



FAUNA, ECOLOGY AND TAXONOMY OF CYPRINIFORMES FISH HELMINTHS IN UZBEKISTAN

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ABSTRACT

The purpose of the research was to study helminthofauna of fish *Cypriniformes* order in comparative aspect in artificial and natural water bodies and the clarification ways of formation of faunal assemblages and development of scientific bases of prevention of helminthiasis of fish. An extensive and systematic research of helminthofauna of fish water bodies of the order *Cypriniformes* of the northeast of Uzbekistan has realized and taxonomic and faunal analysis of detected parasites has also been carried out. Fauna of parasitic worms of *Cypriniformes* in ponds of diverse Syrdarya river shows 49 species, 18 species belongs to the class *Trematoda*, *Cestoda* class represents 13 species, class *Acanthocephala* 4 species and the class *Nematoda* 14 species. Analysis of biological properties and ecological specialty of *Cypriniformes* parasitic worms allows three types of helminth communities: 25 species parasitizing *Cypriniformes* as definitive hosts; 19 species parasitizing as intermediate hosts and 6 species parasitizing as a reservoir (paramontic) hosts. *Diocotylome renale* was registered first time in roach for the water bodies of the Syrdarya river. Ordinary carp, in our research, according to as host a new host *Nematode* of the *Raphidascaris acus* larvae. On the basis of factual data the environmental factors of the quantitative and qualitative composition of cyprinids helminthofauna in the northeast of Uzbekistan is reported.

Keywords: Helminths, trematode, cestode, nematode, acanthocephale, parasite fauna, ecology, taxonomy

INTRODUCTION

Helminths are certainly one of the most popular objects of study of the fauna of the Syrdarya River Basin. The Syrdarya River Basin is a natural geographic complex cross-border area, in which there is a variety of environmental conditions ponds. Currently, the Syrdarya basin has a high number of large reservoirs complexes that use hundreds of thousands hectares of area. Reservoirs are a new type of water bodies, characterized by specific and ecological conditions (Majumder et al., 2015; Cusey et al., 2014; Jahantab et al., 2014). Due to intensive human activities related to the use of water resources, substantial qualitative and quantitative changes of biocenosis and the fish community has undergone. This inevitably of parasitic fish diseases leads to a decrease in the number of valuable species and the deterioration of the epizootic situation reservoirs. Parasitic diseases of fish not only cause significant economic losses associated with a decrease in fish productivity, but they are dangerous also to human health (Lopes et al., 2011; Osmanov 1975a). Information on the fauna of fish helminths in the region are reflected in various studies (Artamoshin et al., 1990; Osmanov, 1975a; Karimov, 2007). To date, data from previous researchers significantly out of date, confirmed recent resumption of studies helminths of fauna of the region (Safarova et al., 2014; 2015). Based on the above it is actually a detailed study to ichthyic-parasitological of the current state of helminth communities of their distribution within the various pools: The purpose of this study was to study of the helminthofauna of fish of the order of *Cypriniformes* in artificial and natural waters.

MATERIAL AND METHODS

Stationary studies were conducted in the period 2009-2014 in the water bodies of the Syrdarya basin (the Syrdarya River, the Chirchik River, Aydar-Amasay lake system, Tuyabuguz reservoir and fish farms, "Balikchi", "Damachi" and

"Tashkent fish farm"), in Syrdarya, Tashkent and Djizakh region. Collection and study of helminths of fish were conducted using appropriated methods described by Jenkins et al. (1965) and Bykhtovskaya-Pavlovskaya and Sheherbina (1985). In the study 2527 individuals of 15 species of *Cypriniformes* (*Cyprinidae* – 12, *Cobitidae* – 3) were analyzed. Besides, we carried out incomplete dissections of 1407 fish individuals and prepared 1561 temporary and permanent whole mounts. The camera treatment and identification of *Trematoda* species was carried out at the Laboratory of General Parasitology of the Institute of Gene Pool of Plants and Animals of Uzbek Academy of Sciences. Helminth species were identified by using the Reference Guide of Freshwater Fishes (Tonguthai, 1997; Ieshko et al., 2012; Shigin, 1986; Khokhlova, 1986) and the Catalogues (Pugachev, 2002). The studies were conducted using a microscope type Olympus CK 2 (Olympus, Japan). The preparations were examined under the microscope LOMO MBI-3 and MBI-4 (Carl Zeiss, Germany), while the drawings were produced using the drawing tubes RA-4 and RA-5.

RESULTS AND DISCUSSION

Results of study detected, that the helminths of *Cypriniformes* from the basin of the Syrdarya (within Uzbekistan) currently present 49 species: 18 species of class *Trematoda*, 13 of *Cestoda*, 14 of *Nematoda* and 4 of *Acanthocephala* (Table 1). Class *Trematoda* represented in the studied basin 18 species belonging to the 5 orders and 9 families. The most numerous representatives were from order *Sirigeida*. For class *Cestoda* representatives of the four orders – *Caryophyllida*, *Pseudophyllida*, *Proteocephalida* and *Cyclophyllida* were detected in the investigated region. There are 13 species found for *Cypriniformes*. The most widespread are the families *Caryophyllaeidae* (Leuckart, 1878) and *Dilepididae* (Fuhrmann, 1907) with four species each.

Table 1 Taxonomic composition of helminths parasitizing *Cypriniformes* in the studied region

This study also reports a corresponding view for the species of *Parotocacium* and *Contraocacium*. The second type is characterized by the fact that some species of *Cypriniformes* are the second intermediate hosts for nineteen helminth species: 12 *Trematodes*, 2 *Cestodes* and 5 *Nematodes*. Definitive hosts (predatory fish, fish-eating birds and mammals) are infected consuming *Cypriniformes* fish infected by helminth larvae.

Participation of *Cypriniformes* as paratenic hosts in the transmission of the considered helminths is in many respects questionable. Nevertheless, *Cypriniformes* were previously noted as paratenic hosts (Dorovskikh and Stepanov, 2014). According to our findings, they are noted for two *Nematoda* species of the genera *Desmidocerella* and *Gnathostoma*, which should be assigned to the third type. Our results also confirm that *Cypriniformes* in the studied region promote the circulation of a number of *Cestoda*, *Trematoda*, *Nematoda* and *Acanthocephala* species in predatory fishes, birds and mammals (Table 3).

Distribution of helminths of *Cypriniformes* in some parts of the Syrdarya River basin is not equivalent. The optimal conditions for the functioning of the communities of helminths obviously represented in the reservoirs of the middle reaches, where 49 species of parasites were recorded. In the 60 years of the last century, in this region have been reported 20 species of helminths (Osmanov 1975b). In other parts of the Syrdarya significantly fewer species were noted, 25 – in the lower reaches (Artamoshin et al., 1990) and 10 – in the headwaters (Spasskii, 1987; Gehring et al., 2014).

CONCLUSION

Results of this research show that the qualitative and quantitative distribution of *Cypriniformes* helminths in water bodies of the basin of the Syrdarya River is very uneven. The greatest diversity of species is characterized by well warmed water bodies in coastal parts of the river. There are optimal conditions for the development of *Cypriniformes* parasites that attract birds and mammals involved in the circulation of helminths. The life cycle of *Capillaria tomentosa* is studied insufficiently. Possible participation of *Oligochaeta* in the life cycle of *Nematodes* require additional studies. Species diversity of *Cypriniformes* helminths in the investigated region is rich enough and stable functions in water biocenosis. The parasitic worms include 49 species of *Cypriniformes*: 18 species of *Trematoda*, 13 of *Cestoda*, 14 of *Nematoda* and 4 of *Acanthocephala*. Among the species mentioned most common pathogenic representatives are those of the family *Sanguinicolidae*, *Diplostomidae*, *Bothriocephalidae*, *Ligulidae* and *Anisakidae*, which a negative effect on the development of hamper the fishing industry. This fact dictates conduct of involves constant monitoring of ichthyoparasitological situation in specific natural and artificial water bodies of Uzbekistan.

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