The Pharma Innovation Journal 2020; 9(6): 607-611

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(6): 607-611

www.thepharmajournal.com
Received: 19-04-2020
Accepted: 21-05-2020

UA SHakarbayev
Institute of Zoology, Academy of Sciences of The Republic of Uzbekistan, Tashkent, Uzbekistan

FD Akramova
Institute of Zoology, Academy of Sciences of The Republic of Uzbekistan, Tashkent, Uzbekistan

BT Norkobilov
Institute of Zoology, Academy of Sciences of The Republic of Uzbekistan, Tashkent, Uzbekistan

DA Azimov
Institute of Zoology, Academy of Sciences of The Republic of Uzbekistan, Tashkent, Uzbekistan

Corresponding Author:
UA SHakarbayev
Institute of Zoology, Academy of Sciences of The Republic of Uzbekistan, Tashkent, Uzbekistan

Cercariae of trematodes of mollusks (Gastropod, Pulmonates) in reservoirs of Uzbekistan

UA SHakarbayev, FD Akramova, BT Norkobilov and DA Azimov

Abstract
Cercari and mollusk trematodes (Gastrpoda, Pulmonata) in freshwater biocenoses of Uzbekistan. Shakarbayev U.A., Akramova F.D., Norkobilov B.T., Azimov D.A. – Some features of the fauna cercariae trematodes were studied, gastropods are produced by molluskss - Lymnaeidae Rafinesque, 1815, Planorbidae Rafinesque 1815, Physidae Fitziger, 1833 and Melanoididae Müller, 1774. In the reservoirs of the rivers Syr Darya**,** Amu Darya (within Uzbekistan) and Zarafshan, natural infection of trematode larvae was observed in 15 species of mollusks, *Lymnaea*(8 species), *Planorbis*(1 species), *Gyraulus*(2 species), *Anisus* (2 species), *Physa*(1 species), *Costatella* (1 species) and *Melanoides*(1 species). In total were found 27 species of cercariae belonging to the trematodes of 11 families of Fasciolidae, Echinostomidae, Philophthalmidae, Paramphistomidae, Gastrothylacidae, Notocotylidae, Plagiorchidae, Sanguinicolidae, Strigeidae, Diplostomidae, schistosomatidae and Bilharziellidae.

Keywords: mollusks, cercariae, fauna, biology, Syr Darya, Amu Darya, Zarafshan, Uzbekistan

Introduction
The gastropods are settled around the globe and have developed a wide variety of habitats: from spring streams to hot springs, from permanent to ephemeral reservoirs, from fresh to brackish waters. Widespread and ecological diversity played a decisive role in their formation as the first intermediate hosts of trematodes - animal and human parasites. The unique, in complexity, life cycles of trematodes are associated with a change in intermediate hosts and generations (Ginetsinskaya, 1968; Azimov, 1975, 1986; Combes *et al*., 19 94; Galaktionov, Dobrovolsky, 1987, 1998; Pinto *et al*., 2010, Akramova, 2011; Shakarbayev and so on, 2012, Shakarbayev and etc., 2013) [1, 13, 26, 11, 29, 23, 24]. In this context, particular importance is the role of mollusks in transmission trematodes. Cercariae developing in the mollusks of the reservoirs of the studied rivers have not been studied enough (Butenko, 1967; Nasimov, 1967; Shakhurina, Tukhmanyants, 1971; Azimov, Kabilov, 1977) [9, 18, 6, 25], and the available data are sufficiently outdated, which is confirmed by recent studies of the fauna of cercaria produced by the mollusks of the studied region (Akramova, 2011; Shakarbaev *et al*., 2013) [23].
The aim of this work was to determine the species diversity of cercariae developing in mollusks in the reservoirs of the Syr Darya, Amu Darya and Zarafshan rivers (within Uzbekistan) and assessment of the role of cercariae in the occurrence of animal trematodes and human cercarioses.

Material and methods
The work was carried out in the spring-summer and autumn periods of 2000 - 2020.in the delta and floodplain reservoirs of the Syr Darya, Zarafshan and Amu Darya, territorially covering all regions of Uzbekistan. Both natural reservoirs and artificial ponds and reservoirs were examined. 55745 copies was collected and investigated for gastropods by known hydrobiological methods (Zhadin, 1952; Starobogatov, 1970; Kruglov, 2005) [14, 19, 16]. The larval stages of trematodes were studied using parasitological techniques. Stationary studies of mollusk contamination were carried out in the floodplain water bodies of the Amu Darya - Kashkadarya, surkhandaryarivers; syrdarya - Naryn, Karadarya, Chirchik, Akhangaran; Zarafshan, its tributary - Akdarya, Karadarya; reservoirs and "Tuyabugiz" (Tashkent region) and in thesource region Nurabadsamarkand region (Fig. 1). To identify mollusks infected with trematode larvae, they wereseated one by one insmall glasses with water and the emergence of mature cercariae was observed. Measurement of cercariae was carried out on objects fixed with hot 10% formalin. Determination of cercariae was conducted by the method proposed m authors (Zdunov, 1961; Azimov, 1975; Frolov, 1975; Chernogorenko, 1983; Combes *et al*, 19. 94;

BeerVoronin, 2007; Mukherjee, 2007) [1, 6, 26].

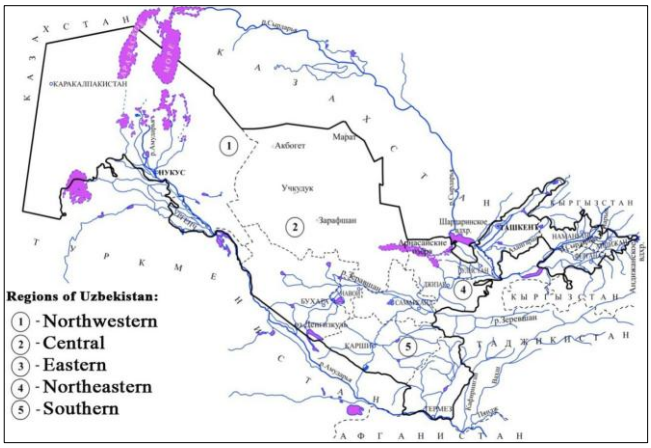

Fig 1: Place of collection of the material of thestudied region.

The biology features of cercariae (the daily rhythm of cercariae exit from the host mollusk, their taxis, life expectancy) werestudied in laboratory conditions at a water temperature of + 25- + 30^0 C.

Results and discussion

We have found that shell fish subclass and Pulmonata in reservoirs investigated rivers Presented by 16 species; of these 8 types of supplies and so on to Lymnaeidae family, 5 types- Planorbidae, 2 species- Physidae. Families of Melanoididae presented a endemic form of-*Melanoides kainarensis* starobogatov et Izzatullaev, 1980 [20] (figure 2.).

Camshaft on rouble shooting fresh water shellfish waters on the survey's territorial nd unevenly. Great and consistency of species with wasps redotochens in reservoirs of Syrdarya and Tashkent and Jizzakh regions in part, where a well-developed coastal and aquatic vegetation.

Ponds of the Lymnaeidae family are the most widely represented in the reservoirs of thesurveyed territory- 8 species. They inhabit the waters of all types and TSA p echayutsya even in the brackish lakes. Insome places, the density of their population reaches 110-130 ind. on 1m$^{2.}$

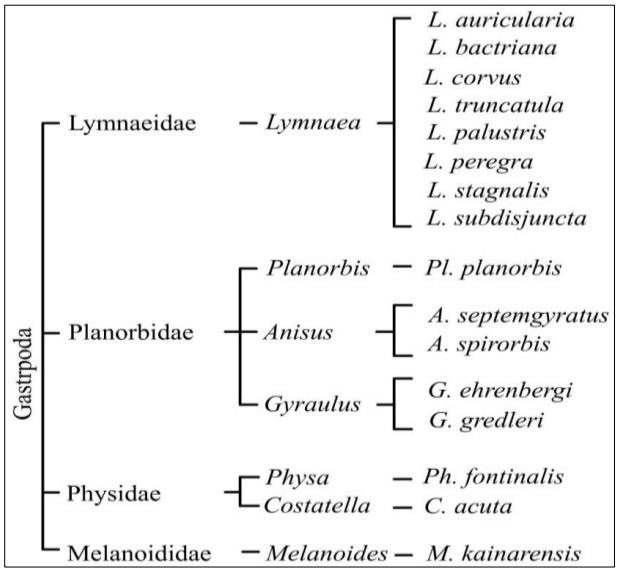

Fig 2: The species composition of mollusks in water bodies of Uzbekistan.

Family Planorbidaeprestavlenostudied in our territory 5 species referring boiling camping to leave *Planorbis, Gyraulus*and *Anisus.* These coils prefer places with clean water, estuaries andstreams, floodplain ponds and pits.Insuch reservoirs, in places their population density exceeds 35-50 ind. on 1m^2.

From the family Physidae, two species were noted - *Ph. fontinalis*and *Costatellaacuta,* which are also quite widespread. Insome places, the density of the population of physiidsis 80-100 ind. on 1m$^{2.}$

Thesmallest species diversity in freshwater biocenoses of Uzbekistan is characterized by the family Melanoididae - we found one species*M. kainarensis*only in the warmspring of thesamarkand region. Previously, DATA th kind described as a new one from thesamesource (Starobogatov, Izzatullaev, 1980) [20]. In studies sreservoirs sectional areas we observed in contaminated shellfish 27 form scercariae belonging to 12 families trematodes (Table., Figure 3.), Taxonomy have been examined according to the works (Azimov *et al.*, 2011.; Akramova, 2011) [23, 5].

Table 1: Cercari and trematodes recorded in mollusks of water bodies of Uzbekistan

No.	TypesofCercariae	Thehosts		Regions *				
		Intermediate	Final	1	2	3	4	5
1	*Faswithiolahepatica*	*L. truncatula*	Mammals	+	+	+		+
2	*F. gigantic a*	*L. auricularia*	Mammals	+			+	+
3	*Calicophoroncalicophorum*	*Pl. planorbis A.septemgyratus, A.spirorbis*	Mammals		+		+	+
4	*C. erschovi*	*Pl. planorbis The G. ehrenbergi, G. gredleri*	Mammals				+	
5	*Gastrothylaxcrumenifer*	*Pl. planorbis, The G. ehrenbergi, A.spirorbis*	Mammals	+				
6	*Liorchisscotiae*	*Pl. planorbis, A.spirorbis*	Mammals	+				
7	*Notocotylusattenuatus*	*L. auricularia, L. bactriana, L. corvus, Pl. planorbis*	Birds	+	+	+	+	+
8	*Notocotylusseineti*	*L. auricularia*	Birds			+		
9	*Echinostomarevolutum*	*L. auricularia, L. corvus, L.stagnalis, Pl. planorbis A.septemgyratus*	Birds	+	+	+	+	+
10	*Echinoparyphiumaconiatum*	*L. auricularia, L.corvus, L.stagnalis, Pl. planorbis*	Birds	+			+	
11	*E. recurvatum*	*L. auricularia*	Birds	+	+		+	
12	*Hypoderaeumconoideum*	*L. auricularia, L. corvus, L.stagnalis, L.subdisjuncta*	Birds	+	+		+	+
13	*Philophthalmuslucipetus*	*M. kainarensis*	Birds				+	
14	*Opisthioglypheranae*	*L. bactriana, L.stagnalis*	Amphibianth	+	+		+	
15	*Skrjabinoecessimilis*	*Pl. planorbis*	Amphibian		+	+	+	
16	*Pneumonoecesvariatus*	*Pl. planorbis*	Amphibian			+		
17	*Haplometracylindracea*	*L.stagnalis*	Amphibian		+		+	
18	*Sanguinicolainermis*	*L. auricularia, L. peregra*	Fishes	+	+	+	+	+

19	*Trichobilharziaocellata*	*L. auricularia, L.stagnalis, M. kainarensis*	Birds	+	+	+	+	+
20	*Bilharziellapolonica*	*Pl. Planorbis A.septemgyratus*	Birds	+	+		+	+
21	*Dendritobilharzialoossi*	*A.spirorbis*	Birds				+	
22	*Gigantobilharziaacotylea*	*A.septemgyratus, Ph. fontinalis*	Birds				+	
23	*Apatemongracilis*	*L. auricularia, L. palustris, L.stagnalis*	Birds		+		+	
24	*Cotyluruscornutus*	*L. auricularia, L. truncatula, L.stagnalis*	Birds	+	+	+	+	
25	*Diplostomumspathaceum*	*L. auricularia, L.stagnalis*	Birds	+	+		+	+
26	*D. helveticum*	*L. auriculari a, L.stagnalis*	Birds	+			+	
27	*Schistosomaturkestanicum*	*L. auricularia*	Mammals	+			+	
Total:				17	15	9	22	10

* - Regions: 1-North-West, 2-Central, 3-East, 4-North-East, 5-South.

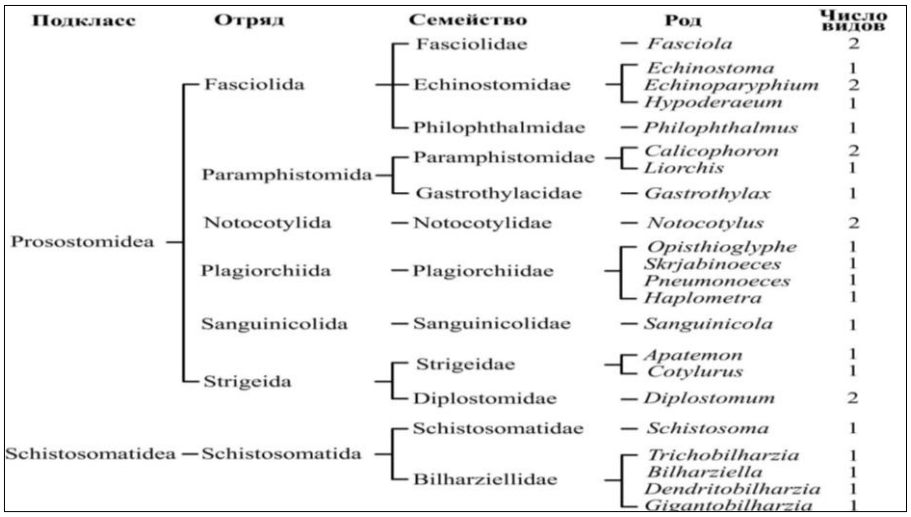

Fig 3: Taxonomic diversity of cercariae

Cercariae produced by the mollusks of this. Lymnaeidae is represented by 17 species, Planorbidae- 11 species, Melanoididae- 2 species and Physidae- one species. In othersections of the (upper and lower) course, the water body o in Syrdarya river, as wasshown earlier (Butenko, 1967; shakhurina, Tukhmanyants, 1971) [9, 25], 7 and 9 species, respectively, were recorded.

According to the diversity of fauna of cercariae of certain species of mollusks, *L. auricularia*and *Pl. planorbis*in which 14 and 10 species of larvae are registered, respectively.

Admittedly, cercariae - it is water (with a few exceptions), free-living larval trematodes, developing in shellfish, is characterized by extremely high Mop fologicheskim diversity. In essence, the appearance of the larvae is thetsya reflection morpho-biologist nical manifolds I adult trematodes - parasites OAPC about nocturnal animals and humans.

The results of ourstudiesshow that the release of cercariae from the mollusk, the host, is correlated with environmental factors. The most intense output cercariae occurs usually in bright sunny days, when the water temperature in the afternoon raised and Referring to 25-30 ^{0}C.

Emission of cercariae occurs unevenly throughout the day. It is subject to certain patterns - circadian rhythms.so, clams *of L. auricularia* produced cercaria. S*ch. turkestanic um* per day on average about 6900 copies. The most intense yield of 700 - 1200 was observed in the daytime (between 12 - 17 hours). At night, the exit of cercariae is not registered (Fig. 4).

Shellfish *Pl. planorbis*e mission Cercariae *B. polonica* occurred at a temperature of 25-30ºC. The average number of published cercariae per day was equal to 9000 copies. In the morning hours - 50-315 copies, in the daytime - 1200-2500 copies, in the evening - 112-1308 copies. (Fig. 5). The nature of circadian emission rhythms of cercariaes *ch. turkestanic um* and *Bed and. polonica*is dependent on environmental factors that stimulator slow down the processes of exit of larvae from the host organism (Markevich, Chernogorenko, 1976) [17].

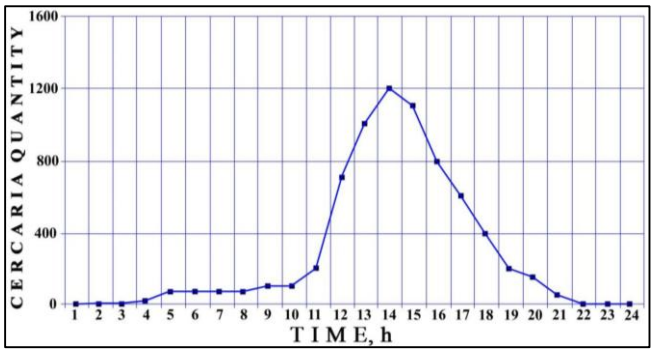

Fig 4: Daily rhythm of exit of s*chistosomatur kestanicum* cercariae from mollusk a *L. auricularia* at a temperature of 25-30 ° C (original)

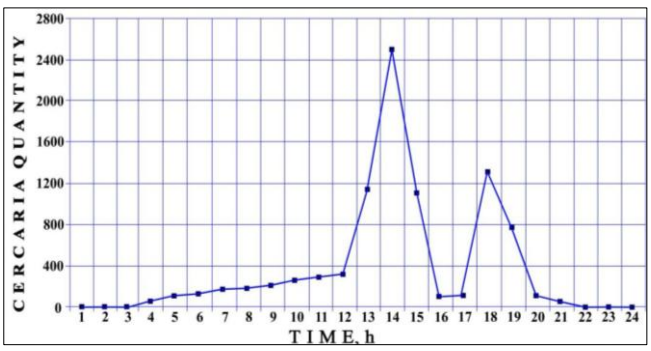

Fig 5: Daily rhythm of cercaria *Bilharziellapoionica exit* from mollusk a *Planorbisplanorbis* (original)

The daily rhythm of the exit of cercaria is broken when the light mode changes. At the optimum temperature and in conditions of constant darkness, cercariae did notstand out, and under artificial lighting and at night cercariae output was noted, but their number was insignificant.

The yield of cercariae of the trematodes under consideration is also related to the nature of their taxis. Taxis, which play an important role in the emission of cercariae from the host mollusk, should be considered as a developed adaptation to the contact of the cercariae with the definitive host (Azimov, Dadaev, 1977; Akramova, shakarboev, 2005) [6, 8].

The synchronous development of helminths and their hosts facilitates contact between partners and ensures the circulation of invasion in a particular biocenosis. The cercariae that we identified, by the nature of the search and infection (of the second intermediate and definitive) hosts, can be divided into the following three groups.

Cercariae first group encyst in the external environment, final e hosts infected by ingesting adolescaria contained in the aqueoussubstrate. These include cercariae of the families: Fas with iolidae, Paramphistomidae, Philophthalmidae and Notocotylidae.

Cercariae of thesecond group are characterized by the fact that they penetrate into the body (second intermediate hosts) - insects, fish, amphibians, etc. and turn into metacercariae. The final hosts become infected by eating thesecond intermediate hosts invaded by metacercariae. This is a large group, characteristic of the families Plagiorchidae, Echinostomidae, Diplostomidaeandstrigeidae.

The third group of cercariae, fundamentally different from previous groups. Left cercariae from the host mollusk attack and actively penetrate into the blood vessels of the final host through its integument. This includes a group of specialized trematodes that have mastered a new ecological niche (blood vessels) of cold-blooded (fish, reptiles) and warm-blooded (birds and mammals). Representatives of this peculiar group in our material are families -sanguinicolidae, Bilharziellidae and schistosomatidae.

Conclusion

The species diversity of cercariae produced by mollusks of the studied reservoirs of Uzbekistan includes 27 species of ova belonging to 22 genera, 15 families and 7 orders. Cercariae were recorded in 15 species of mollusks: Lymnaeidae- 8 species, Planorbidae- 5, Physidae- 1 and Melanoididae- 1. Infection of these mollusks ranged from 0.1-12.6%. Cercariae species *Trichobilharziaocellata*, *Bilharziellapolonica*, *Gigantobilharziaacotylea*, *Dendritobilharzialoossi*, (Bilharziellidae) and *schistosomaturkestanic um* (Schistosomatidae) may' scallswimmer's itch's person.

Foci corresponds to out their cercariae groups in different types of reservoirs are sustainable. The potential risk of infection of animals and humans with individual trematodes is very high. In this regard, continuous monitoring of the mollusk invasion of aquatic biocenoses by trematodecer cariaedeserves special attention in order to develop and improve the system for the prevention of dominant animal trematodoses and human cercarioses.

References

1. Azimov DA. Schistosomatids of animals and humans. - Tashkent: Fan (Science), 1975, 152.
2. Azimov DA. Trematodes are parasites of animals and humans. - Tashkent: Mehnat, 1986, 128.
3. Azimov DA, Kabilov T. On the fauna of cercariae of trematodes in Uzbekistan // Doklady ANs SSR. 1977; 11:66-69.
4. Azimov DA, Akramova FD, shakarboev EB. Trematodes of the order schistosomatida: origin and evolution // Theoretical and practical problems of parasitology. - Moscow, 2010, 9-14.
5. Azimov DA, Akramova FD, Shakarboev EB. Justification of a new schistosomatideasub class in the trematodeclass system (Platyhelminthes, Trematoda) // Reports of the Academy of sciences of the Republic of Uzbekistan. - Tashkent,.-№4. –WITH, 2011, 75-78.
6. Azimov Dadaevs DA. Daily biological rhythms of emission of cercaria // DAN RUz. 1977; 5:67-69.
7. Akramova FD. Trematodes of bilgarciellids, their origin and evolution: Abstract. dis.... doctor. biol.sciences. - Tashkent, 2011, 46.
8. Akramova FD, shakarboev EB. Morphological features of the trematodes *Bilharziellapoionica* (Kowalewsky, 1895) // Vestnik Fer SU. Ferghana. 2005; 3:12-15.
9. Butenko YuV. Infection of mollusks of water bodies of southern Kazakhstan with trematode larvae // Helminths and helminth infections of animals of Kazakhstan. Satscientific Proceedings of the Academy of sciences of the KazakhsSR. - Alma-Ata, 1967, 22-52.
10. Beers A, Voronin M. Cercariosis in urban ecosystems. - Moscow: Nauka, 2007, 240.
11. Galaktionov KV, Dobrovolsky AA. Hermaphroditic generation of trematodes. - Leningrad: Nauka, 1987, 192.
12. Galaktionov KV, Dobrovolsky AA. The origin and evolution of the life cycles of trematodes. -s. Petersburg: Nauka, 1998, 403.
13. Ginetsinskaya TA. Trematodes, their life cycles, biology and evolution. - Moscow: Nauka, 1968, 411.
14. Zhadin VI. Shellfish of fresh and brackish waters of the USSR // Keys to the fauna of the USSR, published by zool. in - volume of the Academy of sciences of the USSR. 1952; 46L:376.
15. Zdun VI. Trematode larvae in prisnovodn u x clam i in Ukra i no. - Kiev: species of the Academy ofsciences of the Uralsovietsocialist Republic, 1961, 143.
16. Kruglov ND. Shellfish of the pond family (Lymnaeidae, Gastropoda, Pulmonata) of Europe and North Asia. - smolensk: Publishing House ofs SPU, 2005, 507.
17. Markevich AP, Chernogorenko MI. The daily rhythm of the emission of cercariae as a result of their relationship with the owners and the dependence of the latter on abiotic environmental factors // In: II All. Symposium on Diseases and Parasites of Aquatic Invertebrates. - Leningrad: science, 1976, 47-49.
18. Nasimov H. Larvae of trematodes of freshwater mollusks ofsamarkand and Bukhara regions of the Uzbeks SR.: Author. Dis. cand. Biol. Sciences. -Samarkand, 1967, 27.
19. Starobogatov YI. Fauna of mollusks and zoogeographic zoning of continental bodies of water of the globe. - L.: science Len. Otdel, 1970, 250.
20. Starobogatov YI, Izzatullaev ZI. Mollusks of the family Melanoididae (Gastropoda, Pectinibanchia) of Central Asia and adjacent territories // Zoological Journal, Science. 1980; 1:P23-31.
21. Rolova FEN. Larvae of trematodes in mollusks of lakes ofsouthern Karelia. - L, 1975, 182.
22. Chernogorenko M.I. Larvae of trematodes in mollusks of

the Dnieper and its reservoirs (fauna, biology, patterns of formation). - Kiev: Naukova Dumka, 1983, 209.
23. Shakarboev EB, Akramova FD, Azimov DA. Trematodes are parasites of vertebrates in Uzbekistan. - Tashkent, 2012, 216.
24. Shakarbayev UA, Safarova FE, Akramova FD, shakarboev EB, Golovanov VI, Azimov DA. Cercariae of trematodes developing in mollusks of the family Lymnaeidae Rafinesque, 1845 reservoirs of Thesyr Darya River // Russian Parasitological Journal. – Moscow. 2013; 4:30-33.
25. Shakhurina EA, Tukhmanyants AA. Parasitic animal worms in the Ferghana Valley. Part II. Larval forms of trematodes from mollusks of the Ferghana Valley. - Tashkent: Fan, 1971, 117-145.
26. Combes C, Fourmer A, Mohe H. Theron A. Behvior in trematodecercaria that enchavce parasite transmission patters and pracesses parasitology // Parasitology. 1994; 109:3-13.
27. Dawes B. The Trematoda with special reference to British and other European forms. Cambridge, 1946, 1-644.
28. Mukherjee RP. Fauna of India and the adjacent countries. Part - III. Larval trematodes. Distome furcocercous cercariae - Koikata: Zoologicaisurvey of India, 2007, 1-157.
29. Pinto HA, Melo AL. *Melanoidestuberculata* as intermediate host of *Philophthalmusgralli* in Brazil // Rev. Inst. Med. Trop. –sanPaulo. 2010; 52(6):323-327.