



REPORT OF THE BIOLOGICAL SURVEY OF MUTSU BAY
35. STUDIES ON THE CALCAREA OF MUTSU BAY¹⁾

By

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(With Plate I and 2 text-figures)

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The calcareous sponges of Mutsu Bay have been already reported by Prof. HOZAWA in 1928, dealing with the specimens obtained by the biological survey of this bay. At that time he reported two species of *Leucosolenia mutsu* and *Leucosolenia laxa*. Since then, several specimens have been collected by himself, by Dr. SATO, and by Mr. YAMAMOTO from the same bay. Through the courtesy of these collectors, I was able to have the opportunity of studying the fauna of calcareous sponges of the bay. The collection was found to contain five species, of which one appears to be new to science. In the present paper I shall deal with these species.

Here I should like to express my hearty thanks to Prof. HOZAWA, Dr. SATO, and Mr. YAMAMOTO for their kindness expressed in allowing me to examine their collections.

The following is the list of the species :

Family Homocoelidae

- 1) *Leucosolenia laxa* KIRK
- 2) *Leucosolenia tenera* TANITA

Family Sycettidae

- 3) *Sycon coronatum* (ELLIS and SOLANDER)

Family Grantiidae

- 4) *Leucandra tomentosa* TANITA

Family Amphoriscidae

- 5) *Leucilla minuta*, n. sp.

As is seen from the above list, the number of species treated in the present report is five, and thus the calcarea fauna of Mutsu Bay is represented by six species when the species *Leucosolenia mutsu* HOZAWA is added.

¹⁾ Contribution from the Marine Biological Station, Asamushi, Aomori-Ken. No. 171.

DESCRIPTION OF THE SPECIES

1. *Leucosolenia laxa* KIRK

(Pl. I, fig. 1)

Leucosolenia laxa, KIRK, 1895, p. 208, Pl. IV., fig. 1; DENDY and ROW, 1913, p. 722; HOZAWA, 1928, p. 220, Pl. I., figs. 4, 5; 1940, p. 35.

This species is represented in the collection by three specimens obtained by Prof. HOZAWA in July, 1929, off Fujishima (St. 116). All of these were found attached by means of their narrowed base to some shells of Brachiopods.

The largest specimen (Pl. I, fig. 1) is ovoid in shape and is more or less laterally compressed. It consists of a massive assemblage of reticulating Ascon-tubes. The total length is 26 mm. and the breadth is 25 mm. The colour is white in alcohol.

The other two specimens are smaller and of a more elongated oval shape than the first, attaining the length of 17 mm. and 8 mm. respectively.

In anatomical structure these specimens agree well with the description given by KIRK of the same species.

Localities: — New Zealand (KIRK); Tairadate and Takaisozaki in Mutsu Bay, Wajima, Ohshima of Rikuzen (HOZAWA); off Fujishima in Mutsu Bay.

2. *Leucosolenia tenera* TANITA

(Pl. I, fig. 2)

Leucosolenia tenera, TANITA, 1940, pp. 166-168, Pl. VIII, fig. 2, textfig. 1.

A single specimen of this species exists in the collection which was taken by Dr. SATO in July, 1929, on the shore of Tsuchiya.

The sponge forms a loose mass of branching Ascon-tubes, attached to the sea weed. The Ascon-tubes are small and thin-walled, some of them bearing a small circular osculum of about 1 mm. diameter at their extremity. The outer surface of the tubes is very minutely hispid. The colour in alcohol is nearly white.

With respect to the inner structure, the present specimen is nearly identical with that of the type.

Localities: — Matsushima Bay (TANITA); Tsuchiya in Mutsu Bay.

3. *Sycon coronatum* (ELLIS and SOLANDER)

Spongia coronata, ELLIS and SOLANDER, 1786, p. 190, Tab. 58, figs. 8, 9.
Sycandra coronata, HAECKEL, 1872, p. 304, Taf. 51, fig. 2, Taf. 60, figs. 1-6.

Sycon coronatum, DENDY, 1892, p. 79; DENDY and ROW, 1913, p. 745; LAUBENFELS, 1932, p. 11; BREITFUSS, 1935, pp. 16-17; HOZAWA, 1940, pp. 140-143, Pl. VI, fig. 5, textfig. 4.

The collection contains one specimen of this species which was taken by Mr. YAMAMOTO by means of a dredge from a depth of about 25 meters off Kawauchi.

The sponge forms a solitary tubular individual. It is broadest near the base and is provided with an osculum surrounded by a well-developed collar at the upper end. It is 13 mm. in total length and 5 mm. in the greatest breadth. The oscular collar is about 6 mm. high and is 1.2 mm. across. The body wall is 1 mm. thick in the middle parts of the body.

The dermal surface is strongly hispid owing to the projecting oxea, while that of the gastral appears nearly smooth to the naked eye. The colour in alcohol is greyish white.

Localities: — East coast of Australia (HAECKEL, LENDENFELD, DENDY); Atlantic Ocean (HAECKEL, BREITFUSS); Pacific Ocean (HAECKEL); Indian Ocean (ROW); Messina (HOZAWA); off Kawauchi in Mutsu Bay.

4. *Leucandra tomentosa* TANITA

(Pl. I, fig. 4)

Leucandra tomentosa, TANITA, 1940, pp. 174-176, Pl. VIII, fig. 6, textfig. 4.

This species is represented by a single specimen. It was secured by Mr. YAMAMOTO in April, 1940, from a depth of about 25 meters off Kawauchi.

The sponge represents a solitary person of an elongated tubular form, showing at the upper end an osculum surrounded by a well-developed collar. The outer surface is strongly hispid on account of the presence of long oxea projecting from it. The gastral cavity is irregular in shape and is rather narrow, the surface of the cavity being smooth. The sponge is 11 mm. high and 4.5 mm. broad in the middle parts. The oscular collar is 2.2 mm high and 1.2 mm. across. The colour in alcohol is greyish white.

In the anatomical structures, the present specimen represents the same features as those of the type.

Localities: — Matsushima Bay (TANITA); off Kawauchi in Mutsu Bay.

5. *Leucilla minuta*, n. sp.

(Pl. I, fig. 5; textfigs. 1, 2)

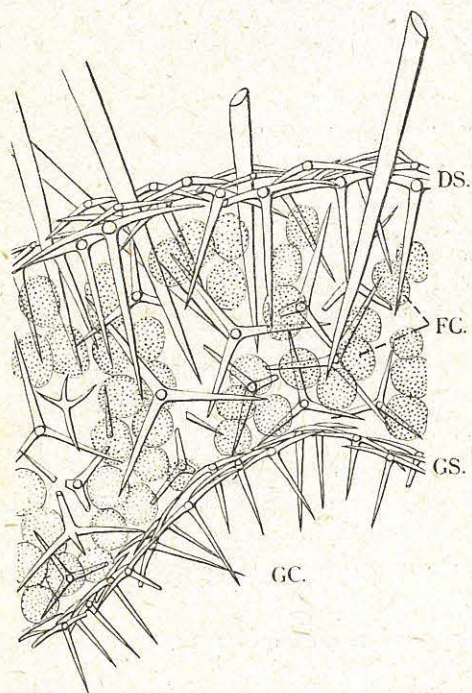
A single specimen of this new species exists in the collection which was obtained by Prof. HOZAWA in July, 1929, at Igamasaki (St. 111). It (Pl. I, fig. 5) is a small solitary person of an oval shape and somewhat dorsoventrally compressed. It is about 3 mm. in length and 4 mm. in the greatest breadth.

The outer surface is strongly hispid due to the presence of large oxea projecting from it. The osculum at the upper end is nearly circular with a diameter of 1.2 mm. and has a feebly developed oscular fringe. The gastral cavity is relatively narrow and the body wall is 1.2 mm. thick in the middle parts. The gastral surface is also hispid from the projecting apical rays of the gastral quadriradiates.

The colour in alcohol is white.

Structure (Textfig. 1):—The canal system is of the leuconoid. The flagellate chambers (FC) are either spherical or ovoid and are thickly packed in the chamber layer.

The skeleton of the dermal cortex (DS) is composed of triradiates, the facial rays of subdermal quadriradiates, and large oxea. The triradiates lie tangentially in a thin layer and the facial rays of the subdermal quadriradiates are also placed tangentially in a rather confused arrangement. The large oxea which occur fairly thickly in the sponge wall project from the dermal surface making nearly right angles with it, but nearer the osculum these spicules have a



Textfig. 1. *Leucilla minuta*, n. sp. Part of a cross-section ($\times 65$). DS, Dermal skeleton; FC, flagellate chambers; GC, gastral cavity; GS, gastral skeleton.

tendency to be placed parallel to the long axis of the sponge.

The tubar skeleton is made up of the apical rays of subdermal quadriradiates and of tubar quadriradiates arranged in several confused layers with their basal rays pointing centrifugally. The proximal parts of large oxea and the basal rays of subgastral quadriradiates may be added to the skeleton.

The gastral skeleton (GS) is thinner than that of the dermal and consists mainly of tangentially placed gastral quadriradiates.

The skeleton of the oscular margin is a close interlacement of linear spicules and quadriradiates with strongly divergent paired rays and downwardly directed basal rays. The former kind of spicules are arranged longitudinally. There may be also found in addition some large oxea disposed parallel to the long axis of the sponge.

Spicule (Textfig. 2):—Dermal triradiates (a) slightly sagittal. Basal ray straight, either equal to or slightly shorter than the paired rays, 150–240 μ long and 12–16 μ thick at base. Paired rays nearly equal, slightly curved forwards, 170–240 μ long and 12–16 μ thick at base.

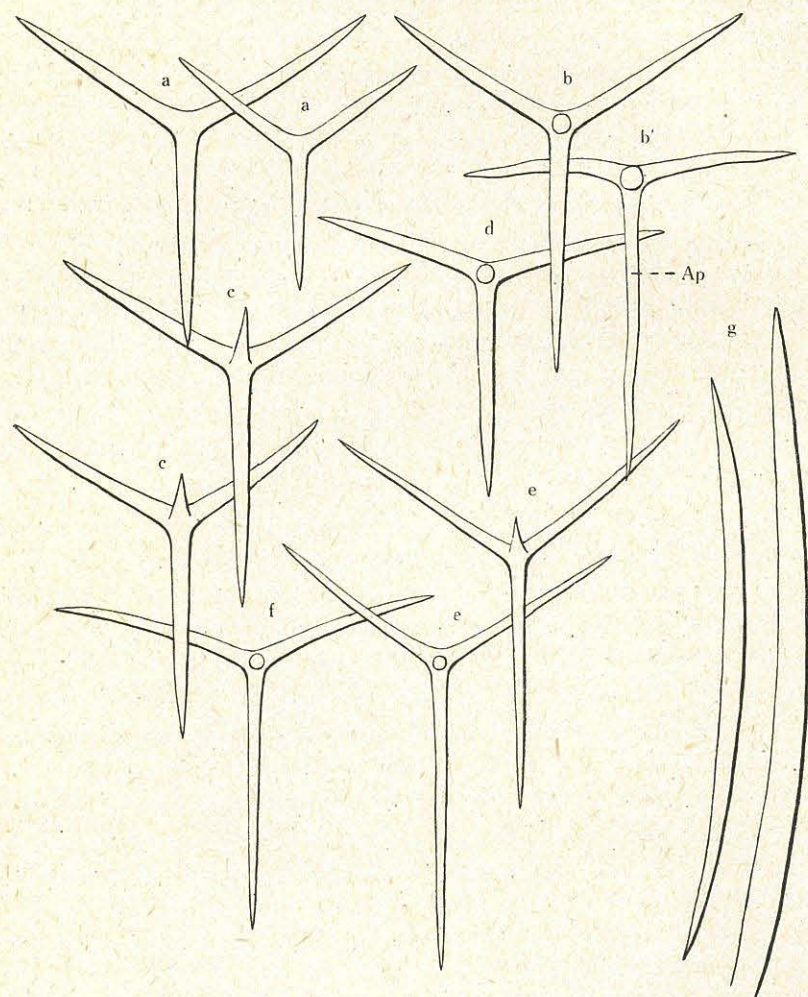
Subdermal quadriradiates (b) sagittal, all rays of nearly equal thickness. Basal ray straight, sharply pointed, slightly longer than paired rays, 140–220 μ long and 12–16 μ thick at base. Paired rays equal, slightly curved forwards, 110–210 μ long and 12–16 μ thick at base. Apical ray straight or slightly curved, sharply pointed, longer than facial rays, 180–330 μ long and 12–16 μ thick at base.

Tubar quadriradiates (c) also slightly sagittal, rays stout. Basal ray straight, gradually tapering, sharply pointed, 240–360 μ long and 15–20 μ thick at base. Paired rays nearly equal, slightly shorter than basal ray, 200–330 μ long and 15–20 μ thick at base. Apical ray much shorter than facial rays, straight or slightly curved, sharply pointed, about 90 μ long and 12–18 μ thick at base.

Subgastral quadriradiates (d) exactly similar to that of the tubar, but having the greater oral angles.

Gastral quadriradiates (e) sagittal. Basal ray straight, longer than paired rays, gradually tapering to sharp end, 260–340 μ long and 10–14 μ thick at base. Paired rays either equal or unequal, slightly curved forwards, 240–300 μ long and 10–14 μ thick at base. Apical ray shorter and slightly thinner than facial rays, straight or slightly curved upwards, 100–210 μ long and 8–12 μ thick at base.

Quadriradiates of the oscular margin (f) similar to the quadriradiates of the gastral cortex, differing only in having the wider oral angles.



Textfig. 2. *Leucilla minuta*, n. sp. a, dermal triradiates; b, subdermal quadri-radiate; b', the same seen from lateral side; c, tubar quadri-radiates; d, subgastral quadri-radiate; e, gastral quadri-radiates; f, quadri-radiate of oscular margin; g, oxea of dermal surface; Ap, Apical ray. (all $\times 150$)

Large oxea projecting from dermal surface (g) elongate spindle-shaped, slightly curved, sharply pointed at both ends, $570\mu-1.5\text{ mm.}$ long and $25-37\mu$ thick in the thickest parts.

Linear spicules of the oscular margin straight, nearly uniformly thick throughout their greater length, measuring $2-6\mu$ in thickness. They are

solely sharply pointed at the proximal end while most of the free ends are broken off.

Remarks:— In external form this species bears a marked resemblance to *Leucilla lanceolata* Row and HOZAWA¹⁾, while in spiculation it approaches to *L. princeps* Row and HOZAWA²⁾. *Leucilla lanceolata* differs from the present species in the absence of dermal triradiates and also in the presence both of tubar triradiates and lance headed oxea. From *L. princeps* the present species may be easily distinguished by the external features and by the differences seen in the shape of subdermal quadri-radiates and of tubar quadri-radiates. Moreover the present species differs from these two species in the absence of trichoxea.

Locality:— Igamasaki in Mutsu Bay.

LITERATURE CITED

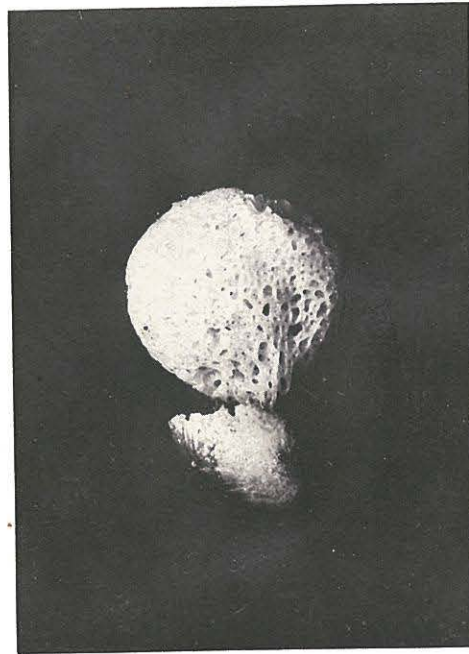
- BREITFUSS, L. (1935) Le Spungne calcaree dell' Adriatico con reflesso a tutto il Mediterraneo. Consiglio Nazionale Ricerche R. Comitato Talassografico Italiano, Memoria CCXXIII.
- DENDY, A. (1892) Synopsis of the Australian Calcareo Heterocoela, with a Proposed Classification of the Group, and Description of Some New Genera and Species. Proc. Roy. Soc. Victoria (n.s.) Vol. V, pp. 69-116.
- DENDY, A. and ROW, W. H. (1913) The Classification and Phylogeny of the Calcareous Sponges, with a Reference List of all the described Species, Systematically Arranged. Proc. Zool. Soc. London, 1913, pp. 704-813.
- ELLIS, J. and SOLANDER, D. (1786) Natural History of Many Curious and Uncommon Zoophytes collected from Various Parts of the Globe. London 1786.
- HAECKEL, E. (1872) Die Kalkschwämme, eine Monographie, Berlin.
- HOZAWA, S. (1928) Report of the Biological Survey of Mutsu Bay. 6. Calcareo of Mutsu Bay. Sci. Rep. Tôhoku Imp. Univ. Ser. Biol. Vol. III, No. 2, pp. 219-222, Pl. I.
- (1940) On Some Calcareous Sponges from Japan. Sci. Rep. Tôhoku Imp. Univ. Ser. Biol. Vol. XV, No. 1, pp. 29-58, Pls. IV, V, Textfigs. 9.
- (1940) Report on the Calcareous Sponges obtained by the Zoological Institute and Museum of Hamburg. Sci. Rep. Tôhoku Imp. Univ. Ser. Biol. Vol. XV, No. 2, pp. 131-163, Pls. VI, VII, Textfigs. 10.
- KIRK, H. B. (1895) New Zealand Sponges. Third Paper. Trans. New Zealand Inst., Vol. XXVIII, pp. 205-210, Pls. III, IV.
- LAUBENFELS, M. W. (1932) The Marine and Fresh-water Sponges of California. Proc. U. S. Nat. Mus., Vol. 81, pp. 1-140.
- ROW, R. W. and HOZAWA, S. (1931) Report on the Calcareo obtained by the Hamburg South-West Australian Expedition of 1905. Sci. Rep. Tôhoku Imp. Univ. Ser. Biol., Vol. VI, No. 4, pp. 727-809, Pls. XIX-XXI, Textfigs. 17.
- TANITA, S. (1940) Calcareous Sponges of Matsushima Bay. Sci. Rep. Tôhoku Imp. Univ. Ser. Biol., Vol. XV, No. 2, pp. 165-177, Pl. VIII, Textfigs. 4.

¹⁾ *Leucilla lanceolata* Row and HOZAWA, 1931, pp. 795-798, Pl. XXI, fig. 16, textfig. 15.

²⁾ *Leucilla princeps* Row and HOZAWA, 1931, pp. 799-802, Pl. XXI, fig. 17, textfig. 16.

EXPLANATION OF PLATE I.

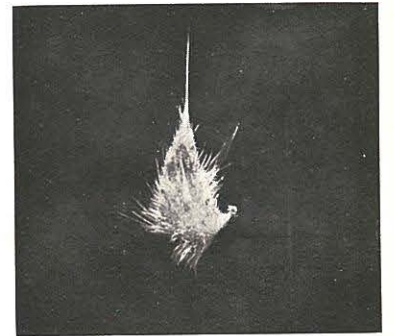
- Fig. 1. *Leucosolenia laxa* KIRK. Natural size.
- Fig. 2. *Leucosolenia tenera* TANITA, $\times 2$
- Fig. 3. *Sycon coronatum* (ELLIS and SOLANDER), $\times 2$.
- Fig. 4. *Leucandra tomentosa* TANITA, $\times 2$.
- Fig. 5. *Leucilla minuta*, n. sp. $\times 2$.



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TANITA photo.

S. TANITA: Calcarea of Mutsu Bay.