

VETERINARY SCIENCES

COMMON CARP MONOGENIA IN RESERVOIRS OF THE ODESA REGION (UKRAINE)

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Abstract

The article presents data on the distribution of *Dactylogyrus* and *Gyrodactylus* in common carp, which depends on the nature of the reservoir and the age of the fish. The highest extensity of damage to carp *Dactylogyrus* and *Gyrodactylus* was recorded in Lake Yalpug (42.7%), while in the mouth of the Dniester River it was only 25.4%. In closed reservoirs of the Odesa region (Khadzhibey estuary and Lake Yalpug), *Dactylogyrus* was most frequently recorded in two-year-old carp with extensiveness indicators of 64.3 and 62.1%, while in the Dniester River the highest extent of invasion was in three-year-old carp (57.9 %). *Gyrodactylus* was most frequently recorded in three-year-old carp from all reservoirs with a lesion rate of 58.9% to 67.5%.

Keywords: common carp, monogenias, distribution, extensiveness, intensity

Outbreaks of fish diseases are the most devastating problem for aquaculture production. Many freshwater fish species are severely affected by various parasites, resulting in high fish mortality and reduced aquaculture productivity and negative economic impacts [1].

In some aquatic ecosystems, parasites can constitute a significant proportion of the total biomass, exceeding the biomass of even top predators in salt marsh estuaries and insects in freshwater ponds [2, 3].

Because fishing reduces fish density, selectively removing large fish, fishing can be expected to reduce the efficiency of both direct and indirect parasite transmission and, as a result, reduce the abundance of fish parasites [4].

Parasites can also influence the strength of bonds between their hosts and other species, affecting host growth, survival, behavior, reproductive investment, and competitive ability. Fish from relatively pristine waters tended to have more parasite species, higher prevalence, and higher numbers of parasites than fish from heavily fished lakes [5].

The epizootic situation in pond fish farming of Ukraine is characterized by a significant spread of helminthiasis (diplostomosis, dactylohyrosis, hydrodactylosis, cavirosis, caryophyllosis) and crustaceans (ergasillosis, synergasillosis, lerneosis, argulosis). At the same time, the intensity of invasions is usually low, and clinical manifestations of diseases are not always observed. At the same time, the presence of these pathogens in the fauna represents a serious danger for the development of valuable commercial fish species, such as carp, white grass carp, etc. [6].

Gyrodactylus birmani and *Caryophyllaeus fimbriiceps* were recorded the most in the deep pond of Akvarest LLC of the Odesa region with the extensity of invasion of 25.7% in two-year-old carp and two-year-old white carp - 21.4%. In the shallow reservoir of "Aquacity" LLC, *Gyrodactylus birmani* (31.4%) and *Caryophyllaeus fimbriiceps* (25.7%) were most recorded in

two-year-old carp, and in two-year-old white carp *Khavia sinensis* (28.5%) and *Caryophyllaeus fimbriiceps* (32.1 %) [7].

In the natural environment, fish parasites are usually in balance with their hosts. Mass kills of fish were frequently reported in Turkey, but were usually attributed to pollution alone as the only acceptable anthropogenic stressor [8].

При дослідженні риб у водоймах Туреччини виявлено 79 видів паразитів: Protozoa (14 видів), Monogenea (12), Digenea (15), Cestodes (8), Crustacea (1), Isopoda (7), Copepoda. (4), Nematoda (8), Bivalvia (1), Acanthocephala (5), Hirudinea (1) і Myxosporidia (3) [9].

A study was conducted in Bangladesh on the prevalence of protozoan and monogenean parasites in fish (*H. molitrix*, *C. idella*, *C. carpio*, *B. gonionotus*, *C. catla*, *L. Rohita* and *C. cirrhosis*). The most common ectoparasite was *Dactylogyrus catlarius* in *H. molitrix* (39.44%) and in *C. catla* (36.17%). *Dactylogyrus extensus* was recorded in *C. carpio* (72.92%) and *L. rohita* (28.12%) [10].

Crafford D. et al. recorded an increase in the prevalence of *Dactylogyrus* with increasing temperature [11]. According to Zhang X., the development of dactylohyrids depends on the water temperature and their eggs do not hatch at a temperature below 5 °C [12].

Monogenea have a narrow range of hosts and often do not cause pathogenic problems in nature. However, under favorable aquaculture conditions, monogeneans can become pathogenic for their hosts. Therefore, information on the presence of parasite diversity, seasonal variation and host size dependence will be useful to understand their biology and thus to prevent possible problems that may arise from Dactylogyrid infection. Fish parasites, as biomonitor species, can be used to determine the pollution of fresh water bodies in the future.

The purpose of the work: to find out the influence of aquaculture and the age of fish on the distribution of monogenic parasites in the Odesa region.

Materials and methods. In 2023, 960 specimens of two- and three-year-old carp *Cyprinus carpio* caught in the mouth of the Dniester River (244 specimens), Khadzhibey estuary (306 specimens) and Lake Yalpug (410 specimens) of the Odesa region were studied.

A magnifying lens was used to detect monogenean parasites on the outer surface of fins, skin, and gills. Scalpel blades were used to obtain scrapings from gills, skin and fins for examination of attached parasites. These scrapings were transferred to clean microscopic slides to prepare wet smears, which were examined under a stereomicroscope. The gill arches were excised with surgical scissors and then placed in Petri dishes for

microscopic examination. Similarly, from the base of each fin, pieces of the fin were placed on glass slides, covered with coverslips, and then observed under a binocular microscope. Monogenean parasites were identified using sclerotized structures (anchor, transverse band, rudimentary ventral band, hooks and male copulatory organ) [13].

The monogenic parasites under study were identified using standard keys [14, 15].

Research results. A total of 960 specimens of *C. carpio* were examined, of which 244 specimens from the mouth of the Dniester River, 306 specimens from Khadzhibey estuary and 410 specimens from Lake Yalpug. Two species of monogenias were identified – *Dactylogyrus* (Fig. 1) and *Gyrodactylus* (Fig. 2).

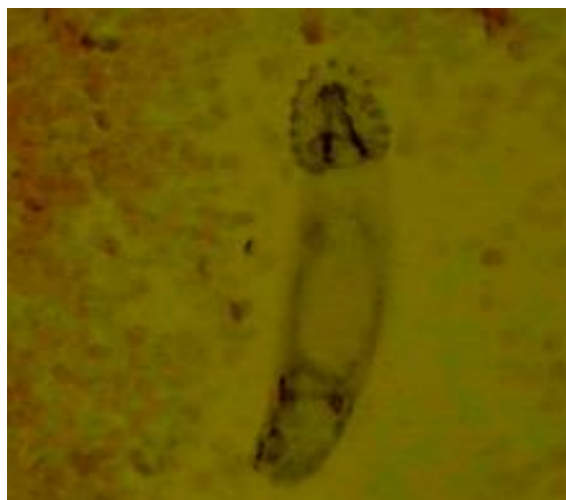


Fig. 1 *Gyrodactylus* on the fins of a carp

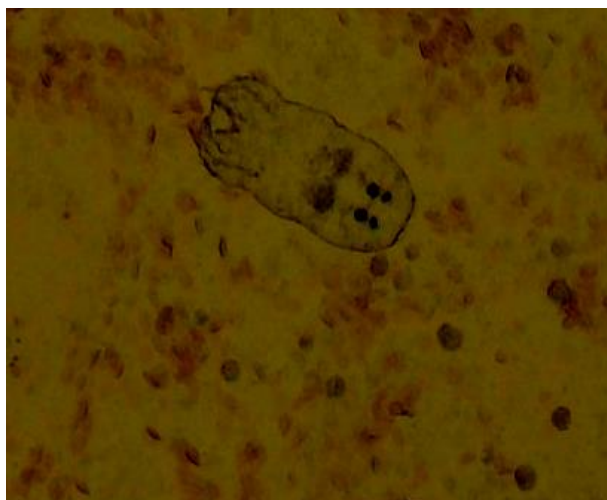


Fig. 2 *Dactylogyrus* on carp gills

The total invasions of fish by monogenias *Dactylogyrus* and *Gyrodactylus* in these reservoirs was 32% (Table 1).

The level of infection with monogenias of carp from Lake Yalpug amounted to 42.7%, from the Khadzhibey estuary - 31.9%, from the mouth of the Dniester River - 25.4%.

Table 1.

The level of infection with monogenia in water bodies of the Odesa region

Reservoirs	Observed Parasites	Number	Infection Rate
Mouth of the Dniester River	<i>Dactylogyrus</i>	38	25.4
	<i>Gyrodactylus</i>	40	
Khadzhibey estuary	<i>Dactylogyrus</i>	42	31.9
	<i>Gyrodactylus</i>	56	
Lake Yalpug	<i>Dactylogyrus</i>	58	42.7
	<i>Gyrodactylus</i>	73	

Three-year-old carp from the mouth of the Dniester River were infested with *Gyrodactylus* (67.5%) with an intensity of 9 to 13 specimens/fish and *Dactylogyrus* (57.9%) with an intensity of 6-8 specimens/fish. The intensity of infestation in two-year-old carp was 35% and 15.8% less, respectively (Table 2).

Table 2.

Age dynamics of the distribution of monogenias in fish in water bodies of the Odesa region							
Reservoirs	Observed Parasites	Two-year-old carp			Three-year-old carp		
		Number	Percentage of cases, %	Intensity, specimens	Number	Percentage of cases, %	Intensity, specimens
Mouth of the Dniester River	<i>Dactylogyrus</i>	16	42.1	3-5	22	57.9	6-8
	<i>Gyrodactylus</i>	13	32.5	9-11	27	67.5	9-13
Khadzhibey estuary	<i>Dactylogyrus</i>	27	64.3	6-8	15	35.7	6-9
	<i>Gyrodactylus</i>	21	37.5	13-17	35	62.5	12-15
Lake Yalpug	<i>Dactylogyrus</i>	36	62.1	4-7	22	37.9	5-8
	<i>Gyrodactylus</i>	30	41.1	11-13	43	58.9	7-9

In two-year-old carp from the Khadzhibey estuary, dactylohyrosis was recorded (64.3%), and in three-year-old carp - hyrodactylosis (62.5%). The intensity of infestation was much higher and ranged from 6 to 15 specimens/fish. Whereas, in two-year-old carp from Lake Yalpug, *Dactylogyrus* (62.4%) was recorded the most, and in three-year-old - *Gyrodastylus* (58.9%), but the intensity of invasion was in the range from 4 to 13 specimens/fish.

Conclusions.

1. The distribution of monogenias depends on the nature of the reservoir and the age of the fish. The highest extent of damage to carp by monogeneans *Dactylogyrus* and *Gyrodastylus* was recorded in Lake Yalpug (42.7%), while in the mouth of the Dniester River - 25.4%.

In the closed reservoirs of the Odesa region (Khadzhibey estuary and Lake Yalpug), *Dactylogyrus* was mostly recorded in two-year-old carp with indicators of 64.3 and 62.1%, while in the Dniester River the highest extent of infestation was in three-year-old carp (57.9%). *Gyrodastylus* monogenia was most frequently recorded in three-year-old carp from all reservoirs with a lesion rate of 58.9% to 67.5%.

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