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CURRENT STATUS OF STUDYING THE PARASITE FAUNA OF FISH IN THE LOWER REACHES OF THE AMUDARYA RIVER

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ANNOTATION

The article discusses changes in the parasite fauna of some fish species in the lower reaches of the river. Amu Darya. The latest data on the parasite fauna of 4 species of indigenous commercial fish of the lower reaches of the river are presented. Amudarya in the conditions of a degraded natural environment (2014-2019). The depletion of the fauna of ichthyoparasites under the influence of the ongoing anthropogenic pressure and its causes is shown. Species of parasites with constant high infection and pathogenic forms, which are potential pathogens of fish diseases and extreme environmental conditions of the region, are indicated.

KEYWORDS: parasite fauna, commercial fish, anthropogenic press, Amudarya delta.

INTRODUCTION

The Amudarya River, after the Volga River, ranked second in size, productivity and biodiversity. The decrease in the natural flow of water into the delta of the Amudarya River and the Aral Sea began in the second half of the 20th century. In recent years, the withdrawal of water from the Amu Darya for irrigation has significantly changed the natural conditions in the middle and lower reaches of the river.

In the lower reaches of the river Many fresh lakes dried up in the Amu Darya and new reservoirs were formed due to waste collector-drainage waters, highly mineralized (1.5-5 mg/l), contaminated with mineral fertilizers, herbicides and pesticides residues. They formed completely unacceptable environmental conditions for hydrobionts.

As a result, in the reservoirs of the lower reaches of the river. In the Amu Darya, the number of aquatic organisms decreased from year to year, mainly fish and forage aquatic invertebrates, which acted as intermediate hosts for many helminths. And also of particular importance is the visit of water bodies by semiaquatic birds, which are the final hosts of a number of fish parasites.

Currently, measures are being taken in the Republic of Karakalpakstan to restore and increase the fish stocks of inland waters through the creation of lake-commodity farms. A set of measures is being implemented, including the fight against dangerous parasites and diseases of fish, which determines the need to study the ichthyoparasitological situation in the reservoirs of the lower reaches of the river. Amudarya in the changed ecological conditions.

MATERIALS AND METHODS

For the study, we selected fishing water bodies of the mouth zone of the river. Amudarya, located in the center of the region of the Aral ecological crisis. Parasitological materials were collected in 2014-2019. in the Muynak and Sarybas bays of the sea, as well as in the Shegekul and Makpalkul lakes. By the method of complete parasitological dissection (Dogel, 1993 Bykhovskaya-Pavlovskaya, 1985), 4 fish species were studied. Their species composition and quantity are given in the relevant sections.



DISCUSSION RESULTS

In the course of a study in the lower reaches of the Amu Darya River, 54 species of parasites were found in 4 fish species, belonging to the following groups: sporozoans (1 species), myxosporidia (4), ciliary (2), monogeneans (16), cestodes (5), trematodes (13), nematodes (7), leeches (1) and crustaceans (5). Changes in their parasitic fauna under the new ecological conditions of the South Prearalie are considered below (Table 1).

Table 1

Data on the parasite fauna of fish in the lower reaches of the river. Amudarya (2014-2019rr.)

Parasite group	Rudd	Bream	Golden carp	common carp
Flagellates	-	-	-	-
spores	-	-	-	1
Myxosporidium	1	1	-	2
microsporidia	-	-	-	-
Eyelash	-	-	-	2
Monogeneans	1	4	7	4
Cestodes	-	1	1	3
Trematodes	2	5	3	3
Nematodes	2	2	1	2
leeches	-	-	-	1
shellfish	-	-	-	-
Crustaceans	2	1	1	1
Total	8	14	13	19

Rudd-Scardinius erythrophthalmus (Linne). Examined in lakes in the amount of 31 specimens. The total infection rate was 93.5%. In these fish, 8 species of parasites were found, belonging to myxosporidium (1 species), monogeneans (1), trematodes (2), nematodes (2) and crustaceans (2). The total invasion was 93.5%. A highly extensive infection with a specific monogenea - *Dactylogyrus difformis* (75-80%) and metacercaria *Diplostomum spathaceum* (46.6-50%) was noted. Other species are recorded rarely and in small numbers. Half of the parasites recorded in the rudd have a complex development cycle.

If in the middle of the 20th century parasites of 11 systematic groups were found in the rudd, then at present representatives of only 5 groups parasitize it. Under the new conditions, the species composition of rudd parasites decreased by 4.5 times.

Bream-Abramis brama orientalis Berg. 49 specimens were discovered: in the Sarybas Bay-15, lakes Shegekul 16 and Makpalkul-18. The total infection was 88.0%. The studied individuals were infested with 14 species of parasites related to myxosporidium (1 species), monogeneans (4), cestodes (1), trematodes (5), nematodes (2) and crustaceans (1). Among them, 8 species (57.1%) develop with the participation of intermediate hosts. Specific species include monogeneans parasitizing on the gills of bream - *Dactylogyrus wunderi* (86.6-90%), *d zandti* (45.5-56.2%) and *Diplozoon paradoxum* (27.2-33.3%). In the parasite fauna of the bream, a large place is occupied by species that are also widespread in other cyprinids. Among them, at low intensity, metacercariae-*D spathaceum* (20-83.3%, eyes) and the nematode *Contracacum microcephalum* (55.5-66.6%, intestines) were more common. In the extreme conditions of the lower reaches of the Amudarya River, the species composition of bream parasites decreased by 17 species (54.8%), i.e., 2.2 times.

Crucian-Carassius auratus gibelio (Bloch). 44 specimens were opened: in lakes Shegekul 16 and Makpalkul 28. The total infection was 95.4%. In crucian carp, 13 species of parasites have been noted, including monogeneans (7 species), cestodes (1), trematodes (3), nematodes (1) and crustaceans (1), which have a wide range of hosts. More than half (53.8%) of carp parasites are monogeneans, which are not specific to this host. The number of parasites with a



complex development cycle is slightly more than a third (38.4%). The parasite fauna of crucian carp has changed relatively little. The crucian lost 2 species of cestodes, 1 species of trematodes and crustaceans each, and gained 5 species of *dactylogyrus* (*D. formosus*, *D. baueri*, *D. inexpectatus*, *D. dogieli*, *D. arcuatus*).

Carp - *Cyprinus carpio* Linne. Investigated in all bays and lakes, 71 specimens unearthed. The overall infection rate is high (91.5%). The parasite fauna of carp in comparison with other fish species is quite numerous - 18 species: coccidia (1 species), myxospores and ciliates (2 each), monogeneans (4), cestodes and trematodes (3 each), nematodes (2), leeches and crustaceans (by 1). Among carp parasites, specific species of coccidia predominate - *Eimeria carpelli* (46.6-77.7%), monogeneans *Dactylogyrus extensus* (86.6-100%), *D. anchoratus* (40.0-72.2%) and widespread metacercariae *D. spathaceum* (53.5-80.0%) from trematodes. The monogenean *Cyrodactylus medius*, characteristic of this host, was also found in small quantities. Often there is an intestinal nematode *C. microcephalum* (33.3-55.5%), which is also recorded in other fish.

Other species of carp parasites have a wide range of hosts and are found in small numbers. Among carp parasites, 57.9% of species have a direct development, 42.1% - a complex cycle of development. Previously, among the native fish of the region, carp had the richest parasite fauna (49 species), consisting of 12 groups: flagellates, coccidia, microsporidia (1 species each), myxosporidium (6), leeches (2), molluscs (1) and crustaceans (5). Only 4 species of monogeneans out of 10 previously noted species have been found so far. In recent studies, 4 species of myxosporidium, nematodes, crustaceans, 3 species of ciliary and trematodes, 2 species of cestodes were not found either. *Flagellates*, *microsporidia* and mollusks have generally fallen out of the fauna of carp parasites. Common carp lost about 2/3 (61.3%) of parasite species, mainly due to developing with the participation of intermediate hosts.

CONCLUSIONS

Based on the results of these studies (2014-2019). in the lower reaches of the river Amu Darya, 55 species of parasites were registered in 4 fish species. In general, the parasite fauna of the studied fish became 4.7 times poorer.

The qualitative and quantitative composition of the parasite fauna largely depends on the frequency of occurrence of the host itself. The high abundance of the host provides the possibility of contact even with rare species of parasites (Dogel, 1962). In the studied region, as a result of the anthropogenic pressure, the number of fish decreases from year to year. Apparently, this is the main reason for the weak infection of fish with many types of parasites.

According to our data, carp (18 species) and crucian carp (16 species) have a relatively rich fauna of parasites. This indicates that the abundance of these fish in the water bodies of the region remains more or less stable.

The fish studied by us did not have ectoparasites - parasitic protozoa, leeches, larvae of mollusks and parasitic crustaceans, or a low invasion by these parasites was noted, which is associated with a change in the hydro chemical regime, primarily increased mineralization. The chemical composition of water also regulates the composition and abundance of food invertebrates, in which the larval stages of many fish helminths parasitize.

Under the extreme conditions of the region, the number and species composition of planktonic and benthic organisms eaten by fish have decreased.

It is especially important to note that under extreme environmental conditions, the studied fish retained a consistently high infestation with certain species, in particular, parasitic on the gills and metacercariae (*D. spathaceum*, *T. clavata*).

Flagellates (5 species), microsporidia (1 species), leeches (2 species), and mollusk larvae (1) have disappeared from the parasite fauna of the studied fish.

Among the recorded species of fish parasites, parasitic protozoa are pathogenic *Eimeria carpelli*, *Myxobolus pseudodispar*, *Ichthyophthirius multifiliis*, *Trichodinella epizootica*, *Dactylogyrus extensus*, *Caryophyllaeus fimbriceps*, *Bothriocephalus opsarichthydis*, *Gryporhynchus pusillum*, *D. spathaceum*, *Posticcarhophioplodicus*, nematode trematodes *Contracaecum microcephalum*, leeches *Piscicola geometra*, crustaceans *Ergasilus sieboldi*. These types of parasites can be considered as potential pathogens of fish diseases in our region. If favorable conditions



arise for their development in a short time, they can cause an outbreak of diseases in fish. Particularly dangerous are representatives of specific species of dactylogyrus and widespread diplostomatids, for which a high intensity of infection is constantly recorded.

Thus, in order to develop measures to combat fish parasites, it is necessary to have actual data on their bioecological characteristics at the population level, since this is a topical issue for parasitological studies in the region.

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