

Short notes

First record of *Apiosoma piscicola* (Blanchard, 1885) (Ciliophora: Epistylididae) in common carp (*Cyprinus carpio* Linnaeus, 1758) (Pisces: Cyprinidae) from aquaculture facilities in North Macedonia

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ABSTRACT. A total of 578 specimens of common carp (*Cyprinus carpio*) from eight the most significant and larger cyprinid aquaculture facilities in Macedonia (fish farms and cage culture systems) were examined for parasitological investigation. Protozoa *Apiosoma piscicola* was found in cage culture system on Globochica reservoir. In this fish farm, a total of 127 fish samples were examined for parasitological investigation, in which parasite infestation with *A. piscicola* was found on fins and gills in 79 specimens of common carp, in winter season. The prevalence of *A. piscicola* in common carp was 62.20%, while the mean intensity was 17.58. Our findings of *A. piscicola* in common carp (*C. carpio*) are first recorded in Macedonia. At the same time, common carp represent new host for *A. piscicola* in Macedonian waters.

Keywords: protozoa, *Apiosoma piscicola*, common carp, aquaculture

Introduction

Warm water fish production in Macedonia dates back to 1961 with the construction of the cyprinid aquaculture facilities, warm water fish farms “Bukri” and “Bel Kamen” in Bitola. At the moment, there are eight significant cyprinid aquaculture facilities in Macedonia (fish farms and cage culture systems): Zhabeni, Bukri, Dolneni, Zhelezara, Globochica, Tikvesh, Gradche and Mladost. The most commonly grown fish species in these warm water aquaculture facilities are: common carp (*Cyprinus carpio*), grass carp (*Ctenopharingodon idella*), silver carp (*Hypophthalmichthys molitrix*) and bighead carp (*Hypophthalmichthys nobilis*).

Parasites are considered to be natural and significant components of all ecosystems. *Apiosoma piscicola* is a parasite species characteristic of pond-raised fishes. This vase-shaped ciliate is rather large. There are leaf-like protrusions at the one end and structure which is used for sucking at the other end. The parasites spread easily and can invade many

fish species. The same as other protozoa, it appears to be of a commensal nature in fish – when environmental factors are worse and the resistance of the fish decreases. The disease is most frequent in fishes up to one month old, reared in inadequate ambient conditions and fed by imbalanced feed. *Apiosoma* is irrelevant to open-water fish, but they can be reservoirs and sources of infection of pond fish. The presence of parasites on the skin and gills result in desquamation of epithelial cells, which is clearly visible. As the disease progress, the initial changes on the skin become necrotic. Being multiplied to large numbers, the parasites make damage to the epithelium of gill filaments, which result by respiratory disturbances and possible death. Improvement of ambient conditions, periodical application of quicklime, balanced feed into ponds, can diminish the risk of death from [1].

The *Apiosoma* spp. live as ectocommensals on the gills and body surface of aquatic organisms, especially the fry of freshwater fish [2].

In the Balkan, the presence of *A. piscicola* was

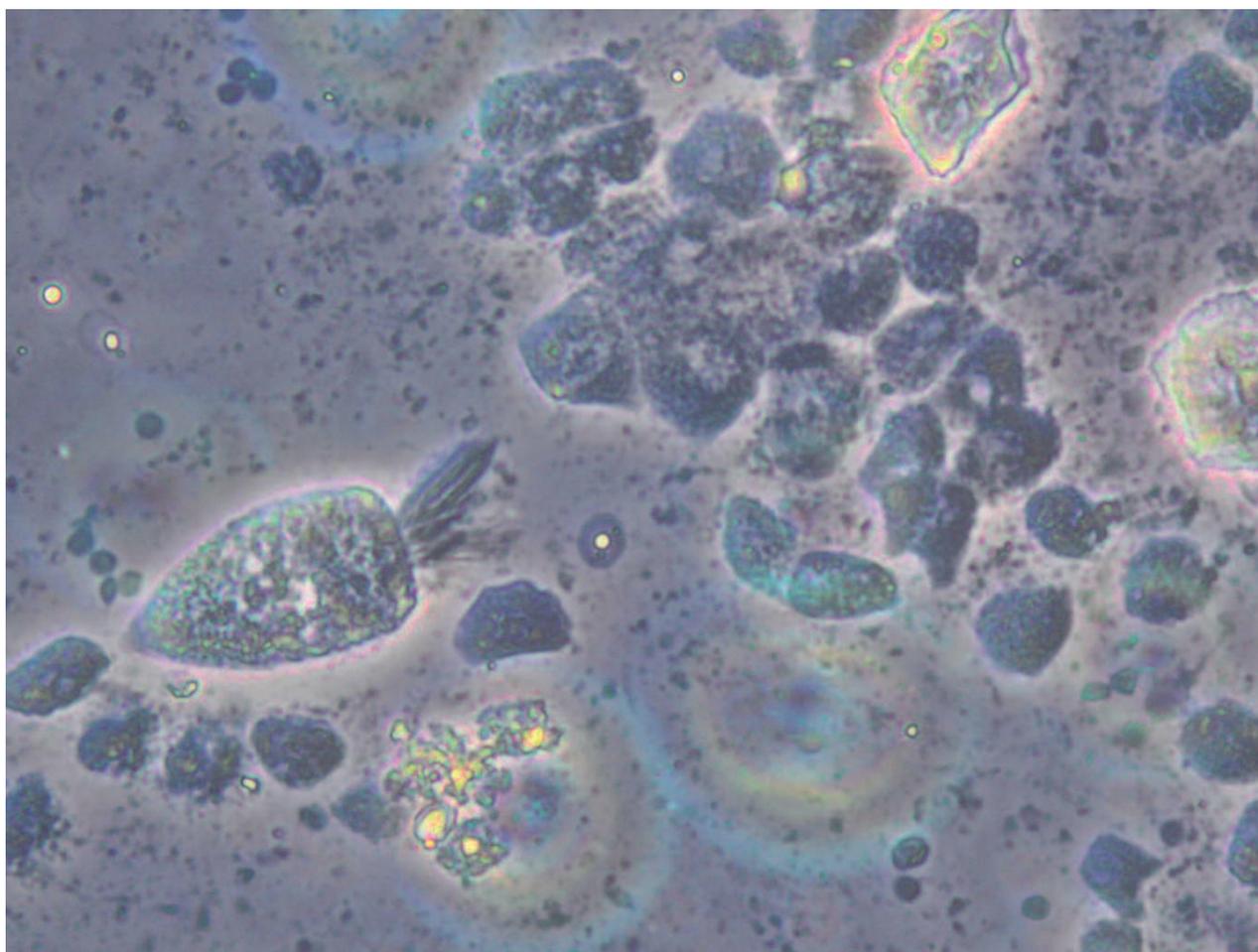


Figure 1. *Apiosoma piscicola* on fins and gills in common carp (original, 1: $\times 400$)

established by Kiškaroly and Tafro [3] in *C. carpio* from cyprinid fish farms in Bosnia and Herzegovina.

According to the literature reviews in the world, *A. piscicola* has been identified on fins, gills, in the nasal cavity of *C. carpio* in fish farms in Romania [4]. The presence of this parasite was also registered by Ali et al. [5] and Mansoor and Al-Shaikh [6] in fish farms in Iraq, while in Turkey data on the occurrence of *A. piscicola* in *C. carpio* have been published by Özer and Erdem [7]) and Özer [8]. Li et al. [2] found the presence of *A. piscicola* in *Ctenopharyngodon idella* (grass carp) in a pond in China.

A. piscicola is protozoa found on gills, fins and skin in many freshwater fish species throughout Europe, Asia and South Africa. According to Li et al. [9], this species of epizootic cilia, which attaches to the surface of many hydrobionts, can endanger many hosts and cause huge losses in aquaculture production.

Materials and Methods

This study was carried out seasonally in a period of three years. A total of 578 specimens of common carp (*Cyprinus carpio*) from eight the most significant and larger cyprinid aquaculture facilities in Macedonia (fish farms and cage culture systems) were examined for parasitological investigation. The fish were caught using net or by local anglers. The specimens were placed in plastic containers and transferred alive to the Laboratory for Fish Diseases in Hydrobiological Institute in Ohrid.

Gills, fins and skin were examined using stereomicroscope. All parasites found in each individual fish were identified and enumerated. Parasites on native smears are observed under light microscope and magnification $\times 200$ and $\times 400$.

Classical epidemiological variables (prevalence and mean intensity) were calculated according to Bush et al. [10]. The parasite specimens were identified using reference keys of Lom and Dykova [11].

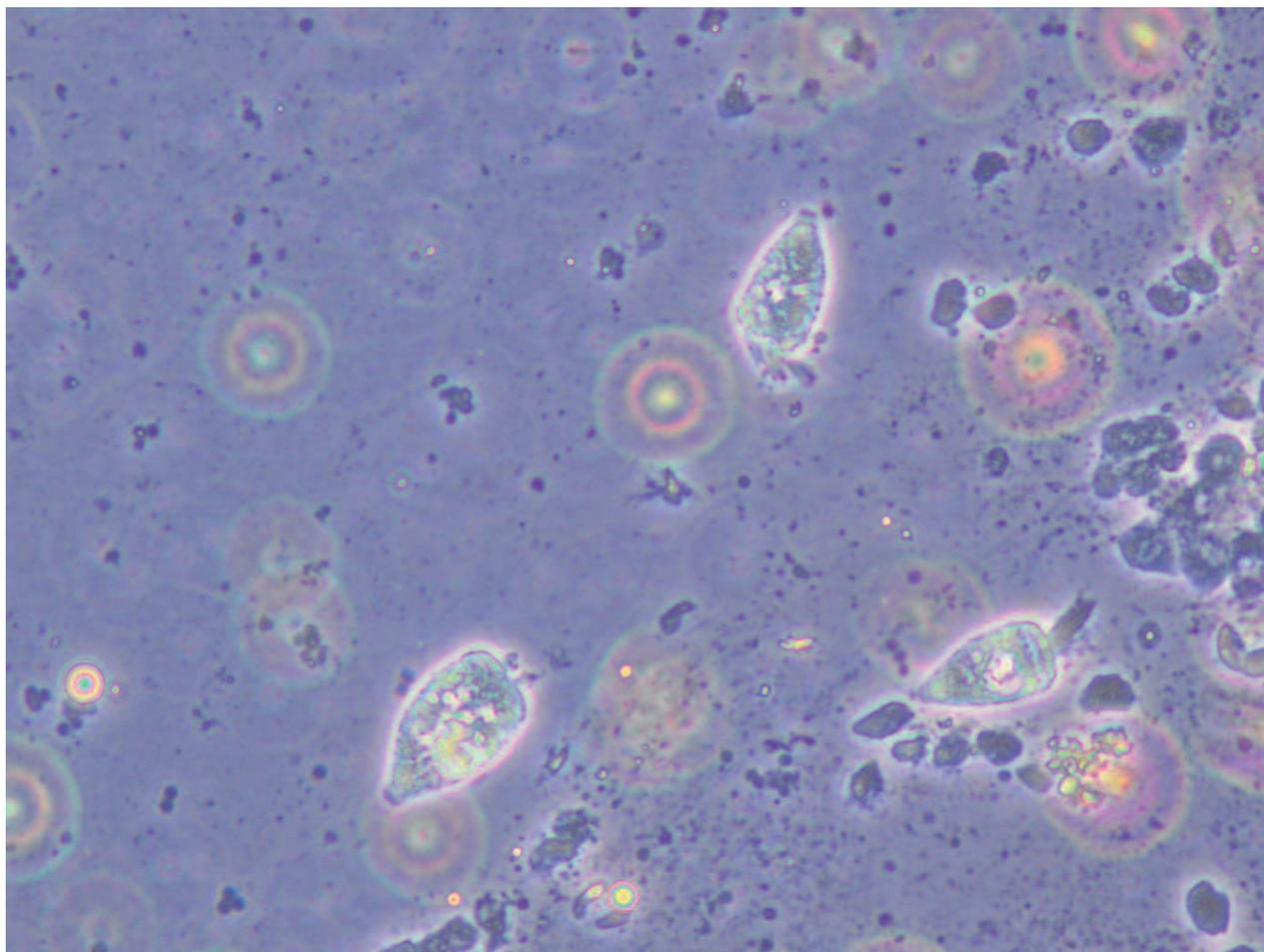


Figure 2. *Apiosoma piscicola* on fins and gills in common carp (original, 2: $\times 200$)

Results and Discussion

A total of 578 fish specimens were examined for parasitological investigation from eight the most significant and larger cyprinid aquaculture facilities in Macedonia. Among them, *Apiosoma piscicola* was found only in one facility, cage culture system on Globochica reservoir. In this cage fish farm, a total of 127 fish samples were examined for parasitological investigation, in which parasite infestation with *A. piscicola* was found on fins and gills in 79 specimens of common carp, in winter season (Figs 1,2). This parasite species was found on all size of host fish. The prevalence of *A. piscicola* in common carp was 62.20%, while the mean intensity was 17.58.

Our findings of *A. piscicola* in common carp (*C. carpio*) are first recorded in Macedonia. At the same time, common carp represent new host for *A. piscicola* in Macedonian waters.

Morphological data. The length of the body is 110 μm . The body of *A. piscicola* is externally divided by a groove without cilia, on one oral

section measuring 12.9 (10.2–15.6) μm and a basal section measuring 16.4 (10.5–22.3) μm . The compact triangular macronucleus is located at the same level or just below the groove and has a length of 13.8 (12.0–15.6) μm and a width of 12.2 (10.0–14.4) μm . The micronucleus is oval and is located above or parallel to the macronucleus. It is 2 \times 10 μm in size. The scopula is wider than the corpse, with a suction disc and a dimension of 4.4 (3.6–5.2) μm . The body is without cilia, except for the peristomical disc (three rows), 34.1 (32.2–36.0) μm long and 21 (20–22) μm wide. The transverse lines of the skin are visible, and their numbers range from 33–42.

In conclusion, our findings of protozoa *Apiosoma piscicola* in common carp (*Cyprinus carpio*) are first recorded for Republic of North Macedonia. At the same time, common carp represent new host for *A. piscicola* in Macedonian waters.

The prevalence of *A. piscicola* in common carp was 62.20%, while the mean intensity was 17.58.

A. piscicola is found in winter, in relatively high

prevalence and intensity of infestation, which may be due to the worse ambient conditions, i.e., the lower water temperature, and because fish eat less food. That is in correlation with commensal nature of *Apiosoma* and protozoans in general.

Fishes infested with *A. piscicola* were usually quite dark on the back and they eat less. Gills and skin are covered by excessive amount of mucus. Higher incidence is met in carp fry, which seem to lose their balance, swimming slowly and gasping at the surface of the water.

Due to the high number of the parasites found and pathological changes they cause, continuous follow up of the condition with the presence of *A. piscicola* in fish from aquaculture facilities is required.

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