Fauna, ecological and morphological characteristics of family Sididae, Baird, 1850 (Crustacea: Cladocera: Ctenopoda) of Ukrainian Roztocze

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Abstract. On the basis of analysis of modern literature and own data taxonomy, ecological and morphological characteristics of family Sididae of Ukrainian Roztocze are presented. 314 tests in 2008–2017 in Ukrainian Roztocze natural region were conducted. The research was conducted on living and fixed materials. In general 283 individuals of genus Sida and 157 individuals of genus Diaphanosoma had been examined. In reservoirs of the Ukrainian Roztocze Sida crystallina crystallina was identified. In the area of Ukrainian Roztocze were indicated three varieties of Diaphanosoma brachyurum: D. b. leuchtenbergianum Fisher, 1854; D. b. megalops Liljeborg, 1900; D. b. frontosa Liljeborg, 1900.

Keywords: zooplankton, Cladocera, Sididae, Ukrainian Roztocze.

Introduction. Roztocze is a transboundary region, it plays an important role in identifying regularities of standard hydroecosystems in the central and Eastern Europe, because on its territory passes a part of the main European watershed.

Here a biosphere reserve UNESCO «Roztocze» is founded which hydrological regime is occurred by the river Vereshchycia.

For indicating structural and functional characteristics of hydrobioncenes, according to recommendations of Directive 2000/60/EC the data of hydroecological monitoring are necessary, which are based on populative-faunistics investigations. At the same time, the regional characteristics of zooplankton groups are insufficiently studied.

The article aim is to investigate the faunal and ecological-morphological characteristics of the Sididae family, whose representatives play an important role in conducting hydroecological monitoring.

Material and methods. Zooplankton coenosia of the impoundments that make up the instream system of impoundment ponds of the river Vereshchita in the Ukrainian Roztocze have been studied.

In the upper reaches and in the coastal zone the ponds bed is overgrown with aquatic vegetation, shrubs and scattered trees. Capacity of bottom sediments is 0.3-0.5 m. Significant cause of siltation of these water bodies are the products of ruination of the coast, wave and wind erosion. The water temperature reaches the highest daily values (24-26°C) in July and the first half of August.

Taxonomic analysis of zooplankton groups were carried out using several identification keys [5, 6, 7, 8, 9].

The data were based on 314 gathered samples, collected in the instream ponds during 2008-2017 usually in three seasons: in spring, summer and autumn. Sampling and processing of samples were carried out by common methods in Hydrobiology [16]. For the sampling the Apstein mesh (length of the cone is 55 cm, the diameter of the inlet 25 cm, Cup diameter of 4 cm) had been used. As well for studying the horizons in deep waters the opened-water-sampler of Dr. Franz Ruttner was used. In such cases samples were taken at three horizons of the water column: the surface of the reservoir, middle level, and near bottom level. The collected material was fixed with 4% formaldehyde. For quantitative processing of the samples the Bohorov’s camera had been used.

The Research was conducted on living and fixed materials. In general 283 individuals of genus Sida and 157 individuals of genus Diaphanosoma had been examined.

The main attention was paid to such signs as sex structure of population, size of individuals, armament of postabdomen and antennas, biotopic delivering and features of the life cycle.

Results and their discussion. Zooplankton plays a very important role in the food base for fish, provides processes of water quality formation and bioproduction [2, 4, 8, 9, 10, 11]. We describe, with the use of our own researches and literary sources, faunal and morpho-ecological parameters of the Sididae family of Ukrainian Roztocze [1, 2, 5, 11, 12, 13, 14, 15].

The genus Sida (Fig.1) belongs to an order Ctenopoda and characterized by monotypy. In this genus there are three subgenus: S. crystallina crystallina (common in western Palearctic ecozone), S. c. ortiva (common in eastern Palearctic ecozone) i S. c. americana (common in Nearctic ecozone).

In reservoirs of the Ukrainian Roztocze lives Sida crystallina crystallina (O. F. Müller, 1776) . Species are well adapted to life among the seaweed. On the dorsal side of Sida a special body develops by which organisms are attached to the surface of plants. This provides more effective filtering. The filter apparatus is represented by spikes that develop on the same type is built by six pairs of thoracic limbs. The diet is mainly represented by single-celled organisms and detritus particles. The length of females varies from 1.9 to 4.3 mm.

Postabdomen is more than twice as long from the edge of each side bears spikes, the number of which varies from 18 to 22 in each row. The sizes of the male one ranges from 1.6 to 1.7 mm.

The eye of the male is bigger than the female eye. Front antennulas have a long thin flagelus with small hooks on the front edge of the end.

In conditions of the Ukrainian Roztocze species occur primarily in littoral zone of ponds, in floodplains of rivers with slow stream. Sida prefers thickets of Potamogeton,
young individuals sometimes occur in pelagic zone of reservoirs. The number of eggs in brood pouch varies from 53 to 72. Males and females with ephippium appear in populations in late October and November.

In waters of the Ukrainian Roztocze is registered speice *D. brachyurum* Lievin, 1848 (Fig. 2).

**Fig. 1.** *Sida crystallina* (O.F. Müller, 1776) [8]: 1 – female; 2 – carapace of female, ventral; 3 – antennule of female; 4 – second antenna of female; 5 – postabdomen of female; 6 – postabdominal claw of female; 7 – male; 8 – antennule of male

Female length changes in bounds of 0,71-1,21 mm. They have transparent, colorless shell leaves with high and straight rear edge, convex dorsal and ventral sides. Ventral edge of the leaves is armed with bristles (5-6 in medial part and 6-7 in the dorsal part of leaves, respectively). Between bristles and on the carapace of the rear edge there are numerous spines. Front antennules have a rod base with estetasks and one long bristle. Bristle and spike lie on the basis of rear antennules too, two-parted (top) and three-parted (bottom) branches of which carries 12 and 5 bristles, respectively.

Male length changes in scopes between 0,71 and 0,79 mm. Their front antennules have cylindrical basis, which proceeds into long flagell.

**Fig. 2.** *D. brachyurum* in the conditions of Ukrainian Roztocze is found in a pelagic and littoral zone among water vegetative. Mostly, it prefers surfaces of oxbows and ponds. Life cycle is characterized by monocyling. The species are thermophilic, male and ephippium female are developed in populations, starting from the point, when water is cooled to 17-16 degrees. The fecundity varies from 5 to 8 eggs.

Materials on the characteristic of *Cladocera* of Ukrainian Roztocze were taken into account in the preparation of a Key to species identification of freshwater plankton in Europe with an indication of the ecology and distribution of organisms [7].

**Conclusion.** The research of population *S. cristallina*, in view of their important role in phytophilous biocenoses, further requires the use of modern genetic and population methods to identify the polymorphism features, patterns subspecies structure, character of closely related links between different subgenus.

The internal population variability of *Diaphanosoma* is caused, first of all, by diversity of the shape and size of head, eye, dimensional characteristics of antennules and correlation between their length and carapace are important as well. Investigations in morphological and ecological features of genus *Diaphanosoma* take place in solving priorities of ecological safety, local monitoring, aquarium compartmentalization of the Ukrainian Roztocze and require an integrated approach with the use of current methods of multidimensional statistic, factorial and dispersal analysis.

**ЛІТЕРАТУРА**

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Фауна и морфо-экологическая характеристика семейства Cladocera, Baird, 1850 (Crustacea: Cladocera: Ctenopoda) Украинского Расточья

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Ключевые слова: зоопланктон, Cladocera, Sidae, Украинское Расточье.