

Hyalonematidae (Porifera: Hexactinellida) from the North Pacific abyssal zone (Bering Sea and Alaskan Golf)

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ABSTRACT: 10 species of the genus *Hyalonema* collected generally by 2 trawl stations and 1 ROV dive from the abyss in the N Pacific are described. A new subgenus of *Hyalonema* with a new species and three new species of previously known subgenera of *Hyalonema* are described. Hyalonematidae and other abyssal hexactinellids (Euplectellidae and Rossellidae) from the N Pacific are discussed.

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KEY WORDS: Spongia, biodiversity, Hyalonematidae, North Pacific.

Нялонематиды (Porifera: Нехактинеллида) из абиссали Северной Пацифики (Берингово море и Аляскинский залив)

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РЕЗЮМЕ: Описано 10 представителей рода *Hyalonema*, которые были собраны в основном 2 траловыми станциями и 1 погружением робота в абиссали Северной Пацифики. Три из этих представителей оказались новыми видами, один — одновременно новым подродом и видом. Обсуждаются абиссальные гексактинеллиды (Hyalonematidae; Euplectellidae и Rossellidae) из Северной Пацифики.

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КЛЮЧЕВЫЕ СЛОВА: губки, видовое разнообразие, Hyalonematidae, Северная Пацифика.

Introduction

This publication belongs to a series of articles on the hexactinellid sponges from the Bering Sea (partly listed below and partly in press) and the N Pacific. The hexactinellid fauna from the abyssal zone of the N Pacific is poorly investigated. Few publications on this area describe Hyalonematidae off the Aleutian Islands and the Alaskan Golf (Schulze, 1899); many hexactinellid representatives together with other hexactinellids in the Northern and Far-Eastern Seas of the USSR were described by Koltun (1967); a lot of hexactinellids from deep waters (bathyal zone) of the central Aleutian Islands, Alaska were described by Reiswig and Stone (2011).

As it was recently shown, Hyalonematidae, particularly representatives of the genus *Hyalonema*, play an important ecological role in adjacent location in the abyss of the N Pacific, which dwell in the Clarion–Clipperton Fracture Zone on polymetallic nodules (Kersken *et al.*, 2017; Stratmann *et al.*, 2021). Large and notable specimens of *Hyalonema* are common in the abyssal zone as well as some other invertebrates including some other hexactinellids (Euplectellidae and Rossellidae). They inhabit hard substrata elements, the polymetallic nodules while usually representatives of these genera live on muddy substrata of the World Ocean. Hyalonematidae are also noticeable in considerable areas of the all oceanic zones in abyssal, hadal, bathyal and shelf which are covered by muddy substrata and pteropods-foraminifera silts. Two new species of *Hyalonema* and a row of previously known representatives from the central-E Pacific were described in this publication (Kersken *et al.*, 2017).

Abyssal hexactinellids described from the Bering Sea (generally from its N-W part) are: Hyalonematidae: *Hyalonema tenerum vitiazii* Koltun, 1967; *H. apertum simplex* Koltun, 1967; *H. populiferum harpagonis* Koltun, 1967. Euplectellidae: *Euplectella oweni* Herklots et Marshall, 1868. Rossellidae: *Bathydorus levis neospinosus* Tabachnick, Menshenina et Ehrlich, 2023 (former *Bathydorus levis spinosus* Wilson, 1904); *Caulophacus schulzei hyperboreus* Koltun, 1967; *C. elegans* Schulze, 1886 (Koltun, 1967). Later was described one new representative of Euplectellidae: *Ijmajella*

beringiana Tabachnick, 2002. Recently a new species of *Docosaccus* (Menshenina *et al.*, 2022) was found in the materials from the Bering Sea collected by the Russian RV ‘Akademik M.A. Lavrentyev’. The list of genera mentioned by Koltun (1967) contains genera of Hexactinellida common for the abyssal zone of the World Ocean (Tabachnick, 1994).

A part of investigated materials has been collected in the N-E Pacific Ocean, Alaskan Golf, by the SURV ‘Vityaz’–45 by several trawl stations. Previous investigations in this area and adjacent locations (generally Southern) were made by the US RV ‘Albatross’ — publications of Schulze (1899), Wilson (1904) and Lendenfeld (1914) which started description of hexactinellid’s species from this and more southern region.

Another adjacent abyssal region (the NW Pacific) was investigated earlier from the North-East Pacific. A single species represented by numerous specimens of *Hyalonema* (*Cyliconema*) *apertum* Schulze, 1886 was described from the Kuril-Kamchatka Trench and in the North East Pacific Basin (Koltun, 1970 — collection of the USSR expeditions of the RV ‘Vityaz’–39). The other abyssal hexactinellids from this area belong to two families: Euplectellidae and Rossellidae.

Several shallow-water Hyalonematida (*Hyalonema*) representatives were collected off the coast of Japan by the regional Japanese investigations and the US ‘Albatross’ voyage (Okada, 1932; Ijima, Okada, 1938).

Material and methods

The material was collected during the cruise of the RV ‘Akademik Mstislav Keldysh’ voyage 22 with Sigsbee trawls and HOV ‘Mir’; RV ‘Akademik M.A. Lavrentyev’ voyage 82 ROV ‘Comanche’. The collected materials were fixed in alcohol 80°, some fragments were fixed in alcohol 96° and stored at 18 °C. For light microscopy, spicules preparations were made by the method described by Janussen *et al.* (2004): a $K_2Cr_2O_7$ solution was made with water ($K_2Cr_2O_7$ powder: water about 1:1 vol %) and H_2SO_4 (96% conc.) was added ($K_2Cr_2O_7$ solution: H_2SO_4 — 1:1 vol %). A dry sponge sample was placed on the microscopic slide; 1–2 drops (depending on sample size) of the $K_2Cr_2O_7$ solution were added. The microscopic slide was heated (ca. 50–70 °C) for a few minutes to let the solution react. After evaporation of the fluid, the slide was removed from the heat and placed on a cold surface (ca. 20 °C) and a few drops of water were added. The water solution was removed

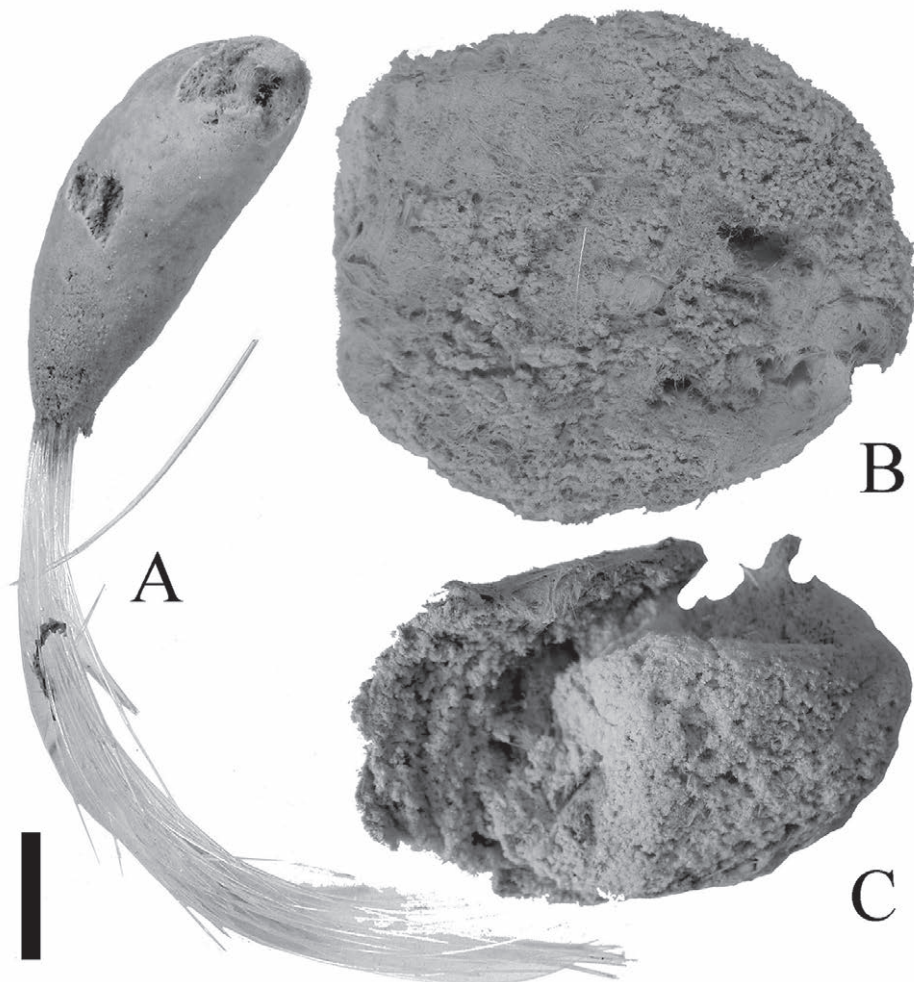


Fig. 1. *Hyalonema alaskiense* sp.n. A — holotype IORAS 5/2/3350; B — paratype IORAS 5/2/3335; C — paratype IORAS 5/2/3334. Scale bar 10 mm.

Рис. 1. *Hyalonema alaskiense* sp.n. A — голотип IORAS 5/2/3350; B — паратип IORAS 5/2/3335; C — паратип IORAS 5/2/3334. Масштаб 10 мм.

by one or several small pieces (at the same time) of normal filter paper. Water was added again and the spicules carefully stirred by needles, and again filter paper was used to remove excess water (sometimes it was necessary to repeat this procedure several times). The dry preparations were covered with Canada balsam and a cover glass. The preparations were examined with a BIOLAR optical microscope with PA-7 camera lucida adopted for it.

The investigated material is stored in the Shirshov Institute of Oceanology of Russian Academy of Sciences under numbers given in the text chapters "MATERIAL" which follow the Latin name of the each sponge.

Abbreviations: avg — average; D, d — diameter; IORAS — Shirshov Institute of Oceanology of Rus-

sian Ac. of Sc.; L, l — length; max — maximum; min — minimum; n — number of measurements; ROV — remotely operated vehicle; RV — research vessel; sta. — station; std — standard deviation.

Systematics

Hexactinellida Schmidt, 1870

Hyalonematidae Gray, 1857

Hyalonema Gray, 1832

Hyalonema alaskiense sp.n.

Figs 1–2; Tab. S1.

MATERIAL. Holotype: IORAS 5/2/3350. RV 'Vityaz'-45, sta. 6136, 53°25' N 163°23' W,

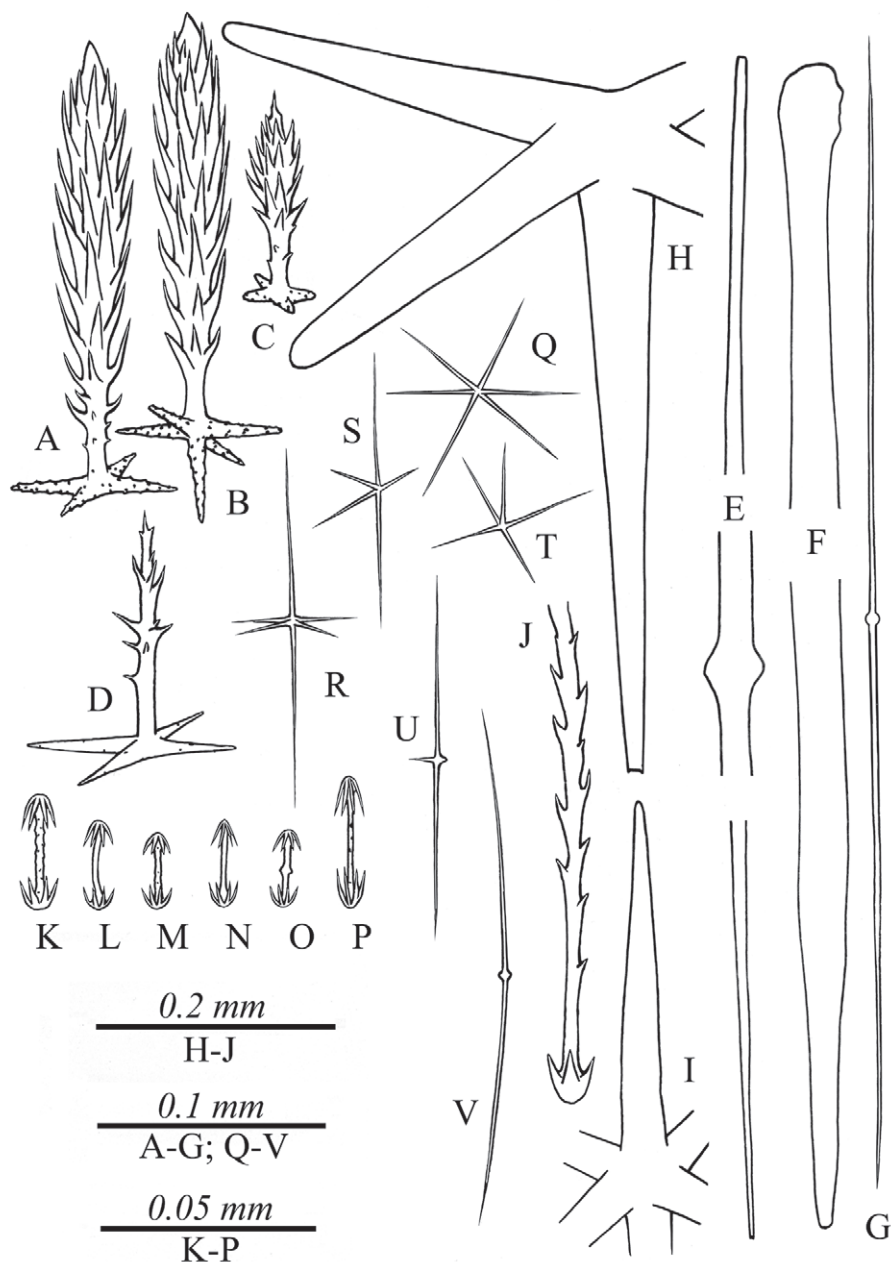


Fig. 2. Spicules of *Hyalonema alaskiense* sp.n., holotype. A-C — dermal or atrial pentactins; D — canalar pinular pentactin; E-G — choanosomal diactins; H — hypodermal or hypoatrial pentactin; I — choanosomal diactin; J — anchorate basalia; K-P — micramphidiscs; Q-R — oxyhexactins; S-T — oxypentactins; U — oxytauactin; V — oxydiactin.

Рис. 2. Спикюлы *Hyalonema alaskiense* sp.n., голотип; А-С — дермальные или атриальные пентактины; D — канальная пинулярная пентактина; E-G — хоаносомальные диактины; H — гиподермальная или гипоатриальная пентактина; I — хоаносомальная диактина; J — якоревидная базалия; K-P — микроамфидиски; Q-R — оксигексактины; S-T — оксипентактины; U — оксистаурактина; V — оксидиактина.

4180–4186 m. Paratypes: IORAS 5/2/3333; 5/2/3334; 5/2/3335. RV 'Vityaz'–45, sta. 6106, 58°15'N 142°34'W, 3620 m.

DESCRIPTION. BODY. The holotype is ovoid 30 mm high, 10 mm in diameter, osculum is 1–1.5 mm in diameter with minute atrial cavity about 5 mm deep, basalialia are about 70 mm. Paratypes are broken fragments.

SPICULES. MACROSCLERES. Choanosomal spicules are diactins and hexactins. The diactins have a widening in the middle or stout shafts and conically pointed outer ends. The diactins are 0.6–1.0/0.003–0.019 mm. Choanosomal hexactins have rays 0.30–0.35/0.024–0.033 mm with conically pointed outer ends. Hypodermal pentactins have tangential rays 0.20–0.45 mm long, proximal rays 0.6–0.7 mm long, the diameter of these rays is 0.026–0.052 mm.

Dermalia and atrialia are pinular pentactins and rare hexactins. Dermal pentactins have pinular rays longer than that of the atrial spicules and longer, more numerous spines; thus the entire shape of the pinular ray is spindle-like, its shaft is stout or it expands a little towards the distal part; tangential rays of these spicules are rarely spiny and conically pointed, sometimes rounded. The pinular ray of dermal pentactins is 0.093–0.233 mm long, tangential rays are 0.015–0.048 mm long; the diameter of pinular ray is about 0.007 mm in diameter at base and up to about 0.011 mm in maximal diameter in its distal part. Atrial pentactins have pinular ray 0.067–0.185 mm, tangential rays are 0.030–0.059 mm long, the diameter of these rays is 0.007–0.011 mm long.

MICROSCLERES. Micramphidiscs are the only reliable type of the amphidiscs in these sponges. They have stout shafts or sometimes curved, smooth or rough, sometimes with a widening in the middle; rarely, they have umbels of different size i.e. they are hemidiscs. Micramphidiscs are 0.016–0.031 mm long; their umbels are 0.004–0.009 mm long and 0.005–0.009 mm in diameter. Some of these micramphidiscs have umbels of different size, their shafts can have widening (usually in the middle) and they may be curved. One micramphidisc has one umbel in the shape of paradisc and the other is regular umbel-like.

Oxyhexactins together with their rare derivatives with reduced number of rays have straight, smooth rays. The regular oxyhexactins have rays 0.033–0.078 mm long. The irregular oxyoidal microscleres have rays longer up to 0.1 mm long, they are stauractins, pentactins, diactins or analogous spicules with some rays long and other – short.

ETYMOLOGY. The species is named after the location situated off Alaska.

DISTRIBUTION. Pacific side of Unimak Island, Aleutian Islands; Alaskan Golf, Yakutat Golf, 3620–4186 m.

REMARKS. Hypoatrial pentactins are unknown in the holotype only, may be due to its small body size

(a juvenile specimen). In the paratypes it is impossible to find the reliable atrial surface since they are poor fragments. It is possible that atrialia are defined not correctly and these spicules with shorter pinular rays and rare spines are canalaria. In this case dermal and atrial pinular pentactins are equal to each other. Some rare macramphidiscs of different shape were found in the investigated specimens. Possibly they have allochthonous origin.

Hyalonema is a genus of Hexactinellida which has the most numerous amounts of species and the subgeneric division facilitates the systematic operations within it. The division was started by Lendenfeld (1915) and followed by Ijima (1927) and Tabachnick (2002). Meantime the absence of macramphidiscs and mesamphidiscs in one new species does not allow the final subgeneric definition of this species. The possible ancestors of this species may belong to five subgenera: *H. (Coyinonema)*; *H. (Onconema)*; *H. (Oonema)*; *H. (Phialonemiella)* and *H. (Prionema)*. Formation of a new subgenus for this peculiar species with no specific 'positive' features (specific 'negative' feature is absence of macramphidiscs and mesamphidiscs) does not seem to be reasonable now. However it is possible to describe a new species with no subgeneric status (even formal). It is reasonable until new specimens of this species or similar representatives of *Hyalonema* are found.

Similar variation of dermal and atrial pinular pentactins is described for *H. (Onconema) obtusum* Lendenfeld (1915). Moreover, the holotype has a shape similar to that of *H. (Onconema) obtusum* var. *gracilis* Lendenfeld (1915) and pinular spicules have similar sizes. Micramphidiscs of *Hyalonema alaskiense* corresponds to the small type of *H. (Onconema) obtusum* micramphidiscs. The subgenus inhabits the tropical part of the Pacific Ocean; the northerner location is off the California coast. Thus, the ancestor of this new species belongs highly likely to *H. (Onconema)*. The direct attribution of the new sponge to this taxon seems not to be reasonable. A similar situation takes place with *H. (Cyliconema) hozawai vicarium* Koltun, 1967. The absence of macramphidiscs allowed the attribution of the species to a known subgenus and species due to notable similarities of other spicules.

Hyalonema (Hemiuncinata) subgen.n.

DIAGNOSIS. The body is conical with apical cone and slit-like atrial cavity around it. Choanosomal spicules are diactins, hexactins and hemiuncinates. Hypodermalia present. Dermalia and atrialia have long pinular rays the thickest at base and short spines. Dermal spicules are pinular pentactins and rare hexactins, atrialia are pentactins, rare hexactins and diactins. Macramphidiscs belong to tree size classes: macramphidiscs, mesamphidiscs and micramphidiscs.



Fig. 3. *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., holotype. Scale bar 30 mm.

Рис. 3. *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., голотип. Масштаб 30 мм.

Macramphidiscs with umbels as long as broad or a little longer, the length of the macramphidiscs is about 1/2–1/3 as the length of the entire spicule. Oxyhexactins are likely absent.

DEFINITION. *Hyalonema* with pinular ray of dermal pentactins the thickest at base and short spines, macramphidiscs with umbels as long as broad or a little longer, the length of the macramphidiscs

is about 1/2–1/3 as the length of the entire spicule, hemiuncinates present.

REMARKS. Important features, which characterize the subgenera of the genus *Hyalonema* are various combinations of following characters: shape of macramphidiscs, dermal and atrial pinular pentactins, presence and absence of uncinates and ambuncinates. Two subgenera of *Hyalonema* have specific features:

paradiscs among micramphidiscs in *H. (Paradisco-nema)*; serrated edge of the macramphidiscs teeth in *H. (Prionema)*. The new subgenus has also a specific feature — so called hemiuncinates or uncinates monactins — the spicule, which, in contrast with uncinates (with both outer ends conically pointed), has one outer end conically pointed and another rounded. It may be supposed origination of these unique spicules from choanosomal hexactins with spiny rays. This assumption is supported by finding of spicules with 2 normal rays and rudimental others. A parallel similar process, reduction of rays, was observed for some microscleres oxyhexactins of two species: *H. (Leptonema) spatha* Tabachnick et Levi, 2000; *H. (Oonema) microstauractina* Tabachnick et Levi, 2000. It seems very likely, that the uncinates, ambuncinates and newly found hemiuncinates have common origination from the spiny choanosomal hexactins which definitely belong to the macroscleres. In some respect these spicules are similar to cuspidates — spicules known in some representatives of the family Pheronematidae where they have regular orientation of the spicule axe — prostral-distal. In the new representative of *Hyalonema* the spicules named hemiuncinates have no common orientation. Another notable feature of the new subgenus is an entire absence of oxyhexactins or their rarity.

Hyalonema (Hemiuncinata) is similar to *H. (Cyliconema)*; *H. (Coscionema)* and *H. (Hyalonema)* with three features: macramphidiscs, dermal and atrial pinular pentactins.

TYPE SPECIES. *Hyalonema (Hemiuncinata) comanchei* sp.n.

ETYMOLOGY. The subgenus name is originated from the specific spicule type — hemiuncinates.

Hyalonema (Hemiuncinata) comanchei sp.n.
Figs 3–5.

MATERIAL. Holotype: IORAS 5/2/3819. RV 'Akademik M.A. Lavrentyev'–75, ROV 'Comanche', sta. 16, 55.5774° N 167.3258° E, depth 4277–4278 m.

DESCRIPTION. BODY. The holotype specimen is notably damaged. A tuft of basal spicules are about 170 mm long. The body is conical 70 mm high and about 20 mm in maximal diameter. The apical cone is 20 mm long, atrial cavity is folded to about 5 mm around the apical cone. Highly likely the body shape is bell-like.

SPICULES. Macroscleres. Choanosomal spicules are diactins, hexactins and hemiuncinates. The diactins have a widening in the middle or four rudimental tubercles and conically pointed outer ends. These diactins are 0.7–1.2/0.006–0.014 mm. Choanosomal hexactins have rays 0.3–0.4/0.011–0.015 mm with conically pointed outer ends. Hemiuncinates have one outer end finely pointed and the opposite one rounded

with one or several spines, the shaft is covered by small spines which are directed towards the rounded outer end. Hemiuncinates are 0.3–0.7/0.001–0.007 mm. Hypodermal pentactins have conically pointed outer ends, their tangential rays are 0.13–0.30 mm long, the ray directed inside the body is 0.27–0.48 mm long, their diameter is 0.005–0.022 mm.

Dermalia are pinular pentactins and rarely hexactins. Atrialia are pinular pentactins, rare hexactins equal to analogous dermal spicules and diactins with two or four rudimental tubercles. The pinular ray is the thickest at base and short spines, tangential rays are short spiny or conically pointed. Pinular ray of dermal pentactin is 0.111–0.433 mm long (n=26, avg: 0.296 mm, std: 0.056 mm), tangential rays are 0.037–0.070 mm long (n=26, avg: 0.047 mm, std: 0.008 mm), their diameter is about 0.004–0.011 mm. Pinular ray of atrial pentactin is 0.118–0.333 mm long (n=25, avg: 0.265 mm, std: 0.046 mm), tangential rays are 0.030–0.078 mm long (n=25, avg: 0.046 mm, std: 0.009 mm), their diameter is about 0.004–0.009 mm. Pinular ray of atrial diactin is 0.3–0.6 mm long and has the same shape as the other pinular rays of pentactins and hexactins; the ray directed inside the body is 0.3–0.5 m long, the diameter of these rays is 0.005–0.007 mm.

MICROSCLERES. Amphidiscs are represented by three types, all types may have paradisc-shaped amphidiscs, rare hemidiscs were found among micramphidiscs. Macramphidiscs have tuberculous shafts and sometimes their umbels are longer than 1/2 of the entire spicule, some macramphidiscs and other size classes of amphidiscs have umbels of slightly different sizes (hemidiscs). Macramphidiscs are 0.215–0.289 mm long (n=23, avg: 0.245 mm, std: 0.018 mm), their umbels are 0.085–0.111 mm long (n=23, avg: 0.097 mm, std: 0.007 mm) and 0.085–0.111 mm in diameter (n=23, avg: 0.097 mm, std: 0.007 mm). Mesamphidiscs have spiny shafts. Mesamphidiscs are 0.044–0.155 mm long (n=26, avg: 0.090 mm, std: 0.029 mm), their umbels are 0.019–0.067 mm long (n=26, avg: 0.036 mm, std: 0.010 mm) and 0.011–0.070 mm in diameter (n=26, avg: 0.030 mm, std: 0.010 mm). Micramphidiscs are 0.016–0.030 mm long (n=26, avg: 0.020 mm, std: 0.003 mm), their umbels are 0.005–0.015 mm long (n=26, avg: 0.008 mm, std: 0.002 mm) and 0.006–0.011 mm in diameter (n=26, avg: 0.008 mm, std: 0.001 mm). The shafts of micramphidiscs are smooth, sometimes spiny, stout or curved, unique paradisc was found among them.

The oxyhexactins are very rare; likely they belong to other specimens of *Hyalonema* which were collected nearby. The rays of oxyhexactins are straight 0.033–0.052 mm long (n=5, avg: 0.039 mm, std: 0.008 mm).

ETYMOLOGY. The species name is originated from the name of the ROV 'Comanche' captured this unique specimen.

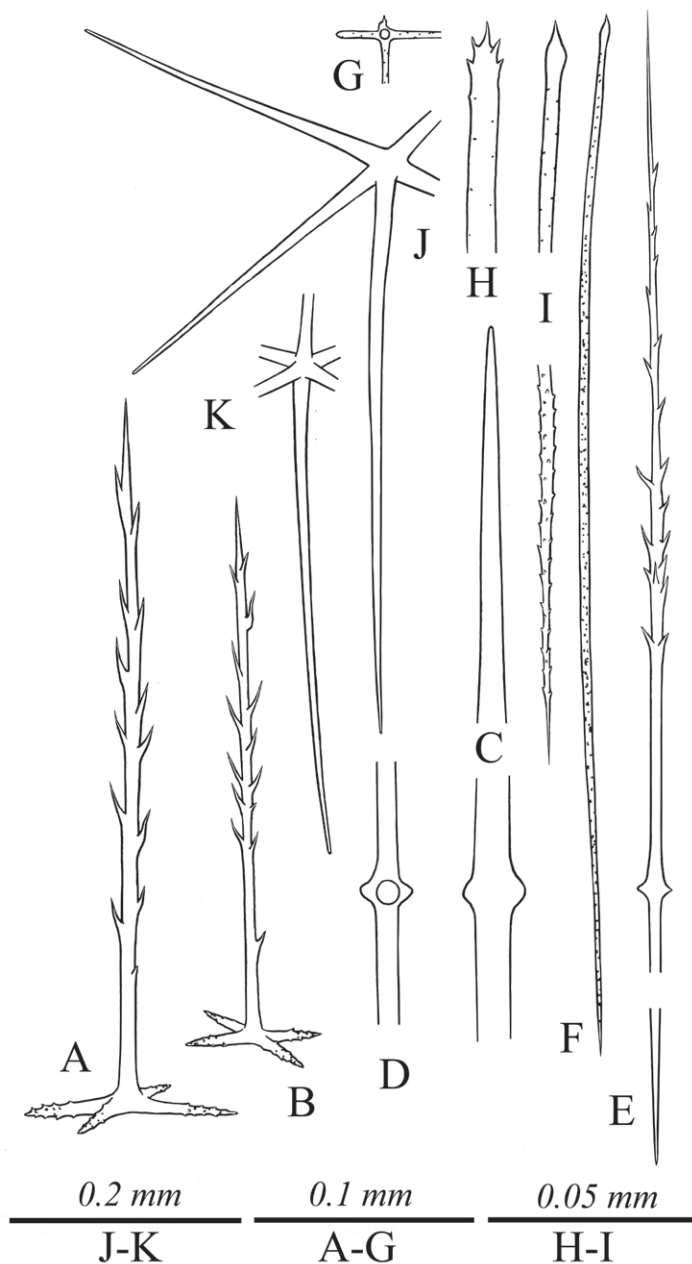


Fig. 4. Spicules of *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., holotype. A — dermal pinular pentactin; B — atrial pinular pentactin; C–D — choanosomal diactins; E — pinular diactin; F–I — hemiuncinate; G — abnormal hemiuncinate.

Рис. 4. Спиккулы *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., голотип; А — дермальная пинулярная пентактина; В — атриальная пинулярная пентактина; С–D — хоаносомальные диактины; Е — пинулярная диактина; F–I — гемиунцината; G — ненормальная гемиунцината.

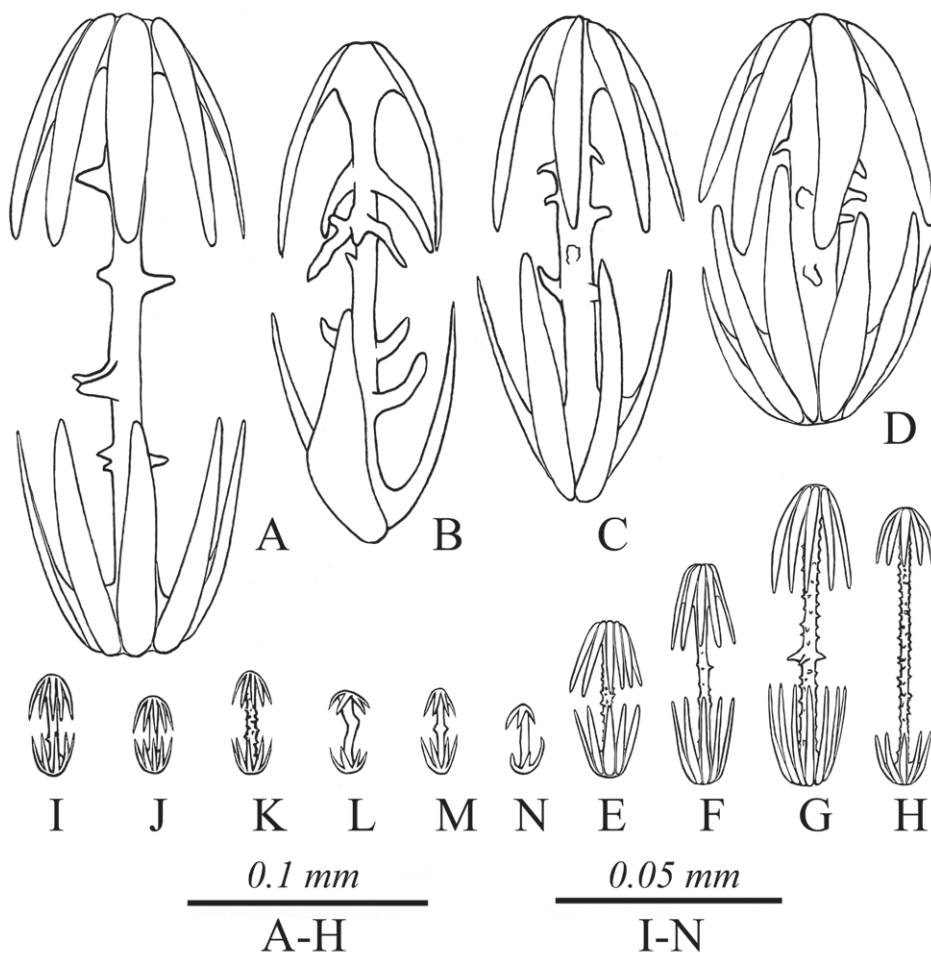


Fig. 5. Spicules of *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., holotype. A–D — macramphidiscs; E–H — mesamphidiscs; I–L — micramphidiscs; M — hemidisc; N — paradisc.

Рис. 5. Спикулы *Hyalonema (Hemiuncinata) comanchei* subgen. et sp.n., голотип. А–D — макрамфидиски; Е–Н — мезамфидиски; I–L — микрамфидиски; М — гемидиск; N — парадиск.

DISTRIBUTION. Currently found only off the Piip underwater volcano (Bering Sea) at 4277–4278 m.

REMARKS. Acanthophores and oxyhexactins are likely absent. The finding of a unique paradisc among micramphidiscs does not make it reasonable to place this sponge among *H. (Paradisconema)*, since this previously specific spicule type is now distributed among several subgenera.

Hyalonema (Cyliconema) Ijima, 1927

Hyalonema (Cyliconema) hozawai
Okada, 1932

Hyalonema (Cyliconema) hozawai vicarium
Koltun, 1967

Fig. 6; Tab. S2.

MATERIAL. IORAS 5/2/2149, 5/2/2156, 5/2/2176, 5/2/2188, 5/2/2198, 5/2/2246, 5/2/2270, 5/2/2272. RV 'Akademik Mstislav Keldysh'–22, sta. 2316, trawl, 55°36.08'–35.00'N 167°23.04'–24.46' E, depth 4200–4294 m.

DESCRIPTION. BODY. The biggest fragment IORAS 5/2/2149 is presented by an upper part of a sponge 150x200 mm and 4–10 mm thick with an apical cone 12 mm long. Other specimens are small lamellate fragments.



Fig. 6. *Hyalonema (Cyliconema) hozawai vicarium* Koltun, 1967, IORAS 5/2/2149. Scale bar 20 mm.
 Рис. 6. *Hyalonema (Cyliconema) hozawai vicarium* Koltun, 1967, IORAS 5/2/2149. Масштаб 20 мм.

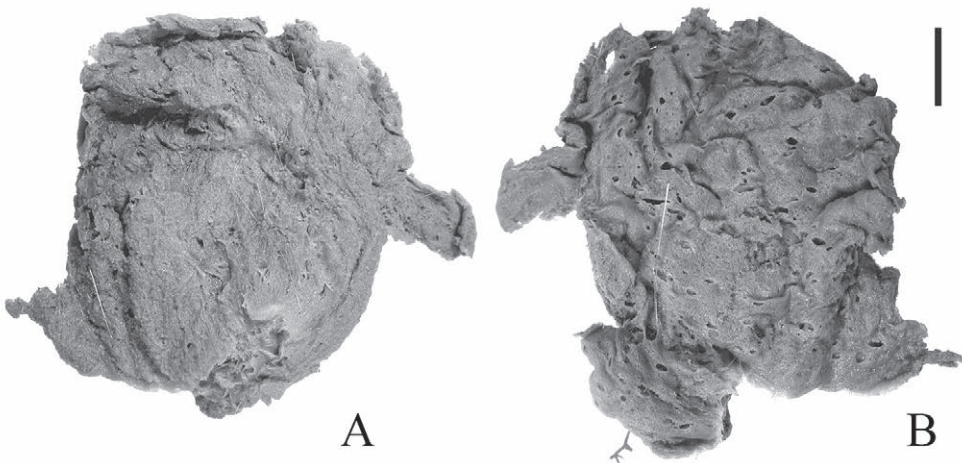


Fig. 7. *Hyalonema (Cyliconema) pateriferum* Wilson, 1904, IORAS 5/2/3348. A — view from dermal side; B — view from atrial side. Scale bar 20 mm.
 Рис. 7. *Hyalonema (Cyliconema) pateriferum* Wilson, 1904, IORAS 5/2/3348. А — вид с дермальной стороны; В — вид с атриальной стороны. Масштаб 20 мм.

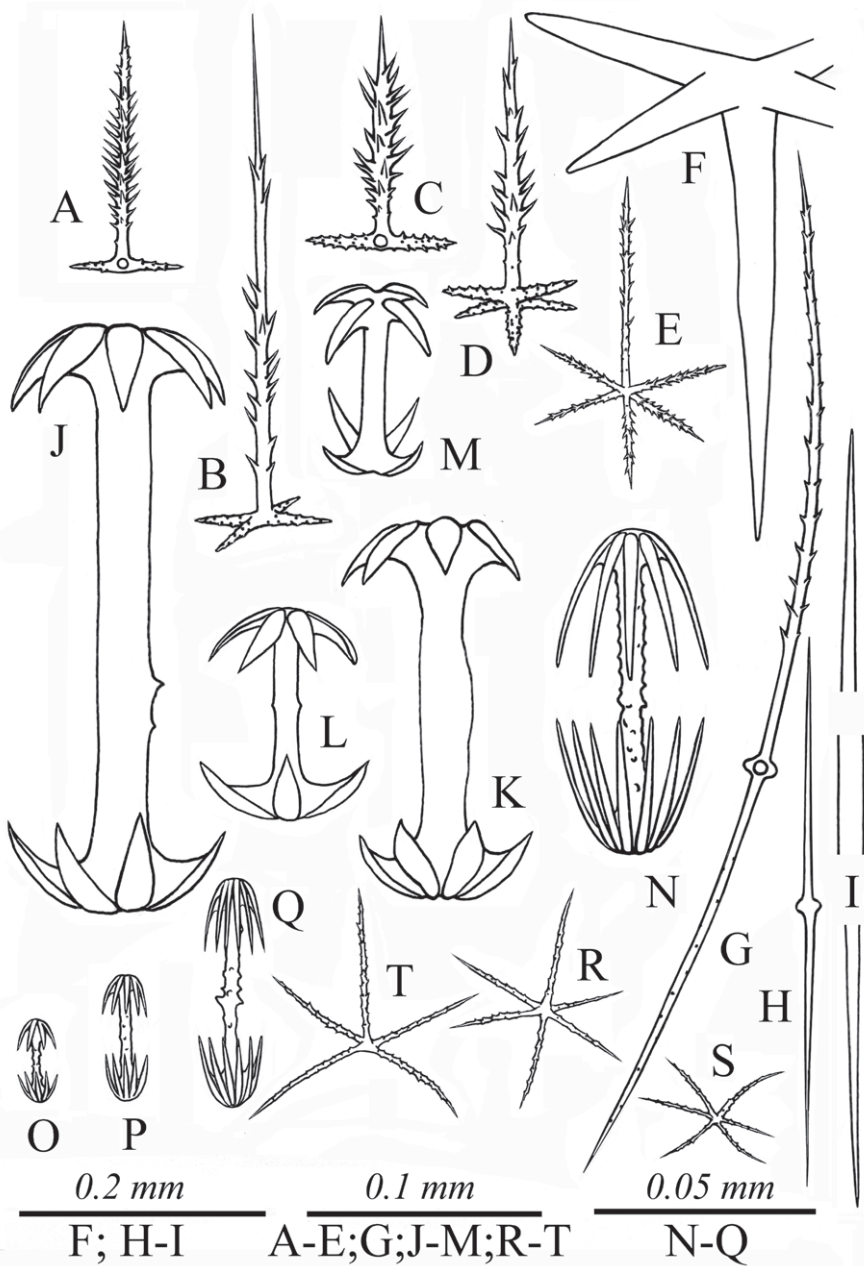


Fig. 8. Spicules of *Hyalonema (Cyliconema) pateriferum* Wilson, 1904, IORAS 5/2/3348. A — dermal pinular pentactin; B–C — atrial pinular pentactins; D–E — atrial pinular hexactins; F — hypodermal pentactin; G — pinular diactin marginalia; H–I — choanosomal diactins; J–M — macramphidiscs; N — mesamphidisc; O–Q — micramphidiscs; R–S — oxyhexactins; T — oxypentactin.

Рис. 8. Спикюлы *Hyalonema (Cyliconema) pateriferum* Wilson, 1904, IORAS 5/2/3348. А — дермальная пинулярная пентактина; В–С — атриальные пинулярные пентактины; D–E — атриальные пинулярные гексактины; F — гиподермальная пентактина; G — пинулярная маргинальная диактина; H–I — хоаносомальные диактины; J–M — макрамфидиски; N — мезамфидиск; O–Q — микроамфидиски; R–S — оксигексактины; T — оксипентактина.

DISTRIBUTION. Bering Sea, 3920–4294 m depth.

REMARKS. In most features the new specimens generally corresponds to the subspecies description made by Koltun (1967). The ‘big amphidiscs’ in Koltun’s description are considered to be mesamphidiscs due to the fact that they correspond to the same class of amphidisc of *Hyalonema (Cyliconema) hozawai* Okada, 1932. The notable difference between the pinular pentactin sizes of the specimens described by Koltun and those in the newly found specimens are considered to be not a significant feature of the subspecies variation.

Hyalonema (Cyliconema) pateriferum

Wilson, 1904

Figs 7–8; Tab. S3.

MATERIAL. IORAS 5/2/3348. RV ‘Vityaz’–45, sta. 6106, 58°15' N 142°34' W, 3620 m.

DESCRIPTION. The specimen is presented by a lamellate fragment of the wall about 100x100 mm and 4 mm thick. Atrial surface is distinguished by presence of canal openings 1–4 mm in diameter, usually they are elongate.

SPICULES. MICROSCLERES. New type of microscleres in the investigated specimen is mesamphidisc with rough or shafts, numerous teeth and umbels generally as long as broad.

DISTRIBUTION. Central-East Pacific, N Pacific – Alaskan Golf, 1780–4500 m depth.

REMARKS. The new specimen is a well recognizable representative of *Hyalonema (Cyliconema) pateriferum* Wilson, 1904 because of the similarities of dermal and atrial pinular spicules and specific shape of macramphidiscs. Most spicules measures generally correspond to the previously described type series of Wilson (1904) and specimens described by Lendenfeld (1915).

Hyalonema (Cyliconema) tenerum

Schulze, 1887

Hyalonema (Cyliconema) tenerum vitiazi

Koltun, 1967

Figs 9–10; Tab. S4.

MATERIAL. IORAS 5/2/2163, 5/2/2166, 5/2/2171, 5/2/2200, 5/2/2203, 5/2/2213, 5/2/2225, 5/2/2239, 5/2/2241, 5/2/2247, 5/2/2249, 5/2/2293. RV ‘Akademik Mstislav Keldysh’–22, sta. 2316, trawl, 55°36.08'–35.00' N 167°23.04'–24.46' E, depth 4200–4294 m. IORAS 5/2/3828; 5/2/3829. RV ‘Akademik M.A. Lavrentyev’ voyage 75, ROV ‘Comanche’, sta. 16, spec. 1; 2, 55, 5774° N 167, 3258° E, depth 4277–4278 m. IBMRAS: lv-82-6 sp1: one fragment and several underwater photos of several

specimens. RV ‘Akademik M.A. Lavrentyev’ voyage 82, sta. 6, ROV ‘Comanche’, 55.6946–6922° N 167.1238–1203° E, depth 3753–3652 m.

Hyalonema (Cyliconema) aff. tenerum vitiazi Koltun, 1967: IORAS 5/2/2145, 5/2/2146, 5/2/2148, 5/2/2219. RV ‘Akademik Mstislav Keldysh’–22, sta. 2309, trawl, 55°13.2'–12' N 167°29.07'–26.7' E, depth 3957–3978 m. IORAS 5/2/2189, 5/2/2205, 5/2/2237, 5/2/2240, 5/2/2256. RV ‘Akademik Mstislav Keldysh’–22, sta. 2316.

DESCRIPTION. BODY. As it is obvious now the body shape of this species is bell-like. The smallest specimen IORAS 5/2/2241 is 60 mm high, the maximal diameter of the margin is 60x70, the diameter of the lower part is 25 mm, apical cone is 10 mm high. The biggest specimen IORAS 5/2/2145 is 90 mm high, the maximal diameter of the margin is 130x150 mm, the diameter of the lower part is 45 mm, the apical cone is absent. The maximal specimen is presented by ring-like marginal part 115x160 mm in diameter. The thickness of the marginal discoidal part is 1–8 mm thick.

DISTRIBUTION. Bering Sea, 3652–4294 m depth.

REMARKS. The newly found specimens generally satisfy the original description of Koltun (1967). Due to notable amount they vastly supplement the original description of the subspecies. Some differences were observed among the amphidiscs: it seems reasonable to distinguish the mesamphidiscs; this type of microsclere was not defined in the original description but nevertheless it looks reasonable. The smallest micramphidiscs described by Koltun (1967) correspond in size to those of newly found specimens, and the largest micramphidisc are similar to large mesamphidiscs of the new materials. Unlike large macramphidiscs described by Koltun the observed spicules in the newly found specimens are less regular: sometimes their shafts have some tubercles; umbels may be of different shape — hemidiscs. Small ovoid macramphidiscs may be also found in the form of hemidiscs; often they have teeth of different length when the large teeth protrude more than half of the entire spicule and the teeth opposite to it is notably shorter than its neighbors. In one specimen, IORAS 5/2/2225, some of the small ovoid macramphidiscs have corrugated, wavy teeth margins. Mesamphidiscs have rough shafts, often with a widening in the middle; as macramphidiscs they sometimes are represented by hemidiscs. Micramphidiscs have a uniform standard shape.

This subspecies, known before by poor fragment (Koltun, 1967), now is represented by several complete specimens. *H. (Cyliconema) tenerum* was described from the S Pacific (Schulze, 1887).

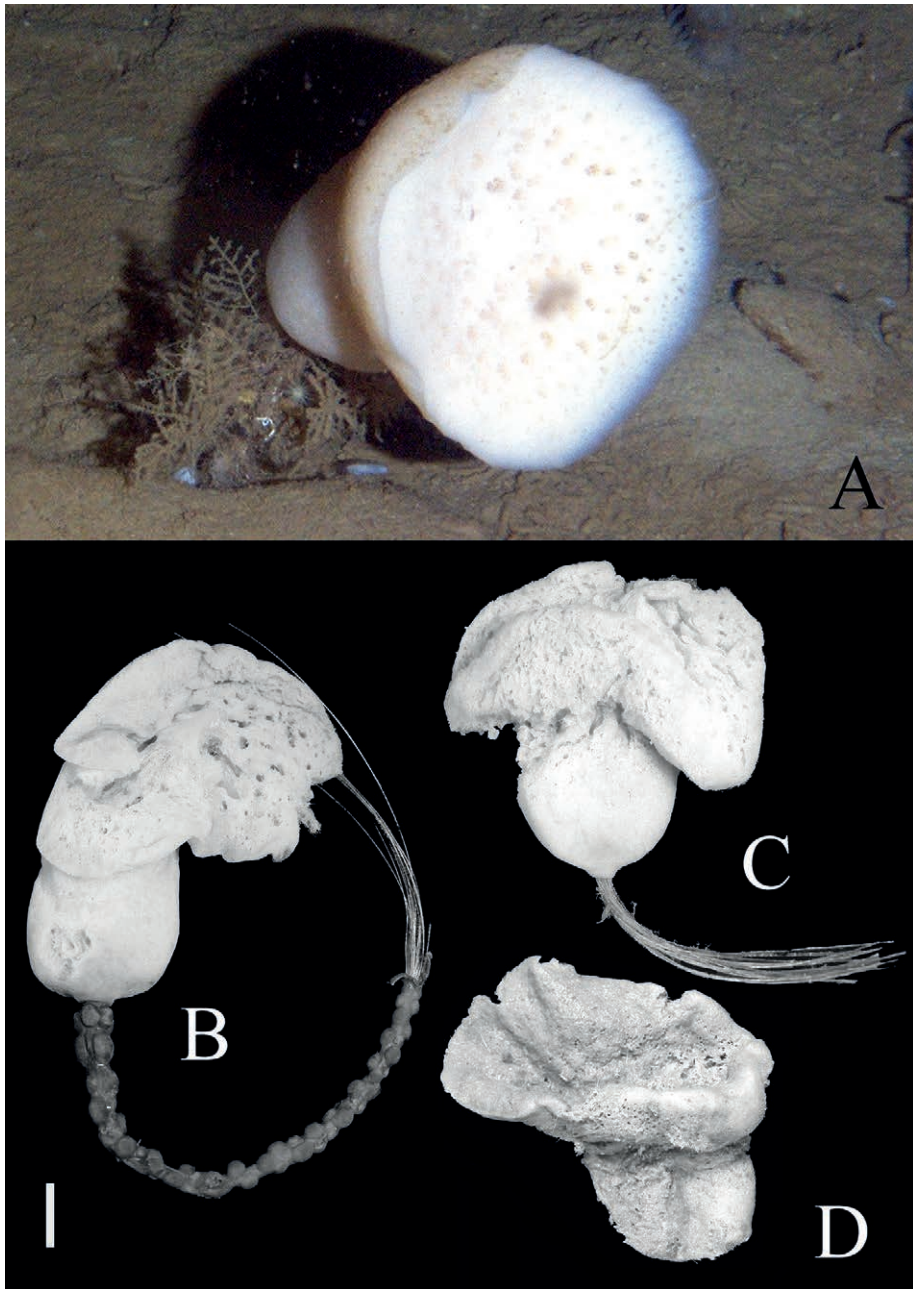


Fig. 9. *Hyalonema (Cyliconema) tenerum vitiazi* Koltun, 1967. A — an underwater photo made by the ROV 'Comanche'; B — IORAS 5/2/3828; C — IORAS 5/2/3829; D — IORAS 5/2/2225. B–D — scale 20 mm.
 Рис. 9. *Hyalonema (Cyliconema) tenerum vitiazi* Koltun, 1967. A — подводная фотография; B — IORAS 5/2/3828; C — IORAS 5/2/3829; D — IORAS 5/2/2225. B–D — масштаб 20 мм.

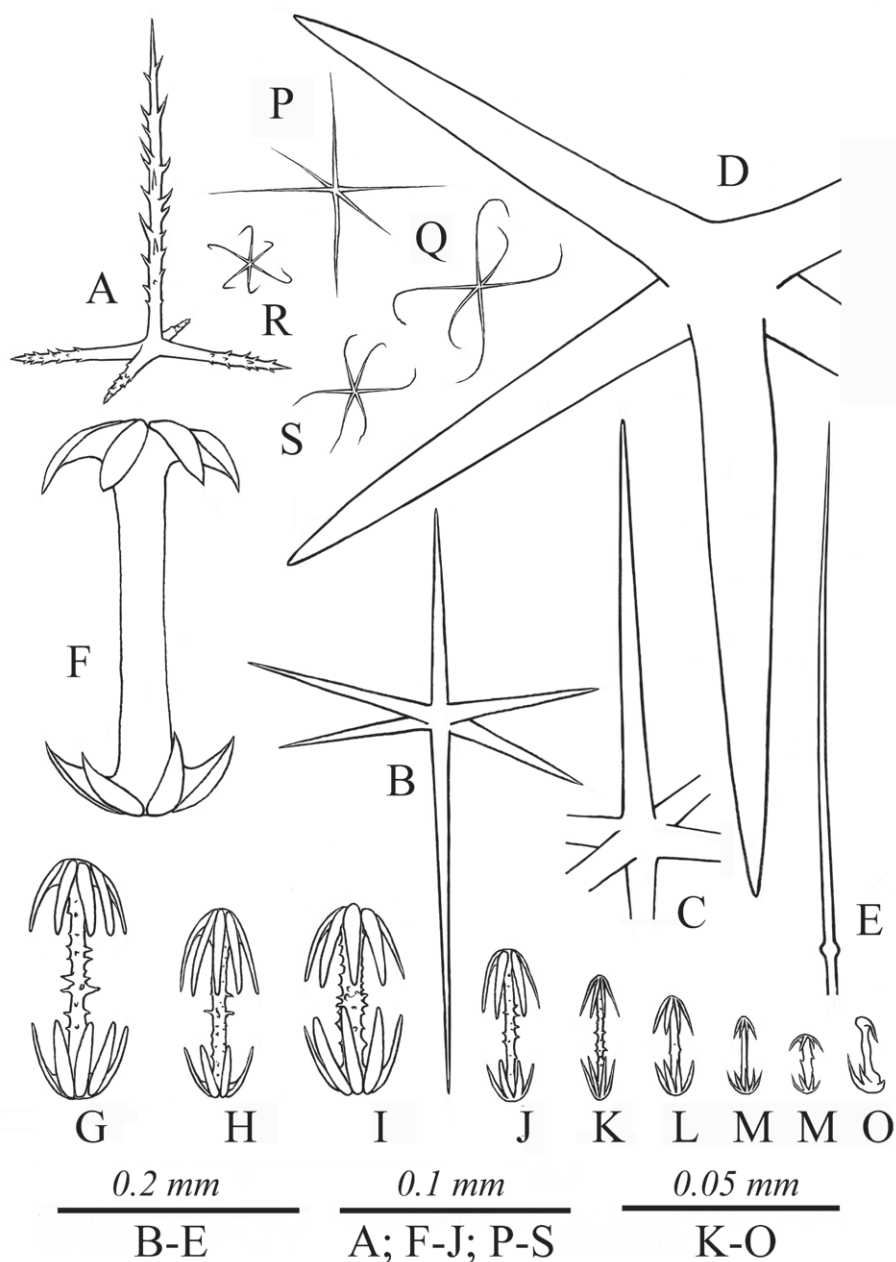


Fig. 10. Spicules of *Hyalonema* aff. (*Cyliconema*) sp., IORAS 5/2/sp4099. A — dermal pinular pentactin; B–C — choanosomal hexactins; D — hypodermal or hypoatrial pentactin; E — choanosomal diactin; F — macramphidisc; G–J — mesamphidiscs; K–N — micramphidiscs; O — paradisc; H, J, M — spicules with tendency of paradiscs; P–S — oxyhexactins.

Рис. 10. Спикеры *Hyalonema* aff. (*Cyliconema*) sp., IORAS 5/2/sp4099. А — дермальная пинулярная пентактина; В–С — хоаносомальные гексактины; D — гиподермальная или гипоатриальная пентактина; E — хоаносомальная диактина; F — макрамфидиск; G–J — мезамфидиски; K–N — микроамфидиски; O — парадиск; H, J, M — спикеры с тенденцией к парадискам; P–S — оксигексактина.

Hyalonema aff. (*Cyliconema*) sp.

Fig. 11.

MATERIAL. IORAS 5/2/4099. RV 'Vityaz'-45, sta. 6106, 58°15' N 142°34' W, 3620 m.

DESCRIPTION. BODY. The specimen is presented by small fragment of notably damaged specimen; one is fixed to a small tuft of basal spicules.

SPICULES. MACROSCLERES. Hypodermal pentactins are very rare; they have conically pointed outer ends. Their tangential rays are 0.24–0.42 mm long, the proximal ray is 0.3–1.0 mm long, these rays have the diameter of 0.015–0.053 mm. Choanosomal spicules are diactins and hexactins with conically pointed or rarely rounded outer ends. Choanosomal diactins, 0.5–1.9/0.007–0.026 mm, have a widening in the middle. Choanosomal hexactins have rays 0.2–2.2/0.007–0.041 mm, often the rays are of unequal length.

Dermal pinular pentactins have short spiny pinular ray which are the thickest at base, tangential rays bear short spines. Pinular ray of dermal pentactin is 0.078–0.185 mm long (n=26, avg: 0.125 mm, std: 0.026 mm), tangential rays are 0.037–0.100 mm long (n=26, avg: 0.054 mm, std: 0.013 mm), their diameter is about 0.007 mm.

MICROSCLERES. Amphidiscs could be subdivided into two types: macramphidiscs and micro-mesoamphidiscs. Macramphidiscs are 0.155–0.178 mm long (n=4, avg: 0.170 mm, std: 0.010 mm), their umbels are 0.026–0.030 mm long (n=4, avg: 0.028 mm, std: 0.002 mm) and 0.074–0.089 mm in diameter (n=4, avg: 0.083 mm, std: 0.006 mm). Micro-mesoamphidiscs have spiny or rough shafts. These spicules often have umbels of different sizes — hemidiscs. The proportion of hemidiscs seems to be larger among small spicules of this type. Rarely the smallest types may be found among paradiscs. Micro-mesoamphidiscs are 0.016–0.100 mm long (n=52, avg: 0.039 mm, std: 0.019 mm), their umbels are 0.005–0.044 mm long (n=52, avg: 0.015 mm, std: 0.008 mm) and 0.005–0.048 mm in diameter (n=52, avg: 0.015 mm, std: 0.009 mm). Oxyhexactins often have notably curved rays, their rays are 0.025–0.074 mm long (n=35, avg: 0.041 mm, std: 0.014 mm).

REMARKS. The specimen likely belongs to *Hyalonema* (*Cyliconema*). It is unknown if the rare macramphidiscs are allochthonous or they belong to *H. (Cyliconema) pateriferum* captured in the same location. The sponge is presented by poor fragments and no continuous layer of dermal or atrial surfaces were found. The rare pinular pentactins are likely dermal spicules since they were found in the vicinity of the basal part of the sponge. No boundary was observed between micramphidiscs and mesamphidiscs. Very specific feature of this specimen is presence of hemidiscs, which were observed among both small-

est and biggest micramphidiscs-mesamphidiscs spicules, the most numerous they are among the smaller categories of amphidiscs. A similar situation — presence of paradiscs among the smallest type of macramphidiscs — was already observed for *H. (Oonema) microstauractina* (Tabachnick, Lévi, 2000). Occasional paradiscs may be of allochthonous origin. A contamination from *H. (Paradisconema)* captured at the same station is also highly likely.

This sponge may belong to a new species with a notable specific feature — hemidiscs, but since it is presented by poor fragment the assignation of separate taxonomic status is delayed. Besides this specimen may belong to *H. (Cyliconema) pateriferum* Wilson, 1904 captured at the same station.

Hyalonema (Cyliconemaoida)

Dohrmann, 2017

Hyalonema (Cyliconemaoida) ovuliferum

Schulze, 1899

Fig. 12; Tab. S5.

MATERIAL. IORAS sp4105; sp4106. RV 'Vityaz'-45, sta. 6106, 58°15' N 142°34' W, 3620 m. A poor fragment. RV 'Vityaz'-45, sta. 6111, 56°17.2' N 137°51' W, 2880 m.

DESCRIPTION. BODY. These sponges are represented by broken, poor fragments in which the dermal and atrial surfaces are undistinguishable.

DISTRIBUTION. Pacific coast of N America, Pacific side of E Aleutian Islands, 2869–3620 m depth.

REMARKS. The spicules are very similar in shape and size to analogous of the species described before (Schulze, 1899; Wilson, 1901) (Tab. S5). The most important common feature of these specimens is presence of ovoid amphidiscs (mesamphidiscs) which are smaller than macramphidiscs but have similar shafts. Rare macramphidiscs in the new species have umbels of different sizes (hemidiscs).

*Hyalonema (Onconema) Ijima, 1927**Hyalonema (Onconema) agassizi*

Lendenfeld, 1915

Tab. S6.

MATERIAL. IORAS 5/2/sp6106. RV 'Vityaz'-45, sta. 6106, 58°15' N 142°34' W, 3620 m.

DESCRIPTION. The sponge has ovoid body 50 mm high 30x60 mm in maximal diameter with osculum 20 mm in diameter and relatively deep 25 mm atrial cavity with an apical cone 10 mm high and 10 mm in diameter at base, 5 septa about 1 mm thick divide the atrial cavity in its lower part to 5 separate cavities. The broken tuft of basal part about 5 mm in diameter was found near the body of the specimen. The walls of this specimen are about 10 mm thick.

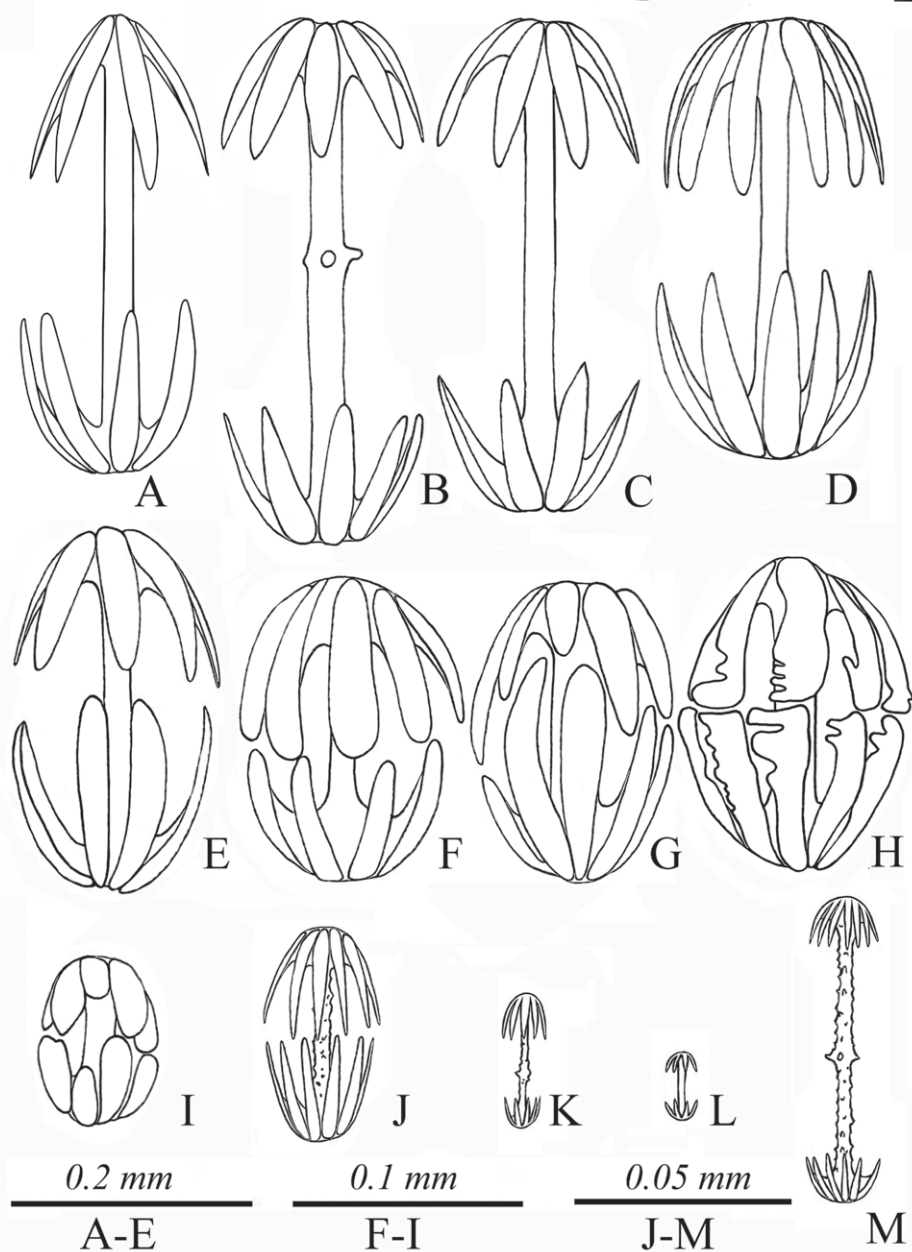


Fig. 11. Spicules of *Hyalonema (Cyliconema) tenerum vitiazi* Koltun, 1967. A-E — large macramphidiscs; A — large macramphidisc in the form of hemidisc; D-E — large macramphidisc of intermediate to ovoid shape; F-I — small ovoid macramphidiscs; J — mesamphidisc; K-L — micramphidiscs; M — abnormal amphidisc intermediate between mesamphidiscs and micramphidiscs; A-G, I-M — IORAS 5/2/2225; H — IBMRAS: lv-82-6 sp1.

Рис. 11. Спикулы *Hyalonema (Cyliconema) tenerum vitiazi* Koltun, 1967. A-E — большие макрамфидиски; A — большой макрамфидиск в форме гемидиска; D-E — большие макрамфидиски переходной к овоидной форме; F-I — маленький овоидный макрамфидиск; J — музамфидиск; K-L — микроамфидиски; M — ненормальный амфидиск переходный между мезамфидисками и микроамфидисками; A-G, I-M — IORAS 5/2/2225; H — IBMRAS: lv-82-6 sp1.

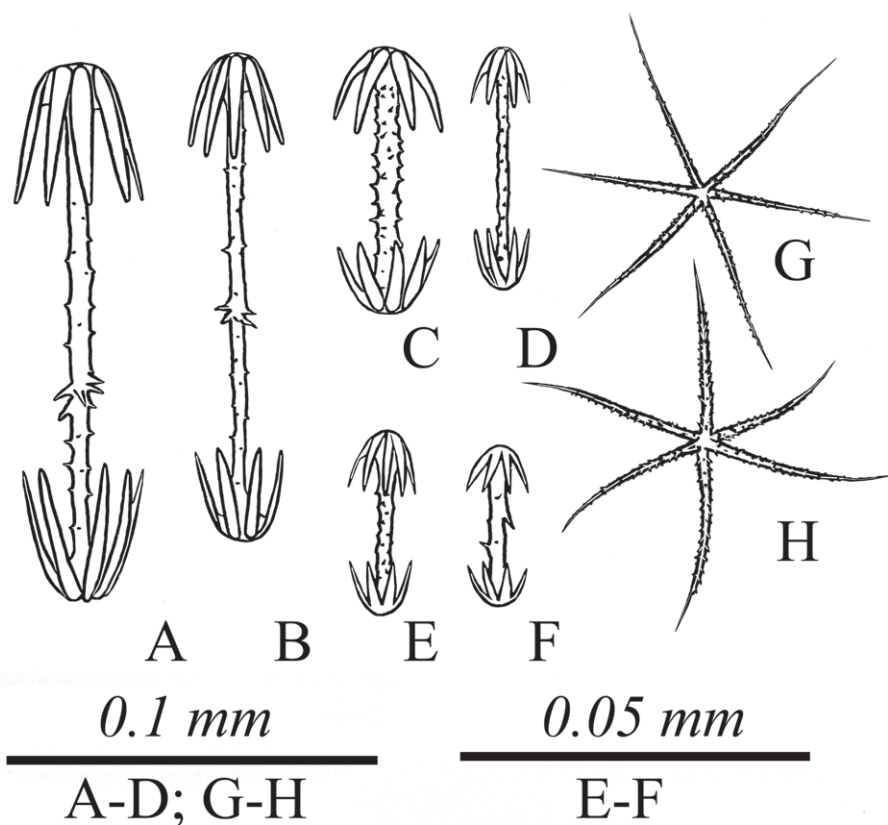


Fig. 12. Spicules of *Hyalonema (Cyliconemaoida) ovuliferum* Schulze, 1899, IORAS 5/2/sp405. A–B — macramphidiscs; C–D — mesamphidiscs; E–F — micramphidiscs; G–H — oxyhexactins.
 Рис. 12. Спикулы *Hyalonema (Cyliconemaoida) ovuliferum* Schulze, 1899, IORAS 5/2/sp405. A–B — макрамфидиски; C–D — мезамфидиски; E — микроамфидиски; G–H — оксигексактины.

DISTRIBUTION. Pacific coast of N and Central America, 3620–4504 m depth.

REMARKS. The body shape of the new specimen corresponds to that of some of type series representatives so-called “cake-shaped” (in form C), to which were attributed 3 specimens from the original description (Lendenfeld, 1915). Spicule shape and their measurements of the new specimen generally correspond to those described by Lendenfeld (1915). Measurements of the type series of spicules and the spicules of newly captured specimen are given in the Tab. S6. Some differences are observed in amphidiscs: the new specimen has few mesamphidiscs and macramphidiscs. The small macramphidiscs and large micramphidiscs described by Laubenfels (1915) correspond to the mesamphidiscs of the newly found specimen. A common specific feature of this species is presence of peculiar acanthophores — spicules found on the surface of the lower part of the body: some

of them are originated from choanosomal spicules (stauractins and diactins with rounded, rough outer ends); the others are smaller spicules with pinular ray which are not widening but the thickest at base and carrying long spines and generally long spiny stauractins — derivatives of dermal pinular pentactins or oxyhexactins.

Hyalonema (Paradisconema) Ijima, 1927
Hyalonema (Paradisconema) commanderi

sp.n.

Figs 13–14; Tab. S7.

MATERIAL. Holotype. IORAS 5/2/2264. RV ‘Akademik Mstislav Keldysh’–22, sta. 2316, trawl, 55°36.08′–35.00′ N 167°23.04′–24.46′E, depth 4200–4294 m. Paratypes: IORAS 5/2/2193, 5/2/2197, 5/2/2221. Same location to the holotype.



Fig. 13. *Hyalonema (Paradisconema) commanderi* sp.n., holotype. Scale bar 10 mm.
 Рис. 13. *Hyalonema (Paradisconema) commanderi* sp.n., голотип. Масштаб 10 мм.

DESCRIPTION. The holotype is broken in the upper part. The specimen has an ovoid form, 20 mm high and 10 mm in diameter with an apical cone 10 mm long and a tuft of basalia 100 mm long. Other specimens are presented by small fragments.

SPICULES. MACROSCLERES. Choanosomal spicules are diactins and hexactins. The diactins have

a widening in the middle and conically pointed outer ends. The diactins are 0.55–1.12/0.004–0.019 mm. The choanosomal hexactins have rays with conically pointed outer ends 0.2–0.4/0.007–0.015 mm. Hypodermal pentactins have rays with conically pointed outer ends, tangential rays are 0.3–0.4 mm long, the proximal ray is 0.3–0.6 mm long, the diameter of these rays is 0.011–0.026 mm.

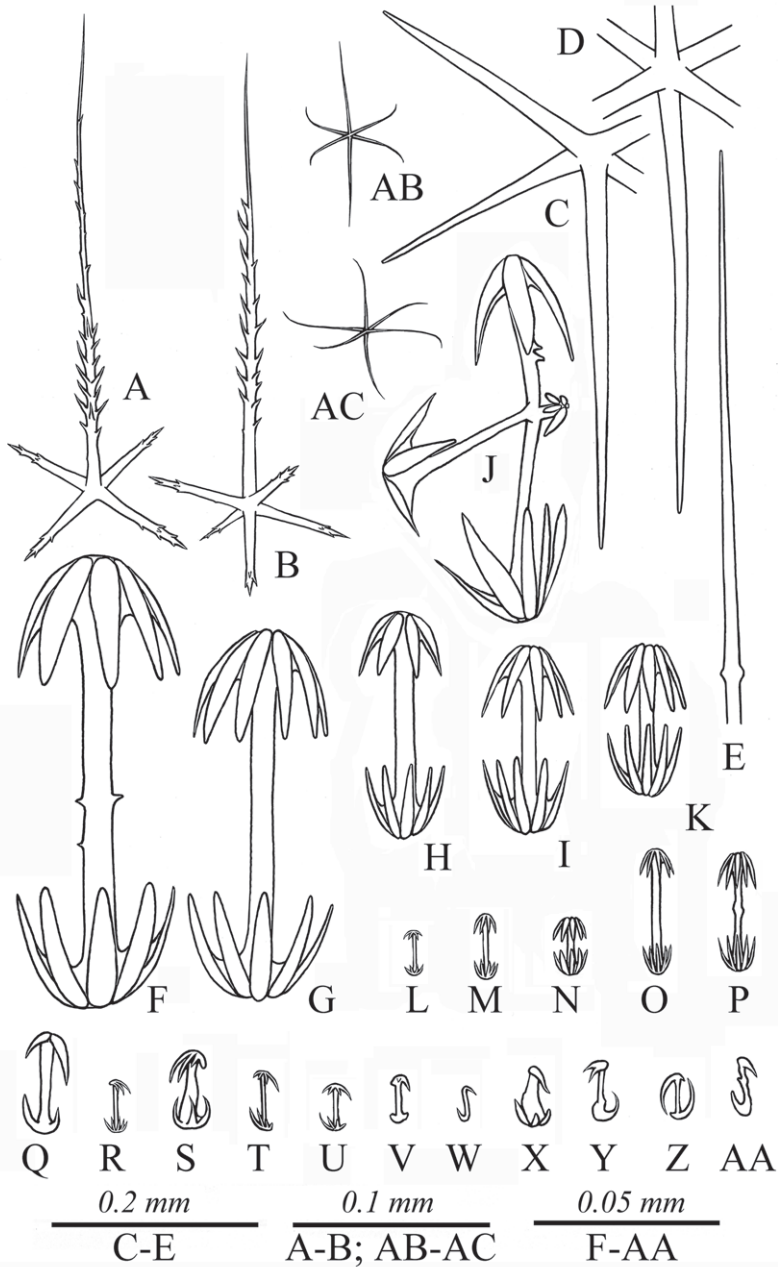


Fig. 14. Spicules of *Hyalonema (Paradisconema) commanderi* sp.n., holotype. A — dermal pinular pentactin; B — dermal pinular hexactin; C — hypodermal pentactin; D — choanosomal hexactin; E — choanosomal diactin; F–I — macramphidiscs; J — abnormal macramphidisc; K — small ovoid macramphidisc; L–P — micramphidiscs; Q–U — paradiscs; V–AA — abnormal paradiscs; AB–AC — oxyhexactins.

Рис. 14. Спикулы *Hyalonema (Paradisconema) commanderi* sp.n., голотип. А — дермальная пинулярная пентактина; В — дермальная пинулярная гексактина; С — гиподермальная пентактина; D — хоаносомальная гексактина; E — хоаносомальная диактина; F–I — макрамфидиски; J — ненормальный макрамфидиск; K — маленький овоидный макрамфидиск; L–P — микроамфидиски; Q–U — парадиски; V–AA — ненормальный парадиск; AB–AC — оксигексактины.

Dermal pinular pentactins and rare hexactins have pinular rays with short spines and finely pointed, whip-like and not spiny outer ends, tangential rays have finely pointed outer ends and rare spines in their distal parts. The pinular rays of dermal pentactins are 0.070–0.266/0.007 mm; tangential rays are 0.030–0.074/0.004–0.006 mm.

MICROSCLERES. Amphidiscs in this new species may be hardly subdivided into different types because of presence of various transitional forms, nevertheless amphidiscs are divided into 2 types of macramphidiscs: large macramphidiscs and small ovoid macramphidiscs; micramphidiscs: usual and ovoid and paradiscs and their derivatives. Large macramphidiscs have shafts smooth, rarely with occasional spines. Large macramphidiscs are 0.041–0.122 mm long; their umbels are 0.013–0.041 mm long and 0.014–0.044 mm in diameter. Small ovoid macramphidiscs have ovoid shape. They are 0.032–0.074 mm long, their umbels are 0.014–0.033 mm long and 0.013–0.037 mm. Micramphidiscs are 0.011–0.054 mm long, their umbels are 0.004–0.023 mm long and 0.005–0.024 mm in diameter. Ovoid micramphidiscs are 0.013–0.030 mm long; their umbels are 0.006–0.015 mm long and 0.007–0.016 mm in diameter. Paradiscs are 0.009–0.022 mm long; their umbels are 0.004–0.013 mm long and 0.004–0.013 mm in diameter.

Oxyoidal microscleres have fine rays curved or rarely some of them — 2 are curved. The ray of oxyhexactin is 0.024–0.052 mm long.

ETYMOLOGY. The species is named after the location in the Commander Basin in the West Bering Sea.

DISTRIBUTION. Commander Basin, Bering Sea, 4200–4294 m.

REMARKS. This subgenus was known erenow by tree species: *H. (Paradisconema) alkocki* Schulze, 1895; *H. (Paradisconema) investigatoris* Schulze, 1899 and *H. (Paradisconema) vosmaeri* Ijima, 1927. Two first species were found in the Indian Ocean, the latter one — in the Central-West Pacific, off the Indonesian Archipelago. The new species has specific feature — presence of ovoid-shaped amphidiscs here they are called small macramphidiscs and ovoid micramphidiscs. Meantime intermediate forms of amphidiscs rarely present among all their types in previously known species, in the new species intermediate forms were found in notable amounts. The pinular ray in the new species is whip-like and the sizes of most microscleres, especially amphidiscs, in the new species are specific features.

Hyalonema (Paradisconema) yakutati sp.n.

Figs 15–16.

MATERIAL. HOLOTYPE. IORAS 5/2/3228. RV 'Vityaz'–45, sta. 6106, 58°15' N 142°34' W, 3620 m.

DESCRIPTION. **BODY.** The body is bell-like 75 mm high with flat atrial cavity; the most widened upper part is 50x60 mm, the lower part is about 35 mm in diameter and notable apical cone is about 10 mm high. A tuft of basalialia is separated from the body; it is about 200 mm long.

SPICULES. **MACROSCLERES.** Choanosomal spicules are diactins and hexactins. The diactins have conically pointer outer ends or rarely rounded and stout shafts, they are 0.3–2.2/0.06–0.18 mm. Hypodermal hexactins have rays conically pointed 0.2–0.4/0.01–0.04 mm. Hypodermalia are pentactins with conically pointed outer ends, tangential rays are 0.2–1.0 mm, the ray directed inside the body is 0.5–1.5 mm long, the diameter of these rays is 0.027–0.152 mm.

Dermalia and atrialia are pinular pentactins similar to each other (atrial pentactins are a little larger than dermal ones). The shaft of these pentactins is a little bit thicker not far from its base; tangential rays are spiny, usually with conically pointed, rarely rounded outer ends; pinular ray is spindle-like in shape. Dermal pentactins have pinular ray 0.093–0.296 mm (n=25, avg: 0.214 mm, std: 0.049 mm), diameter at base is 0.015–0.023 mm, maximal diameter is 0.015–0.030 mm; tangential rays are 0.024–0.052 mm (n=25, avg: 0.041 mm, std: 0.006 mm). Atrial pentactins have pinular ray 0.163–0.289 mm (n=25, avg: 0.221 mm, std: 0.033 mm), diameter at the base is 0.029–0.030 mm, maximal diameter is 0.030–0.038 mm; tangential rays are 0.011–0.070 mm (n=25, avg: 0.044 mm, std: 0.011 mm).

MICROSCLERES. Amphidiscs in this species are attributed to four types: large and small macramphidiscs, mesamphidiscs and two types of micramphidiscs: typical regular and paradiscs. Large macramphidiscs have smooth shafts with some randomly located or sometimes concentrated in the middle irregular processes; the teeth of this type of macramphidiscs are usually conically pointed. Large macramphidiscs are 0.226–0.400 mm long (n=26, avg: 0.282 mm, std: 0.036 mm), their umbels are 0.074–0.130 mm long (n=26, avg: 0.098 mm, std: 0.016 mm) and 0.104–0.167 mm in diameter (n=26, avg: 0.142 mm, std: 0.015 mm). Small ovoid macramphidiscs have overall ovoid shape. They are 0.126–0.233 mm long (n=25, avg: 0.171 mm, std: 0.030 mm), their umbels are 0.059–0.126 mm long (n=25, avg: 0.085 mm, std: 0.016 mm) and 0.093–0.159 mm in diameter (n=25, avg: 0.117 mm, std: 0.017 mm). Mesamphidiscs have spiny shafts, usually with widened central part. Mesamphidiscs are 0.048–0.087 mm long (n=25, avg: 0.068 mm, std: 0.008 mm), their umbels are 0.019–0.031 mm long (n=25, avg: 0.025 mm, std: 0.003 mm) and 0.016–0.033 mm in diameter (n=25, avg: 0.025 mm, std: 0.004 mm). Regular micramphidiscs are similar in shape to mesamphidiscs. Micramphidiscs are 0.017–0.037 mm long (n=26, avg: 0.011 mm, std: 0.002 mm), their umbels are 0.007–0.015 mm

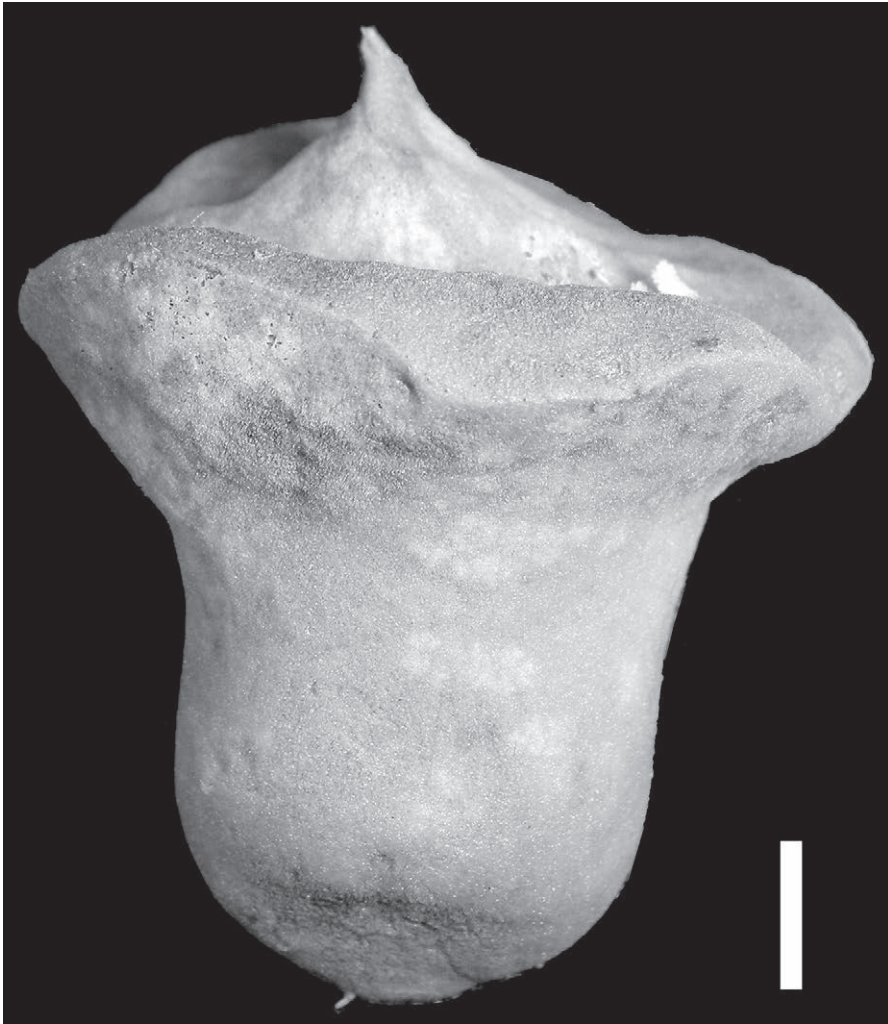


Fig. 15. *Hyalonema (Paradisconema) yakutati* sp.n., holotype. Scale bar 10 mm.

Рис. 15. *Hyalonema (Paradisconema) yakutati* sp.n., holotype. Масштаб 10 мм.

long (n=26, avg: 0.011 mm, std: 0.002 mm) and 0.008–0.013 mm in diameter (n=26, avg: 0.010 mm, std: 0.002 mm). Paradiscs are 0.020–0.031 mm long (n=25, avg: 0.024 mm, std: 0.003 mm), their umbels are 0.007–0.012 mm long (n=25, avg: 0.010 mm, std: 0.001 mm) and 0.007–0.011 mm in diameter (n=25, avg: 0.010 mm, std: 0.001 mm).

Oxyoidal microscleres have spiny rays, straight or curved. Sometimes they are pentactins or diactins. The ray of oxyhexactin is 0.030–0.056 mm long (n=25, avg: 0.042 mm, std: 0.008 mm).

ETYMOLOGY. The species is named after the location situated in front of the Yakutat Golf.

DISTRIBUTION. Alaskan Golf, in from of Yakutat Golf, 3620 m.

REMARKS. Similarly between the new species *H. (Paradisconema) commanderi* and *H. (Paradisconema) yakutati* relies on presence of the ovoid-shaped amphidsics. A specific feature of *H. (Paradisconema) yakutati* is presence of specific pinular ray on both dermal and atrial spicules, which are a little bit thicker at some distance from its base (so it is spindle-like in shape). In most other features the species *H. (Paradisconema) yakutati* is most similar to the Pacific species *H. (Paradisconema) vosmaeri* Ijima, 1927. However numerous differences in spicules sizes are observed.

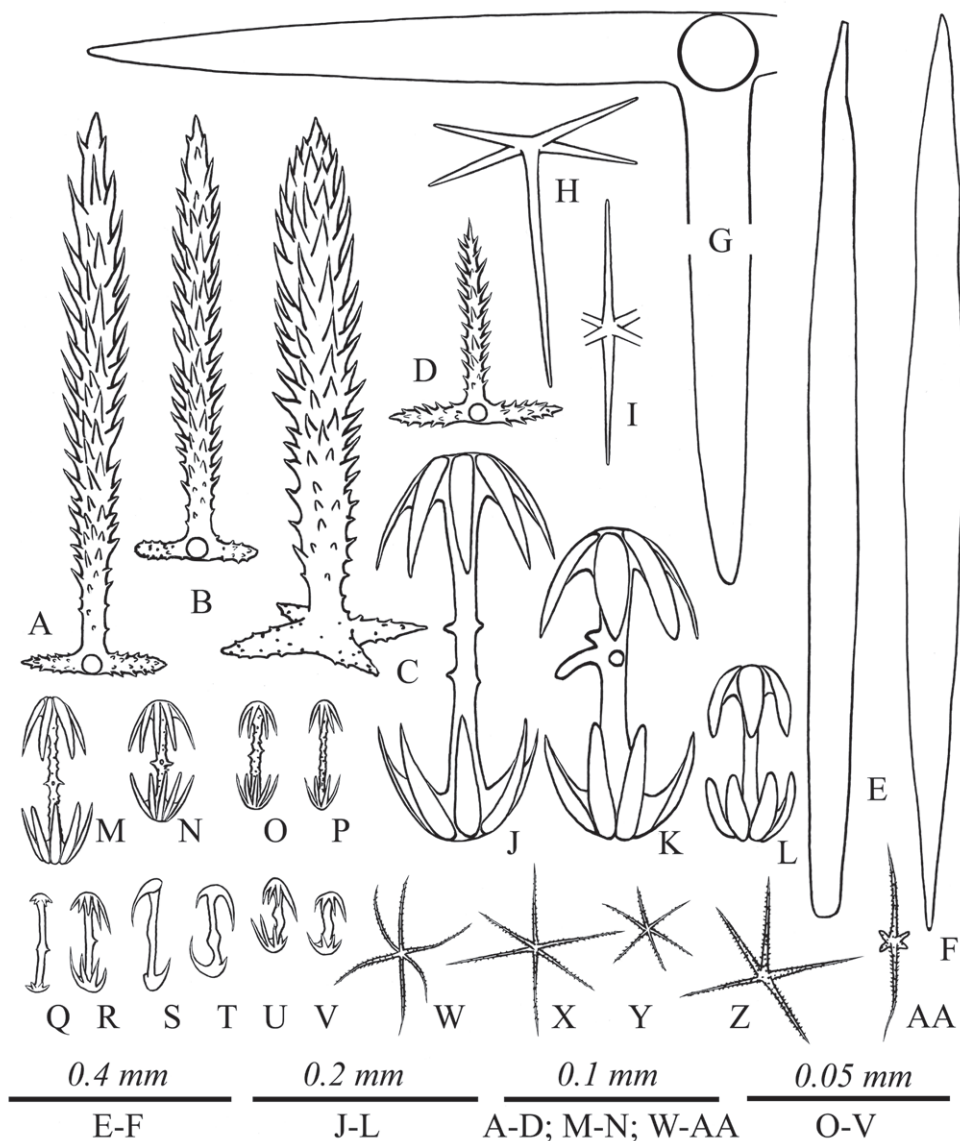


Fig. 16. Spicules of *Hyalonema (Paradisconema) yakutati* sp.n., holotype. A–B — dermal pinular pentactins; C — atrial pinular pentactin; D — canalar or dermal pinular pentactin; E–F — choanosomal diactins; G–H — hypodermal pentactins; I — choanosomal hexactin; J–K — macramphidiscs; L — small ovoid macramphidisc; M–N — mesamphidiscs; O–Q — micramphidiscs; R–V — paradiscs; W–Y — oxyhexactins; Z — oxypentactins; AA — oxydiactin.

Рис. 16. Спикулы *Hyalonema (Paradisconema) yakutati* sp.n., голотип. А–В — дермальные пинулярные пентактины; С — атриальная пинулярная пентактина; D — канальная или дермальная пентактина; E–F — хоаносомальная диактина; G–H — гиподермальные пентактины; I — хоаносомальная гексактина; J–K — макрамфидиски; L — маленькие овоидные макрамфидиски; M–N — мезамфидиски; O–Q — микроамфидиски; R–V — парадиски; W–Y — оксигексактины; Z — оксипентактины; AA — оксидиактины.

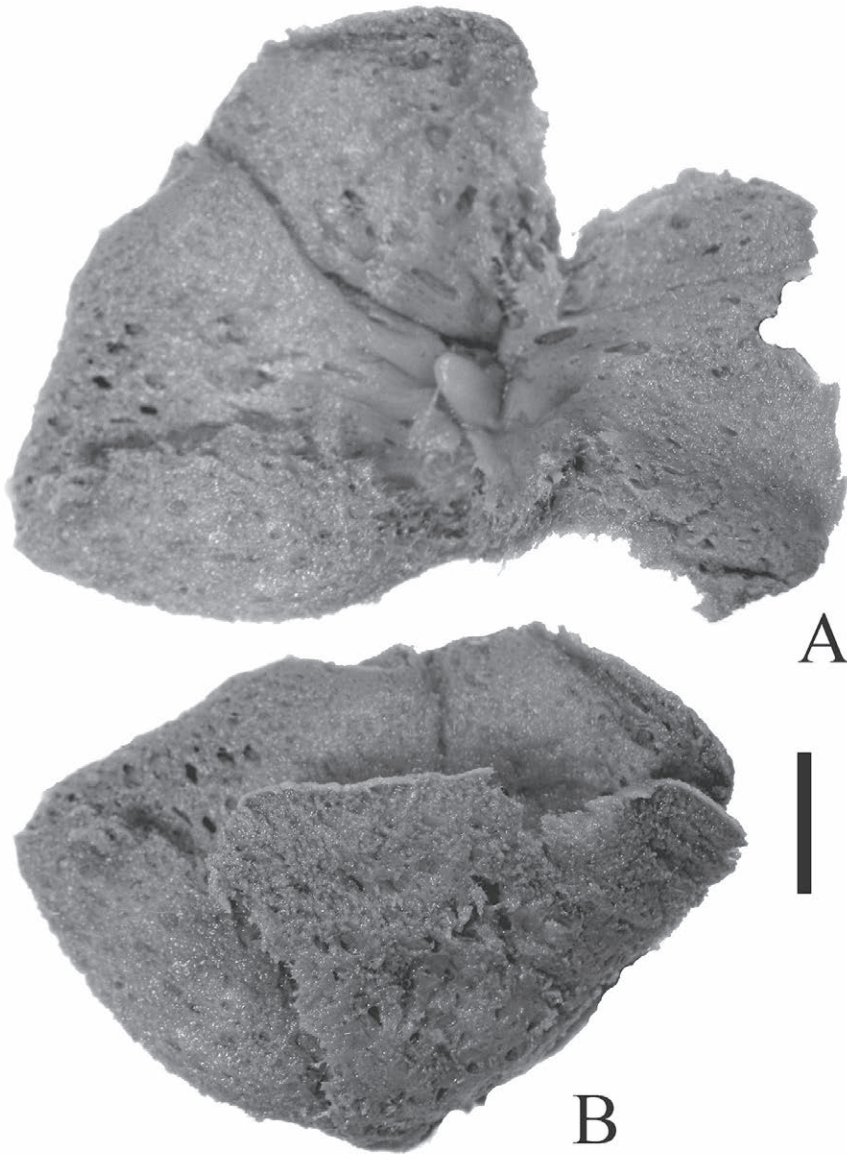


Fig. 17. *Hyalonema (Prionema) crassum* Lendenfeld, 1915, IORAS 5/2/3337. A — view from upper side; B — view from lateral side. Scale bar 10 mm.

Рис. 17. *Hyalonema (Prionema) crassum* Lendenfeld, 1915, IORAS 5/2/3337. А — вид с дермальной стороны; В — вид с атриальной стороны. Масштаб 10 мм.

Hyalonema (Prionema) Lendenfeld, 1915

Hyalonema (Prionema) crassum

Lendenfeld, 1915

Fig. 17; Tab. S8.

MATERIAL. IORAS 5/2/3336; 5/2/3337. RV 'Vityaz'-45, sta. 6106, 58°15' N 142°34' W, 3620 m.

DESCRIPTION. BODY. The specimens have funnel-like bodies: IORAS 5/2/3336 is 15 mm high, 25 mm in maximal diameter with walls 4–5 mm thick; 5/2/3337 is 40 mm high, 40 mm in maximal diameter, the walls are 2–5 mm thick, the apical cone is 2 mm in diameter and 5 mm high.

DISTRIBUTION. Central-East Pacific, N Pacific Alaskan Golf, 3620–4243 m depth.

REMARKS. These specimens are reliable representatives of *Hyalonema* (*Prionema*) *crassum* Lendenfeld, 1915 owing to the similarity of spicules shape, especially the oxyhexactins with thick, harpoon-like rays, thick dermal and atrial pinular rays with spines. Some differences in sizes of the amphidiscs are not significant and generally ones of the observed specimens correspond to the original description of the species.

Conclusion

Most of the newly found materials were collected at three stations: RV ‘Vityaz’–45, sta. 6106, trawl: 5 species (3 — new species); RV ‘Akademik Mstislav Keldysh’–22, sta. 2316, trawl: 3 species (1 — new); RV ‘Akademik M.A. Lavrentyev’ voyage 75, ROV ‘Comanche’, sta. 16, a single dive: 2 species (1 — new). The conclusions based on the results of the study of these materials are follows.

The abyssal is studied very poorly since the materials collected at three stations made it possible to describe five new species.

The station in the Alaskan Golf contains some species previously described from adjacent areas and in the central East Pacific

No common species were found in the newly collected materials and a relatively adjacent the Clarion-Clipperton Fracture Zone (8 species of *Hyalonema* with 2 new were described their (Kersken *et al.*, 2017)). Most of the previously known representatives of *Hyalonema* described from the Clarion-Clipperton Fracture Zone are common to the central East Pacific and one of them was previously described from the central Pacific.

Hyalonema from the Western Bering Sea are endemics there is no similarity between the representatives of this genus from the Bering Sea and representatives of the adjacent Southern waters — the Kuril-Kamchatka Trench and the North East Pacific Basin.

The only possible explanation for these facts is that near-continental areas in the abyssal zone remain important for the distribution of abyssal Hyalonematidae from the Central-East Pacific to the North-East Pacific. Similar pattern of dispersion of a part of abyssal Echinoidea and Asteroidea from the Antarctic to the North Pacific along the base of the American continental slope was observed (Mironov *et al.*, 2015). Hyalonematidae in the North-West Pacific (West Bering

Sea) are endemics, it is likely a result of poor investigation of the adjacent areas.

Supplementary data. The following materials are available online.

Table S1. Measurements of spicule types of *Hyalonema alaskiense* sp.n. (in mm).

Table S2. Measurements of spicule types of *Hyalonema* (*Cyliconema*) *hozawai* Okada, 1932 (in mm).

Table S3. Measurements of spicule types of *Hyalonema* (*Cyliconema*) *pteriferum* Wilson, 1904 (in mm).

Table S4. Measurements of spicule types of *Hyalonema* (*Cyliconema*) *tenerum vitiazi* Koltun, 1967 (in mm).

Table S5. Measurements of spicule types of *Hyalonema* (*Cyliconema*) *ovuliferum* Schulze, 1899 (in mm).

Table S6. Measurements of spicule types of *Hyalonema* (*Onconema*) *agassizi* Lendenfeld, 1915 (in mm).

Table S7. Measurements of spicule types of *Hyalonema* (*Paradisconema*) *commanderi* sp.n. (in mm).

Table S8. Measurements of spicule types of *Hyalonema* (*Prionema*) *crassum* Lendenfeld, 1915 (in mm).

Compliance with ethical standards

CONFLICTS OF INTEREST: The authors declare that they have no conflicts of interest.

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