

UDC 574.583 (477-25)

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CLADOCERAN ASSEMBLAGE OF KYIV SMALL WATER BODIES: RESULTS OF MONITORING IN 2010-2011

Twenty species of cladocerans (Crustacea, Cladocera) were identified from ten lentic water bodies of Kyiv city. The biggest species richness along with the lowest saprobity index is revealed for Rusanivske lake (water quality class – II, clean). The quality of water of most studied Kyiv lakes, which has been evaluated by Pantle-Buck saprobiological method using modification of Sladeček, is regarded as moderately polluted, water quality class – III. The collection of cladoceran species photos at the IEE NASU web page is launched.

Keywords: saprobity index, water quality class, Kyiv water bodies, Cladocera

Cladocerans are one of the common and abundant groups of aquatic organisms in water bodies of urban territories. Providing a great role in food webs, they are important grazers on algae and detritus, and recognized as useful ecological indicator [3]. Being filtrators, they are greatly involved in biological self-purification of polluted waters [4]. In such big city as Kyiv, these crustaceans are still not completely integrated into water quality monitoring programs. As capital grows (appearing new apartment complexes, industrial buildings, infrastructure development etc) as negative anthropogenic influence increases on natural water bodies (eutrophication, destroying, drainage). Hence, periodical overview and monitoring of zooplankton is needed to understand sanitary situation in city's water bodies.

Material and methods

Zooplankton samples were collected in summer time in 2010-2011 in lakes Vyrlytca, Zaplavne, Nyzhnij Telbin, Berizka, Sonjachne, Radunka, Rusanivske, Verbne, Opechen, Feofania pond cascade, by throw net with 63 μm mesh size and preserved in 4% formaldehyde. Laboratory analysis for taxonomic composition, abundance and photography of cladocerans was performed at IEE NASU using Olympus BX51 equipped by camera Olympus E-410 Camedia. We launched the collection of cladoceran species photos at the IEE NASU web page, which we are planning to use for planktonic crustaceans photoatlas ([http://www.ieenas.org/index.php?option=com_datsogallery & Itemid=42 & func=viewcategory & .catid=6](http://www.ieenas.org/index.php?option=com_datsogallery&Itemid=42&func=viewcategory&.catid=6)). Cladocerans were identified using the key and figures of Manujlova [5]. The quality of water at studied sites was evaluated by Pantle-Buck saprobiological method using modification of Sladeček [6].

Results and discussion

Twenty species (table 1) from 14 genera and 2 orders (Ctenopoda and Anomopoda) were found in the studied water bodies in summer time. Rusanivske lake, which is most close to Dnipro river and affected by, has the biggest species richness. In the same time, it has the lowest value of the saprobity index - 1.3 and water of quality class II (clean). Recreational lakes, Berizka and Sonjachne, have 5 species each, however, by saprobity index using modification of Sladeček [6] they belong to β -mesosaprobic (moderately polluted). By the way, Sonjachne lake had the biggest cladoceran abundance - 1700 ind/m³, the dominant species was *Chydorus sphaericus*.

In Radunka lake no cladocerans were recorded between zooplankton groups. High density of blue-green algae filaments was observed in that sample. Well known, what cyanobacteria can produce toxins into the water. This may inhibits development of planktonic crustaceans.

The lowest cladoceran abundance was observed in Zaplavne lake - 400 ind/m³, but the species composition was dominated by bioindicators of oligosaprobity and water quality shows class II - pure. In opposite, where are two lakes, Opechen and Feofania pond cascade, characterized by the highest value of saprobity index 1.9-2.0 between studied water bodies. Opechen lake has been shown a high

saprobity value during long time [1]. The water bodies mainly (40 % of total number) had low number of cladoceran species each (see table).

Species composition of cladocerans is not specific in Kyiv water bodies and consists from widespread taxa. The biggest number of species was found in Rusanivske lake. *Chydorus sphaericus* and *Scapholeberis mucronata* were very common species in studied water bodies. This may indirectly indicates the presence of water-coastal vegetation and bacterial film on the water surface. Other species have low and sporadic occurrence (possibly because of the seasonality of samples).

Table 1

Cladoceran species composition of Kyiv small water bodies

Water body	Vyrlytca	Zaplavne	Nyzhnij Telbin	Sonjachne	Berizka	Rusanivske	Opechen	Verbne	Feofanija ponds	Individual saprobic value
<i>Sida crystallina</i>			+							1.3
<i>Diaphanosoma brachyurum</i>	+	+								1.4
<i>Daphnia pulex</i>									+	2.8
<i>D. longispina</i>					+					2.05
<i>Daphnia</i> sp.						+				-
<i>Simocephalus vetulus</i>					+				+	1.5
<i>Simocephalus</i> cf. <i>serrulatus</i>						+				1.3
<i>C. quadrangula</i>						+				1.15
<i>Ceriodaphnia reticulata</i>									+	1.7
<i>C. leticaudata</i>					+					1.6
<i>Scapholeberis mucronata</i>	+		+	+	+		+	+	+	2.0
<i>Camptocercus rectirostris</i>				+				+		1.2
<i>Peracantha truncata</i>	+									1.3
<i>Monospi lus dispar</i>		+								1.3
<i>Graptoleberis testudinaria</i>						+				1.5
<i>Chydorus sphaericus</i>	+	+	+	+	+		+	+		1.75
<i>C. ovalis</i>		+				+				1.2
<i>Pleuroxus</i> sp.				+						-
<i>Alona quadrangularis</i>			+	+		+				1.4
<i>Bosmina longispina</i>						+				-
Total species number	4	4	4	5	5	7	2	3	4	
Saprobity index of water (S)	1.6	1.4	1.6	1.6	1.8	1.3	1.9	1.7	2	S _{mean} = 1.7
Water quality class	III	II	III	III	III	II	III	III	III	III

Thus, 13 species (65 % from species list) was recorded only once. The distribution of cladocerans at different water bodies seems has no any consistent pattern, except their confinement to the certain saprobity zone. Each zone has optimal conditions for certain species and communities of organisms [7]. Similar study for Kiev's lakes had been performed 10 years ago [2]; comparing three

common recreational lakes with our preliminary results we can see what species composition is changed. Thus, in summer time Berizka lake had 29% of cladoceran species found 10 years ago, in Verbne lake is remained 10%, in Sonjachne – only 7%. The saprobity value for these three lakes since 10 years is a little bit increased: from 1.6 till 1.8 for Berizka, from 1.5 till 1.7 for Verbne and from 1.5 till 1.6 for Sonjachne.

Conclusion

It seems that the cladoceran species composition is quite unstable over time and they occupy the resource space randomly. So, the assessment of lakes water quality of Kyiv urban territories based on Pantle-Buck saprobiological method using modification of Sladeček is demonstrated what waters of city classified as moderately polluted.

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РЕЗУЛЬТАТИ МОНІТОРИНГА ВИДОВОГО СКЛАДУ ГІЛЛЯСТОВУСИХ РАКОПОДІБНИХ ВОДОЙМ М. КИЄВА В 2010–2011 РР.

В 10 лентичних водоймах м. Києва було ідентифіковано 20 видів гіллястовусих ракоподібних (Crustacea, Cladocera). Найбільше видове багатство і одночасно найменший індекс сапробності виявлені для оз. Русанівське (II клас чистоти вод). За індексом Пантле і Букк (в модифікації Сладечека) більшість водойм м. Києва відносяться до III класу чистоти вод – помірно забруднені. Започаткована електронна база фотографій видів гіллястовусих рачків на сайті ІЕЕ НАНУ.

Ключові слова: сапробіологічний індекс, клас чистоти вод, водойми м. Києва, Cladocera

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РЕЗУЛЬТАТЫ МОНИТОРИНГА ВИДОВОГО СОСТАВА ВЕТВИСТОУСЫХ РАКООБРАЗНЫХ ВОДОЕМОВ Г. КИЕВА В 2010–2011 ГГ.

В 10 лентических водоемах г. Киева было идентифицировано 20 видов ветвистоусых ракообразных (Crustacea, Cladocera). Наибольшее видовое богатство и одновременно наименьший индекс сапробности выявлены для оз. Русановское (II класс чистоты вод). Большинство водоемов г. Киева по индексу Пантле и Букк (в модификации Сладечека) относятся к III классу чистоты вод - умеренно загрязненные. Создается электронная база фотографий видов ветвистоусых ракообразных на сайте ИЕЕ НАНУ.

Ключевые слова: сапробіологічний індекс, клас чистоти вод, водоемы г. Києва, Cladocera