



HOKKAIDO UNIVERSITY

Title	The Fauna of Akkeshi Bay : XVII. Hydroids (With 1 Plate)
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| (Alder) | Family Plumulariidae |
| 18) <i>Sertularella rugosa</i> (L.) | 26) <i>Plumularia undulata</i> n. sp. |

1) *Coryne pusilla* Gärtner

Coryne pusilla: Inaba 1890, No. 1 figs. 1-4; Stechow, 1909, p. 33; —, 1913, p. 49; —, 1923a, p. 2, No. 1; Stechow & Uchida, 1931, p. 545, pl. 15, fig. 1.

Trophosome. Colony attaining 20 mm in height, much branched dichotomously. Stolon creeping over its substratum, not forming any definite network, somewhat wavy but seldom distinctly annulated. Both stem and branches distinctly and regularly annulated throughout the whole length. Hydrocaulus springing from the creeping stolon, covered with a firm perisarc. Perisarc, with distinct rings, reddish brown in color, developing well to just below the hydranth but not forming a cup-like sheath on the lower part of the hydranth. Hydranth, light red in colour, elongated, gradually tapering upwards, possessing tentacles or tentacles and sporosacs, when extended attaining 3 mm in length, about 0.3 mm in diameter, but in extreme contraction assuming a thick club form. Tentacles, 25-30 in number, rather long and slender, with a knob-like enlargement at extremity, scattered over the whole surface of the hydranth.

Gonosome. Sporosacs springing between the tentacles in the lower and middle parts of the hydranth, spherical in form, very shortly stalked. In the center of each sporosac a long simple spadix present, around which exist several ova or a spermatid mass. Sporosacs destitute of tentacles and radial- and ring-canal.

The species is commonly found on algae or rocks in shallow pools at low tide in Akkeshi Bay. The development of sporosacs is observed from July to October.

Distribution. Widely distributed in the world. In Japan, Sagami Bay,

Mutsu Bay, coast of Hokkaido.

2) *Tubularia radiata* Uchida.

Tubularia radiata: Uchida, 1937, p. 157, figs. 1, 2.

Trophosome. Colony consisting usually of 10-15 or often more polyps. Polyps connected with each other by radially arranged hydrorhiza which attaches to eel-grass. From the central portion of the colony an oldest polyp erects the hydrocaulus, and the base of this polyp sends out several radial stolons, on each terminal end of this stolons stands a young polyp. Often some of these young polyps have a few small radiated, secondary stolons. Stolons coated with an unannulated hard perisarc. Hydrocaulus, attaining 5 cm in height, unbranched, bending slightly under the hydranth in the oldest polyp, covered with a firm perisarc like the stolon. This well-developed perisarc, light brown in colour, narrows towards the base and forms a small collar-like expansion below the hydranth. On the perisarc there are annulations at regular intervals, but in some parts these are indistinct. Hydranths arising on the collar-like expansion, with two circlets of tentacles, a proximal and a distal. Distal tentacles short, about 22 in number; proximal tentacles about 28 in number, much longer than the distal ones. The hydranth is pinkish in colour.

Gonosome. Gonophores appearing from the body of the hydranth between the two circlets of tentacles; ovate in form, on 10-12 sparsely branched peduncles. Male gonophores present in cluster which forms a pendulous racemose. Female gonophores with four tentaculiform processes, while male ones without processes.

This beautiful hydroid was originally described by Uchida basing on specimens from Akkeshi Lake. It occurs very commonly on eel-grass in Akkeshi Lake from July to October. In September and October the actinula-larvae liberate from the female gonophores through a mouth at the summit.

Distribution. Akkeshi Lake.

3) *Tubularia venusta* n. sp.

(Pl. I, figs. 1, 2)

Trophosome. Colony composed of a great number of polyps. Hydrorhiza creeping upon the rock, sinuous, inosculated, irregularly branched. As many polyps are usually included densely in a colony, the branches of the hydrorhiza are closely connected with each other, taking a turf-like appearance and some parts of them are slightly raised from the substratum.

Hydrocaulus, attaining 5 cm in height, unbranched, wavy in some extent, bending scarcely below the hydranth. Well-developed perisarc which covers the hydrocaulus, light reddish-brown in colour, slightly tapering downwards, terminated in a small collar-like dilation just below the hydranth. Perisarc slightly marked with annulations at regular intervals but often destitute in some parts. Hydranths rather small, supported on the callar-like dilation; distal tentacles short, approximately 20 in number, proximal long, about 28 in number, about three times as long as distal ones. The hydranth is pinkish in colour.

Gonosome. Gonophores developing between the two circlets of tentacles upon about 10 peduncles which form racemiform clusters; oval or slightly elongated in form. Peduncles rather short, not pendulous, usually unbranched but occasionally branching dichotomously in well-developed clusters. Female gonophores with 4-8 tentaculiform processes; male ones destitute of processes. There are no radial- nor ring-canal.

This species may be distinguished from any preexisting species by several features in the above description and seems to be referable to a new member of genus *Tabularia*. From July to October the species occurs very abundantly attached on rocks and stones between the tide-marks in Aikappu and Daikoku-shima at Akkeshi. In July to August the sporosacs are in mature and actinula-larvae with oral tentacles liberate from the orifice.

4) *Hydractinia epiconcha* Stechow

Podocoryne sp.: Inaba, 1890, No. 3, figs. 5-7.

Hydractinia epiconcha: Stechow, 1903, p. 18, pl. 3, figs. 4, 5; Jäderholm, 1919, p. 4, Stechow, 1913, p. 58; —, 1923a, p. 4, No. 21.

Trophosome. The colony develops on the surface of a gastropod shell. Hydrorhiza very strongly built, covered with chitinous perisarc forming a strong lamella, from which, especially at the outer corners of the colony, spring a number of simple pointed chitinous spines. Spines variable in height, attaining 1.2 mm, hollow and filled with the coenosarc. Perisarc not elevated in the form of a bowl at the base of the hydranth. The upper surface of the hydrorhizal lamella is covered with a naked coenosarc. Gastrozooids, springing in large numbers from the lamella, attaining 2.5 mm in height when fully expanded; no distinction between the hydranth and the hydrocaulus. Hypostome present at the distal end of the gastrozoid, distinctly conical, with a single whorl of 15-25 filiform tentacles on its base. Besides the gastrozooids and spines, there occur vibratile nematozooids on the stolon, though these are rare and easily escape notice. The perisarc and the spines are dark brown and the gastrozooids are light

red in colour.

Gonosome. Blastostyles and gonophores not found in the present specimens.

This species is found covering the shell surface of a gastropod *Neptunea* sp., which contains a hermit-crab in most cases. From May to August specimens without gonophores are rather commonly collected in Akkeshi Bay.

Distribution. Only in Japan. The Pacific coast of the middle part of Honshu and Hokkaido.

5) *Eudendrium capillare* Adler

Eudendrium sp.: Inaba, 1890, No. 35, figs. 99-102

Eudendrium capillare: Stechow, 1909, p.29; —, 1913, p. 61, figs 15-17; —, 1923a, p. 4, No. 26.; Nutting, 1927, p. 201.

Trophosome. Colony very delicate, attaining a height of 0.5-2.0 cm. Stolon creeping on algae or stones. Main stem straight, slender, not fascicled, thread-like, much and irregularly branched. Branches irregularly given rise from the main stem, with the equal thickness with the stem and 0.12-0.15 mm in diameter. The stem and branches are covered with a rather hard perisarc which is always annulated at the base of the branches and also often wrinkled slightly on the stem. Hydranths, present on the terminal end of the stem and branches, bowl-shaped with a trumpet-shaped hypostome and a verticil of 20-22 filiform tentacles. Just beneath the verticil of tentacles it measures about 0.35 mm in diameter. The hydranths show the light reddish brown in colour.

Gonosome. Male gonophores borne on a small secondary branch which is regularly annulated; each gonophore two-chambered, a large distal one and a small proximal one, present radially at the end of the blastostyle forming a cluster of about 16 or more. The tentacles and hypostome of the male blastostyle are not present. Female gonophores oval in form, radially arranged in 3-5 in number on a blastostyle. 3-5 small tentacles are present on the female blastostyle.

In structure of the trophosome this species closely agrees with Inaba's and Stechow's descriptions, which are based on the specimens from the deep zone in Sagami Bay. But in this material we can occasionally recognize the slight wrinkles on the stem. The species also resembles *Eudendrium biseriale* which has been recently described by Fraser (1935) from the vicinity of Enoshima, Sagami Bay, but the latter clearly distinguishes from this species by the arrangement of the gonophores. In Akkeshi Bay some specimens were collected in June to August at the lower water.

Distribution. Widely distributed in the world. In Japan, Sagami Bay, Muroran and Akkeshi Bay.

6) *Lar flavicirrata* (Brandt)

Lar flavicirrata: Uchida & Okuda, 1941, p. 431, figs. 1-11.

Proboscidactyla flavicirrata: Uchida, 1940, p. 228.

Trophosome. The colony grows around the mouth of the tube of a sedentary polychaete, *Potamilla myriops*. Stolons creeping on the mouth and more proximal part of the tube, forming a network. Many gastrozooids and blastostyles stand from the stolon on the marginal part of the tube. Besides these gastrozooids and blastostyles a number of small strange blastostyles which do not bear the gonophores, spring from the stolon on the proximal part of the tube. All these polyps are entirely destitute of perisarc. Gastrozooids, present only on the distal margin of the tube, about 10-15 mm in height, with two tentacles and a head-like lobe. The two tentacles spring in pair from the ventral base of the lobe. Tentacles are usually two in number but sometimes three or more as the abnormality. Mouth present ventrally on the upper portion of the lobe, directed towards the same side as the tentacles pair. The gastrozooid is slightly brownish in colour.

Gonosome. The gonosomes are typical medusa buds. Medusa buds borne in a group of 2-7 in the distal half of the blastostyles, bell-shaped, with a short stalk. The blastostyles and medusa buds are slightly brownish in colour.

Medusa. Young liberated medusae globular in shape, about 0.5 mm in height. Manubrium short, with a round mouth. Radial canals narrow and straight, 4-6 in number. Ring canal narrow and distinct. Tentacles varying 4-6 in number according to the number of radial canals. The manubrium and the tentacle-bases are slightly brownish in colour.

Detailed accounts on this species were recently described by Uchida and Okuda (1941). In Akkeshi Bay the hydroid is abundantly found on comparatively young tubes of *Potamilla myriops* near low-water mark. The gonophores on the blastostyle develop from August to October.

Distribution. All coasts of Hokkaido.

7) *Halecium magellanicum* (Hartlaub)

(Pl. I, figs. 3, 4)

Halecium magellanicum: Linko, 1911, p. 15, fig. 2.

Trophosome. Colony slender, attaining to about 2-3 cm, scarcely branched, arising from rather thick stolon. Stem not fascicled, divided through the length into regular internodes, each of which bears a branch on a process of its distal end. Branches alternate on the stem, divided into more or less regular internodes, some of which have a hydrotheca. Hydrothecae rather shallow, cup-shaped, fairly distant.

Gonosome. Gonangia large, ovate, ribbed transversely, with a truncated cup, singly borne on the base of the branch. It attains 1.2 mm in height.

The species was reported by Kudelin from Wladiwostok but new to Japanese waters. Some specimens were often found near low-water mark in Akkeshi Bay.

Distribution. North polar regions of the world.

8) *Orthopyxis platycarpa* Bale

Orthopyxis platycarpa: Stechow & Uchida, 1931, p. 548, fig. 2, pl. 15, fig. 2.

Trophosome. Stem simple, unbranched, springing at irregular intervals from a creeping and unannulated but very thick walled stolon. The pedicel and the hydrotheca combined attain a height of 6 mm. Pedicels very thick walled as that of stolon, with one annulation at the top forming a spherical knob just beneath the hydrotheca; wall wavy, spirally twisted throughout its length. Hydrothecal walls at two opposite sides greatly thickened but considerably thin at the other two sides, projecting inwards in some extent near the bottom of the hydrotheca, consequently a spherical cavity occurs there. The hydrotheca measures 0.45-0.52 mm in height and 0.34-0.45 mm in breadth.

Gonosome. Gonangia arising from the stolon, cup-like or elongate-oval in shape, attaining a height of 1.0 mm, with very short stalk which one or two annulated. The female gonangia contains a sporosac from which the ova are discharged into an external breeding sac, in which they complete the development.

This species was reported by Stechow and Uchida from Mutsu Bay. It resembles *Orthopyxis compressa*, but differs by the throughout twisted pedicel. The species also resembles *Orthopyxis caliculata*, but in the hydrotheca of the latter species the wall is coarsely and unevenly coagulated, while in that of this species generally smooth. Stechow and Uchida described that the height of the gonotheca is 0.64 mm and much shorter than that of the Australian type specimen. In this specimens, however, the height of it attains 1.0 mm. This species is one of the commonest hydroid on the coast of Hokkaido, and abundantly found attached to eel-grass or algae.

Distribution. Australia, northern part of Honshu, Hokkaido.

9) *Obelia plana* (M. Sars)

(Pl. I, fig. 5)

Obelia plana: Stechow, 1923a, p. 7, No. 68.

Trophosome. Colony attaining a height of 16 cm. Main stem simple, dark brown in colour, zigzag in various degree, marked with 3-5 annula-

tions above the origin of the branch. Branches alternately given off at each bend of the stem, not forming the regular planes, divided several times consequently showing a fan-shaped appearance. In all cases two or three annulations exist above every division of the branch. Hydrothecae campanulate, with entirely even rim, regularly and slightly curved and subtriangular in outline. The hydrotheca measures 0.38 mm in height and 0.29 mm in breadth at the margin.

Gonosome. Gonangia borne on the ringed stalk, considerably flattened at the top and elongated obconical in shape, terminated in a small orifice, destitute of a distinct collar. The gonangium measures 0.44-0.53 mm high and 0.34 mm wide at the top.

This species is common in the Atlantic and also has been reported from the vicinity of Wladiwostok and the coast of Okhotsk. The species resembles *Obelia longissima*, but the branches and pedicel differ in several points. In Akkeshi Bay this hydroid is found very commonly attached to eel-grass, the shell surface, the bottom of the ship, etc.

Distribution. North Atlantic coasts of Europe and America. Wladiwostok, the Okhotsk Sea and Hokkaido.

10) *Obelia dichotoma* (L.)

(Pl. I, fig. 6)

Obelia dichotoma: Torrey, 1902, p. 57; Mayer, 1910, p. 246; Nutting, 1915, p. 80, pl. 20, fig. 7.

Trophosome. Colony consisting of an upright stem, 2.0 cm in height, giving off irregular lateral branches, some of which again branch in a dichotomous manner. Stem and branches sometimes straight and sometimes sinuous in outline, with a group of usually 5-8 annulations above the origin of each branch or pedicel. Pedicels alternate, short. Hydrothecae deeply campanulate, with very slightly curved sides, so that they approach a triangle in outline; margin without teeth; diaphragm low but evident.

Gonosome. Gonothecae not present.

The species is easily distinguishable from the former species by its small size of the colony. This is commonly found near the low-tide, attached on the rock.

Distribution. Widely distributed in the world.

11) *Campanularia volubilis* (L.)

(Pl. I, fig. 7)

Campanularia volubilis: Torrey, 1902, p. 54; Linko, 1911, p. 157, fig. 26; Nutting, 1915, pl. 23; p. 1, figs. 4-6.

Trophosome. Colony consisting of a number of unbranched pedicels arising from a creeping stolon. Stolon attached on the sertularian hydroids,

creeping irregularly over the branches and hydrothecae. Pedicels arising irregularly, varying greatly in height but seldom more than 1.5 mm in height, usually annulated throughout, the annulations often being oblique and thus giving a spirally twisted appearance. There is a well-marked spherical annulation just below the hydrotheca. Hydrothecae, rather small, deeply campanulate, a typical one being about twice as long as wide; margin with about 12 rather shallow but distinct teeth. The hydrotheca measures about 0.3 mm in height.

Gonosome. Gonangia standing from the stolon, flask-shaped, with a short neck and a round aperture.

This is often collected on the body of other hydroids.

Distribution. Widely distributed in north temperate region of the world. The Okhotsk Sea, Hokkaido.

12) *Campanularia urceolata* Clark

(Pl. I, fig. 8)

Campanularia urceolata: Torrey, 1902, p. 54; Linko, 1911, p. 162, fig. 27; Nutting, 1915, p. 40, pl. 4, figs. 4, 5.

Trophosome. Colony attached on other hydroids. Pedicels closely annulated throughout, unbranched, rather thick-walled and stiff, attaining a height of 1 mm. They are short, sometimes shorter than the hydrothecae. Hydrothecae exceedingly variable in shape, the typical ones being distinctly urceolate, about 1.5 times as high as broad; the margin with distinct rounded or undulating teeth about 14 in number. The hydrotheca measures about 0.5 mm in height.

Gonosome. Gonangia varying from a roughly oval form with a wavy outline to ovoid regular forms, with a short neck and even, round aperture.

This species apparently resembles the former species, but quite differs from it in the urceolate form of the hydrotheca.

Distribution. North temperate region of the Pacific. The Okhotsk Sea, the Kurile Islands, Akkeshi Bay.

13) *Calycella syringa* (L.)

Calycella syringa; Stechow, 1923a, p. 9, No. 79

Trophosome. Stolon creeping on the body of other hydroids, entangled to each other. Pedicels standing from the creeping stolon, with various length, unbranched, twisted throughout. Hydrothecae present on pedicel, cylindrical, narrowed at the base, three to five times as long as wide, often with hydrotheca and pedicel. Hydrotheca 0.36-0.42 mm in height, 0.11-

0.12 mm in width at the margin. Pedicel 0.03-0.04 mm in width.

Gonosome. Gonangia arising from the stolon, irregularly elongated oval in shape, with a short unbranched stalk. The gonangium measures 0.29-0.30 mm in height and about 0.14 mm in width at the widest portion.

This species was described by Stechow in 1913 from Sagami Bay but he revised it to *Calicella pygmaea* afterwards. At Akkeshi this hydroid is found on the colony of *Sertularia cupressoides*, *Obelia plana*, and some species of *Sertularella*.

Distribution. Widely distributed in the world.

14) *Symplectoscyphus tricuspидatus* (Alder)

(Pl. I, fig. 9)

Sertularella tricuspидata: Hincks, 1868, p. 239, fig. 30, pl. 47, fig. 1; Kirchenpauer, 1884, p. 45; Nutting, 1904, p. 100, pl. 25, figs. 3-7; Linko, 1912, p. 103, fig. 14; Jäderholm, 1919, p. 18, pl. 4, fig. 7.

Symplectoscyphus tricuspидatus: Stechow, 1923a, p. 13, No. 126; Leloup, 1938, p. 17, fig. 12.

Trophosome. Colony irregularly branched, attaining about 3 cm. Stem not fascicled, slender, divided into regular internodes, each of which bears a hydrotheca or a hydrotheca and a branch. Branches irregularly alternate, slender, often branching somewhat irregularly, divided into regular internodes throughout the length, with one or two annular constrictions on the proximal part. Two series of hydrothecae always arranged in one plane. Hydrothecae rather small, cylindrical, without any corrugations on the wall, the distal half or more of the adcauline wall being separated from the branch; margin with three low teeth; operculum composed of three flaps. No inner teeth are observed. Length of hydrotheca in abcauline wall about 0.34 mm; breadth in the mouth aperture about 0.25 mm.

Gonosome. Gonangia borne on the stem and main branches, about 1.7 mm in length, ovoid, strongly marked throughout with compressed annular rugosities; aperture slightly expanded, at the summit of a short tubular neck.

This species was found attached to algae in Akkeshi Bay. The trophosome and gonosome of the specimens closely agrees with that of specimens from the Okhotsk Sea, the Bering Sea and Alaska. Recently Leloup reported the species from Sagami Bay and mentioned about the hydrothecal inner teeth in his material, while in the present material no inner teeth were observed.

Distribution. North polar and north temperate regions of the world. In Japan, Sagami Bay and Akkeshi Bay.

15) *Sertularella gigantea* Mereschkowsky

(Pl. I, fig. 10)

Sertularella polyzonias gigantea: Kirchenpauer, 1884, p. 38; Linko, 1912, p. 126. fig. 19.*Sertularella gigantea*: Nutting, 1904, p. 87, pl. 19, fig. 7; Stechow, 1923a, p. 14, No. 142.

Trophosome. Colony attaining a height of 3 cm. Stem not fascicled, almost straight, divided into regular internodes, the length of which being variable. Branches irregularly alternate, resembling the main stem in form, themselves sometimes dividing dichotomously. The two series of hydrothecae lie almost in one plane. Hydrothecae alternate on stem and branches, cylindrical but slightly tapering towards the mouth. Hydrothecal walls smooth, less a third of abcauline wall being adherent, with two or more duplications in distal part. Hydrothecal margin with four low teeth, decked by an operculum of four flaps. The abcauline wall of the hydrotheca including duplications measures 1.1-1.2 mm in length, and the breadth at the widest part 0.62 mm and at the margin 0.42 mm.

Gonosome. Gonophores not present.

This species has been reported from Kamtschatka by Kirchenpauer (1884) and afterwards from the Okhotsk Sea, the Japan Sea and other arctic regions by Linko (1912). Many specimens without gonophores were collected in Akkeshi Bay.

Distribution. North polar regions of the world. Iceland, the Arctic Ocean, the Bering Sea, Alaska, Kamtschatka, the Okhotsk Sea, the Japan Sea and Hokkaido.

16) *Sertularella miurensis* Stechow*Sertularella* sp.: Inaba, 1880.*Sertularella indivisa*: Stechow, 1913, p. 134, figs. 106-107.*Sertularella miurensis*: Stechow, 1921, p. 258; —, 1923a, p. 13, No. 134; —, 1923b, p. 175, fig. T.

Trophosome. Colony attaining about 1.5 cm. Stem usually unbranched, distinctly articulated throughout, forming ten to fifteen regular internodes, each of which bears a hydrotheca. At the base of the stem always two to four distinct annular constrictions are present. Hydrothecae lying in many planes, comparatively approximate, barrel-shaped and slightly tapering towards the mouth, a third to two-fifths of the adcauline wall free. Hydrothecal margin with four low teeth, operculum composed of four flaps. Three rather large inner teeth are present at the inner edge of the mouth of each hydrotheca. The length of the hydrotheca measures 0.35-0.40 mm, and the breadth 0.27-0.28 mm at the middle part and 0.20 mm at the margin.

Gonosome. Gonangia attaching to the lower part of the stem by a short stalk, one to each internode, rather large, ovoid, strongly annulated by four or five remarkable rugosities on the side wall, and margin with three or four conspicuous horn-like projections. The gonotheca measures 0.90 mm in height and 0.75 mm in breadth.

The species was reported from Sagami Bay by Inaba (1890) and Stechow (1913, 1921, 1923a, 1923b), and afterwards a variety of this species, *Sertularella miurensis* var. *pungens* Stechow, was found from Mutsu Bay. The materials examined agree in trophosome with descriptions of these authors but differ in several points in gonosome. It seems to me that some features of the species are variable within rather wide range. As to these variations I am preparing another paper. The species occurs very commonly attached on algae in the low-water mark throughout Hokkaido. The materials came from following localities: Oshoro, Muroran, Urakawa, Biroh, Akkeshi, Nemuro and Tokoro.

Distribution. Only in Japan, both Pacific coasts and coasts of the Japan Sea, of Honshu and Hokkaido.

17) *Sertularella tenella* (Alder)

(Pl. I, fig. 11)

Sertularella tenella: Hincks, 1868, p. 242, pl. 47, fig. 3; Kirchenpauer, 1884, p. 44: Torrey, 1902, p. 64; Nutting, 1904, p. 83, pl. 18, figs. 1, 2; Jäderholm, 1919, p. 17, fig. 4; Stechow, 1923a, p. 13, No. 123.

Sertularella atlantica: Stechow, 1923b, p. 183, fig. 11a.

Trophosome. Stem not branched, attaining 2 cm in height, strongly zigzag, divided into regular long internodes, each of which bears a hydrotheca. The two series of the hydrothecae almost in one plane. Some irregular annular constrictions are always present on the stem under each hydrotheca. Hydrothecae variably distant, flask-shaped, about the distal half or more of adcauline wall free, ornamented with six to seven remarkable annular rugosities on all sides of the hydrothecal walls. Margin with four rather conspicuous teeth; operculum with four flaps. No inner teeth are present. Length of hydrotheca in the abcauline wall 0.45 mm; breadth in the middle part 0.35 mm and at the margin 0.22 mm.

Gonosome. Gonophores not present.

This species was reported from the Bonin Islands by Jäderholm (1919). In 1923 Stechow examined the specimens which had been described under the name of *Sertularella tenella* and divided them into three species namely *Sertularella atlantica*, *Sertularella tenella* and *Sertularella geniculata*, and referred Jäderholm's species to *S. atlantica*. But the differences between his descriptions or figures of *S. atlantica* and *S. tenella* are indistinct, and the present materials agree in general to above three species but

differ in detail from each of them. This species was found washed ashore at Daikoku-shima near Akkeshi Bay.

Distribution. Widely distributed in the world.

18) *Sertularella rugosa* (L.)

(Pl. I, fig. 12)

Sertularella rugosa: Kirchenpauer, 1884, p. 42; Nutting, 1904, p. 82, pl. 17, figs. 1-5; Broch, 1910, p. 216; Linko, 1912, p. 133, fig. 20.

Trophosome. Stem attaining 1.5 cm, usually unbranched but occasionally branched dichotomously in the lower part, regularly and distinctly jointed, with two or three annular constrictions on the proximal end. The two series of hydrothecae are always included in one plane. Hydrothecae very closely approximate, alternate, one to each internode, barrel-shaped, the distal half or more of the adcauline wall being free; hydrothecal body marked by two or three remarkable rugosities which are indistinct at the adcauline side; margin with four low teeth and a four-flapped operculum. The inner teeth are not observed. Length of hydrotheca in the abcauline wall about 0.46 mm; breadth at the widest part 0.38 mm and at the margin 0.25 mm.

Gonosome. Gonangia rather large, attaining 2.5 mm in length, oblong to ovate, with a number of annular rugosities on upper half, and margin with four blunt teeth.

In structure of the trophosome and gonosome, the specimens closely agree with the descriptions of the European and American species *Sertularella rugosa*. Some specimens attached on rocks were collected in low-water mark in Akkeshi Bay.

Distribution. North polar and north temperate regions of the Atlantic and the Pacific.

19) *Sertularella sagamina* Stechow

(Pl. I, figs. 13, 14)

Sertularella sagamina: Stechow, 1921, p. 257; —, 1923b, p. 177, fig. U.

Trophosome. Colony rather small, attaining about 1 cm in height. Stem not fascicled, delicate, often branched dichotomously, divided into regular internodes, each of which bears a hydrotheca. No annular constrictions are present at the base of the stem. Hydrothecae not lying in regular series, barrel-shaped, slightly constricted beneath the margin, about one-third of adcauline wall adherent to the stem. Hydrothecal wall not smooth, with one or two corrugations. Hydrothecal margin with four teeth, operculum of four flaps. Three large inner teeth are present. Length of hydrotheca in the abcauline wall 0.32-0.36 mm, breadth at the

margin about 0.16 mm.

Gonosome. Gonophores springing from stem, one to three on every one, or from hydrorhiza directly. Gonangia oblong-oval, with short unannulated stalk, rather feebly corrugated throughout, ending in a short collar, which is surmounted with four to six low processes. The gonangium measures 0.96-1.12 mm excluding the stalk.

This species originally described from Sagami Bay by Stechow (1921). The present material agrees in general with Stechow's description but differs in the following points; the large size attaining 1 cm, and the gonophores springing from stem or hydrorhiza, while in the specimens from Sagami Bay only from hydrorhiza. The species was collected attached on rocks near low-water mark in Akkeshi Bay.

Distribution. Only Japan. Sagami Bay and Akkeshi Bay.

20) *Abietinaria costata* (Nutting)

(Pl. I. fig. 15)

Abietinaria costata: Nutting, 1904, p. 122, pl. 36, figs. 9-12.

Diphasia costata: Kudelin, 1914, p. 411, figs. 125, 142, pl. 3, fig. 9.

Trophosome. Colony attaining a height of 6 cm. Main stem straight, not fascicled; proximal portion without branches, divided into several internodes by distinct nodes, each of which bears a pair of subopposite hydrothecae; upper portion divided into regular internodes, each of which bears a branch and two hydrothecae on one side and a single hydrotheca on the other. Branches alternate, often repeating branching further, divided into irregular internodes which usually bear several hydrothecal pairs, with a deep constriction near the base. Hydrothecae alternate or subalternate, rather small, bottle-shaped, and the distal one-third of the adcauline wall is free from the stem; margin without teeth, decked with a one-flapped operculum. Length of hydrotheca in the abcauline wall 0.30-0.32 mm; breadth at the margin about 0.10 mm.

Gonosome. Gonophores borne in front of stem and just beneath of each hydrotheca of the stem and the basal parts of branches. Gonangia oblong-ovate, with a small tubular neck and a round aperture, with four or five longitudinal ridges as conspicuous markings. The gonangium measures 2.0-2.3 mm in height.

The present material is identical with the Alaskan form *Abietinaria costata* (Nutting). This species was collected for the first time (1904) at Yukutat in Alaska by the Harriman Alaska Expedition, and afterwards Kudelin (1914) reported this from Wladiwostok and Kamtschatka. In Hokkaido this is one of the commonest species in low-water mark and many specimens with gonophores were collected at Muroran and Akkeshi.

Distribution. Alaska, Kamtshatka, Wladiwostok, Hokkaido.

21) *Sertularia tenera* G. O. Sars

(Pl. I, fig. 16)

Thuiaria tenera: Nutting, 1904, p. 70, pl. 11, figs. 9-12.

Sertularia tenera: Kudelin, 1914, p. 148, figs. 21-23; Jäderholm, 1919, p. 15, pl. 6, fig. 1; Stechow, 1923a, p. 15, No. 163.

Trophosome. Colony attaining about 5 cm in height. Main stem straight, divided into regular internodes, each of which bears strictly alternate branches and three hydrothecae. Branches springing out regularly from just beneath the hydrotheca on the stem, divided into rather short internodes, with a annular constriction at its origin. Hydrothecae subopposite on stem and branches, flask-shaped, tapering towards the mouth, ending two large side-teeth, about two-thirds of adcauline wall being free. The length of the abcauline hydrothecal wall measures about 0.14 mm and the breadth at the middle part about 0.09 mm.

Gonosome. Gonophores absent.

This species was described from the Okhotsk Sea and the Japan Sea by Kudelin (1914). In 1919, Jäderholm reported this from the Goto Islands. Many specimens were collected washed ashore in Daikoku-shima near Akkeshi Bay.

Distribution. One of the commonest species of the north polar region in the Atlantic and the Pacific.

22) *Sertularia cupressoides* Clark

(Pl. I, figs. 17-19)

Taiaria dalli: Nutting, 1904, p.68, pl. 10, figs. 4-6.

Sertularia cupressoides: Kudelin, 1914, p. 200, figs. 46-48.

Trophosome. Colony plumose, attaining 8 cm in height. Main stem straight, divided into unequal-sized internodes, each of which bears two branches and no hydrothecae. Branches opposite or subalternate, with a distinct annular constriction at their origin, divided into irregular internodes, each of which bears several hydrothecae. Hydrothecae subopposite on branches, rather approximated, deeply immersed, only a quarter or less of the adcauline wall being free. The margin of the hydrotheca is marked with two teeth and a two-flapped operculum. Length of hydrotheca in the abcauline wall 0.19-0.21 mm, breadth at the base about 0.12 mm.

Gonosome. Gonangia borne in rows on the upper sides of the branches, with a round mouth and a short collar, and two large sharply pointed, lateral horn-like spines directing upwards. Length of gonangium containing spines about 0.95-1.10 mm.

This species reported by Nutting from Alaska under the name of *Thuiaria dalli*, which was revised afterwards to the present name. Kudelin reported this from the Okhotsk Sea. Many specimens attached to the surface of a lamellibranchian shell were dredged up in Akkeshi Bay.

Distribution. The north Pacific Ocean. Alaska, the Okhotsk Sea and Hokkaido.

23) *Selaginopsis triseriaria* Mereschkowsky

(Pl. I, fig. 20)

Selaginopsis triseriaria: Mereschkowsky, 1878, p. 435, pl. 16, figs 1, 2; Kirchenpauer, 1884, p. 14.

Sertularia incongrua: Torrey, 1902, p. 69.

Selaginopsis triseriaria: Nutting, 1904, p. 129, pl. 39, figs. 1, 2.

Sertularia triseriaria: Kudelin, 1914, p. 324.

Selaginopsis triseriaria: Stechow, 1923a, p. 17, No. 181.

Trophosome. Colony attaining a height of about 6 cm. Main stem straight, covered with rather thick periderm, usually unbranched, divided into internodes which are more distinct at the proximal part. Branches springing from all sides of the main stem, attached by a tubular process of the stem, divided at a certain distance from the point of attachment into two, each of which usually subdivided again. Hydrothecae on stem and branches, arranged in three rows, almost entirely immersed in the substance of the axial tube; aperture oval, with no marginal teeth; operculum of a single adcauline flap.

Gonosome. Gonophores absent.

This species is easily distinguished from the others by the arrangement of hydrothecae in three rows. It is supposed that the species seems as the simplest form in the genus. The present material were abundantly collected washed ashore at Daikoku-shima near Akkeshi Bay.

Distribution. The Arctic Ocean and north polar and north temperate regions of the Pacific. Alaska, California, Kamtschatka, the Okhotsk Sea and Hokkaido.

24) *Selaginopsis decemseriaria* Mereschkowsky

(Pl. I, figs. 21, 22)

Selaginopsis decemseriaria: Mereschkowsky, 1878, p. 442, figs. 1-3, pl. 17, figs. 13-16;

Kirchenpauer, 1884, p. 14; Stechow, 1923a, p. 16, No. 178.

Thuiaria decemseriaria; Broch, 1910, p. 222; Kudelin, p. 344, figs. 414-416, pl. 3, fig. 2.

Trophosome. Colony attaining 9 cm in this specimen which is destitute of distal and proximal portions. Main stem stout, decked with thick

periderm, slightly zigzag. Branches arising from all sides in the bending point of the stem, divided at just front of the attachment into two branchlets, each of which is divided twice or more times. Hydrothecae arranged in branches in nine to twelve rows, entirely immersed in the tubular axis, cylindrical in shape, slightly narrowed at the end; aperture oval, no marginal teeth. Diameter of branchlets 0.75-0.90 mm. Length of hydrotheca in abcauline wall 0.37-0.39 mm; breadth at the widest portion 0.35-0.36 mm.

Gonosome. Gonangia springing from all sides of branchlets, elongate oval, with a broad collar and large terminal aperture. Wall of gonangium smooth, without annular corrugations. Gonangium attaining 1.4 mm in height.

The present material was collected washed ashore at Daikoku-shima near Akkeshi Bay.

Distribution. North Pacific Ocean. The Okhotsk Sea, the Japan Sea and Hokkaido.

25) *Salaginopsis breitfussi* (Kudelin)

(Pl. I, fig. 23)

Thuiaria breitfussi; Kudelin, 1914, p. 244, figs. 78 and 78a, pl. 2, fig. 9.

Trophosome. Main stem stout, covered with thick periderm. Branches springing in distal portion from two sides of stem alternately and in proximal portion from all sides of it. From each of branches branchlets arise alternately in two sides. Hydrothecae present on branches and branchlets, entirely immersed, arranged in eight to ten rows which are in pairs in most cases. Hydrothecal margin nearly round, without teeth; operculum composed of a single adcauline flap. Branchlets about 3 cm in length, 1.0-1.2 mm in diameter. Length of hydrotheca in abcauline wall about 0.41 mm, breadth in widest portion about 0.32 mm.

Gonosome. Gonophores not present.

This species has been reported from the Arctic Ocean by Kudelin (1914), but new to Japanese waters. The material was collected washed ashore at Daikoku-shima near Akkeshi Bay.

Distribution. The Arctic Ocean and Akkeshi Bay.

26) *Plumularia undulata* n. sp.

(Pl. I, figs. 24-26)

Trophosome. Colony plumose, attaining 6 cm in height. Hydrorhiza creeping on the algae, covered with a thick perisarc. Stem not fascicled, unbranched, divided into regular internodes of which the proximal ones

only provide a cauline nematophore on each but each of all the remainder bears a hydrocladium on a process of the distal end and a cauline and a mesial nematophores. Hydrocladia alternate, divided into regular rather short hydrothecate internodes, without intermediate internodes. Two series, right and left, of hydrocladia are not present in one plane, consequently before and behind sides of the colony are always distinguishable. Hydrothecae closely approximated, cup-shaped, somewhat deeper than wide, without inner septa; margin not smooth but provided with a tongue-like projection at the abcauline end. One mesial nematophore at the base of each hydrotheca; supracalycine nematophores rather large.

Gonosome. Gonangia arising from the process to which the hydrocladium is attached, with 1-4 small nematophores at the base, not protected by any apparatus. Male gonangium attaining 1.9 mm in height, obconical, more elongated than female, often with a broad neck on the terminal end. All the gonangia present on the before side of the colony.

The present species differs from the known species of *Plumularia* on account of the hydrothecal margin. The tongue-like projection of the hydrothecal margin is more or less variable in shape but is very distinct character in all specimens of the species. This is one of the commonest species in the coast of Hokkaido. The gonophores are seen in July to September.

Distribution. All coast of Hokkaido.

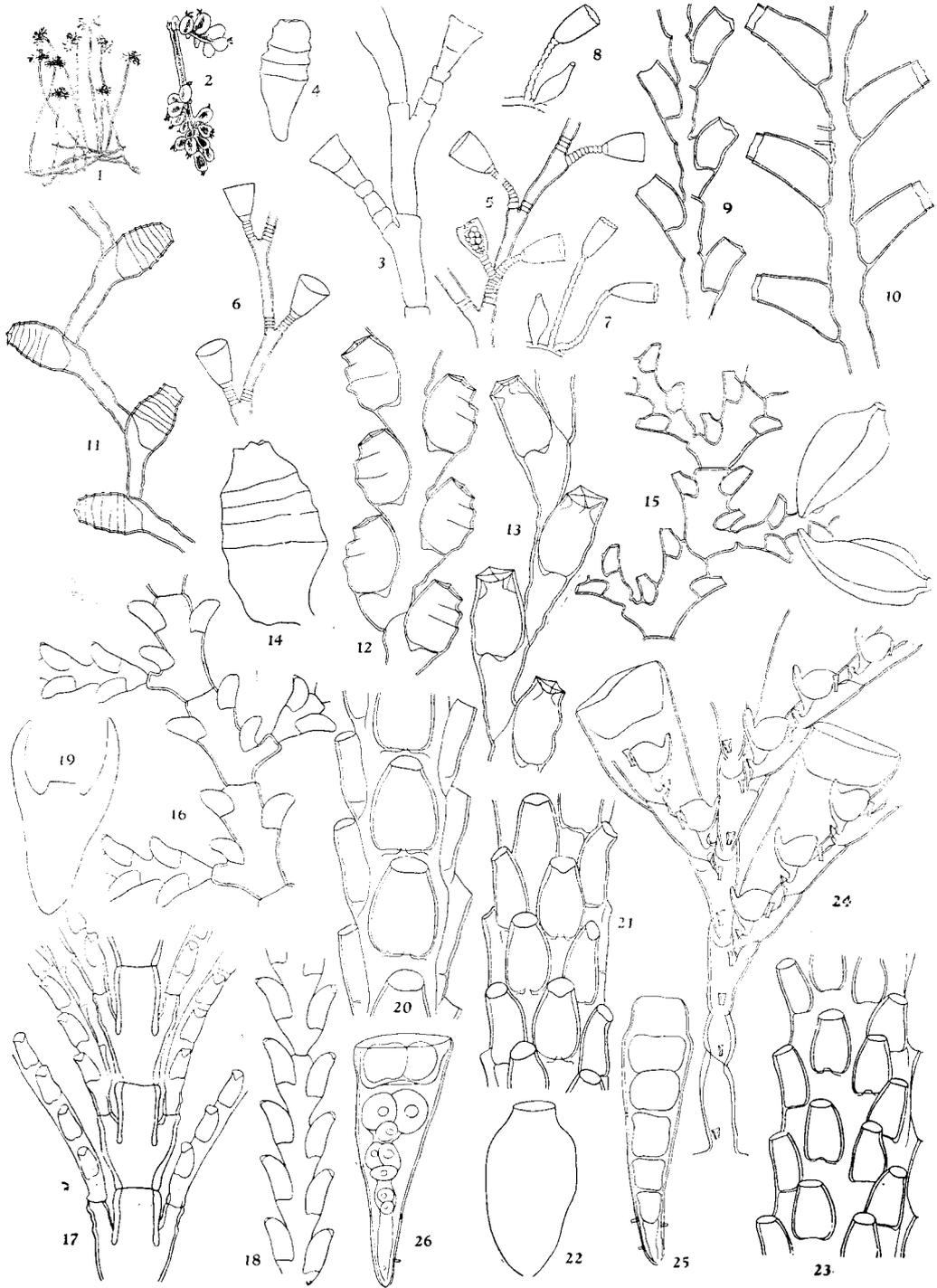
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Explanation of Plate I

- Fig. 1. *Tubularia venusta* n. sp. Part of colony. Fig. 2. *Tubularia venusta* n. sp. Peduncle with female gonophores. Fig. 3. *Halecium magellanicum* (Hartlaub). Part of colony. Fig. 4. *Halecium magellanicum* (Hartlaub). Gonangium. Fig. 5. *Obelia plana* (M. Sars). Part of colony with gonangium. Fig. 6. *Obelia dichotoma* (L.). Part of colony. Fig. 7. *Campanularia volubilis* (L.). Part of colony with gonangium. Fig. 8. *Campanularia urceolata* (L.). Part of colony with gonangium. Fig. 9. *Symplectoscyphus tricuspidatus* (Alder). Part of colony. Fig. 10. *Sertularella gigantea* Mereschkowsky. Part of colony. Fig. 11. *Sertularella tenella* (Alder). Part of colony. Fig. 12. *Sertularella rugosa* (L.). Part of colony. Fig. 13. *Sertularella sagamina* Stechow. Part of colony. Fig. 14. *Sertularella sagamina* Stechow. Gonangium. Fig. 15. *Abietinaria costata* (Nutting). Part of stem and colony with gonangia. Fig. 16. *Sertularia tenera* G. O. Sars. Part of stem and branches. Fig. 17. *Sertularia cupressoides* Clark. Part of main stem and branches. Fig. 18. *Sertularia cupressoides* Clark. Part of branch. Fig. 19. *Sertularia cupressoides* Clark. Gonangium. Fig. 20. *Selaginopsis triserialis* Mereschkowsky. Part of branch. Fig. 21. *Selaginopsis decemserialis* Mereschkowsky. Gonangium. Fig. 22. *Selaginopsis decemserialis* Mereschkowsky. Part of branch. Fig. 23. *Selaginopsis breidfussi* Kudelin. Part of branch. Fig. 24. *Plumularia undulata* n. sp. Basal part of colony. Fig. 25. *Plumularia undulata* n. sp. Female gonangium. Fig. 26. *Plumularia undulata* n. sp. Female gonangium.



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