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# Kermadec Biodiscovery Expedition 2011

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Thomas Trnski and Heidi Ann Schlumpf

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# Hydroids (Cnidaria, Hydrozoa: Hydroidolina) from the Kermadec Islands

Jeanette E. Watson Museum Victoria

## Abstract

Thirteen species of hydroids from the Kermadec Islands collected at depths to 24 m by scuba divers are reported. Only 19 species are known from the Kermadec Islands, all from shallow water, eight of these being reported by Hilgendorf (1911) from beach drift at Sunday Island (now Raoul Island). Five species in this collection are exclusively tropical and eight have temperate to tropical affinities. A new species, *Halecium fijiensis* is described.

## Keywords

Kermadec hydroids; 13 species; tropical, temperate affinities.

## INTRODUCTION

This paper describes a collection of 13 species of hydroids made in May to June, 2011 at several islands in the Kermadec Islands (29°16.37'S, 177°55.24'W), 1000 km north east of New Zealand. The hydroids were collected to depths of 24 m by scuba divers.

The hydroid fauna of the Kermadec Islands is poorly known, there being a total of 19 species recorded, all from shallow water; eight of these were reported by Hilgendorf (1911) from beach drift at Sunday Island. Some are represented in the present collection. Vervoort and Watson (2003) also listed 11 species from deeper offshore water to 274 m depths off the Kermadec Islands, collected by the New Zealand National Institute of Water and Atmospheric Research (NIWA).

The subtropical Kermadec Islands supports both temperate and tropical hydroid species; five species in this collection are exclusively tropical and eight have temperate to tropical affinities.

This report includes a description of one new species and redescribes several poorly known species; better known species are annotated. Synonymies relevant to the geographical region are provided. Identified voucher specimens are lodged in the Australian Museum Sydney and a holotype microslide specimen of *Halecium fijiensis* is lodged in the Auckland Museum.

## Family LAFOEIDAE A. Agassiz, 1865

### *Filellum serratum* (Clarke, 1879)

*Lafoëa serrata* Clarke, 1879: 242.

*Reticularia serrata*. – Ralph, 1958: 312.

*Filellumserratum*. – Millard, 1975: 178. – Gravier–Bonnet,

1979: 22. – Hirohito, 1995: 110. – Watson, 2000: 5, fig. 2C. – Vervoort and Watson, 2003: 59.

**Material examined.** One small infertile colony on stem of *Clytia linearis*, intergrown with *Hebella scandens*.

**Remarks.** Undoubtedly there are more hydrothecae in the sample but they are so closely intergrown with and obscured by *H. scandens* that it is difficult to separate them. Hydrothecae colourless to white. The basal striations clearly identify the material as *F. serratum*.

**Distribution.** Indo–Pacific, Japan, tropical Australia, New Zealand.

## Family HEBELLIIDAE Fraser, 1812

### *Hebella scandens* (Bale, 1888) (Figure 1A, B)

*Lafoea scandens* Bale, 1888: 758, pl. 13, figs 16–19. – Gibbons and Ryland, 1989: 395, fig. 14. – Stranks, 1993: 7.

*Hebella scandens*. – Vervoort and Watson, 2003: 66, figs 6G, H, 9A–I.

**Material examined.** Abundant infertile colony on stems of *Clytia linearis*.

**Description and remarks.** Colony stolonial, hydrorhiza of creeping tubular stolons. Hydrotheca borne on a short pedicel, body cylindrical, straight or asymmetrically bent about halfway along length, margin circular, rim slightly everted, some hydrothecae with a thin dome-shaped operculum. Perisarc thin. Colony colourless.

The material agrees in every respect with description of the species by Vervoort and Watson (2003).

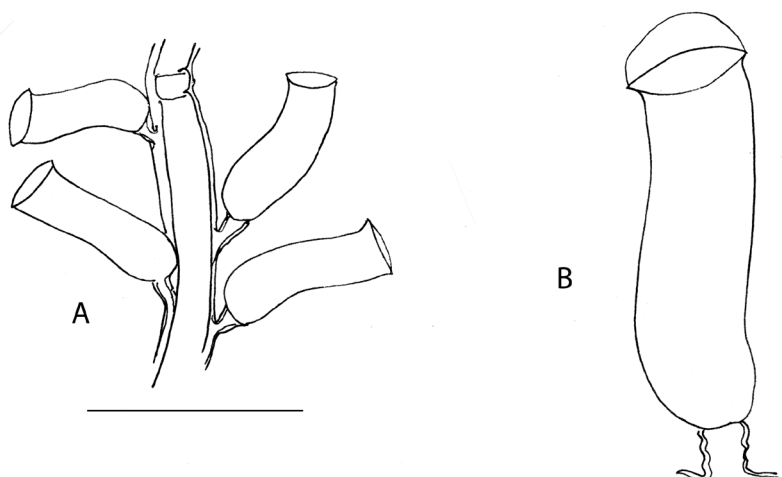


Figure 1. *Hebella scandens* A, part of colony on stem of *Clytia linearis*. B, hydrotheca with dome-shaped operculum. Scale bar, mm: A, B, 0.5.

**Distribution.** Cosmopolitan, including Australia, New Zealand.

**Family HALECIIDAE Hincks, 1868**

*Halecium fijiensis* sp. nov. (Figure 2 A–C)

**Material examined.** Holotype, Auckland Museum Reg. No. MA 73398. Two Infertile stems on sponge.

**Description.** Hydrorhiza of tangled rugose tubular stolons. Stems monosiphonic to 10 mm high, perisarc thick, sparsely to complexly branched. Basal stem segments in linear series without hydrothecae. Branching either from a single a hydrophore just beneath a hydrotheca or from two opposite hydrophores one each side of base of hydrotheca imparting a dichotomous appearance. Hydrophores linear, distalmost variable in length, deeply and irregularly septate, expanding from a transverse proximal node to base of hydrotheca.

Hydrotheca saucer-shaped, expanding strongly from transverse diaphragm to margin, some hydrothecae showing a concave pseudodiaphragm, a row of large desmocytes halfway between diaphragm and margin. Margin delicate with strongly everted rim, in some hydrothecae rim upwardly curled. Hydranth large with about 30 tentacles.

Measurements of *Halecium fijiensis*,  $\mu\text{m}$

Hydrorhiza, width of stolon	88–112
Hydrophore	
– length of primary from proximal node to hydrotheca	128–192
Hydrotheca	
– diameter at diaphragm	152–160
– depth, diaphragm to margin	40–48
– diameter at margin	208–228

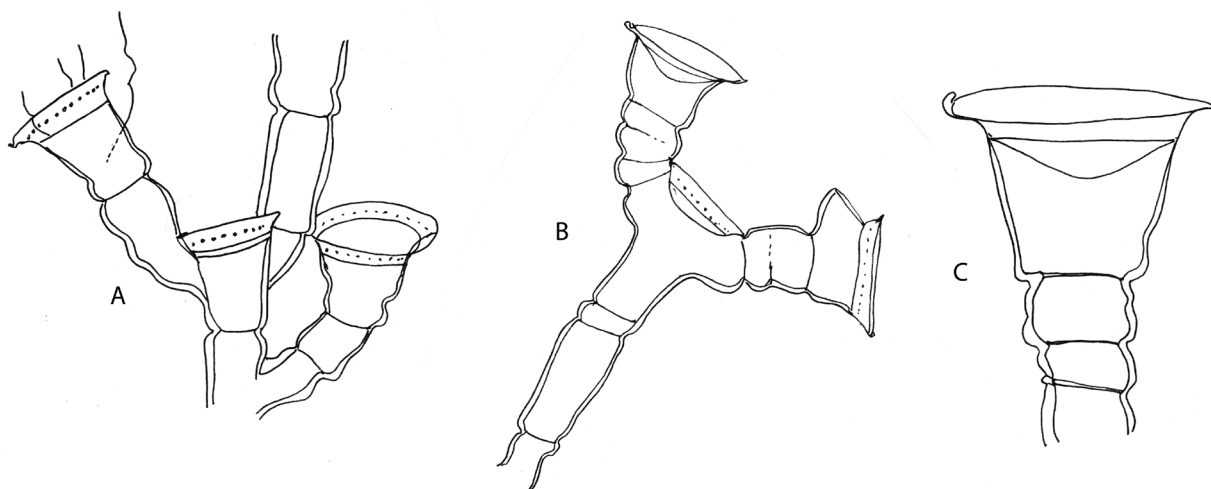


Figure 2. *Halecium fijiensis* sp. nov. A, part of branched stem. B, dichotomous branching with opposite hydrophores. C, hydrotheca enlarged, showing upturned rim and pseudo-diaphragm. Scale bar, mm: A, B, 0.5. C, 0.2.

**Remarks.** Species considered were *Halecium reflexum* Stechow, 1919 and *Halecium plicatocarpum* Vervoort and Watson, 2003. The hydrothecae of both *H. reflexum* (see Vervoort 1968) and *H. plicatocarpum* are smaller than in the present specimen. I have examined a microslide labelled "*Halecium* sp. 1" by Gibbons and Ryland (1991: 390, fig. 9) displaying a small fragmentary specimen from Fiji loaned by the Queensland Museum (Reg. No. GL 10184). Although there is no upward flexure of the hydrothecal margin in the Fiji specimen, in all other respects both are identical. The marginal flexure of the Kermadec specimens may be due to shrinkage during collection and preservation.

The material of *Halecium fijiensis* is infertile and limited to a few specimens in the present and the Gibbons and Ryland collections. Had it been recorded from only the Kermadec Islands its status as a new species would be somewhat doubtful. However its occurrence in two widely separated localities confirms its identity as a new species.

**Etymology.** Named for Fiji, the locality from where the species was first reported by Gibbons and Ryland.

*Halecium tenellum* (Hincks, 1861) (Figure 3A, B)

*Halecium tenellum* Hincks, 1861: 252, pl. 6, figs 1–4. – Vervoort, 1959: 229, fig. 8. – Vervoort, 1966: 102, fig. 2. – Millard, 1975: 156, fig. 50F–L. – Vervoort and Watson, 2003: 98, fig. 19A, B.

**Material examined.** Infertile colonies on algal holdfast.

**Description.** Hydrorhiza tubular, rugose, stolons loosely creeping on substrate. Stems to 2 mm high, monosiphonic, simple to sparsely branched, no visible internodes. Hydrophores cylindrical, in linear series of variable length, one, rarely two opposite, arising from below a hydrotheca on a short geniculate apophysis with deep transverse distal node.

Hydrothecae closely adpressed to but not adnate to hydrophore, shallow saucer-shaped, expanding slightly

from a transverse diaphragm to margin, sometimes a concave pseudodiaphragm below and a line of desmocytes above, rim transverse to hydrophore, not everted or replicated. Hydranth with about 16 tentacles. Persisarc of colony relatively thick.

Measurements of *Halecium tenellum*,  $\mu\text{m}$

Hydrorhiza, width	68–92
Hydrophore, length below hydrotheca	72–220
– width at apophysis distal node	52–60
Hydrotheca	
– diameter at diaphragm	80–100
– depth, diaphragm to margin	32–40
– diameter at margin	108–116

**Remarks.** The specimen is doubtfully referred to *Halecium tenellum* although the hydrothecal dimensions are somewhat greater than is usual for that species. *H. tenellum* was also recorded from the Kermadec Islands by Hilgendorf (1911).

Putative world-wide distribution of *Halecium tenellum* almost certainly involves confusion of some closely related species. Unravelling the problem of whether there is there only one widespread or several species requires critical review of the literature supported by molecular analysis.

**Distribution.** Atlantic, Indian and Pacific Oceans, Australia, possibly New Zealand.

**Family SERTULARIIDAE Lamouroux, 1812**

*Dynamena quadridentata* (Ellis and Solander, 1786)

*Sertularia quadridentata* Ellis and Solander, 1786: 57. – Lamarck, 1816: 2, 121.

*Pasythea* (*Sertularia*) *quadridentata*. – Lamouroux, 1812:

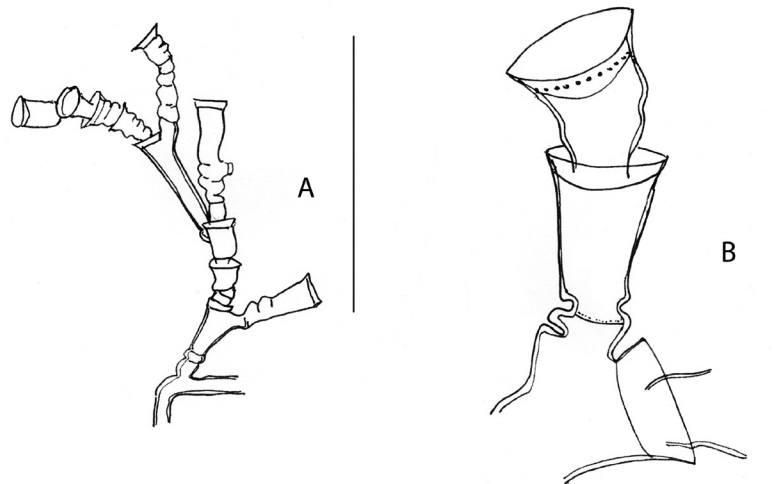


Figure 3. *Halecium tenellum*. A, part of stem. B, hydrophores and hydrothecae. Scale bar, mm: A, 2.0. B, 0.2.



183.– Lamouroux, 1816: 156.– Whitelegge, 1889: 193.– Nutting, 1927: 226.– Yamada, 1959: 58.

*Dynamena quadridentata*.– Billard, 1925b: 194, 222.– Trebilcock, 1928: 23.– Blackburn, 1942: 113. – Pennycuik, 1959: 193.– Ralph, 1966: 159.– Shepherd and Watson, 1970: 140.– Millard, 1975: 266. – Gibbons and Ryland, 1989: 411.– Vervoort, 1993: 108.– Calder, 1995: 543.– Hirohito, 1995: 176.– Watson, 1996: 78.– Watson, 1997: 520.– Watson, 2000: 15.

**Material examined.** One small infertile colony on algal holdfast.

**Description and remarks.** The material is identical with *Dynamena quadridentata* reported from Darwin by Watson (2000). The stems are heavily invested by *Hebella scandens*.

**Distribution.** Circumglobal in tropical waters.

*Sertularella diaphana* (Allman, 1885) (Figure 4A–C)

*Thuiaria distans* Allman, 1877: 27.

*Thuiaria pinnata* Allman, 1877: 28.

*Sertularella diaphana*.– Billard, 1933: 12. –Dollfus, 1933: 127.– Millard, 1958: 188.– Yamada, 1959: 63.– Pennycuik, 1959: 195.– Hirohito, 1969: 21.– Millard, 1975: 285.– Millard and Bouillon, 1975: 14.– Gibbons and Ryland, 1989: 414.– Calder, 1991: 101.– Vervoort, 1993: 214.– Hirohito, 1995: 192.– Watson, 1996, 78.– Schuchert, 2003: 184, fig. 40A–D.– Vervoort and Watson, 2003: 159, fig. 36G, H.

**Material examined.** Several fertile stems detached from substrate.

**Description.** Stems to 70 mm high, wide and thick, arising from a tangled hydrorhiza of stout tubular stolons. Stems polysiphonic, unbranched or sparsely branched, with several proximal fascicular tubes, the tubes running part way up main stem but not onto

hydrocladia. Hydrocladia alternate, to 15 mm long, standing stiffly out at an angle of 20–30° from stem, internodes indistinct with two alternate hydrothecae, nodes where present, oblique.

Hydrothecae biserial, tubular, adcauline wall convex, abcauline wall concave, body narrowing along free adcauline wall to margin. Margin with four delicate low cusps, a slight submarginal thickening of abcauline and adcauline walls, operculum of four delicate valves, hydrothecal floor not clearly marked, a knob of perisarc at base of adnate adcauline wall. Hydranth with diverticulum and 18–20 tentacles.

One to three large gonothecae proximal on hydrocladium, each facing distally on a short bent pedicel below a hydrotheca; gonotheca elongate, basally curved, becoming cylindrical at about one third distance along body, margin irregularly circular with four very low equidistant peaks and four distinct ridges passing down body to base. Operculum a flattened dome of tissue. Sex of gonophores indeterminate. Perisarc of colony very thick. Colony probably yellow in colour.

Measurements of *Sertularella diaphana*,  $\mu\text{m}$

Hydrocladium	
– distance between hydrothecae on same side	920–1000
– width at node (where visible)	128–176
Hydrotheca	
– length of adnate adcauline wall	364–400
– length of free adcauline wall	80–140
– length abcauline wall	252–280
– width of margin	212–232
Gonotheca	
– length including pedicel	2000–2400
– width of pedicel	96–160
– maximum width	736–872
– width at margin	656–960

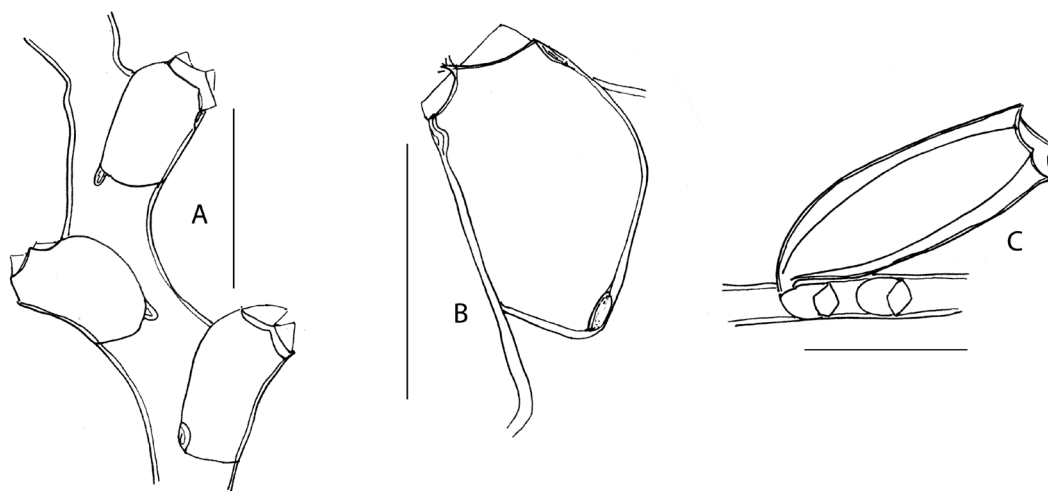


Figure 4. *Sertularella diaphana*. A, stem internode. B, hydrotheca enlarged, showing perisarc thickening at base. C, gonotheca. Scale bar, mm: A, 0.5. B, 0.3. C, 1.0.

**Remarks.** *Sertularella diaphana* is a common but variable tropical species. The adcauline wall of the hydrotheca is represented by authors as partially or completely adnate to the hydrocladium and hydrothecae, either overlapping or separated [see Watson (2000), Vervoort and Watson (2003), Schuchert (2003)]. The apical peaks of the gonothecal wall in the present material are eroded imparting a rounded appearance to the margin.

**Distribution.** Circumglobal in tropical and subtropical waters.

*Sertularella integra* Allman, 1876 (Figure 5)

*Sertularella integra* Allman, 1876a: 262, pl. 13, figs 3, 4.– Bale, 1924: 242.– Ralph, 1961a: 827, fig. 23a–d.– Stranks, 1993: 16.– Vervoort, 1993a: 191.– Vervoort and Watson, 2003: 166, fig. 38D–J, 39A.

**Material examined.** One infertile stem on coralline rock.

**Description and remarks.** Stems monosiphonic, simple, one stem with broken off branch. Hydrothecae biserial, opposite, cylindrical, wall with three or four ridges, rarely smooth, narrowing to margin. Margin with four delicate cusps and three submarginal cusps deep inside margin.

The material accords with the description of *Sertularella integra* given by Vervoort and Watson (2003).

**Distribution.** Type locality New Zealand; also recorded from the Malay Archipelago.

*Symplectoscyphus ?indivisus* (Bale, 1882) (Figure 6A–E)

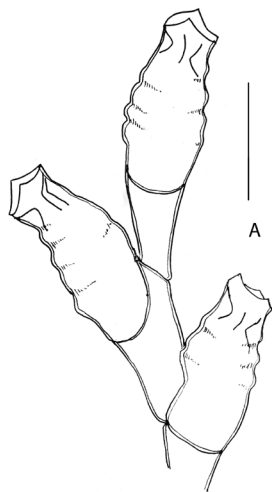


Figure 5. *Sertularella integra*. Stem internodes and hydrothecae. Scale bar, mm: 0.5.

*Sertularella indivisa* Bale, 1882: 24, pl. 12, fig.7.– Bale, 1884: 105, pl.3, fig. 5, pl. 19, fig. 27.– Bartlett, 1907: 42.– Bale, 1915: 205.– Blackburn, 1942: 115.– Hodgson, 1950: 31, figs 55–56.

*Sertularella variabilis* Bale, 1888: 764, pl. 15, figs 5–9.– Stranks, 1993: 19.

*Symplectoscyphus indivisus*.– Stechow, 1922: 148.– Ralph, 1961a: 803, fig. 51i–k.– Watson, 1973: 175.– Watson, 1994a: 67.

**Material examined.** Abundant fertile colony on algal holdfast, overgrown by red microalgae.

**Description.** Hydrorhizal stolons thick. Stems to 5 mm high, unbranched or rarely with one branch, monosiphonic with several deep basal corrugations, stem internodes short, nodes oblique, distinct where present, marked by narrowing of perisarc but often absent, a hydrotheca about middle of internode. Hydrothecae alternate, tubular, narrowing from base to margin, free adcauline wall weakly concave, adnate wall more strongly convex, abcauline wall almost straight to faintly convex, a knot of perisarc at base of adcauline wall. Margin with two delicate cusps closer to adcauline wall than abcauline wall, and three large equidistant submarginal cusps in the embayments. Operculum of three delicate valves. Hydranth with diverticulum.

Gonotheca borne on a short, narrow pedicel bent to one side inserted above a hydrotheca near base of stem, large, barrel-shaped, with six or seven shallow corrugations, narrowing to apex with three low cusps. Gonophores probably male, anchored by strands of tissue to internal wall of gonotheca.

Measurements of *Symplectoscyphus ?indivisus*,  $\mu\text{m}$

Hydrorhiza, width	156–160
Stem	
– basal width	148–168
– internode length	384–416
– width at node	88–120
Hydrotheca	
– length of adnate adcauline wall	216–240
– length of free adcauline wall	280–304
– length of abcauline wall	400–416
– maximum width	256–272
– width at margin	176–200
– width adcauline submarginal cusp	32–52
Gonotheca	
– length	1200–1376
– maximum width	704–776
– width at margin	192–208

**Remarks.** Unusually for the genus *Symplectoscyphus* the perisarc of the hydrothecal margin is very thin many being collapsed and others obscured by overgrowth of diatoms and coralline algae. The material is here doubtfully assigned to *Symplectoscyphus indivisus* even though it has forward-facing cauline hydrothecae and a corrugated gonotheca with terminal spines on a short neck, more akin to *Sertularella*. The common Australasian species presently recognized as *S. indivisus*

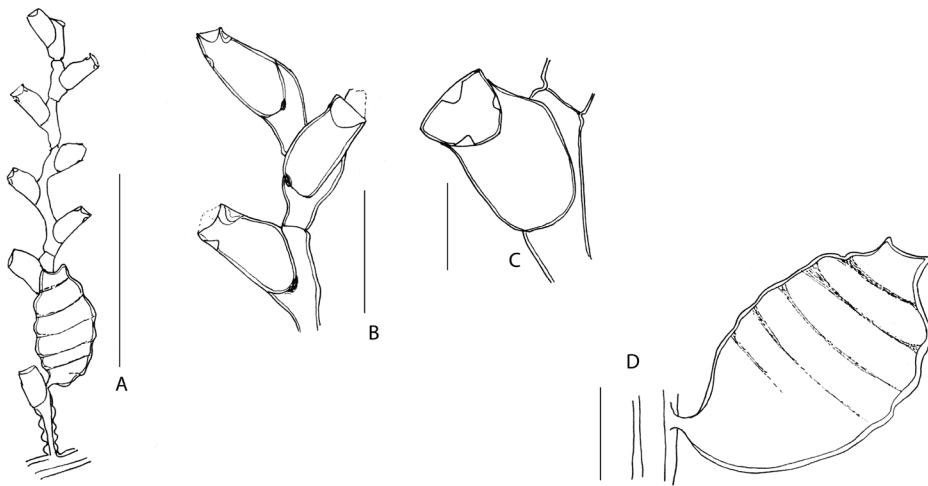


Figure 6. *Symplectoscyphus ?indivisus*. A, whole stem. B, stem internodes and forward-facing hydrotheca. C, internal submarginal hydrothecal cusps. D, gonotheca. Scale bar, mm: A, 2.0. B, D, 0.5. C, 0.2.

is highly variable and has several characters intermediate between *Symplectoscyphus* and *Sertularella*. Its taxonomic status requires critical examination.

**Distribution.** South-east Australia, doubtfully from New Zealand, Kermadec Islands.

#### Family HALOPTERIDIDAE Millard, 1962

##### *Monostaechas quadridens* McCrady, 1859 (Figure 7)

*Monostaechas quadridens* McCrady, 1859: 199.–Pennycuik, 1959: 178, pl. 3 fig. 6.–Yamada, 1959: 81.–Mammen, 1965: 98.–Vervoort, 1968: 61.–Hirohito, 1974: 35, fig. 16.–Millard and Bouillon, 1974: 9.–Watson, 1979: 234.–Calder, 1983: 17, fig. 9.–Hirohito, 1995: 249, fig. 84a–g.–Watson, 1996: 78.–Schuchert, 1997: 130, fig.

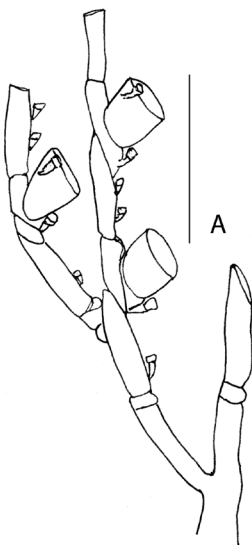


Figure 7. *Monostaechus quadridens*. Part of stem showing typical mode of branching. Scale bar, mm: 0.5.

47.–Vervoort and Watson, 2003: 364, fig. 88H–J.–Galea, 2010: 26, fig. 6M.–Watson 2010: 18, fig. 9A–J.

**Material examined.** Several small infertile colonies on ascidian.

**Remarks.** The material conforms with descriptions of *Monostaechas quadridens* by Vervoort and Watson (2003) from New Zealand and southern Australia (Watson 2010).

**Distribution.** Circumglobal in temperate to tropical seas; Australia, New Zealand.

#### Family PLUMULARIIDAE McCrady, 1859 (Figure 8A, B)

##### *Plumularia setacea* (Linnaeus, 1758)

*Sertularia setacea* Linnaeus, 1758: 813.

*Plumularia tripartita* von Lendenfeld, 1885a: 477, pl. 12, figs 8–10.

*Plumularia setacea*.–Lamarck, 1816: 129.–Hincks, 1868: 296.–Bale, 1888: 778.–Billard, 1913: 32.–Hilgendorf, 1911: Ritchie, 1911: 851.–Bale, 1915: 294.–Bale, 1924: 252, fig. 11.–Pennycuik, 1959: 180.–Ralph, 1961d: 236.–Hirohito, 1974: 41.–Millard, 1975: 399, fig. 124–K.–Watson, 1994a: 67.–Cornelius, 1995: 158.–Watson 1996: 79.–Watson, 2000: 53, fig. 41A, B.–Vervoort and Watson, 2003: 398, figs 96G, 97A–G, 98A.

**Material examined.** Several fertile stems on ascidian.

**Description and remarks.** One stem bears almost mature and empty male gonothecae. The specimens are identical with *Plumularia setacea* reported from Darwin, Australia by Watson (2000). *P. setacea* was also recorded from the Kermadec Islands by Hilgendorf (1911).

**Distribution.** Cosmopolitan in temperate and tropical seas.

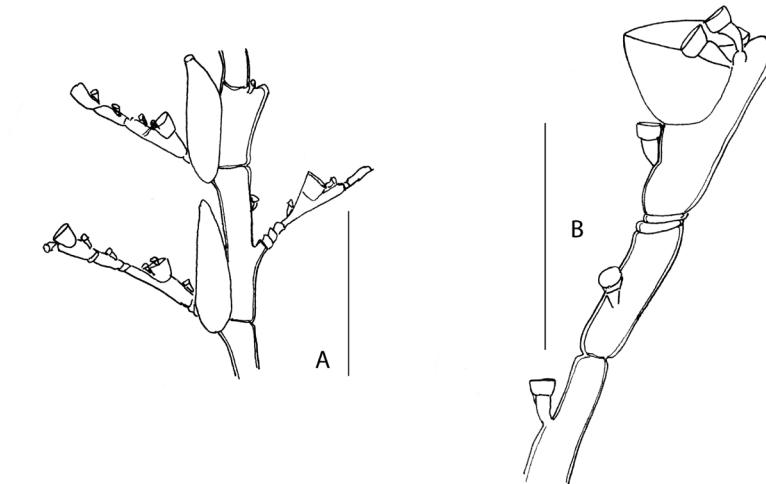


Figure 8. *Plumularia setacea*. **A**, stem internodes and hydrocladia with male gonothecae. **B**, hydrocladium with athecate and hydrothecate internodes. Scale bar, mm: **A**, 0.5; **B**, 0.2.

Family AGLAOPHENIIDAE Marktanner-Turner-etscher, 1890

*Aglaophenia laxa* Allman, 1876 (Figure 9A)

*Aglaophenia laxa* Allman, 1876a: 275, pl. 21, figs 5–7.– Hilgendorf, 1911: 541, figs 1–3.– Bale, 1924: 260, fig. 15.– Trebilcock, 1928: 25, pl. 5, figs 5–5b.– Totton, 1930: 233, figs 67, 58.– Ralph, 1961b: 69, fig. 10a–c.– Stranks, 1993: 11.– Vervoort and Watson, 2003: 275, figs 64F–I, 65A, B.

**Material examined.** Several infertile stems on ascidian.

**Remarks.** *Aglaophenia laxa* is recorded from all around New Zealand and was previously reported from the Kermadec Islands by Hilgendorf (1911).

**Distribution.** Tasman Sea, New Zealand.

*Gymnangium hians* (Busk, 1852) (Figure 9B)

*Plumularia hians* Busk, 1852: 396.

*Halicornaria hians*.– Bale, 1884: 179.– Kirkpatrick, 1890: 604.– Billard, 1913: 68.– Jäderholm, 1916: 8.– Briggs, 1918: 47.– Nutting, 1827: 237.– Vervoort, 1941: 222.– Millard, 1958: 219.– Pennycuik, 1959: 186.

*Gymnangium hians*.– Stechow, 1923: 19.– Stechow, 1924: 69.– Stechow, 1925: 254.– Millard and Bouillon, 1973: 92.– Millard, 1975: 444.– Vervoort, 1977: 84.– Vervoort and Vasseur, 1977: 84.– Hirohito, 1983: 77.– Ryland and Gibbons, 1991: 542.– Hirohito, 1995: 287.– Watson, 1996: 79.– Watson, 2000: 58, fig. 47A–E.– Vervoort and Watson, 2003: 292, fig. 69F.

**Material examined.** Colony comprising several flexuous infertile stems.

**Remarks.** *Gymnangium hians* is not well known from the New Zealand region although Hilgendorf (1911) probably previously recorded it (as *Aglaophenia* sp. 4) from the Kermadec Islands.

**Distribution.** Tropical Australia and Lord Howe Island.

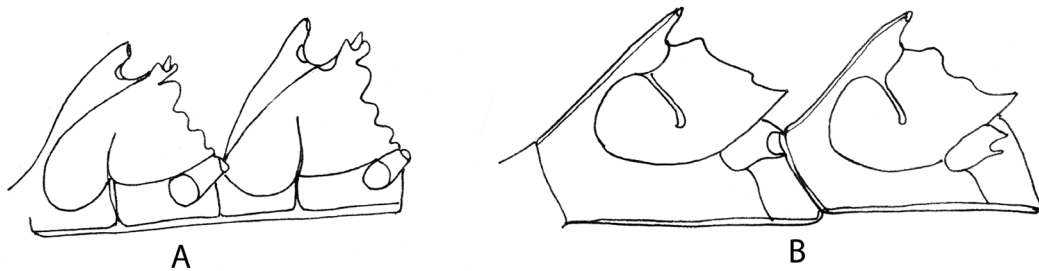


Figure 9. **A**, *Aglaophenia laxa*. Hydrocladium with two hydrothecae. **B**, *Gymnangium hians*. Hydrocladium with two hydrothecae. Scale bar, mm: **A**, **B**, 0.5.



# Family CAMPANULARIIDAE Johnston, 1836

## *Clytia linearis* (Thornely, 1900) (Figure 10A–C)

*Obelia linearis* Thornely, 1900: 453.

*Campanularia gravieri* Billard, 1904b: 482.– Millard, 1975: 215.– Millard and Bouillon, 1973: 51.

*Campanularia obliqua* Clarke, 1907: 9.

*Clytia linearis*.– Cornelius, 1982: 84.– Gibbons and Ryland, 1989: 404.– Calder, 1991: 62.– Migotto, 1996: 85.

**Material examined.** Several infertile colonies on red alga.

**Description.** Colonies to 6 mm high, hydrorhiza of tubular stolons creeping on alga. Stems simple or sparingly branched more or less alternately, base of stem with up to 12 deep annulations, pedicel (branch) given off from a distinct geniculation, typically with 10 annulations above geniculation, short pedicels completely annulated to base of hydrotheca, longer pedicels with smooth mid region, followed by four to 10 distal annulations to base of hydrotheca. Hydrotheca deep, slenderly campanulate, walls smooth, basal chamber large, expanding from base to transverse diaphragm. Perisarc of margin thin with about 10 pointed cusps separated by scalloped embayments, width of embayment about the same as height of cusp.

Measurements of *Clytia linearis*,  $\mu\text{m}$

Hydrorhiza diameter	96–104
Stem	
– diameter at base	128
Hydrotheca	
– diameter at base	68–108
– diameter at diaphragm	116–160
– depth, margin to base	584–846
– diameter at margin	292–360
– length of marginal cusp	60–72
– distance between cusps	52–64

**Remarks.** The hydrotheca of *Clytia linearis* is a very variable in size over its geographical range and even in the same colony. Descriptions and illustrations of the margin of *C. linearis* is often depicted as a series of sharp linear cusps passing down as pleats in the hydrothecal wall. The pleats do not occur in fresh material and are caused by shrinkage and collapse of the margin during preservation or mounting.

**Distribution.** Circumglobal in warm shallow waters.

## ACKNOWLEDGEMENTS

I thank the Australian Museum and Auckland Museum for the opportunity to examine the collection.

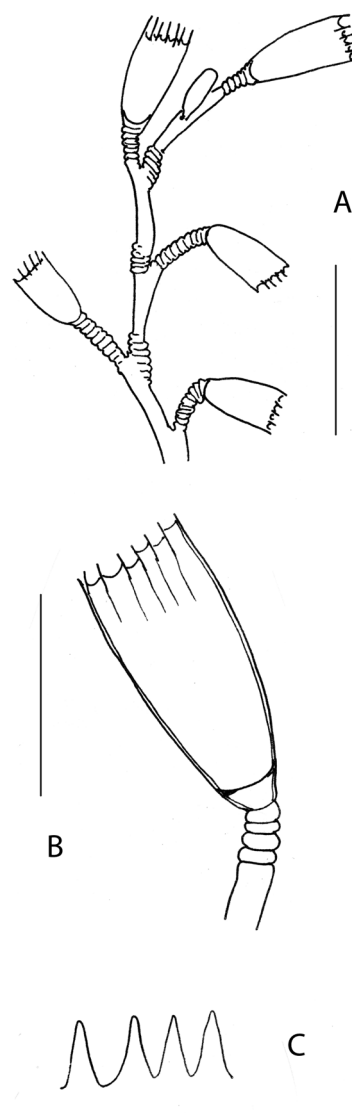


Figure 10. *Clytia linearis*. A, part of stem. B, hydrotheca with collapsed cusps. C, part of margin enlarged showing entire cusps. Scale bar. mm: A, 1.0. B, 0.5. C, 0.1.

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Jeanette E. Watson, Honorary Research Associate, Marine Biology, Museum Victoria, P.O. Box 666, Melbourne, Australia, 3001. email: hydroid@bigpond.com

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