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SPIROCHONA AMERICANA SP. N. (CILIOPHORA, CHONOTRICHIA) — A NEW NORTH AMERICAN FRESHWATER CHONOTRICH SPECIES FROM THE AMPHIPOD (*GAMMARUS LACUSTRIS*)

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Spirochona americana sp. n. (Ciliophora, Chonotrichia) — новый вид пресноводных хонотрих с бокоплава (*Gammarus lacustris*) из Северной Америки. Довгаль И. В., Григорович И. А. — Описана *Spirochona americana* Dovgal, sp. n. по материалам из оз. Пирамида, провинция Альберта, Канада. Инфузория была обнаружена на жабрах гаммариды *Gammarus lacustris*. От восьми других видов рода *Spirochona* *S. americana* отличается пропорциями и формой тела, размером и морфологией предротовой воронки, максимальной длиной тела и географическим распространением.

Ключевые слова: инфузории, хонотрихи, *Spirochona*, Северная Америка.

Spirochona americana sp. n. (Ciliophora, Chonotrichia) — a New North American Freshwater Chonotrich Species from the Amphipod *Gammarus lacustris*. Dovgal I. V., Grigorovich I. A. — *Spirochona americana* Dovgal, sp. n. is described from specimens collected in Pyramid Lake, Alberta, Canada. The chonotrich was found colonizing the gills of the gammarid amphipod *Gammarus lacustris*. *S. americana* differs from eight other species of the genus *Spirochona* in the ratio of cell length to cell width, cell body shape, size and morphology of the peristomal funnel, maximum cell size, and geographical distribution.

Key words: Infusoria, chonotrichs, *Spirochona*, North America.

The ciliate genus *Spirochona* Stein, 1852 comprises freshwater and marine species, which differ in the shape of cell body, size and morphology of the peristomal funnel, and structure of the adhesive organelles. Eight species of *Spirochona* were recognized from prior studies (Jankowski, 1973). *Spirochona gemmipara* Stein, 1852, a type species of the genus, colonizes the gill plates of the freshwater gammarid amphipod *Gammarus lacustris*. *Spirochona gemmipara* is thought to possess an extensive Palaearctic distribution, conforming to the range of its host (Jankowski, 1973, Batisse, 1994, Dovgal, 2000). However, this chonotrich is most frequently encountered in Europe (see Schodel, 1987). In Lake Baikal, valid records are provided for five species of *Spirochona* including *S. gnathopodialis* Jankowski, 1973, *S. gemmipara*, *S. brevis* Jankowski, 1973, *S. globulus* Swarczewsky, 1928, *S. simplex* Swarczewsky, 1928, and *S. tuba* Swarczewsky, 1928. The first species lives on gnathopods, whereas the other taxa colonize gill plates of gammarids. The marine species of *Spirochona* are represented by two taxa — *S. halophila* Matsudo et Mohr, 1968 and *S. marina* Jankowski, 1973 — both of which colonize gammarid gills (Jankowski, 1973). The former is described from the Pacific coast of North America and the latter from the Okhotsk, Bering and Japanese seas.

The freshwater chonotrichs of the genus *Spirochona* were also reported from North American localities (Herrich, 1884, Tibbs, 1967, cited by Jankowski, 1973); however, these distributions were not confirmed in recent taxonomic treatises.

This paper formally describes a new species, *Spirochona americana*, from the gills of *G. lacustris* collected in Pyramid Lake, Alberta, Canada. As well, we detail taxonomic aspects of other species of *Spirochona* and discuss morphological features, by which these taxa differ from *S. americana*.

Material and methods

Collection of the gammarid amphipod *G. lacustris* from Pyramid Lake was performed by Dr. Frank Wilhelm, New Zealand. *Gammarus lacustris* was collected during summer 1997 and preserved in 70% ethanol. Pyramid Lake (52°55'N and 118°05'W) is located in Alberta, Canada, at an elevation of 1,186 m above sea level. It has a surface area of 127.4 ha, volume of 11,130,000 m³, maximum depth of 19.0 m, and mean depth of 8.7 m. Water conductivity at the collection site was 242 μS and pH was 7.7.

In the laboratory, 20 specimens of *G. lacustris* were examined using a dissecting microscope for the presence of commensals. On the gills of *G. lacustris*, we detected one chonotrich species, *S. americana*, co-existing with the suctorian ciliate *Dendrocometes paradoxus* Stein, 1851. In order to produce permanent preparations of *S. americana*, the gill plates with attached chonotrichs were placed in a concentrated Bouin's fixative, then stained with Bohmer's haematoxylin and, finally, mounted in Canada balsam. The type material *Spirochona americana*, hapantotype N 280, is deposited at the Department of Fauna and Systematics of Invertebrates, Schmalhausen Institute of Zoology, National Academy of Sciences, Kyiv, Ukraine.

Spirochona americana Dovgal, sp. n.

Etymology. The specific name is of Latin derivation and reflects the geographical distribution of this species in North America.

Host. Adult gammarid amphipod *Gammarus lacustris*. **Localization:** edges of gill plates.

Type locality. Pyramid Lake, Alberta, Canada; sampled during summer 1997.

Hapantotype N 280: Preparation of sessile forms mounted in Canada balsam and deposited in the Schmalhausen Institute of Zoology.

Diagnosis. Body dimensions 47–71×24–32 μm. Cell body oviform in shape, expanded in middle section (fig. 1, 1, 2; tabl. 1). Maximal body width equal to or exceeding width of peristomal collar slope. Macronucleus spherical and located in top third of cell body. Peristomal funnel wide, short, lacking adventitious plicae, with collar spiral

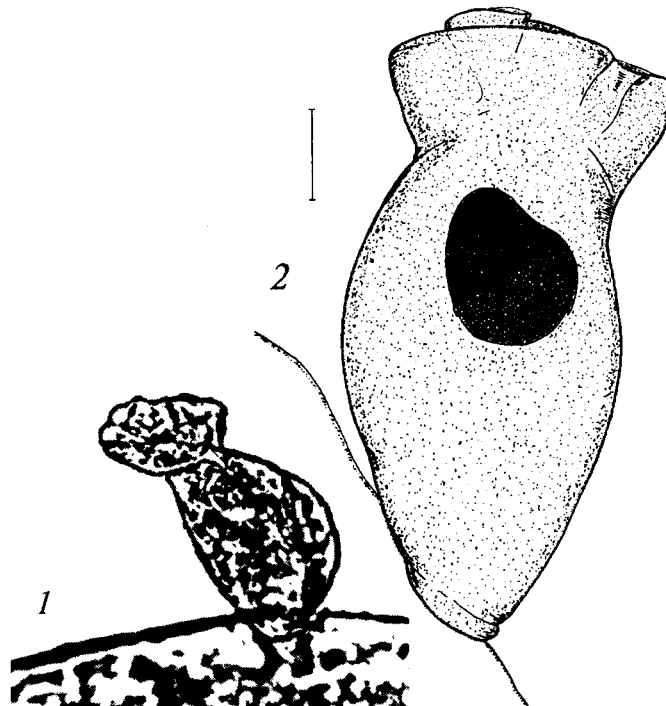


Fig. 1. Trophont of *Spirochona americana* from Pyramid Lake, Alberta: 1 — photomicrograph, dorsal view (×600); 2 — drawing, ventral view (scale bar 10 μm).

Рис. 1. Трофонт *Spirochona americana* из оз. Пирамида, провинция Альберта, Канада: 1 — микрофотография, вид с дорсальной стороны (×600); 2 — вид с вентральной стороны (масштабная линейка — 10 мкм).

Table 1. Morphometric characterization of *Spirochona americana**

Таблица 1. Размерные характеристики *Spirochona americana*

Character	X	Min	Max	SD	S _x
Body, length	62.54	47.34	71.01	7.17	2.39
Body, width	27.18	23.67	31.56	2.94	0.98
Peristomal funnel, length	18.70	13.15	23.67	3.07	1.02
Peristomal funnel, width	26.59	21.04	28.93	3.07	1.02
Macronucleus, length	13.73	10.52	15.78	2.19	0.73
Macronucleus, width	10.23	7.89	13.15	2.06	0.68

Note. *All data based on 10 randomly selected specimens. All measurements in μm . Abbreviations: X — arithmetic mean; Min — minimum; Max — maximum; SD — standard deviation; S_x — standard error.

Table 2. Comparative characteristics of species of the genus *Spirochona* (after A. V. Jankowski (1973) and own data)

Таблица 2. Сравнительная характеристика видов рода *Spirochona* (по данным А. В. Янковского (1973) и собственным)

Species	Characters								
	I	II	III	IV	V	VI	VII	VIII	IX
<i>S. gemmipara</i> *	non-flattened, elongated	2–3.5	1/3	poorly marked	small	narrow	present	38–98	4:1
<i>S. brevis</i>	non-flattened, elongated	2.5–3.75	1/3	superficially notched	poorly developed	wide	short	62–78	4.3:1
<i>S. globulus</i>	non-flattened, wide, saccular	1.75–2.5	1/2	poorly marked	poorly developed	wide	absent or poorly developed	63–66	2.5:1
<i>S. simplex</i>	dorso-ventrally flattened, wide	2–3	2/5	poorly marked	poorly developed	wide	absent or poorly developed	87–97	3:1
<i>S. gnathopodialis</i>	non-flattened, spindle-shaped	2.75–3.5	2/5	poorly marked	poorly developed	narrow	long	102–126	4:1
<i>S. tuba</i>	non-flattened, elongated	2–2.75	3/5	deeply notched	large	narrow	short	78–90	3.5:1
<i>S. halophila</i>	non-flattened, non-wide	1.75–3	2/5	absent	absent	wide	absent	36–40	2.5:1
<i>S. marina</i>	non-flattened, wide	2–2.75	2/5	poorly marked	poorly developed	narrow	present	51–78	4:1
<i>S. americana</i> sp. n.*	non-flattened, oviform	2.5–3	1/3	absent	absent	narrow	present	47–71	2:1

Note. I — body shape; II — convolutions of peristomal funnel spiral; III — ratio of peristomal funnel length to body length; IV — adventitious plicae of peristomal funnel; V — lateral sacs of peristomal funnel; VI — width of lower body section; VII — pseudostyle; VIII — body length (in μm); IX — ratio of body length to body width; * — own data.

composed of 2.5–3 convolutions. Inner, convoluted part of collar spiral almost completely surrounded by outer convolution. Podite short and composed of adhesive disc.

Narrative. This species is probably related closely to *S. gemmipara* as it also possesses a non-flattened, elongated body cell, a collar spiral consisting of 2.5–3 convolutions and a relatively short peristomal funnel which extends 1/3 the body length (tabl. 2). However the two taxa differ in the ratio of body length to body width and by the absence in *S. americana* of adventitious plicae and lateral sacs on the peristomal funnel. Based on the ratio of body length to body width, *S. americana* resembles *S. globulus* and *S. halophila*, but the former has a shorter peristomal funnel than the two other taxa (tabl. 2). Two species in the genus, i. e. *S. halophila* and *S. marina*, occur exclusively in marine habitats. *Spirochona americana* can be discriminated from *S. simplex* in that its cell body is not flattened, while in the latter species it is dorso-ventrally compressed.

A. V. Jankowski (1973) hypothesized that speciation in the sessile Chonotrichia may be associated with their adaptation to a specific host species and specialization to a site on the host body, as well as co-evolution with the host species. A. V. Jankowski (1973) further inferred that adaptive radiation of *S. gemmipara* in Lake Baikal has led to the assemblage of four endemic species of *Spirochona*.

It has yet to be established what relationships exist between *S. americana* and *S. gemmipara*, but the two species exhibit similar host and site-specific affinities. It is possible that *S. americana* represents a rare form of ciliates speciation, resulting from the geographic isolation of its host species' populations on the different continents.

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