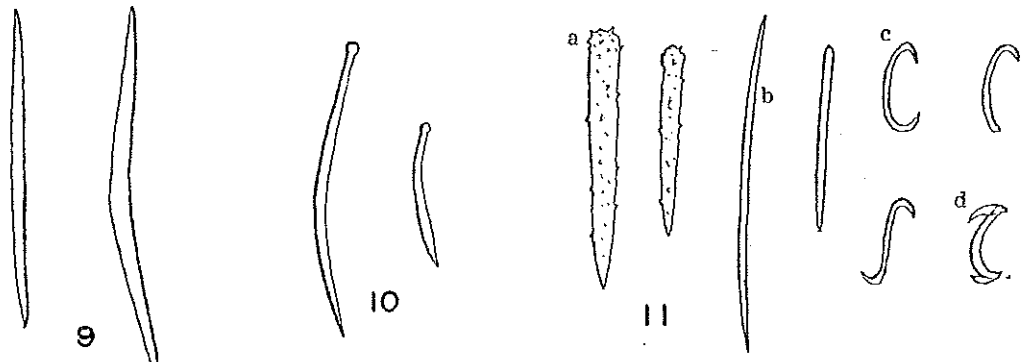

Fig. 9. *Halichondria panicea* (Pallas), Oxeas. Fig 10. *Suberites ficus* (Johnston), Tylostyle. Fig. 11. *Myxilla setoensis* Tanita, a. Acanthostyles; b. Tornota; c. Sigma. d. Isochelas

Suberites ficus: Hartman, 1958, pp. 3-16; Tanita, 1955 a, pp. 95-97.

Material examined: Haeundae, June 14, 1967; Cheju-do, July 11, 1965.

Distritution: Korea Strait; Japan(Hakotate, Sendai Bay, Sagami Bay etc.); etc.

Description: The sponge is more or less flat and irregular mass in shape, has some leaf-like projections. It has a large hole, 11.5 x 10mm, from Cheju-do, and 22 x 15mm, from Haeundae in diameter, in which a *Pagurus pectinatus* lives. There are 5 pores on the opposite side of the large hole. The largest pore is 3mm in diameter. The colour is gray. Size of this sponge is 38×52×25.5 mm. Spicules are tylostyle; size, 290μ by 6.6μ.

Order Poecilosclerina

Family Myxillidae

10. *Myxilla setoensis* Tanita, 1961

(Pl, 2, Fig. 10; Text-fig. 11)

Myxilla setoensis Tanita, 1961b, pp. 342-343, pl. 3, fig. 9; Okata, 1963, p. 160.

Material examined: Pangojin, July 23, 1963.

Distribution: Korea Strait; Japan (the Inland Sea of Seto).

Description: This species consists of a large, bread, very much flattened lamella and several digitate branches. The surface of the sponge is very minutely hispid. The colour is pale brown in dry state. Spicules are acanthostyles, size, 150-200μ by 8-10μ; tornota, 145-190μ by 3-5μ; sigma, 55-60μ by 2-2.5μ; isochela, 30-35μ.

11. *Lissodendoryx isodictyalis* (Carter, 1882)

(Pl. 2, Fig. 11;Text-fig. 12)

Halichondria isodictyalis Carter, 1882, p, 285.

Lissodendoryx isodictyalis: Hartman, 1958, pp. 41-42, pl. 4, fig. 12, text-fig. 11.

Material examined: Tolsan-do, May 23, 1967; Namhae-do, July 18, 1967.

Distribution: Korea Strait; North-America; Caribbean Sea.

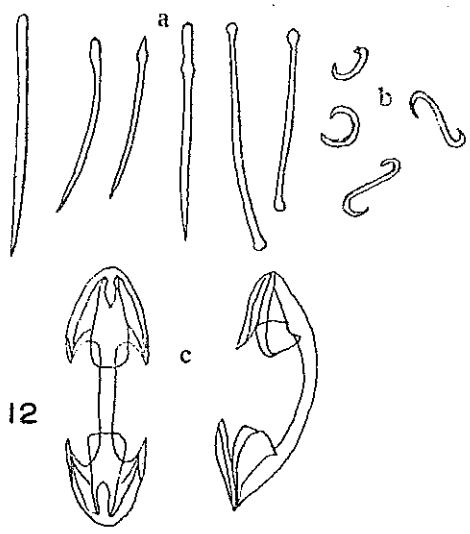

Fig. 12. *Lissodendoryx isodictyalis* (Carter).
a. Styles and Tylotes; b. Sigmas; c. Isochelas

Description: The species is elongate encrustation in shape. The colour in living is pale olive. The surface is raised into numerous low knob-like projections. The oscula are about 0.5mm in diameter.

Spicules are style, size, 140-160μ by 3-6μ; tylote, 165-180μ by 3-5 μ; sigma, 20μ in length; isochela, 15-30μ in length.

Family Ophlitaspongiidae

12. *Ophlitaspongia noto* Tanita, 1963

(Pl. 3, Fig. 12; Text-fig. 13)

Ophlitaspongia noto Tanita, 1963, pp. 124-125, pl. 4, fig. 3, text-fig. 3; 1954, p. 17, pl. 1, fig. 4, 1965b, p. 48; Okata, 1963. p. 160.

Material examined: Changun-do, May 24, 1967; Namhae-do, July 22, 1967.

Distribution: Korea Strait; Japan (Aikawa, Sado Island, Noto-peninsula).

Description: The species is encrusting, roughly squarish in shape, with 4.5×5cm in extension and 5-7mm in thickness. The oscula, which are 2 to 3mm in diameter, are usually on raised processes, and several radiating grooves placed around each osculum. The surface is seen superficially velvety, the colour in living is red.

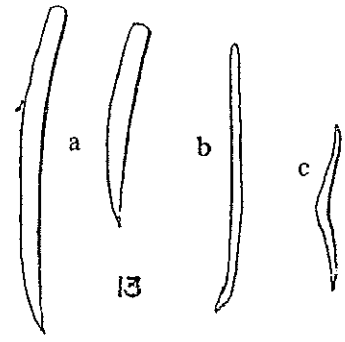

Fig. 13. *Ophlitaspongia noto* Tanita.
a. Styles; b. Slender style; c. Toxas.

Spicules are style, size, 303μ by 24μ; slender style, 238-264μ by 2 μ; toxa, 66μ by 3μ.

13. *Mycale plumosa* (Carter, 1882)

(Pl. 3, Fig. 13, Text-fig. 14)

Esperia plumosa Carter, 1882, p. 299.

Mycale plumosa: Tanita, 1958, p. 133, pl. 2, figs. 10-11, text-fig. 5.

Material examined: Namhae-do, July 20, 1967.

Distribution: Korea Strait; Japan (Matsushima Bay); Indian Ocean.

Description: The sponge is irregular and encrusting. The surface is irregular cactus-form. The colour in living is yellowish gray. Spicules are style, 240-350μ by 8-9 μ; sigma, 30-70μ in length; anisochela, 40-50μ in length.

Order Tetractinellida

Family Ancorinidae

14. *Penares incrustans* Tanita, 1963

(Pl. 3, Fig. 14; Text-fig. 15)

Penares incrustans Tanita, 1963, pp. 127-128, pl. 4, fig. 6, text-fig. 5.

Material examined: Namhae-do, July 19, 1967.

Distribution: Korea Strait; Japan (Noto-peninsula).

Description: The sponge is encrusting and irregular comma in shape. There are numerous folds on the upper surface of the sponge. The oscula are slit-like or circular in outline. The colour of the surface is violet, but the inner part of the sponge is brown in alcohol.

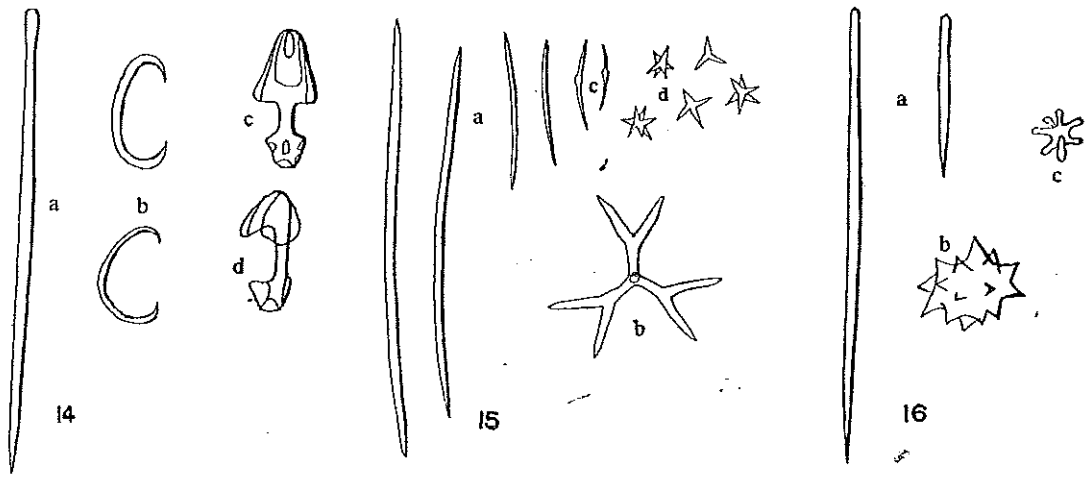

Fig. 14. *Mycale plumosa* (Carter), a. Style; b. Sigmas; c. Anisochela; d. Anisochela (side view).

Fig. 15. *Penares incrustans* Tanita, a. Oxeas; b. Dichotriaen; c. Microoxeas; d. Oxyasters.

Fig. 16. *Tethya japonica* Sollas, a. Styles; b. Spheraster; c. Strogylaster.

Spicules are oxeote, 726μ by 13.2μ; dichotriaen, 450μ by 30μ; microxeote, 70–130μ by 3–6μ; oxyaster, 39.6μ.

Family Tethyidae

15. *Tethya japonica* Sollas, 1888

(Pl. 3, Fig. 15; Text-fig. 16)

Tethya japonica Sollas, 1888, p. 25.

Tethya japonica: Tanita, 1964, p. 19, pl. 1, fig. 8, text-fig. 3.

Material examined: Namhae-do, July 18, 1967.

Distribution: Korea Strait; Japan; Indian Ocean; Malaysia; Java; Philippine.

Description: The sponge is hemi-spherical in shape with small distinct osculum in the upper surface. The sponge is 11mm in height and 14×17mm in widths. The colour is yellowish-green in living. Spicules are style, size, 792–1188μ by 13.2–19.8μ; spheraster, 40μ; strongylaster, 10μ.

Class Calcarea

Order Heterocoela

Family Grantiidae

16. *Leucandra tuba* Hozawa

(Pl. 3, Fig. 16; Text-fig. 17)

Leucandra tuba: Hozawa, 1940, pp. 69–70, text-figs. 120–121.

Material examined: Cheju-do, July 8, 1965.

Distribution: Korea Strait; Japan (Okinoshima of Kyushyu).

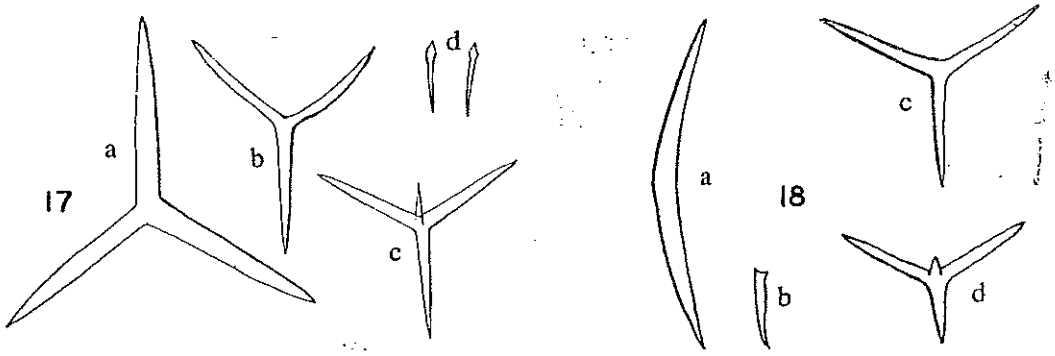

Fig. 17. *Leucandra tuba* Hozawa, a, b. Triaxon; c. Tetraxon; d. Small styles.

Fig. 18. *Vosmaeropsis japonica* Hozawa, a. Large oxeote; b. Small oxeote; c. Triaxon; d, Tetraxon,

Description: The sponge is very hard and massive, has some tubes. An osculum is opened on the tip of some tubes. The colour is grey in alcohol. Spicules are triaxon, tetraxons, small style.

Family Heteropiidae

17. *Vosmaeropsis japonica* Hozawa

(Pl. 3, Fig. 17; Text-fig. 18)

Vosmaeropsis japonica: Hozawa, 1940, p. 47, text-figs. 78-79.

Material examined: Namhae-do, July 19, 1967.

Distribution: Korea Strait; Japan (Sagami Bay).

Description: The sponge is more or less hemi-spherical. One side is concave. There is only one hemi-spherical osculum, 0.5mm in diameter, at the center of the concave side. The colour of surface is deep brown in living. Spicules project out. Spicules are large oxeas, small oxeas, triaxon, tetraxon.

SUMMARY

During the period from July 1956 to July 1967, authors collected marine sponges from the East sea, the Korea Strait and the Yellow sea. The results of the identification turned out to be 17 species, 14 genera and 10 families. The species are *as follows:* Family Haliclonidae: 1. *Haliclona permollis;* Family Callyspongiidae: 2. *Callyspongia elegans,* 3. *C. ramosa,* 4. *Ceraochalina differentiata;* Family Halichondriidae: 5. *Halichondria japonica,* 6. *H. okadai,* 7. *H. oshoro,* 8. *H. panicea;* Family Suberitidae: 9. *Suberites ficus;* Family Myxillidae: 10. *Myxilla setoensis,* 11. *Lissodendoryx isodictyalis;* Family Ophlitaspongiidae: 12. *Ophlitaspongia noto,* 13. *Mycale plumosa;* Family Ancorinidae: 14. *Penares incrustans;* Family Tethyidae: 15. *Tethya japonica;* Family Grantiidae: 16. *Leucandra tuba;* Family Heteropiidae: 17. *Vosmaeropsis japonica.*

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Plate 1

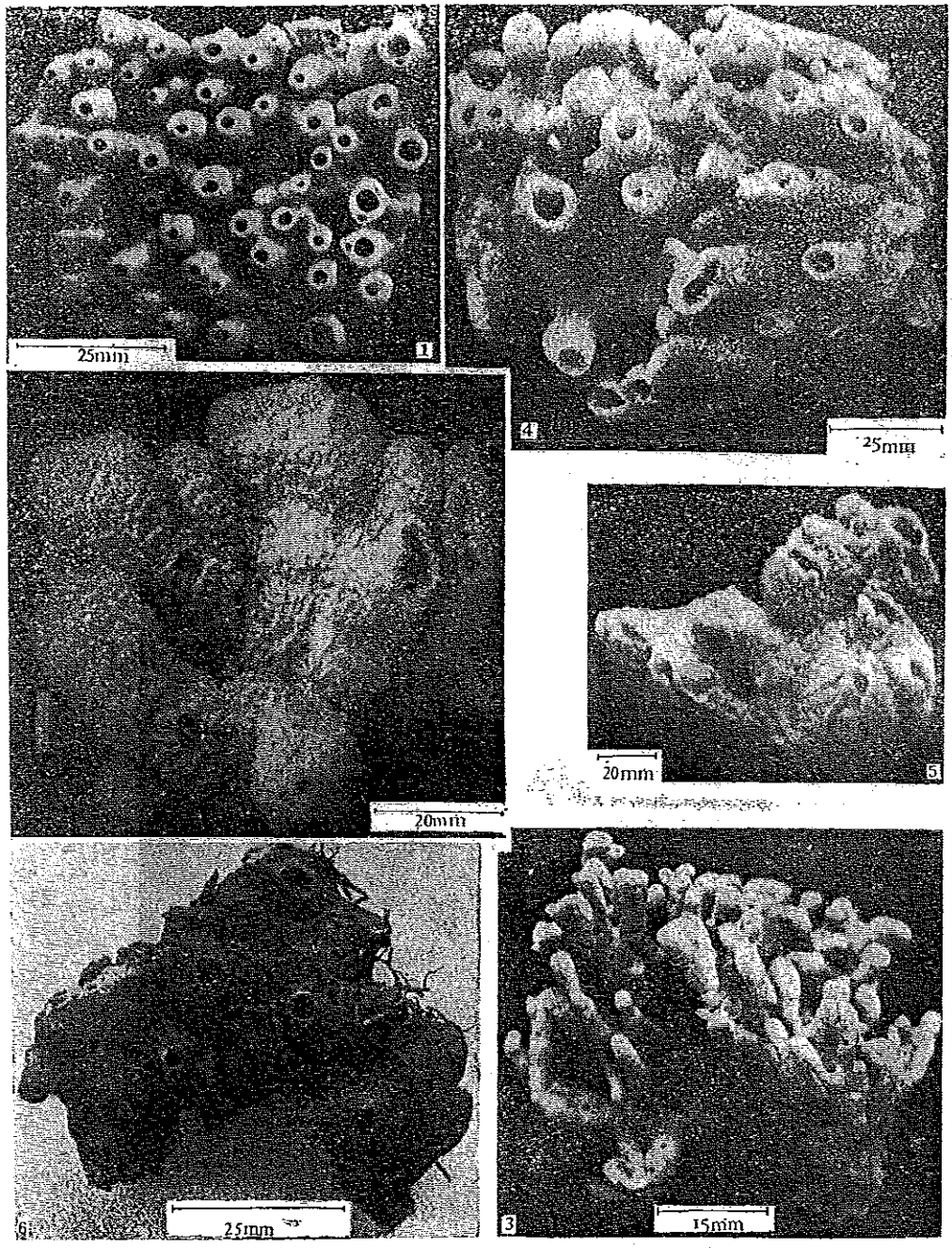

Fig. 1. *Haliclona permollis* (Bowerbank)
Fig. 2. *Callyspongia elegans* (Thiele)
Fig. 3. *Callyspongia ramosa* (Gray)
Fig. 4. *Ceraochalina differentiata* Dendy
Fig. 5. *Halichondria japonica* (Kadota)
Fig. 6. *Halichondria okadai* (Kadota)

Plate 2

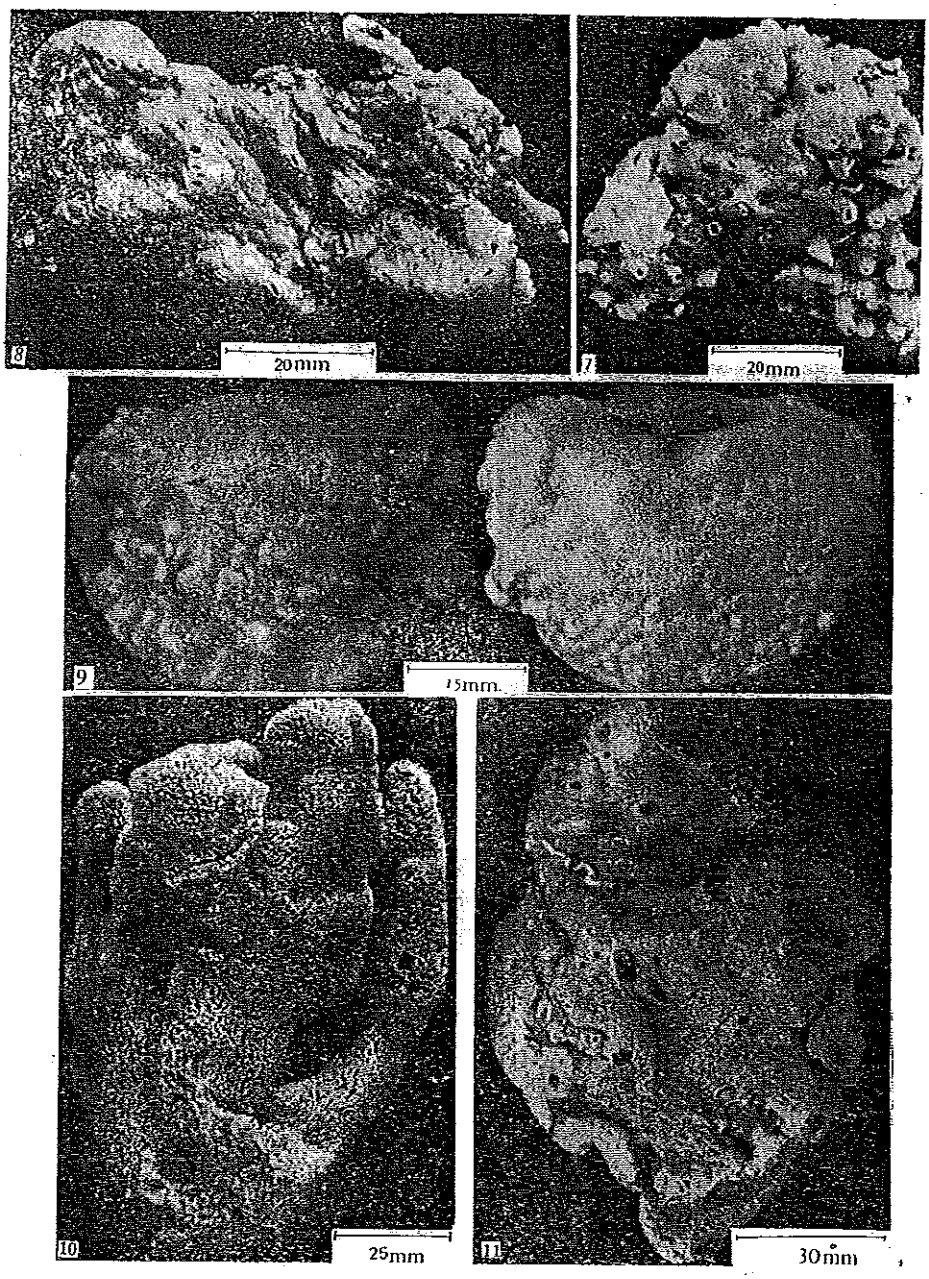

Fig. 7. *Halichondria oshoro* Tanita
Fig. 8. *Halichondria panicea* (Pallas)
Fig. 9. *Suberites ficus* (Johnston)
Fig. 10. *Myxilla setoensis* Tanita
Fig. 11. *Lissodendoryx isodictyalis* (Carter)

Plate 3

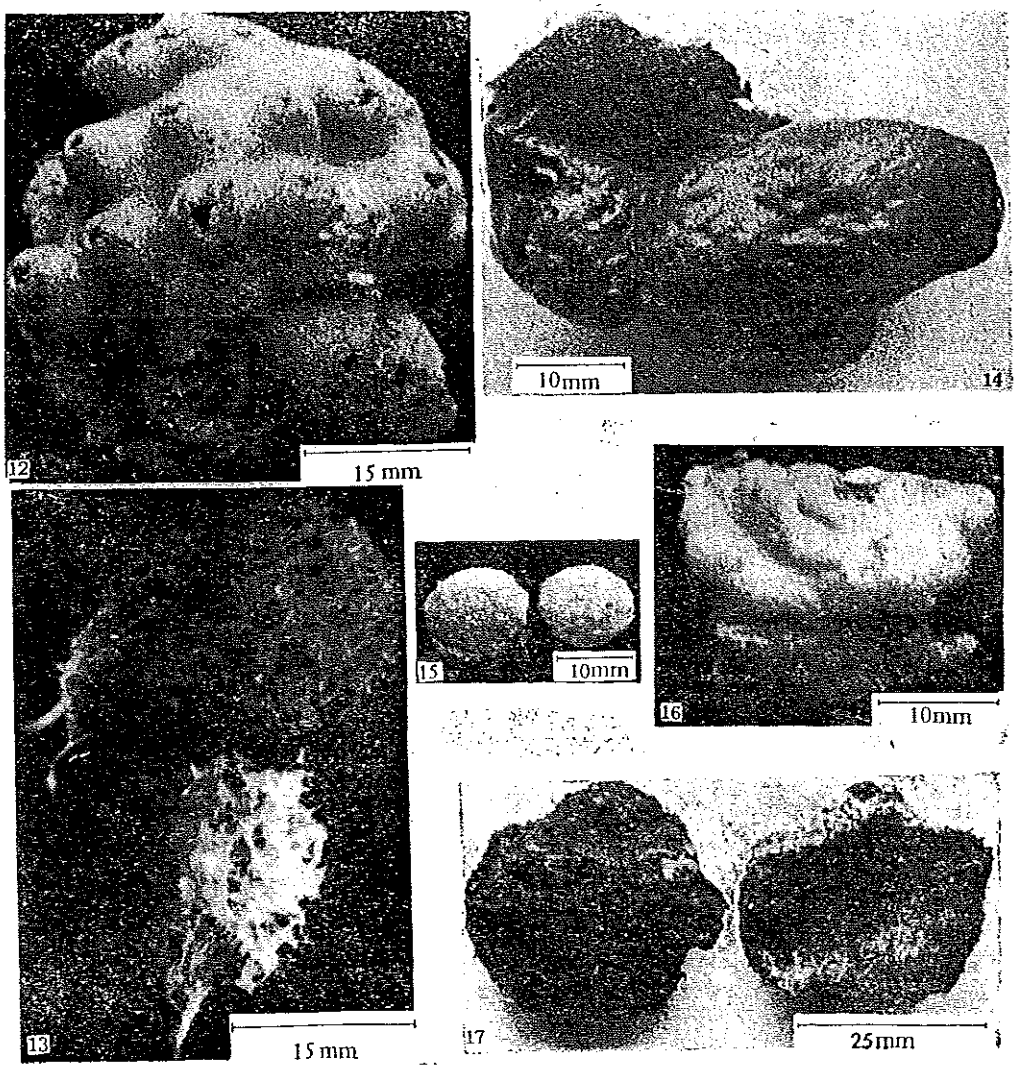

Fig. 12. *Ophlitaspongia noto* Tanita
Fig. 13. *Mycale plumosa* (Carter)
Fig. 14. *Penares incrustans* Tanita
Fig. 15. *Tethya japonica* Sollas
Fig. 16. *Leucandra tuba* Hozawa
Fig. 17. *Vosmaeropsis japonica* Hozawa