INFESTATION OF GIBEL CARP *Carassius auratus gibelio* (CYPRINIDAE) WITH *Piscicola geometra* (HIRUDINEA, RHYNCHOBDELLIDA)

GOGA Ionelia Claudia, TÎMBURESCU Constanţa

Abstract. *Piscicola geometra* (LINNAEUS 1761) is the most common species of fish leech, which affects a wide variety of host - fish belonging to natural or aquaculture populations, inducing haemorrhages and ulcerations. The paper focuses on different ecological aspects regarding quantitative indexes (frequency and abundance) in case of captured species, the relation between the parasitized fish and this leech, the parasitic spots, as well as on the visible effects it generates. The studied material was collected from the Preajba Valley hydrographical basin.

Keywords: The Preajba Valley, infestation, *Carassius auratus gibelio*, *Piscicola geometra*.

Rezumat. Infestarea carasului *Carassius auratus gibelio* (Cyprinidae) cu *Piscicola geometra* (Hirudinea, Rhynchobdellida). *Piscicola geometra* (LINNAEUS 1761), cea mai comună lipitoare a peştilor, parazitează un spectru larg de peşti din populaţiile naturale, ca şi pe cele din culturi, provocând gazdelor hemoragii şi ulceraţii. Lucrarea tratează aspecte ecologice privind indicii biocenotici cantitativi (frecvenţa şi abundenţa) în cazul speciilor capturate, relaţia dintre peştele parazitat şi această lipitoare, situsurile de parazitare precum şi efectele vizibile ale acţiunii acestui ectoparazit. Materialul studiat a fost colectat din bazinul hidrografic Valea Preajba.

Cuvinte cheie: Valea Preajba, infestare, *Carassius auratus gibelio*, *Piscicola geometra*.

INTRODUCTION

The study was achieved in the first trimester of 2012. The study site was represented by the small reservoirs built along the Preajba River, a small tributary of the Jiu. There were taken samples in order to gather the ichthyologic material necessary for further parasitological studies (GOGA, 2009a, b; 2010; GOGA & TÎMBURESCU, 2011; GOGA & CODREANU BĂLCESCU, 2011), as well as for the calculation of the biocoenotic quantitative indexes (frequency and abundance) of the captured species, the purpose of which was the achievement of a correlation between parasite and parasitized fish.

Piscicola geometra (LINNAEUS 1761) is a non-specific ectoparasite that provokes the disease called "piscicolosis" to fish (Fig. 1). This leech is part of the 60 species of freshwater and marine Hirudinees mentioned in the specialized literature as fish parasites (GHITTINO, 1985); it is brown or green. The leech is up to 35 mm long and 3 mm wide and presents two suckers (MUNTEANU & BOGATU, 2008); it was identified on the gibel carp *C. auratus gibelio*. The anterior extremity of the parasite presents a distinct sucker with some black ocular spots (two pairs of eyes), the first two being larger (Figs. 2; 2a); the posterior extremity presents a much larger and stronger sucker with pigmentation fields radially disposed (Fig. 3) (VULPE, 2007). In the superficial layer of the body wall, there can be noticed small, star-shaped, light-brown pigment cells (Figs. 4; 4a), while in deeper layers, there appear larger, dark-brown pigment cells (Fig. 5). Generally, the colour of these fish leeches varies according to the colour of the host fish. They parasite the fish without any intermediate host (VULPE, 2007).

MATERIAL AND METHODS

In the first months of 2012, there were made some field trips in the area of the small reservoirs located along the Preajba river and taken sporadic samples by means of monofilament net (a net of 100 m length and 2 cm wide meshes). Taking samples was a quite difficult process as the lakes were invaded by macrophytic submerged vegetation. During this sampling period, there were captured 47 samples containing the following fish species: *Scardinius erythrophthalmus*, *Lepomis gibbosus*, *Abramis brama*, *Carassius auratus gibelio*, *Perca fluviatilis.* The ectoparasite fish leeches belonging to *Piscicola geometra* were identified only on the gibel carp; there were also established the parasitic spots and the incidence of the parasitosis. The collected material was ichthyo-pathologically examined, namely clinical and parasitological, in the Parasitology laboratory of Sanitary Veterinary Direction Dolj. The fish were examined macroscopically in order to study the areas affected by leeches.

The parasites were then placed on a Petri dish, in distilled water, its visualisation being achieved through transparency at the stereomicroscope Olympus SZX7 with objectives 2x, 3,2x; ocular WHSZ 10x/22, as well as at the optic microscope Olympus BX 43, as fresh preparation slide-slide, with the objectives 2x, 10x; ocular WHN 10x/22. After examination, the parasites were fixed in plastic bottles in 4% formaldehyde (Fig. 6).

Figure 1. *Piscicola geometra* (LINNAEUS 1761) (original).

Figure 2. Anterior sucker with the four black ocular spots (fresh preparation; optical microscope, objective 2x; ocular WHN 10x/ 22) (original). / Figura 2. Ventuza anterioară prevăzută cu patru pete oculare negre (preparat nativ între lamă şi lamelă; microscop optic, obiectiv 2x; ocular WHN 10x/22) (original).

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Figure 2a. Anterior sucker with four black ocular spots (stereomicroscope visualisation, objective 2x; ocular WHSZ 10x/22) (original). / Figura 2a. Ventuza anterioară prevăzută cu patru pete oculare negre (vizualizare stereomicroscop, obiectiv 2x; ocular WHSZ 10x/22) (original).

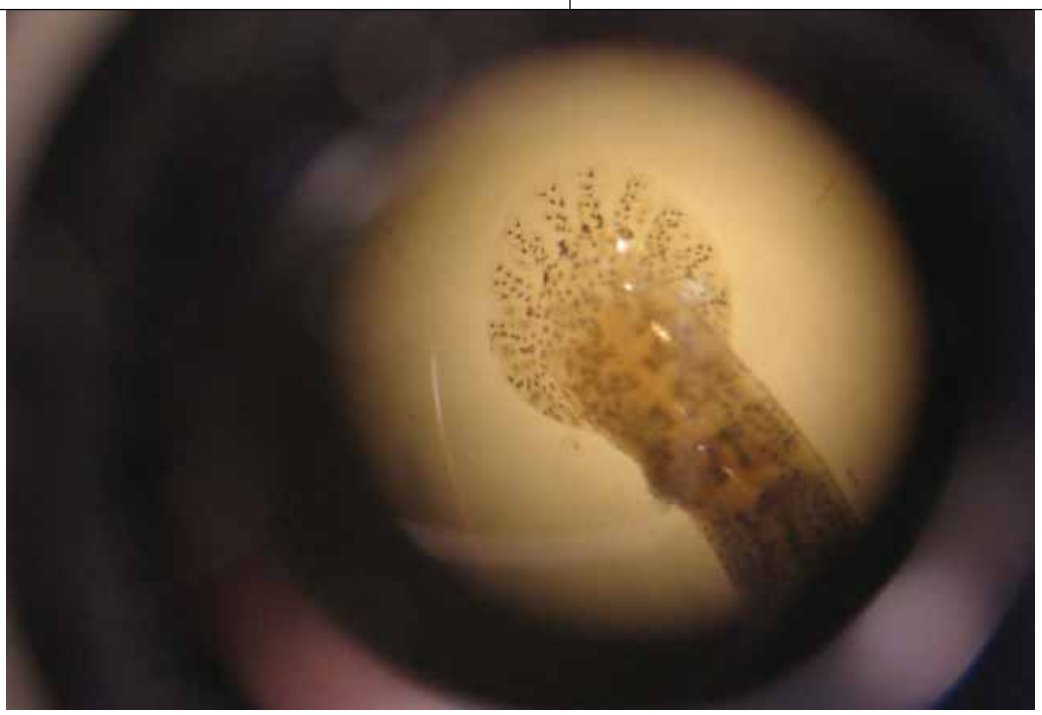
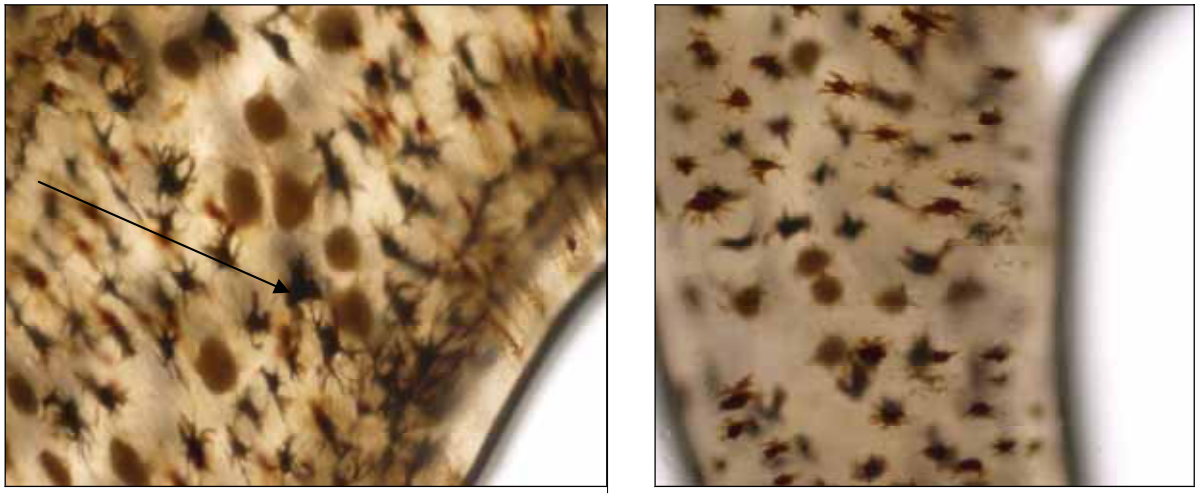


Figure 3. Posterior sucker with pigmentation fields radially disposed (stereomicroscope visualisation, objective 3,2x; ocular WHSZ 10x/22) (original). / Figura 3. Ventuza posterioară prevăzută cu câmpuri pigmentare dispuse radial (vizualizare stereomicroscop, obiectiv 3,2x; ocular WHSZ 10x/22) (original).



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Figures 4, 4a. Small, star-shaped, light-brown pigment cells within the superficial layer of the body wall (fresh preparation; optical microscope, objective 10x; ocular WHN 10x/ 22) (original). / Figurile 4, 4a. Celule pigmentare mărunte în formă de stea de culoare brun – deschis, prezente în stratul superficial al peretelui corpului (preparat nativ între lamă şi lamelă; microscop optic, obiectiv 10x; ocular WHN 10x/ 22) (original).

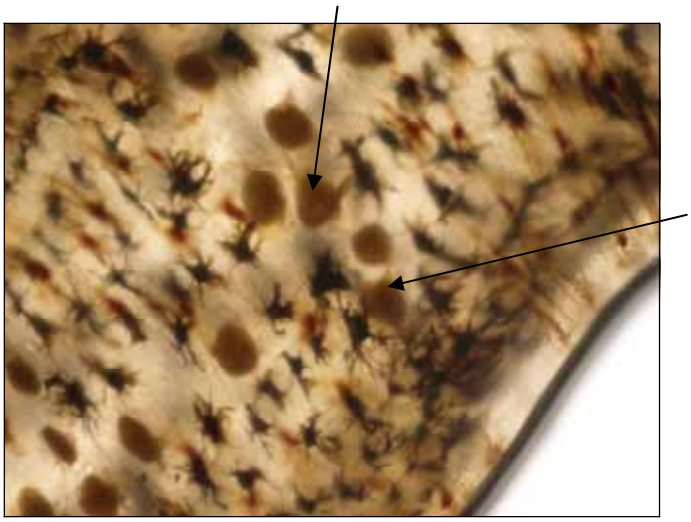

Figure 5. Large, dark-brown pigment cells in the deeper layers of the body wall (fresh preparation; optical microscope, objective 10x; ocular WHN 10x/ 22) (original). / Figura 5. Celule pigmentare mari brun – deschis, prezente în straturile profunde al peretelui corpului (preparat nativ între lamă şi lamelă; microscop optic, obiectiv 10x; ocular WHN 10x/ 22) (original).

Figure 6. Parasites fixed in 4% formaldehyde. / Figura 6. Paraziţii fixaţi în formaldehidă 4% (original).

RESULTS AND DISCUSSIONS

The 47 samples taken were also analysed from the ecological point of view rendering the quantitative biocoenotic indexes: Frequency (F%) and Abundance (A%) (STĂNICĂ - EZEANU & NEACŞU, 1998).

F % = p / P x 100 where: p – number of samples where a certain species appears;

P – total number of examined samples.*F% (0 – 25%) accidental species ; *F% (25 –50%) accessory species; *F% (50 – 75%) constant species; *F% (75 – 100%) euconstant species.

A% = n / N x 100 where: n – number of individuals per species;
N – number of individuals belonging to all the species of samples.

Table 1. Frequency – qualitative biocoenotic index of captured species.
Tabel 1. Frecvenţa – indice biocenotic cantitativ al speciilor capturate.

No.	Species	F% (0 - 25%) accidental	A/%)	F% (25 - 50%) accessory	F% (50 - 75%) constant	F% (75 - 100%) euconstant
1.	*Carassius auratus*	-	72.3		-	100
2.	*Scardinius erythrophthalmus*	-	12.7	33.3	-	-
3.	*Lepomis gibbosus*	-	4.25	33.3	-	-
4.	*Abramis brama*	-	4.25	-	66.6	-
5.	*Perca fluviatilis*	-	2.12	33.3	-	-

The values of the indexes emphasize that the species *C. auratus gibelio* registers a high density compared with the other species and an increased frequency in captures, thus, possibly illustrating a preference of this fish leech for the species belonging to the family Cyprinidae, as literature in the field mentioned (ROMAN, 1955).

Piscicola geometra is a leech displaying a long, flexible body made up of a definite number of segments. It affects fish populations from the lakes invaded by vegetation. All species of fish may be affected by piscicolosis, but a higher incidence is registered at Cyprinidae. *Piscicola geometra* is the most common freshwater leech species scarce in lakes. It is distributed in Europe, Central Asia, North America, parasitizing freshwater fish, especially Cyprinidae, and was previously reported from 8 host species (*Rutilus rutilus*, *Scardinius erytrophthalmus*, *Blicca bjoerkna*, *Tinca tinca*, *Esox lucius*, *Barbus rajanorum mystaceus*, *Abramis brama*, *Cyprinus carpio*) from different lakes in Turkey (Sapanca Lake, Terkos Lake, Keban Dam Lake, Cavuscu Lake, Uluabat Lake) CEYLAN *et al*., 2011; ARSLAN & EMIROĞLU, 2011 identified the parasitic leech *Piscicola geometra*, for the first time, at exotic fish species *Carassius gibelio* (on operculum) in Lake Uluabat (Turkey). In the work entitled Research regarding the parasite fauna of the Danube fish (ROMAN, 1955) in case of the Danube Delta, this leech was mentioned on the gills of freshwater bream and on the skin of rudd and perch. Within the Danube basin, it was also identified in case of pike, nase, chub, and perch. In our country, *P. geometra* was mentioned by ANTIPA (1909) at carp, DUMITRU (1937) at pike, barbel, and bream, ZEMIANKOVSKI (1946) at carp.

With regard to the pathogeny of the disease, the parasites sources are represented by old fish, water, macrophytic vegetation and the substratum the leeches lay their cocoons (in summer). An important factor triggering the appearance of the parasitosis is water temperature; the invasion decrease in intensity when water gets warmer. There were collected 75 samples fixed on different parts of the body (oral mucosa, pectoral fins, caudal fin, and the skin covering the ventral part of the body); their length varied between 15 mm and 35 mm.

The fish affected by piscicolosis had bleeding wounds at the body surface provoked by the suckers of the leeches. Some individuals of gibel carp still displayed portions of destroyed tegument at the level of the scales from the dorsal part of the body due to the disappearance of the mucus layer, which enabled the penetration of other pathogen agents, in this case of the fungus *Saprolegnia* sp. The diagnosis of the parasitosis was relatively simply achieved, through macroscopic examination of the body of all collected fish and emphasis of leeches (Figs. 6; 6a).

The parasitosis evolved sub clinically due to the small number of parasitized fish and to the fact it was no longer identified in the next captures.

Specialized literature (MUNTEANU & BOGATU, 2008) mentions as prophylactic measures meant to prevent piscicolosis: destruction of macrophytic vegetation and avoidance of the penetration of other fish species from one basin to another, taking into account the reservoirs have direct communication and the water surplus is discharged through bottom dischargers. Among treatment measures, it is used Trichlorfon 1g/6 m^3 water.

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Figures 6, 6a. Presence of leeches – macroscopic examination (original).
Figurile 6, 6a. Evidenţierea lipitorilor, prin examen macroscopic (original).

CONCLUSIONS

The study was performed during the first trimester of 2012; the studied site was represented by the small reservoirs located along the Preajba river, a small tributary of the Jiu river.

The parasitosis evolved sub-clinically taking into account the reduced number of parasitized fish, as well as the disappearance of leeches in the next captures.

The sampled fish material was examined from the ichthyo-pathological viewpoint, namely clinical and parasitological examinations, in the laboratory of parasitology of the Sanitary Veterinary Direction Dolj. The fish were examined macroscopically and the diagnosis of the parasitosis was relatively simple to achieve, based on the visual observation of the spots affected by leeches, as well as on the observations made with the optic microscope Olympus BX 43 and stereomicroscope Olympus SZX7.

The fish affected by piscicolosis had bleeding wounds at the skin surface provoked by the suckers of the leeches; the disappearance of the layer of mucus enabled the penetration of other pathogen agents, in this case the fungus *Saprolegnia* sp.

An important factor that triggers the development of the parasitosis is water temperature and abundant submerge macrophytic vegetation.

The destruction of macrophytic vegetation, the prevention of fish migration from one reservoir to another and the treatment with Trichlorfon 1g / 6 m^3 water are just some of the measures able to stop this parasitosis.

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Goga Ionelia Claudia
The Oltenia Museum, Craiova, Str. Popa Şapcă,
No. 8, 200422, Craiova, Romania
E-mail: ioneliagoga@yahoo.com

Tîmburescu Constanţa
The Sanitary Veterinary Direction Dolj, Str. Fantana Popova,
No. 30, 200319, Craiova, Romania
E-mail: ctimburescu@yahoo.com

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