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RESEARCH ARTICLE

Leucotreton kurilense, a new genus and species of calcareous sponges of the family Sycanthidae (Porifera: Calcarea: Leucosolenida) from the north-western Pacific Ocean, with contribution to taxonomy and nomenclature of related genera

Leucotreton kurilense, новый род и вид известковых губок семейства Sycanthidae (Porifera: Calcarea: Leucosolenida) из северо-западной части Тихого океана, с замечаниями по таксономии и номенклатуре родственных родов

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Abstract. A calcareous sponge *Leucotreton kurilense* **gen.** et **sp. nov.** (Sycanthidae) is described from the area of the Kuril Islands. It differs from all members of the family Sycanthidae in its aquiferous system, which is intermediate between leuconoid and sylleibid. Taxonomic status and nomenclature of several taxa formerly assigned to Sycanthidae is discussed. It is shown that the genus *Dermatreton* Jenkin, 1908 does not belong to Sycanthidae but this name is a senior synonym of *Breitfussia* Borojevic et al., 2000 (Jenkinidae), **syn. nov.**; *Dermatreton* contains three species previously included in *Breitfussia*: *D. chartaceum* Jenkin, 1908, *D. schulzei* (Breitfuss, 1896), **comb. nov.** and *D. vitiosum* (Brøndsted, 1931), **comb. nov.** It is shown that *Tenthrenodes* Jenkin, 1908 should be considered as a junior synonym of *Sycon* Risso, 1827, **syn. nov.** A new genus *Scytotreton* **gen. nov.** (Sycanthidae) is created to accommodate two species originally described in the genera *Dermatreton* and *Tenthrenodes*, respectively: *Scytotreton hodgsoni* (Jenkin, 1908), **comb. nov.** and *S. scotti* (Jenkin, 1908), **comb. nov.**

Резюме. Известковая губка *Leucotreton kurilense* **gen.** et **sp. nov.** (семейство Sycanthidae) описана из района Курильских островов. Она отличается от всех представителей Sycanthidae типом строения водной системы, промежуточным между лейконоидным и силлеибидным типами. Также в статье обсуждается таксономический статус и номенклатура нескольких таксонов, ранее относимых к Sycanthidae. Показано, что род *Dermatreton* Jenkin, 1908 не относится к Sycanthidae, а это название является старшим синонимом *Breitfussia* Borojevic et al., 2000 (Jenkinidae), **syn. nov.**; род *Dermatreton* включает три вида, ранее относимых к *Breitfussia*: *D. chartaceum* Jenkin, 1908, *D. schulzei* (Breitfuss, 1896), **comb. nov.** и *D. vitiosum* (Brøndsted, 1931), **comb. nov.** Показано, что название *Tenthrenodes* Jenkin, 1908 должно рассматриваться в качестве младшего синонима *Sycon* Risso, 1827, **syn. nov.** Новый род *Scytotreton* **gen. nov.** (Sycanthidae) предложен для двух видов, которые были описаны в родах *Dermatreton* и *Tenthrenodes*, соответственно: *Scytotreton hodgsoni* (Jenkin, 1908), **comb. nov.** и *S. scotti* (Jenkin, 1908), **comb. nov.**

Key words: biodiversity, Kuril Islands, North-West Pacific, Porifera, Calcarea, Calcaronea, Jenkinidae, Sycanthidae, *Breitfussia*, *Dermatreton*, *Leucotreton*, *Scytotreton*, *Sycantha*, *Tenthrenodes*, new combination, new genus, new species

Ключевые слова: биоразнообразие, Курильские острова, Северо-Западная Пацифика, Porifera, Calcarea, Calcaronea, Jenkinidae, Sycanthidae, *Breitfussia*, *Dermatreton*, *Leucotreton*, *Scytotreton*, *Sycantha*, *Tenthrenodes*, новая комбинация, новый род, новый вид

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Introduction

Calcareous sponges are one of the most poorly studied among major taxonomic groups in the Russian waters of the Far Eastern seas (the North-West Pacific) and it is not surprising that the collections made in this region during several recent expeditions contain many new or poorly known taxa. In the present article, we describe a new genus and a new species of tubular solitary calcareous sponge, which differs from all sponges known from the North Pacific in the general structure of the body wall but resembles *Dermatreton hodgsoni* Jenkin, 1908, known only from a few records from Antarctica. The species from the North-West Pacific differs from the latter in its leuconoid aquiferous system. Moreover, the situation is much complicated by confused nomenclature of the genus *Dermatreton* Jenkin, 1908 and related genera due to several errors (like overlooked type fixation or incorrect nomenclatural acts) in the key work of Borojevic et al. (2000) summarising and revising the classification of the subclass Calcaronea. Several of these nomenclatural issues and their consequences are discussed herein. In particular, we show that the generic name *Dermatreton* is a senior synonym of *Breitfussia* Borojevic et al., 2000 and this genus comprises species belonging to Jenkinidae, while a new generic name is required (and here proposed) for two species formerly assigned to *Dermatreton*, which have a *Sycantha*–like structure and currently classified in the Sycanthidae.

Material and methods

The specimens reported in the present paper were collected (trawled) during the expedition of the RV "Akademik Oparin", cruise 56 in June–August 2019 in the region of the Kuril Islands, the collector V. Shilov. Collected specimens were fixed in 96% ethanol. Spicule preparations and measurements followed standard procedures (e.g. Wörheide & Hooper, 1999). The structure of the skeleton was studied on the thick (100–400 μm) sections. To prepare these sections, the samples were dehydrated in several changes of 100% isopropanol, then in two changes of isopropanol mixed with mineral oil (5:1 and 2:1 at 50 °C), then placed into pure mineral oil at 55 °C, and finally soaked in three changes of paraffin at 56–58 °C. Paraffin embedded samples were cut using a rotatory microtome, deparaffinised in white spirit (a hazard-less alternative of xylene) and the sections were mounted using Canada balsam. For histology, small pieces of sponge were decalcified in 5% solution of Na2EDTA (about six hours) and embedded in paraffin as described above. To reveal the structure of aquiferous system and choanocyte chambers, 7-μm sections were stained by a variant of Masson trichrome (Llewellyin, 2022).

The specimens are stored at the Museum of the Institute of Marine Biology, A.V. Zhirmunsky National Scientific Center of Marine Biology, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok (MIMB).

DNA was extracted from ethanol-preserved sponges using a GeneJET genomic DNA purification kit (ThermoFisher Scientific). PCR of the C-region of the 28S rRNA gene was conducted using the forward primer 5'-GAAAAGCACTTTGAAAAGAGA-3' (Voigt & Wörheide, 2016) and the reverse primer 5'-TCCGTGTTTCAAGACGGG-3' (Chombard et al., 1998) in 10 µL reaction mixture using DreamTaq PCR master mix (2X) (ThermoFisher Scientific), 1 µL of DNA and 0.25 µM of each primer. Reaction parameters were as follows: initial denaturation, 95 °C for 3 min; 35 cycles of 95 °C for 30 s, 57 °C for 1 min, 72 °C for 1 min; elongation of PCR products, 72 °C for 5 min; cooling to 12 °C. PCR products were tested by electrophoresis in agarose gel and then cleaned with ExoSap-ITTM (ThermoFisher Scientific) to remove residues of primers and triphosphates. Sequencing reaction was performed in both directions using a BigDye Terminator v3.1 cycle sequencing kit (Applied Biosystems Inc.) under conditions recommended by the manufacturer. The sequencing reaction products were purified from unreacted terminators on Sephadex G-50 columns (CE Healthcare), dried, dissolved in formamide and subjected to electrophoresis on a GA3500 genetic analyser (Applied Biosystems Inc.). Assembling of direct and reverse sequences was conducted using Lasergene 17.3 software (https://www.dnastar.com/software/lasergene/).

Additional molecular data were obtained from GenBank. We used a full set of sequences generated by Alvizu et al. (2018) to which we added our sequences. The dataset contained 310 sequences of about 160 taxa (Electronic supplementary material 1; see Addenda). Sequences were aligned using the Mafft v7.409 with E-INS-i algorithm and "--maxiterate 1000" option (Katoh & Standley, 2013) implemented in AliView v.1.24 (Larsson, 2014). The final alignment contained 517 bp including gaps. A ML tree was generated by IQ-TREE v.1.6.12 (Nguyen et al., 2015) running on a local machine using automatic model selection (Kalyaanamoorthy et al., 2017) and ultrafast bootstrap approximation (Hoang et al. 2018). To view, edit and print a final tree, MEGA7 (Kumar et al., 2016) was used.

Results

Class **Calcarea** Bowerbank, 1862

Subclass **Calcaronea** Bidder, 1898

Order **Leucosolenida** Hartman, 1958

Family **Sycanthidae** Lendenfeld, 1891

Diagnosis (after Borojevic et al., 2000: 228; direct quote with modifications in *italics*; modifications are needed to accommodate *Leucotreton* **gen. nov.** in this family). Leucosoleniida with an irregular syconoid *or sylleibid/leuconoid* organization, and the *articulated* skeleton primarily supported by triactine spicules, with occasionally diactines in the distal cones. The large central atrium bears numerous short radial tubes lined by choanoderm *or containing numerous small choanocyte chambers*. Radial tubes are grouped and fused proximally, each group communicating through a wide opening with the atrial cavity. The distal free or coalescent cones are intercalated by large inhalant spaces, which often reach the external surface of the atrial skeleton. When coalescent, distal cones can have tangential triactines, but there is no continuous cortex covering the choanosome and delimiting the inhalant cavities externally.

Genus *Leucotreton* gen. nov.

Type species: *Leucotreton kurilense* **sp. nov.**

Diagnosis. Sycanthidae with coalescent radial tubes lined with numerous small round choanocyte chambers. Distal parts of radial tubes supported by tangential triactines that form meshwork perforated by large inhalant cavities.

Etymology. The new generic name is derived from the ancient Greek word λευκός (*leucus*, light in colour, white) and the second stem with the flexion of the name *Dermatreton*. Gender is neuter.

Differential diagnosis. *Leucotreton* **gen. nov.** closely resembles *Dermatreton*, but differs in having an aquiferous system intermediate between leuconoid and sylleibid (rather than syconoid in *Dermatreton*). For details, see discussion under the description of *L. kurilense* **sp. nov.**

Leucotreton kurilense **sp. nov.**

(Figs 1–4)

Holotype. MIMB 42998, RV "Akademik Oparin" cruise 56, Station 2, **Russia**, *Kuril Is.* (southern group), *Urup I.* (off Pacific coast), 45°38.2′N 149°53.1′E, 253–222 m, pebbles, 27 June 2019, coll. V. Shilov.

Paratypes. MIMB 42999, RV "Akademik Oparin" cruise 56, Station 69, **Russia**, *Kuril Is.* (northern group), *Onekotan I.* (off Sea of Okhotsk coast), 49°24.0′N 154°16.1′E, 146–147 m, sand, pebbles, stones, 12 Aug. 2019, 5 specimens, coll. V. Shilov.

Description. Solitary specimens with tubular body. Holotype about 5.5 cm long and 1.5 cm wide in its widest part located at some distance from anterior (upper) end (Fig. 1A). Largest paratype 16 cm long and 1.5 cm wide. Body either almost cylindrical or gradually tapering to narrow posterior end attached to substratum. All specimens laterally compressed in ethanol. Single large (4 mm in holotype) osculum leading into voluminous atrial cavity continuing to bottom of sponge. Osculum with short lamellate rim but without oscular fringe. Consistency compressible but not especially soft. Dark-brown in ethanol.

Body wall 1.2–1.5 mm thick, composed of radial tubes extending from atrium (Fig. 2A, B, D). Some of these radial tubes free along their entire length (e.g. Fig. 2B), others in part or fully coalescent with adjacent tubes and forming characteristic "chains" of tubes (well visible in tangential sections of body wall, Fig. 3F), with large inhalant spaces ("holes" seen on surface of sponge, Fig. 1A) between them often reaching atrial wall of sponge. Coalescent distal ends of radial tubes forming very characteristic structure of external surface, allowing easy recognition of this species when collected together with other tubular calcareous sponges. External surface superficially resembling network of anastomosing tubes, as in Clathrinidae (Fig. 1B), but actual structure very different. Radial tubes communicating with atrial cavity through either individual openings or several joined radial tubes possessing one common opening. Atrial surface visually (macroscopically) smooth and even, pierced by irregularly distributed orifices of exhalant spaces of radial tubes 0.2–0.5 mm in diameter (Fig. 1C).

Water system intermediate between leuconoid and sylleibid. Choanocyte chambers round, (50)60–100 μm in diameter. Inner walls of radial tubes lined with choanocyte chambers usually in one layer, sometimes in two or rarely in more than two (in coalescent tubes) irregular layers, leaving, in each radial tube, empty central exhalant space (Figs 2C, 3G: *ec*).

Atrial skeleton composed of single layer of tangential tetractines whose apical actines protruding into atrium (Fig. 3E). Choanosomal skeleton articulated, composed of triactines only. Triactines supporting external walls of radial tubes, arranged in somewhat irregular rows (Fig. 2B). Cortical skeleton composed of several layers of crowded tangential triactines cowering distal ends of free and coalescent radial tubes (Fig. 2D: *cts*, arrow). Cortical skeleton not covering spaces between radial tubes and thus forming discontinuous cortex.

Spicules (Table 1; Fig. 3A–D). Cortical triactines more or less equiactinal, almost equiangular, with slightly raised centre; actines conical, with blunt tips. Mean length of actines about 100 μm, mean width 9.4 μm (see Table 1 for details).

Choanosomal triactines more or less equiactinal, unpaired actine slightly longer than paired; actines conical, with blunt tips. Mean length of paired actines about 100 μm, that of unpaired actines 129 μm; mean width of paired and unpaired actines 9 μm (see Table 1 for details).

Atrial triactines strongly sagittal, with wide angle between paired actines; unpaired actine thinner and usually longer that paired actines; actines conical or subcylindrical, with blunt tips. Mean length of paired actines about 180 μm, that of unpaired actines 250 μm; mean width of paired actines 12 μm, that of unpaired actines 9 μm (see Table 1 for details).

Atrial tetractines equiangular and mostly equiactinal, sometimes unpaired actine slightly longer or shorter than paired. Apical actine perpendicular to basal plane, slightly thinner and about half as long as basal actines. All actines conical, present only in atrial wall. Mean length of basal actines about 160 μm, mean width 11 μm (see Table 1 for details).

Etymology. The species name is an adjective referring to the Kuril Islands, a geographical area where the type material was collected.

Molecular data. The topology of the resulting large phylogenetic tree (Electronic supplementary material 2; see Addenda) is very similar to the

Fig. 1. *Leucotreton kurilense* **sp. nov.**, holotype. **A**, intact specimen; **B**, outer surface; **C**, inner (atrial) surface. Scale bars: 5 mm.

tree published by Alvizu et al. (2018). The clades labelled by these authors as "Clade I" to "Clade X" are resolved and *Leucotreton kurilense* **sp. nov.** is resolved as a member of "Clade X" (Fig. 4).

This clade contains two species of the genus *Sycetta* Haeckel, 1872 (*S. antarctica* Brøndsted, 1931 and unidentified *Sycetta* sp.), a species of *Sycon* Risso, 1827 whose morphology is similar to *Sycetta* (*Sycon karajakense* Breitfuss, 1897; according to Rapp, 2015, its radial chambers are free in most of their length, only fused close to the base, almost as in *Sycetta*), but also *Sycon abyssale* Borojevic et Graat-Kleeton, 1965 (with morphology typical for *Sycon*), a species of Heteropiidae [*Sycettusa thompsoni* (Lambe, 1900)] with thin body wall and inarticulate skeleton, and two species of Grantiidae [*Sycandra utriculus* (Schmidt, 1869) and *Sycandra* sp.]. A sequence labelled as "*Sycetta asconoides*" is probably based on a specimen identified by Rapp (2015) as *Grantia phillipsi* Lambe, 1900 and may also belong to Grantiidae (see Rapp, 2015). Thus, this clade comprises

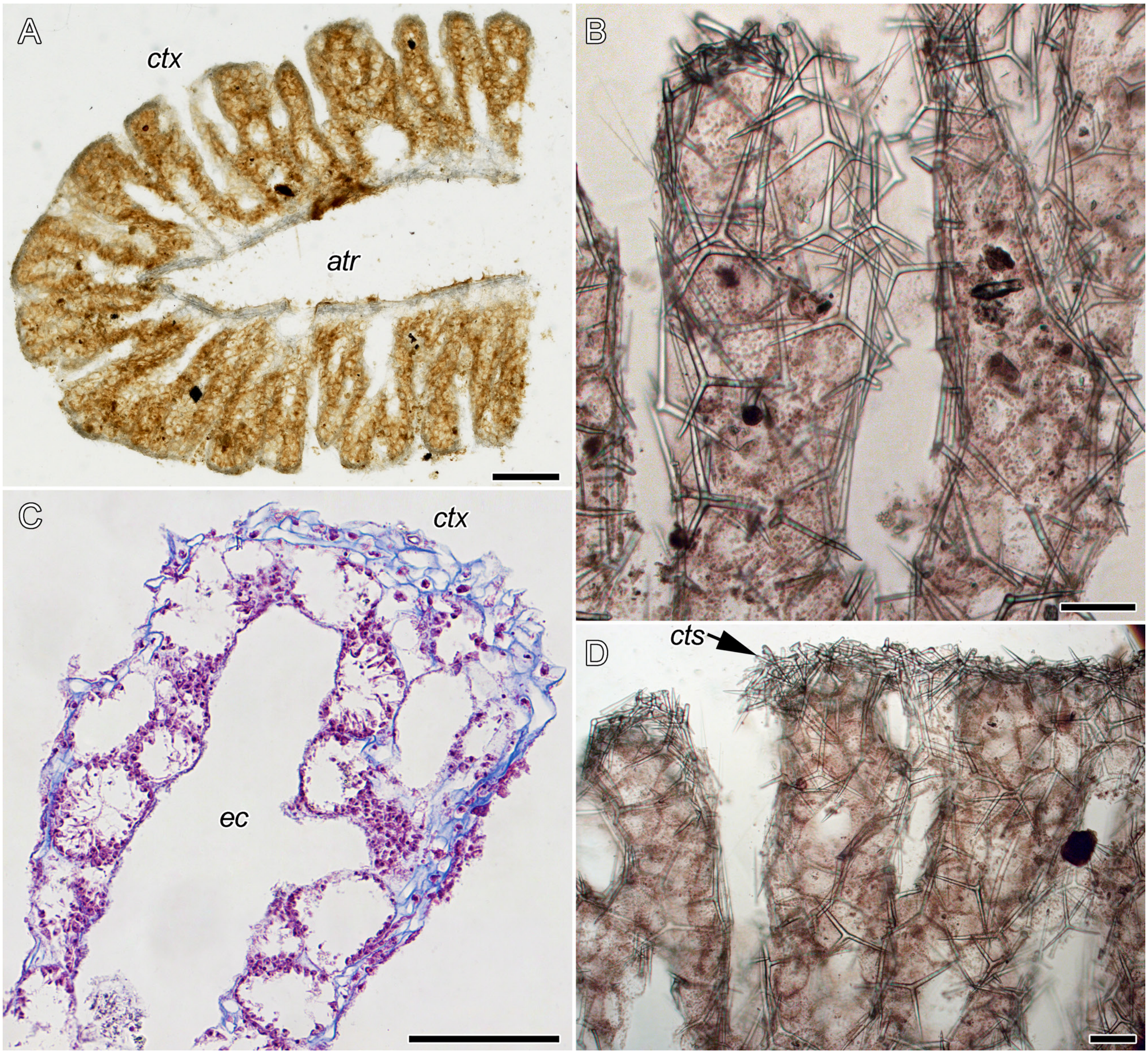

Fig. 2. *Leucotreton kurilense* **sp. nov.**, holotype. **A**, transverse section through the body wall to show its general structure; **B**, articulated skeleton of radial tubes; **C**, longitudinal histological section of radial tube to show arrangement of choanocyte chambers; **D**, transverse section through the body wall to show distinct cortical skeleton. Abbreviations: *atr* – atrium; *cts* – cortical skeleton; *ctx* – cortex (cortical side); *ec* – exhalant canal. Scale bars: 500 μm (A); 100 μm (B–D).

species with different morphologies, belonging to three families. A large proportion of species with free (*Sycetta*) or free and irregularly coalescent (*Leucotreton* **gen. nov.**) radial chambers in this clade is noteworthy and suggests that this feature should be treated as significant in the classification of calcareous sponges (as most authors did). On the other hand, a cladogram based on a single molecular marker (28S rRNA) can only approximate the relationships between the considered taxa. Unfortunately, neither species of *Sycantha* Lendenfeld, 1891 nor any species described in *Dermatreton*, which also have partially coalescent radial tubes, are sequenced and their relationships with *Leucotreton kurilense* **sp. nov.** cannot be revealed from the molecular data. However, they obviously are related to *L. kurilense* **sp. nov.** according to the morphological data, as discussed below.

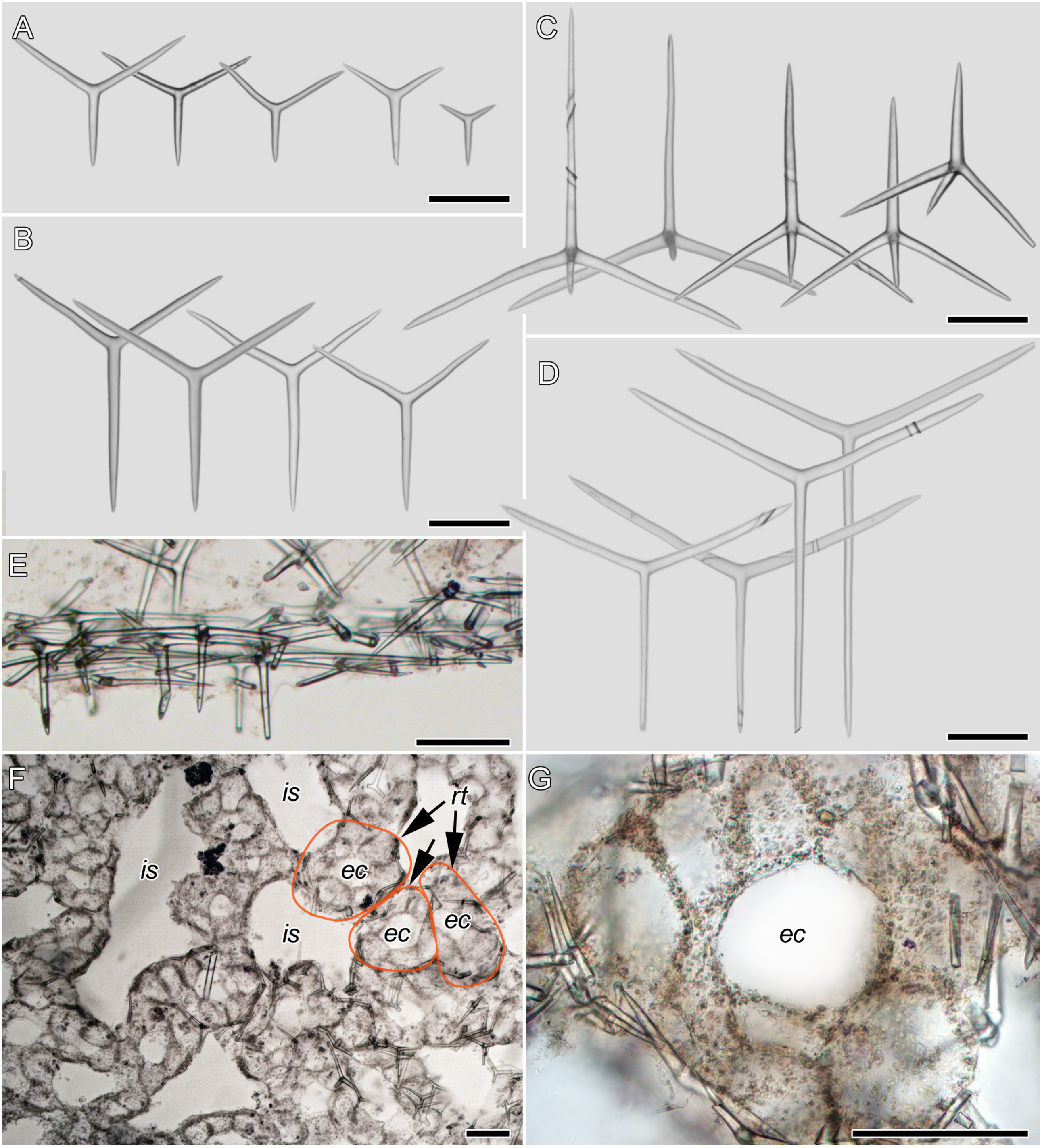

Fig. 3. *Leucotreton kurilense* **sp. nov.**, holotype. **A**, cortical triactines; **B**, choanosomal triactines; **C**, atrial tetractines; **D**, atrial triactines; **E**, atrial skeleton; **F**, tangential section of the body wall to show chains of linked radial tubes and large inhalant spaces between them; **G**, transverse section through single radial tube to show central exhalant canal and spherical choanocyte chambers on the periphery of the tube. Abbreviations: *ec* – exhalant canal; *is* – inhalant spaces; *rt* – radial tubes (transversely sectioned). Scale bars: 100 μm.

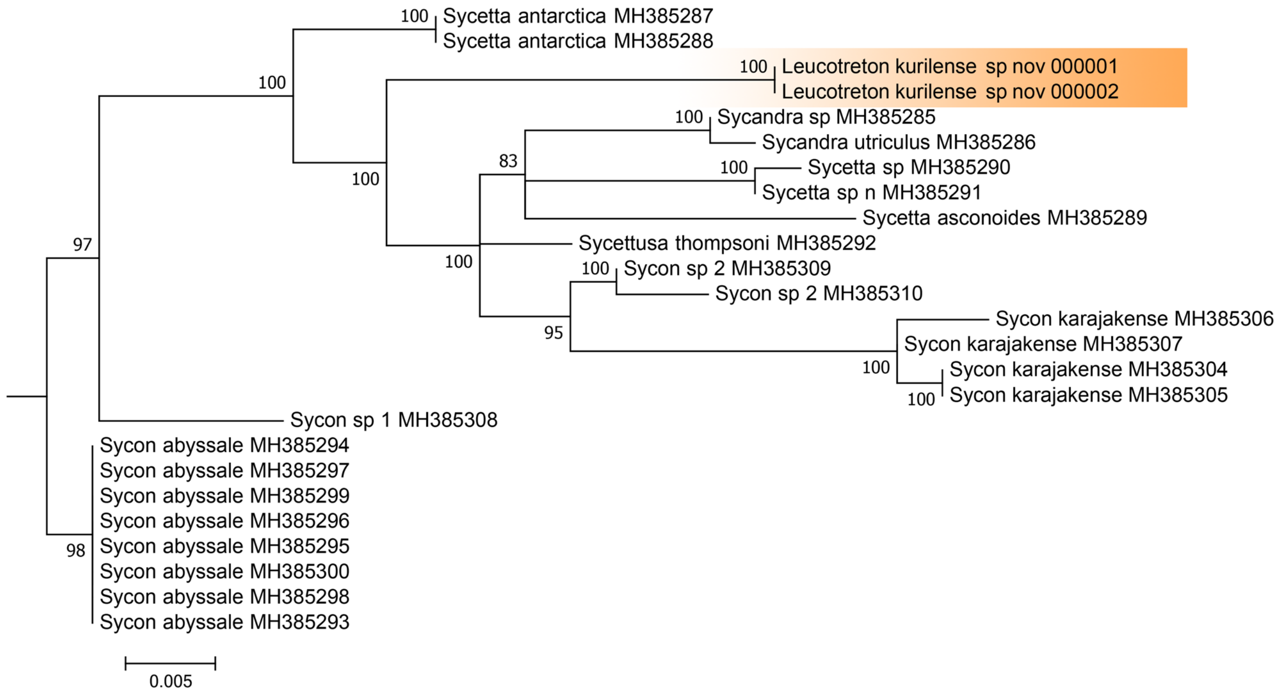

Fig. 4. Clade X with *Leucotreton kurilense* **sp. nov.** of the Maximum Likelihood tree inferred from the C-region of 28S rRNA sequences (bootstrap values and GenBank accession numbers are indicated).

Comparison with related species and taxonomic position. The structure of the body wall of *Leucotreton kurilense* **sp. nov.**, composed of linked radial tubes distributed on the central atrium, large inhalant spaces between them, the presence of distinct cortex which, however, unlike that of Grantiidae, does not delimit the inhalant water system, suggests that this species is a member of the family Sycanthidae as it was defined by Borojevic et al. (2000: 228). These authors grouped together in Sycanthidae several species "which are derived from sponges with a sycettid type of organization" and which have "a large atrial cavity that has numerous short radial tubes, which are not regularly distributed on the central atrium but form groups which communicate with the central atrial cavity by a large opening" and in which the cortex, if present, does not delimit the inhalant cavities externally.

The way how the radial tubes of *L. kurilense* **sp. nov.** are arranged is similar to that described by Jenkin (1908) for several species assigned by him to the genera *Dermatreton*, *Tenthrenodes* Jenkin, 1908 and *Hypodictyon* Jenkin, 1908. Jenkin (1908) assigned these genera to three different families: *Dermatreton* was assigned to Grantiidae because it (as *L. kurilense* **sp. nov.**) has partial cortical skeleton, *Tenthrenodes* lacks cortical skeleton and was assigned to Sycettidae (syn. Syconidae), and *Hypodictyon* was assigned to "Chiphoridae" (unavailable family name not based on available generic name) based on the presence of chiatines.

In all features, except the type of aquiferous system, *Leucotreton kurilense* **sp. nov.** fits the definition of the genus *Dermatreton* as given by Borojevic et al. (2000: 229): "Sycanthidae with coalescent radial tubes whose distal parts are supported by tangential triactines that form a loose meshwork perforated by large inhalant cavities" and most closely resembles *D. hodgsoni* Jenkin, 1908. The original Jenkin's (1908) description and figures of this species are detailed and precise. In particular, the schematic drawing of the cross-section of the radial tubes of *D. hodgsoni* shows exactly the same pattern of "chains" of "linked" radial tubes as in *L. kurilense* **sp. nov.** (compare Fig. 3F in the present work and Fig. 70 in Jenkin, 1908). The pattern of distribution of the openings on the gastral membrane ("ports in the gastral layer" in the terminology of Jenkin, 1908) are similar in *L. kurilense* **sp. nov.** and *D. hodgsoni*, and quite distinct from the regular pattern seen in the sponges in which the radial tubes are not fused proximally, e.g. *Sycon* or *Grantia* Fleming, 1828 (compare Fig. 1C in the present work and Fig. 68 in Jenkin, 1908). Incomplete cortical layer, distinct on the tops of joined radial tubes but not covering inhalant spaces between them (termed "reticulated cortex" by Jenkin, 1908) is also similar in two species, although *L. kurilense* **sp. nov.** lacks diactines in it. The main difference between these species is the type of water system, clearly syconoid in *D. hodgsoni* (each radial tube is lined with a layer of choanocytes), but leuconoid with the traits of sylleibid arrangement in *L. kurilense* **sp. nov.** (each tube contains numerous small round choanocyte chambers).

We consider the differences between the syconoid and the sylleibid/leuconoid organisations in the two species to be significant enough to assign them to different genera (by the analogy with the genera *Achramorpha* Jenkin, 1908 and *Megapogon* Jenkin, 1908, the former of which has the syconoid organisation, while the latter has the sylleibid or leuconoid one; this is the only difference between them, see Borojevic et al., 2000: 241, and Alvizu et al., 2019). Therefore, the new genus *Leucotreton* **gen. nov.** is proposed to accommodate the new species.

Nomenclature and taxonomy of nominal genera related to *Leucotreton* gen. nov.

Jenkin (1908) described three genera, *Dermatreton*, *Tenthrenodes* and *Hypodictyon*, which contain species with similar arrangement of radial tubes. The nomenclature and taxonomic status of these genera, however, are confused and need to be discussed.

1. <u>*Hypodictyon* Jenkin, 1908</u>. This name is a junior homonym of *Hypodictyon* Cope, 1885 (Amphibia) and is permanently invalid. The genus *Hypodictyon* originally included a single species, *H. longstaffi* Jenkin, 1908. Borojevic et al. (2000: 229) transferred *H. longstaffi* to the genus *Sycantha* stating that this species "is apparently one of the typical representatives" of this genus (despite the fact that according to Jenkin, 1908: 28, in this species "each chamber opens directly into the gastral cavity through an irregular apopyle", while in *Sycantha*, as it was understood

Table 1. Spicule measurements of *Leucotreton kurilense* **sp. nov.**

Specimen	Spicule	Actine	Length min–(**mean**)–max, SD	Width min–(**mean**)–max, SD	n
Paratype	Cortical triactines	Paired	48.2–(**94.1**)–148.3, 23.6	5.8–(**9.3**)–11.8, 1.3	41
		Unpaired	52.8–(**102.5**)–144.4, 24.0		21
	Choanosomal triactines	Paired	30.9–(**99.2**)–164.8, 38.7	5.4–(**10**)–16.4, 2.5	42
		Unpaired	47.7–(**128.8**)–217.3, 49.9		42
	Atrial triactines	Paired	118.2–(**188.9**)–254, 32.0	9.1–(**12.2**)–16.7, 2.0	21
		Unpaired	121.2–(**261.2**)–406, 78.1		21
	Atrial tetractines	Paired	32.3–(**162.7**)–251, 53.8	9.6–(**12.3**)–17.5, 2.0	21
		Unpaired	69.6–(**164.6**)–386, 73.9		
		Apical	32.0–(**74**)–101.4 22.1	6.1–(**8.3**)–11.1 1.8	10
Holotype	Cortical triactines	Paired	58.4–(**98.3**)–125.4, 17.4	7.0–(**9.4**)–11.6, 1.2	22
		Unpaired	56.4–(**94.6**)–139.5, 18.4		
	Choanosomal triactines	Paired	35.5–(**102.4**)–154.6, 26.5	5.1–(**8.9**)–11.6, 1.6	20
		Unpaired	51.8–(**126.2**)–160.1, 31.7		
	Atrial triactines	Paired	85.0–(**182.7**)–243.7, 39.1	9.1–(**12.1**)–16.3, 1.8	20
		Unpaired	108.8–(**244.3**)–433.3, 87.3	5.9–(**8.8**)–10.7, 1.3	20
	Atrial tetractines	Paired	64.7–(**158.7**)–275.5, 50.6	7.1–(**11.3**)–17, 2.0	41
		Unpaired	60.1–(**198.7**)–440, 89.5		41
		Apical	51.0–(**79.1**)–99.0 18.3	5.1–(**6.9**)–8.6 1.2	4

by Borojevic et al. (2000: 228), "radial tubes are grouped and fused proximally, each group communicating through a wide opening with the atrial cavity"). Hence, Borojevic et al. synonymised *Hypodictyon* with *Sycantha*.

2. *Tenthrenodes* Jenkin, 1908. Two species were originally included in this genus, *T. antarcticus* Jenkin, 1908 and *T. scotti* Jenkin, 1908, and one more species, *T. primitivus* Brøndsted, 1931 was added subsequently. The type species is *T. antarcticus* Jenkin, 1908, subsequently designated by Dendy & Row (1913: 796).

Borojevic et al. (2000: 218, 228) stated that they synonymised *Tenthrenodes* with *Sycantha*. This statement is erroneous because in the same paper these authors transferred all three species of *Tenthrenodes* to three different genera and none of them to *Sycantha*: *T. scotti* was transferred to *Dermatreton* (Borojevic et al., 2000: 228–229), *T. antarcticus* to *Sycon* (Borojevic et al., 2000: 228), and *T. primitivus* to *Sycetta* (Borojevic et al., 2000: 218). Since *T. antarcticus* (type species) is assigned to *Sycon*, *Tenthrenodes* is a junior synonym of *Sycon*, **syn. nov.**

3. *Dermatreton* Jenkin, 1908. Originally, Jenkin (1908) included in *Dermatreton* two species: *D. chartaceum* Jenkin, 1908 and *D. hodgsoni*. Dendy & Row (1913: 789) designated *D. chartaceum* as a type species of *Dermatreton*. Borojevic et al. (2000: 229) designated another species, *D. hodgsoni*, as a type species of *Dermatreton*. This subsequent designation is invalid (Code, Article 69.1). In the same paper, Borojevic et al. established a new genus *Breitfussia* Borojevic et al., 2000 in the family Jenkinidae, with the type species *Ebnerella schulzei* Breitfuss, 1896, and included in it *D. chartaceum* and *Grantia vitiosa* Brøndsted, 1931. The type species of *Breitfussia* and *D. chartaceum* were recently redescribed by Rapp (2015) and Rapp et al. (2011) as *Breitfussia schulzei* and *B. chartacea*, respectively. Rapp et al. (2011) confirmed the congenerity of these two species. Therefore, since *D. chartaceum* is the type species of *Dermatreton* Jenkin, 1908, *Breitfussia* is invalid being a junior subjective synonym of *Dermatreton*, **syn. nov.**, and the valid generic name for all three species currently assigned to *Breitfussia* is *Dermatreton*: *D. chartaceum* Jenkin, 1908, *D. schulzei* (Breitfuss, 1896), **comb. nov.**, and *D. vitiosum* (Brøndsted, 1931), **comb. nov.** We consider that the diagnosis of *Dermatreton* is the same as the diagnosis of *Breitfussia* given by Borojevic et al. (2000: 230): "Jenkinidae with a simple tubular body and syconoid organization. The choanoskeleton is reduced to the unpaired actines of the subatrial triactines, and occasionally contains the proximal part of radial diactines".

The remaining species originally included in *Dermatreton*, *D. hodgsoni*, is taxonomically distinct and not congeneric with the type species of *Dermatreton* (see Borojevic et al., 2000) and therefore it requires a new generic name. We propose the name *Scytotreton* **gen. nov.** for it.

Genus ***Scytotreton*** **gen. nov.**

Type species: *Dermatreton hodgsoni* Jenkin, 1908 (designated here).

Diagnosis (after Borojevic et al., 2000; direct quote with modifications in *italics*; modification is needed to distinguish this genus from *Leucotreton* **gen. nov.**). Sycanthidae with coalescent radial tubes *lined with choanoderm* whose distal parts are supported by tangential triactines that form a loose meshwork perforated by large inhalant cavities.

Other species included. Scytotreton scotti (Jenkin, 1908) (originally described as *Tenthrenodes scotti*; see Borojevic et al., 2000).

Etymology. The new generic name is derived from the ancient Greek word σκῦτος (*scytus*, skin, hide) and the second stem with the flexion of the name *Dermatreton*. Gender is neuter.

Remarks. The genus fully corresponds to the taxonomic genus for which Borojevic et al. (2000) incorrectly used the name *Dermatreton*.

List of genera and species of Sycanthidae

To summarise the taxonomic and nomenclatural changes made in the present work, below we list all genera and species currently assigned to Sycanthidae.

Sycanthidae Lendenfeld, 1891

Sycantha Lendenfeld, 1891
Sycantha tenella Lendenfeld, 1891 (type species)
Sycantha longstaffi (Jenkin, 1908) (syn. *Hypodictyon longstaffi* Jenkin, 1908)

Scytotreton **gen. nov.**

Scytotreton hodgsoni (Jenkin, 1908) (syn. *Dermatreton hodgsoni* Jenkin, 1908; type species)

Scytotreton scotti (Jenkin, 1908) (syn. *Tenthrenodes scotti* Jenkin, 1908)

Leucotreton **gen. nov.**

Leucotreton kurilense **sp. nov.**

Addenda

Electronic supplementary material 1. A list of taxa and sequences used for phylogenetic analysis. File format: PDF.

Electronic supplementary material 2. Full ML phylogenetic tree generated in the present study (see text for details; numbers indicate bootstrap values for Maximum Likelihood). File format: PDF.

All these materials are available from: https://doi.org/10.31610/zsr/2022.31.1.143

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