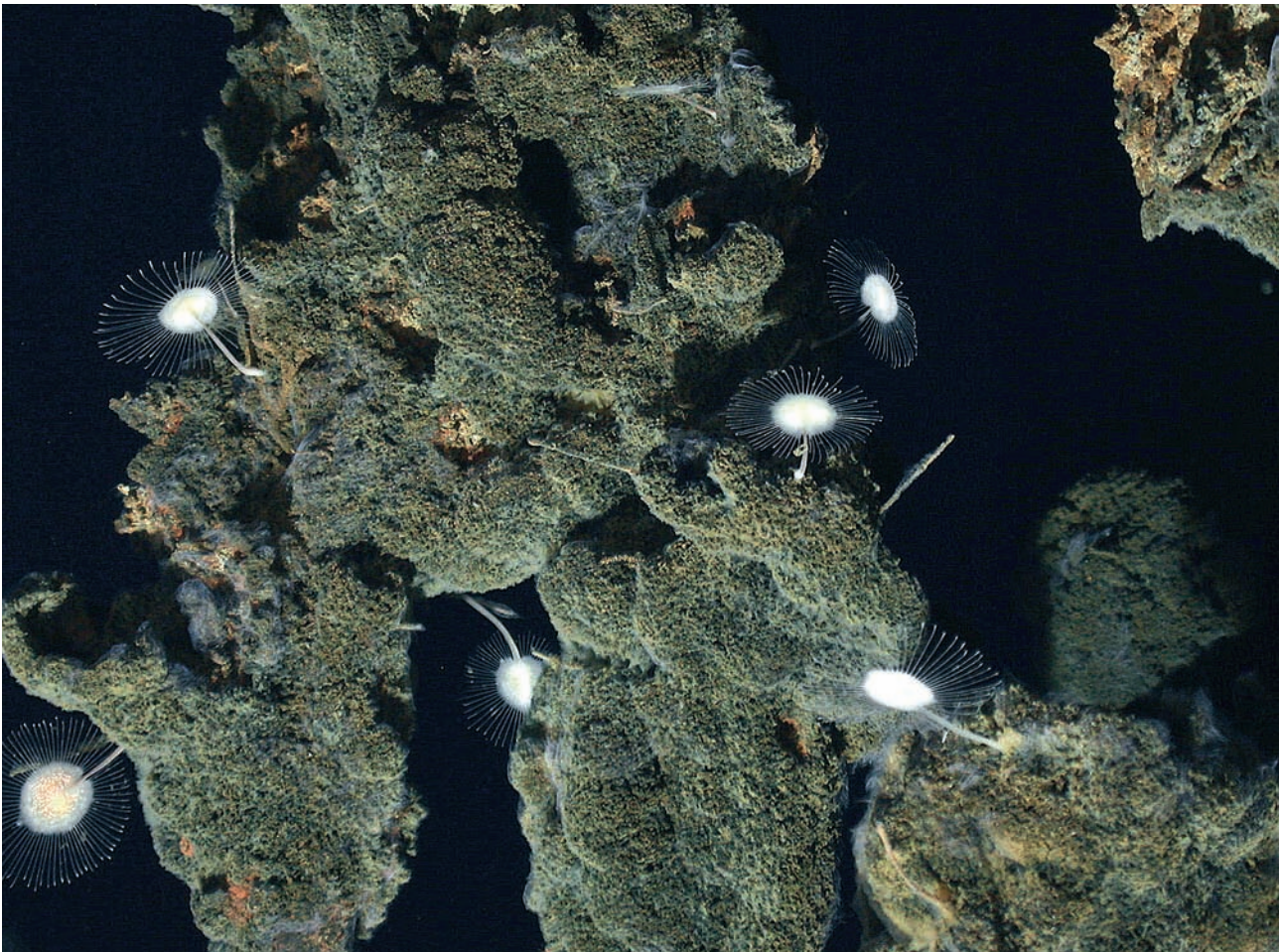


## Porifera

Deep-sea representatives of the Porifera (sponges) belong mainly to the classes Hexactinellida and to a special family of Demospongiae, class Poecilosclerida, the Cladorhizidae, although many other Demospongiae are able to live in bathyal environments. Hexactinellida and Cladorhizidae display two very different life strategies allowing them to survive in deep-sea conditions where life is difficult for sponges, which are filter-feeders living on tiny particles. The hexactinellids have a highly developed filter-feeding system with large cavities lined by extremely thin living tissue to maximize the volume of filtered water and the ability for retention of particles. Conversely, the Cladorhizidae have lost their filter-feeding mode and rely on carnivory of relatively large prey, mostly crustaceans, a very unusual and unexpected mode of feeding in sponges. This strategy allows cladorhizids to reach the hadal zone with a depth record of 8840 m, whereas the hexactinellids and “normal” demosponges do not exceed 7000 m.

Both hexactinellids and cladorhizids are not members of the true vent communities. Up to now, they have never been observed in the immediate environment of active smokers. However, a few hexactinellids and numerous cladorhizids occur at few distance from the active vents in high diversity, and at a high proportion of undescribed species in the case of cladorhizids (VACELET, in press). These carnivorous sponges benefit, at least in part, from a general distant enrichment around the vents. At the Lau sites, cladorhizid specimens caught tens of larval zoe of crab *Austinograea alaysae* (M. Segonzac, pers. obs.). It cannot be excluded, however, that they belong to a “non-vent” fauna taking advantage only of the presence of hard substrata offered by the lava issued at rapidly spreading areas and that their high diversity is due to a higher sampling effort in these areas.



1: *Abyssocladia* sp. from Kilo Moana, Lau Back-Arc Basin, TUIM 05 cruise © M. Tivey.

The cladorhizids are generally small sponges with a morphology rather unusual in sponges. They are erect, with a pinnate or symmetrical shape, and their aquiferous system, long considered as a diagnostic characteristic of the phylum Porifera, has been discarded in most genera. A special mention, however, should be made for the genus *Chondrocladia*, in which a canal system and choanocyte chambers are maintained, but serve to inflate large spheres on which the prey is captured. The prey, mostly small crustaceans, are passively captured by means of hook-like cheloid microscleres lining the surface of the sponge and catching the setae or appendages of various invertebrates, acting as a Velcro cover. In the absence of a digestive cavity, cells act individually to digest the prey.

The classification of the carnivorous sponges is presently rather problematic (HAJDU & VACELET 2002). They all belong to the order Poecilosclerida, and most are classified in the family Cladorhizidae, with several genera distinguished mainly by the microsclere spicules. These microscleres, however, belong to different evolutionary lines of the Poecilosclerida. Furthermore, it appears that a carnivorous feeding habit also exists in some other poecilosclerids displaying a similar morphology, but classified in different families due to their different cheloid microscleres. Molecular characters have not yet been used for the distinction of the evolutionary lines of these sponges.

These deep-sea sponges are highly fragile. The hexactinellids, although supported by a highly developed siliceous skeleton, have very thin, partly syncytial living tissue which is very difficult to preserve properly. They must be preserved in good histological or cytological fixatives as soon as possible after collection. The carnivorous sponges have very fragile appendages that are generally only partially preserved during collection. Observation of their morphology from manned submersibles or ROVs is important. For instance, a long time was needed to realize that a mysterious organism with pedunculate, translucent spheres actually corresponds to the genus *Chondrocladia* as it was known from preserved specimens, in which the spheres were contracted. Their histology and reproduction is poorly known and could be studied only from specimens preserved in formalin or fixatives for electron microscopy. The present uncertainties in the distinction of evolutionary lines in carnivorous sponges require more information on their molecular characters, and the preservation of fragments in alcohol is highly desirable.

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#### References:

- HAJDU E. & J. VACELET (2002) in HOOPER J.N.A. & R.W.M VAN SOEST (Eds.) *Systema Porifera: A Guide to the Classification of Sponges*. Vol. 1: 636-641.  
VACELET J. (in press) *Zool. J. Linn. Soc.*

Porifera, Demospongiae, Poecilosclerida, Cladorhizidae

*Abyssocladia dominalba* VACELET, in press

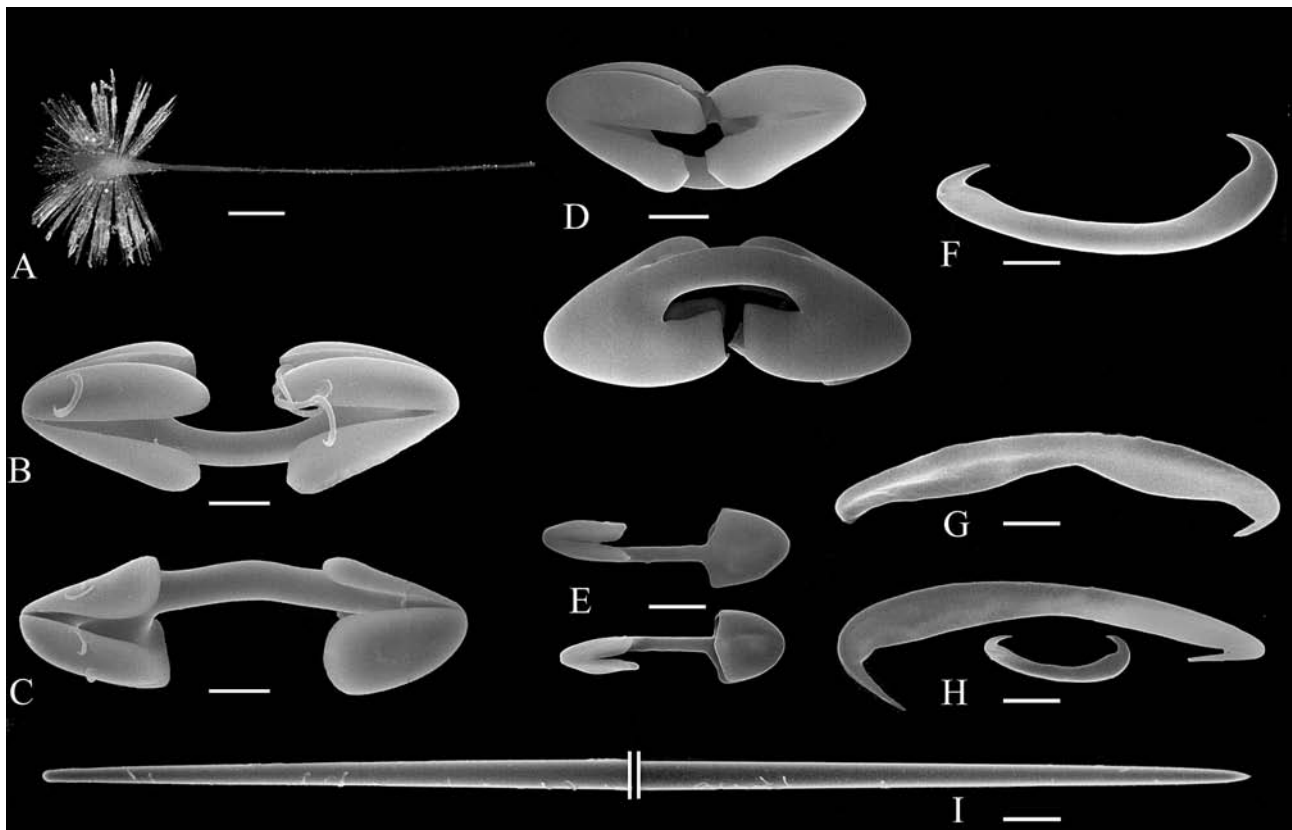
**Size:** 30 mm high, with a body 10 mm in diameter.

**Color:** White in alcohol.

**Morphology:** A thin peduncle bearing an ovoid or subspherical body made of radiating fascicles. No aquiferous system. Skeleton: Peduncle made of longitudinally arranged long fusiform styles; radiating fascicles made of fusiform styles and smaller styles with the tip outwardly directed. Spicules: fusiform styles, 620-2500 x 7-35  $\mu\text{m}$ ; arcuate isochelae, 80-170  $\mu\text{m}$ ; abyssochelae with the front alae long, nearly in contact with the opposite ala, 40-45  $\mu\text{m}$ ; anisochelae, generally twisted, one end tridentate, the other end with fused alae, 9.5-11  $\mu\text{m}$ ; sigmancistra in two classes, 30-40  $\mu\text{m}$  and 9.5-12.5  $\mu\text{m}$ .

**Biology:** On a dead smoker near an active site, water temperature 2.6°C at the site of collection. A carnivorous feeding habit has been demonstrated in another species of the genus.

**Distribution:** North-Fiji Back Arc Basin: site White Lady.



1A: View of the holotype, scale bar 3.4 mm; B: Arcuate isochela 1, scale bar 12  $\mu\text{m}$ ; C: Arcuate isochela 1, scale bar 22  $\mu\text{m}$ ; D: Arcuate isochelae 2 (abyssochelae), scale bar 7.4  $\mu\text{m}$ ; E: Anisochelae, scale bar 2.5  $\mu\text{m}$ ; F: Sigmancistra 2, scale bar 2.2  $\mu\text{m}$ ; G: Sigmancistra 1, scale bar 4.4  $\mu\text{m}$ ; H: Sigmancistras 1 and 2, scale bar 4.4  $\mu\text{m}$ ; I: Style, scale bar 47  $\mu\text{m}$ ; from VACELET (in press).

**Reference:**

VACELET J. (in press) Zool. J. Linn. Soc.

J. VACELET & M. SEGONZAC

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*Abyssocladia naudur* VACELET, in press

**Size:** Up to 40 mm high, with thin lateral filaments 6 mm long.

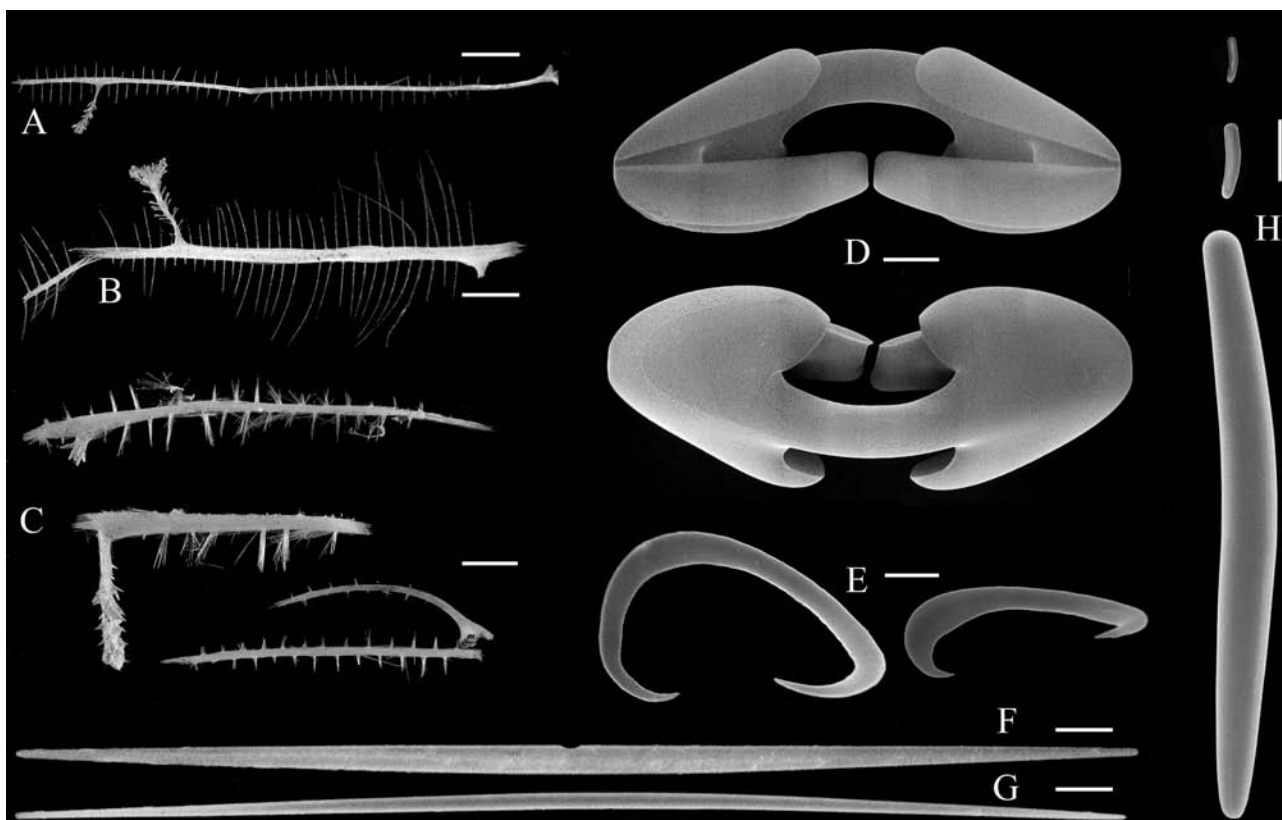
**Color:** White in situ, yellowish gray to clear brown in alcohol.

**Morphology:** Small erect sponge, forming a flattened axis with numerous lateral filaments, frequently with a bud-like branching process. Filaments regularly arranged in two lateral rows, alternating on each side. No visible aquiferous system. Skeleton: main axis of fusiform styles longitudinally arranged, lined by substrongyles at the base; axis of the processes conical at the base, with the styles anchored by their head entirely crossing the stem; stem and base of the filaments with a continuous lining of isochelae. Spicules: Styles of the axis of the stem and filaments, fusiform, shorter in the filaments, 330-1600 x 5-37  $\mu\text{m}$ ;

substrongyles or strongyles of the basal coating, fusiform, bent or slightly flexuous, 30-825 x 8-30  $\mu\text{m}$ ; abyssochelae with frontal alae roughly parallelepipedal, nearly in contact with the opposite frontal ala, 48-72  $\mu\text{m}$ ; sigmancistra in two classes, 15-19  $\mu\text{m}$  and 5-8  $\mu\text{m}$ .

**Biology:** Several specimens collected from a dead smoker, a few meters from active black smokers. Presumably with a carnivorous feeding habit.

**Distribution:** East Pacific Rise: 17°S.



1A: View of the holotype, scale bar 4.3 mm; B: Part of a paratype, scale bar 3.4 mm; C: Paratypes, scale bar 2 mm; D: Isochelae, scale bar 5.5  $\mu\text{m}$ ; E: Sigmancistra 1 and 2, scale bar 1.4  $\mu\text{m}$ ; F: Style of the axis, scale bar 64  $\mu\text{m}$ ; G: Styles of the lateral processes, scale bar 40  $\mu\text{m}$ ; H: Diverse sizes of substrongyles of the base, scale bar 33.4  $\mu\text{m}$ ; from VACELET (in press).

**Reference:**

VACELET J. (in press) Zool. J. Linn. Soc.

J. VACELET & M. SEGONZAC

Denisia 18 (2006): 38

*Asbestopluma agglutinans* VACELET, in press

**Size:** Axis 4 cm high and 0.8-1 mm in diameter, lateral filaments up to 5-6 mm long.

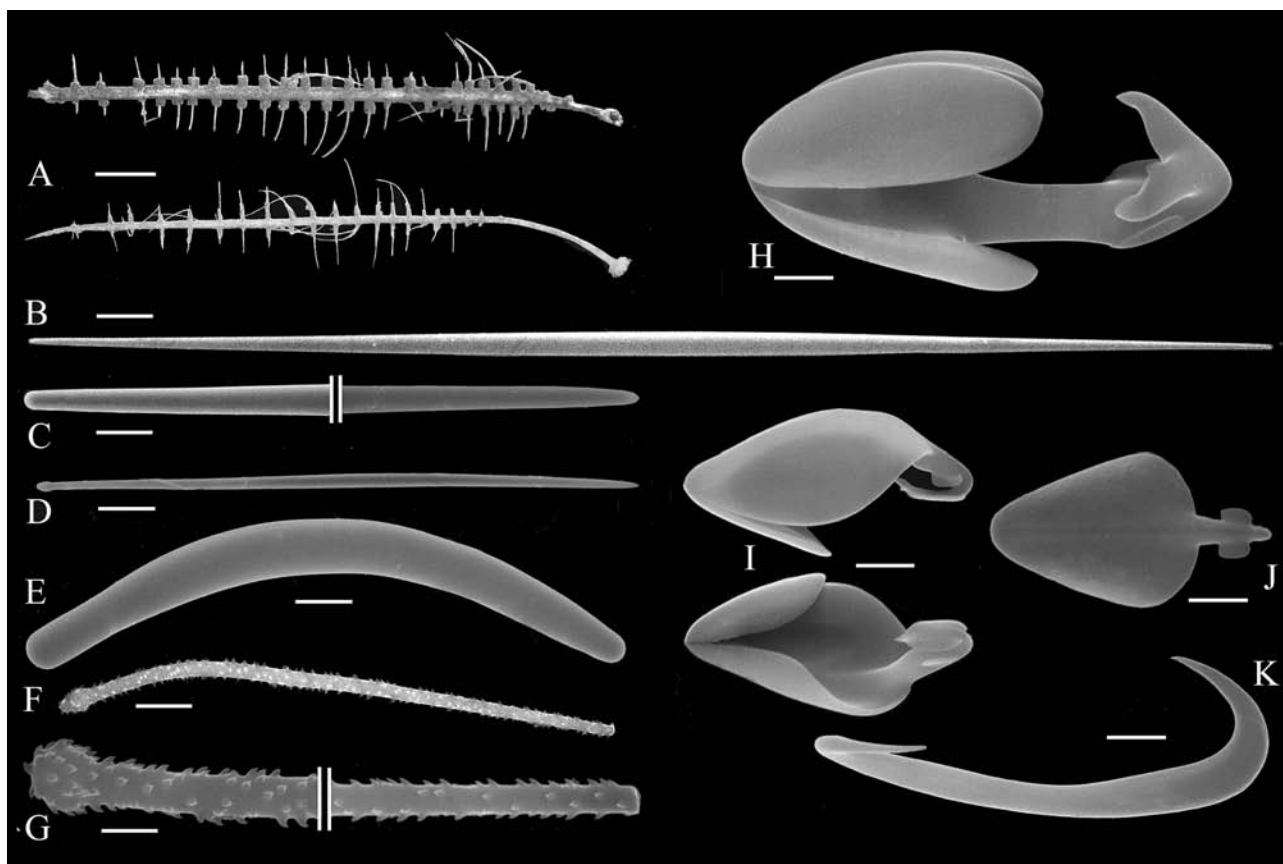
**Color:** Brown in alcohol.

**Morphology:** Small erect sponge, consisting of a flattened axis smooth on the base, then with biserially arranged filaments arising perpendicularly to the axis in two opposite series. Filaments thick, cylindrical at the basis, then abruptly reduced to a thin spicular axis. No visible aperture. Skeleton: axis of large fusiform styles longitudinally arranged, surrounded by a felt-work of acanthotylostrongyles including numerous skeletons of radiolarians and foraminiferans; base with a cover of tangential flexuous styles or strongyles. Spicules: fusiform styles of the ax-

is, 1550-2100 x 30-35  $\mu\text{m}$ ; mycalostyles of the filaments, 370-780 x 8.5-17  $\mu\text{m}$ ; styles or strongyles of the base, 220-535 x 15-42  $\mu\text{m}$ ; acanthotylostrongyles, 65-165 x 0.8-2.3  $\mu\text{m}$ ; anisochelae, 32-36  $\mu\text{m}$  and 9.8-10.5  $\mu\text{m}$ ; sigmancistras, 23-28  $\mu\text{m}$ .

**Biology:** Collected on a dead smoker and a basalt fragment.

**Distribution:** East Pacific Rise: collected at 18°S and 14°S.



1A: Holotype and paratype, scale bar 3.8 mm; B: Style of the axis, scale bar 83  $\mu\text{m}$ ; C: Head and tip of a style of the axis, scale bar 28  $\mu\text{m}$ ; D: Style of the filament axis, scale bar 35  $\mu\text{m}$ ; E: Substrongyle of the base, scale bar 37  $\mu\text{m}$ ; F: Acanthotylostrongyle, scale bar 7.5  $\mu\text{m}$ ; G: Head and tip of an acanthotylostrongyle, scale bar 2.3  $\mu\text{m}$ ; H: Anisochela 1, scale bar 4.1  $\mu\text{m}$ ; I: Anisochela 2, scale bar 2  $\mu\text{m}$ ; J: Anisochela 2, back view, scale bar 2  $\mu\text{m}$ ; K: Sigmancistra, scale bar 2.9  $\mu\text{m}$ ; from VACELET (in press).

**Reference:**

VACELET J. (in press) Zool. J. Linn. Soc.

J. VACELET & M. SEGONZAC

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*Asbestopluma formosa* VACELET, in press

**Size:** Approximately 8 cm high and 16 cm wide, with stem and branches up to 1 mm in diameter.

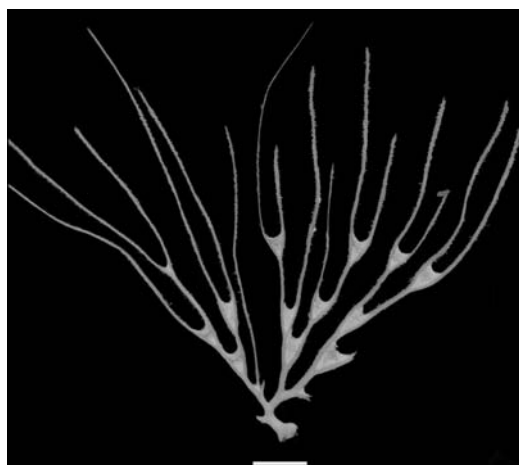
**Color:** White in situ and after preservation.

**Morphology:** Erect, fan shaped, consisting of a short stem from which arise branches which divide dichotomously three or four times in a single plane, the last branches being long and parallel. Terminal branches flattened, bearing on both sides numerous, regularly spaced thin filaments. Flattened enlargements present at each dichotomy containing numerous reproduction bodies. No visible apertures or aquiferous system. Skeleton: Stem and branches with an axis of large fusiform styles with a

dense outer cover of microstrongyles, filaments with an axis of smaller styles; base of the stem with a cover of special microtylostyles and short fusiform substrongyles. Spicules: Styles, 200-1025 x 20-45 µm and 180-350 x 7-9 µm; curved substrongyles, 80-500 x 15-30 µm; microstrongyles minutely spinose, 25-60 x 5-7 µm; microtylostyles, minutely spinose, 25-45 x 4-7 µm; anisochelae sometimes in rosettes, 72-90 µm and 10-15 µm.

**Biology:** On a fossil chimney ca. 50-100 m distant from an active site White Lady. Presumably with a carnivorous feeding habit.

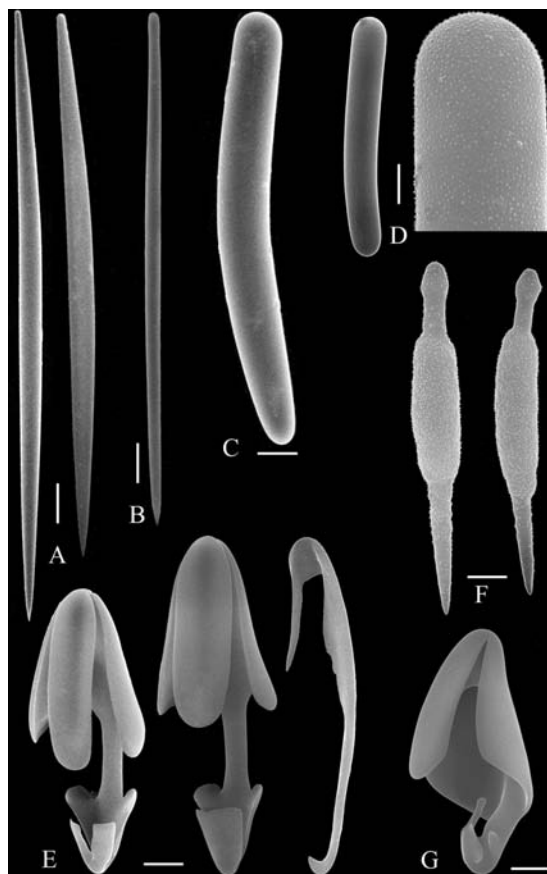
**Distribution:** North-Fiji Back-Arc Basin.



1: Fragment of the holotype, scale bar 10.2 mm; from VACELET (in press).



2: Collection of the holotype by the arm of "Nautilus" submersible, 1997 m; from VACELET (in press) © Ifremer/Starmer 1.



3A: Two fusiform styles of the axis, scale bar 65 µm; B: Style of the lateral processes, scale bar 21.5 µm; C: Substrongyle, scale bar 14.3 µm; D: Microstrongyle and detail of the head, scale bars 6.2 µm and 1.5 µm; E: Two anisochelae 1 and an immature one, scale bar 10 µm; F: Two microtylostyles, scale bar 4.3 µm; G: Anisochelae 2, scale bar 2 µm; from VACELET (in press).

**Reference:**

VACELET J. (in press) Zool. J. Linn. Soc.

J. VACELET & M. SEGONZAC

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## Porifera, Demospongiae, Poecilosclerida, Cladorhizidae

*Asbestopluma pennatula* (SCHMIDT, 1875)

**Size:** 100 mm high. Lateral filaments up to 2.5 mm x 0.1-0.2 mm, possibly longer but easily broken. Specimens up to 180 mm with filaments 7 mm long have been recorded near Iceland.

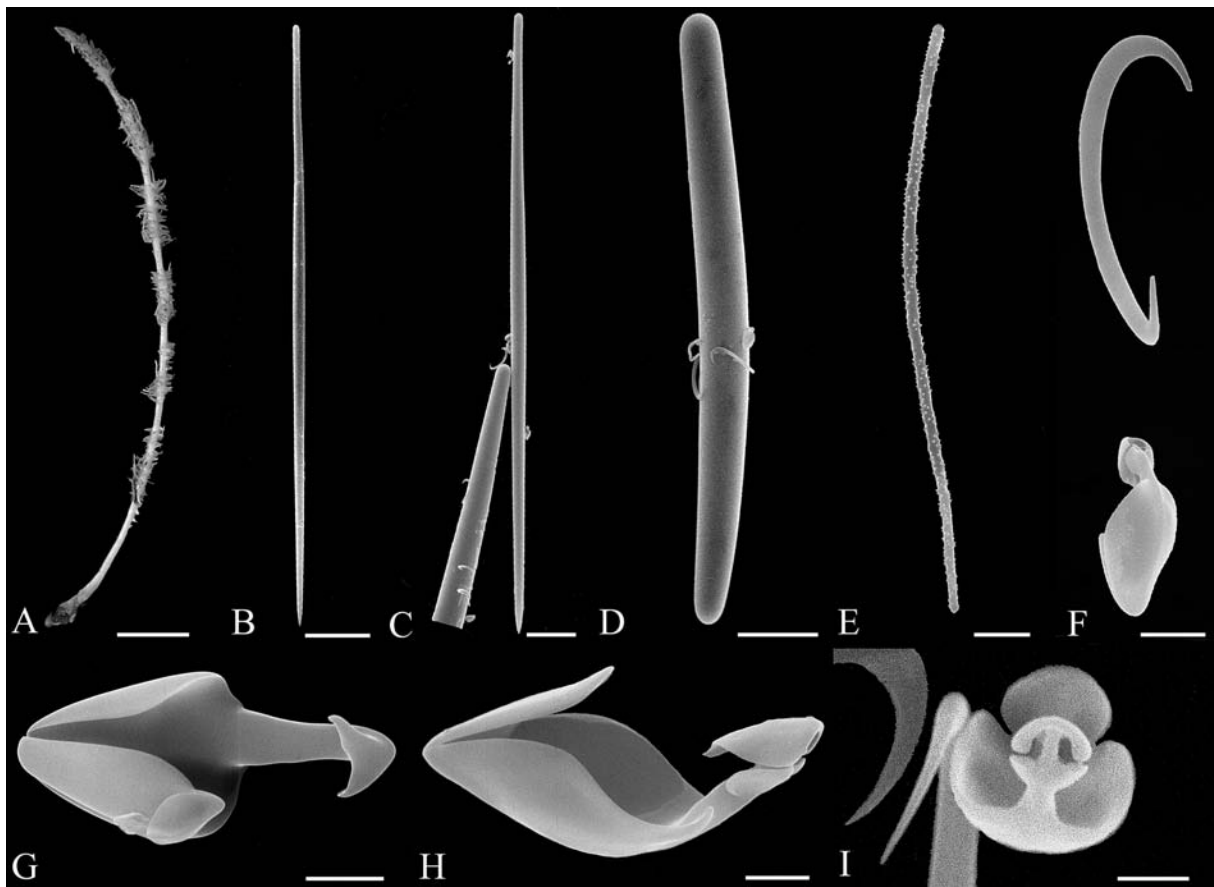
**Color:** Cream in situ and in alcohol.

**Morphology:** Erect axis with distinct groups of lateral filaments arising perpendicularly, regularly spaced along the stalk. No aquiferous system. Skeleton: spicular axis of styles in the stalk and in lateral filament, covered at the basis of the sponge by a coating of spinose microtylostongyles. Spicules: Styles of the axis of the stalk, fusiform, 700-920 x 17-22  $\mu\text{m}$ , shorter and thicker at the basis of the axis where they gradually become substrongyles 200-540 x 18-30  $\mu\text{m}$ . Styles of the filaments,

slightly fusiform with an acerate end, straight, fusiform, 380-520  $\mu\text{m}$  x 7-10  $\mu\text{m}$ . Microtylostongyles coating the surface of the axis near its basis, slightly flexuous, with a short spination, 40-130 x 0.5-1  $\mu\text{m}$ . Palmate anisochelae I, moderately abundant, longitudinally arranged with the teeth upwards on the filaments, with well marked lateral teeth in the small end, 33-40  $\mu\text{m}$ . Palmate anisochelae II, very abundant, perpendicular to the surface of the filaments with the large tooth upwards, 9-10  $\mu\text{m}$ . Sigmancistras very abundant, 17-25  $\mu\text{m}$ .

**Biology:** Attached to solid substrata in the bathyal zone.

**Distribution:** North Sea, Arctic, Bay of Biscay. Collected at Mid-Atlantic Ridge: Lucky Strike and Menez Gwen.



1A: Specimen from Lucky Strike, scale bar 5 mm; B: Style of the filament, scale bar 50  $\mu\text{m}$ ; C: Style of the filament and head of style of the axis, scale bar 40  $\mu\text{m}$ ; D: Strongyle of the basis of the axis, scale bar 30  $\mu\text{m}$ ; E: Spinose microstrongyle, scale bar 6  $\mu\text{m}$ ; F: Sigmancistra and anisochela II, scale bar 4  $\mu\text{m}$ ; G: Anisochela I, scale bar: 8  $\mu\text{m}$ ; H: Anisochela II, scale bar 2  $\mu\text{m}$ ; I: Basis of anisochela II and end of sigmancistras, scale bar 2  $\mu\text{m}$ .

## References:

LUNDBECK W. (1905) The Danish Ingolf-Expedition 6(2): 1-219.

J. VACELET & M. SEGONZAC

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Porifera, Demospongiae, Poecilosclerida, Cladorhizidae

*Chondrocladia lampadiglobus* VACELET, in press

**Size:** Up to approximately 50 cm high, with inflated spheres 3-5 cm in diameter.

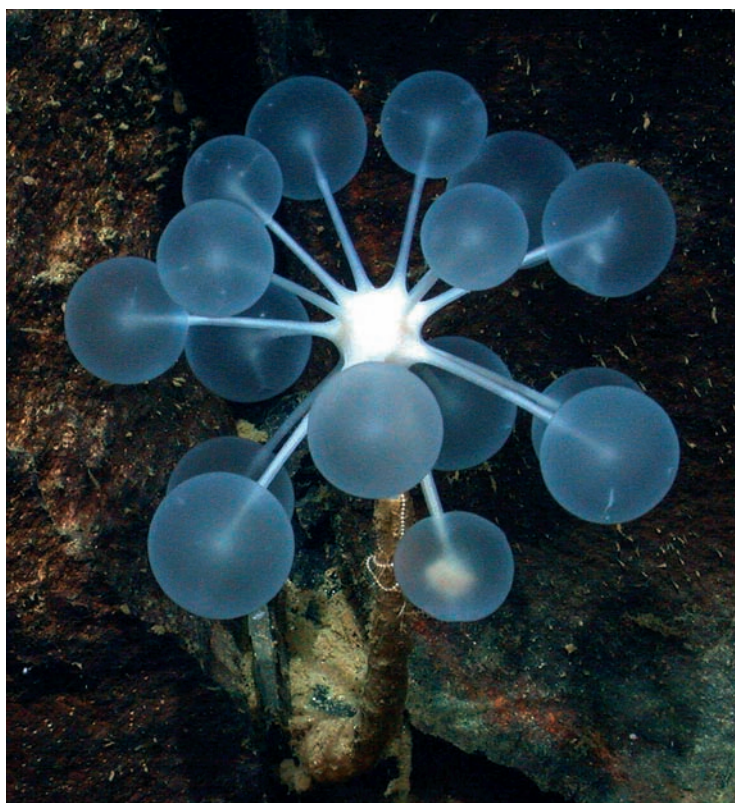
**Color:** White in life, yellowish white to clear brown in alcohol.

**Morphology:** Large stalked sponge, composed of a rhizoid fixation system, a cylindrical stalk ending in an enlarged, ovoid body from which radiate in all directions secondary branches, each ending in translucent sphere in the living animal, in an irregular swelling including crustacean debris on the preserved specimen. Aquiferous system present, with large choanocyte chambers and canals ending in the inflatable spheres. Skeleton: stalk and branches made of large fusiform styles longitudinally arranged, covered with a feltwork of rugose tylostyles; terminal swellings made of smaller styles with an outer cover of numerous microscleres. Spicules: fusiform styles, 700-4750 x 15-75  $\mu\text{m}$  and 510-580 x 17-30  $\mu\text{m}$ ; rugose tylostyles, 300-535 x 5-6  $\mu\text{m}$ ; anchorate isochelae in two sizes, with six alae at each end, 123-

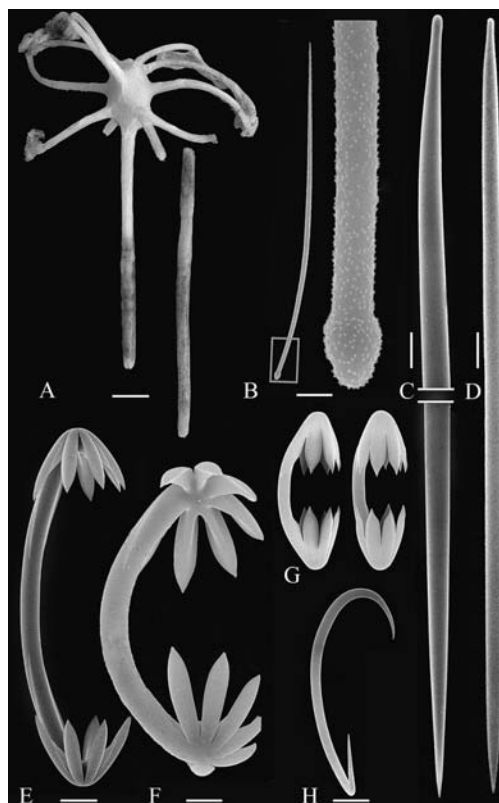
140  $\mu\text{m}$ , alae 25  $\mu\text{m}$  long, and 20-32  $\mu\text{m}$ , alae 10-11  $\mu\text{m}$  long; sigmas 45-120 x 2-3  $\mu\text{m}$ .

**Biology:** The collected specimen was rooted in sediment between pillow lava, near active hydrothermal sites, but in an area still with low density of animal life. Sponges of similar morphology have been often observed on various sites of the East Pacific Rise, either rooted in sediment or attached to pillow lava, always at some distance from the rich animal communities of the active hydrothermal sites. Their identification to *C. lampadiglobus* cannot be ascertained from external morphology alone, and several species may be present in this large geographic zone. Carnivorous mode of feeding.

**Distribution:** East Pacific Rise: collected at 17°S. Sponges of similar morphology observed in various sites extending from 23°S to 13°N, 2600-3000 m deep.

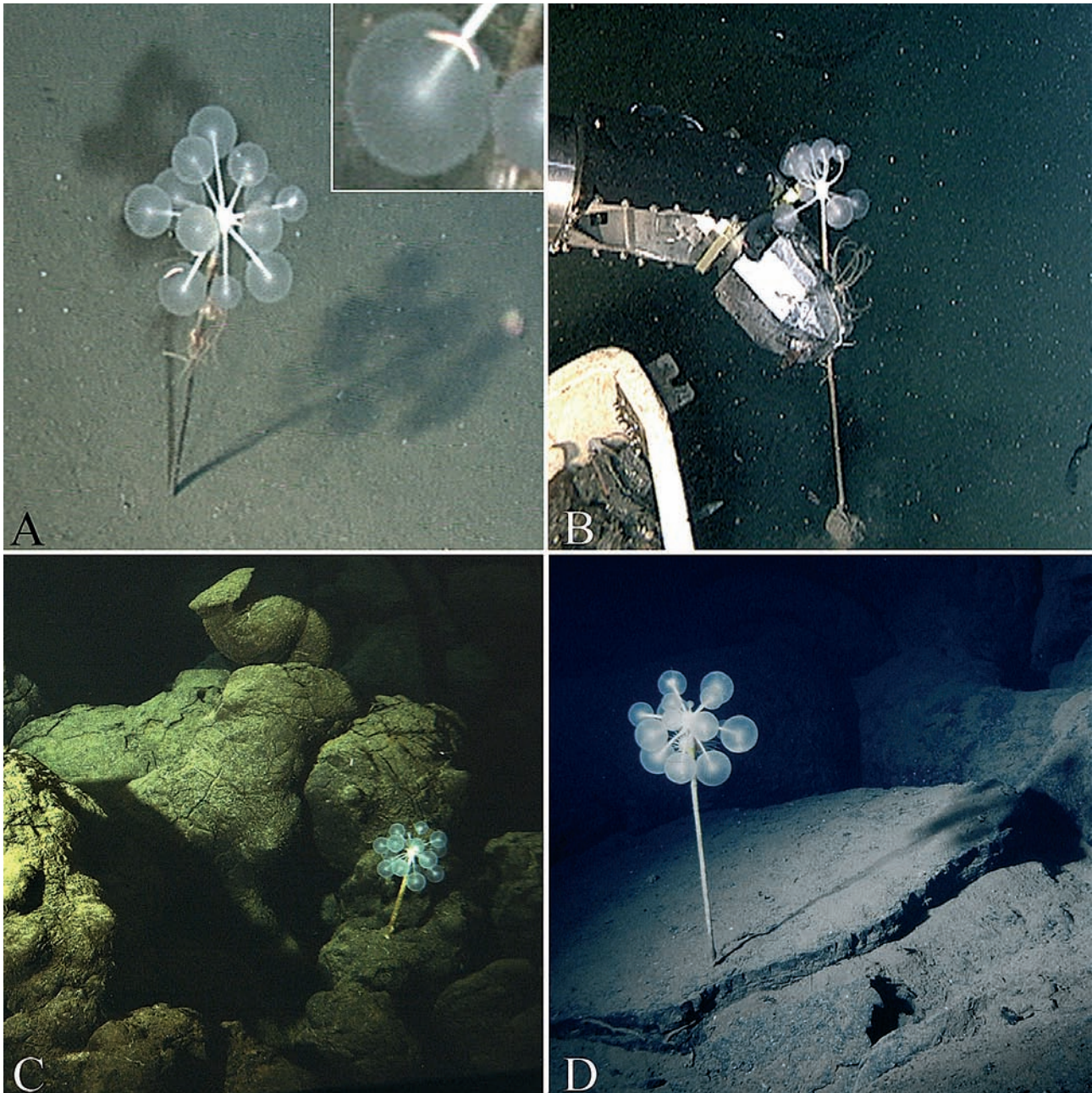


1: ROV Tiburon/2003, dive 556, 20°47.03'N, 109°08.98'W, 2555 m; by R. Vrijenhoek © MBARI.



2A: Holotype; scale bar 17 mm; B: Tylostyle of the cover of the stalk; scale bars: 42  $\mu\text{m}$  and 4.2  $\mu\text{m}$ ; C: Style of the stalk; scale bar 30  $\mu\text{m}$ ; D: Style of the body surface; scale bar 63  $\mu\text{m}$ ; E: Anchorate isochelae 1; scale bar 14  $\mu\text{m}$ ; F: Anchorate isochelae 1; scale bar 9.6  $\mu\text{m}$ ; G: Two anchorate isochelae 2; scale bar 7  $\mu\text{m}$ ; H: Sigma; scale bar 10  $\mu\text{m}$ ; from VACELET (in press).





3A: Holotype, East Pacific Rise: 17°S, 2714 m © Ifremer/Naudur; inset: Unidentified worm gliding on the lower left sphere; B: Collection of the holotype by the "Nautile" submersible © Ifremer/Naudur; C: Presumed *C. lampadiglobus*, Geocyarise 3 (CY 30), 2622 m, 12°54'N, 103°58'W; cruise Geocyarise © Ifremer; D: Presumed *C. lampadiglobus*, Geocyarise 1 (CY 07), 2623 m; © Ifremer; modified from VACELET (in press).

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Reference:

VACELET J. (in press) Zool. J. Linn. Soc.

Porifera, Demospongiae, Poecilosclerida, Cladorhizidae

*Cladorhiza abyssicola* G.O. Sars, 1872

**Size:** Up to 75 mm high.

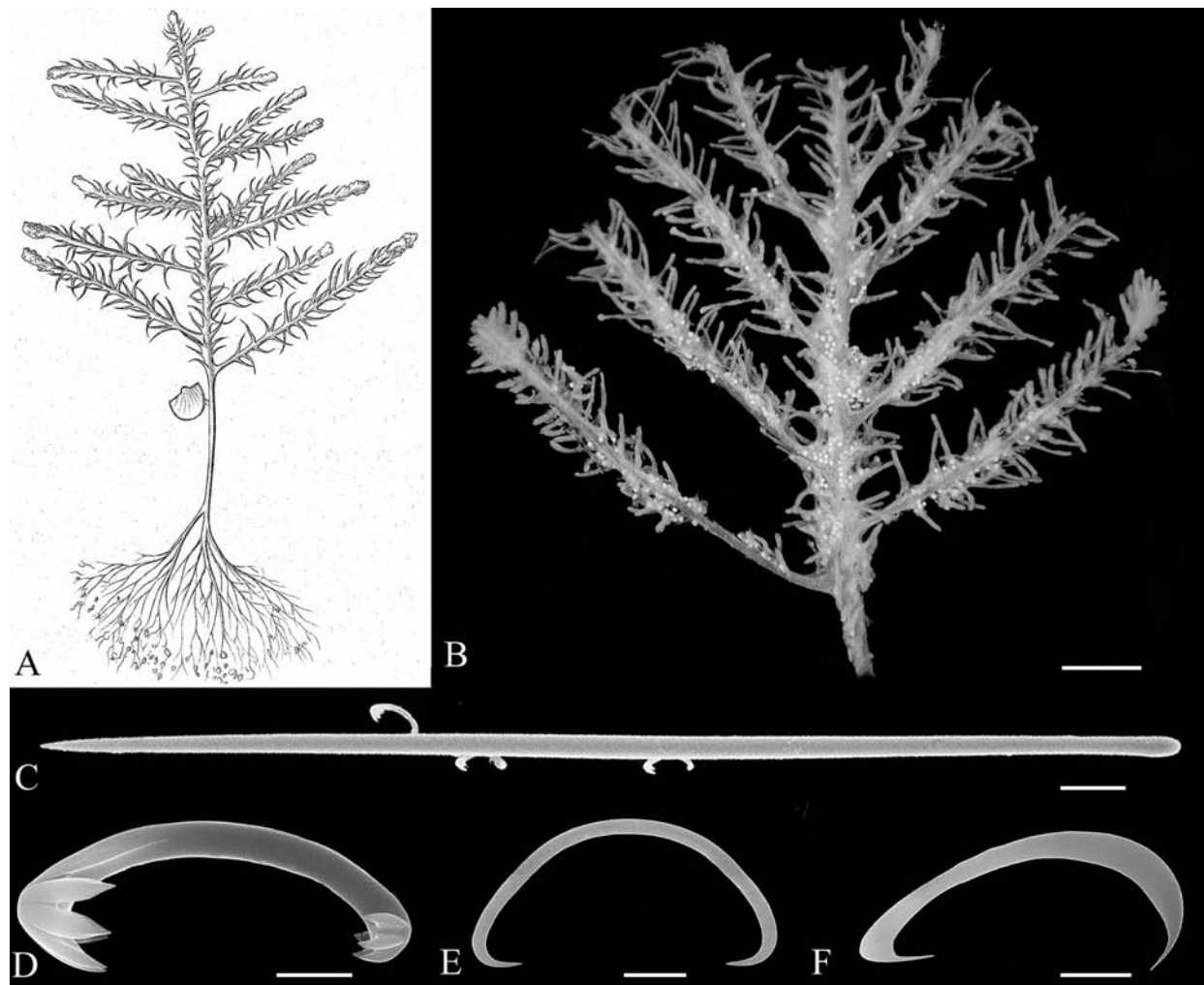
**Color:** Cream white in alcohol.

**Morphology:** Erect, with numerous lateral branches arising at nearly right angle from a central axis and bearing short secondary processes, generally anchored in the sediment by richly branched roots. No aquiferous system. Main skeleton: polyspicular fibres of styles in the axis of stem, branches, lateral processes and roots. Spicules: Styles, fusiform, 390-730  $\mu\text{m}$  x 14-22  $\mu\text{m}$ ;

unguiferate anisochelae with five teeth at each end, 21-25  $\mu\text{m}$ ; sigmas, 78-100  $\mu\text{m}$ ; sigmancistras, 40-42  $\mu\text{m}$ .

**Biology:** A common species in the bathyal and abyssal zones, usually anchored in mud by the roots, with a carnivorous mode of feeding. A near relative, *C. methanophila* VACELET & BOURY-ESNAULT, 2002, is both carnivorous and symbiotic with methanophilous bacteria.

**Distribution:** Atlantic N.E., Arctic, Mediterranean, Mid-Atlantic Ridge.



1A: Type specimen from Lofoten, 550 m, approximately 60 mm high, from Sars (1872); B: Specimen from MAR, Logatchev vent site, DiversExpedition, dive 3668, 3012 m, with oocytes and embryo; scale bar 3 mm; C: Style and anisochelae; scale bar 30  $\mu\text{m}$ ; D: Anisochela; scale bar 5  $\mu\text{m}$ ; E: Sigmas; scale bar 25  $\mu\text{m}$ ; F: Sigmancistra; scale bar 8  $\mu\text{m}$ .

References:

- LUNDBECK W. (1905) The Danish Ingolf-Expedition 6(2): 1-219.  
SARS G.O. (1872) in Kongelige Norske Universitet (Ed.) Spongiae. Volume I. Brøgger & Christie, Christiania, Norway: 1-82.

Porifera, Demospongiae, Poecilosclerida, Cladorhizidae

*Cladorhiza segonzaci* VACELET, in press

**Size:** Axis up to 32 mm high and 0.4-0.5 mm in diameter, with lateral processes 4-9 mm long.

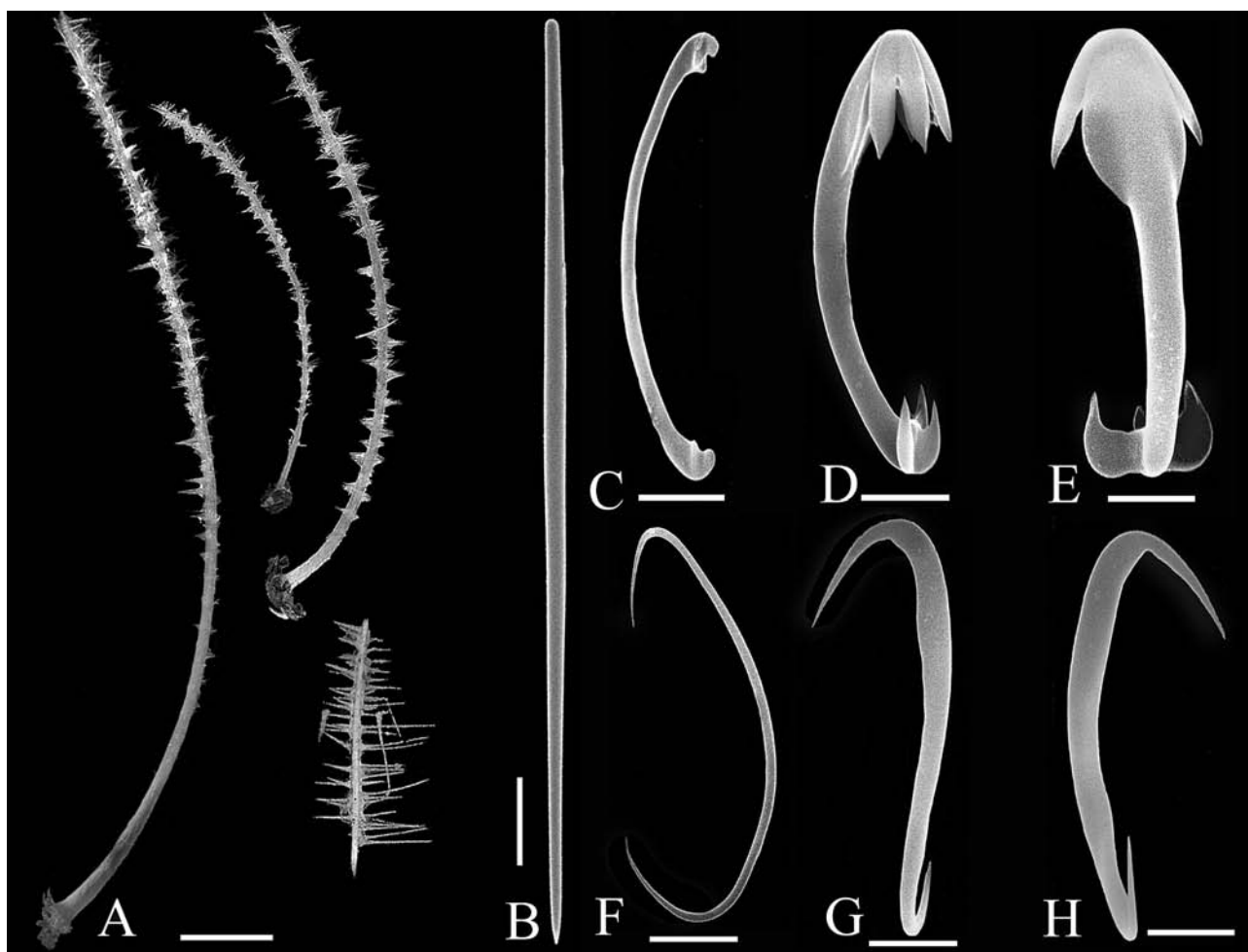
**Color:** In situ white; cream to clear brown in alcohol, with the basal portion of the stem darker.

**Morphology:** Small erect sponge, forming an unbranched axis with numerous lateral processes arranged in opposed series at right angle all around the axis. No aquiferous system. Skeleton: main axis of fusiform styles longitudinally arranged; axis of the processes conical at the base, with the styles anchored by their head reaching the centre of the stem and the point outwardly directed. Spicules: Styles of the axis of the stem and lateral

processes, slightly fusiform, 380-990 x 14-23  $\mu\text{m}$ ; anchorate/uniguiferate anisochelae numerous, with five lanceolate alae and well developed fimbriae at the large end, and three fang-like alae at the small end, 15-17.5  $\mu\text{m}$ ; sigmas 50-80 x 1-1.5  $\mu\text{m}$ ; sigmancistras without notch, 20-25 x 2.0  $\mu\text{m}$ .

**Biology:** 11 specimens collected from a dead smoker, a few meters from active black smokers. Presumably carnivorous mode of feeding.

**Distribution:** East Pacific Rise: 17°S.



1A: View of the holotype (left), two paratypes and a fragment of a paratype; scale bar 3 mm; B: Style; scale bar 90  $\mu\text{m}$ ; C: Developmental stage of anisochela; scale bar 3.1  $\mu\text{m}$ ; D: Anisochela; scale bar 3.7  $\mu\text{m}$ ; E: Anisochela, back view; scale bar 3.2  $\mu\text{m}$ ; F: Sigma; scale bar 12  $\mu\text{m}$ ; G: Sigmancistra; scale bar 5.3  $\mu\text{m}$ ; H: Sigmancistra; scale bar 5.3  $\mu\text{m}$ ; from VACELET (in press).

**Reference:**

VACELET J. (in press) Zool. J. Linn. Soc.

J. VACELET & M. SEGONZAC

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*Euchelipluma pristina* TOPSENT, 1909

**Size:** 14-120 mm high, shaft 3-4 mm wide, lateral filaments up to at least 8 mm long and 70-100  $\mu\text{m}$  in diameter.

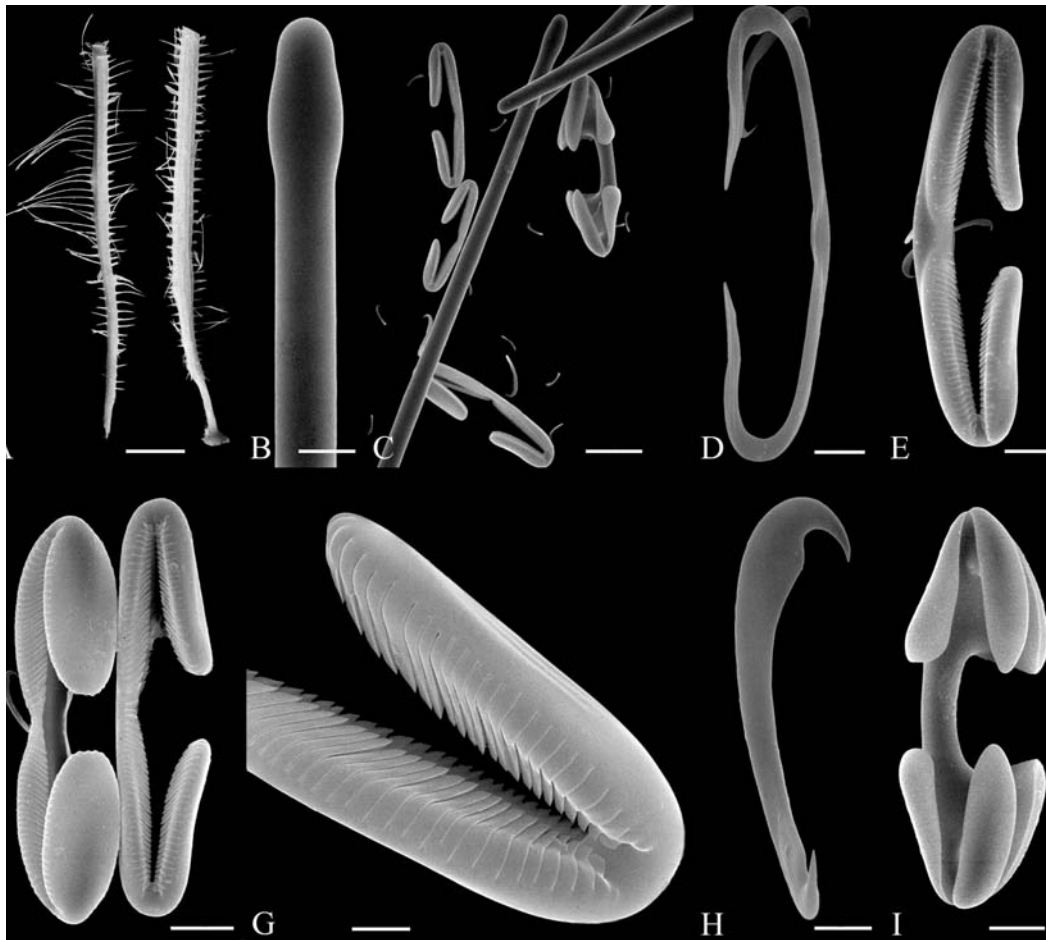
**Color:** Clear brown in alcohol.

**Morphology:** Erect, pennaceous, composed of a short peduncle and a flattened shaft bearing symmetrically paired lateral filaments, broken and reduced to their basis in most specimens. No aquiferous system. Skeleton a spicular axis of styles, condensed at the basis and divided in parallel fibres upward; lateral filaments with a twisted axis of subtylostyles. Microscleres most often regularly arranged at the surface of the shaft and of the filaments, with the teeth outwardly directed. Spicules: Styles of the axis, fusiform with an obtuse point, 900-1550 x 15-40  $\mu\text{m}$ ; strongyles in the basis of the peduncle, slightly curved or flexuous, 210-490 x 14-22  $\mu\text{m}$ ; subtylostyles in the filaments, 330-

700 x 6-14  $\mu\text{m}$ ; palmate isochelae, 75-130  $\mu\text{m}$ , in two size categories in some specimens; placochelae I, 60-90  $\mu\text{m}$ ; placochelae II, 100-130  $\mu\text{m}$ , absent in the type specimen; sigmancistras I, 11-14  $\mu\text{m}$ ; sigmancistras II, 22-30  $\mu\text{m}$ , sometimes absent.

**Biology:** Type specimens collected from 91 m. Fixed on solid substrata up to 4960 m deep. The presence of lateral filaments covered by microscleres regularly arranged with the teeth upwards, and the absence of canal system and apertures in the collected specimens suggest a carnivorous mode of feeding, similar to that developed in Cladorhizidae. This is supported by the presence of debris of small crustaceans in the best preserved specimens from Barbados (cruise Manon © Ifremer).

**Distribution:** Cape Verde Islands (91 m); Barbados (4960 m); Mid-Atlantic Ridge: Lucky Strike; Rainbow.



1A: Two specimens from Barbados; scale bar 4 mm;  
 B: Head of a subtylostyle, Barbados; scale bar 10  $\mu\text{m}$ ;  
 C: Subtylostyles, placochelae I and II, isochela, sigmancistras I and II, Barbados; scale bar 50  $\mu\text{m}$ ;  
 D: Immature placochela, holotype; scale bar 10  $\mu\text{m}$ ;  
 E: Placochela, holotype; scale bar 10  $\mu\text{m}$ ;  
 F: Placochela, Barbados; scale bar 15  $\mu\text{m}$ ;  
 G: Placochela, Barbados; scale bar 5  $\mu\text{m}$ ;  
 H: Sigmancistras I, Barbados; scale bar 2  $\mu\text{m}$ ;  
 I: Isochela, Barbados; scale bar 15  $\mu\text{m}$ .

**References:**

- TOPSENT E. (1909) Bull. Inst. Océanogr. Monaco **15**: 1-23.  
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Porifera, Hexactinella, Lyssacinosida, Caulophacidae

*Caulophacus cyanae* BOURY-ESNAULT & DE VOS, 1988

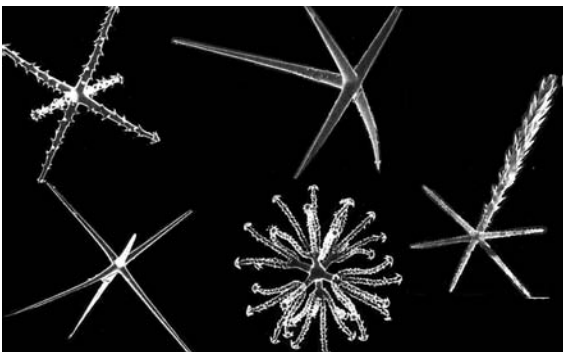
**Size:** Up to 50 cm

**Morphology:** Mushroom-like body, white with a solid stalk and a convex discoid upper part; ectosomal skeleton of small pentactine, pinnular dermalia and of strong pentactine hypodermalia. Choanosomal megascleres of hexactines, pentactines and rhabdodiactines. Microscleres are discohexasters of three sizes. Large choanocyte chambers composed of anucleate choanocytes.

**Distribution:** East Pacific Rise: 13°N. On vertical walls, inactive sulphide edifices and basaltic pillars in the graben. *Caulophacus*-like Porifera occur along the northern and southern East Pacific Rise and Pacific-Antarctic Ridge: 38°S, but in fewer abundance.



1: Some specimens in situ; cruise Hope @ Ifremer.



2: Spicules (SEM); after BOURY-ESNAULT & DE VOS (1988).



3: A preserved specimen; by P. Briand @ Ifremer.

**Reference:**

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N. BOURY-ESNAULT

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## Cnidaria, Hydrozoa, Leptolida (= Hydroida)

The leptolid fauna of hydrothermal vents of oceanic ridge sites is still poorly investigated and understood. Fragmentary colonies of leptolids from oceanic ridges in the Pacific have so far made it possible to identify *Zygophylax cervicornis* (NUTTING, 1905), *Zygophylax* sp. and *Halecium tenellum* HINCKS, 1861. While from vents on the Mid-Atlantic Ridge only a single anthoathecate leptolid, *Candelabrum serpentarii* SEGONZAC & VERVOORT, 1995 can be considered to be a true companion of the vent community. A second species, *Candelabrum phrygium* (FABRICIUS, 1780) is a North Atlantic deep-sea inhabitant occasionally found associated with the hydrothermal vent fauna.

Another anthoathecate, *Bouillonia* sp. was found on the Mid-Atlantic Ridge in the Gulf of Guinea area; it probably represents the deep-water leptolid community without direct affinities to hydrothermal vents (SVOBODA, STEPANJANTS & LJUBENKOV, in press). Photographs taken during surveys of Mid-Atlantic vent areas show a third species of anthoathecate, occasionally in great numbers; it may represent a species of *Tubularia* or *Ectopleura*. There is presently no material available to substantiate that guess. A probably undescribed species of *Hydractinia* has also been observed.

Collecting activities at or near Mid-Atlantic vents areas have currently provided material for proper identification of 3 anthoathecates and 23 leptothecates; 4 more leptothecates could only be identified to the genus (CALDER & VERVOORT 1998). One more species (*Hydrallmania falcata*) was dead when collected and accidentally introduced; all remaining leptothecates belong to the deep-water fauna and are only partly restricted to the Atlantic.

Because of the technique used to collect animals at ridge sites, only rarely do complete animals or colonies become available for scientific study. Anthoathecates in particular are hard to collect and they must be narcotized prior preservation. So far, only a single complete animal of *Candelabrum serpentarii* has been obtained, in addition to many incomplete individuals, which have been studied. Anthoathecates are best preserved in 6% formalin (after prior relaxation by adding MgSO<sub>4</sub> solution to the seawater), but Leptothecates get very brittle in formalin and are best preserved in 70% ethanol. These preservation techniques only apply to material for routine taxonomic investigations; more sophisticated methods are necessary for modern DNA techniques.

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- CALDER D.R. & W. VERVOORT (1998) Zool. Verh., Leiden **319**: 1-65.  
SEGONZAC M. & W. VERVOORT (1995) Bull. Mus. Natl. Hist. Nat., Paris (4)**17**(1-2): 31-64.  
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