

## **PARASITOSIS ON THE CULTURED FISH IN ANTHROPIC AQUATIC ECOSYSTEMS IN THE GALATI COUNTY**

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**Abstract.** In what regards the intensive and super-intensive aquaculture, parasites are often the cause of severe illness manifestations. The presence of some dense fish populations, maintained in specific medial conditions, can be favourable for the growth of some parasites species and also can trigger the development of severe illnesses which can lead to a high mortality ratio, with negative aspects on the aquaculture production. The present paper reveals the evaluation of the cultured fish parasitological conditions, from the ecosystems in the Galati county, from the point of view of the illness degree caused by the various parasitosis. Thus, the researches were oriented as to underline the parasitosis which affects fishes in anthropic aquatic ecosystems such as Brates and Vladesti, the spreading area and their evolution.

*Keywords:* parasitosis, anthropic aquatic ecosystems, cultured fish.

### **AIMS AND BACKGROUND**

In aquaculture, as in any sector where it is working with living organisms, obtaining control of the biomass production is organically conditioned by knowing and maintaining unaltered the fish health. To achieve this knowledge use is made of certain specific physiological and biochemical indicators. In the light of these indicators, a practitioner can assess the extent to which he applied adequately or not the growth of technological norms. It thus becomes possible maintaining stocks outside stressful incidents, both in terms of nutrition and other elements of the eco-physiological comfort: density, flow, health, etc.<sup>1</sup>

In these circumstances, in aquaculture, improved health of aquatic organisms that are growing is one of the guarantees of profitability of this activity and obtaining proper food for human consumption.

Because the diseases are limiting factors of fishery production, by slowing the rate of increase and decrease in the nutrition value and by the death they can cause, knowledge of disease in fish is of particular importance.

The research subject was the basic species of juvenile fish bred in the farms of Brates and Vladesti, respectively the juvenile of the cyprinids such as carp (*Cyprinus carpio* L.), silver carp (*Hypophthalmichthys molitrix* V a l.), bighead carp (*Aristichthys nobilis* R i c h.) and grass carp (*Ctenopharyngodon idella* V a l.).

The fish from winter ponds, reproduction and growth pools, summer I and summer II ponds (10 samples from each age and species) of the two farms, Brates and Vladesti, during 2000–2005 were investigated in terms of ichthyopathology by field observations and complete parasitological dissections<sup>2,3</sup>.

## EXPERIMENTAL

Fish were picked up live in pots with pond water and were examined in the laboratory. A number of 10 specimens from each species of different ages have been investigated with careful handling of fish when collected and transported in order to limit loss of mucus on the surface of the fish where usually ectoparasitosis are found.

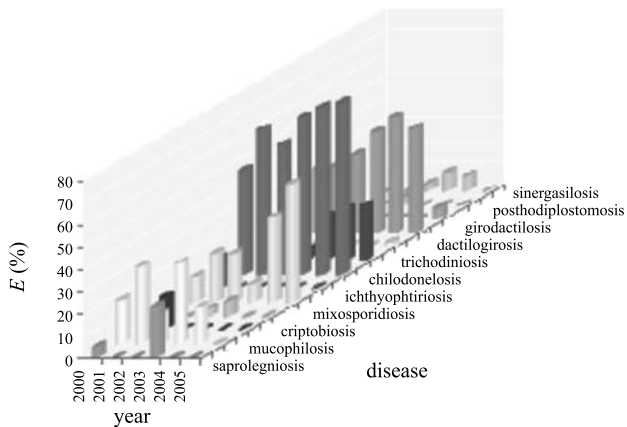
Parasitological examination in the case of parasitic diseases was conducted on fresh preparations of blades and lamella (scrape mounts and squash mounts). Squash mounts have been achieved both on surface and depth, from gills, tegument, fins and intestinal mucosa. Squashes were made from tissues of liver, flippers and bladder. Preparations were studied under a microscope with magnification objectives 5× to 100× (Refs 4 and 5). Results were expressed as a percentage of disease spread (disease incidence) (E, % of fish material per age and species) and the intensity of the disease based on the number of microscopic parasites on the microscope scan: S – 1–10 parasites; M – 10–20 parasites; I – from 20 in the microscopic parasites<sup>6,7</sup>.

## RESULTS AND DISCUSSION

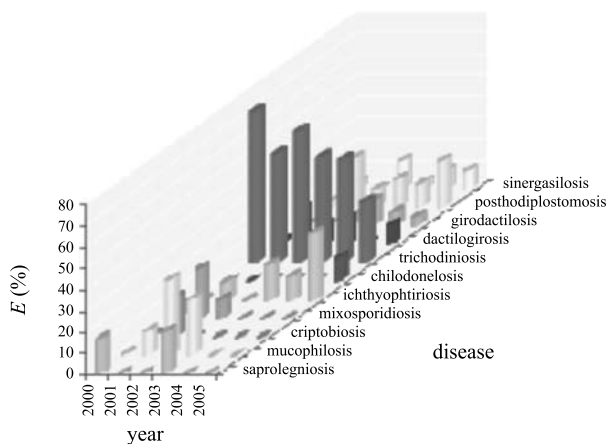
*Parasite diseases present in culture fish from the Brates farm.* In the Brates farm, in the period 2000–2005, a number of 18 parasitosis with varying degrees of extension and intensity, has been identified on the fish culture, depending on the species, age and technology stage (reproduction, breeding and wintering). The extension percentage of the annual parasite diseases per cyprinid species in the period studied is presented in Figs 1–4.

- The largest number of parasite diseases each spring has been reported with the material removed from wintering. Among the species of the Brates fish farm, carp was the most affected, the number of annual parasite diseases ranging between 4 and 6 during the growth period and wintering, respectively. Silver carp, bighead carp and grass carp were affected by a number of 3–5 parasite diseases in the periods of growth and wintering each year during 2000–2005.

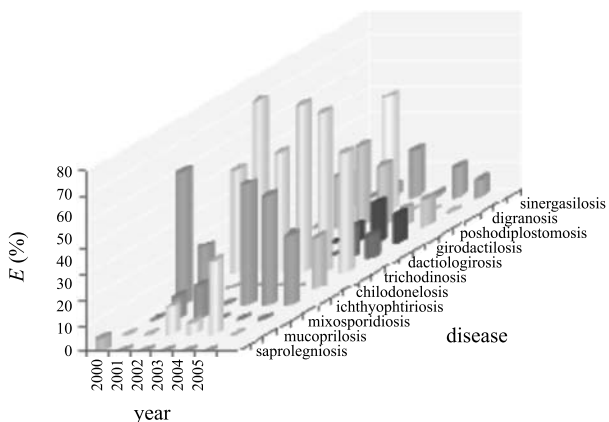
- In the growth ponds summer I the culture cyprinids were affected by a smaller number of parasite diseases. Thus, the carp and silver carp showed 3–4 parasite diseases while the bighead carp and grass carp 2–3 diseases each year in the period 2000–2005. Parasitosis occurred due to the presence of macrophyte vegetation, ichthyophagous birds which are also final or intermediate hosts for some parasites and predators for juvenile summer crop.



**Fig. 1.** Parasite diseases of carp of the Brates farm during 2000–2005



**Fig. 2.** Parasite diseases of silver carp of the Brates farm during 2000–2005



**Fig. 3.** Parasite diseases of bighead carp of the Brates farm during 2000–2005

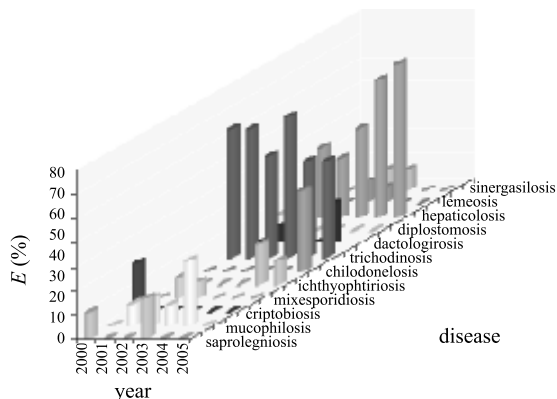


Fig. 4. Parasite diseases of grass carp of the Brates farm during 2000–2005

- The fish material (larvae of 3–5 days, 20-day juvenile fish) in the carp natural controlled reproduction pools has been affected every year by 1 or 2 parasitic diseases namely protozoosis, ichthyophtiriosis and trichodiniosis of 100% extension and an average or intense intensity. With asian cyprinids, reproduction has been made in artificial breeding station of the farm. Larvae of 3–5 days from incubators were pre-developed up to 20 days in the carp natural breeding ponds.

From the research carried out on the Brates farm on the health of cyprinids culture during 2000–2005, the following conclusions have been drawn.

In the mentioned period on the culture cyprinids (carp, sanger, bighead carp, grass carp) a number of 18 parasitic diseases were found: saprolegniosis, muchophilosis, criptobiosis, mixosporidiosis, ichthyophtiriosis, chilodnelosis, trichodiniosis, dactilogirosis, girodactilosis, diplostomosis, posthodiplostomosis (black spots disease), botriocephalosis, digramosis, hepaticolosis, argulosis, ergasilosis, lerneosis, sinergasilosis:

- carp – 13 parasitosis: saprolegniosis, muchophilosis, criptobiosis, mixosporidiosis, ichthyophtiriosis, chilodnelosis, trichodiniosis, dactilogirosis, botriocephalosis, hepaticolosis, argulosis, ergasilosis, lerneosis;

- silver carp – 11 parasitosis: saprolegniosis, muchophilosis, criptobiosis, mixosporidiosis, ichthyophtiriosis, chilodnelosis, trichodiniosis, dactilogirosis, girodactilosis, posthodiplostomosis (black stain disease), sinergasilosis;

- bighead carp – 11 parasitosis: saprolegniosis, muchophilosis, mixosporidiosis, ichthyophtiriosis, chilodnelosis, trichodiniosis, dactilogirosis, girodactilosis, posthodiplostomosis (black stain disease), digramosis, sinergasilosis;

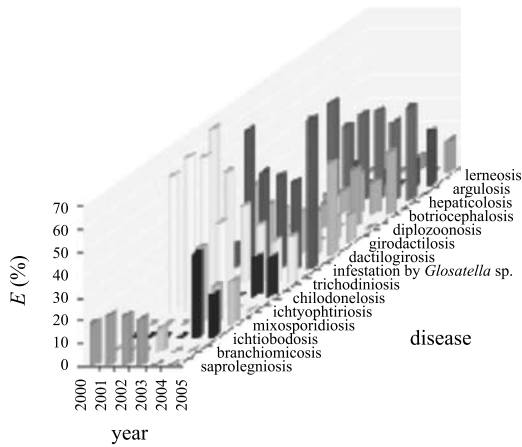
- grass carp – 12 parasitosis: saprolegniosis, muchophilosis, criptobiosis, mixosporidiosis, ichthyophtiriosis, chilodnelosis, trichodiniosis, dactilogirosis, diplostomosis, hepaticolosis, lerneosis, sinergasilosis;

- the biggest losses due to various diseases have been recorded in juvenile carp ponds of natural controlled reproduction and other species that were pre-de-

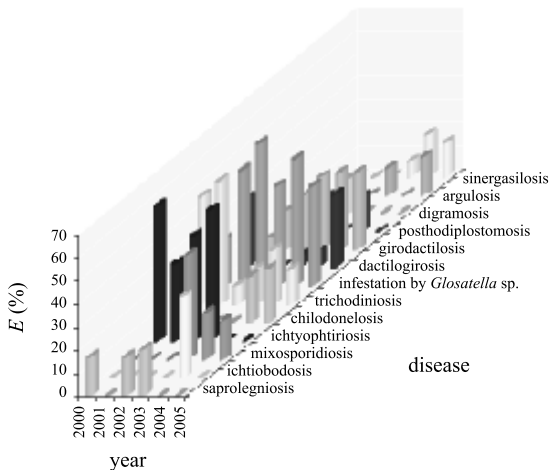
veloped in these basins. Thus, in 2002, losses of juvenile were 100% and in the coming years they reduce to 50%;

- the wintering material in the aquaculture ponds has been found with all the 16 parasitic diseases, the degree of damage variation depending on the species, age and condition of fish.

*Parasite diseased in the Vladesti farm.* In the period 2000–2005 in the fish farm of Vladesti 19 parasite diseases with varying degrees of extension and intensity depending on age, species and technological stage were identified on the cultured fish. Figures 5–8 illustrate the percentages of parasites extension on each species of fish cultured in the Vladesti farm, most parasite diseases were found in wintering.



**Fig. 5.** Parasite diseases of carp of the Vladesti farm during 2000–2005



**Fig. 6.** Parasite diseases of silver carp of the Vladesti farm during 2000–2005

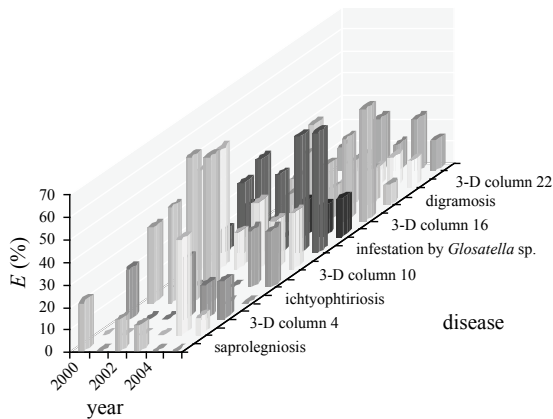


Fig. 7. Parasite diseases of bighead carp of the Vladesti farm during 2000–2005

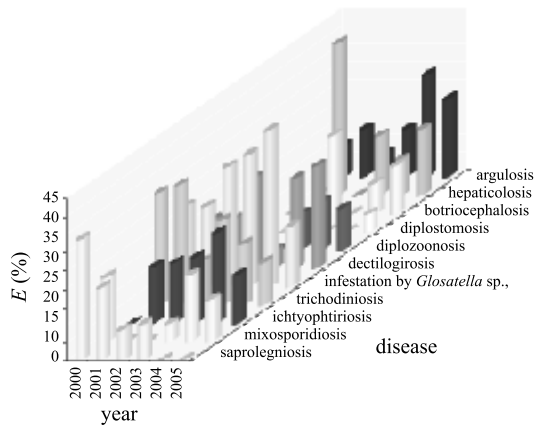


Fig. 8. Parasite diseases of grass carp of the Vladesti farm during 2000–2005

- The greater number of diseases on cultured fish during winter was due to water supply, high density of population, the mixture of different species and age and the fact that pools are used both for the purpose of growth and wintering of the material fisheries.

- In the growth ponds summer I and II, carp and silver carp were found yearly with a smaller number of parasites than in winter though higher for bighead carp and grass carp.

- The water supply, presence of macrophit vegetation, presence of gastropods – intermediate hosts for many species of parasites of fish and ichthyophagous birds – predators and definitive hosts for many species of helminthes are some of the conditions that foster and maintain the outbreaks of parasite diseases in the fish in these types of tanks.

● The fish (larvae of 3–5 days, 20-day age juvenile) of the natural controlled reproduction has been affected every year by 1–2 parasitosis as ichthyophthiriosis, trichodiniosis and infestations with *Glosatella* sp. with an impact of 100% and an average intensity or intense parasitic intensity.

From researches conducted in the farm Vladesti on the health status of cultured Cyprinid the following conclusions could be drawn.

During the period 2000–2005, the culture cyprinid (carp, silver carp, bighead carp, grass carp) have been identified with 19 parasite diseases as per by species, namely:

● with carp, 15 parasitosis – saprolegniosis, branchiomycosis, ichthyobodosis, mixosporidiosis, ichthyophthiriosis, chilodonellosis, trichodiniosis, with infestations *Glosatella* sp., dactilogirosis, girodactilosis, diplozoonosis, botriocephalosis, hepaticolosis, argulosis, lerneosis;

● with silver carp, 13 parasitosis – saprolegniosis, ichthyobodosis, mixosporidiosis, ichthyophthiriosis, chilodonellosis, trichodiniosis, infestation by *Glosatella* sp., dactilogirosis, girodactilosis, posthodiplostomosis (disease black spots), digramosis, argulosis, sinergasilosis;

● with bighead carp, 12 parasitosis – saprolegniosis, ichthyobodosis, mixosporidiosis, ichthyophthiriosis, chilodonellosis, trichodiniosis, infestation by *Glosatella* sp., dactilogirosis, girodactilosis, digramosis, argulosis and sinergasilosis;

● with grass carp, 11 parasitosis – saprolegniosis, mixosporidiosis, ichthyophthiriosis, trichodiniosis, infestation by *Glosatella* sp., dactilogirosis, diplozoonosis, diplostomosis, botriocephalosis, hepaticolosis, argulosis.

The 20-day juvenile was heavily infested with mostly ichthyophthiriosis, trichodiniosis and infestation by *Glosatella* sp.

In the aquaculture material from wintering ponds a maximum number of diseases was reached which can be accounted for by using the same ponds for growth and for winter.

## CONCLUSIONS

● In the Brates farm 18 diseases were diagnosed on the cultured cyprinids (carp, silver carp, bighead carp and grass carp). As regards the range of parasitic diseases found in the fish stock of this farm, those caused by parasite ciliates prevail, which confers a specific status to the farm of Brates which is supplied mostly from the lake Brates, found in an advanced eutrophic stage:

– the health status of the cultured fish in the farm of Brates was affected by the diseases mentioned above both in terms of quality and quantity. While the mortality losses were low, with the exception of juveniles, the slowing pace of growth as well as the depreciation of the commercial aspect of the fish stock is the result of the pathologies manifested;

– the large number of parasitic diseases of the cultured cyprinids from the the Brates farm is largely attributable to the organic loading of the water supply which comes from the lake Brates and due to large number of wild fish, carriers of pathogens.

• Specific to the Vladesti farm are the diseases ichthyophthiriosis and infestation by *Glosatella* sp. diagnosed mainly in juvenile cyprinid bred in natural controlled pools. The ciliate presence in these pools is mainly due to the water supplying source:

– at cyprinids of the Vladesti farm (carp, silver carp, bighead carp, and grass carp) a number of 19 diseases have been identified. The large number of parasites is due to water supply (Prut) which featured high values of organic content, above the maximum allowed in the period studied;

– the juvenile 1 and 2-year old cyprinids are mostly affected by crustacean diseases: lerneosis, argulosis and sinergasilosis. Their presence is due to larval stages of crustaceans in the water supply and other factors (mixture of different ages and species, impossible annual vacuum procedures in these types of ponds).

As a general conclusion we can highlight that the health status of the cultured cyprinid in combination with various other factors (climate, water, technology, etc.) influenced the production of fish both in terms of quantity and quality decreasing fish production with 10–15% as a result losses due to mortality and slowing the pace of growth and in some cases impairing the market value of the fish.

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