Pleuroxus pamirensis (Werestschagin, 1923) (Crustacea: Cladocera),
first record for the fauna of Russian Federation

Pleuroxus pamirensis (Werestschagin, 1923) (Crustacea: Cladocera),
первая находка для фауны России

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ABSTRACT. This communication provides the first record of Pleuroxus pamirensis (Werestschagin, 1923) (Crustacea: Cladocera) from the Russian Federation. It belongs to a unique pair of chydorid species having lateral horns on valves. It differs from closest P. annandalei (Daday, 1908) in: (1) postanal teeth predominantly solitary; (2) spine on proximal exopod segment of antenna II longer than half of second segment; (3) seta i on limb I long (as long as seta g of h). Our study has demonstrated that the mountain regions could be regarded as sources for such new findings of the cladocerans even in well-studied countries.

KEY WORDS: Crustacea, Cladocera, first record, fauna, Russia.

KEY СЛОВА: Crustacea, Cladocera, первая находка, фауна, Россия.

Introduction

Unfortunately, taxonomy (being an important direction of biological sciences and basis for all types of biological analysis) is now in a deep crisis [Agnarsson, Kuntner, 2007; Wägele et al., 2011; Vinarski, 2020]. Nowadays we observe a very rapid decline in taxonomists in Western countries, and only some developed countries care about taxonomic studies. Even the interest in molecular biology-based taxonomic studies has recently decreased for many freshwater animal groups.

Fortunately, Cladocera (Crustacea: Branchiopoda) is an exception to this rule. This is a group of microscopic organisms undergoing rapid progress in taxonomy and faunistic studies. New groups of taxonomists have appeared in some developed countries [Elías-Gutiérrez et al., 2006, 2008; Fuentes-Reines, 2014; Sousa, Elmoo-Loureiro, 2018; Sousa et al., 2021], and a paradoxical situation has emerged: cladoceran fauna of Mexico, Brazil and Thailand are studied more intensively now compared to those of the USA or Canada.

Europe is traditionally the best studied region of the planet with a very long history of animal, including cladoceran, studies [Korovchinsky, 1996; Dumont, Negrea, 2002]. It is also a hub for molecular biological investigations, although the latter are focused primarily on a single genus, Daphnia O.F. Müller [Petrusek et
Fig. 1. Water bodies (A–B) where *P. pamirensis* (C–D) was found. A — the north-western shore of Lake Sut-Khol'; B — a shallow pool near Lake Sut-Khol'; C–D — *P. pamirensis*, parthenogenetic female, optical photo. Scale bars: 0.1 mm for C–D.

**Material and methods**

Eleven parthenogenetic females were collected from the northwestern shore of Lake Sut-Khol' (51.52697°; 91.13585°) (Fig. 1A) and a shallow pool (51.52736°N; 91.13432°E) 2–5 m from the shore of the former (Fig. 1B), Alash Nagorie, Western Sayan mountains, Tyva Republic, Russia collected in 22.8.2020. The lake surface is 13.3 km², predominant depths are 15–20 m, maximum depth is 148 m. Littoral zone is expressed in the northwestern shore, its width is 15–20 m, and *P. pamirensis* was found there, on a muddy bottom. The water was fresh, with mineralization of 0.16 g/l, pH 7.84, water temperature at time of sampling was 14 °C. The closest shallow pool had 9 m in length, width of 3–5 m, muddy bottom and a developed macrophyte zone, mainly represented by *Carex* sp. Water temperature at sampling time was 16 °C.

Specimens were selected from formalin-preserved samples under a compound microscope and studied under an optical microscope *in toto* in a drop of a glycerol-formaldehyde mixture. Two adult specimens were dissected under a stereoscopic microscope for the study of appendages and postabdomen. Drawings were prepared using a camera luci-
Pleuroxus pamirensis (Werestschagin, 1923)

Fig. 1–3.

Results

Order Anomopoda Sars, 1865
Family Chydoridae Dybowski et Grochowski, 1894
Subfamily Chydorinae Dybowski et Grochowski, 1894
Genus Pleuroxus Baird, 1843

*Pleuroxus pamirensis* (Werestschagin, 1923)
Fig. 3. Parthenogenetic female of *P. pamirensis* from a shallow pool near Lake Sut-Khol’. A — valve; B — its anterior portion; C — its ventral portion; D — its postero-ventral portion; E–G — postabdomen; H — thoracic limb I; I — setae i and j. Scale bars: 0.1 mm.

Рис. 3. Партеногенетическая самка *P. pamirensis* из мелкого водоема у озера Сут-Коль. А — створка; В — ее передняя часть; С — ее брюшная часть; D — ее заднебрюшная часть; E–G — постабдомен; H — терракопод I; I — щетинки i и j. Масштабная линейка: 0,1 мм.

distance (Fig. 2C, G). Marginal setae relatively long (Fig. 3A); setae at anterior margin lie at a distance from valve edge (Fig. 3B); all setae of valve ventral margin exactly marginal (Fig. 2C–D). Postabdomen wide, narrowing distally, its preanal margin approximately as long as anal margin, preanal and postanal angle well-defined, postanal margin with series of solitary postanal teeth (Fig. 3E–G), postabdominal claw with two basal spines of remarkably different size (distal spine 2–4 times longer than proximal one). Antenna I not reaching tip of rostrum, with a low basal peg (Fig. 2H–J). On antenna II, all apical “swimming” setae subequal in size, lateral seta on proximal segment of endopod shorter than other setae (Fig. 2K). Spine on proximal segment of exopod longer than half of next segment length (Fig. 2L). All setae on antenna I with a short setulation (Fig. 2M). All thoracic limbs as described by Kotov & Sheveleva [2008]. On limb I, seta i long (Fig. 3H–I).

Length in our material 0.4–0.71 mm, height 0.32–0.53 mm.

**EMENDED DIFFERENTIAL DIAGNOSIS WITH BRIEF COMMENTS.** The only other taxon of *Pleuroxus* with lateral projections is *P. annandalei* (Daday, 1908), the close congener of *P. pamirensis* [Kotov, Sheveleva, 2008]. According to Kotov & Sheveleva [2008] the latter differs from the former in (1) preanal margin of postabdomen longer than anal margin; (2) postanal teeth predominantly solitary; (3) antenna I thick; (4) spine on basal exopod segment of antenna II longer than half of second segment; (5) seta i on limb I long (as long as seta g of h). According to our new
Discussion

In Northern Eurasia, the genus *Pleuroxus* is represented by 15 species [Korovchinsky et al., 2021]. Two taxa, *P. pamirensis* (Werestschagin 1923) and *P. annandalei* (Daday 1908), have lateral “horns” of unknown function on the valves, very rare character for the chydroridae, although analogous structures are described in other cladocerans: ilycryptids, macrothricids, daphnids [Kotov, 2006, 2013]. Horned species of *Pleuroxus* seem to be endemics of mountain regions of Central Asia. Unfortunately, discussion of their exact distribution patterns is premature, as only few records of both taxa are known to date, i.e. due to difficulty of access to the water bodies where they live. However, we can confirm that they belong to the “Mountain endemic” faunistic complex according to Kotov [2016], which is studied inadequately, and its exact species composition is very obscure to date. High endemism level and inadequate level of study are characteristic of the mountain cladocerans from other continents [Van Damme, Eggert, 2019; Paggi, Herrera-Martinez, 2020; Neretina, Sinev, 2021].

We have found *P. pamirensis* in Russia for the first time and demonstrated that new records are possible even for the countries with well-studied cladoceran faunas [Korovchinsky et al., 2021], and just the mountain regions could be regarded as sources for such new records.

Acknowledgements. The study is supported by the Russian Science Foundation (grant 18-14-00325). Many thanks to R.J. Shiel for linguistic corrections.

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*Responsible editor I.N. Marin*