

REPORT ON THE NON-CALCAREOUS SPONGES IN THE
MUSEUM OF THE BIOLOGICAL INSTITUTE OF
THE TOHOKU UNIVERSITY. PART II.

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Our knowledge on the sponge-fauna of the Japan Sea is extremely deficient. This deficiency seems to be due to the few investigations rather than to the actual scarcity of the sponges. In 1940, the late Prof. Hozawa reported five species of Calcarea from the Noto peninsula, but there are no records on the Demosponges from the Japan Sea, except for the only report by Burton. Burton reported 41 species from the Japan Sea in 1935, but his samples were all from the coast of north Siberia.

The present paper is the second report of a series on the sponges in the collection of the Museum of the Biological Institute of the Tohoku University. This is a report on a collection of sponges made along the east coast of the Noto peninsula by Prof. Ueki of the Toyama University and of several specimens obtained by Mr. Namiyoshi of Ushitsu using a trawl-net. There can be no doubt that the present collection was obtained from shallow or moderately shallow water, although there are no depth records. In addition to those treated herein, many species are expected from the deeper waters off shore and the shallow-waters along the western part of the Peninsula.

The collection is of interest owing to that it is the first record of sponges from this particular locality. The collection includes eight species as discussed in the following pages, and five of these are described for the first time.

The following is the list of the identified species described in the present paper;

SYSTEMATIC LIST OF SPECIES

Class Demospongiae

Order Poecilosclerina.

Family Adocidae

- 1. *Petrosia ushitsuensis*, n. sp.

Family Tedaniidae

- 2. *Acarinus tenerus*, n. sp.

Family Microcionidae

- 3. *Clathria fasciculata* Wilson

Family Ophlitaspongiidae

- 4. *Ophlitaspongia noto*, n. sp.

Order Halichondrina

Family Halichondriidae

5. *Halichondria panicea* (Pallas)

Order Hadromerina

Family Suberitidae

6. *Suberites japonicus* Thiele

Order Tetractinellida

Family Ancorinidae

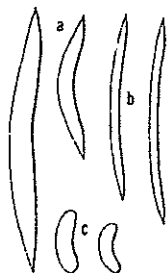
7. *Stelletta solida*, n. sp.8. *Penares incrustans*, n. sp.

DESCRIPTION OF THE SPECIES

1. *Petrosia ushitsuensis*, n. sp.

(Pl. IV, fig. 1; text-fig. 1)

This new species is based upon a single specimen (Pl. IV, fig. 1) obtained by a trawl-net off Ushitsu, Noto Peninsula, in 1933. The sponge represents an irregular massive body with six short, stout branches, three of which terminals are round but the others were broken off. The sponge measures 55 mm in breadth and 30 mm in height. The oscula are circular in shape with diameters of 1.5–4 mm. The dermal surface is nearly smooth but uneven. The gastral cavity is relatively narrow and 2–4 mm in diameter. The colour in the preserved state in formalin is pale brown and the texture is hard and stony.



Text-fig. 1. *Petrosia ushitsuensis*, n. sp.
a, stout oxeas; b, slender oxeas; c, strongyles. All. $\times 100$.

The skeleton is that of a typical *Petrosia*. There appears to be no spongin. The main skeleton is very dense, confused reticulation of the stout megascleres, separate and in bundles, intermingled with a fewer number of slender and microstrongyles. The dermal skeleton is a confused reticulation of slender megascleres arranged tangentially.

Spicules (Text-fig. 1):— Megascleres are of two kinds. 1) Stout oxea (a) of main skeleton are of varying sizes, sharply and rather abruptly pointed at each end, slightly or sometimes quite strongly curved, measuring $160\text{--}310 \times 20\text{--}23\mu$. 2) Slender oxea (b) slightly curved, gradually and sharply pointed at each end, measuring $120\text{--}200 \times 4\text{--}8\mu$.

Microsclere is of one kind, strongyles (c), bean-shaped, slightly curved, rounded

at each end, measuring $30-70 \times 9-13\mu$.

Locality:—Off Ushitsu, Noto Peninsula.

Remarks:—This species seems to be well characterized by its external features, by the differentiation of its oxea into two distinct categories, and by the presence of bean-shaped microstrongyles.

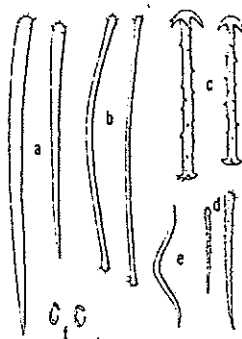
2. *Acarnus tenerus*, n. sp.

(Pl. IV, fig. 2; text-fig. 2)

This new species is represented in the collection by three specimens. They were obtained by Prof. Ueki in August, 1933 from the east coast of Noto Peninsula. All of them are nearly the same in shape and structures.

The largest specimen (pl. IV, fig. 2) which is taken for the type, shows an oval mass, more or less dorso-ventrally compressed and growing among sea weeds, *Laurencia* sp. The sponge measures 50×40 mm in diameter and 20 mm in height. The surface of the sponge is very rough owing to the presence of sea weeds; oscula and pores inconspicuous. The colour in formalin is dull reddish brown and the texture is slightly soft and resilient.

Text-fig. 2. *Acarnus tenerus*, n. sp.
a, styles; b, tylota; c, cladotylota; d, echinating
acanthostyles; e, toxa; f, isochelas. a~e $\times 100$,
f $\times 160$.



The dermal skeleton is composed of slender tylotes arranged tangentially. The main skeleton consists of numerous slender, multispicular fibres running for the most part at right angles to the surface and branch on their way to the surface. These spiculofibres are echinated densely by cladotylotes and small acanthostyles, which usually project more or less at right angles from the surface of the fibre. Microscleres and a few megascleres occur scattered between the fibres.

Spicules (Text-fig. 2):—1) Styles (a) straight or slightly curved, tapering gradually from base to sharply pointed apex, minutely and sparingly spined at the base, measuring $260-340 \times 8-10\mu$.

2) Tylota (b) long, slender, straight or slightly curved, with well-developed oval heads which are very minutely spined; size $180-320 \times 2.5-5\mu$.

3) Cladotylota (Grapple spicules) (c) straight, nearly equally thick throughout the length. Apex with four strongly recurved, sharp hooks; shaft covered with short, sharp, mostly recurved thorn-like spines; base with four or five

larger spines curved towards the apex; measuring $130-190 \times 5-6 \mu$.

4) Echinating acanthostyles (d) straight, sharply pointed, covered with small spines, measuring $80-130 \mu$ long and $4-6 \mu$ thick exclusive of spines.

5) Texas (e) smooth, strongly arcuate, sharply pointed at each end, size $70-110 \times 2 \mu$.

6) Isochelas (f) very minute, ^{palmate}plante, "navicular", $12-14 \mu$ long.

Locality:—East coast of Noto Peninsula.

Remarks:—This new species is easily distinguished from other members of the genus by the external form and by the presence of echinating small acanthostyles.

3. *Clathria fasciculata* Wilson

Clathria fasciculata, Wilson (1925) p. 442, pl. 42, fig. 6; pl. 49, figs. 7, 8.

I identify with this species a single specimen in the collection which was obtained by Prof. Ueki from the east coast of Noto Peninsula in 1933. It is a long, slender body with a few branches near the base which anastomose roughly, measuring about 130 mm long and about 8 mm thick. The colour in formalin is greyish brown and the texture is elastic.

As the species has already been fully described by Wilson, no further details are necessary with regard to the skeletal structure or to the spicules.

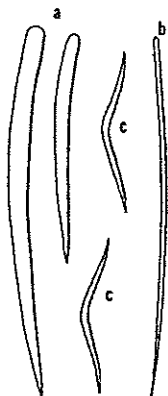
Previously known distribution:—Togian Bay, Celebes.

Locality:—East coast of Noto Peninsula.

4. *Ophlitaspongia noto*, n. sp.

(Pl. IV, fig. 3; text-fig. 3)

This new species is based upon two specimens in the collection secured by Prof. Ueki in August, 1933 from the east coast of Noto Peninsula.



Text-fig. 3. *Ophlitaspongia noto*, n. sp.
a, styles $\times 75$; b, slender style $\times 75$; c, toxas $\times 160$.

The larger specimen (Pl. IV, fig. 3) which has been taken as the type is encrusting, roughly squarish in shape, 61×37 mm in size with the thickness of 5-7 mm. The oscula, which are 2 to 3 mm in diameter, are usually on raised processes, several radiating grooves placed around each osculum as a focal point. The surface of the

sponge is minutely hispid. The dermal membrane thin and transparent, so that the surface is seen superficially velvety. The colour in formalin is yellowish brown and the texture is firm, slightly brittle.

The skeleton is composed of ascending pulmose fibres, cored by smooth styles, connected irregularly with each other by ill-defined spicular tracts. At the surface these make an extensive brush.

Spicules (Text-fig. 3):—1) Styles (a) smooth, slightly curved, tapering gradually to a sharp point, measuring $270-440 \times 18-28\mu$.

2) Raphides or slender styles (b) not common, very sharply pointed at one end, measure $200-230 \times 2\mu$.

3) Texas (c) numerous, smooth, sharply pointed at each end, size $65-80 \times 3\mu$.

Locality:—East coast of Noto Peninsula.

5. *Halichondria panicea* (Pallas)

Spongia panicea, Pallas (1766) p. 388.

Amorphina panicea, Schmidt (1870) p. 77; Fristedt (1887) p. 421.

Amorphina megalorhaphis, Carter (1881), p. 368; Ridley (1884), p. 416; (1885) p. 571.

Halichondria panicea, Johnston (1842) p. 114, pl. 10, pl. 11, figs. 5, 6; Ridley & Dendy (1887) p. 2, pl. 2, figs. 2, 3; Dendy (1905) p. 146; (1916) p. 112; (1921) p. 37; Babić (1922) p. 220, text-fig. B; Lambe (1893) p. 25; (1896) p. 182; Brøndsted (1924) p. 451; Wilson (1925) p. 394; Hentschel (1929) p. 902; p. 990; Burton (1929) p. 421; (1932) p. 199, Pl. 7, figs. 5-9; (1934) p. 13; (1934) p. 43; (1935) p. 75; Arndt (1935) p. 103, fig. 221; de Laubenfels (1932) p. 56, fig. 28; (1936) p. 449; (1949) p. 17, figs. 14, 15; Tanita (1958) p. 134, pl. 3, figs. 12-15, text-fig. 6.

This cosmopolitan species is represented in the collection by four specimens, one of which was obtained by a trawl-net off Ushitsu by Mr. Namiyoshi and the remaining three were collected by Prof. Ueki from the east coast of Noto Peninsula. All of them are alike in appearance and structure, but the colour varies from dull white to purplish brown in the preserved state in alcohol or in formalin. The largest specimen is an amorphous mass with flabellate habits having several oscula on the upper ridges of the body. It measures 70 mm in maximum breadth and 25 mm in height.

Previously known distribution:—Cosmopolitan.

Locality:—East coast of Noto Peninsula.

6. *Suberites japonicus* Thiele

(Pl. IV, fig. 4)

Suberites japonicus, Thiele (1898) p. 39, pl. 1, fig. 13, 14; pl. 8, fig. 9.

The one specimen in the collection is referable to this species. It was obtained by Prof. Ueki from the east coast of Noto Peninsula in 1933.

The sponge (Pl. IV, fig. 4) is irregularly flattened massive, consists of two kidney-like lobes, with uneven, very slightly hispid surface. The basal part of a

lobe is perforated by three large, irregular holes. Irregularly scattered over the surface are several small, more or less circular openings, which are regarded as the oscula and average in diameter about 1.5 mm. The colour in formalin is pale brown and the texture is slightly elastic. It measures 77 mm in length, 45 mm in breadth and 27 mm in the greatest thickness.

The skeleton is composed of irregular, densely aggregated tylostyles, with apices directed towards the surface. Tylostyles are of two sizes, the larger, constituting the main skeleton, measure $460-980 \times 10-15\mu$ and the smaller, mainly found in the dermal portion, $230-380 \times 5-10\mu$.

Previously known distribution:—Off Enoshima, Sagami Bay.

Locality:—East coast of Noto Peninsula.

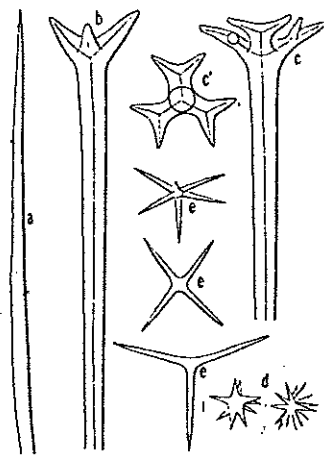
Remarks:—This species was first described by Thiele (1898) based upon two specimens obtained by Döderlein and Hilgendorff from the Sagami Sea. This is the second report of this species from Japan.

7. *Stelletta solida*, n. sp.

(Pl. VI, fig. 5; text-fig. 4)

This new species is based upon a single specimen which was obtained by a trawl-net from off Ushitsu by Mr. Namiyoshi in September, 1933.

The sponge (Pl. IV, fig. 5) is a massive block, attaching by its base to some bivalves, but the upper half of the body has been cut off and therefore the choanosome is naked. The surface of the sponge is even, but not smooth, hispid due to the projecting oxeas. Vents and pores inconspicuous. The ectosome is very sharply differentiated from the underlying choanosome and thus it forms a distinct cortex. It measures 33mm in breadth, 20 mm in height and 25 mm in thickness.



Text-fig. 4. *Stelletta solida*, n. sp.
a, oxea $\times 40$; b, plagiotriaene $\times 40$; c, c', dichotriaenes $\times 40$; d, spherasters $\times 300$; e, oxyasters $\times 300$.

The colour of the ectosome in formalin is nearly white but the choanosome is pale brown. The texture is firm owing to the distinct cortex having 2 mm in thickness but that of the choanosome is slightly cavernous, soft and elastic.

The skeleton of the dermal cortex consists mainly of large dichotriaenes and plagiotriaenes, intermingled with oxeas. These spicules are radially arranged towards the surface, lying for the most part in the cortex, with the cladi at or near the surface. The cladi of the dichotriaenes are for the most part extended at the surface of the sponge, but do not project beyond it, those of plagiotriaenes lie somewhat deeper in the cortex. The ends of oxeas project beyond the surface. The surface of the cortex is covered densely with numerous microscleres. In the choanosome, there are no triaenes, megascleres being oxeas.

The skeleton in the interior of the sponge is loose and irregular, composed principally of large, scattered oxeas, not arranged in definite fibres. Towards the surface the spicules tend to accumulate into fibres which end in dense brushed form, composed almost entirely of dichotriaenes and plagiotriaenes. The microscleres are abundant in the choanosome.

Spicules (Text-fig. 4):—1) Oxeas (a) long, slender, sharply pointed at both ends, measuring $1500-3000 \times 30-45 \mu$.

2) Plagiotriaenes (b), with short, conical, sharply pointed, slightly incurved cladi; and very long, stout, straight rhabdome, tapering gradually to a sharp point. Rhabdome about 2000μ by $65-75 \mu$; cladi about 80μ long.

3) Dichotriaenes (c, c'); rhabdome long, stout, tapering very gradually to a sharp apex, nearly straight, measuring $2000-2200 \times 65-75 \mu$. Cladi stout, bifurcating near the middle, conical, sharply pointed; protocladi measure $60 \times 40-45 \mu$ and deuterocladi about 70μ long.

4) Spherasters (d); with small centrum and about a dozen or more short slender rays; total diameter about 15μ . Characteristic of the dermal crust, very numerous, but in choanosome decrease in number.

5) Oxyasters (e); with three to six rays, long, slender, sharply pointed rays, total diameter $30-50 \mu$. Characteristic of the interior.

Locality:—Off Ushitsu, Noto Peninsula.

8. *Penares incrustans*, n. sp.

(Pl. IV, fig. 6; text-fig. 5)

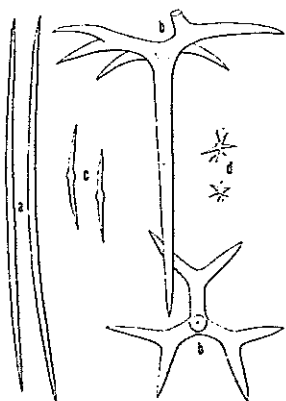
This new species is based upon a single specimen (Pl. IV, fig. 6) secured by Prof. Ueki in August of 1933 from the east coast of Noto Peninsula.

The sponge is encrusting, irregular comma-shaped, measures 65 mm in length, 50 mm in the greatest breadth and 17 mm in thickness. There are numerous folds on the upper surface of the sponge which run irregularly and several oscula are scattered singly among them. Oscula slit-like or circular in outline and measure 1-2 mm in diameter. Surface sections show the dermal pores to be thickly and evenly distributed all over, each of them is circular in outline and about 40μ in diameter. The colour of the surface is blackish brown but the interior of the sponge is brown in the preserved state. The texture is tough and leathery.

The ectosome of the sponge consists of a densely felted mass of microxeas, containing also the cladi of the dichotriaenes. The cladi of the dichotriaenes are for

the most part extended at the surface of the sponge. The skeleton of the choanosome is composed of loose and irregular scattered oxeas, with a tendency to collect into very ill-defined bundles, radiating towards the surface and intermingled with the rhabdomes of the dichotriaenes. Immediately beneath the cortex lie the cladi of dichotriaenes whose rhabdomes are directed centripetally. Numerous microscleres scattered in the tissues among the spicules.

Spicules (Text-fig. 5):—1) Oxeas (a) fusiform, straight or slightly curved, smooth, gradually and fairly sharply pointed at each end, measuring $500-820 \times 10-15\mu$.



Text-fig. 5. *Penares incrustans*, n. sp.
a, oxeas $\times 50$; b, dichotriaenes $\times 50$; c, microxeas
 $\times 110$; d, oxyasters $\times 110$.

2) Dichotriaenes (b); stout, with rather short rhabdome, tapering gradually to a fairly sharp point, measuring $670-710 \times 50-60\mu$. The cladi outspread at nearly right angles to the rhabdome, point of bifurcation usually about the middle, protocladi measure 120μ , deuterocladi conical, sharply pointed, measuring $130-140\mu$.

3) Microxeas (c), slightly curved, equally sharply pointed both ends, variable in length, centrotylote, measure $40-110 \times 2-4\mu$.

4) Oxyasters (d) with few, slender, sharply pointed rays; total diameter $15-20\mu$. Characteristic of the interior.

Locality:— East coast of Noto Peninsula.

LITERATURES

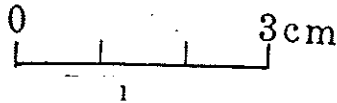
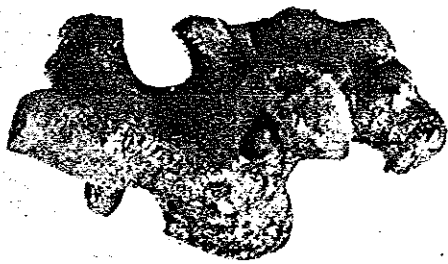
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EXPLANATION OF THE PLATE

Plate IV

- Fig. 1. *Petrosia ushitsuensis*, n. sp.
Fig. 2. *Acarus tenerus*, n. sp. $\times 0.8$.
Fig. 3. *Ophlitaspongia noto*, n. sp. $\times 1$.
Fig. 4. *Suberites japonicus* Thiele, $\times 1$.
Fig. 5. *Stelletta soldia*, n. sp. $\times 1.3$
Fig. 6. *Penares incrustans*, n. sp.



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S. TANITA: Non-calcareous sponges