

## Addition to the desmid flora (Charophyta: Desmidiiales) of Nizhnevartovsk district, KMAO-Yugra, Russia

### Дополнение к флоре десмидиевых водорослей (Charophyta: Desmidiiales) Нижневартовского района ХМАО-Югры, Россия

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**Summary.** Five species of desmid algae new to Nizhnevartovsk city are reported. Three species (*Closterium abruptum*, *Cl. jenneri*, *Euastrum ansatum*) are rare for Nizhnevartovsk administrative region, one (*Penium margaritaceum*) is new for Khanty-Mansi Autonomous Okrug – Yugra.

**Key words.** Closteriaceae, Desmidiaceae, new records, rare species, Peniaceae, West Siberia.

**Реферат.** Приведена информация о находке пяти видов десмидиевых водорослей в городе Нижневартовске. Три из них (*Closterium abruptum*, *Cl. jenneri*, *Euastrum ansatum*) являются редкими для Нижневартовского административного района, один вид (*Penium margaritaceum*) – новый для Ханты-Мансийского Автономного Округа – Югры.

**Ключевые слова.** Западная Сибирь, новые находки, редкие виды, Closteriaceae, Desmidiaceae, Peniaceae.

**Introduction.** Nizhnevartovsk administrative district, with an area of 117,300 km<sup>2</sup>, is the largest part of Khanty-Mansi Autonomous Okrug – Yugra (KMAO – Yugra). The district is located in the middle of taiga zone, in the eastern part of the West Siberian Plain. A large number of lakes, marshes and rivers, including a part of the middle course of the Ob River are situated on its territory.

Biodiversity studies of Desmids, both special and general algofloristic studies, are carried out mainly on large rivers such as Ob, Vakh, Sarmsabun and Seikryogan, as well as in vicinities of large settlements and in the Nature Park “Sibirskiye uvaly” (Naumenko, 1992, 1996, 2006, 2007; Safonova, Shaulo, 2006, 2007; Skorobogatova, Naumenko, 2009; Naumenko, Ptukhina, 2013; Naumenko, Gidora, 2014; Naumenko, Gidora, 2017; Skorobogatova, 2018). According to the available literature data, the algal flora of the region is quite rich, and it is noteworthy that representatives of order Desmidiiales (Closteriaceae family in particular) often dominate in the number of species over other groups of algae.

Here we report records of new for the region and rare desmid species made in Lake Komsomolskoye in Nizhnevartovsk city, which supplement the floristic lists of Nizhnevartovsk district and KMAO-Yugra in general, as well as expanding the geographical distribution of individual species on that territories.

**Materials and Methods.** The present study was carried out during the middle of September 2014 in Nizhnevartovsk city, which is situated in the south-western part of Nizhnevartovsk administrative district, on the right bank of the Ob River (Fig. 1A, B). The city is surrounded by middle taiga forests with *Pinus sylvestris* L. and *P. sibirica* Du Tour as dominants. The climate of this area is continental, with moderately cold winter (average temperature in January varies from – 22 °C to – 24 °C) and relatively warm summer (average temperature in July varies from 16 °C to 17 °C).

The samples of plankton and benthos were taken from Lake Komsomolskoye (N60°57'01.6", E76°34'37.2") on its both sandy and swampy banks. Until a recent time, this water body was heavily contaminated with oil products, but at present, it is almost completely cleared of pollution.

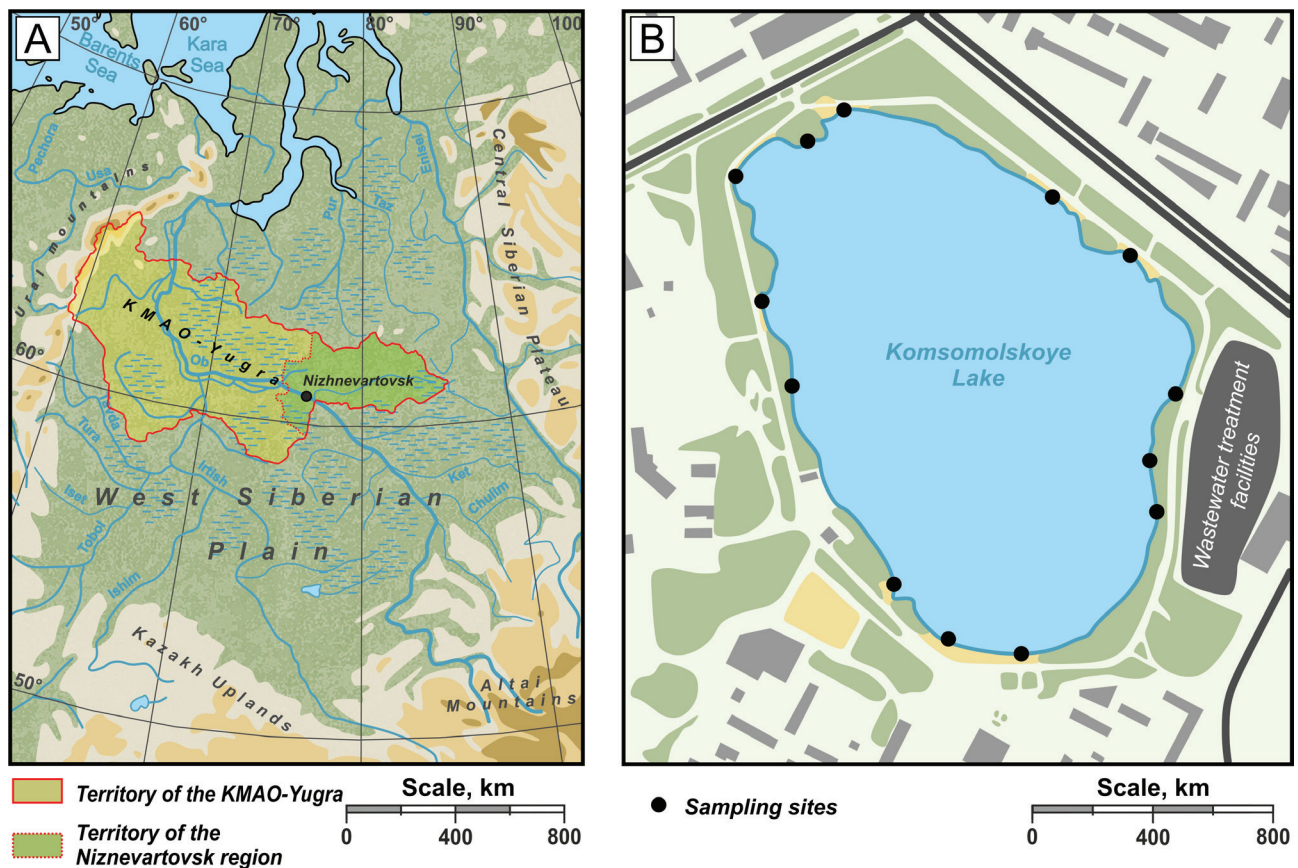


Fig. 1. The location of Nizhnevartovsk administrative district in the West Siberian Plain (A) and Komsomolskoye Lake in Nizhnevartovsk city (B).

The study of the collected material was carried out by using light microscopes Levenhuk 320 and Levenhuk C310 NG digital camera. Cell measurements were made using TouPView v.3.7.1047 software. Species identification was performed by using a special literature (West, West, 1904; Kosinskaya, 1960; Palamar-Mordvintseva, 1982; Coesel, Meesters, 2007). The validity of taxa was verified with Algaebase (Guiry, Guiry, 2019).

**List of Species.** As a result of the collected material study, the following annotated list was compiled. For each taxon the abundance estimation (Ab.: s – single finding, r – rare, c – common, a – abundant, m – mass occurrence), dimensions (Dim.), information about distribution in KMAO – Yugra territory (Distr.) and illustrations are given.

Familia **Peniaceae** Haeckel, 1894

*Penium margaritaceum* Brébisson in Ralfs, 1848 (Fig. 2, 1) – **Ab.:** “r” in plankton samples. **Dim.:** 107.7–118.3  $\mu\text{m}$  long and 22.8–23.9  $\mu\text{m}$  wide. **Descr.:** cells cylindrical, with light median constriction and broadly rounded ends. Cell wall slightly brownish or colorless, with griddle bands and longitudinal rows of small granules. **Distr.:** this species has a worldwide distribution, but it was recorded in KMAO – Yugra territory for the first time. In addition, this species is common in the nearest regions such as Polar Urals (Patova and Demina, 2007; Briškaitė et al., 2016) and South-East part of West Siberian Plain (Kosinskaya, 1960).

Familia **Closteriaceae** Bessey, 1907

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Fig. 2. Desmids, recorded in Komsomolskoye Lake: 1 – *Penium margaritaceum*, 2 – *Closterium abruptum*, 3 – *Cl. jenneri*, 4 – *Cl. venus*, 5 – *Euastrum ansatum* empty semicell.

#### Familia **Closteriaceae** Bessey, 1907

*Closterium abruptum* West, 1892 (Fig. 2, 2) – **Ab.:** “r” in plankton samples. **Dim.:** 151.5–161.6 µm long and 15.1–15.9 µm wide. Ends 6.8–7.1 µm wide. **Descr.:** cells slightly curved, with obviously indistinctive striated brown-colored cell wall and truncate ends. Terminal vacuoles contain one large crystal. **Distr.:** species is new to Nizhnevartovsk district and rare to KMAO – Yugra, where it is recorded in Middle and lower course of the Ob River (Naumenko, 1992).

*Closterium jenneri* Ralfs, 1848 (Fig. 2, 3) – **Ab.:** “s” in plankton samples. **Dim.:** 112.3 µm long and 16.5 µm wide. Ends 7 µm wide. **Descr.:** cells moderately curved, with slightly striate colorless cell wall and acuminate ends. Terminal vacuoles contain one large small crystal. **Distr.:** this species is rare for Nizhnevartovsk district and KMAO – Yugra, where it is known from Sarmsabun (Naumenko, Gidora, 2014), Seikryogan (Naumenko, 2007) and Vakh (Skorobogatova, 2018) rivers only.

*Closterium venus* Kützing ex Ralfs, 1848 (Fig. 2, 4) – **Ab.:** “c” in plankton samples. **Dim.:** 89.1–91.5 µm long and 12.8–13.4 µm wide. Ends 3.2–4 µm wide. **Descr.:** cells moderate curved, with smooth colorless cell wall and rounded ends. Terminal vacuoles contain several small crystals. **Distr.:** species is widespread on Nizhnevartovsk district territory, it recorded in Seykoryogan (Naumenko, 2007), Sarmsabun (Naumenko and Gidora, 2014) and Vakh (Skorobogatova, 2018) rivers, as well as from the vicinity of the Vysokiy village (Safonova & Shaulo, 2007).

Familia **Desmidiaceae** Ralfs, 1848

*Euastrum ansatum* Ehrenberg ex Ralfs, 1848 (Fig. 2, 5) – **Ab.:** “s” in benthos samples. **Dim.:** 51.1  $\mu\text{m}$  wide and presumably 122.9  $\mu\text{m}$  long. Polar lobe 25.2  $\mu\text{m}$  wide. Isthmus  $\sim$ 17.4  $\mu\text{m}$  wide. The record of only one empty semicell of this species makes it possible only to assume a length of the living cell and isthmus width. **Descr.:** Semicells are pyramidal in shape, with rudimental lateral and well-developed basal lobes. Polar lobe with closed deep median incision. Cell wall smooth. **Distr.:** this species is new to Nizhnevartovsk district and rare to КМАО – Yugra, where it is recorded in swamps near Yugorsk City (Shakhmatov, Pavlovskiy, 2019). In addition, this species is recorded from the neighboring regions such as Yamal Peninsula (Luknitskaya, 2001) and Polar Urals (Briškaitė et al., 2016).

**Discussion.** Summarizing the above, during the determination of the material collected in Lake Kom-somolskoye in Nizhnevartovsk city, only five species of desmid algae belonging to families Peniaceae, Closteriaceae and Desmidiaceae have been found. One of them, *Closterium venus*, which characterized by a high abundance in samples, is widespread both on Nizhnevartovsk administrative region territory and in the territory of Khanty-Mansi Autonomous Okrug – Yugra. This record expands the geographical distribution of this species in the region. Another species, *Closterium jenneri*, was previously recorded only several times in the Nizhnevartovsk region, which indicates its relative rarity. Two species (*Closterium abruptum* and *Euastrum ansatum*) were previously found in other parts of Khanty-Mansi Autonomous Okrug – Yugra, but for Nizhnevartovsk region they are recorded for the first time. The last species, *Penium margaritaceum*, is new to the territory of Khanty-Mansi Autonomous Okrug – Yugra.

It should be noted that most of the above-mentioned species are characterized by a single or rare occurrence in samples, which can be explained by the recent purification of the lake, during which its biota was greatly transformed, which led to the emergence of suitable conditions for desmids in it. Thus, it is most likely that these species were accidentally introduced into the lake from nearby wetlands.

The fact that the recorded species, which are quite common in the neighboring regions, are rare or new for Nizhnevartovsk district and for Khanty-Mansi Autonomous Okrug – Yugra in general, clearly indicates the necessity of further floristic study of the algoflora.

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