

Parasitic fauna in farmed trouts in Tismana, Romania

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Abstract. Between 2004 and 2006, 960 trouts have been examined for the presence of parasites in two farms from Tismana locality, Gorj County, Romania. Overall, 6 species of parasitic organisms (*Saprolegnia diclina*, *Ichthyophthirius multifiliis*, *Trichodina* sp., *Chilodonella piscicola*, *Myxobolus cerebralis*, *Gyrodactylus salaris*) were identified in the trouts from Tismana. Parasitic infestations have been found in all three studied species of trouts. Epidemiological study of the general prevalence of parasites in trouts in the two farms from have revealed various aspects depending on the species studied, depending on season, age category (size) but also from a farm to another.

Keywords: trout parasites; brown trout; brook trout; rainbow trout.

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Introduction

Trout farming is an important branch of animal husbandry that grows increasingly from year to year, especially now when food needs of humanity are becoming larger. Even in our country this branch is well represented as part of the agricultural economy, placing Romania among the leading countries (Cocan, 2008).

Diseases play an important role in trout breeding and are the most common cause of economic losses in intensive aquaculture. The potential effect of the disease can be a real economic disaster and trout owners cannot afford not to know the importance of controlling these diseases and management

measures to be applied. In this chapter we will try to emphasize the importance of trout parasitic diseases, with examples of the most important of them, especially from an economic perspective (Bruno and Ellis, 1996).

Knowledge of parasitic diseases in trouts farmed in intensive systems is of major importance in all aspects (etiology, epidemiology, pathology, control). Many parasitic diseases in trout have serious outcome, with high mortality, usually affecting all fish from infected tanks. Their early diagnosis is important for early therapeutic intervention (Bruno and Ellis, 1996).

In this context, this study aimed to evaluate the epidemiology of parasitic infections in three

species of trouts (brown trout, brook trout and rainbow trout) raised in two farms from Gorj County, Romania.

Materials and method

Between 2004 and 2006, 960 trouts have been examined for the presence of parasites (table 1). The studies were done in two farms from Tismana locality, Gorj County, Romania. Each fish was carefully examined for the presence of parasites according the methodology described by Cojocaru (2006).

Table 1. Total number of samples from each species and farm

Farm	<i>Salmo trutta fario</i>	<i>Salvelinus fontinalis</i>	<i>Oncorhynchus mykiss</i>	Total
Tismana 1	240	240	240	720
Tismana 2	-	240	0	240
Total	240	480	240	960

Results

Overall, 6 species of parasitic organisms (*Saprolegnia diclina*, *Ichthyophthirius multifiliis*, *Trichodina* sp., *Chilodonella piscicola*, *Myxobolus cerebralis*, *Gyrodactylus salaris*) were identified in the trouts from Tismana. Parasitic infestations have been found in all three studied species of trouts. Epidemiological study of the general prevalence of parasites in trouts in the two farms from have revealed various aspects depending on the species studied, depending on season, age category (size) but also from a farm to another (figures 1, 2, 3 and 4).

Saprolegniasis has evolved only in the breeding category ($p < 0.001$), both in males and females; it was associated with the period of sperm collection/breeding in February. The disease evolved in all species studied in both farms in 2005 and 2006 but was absent in 2004. In total, *Saprolegnia diclina* infection was diagnosed in 41 breeding trouts of 120 examined (34.17%). The prevalence in males was 24/60 (40%) and 17/60 females (28.33%). Although the infection was more common in males, differences between the sexes are not covered statistically. Statistically

significant differences were recorded between the years of study ($p < 0.05$). Thus in 2004 prevalence was 0, in 2005 it was 17/30 (56.67%) and in 2006 24/30 (80%). Prevalence by species was: brown trout 12/30 (40%), brook trout 19/60 (31.67%) and rainbow trout 10/30 (33.33%), without statistical differences. The only parasitic coinfection associated with *Saprolegnia* was *Trichodina* sp. (brown trout) and *Chilodonella* (brook trout). We also found statistically significant differences between the two farm prevalences ($p < 0.05$) as follows: Tismana 1 (5.83%) and Tismana 2 (1.67%).

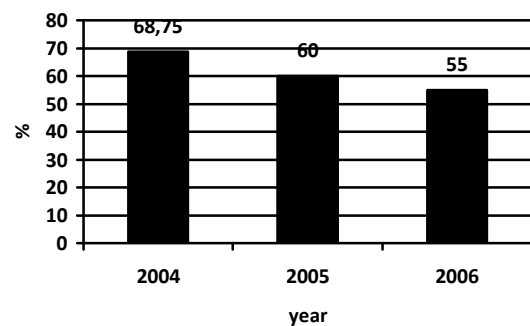


Figure 1. Overall prevalence of parasitism in brown trouts, *Salmo trutta fario* from Tismana 1 farm

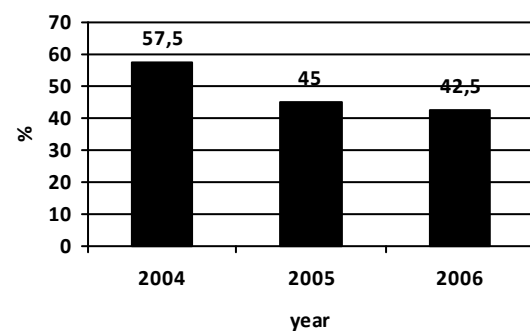


Figure 2. Overall prevalence of parasitism in brook trouts, *Salvelinus fontinalis* from Tismana 1 farm

Of the 960 fish examined in 2004-2006, 215 were diagnosed as being infected with *Ichthyophthirius multifiliis* (22.40%). Annual total prevalences were similar, with no statistical differences covered: in 2004 78/320 (24.38%), 2005 68/320 (21.25%) and 2006 69/320 (21.56%). Considering the entire period, overall prevalence of infection with *I. multifiliis* was 28.67% in Tismana 1 to 11.94%

in Tismana 2 ($p < 0.05$). Infection was diagnosed in all technological categories as follows: <5 cm (14.17%), 5-15 cm (41.25%), >15 cm (21.67%) and breeding (3.33%). The most infected group was the 5-15 cm ($p < 0.01$) and the most resistant the breeding ones ($p < 0.001$). Regarding differences between species we found: the brown trout 35.83%, the brook trout 17.50% and the rainbow trout 18.75% ($p < 0.05$). *I. multifiliis* infection associated with *Trichodina* was found in 6.46% of the total fish examined, with *Chilodonella* (5.63% of total fish examined), *Myxobolus cerebralis* (0.73%) and *Gyrodactylus* spp (0.42%) (values expressed as percentage of the total fish examined).

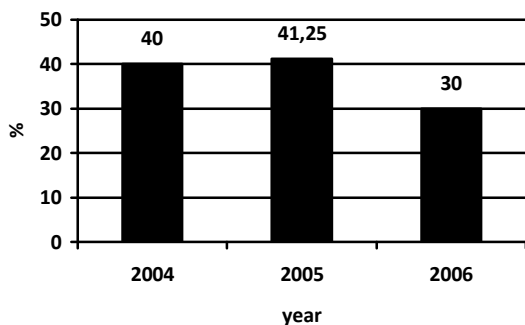


Figure 3. Overall prevalence of parasitism in brook trouts, *Salvelinus fontinalis* from Tismana 2 farm

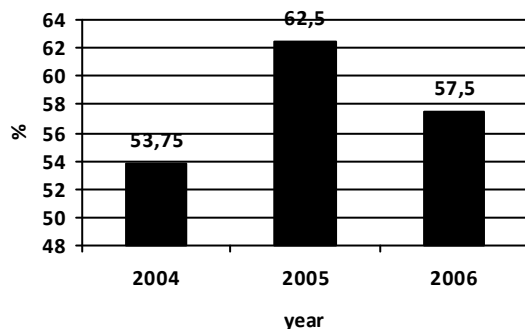


Figure 4. Overall prevalence of parasitism in brook trouts, *Oncorhynchus mykiss* from Tismana 1 farm

In the case of *Trichodina* infection, total prevalence was 23.23% (223/960). The annual growth rate has significant differences: 2004 (25.63%), 2005 (25.63%) and 2006 (18.44%). Of the three species considered for this study, the analysis shows an average prevalence values covered sensitivity ($p < 0.001$) of

rainbow trout (37.08%) from the brook (14.58%) and brown (26.67 %). Among the age groups, most susceptible to infection with *Trichodina* are the trouts <5 cm (29.17%) and category 5 to 15 cm (30.83%) and larger fish are more resistant: category >15cm (19.72%) and breeding (6.67%). In this case, *Trichodina* infection prevalence was significantly higher in farm Tismana 1 (30.33%) than Tismana 2 (11.39%) ($p < 0.001$). The most common association with *Trichodina* were *Ichthyophthirius multifiliis* (6.46%), with *Chilodonella* (4.17%), *Myxobolus cerebralis* (0.63%), with *Saprolegnia diclina* (0.31%) and with *Gyrodactylus* spp (0.10%) (values expressed as percentage of the total fish examined).

Overall prevalence of infection with *Chilodonella* was 16.15%. There was a downward trend from year to year. In 2004 the total prevalence was 22.19%, 14.38% in 2005 and 11.88% in 2006. The values are similar: brown trout - 12.08%; 17.71% brook trout and rainbow 17.08%. On the other hand, age-dependent susceptibility (translated into technological categories) was similar. Prevalence values of secondary categories are: <5 cm 20.83%, 22.92% 5-15 cm, >5 cm 12.78% and 3.33% breeding. Statistical calculations show significant differences between fish under 15 cm and over 15 cm ($p < 0.0001$). All statistically significant differences ($p < 0.0001$) were between the two farms.

Myxobolus cerebralis infection was found in only 11 of 960 fish examined, resulting in an overall prevalence of 1.15%. Annual prevalences were similar: 2004 (0.63%) 2005 (0.94%) 2006 (1.88%). Because of the small number of samples, no statistical calculations have been applied. *Myxobolus cerebralis* infection was diagnosed in all three species studied, values for brown trouts being 2.08% to 0.42% for brook trout and rainbow at 1.67%. Mixoboliasis did not appear in trouts less than 5 cm long nor in the breeding category. Most cases were found in category 5 to 15 cm, the prevalence being 2.92%. The adult and subadult fish (>15 cm) prevalence was 1.11%. Infection was found only in Tismana 1 farm. *Myxobolus* coinfection with other parasitic species have evolved in varying

percentages (values expressed relative to the total fish examined): *Ichthyophthirius multifiliis* (0.73%), *Trichodina* sp. (0.63%), *Chilodonella* (0.21%).

The only helminth found was the monogenic flatworm *Gyrodactylus salaris*. 1.04% (10 of 960 fish examined) and only in Tismana 1 farm.

Discussion

Our findings are similar with those of other studies in trouts, mainly regarding the spectrum of species. Balta et al. (2008) in a study from Turkey, on the same three species of trouts found only protozoan parasites: *Ichthyophthirius multifiliis*, *Ichthyobodo necator* and *Trichodina* sp. The prevalence of *I. multifiliis* was 20.69% and of *Trichodina* 41.38%. In another study, in Denmark, Buchmann and Bresciani (1997) found ten species of protozoans in trouts: *Ichthyophthirius multifiliis*, *Chilodonella piscicola*, *Capriniana* sp., *Trichodina nigra*, *T. mutabilis*, *T. fultoni*, *Trichodinella epizootica*, *Epystylis* sp., *Ambiphrya* sp., *Apiosoma* sp.

In another study from USA, the total prevalence of parasitism in brook trouts was 83.02% while in the brown trout it was 66.23% (Muzzall, 1986). The identified species were *Crepidostomum cooperi*, *Neascus* sp., *Eubothrium* sp., *Proteocephalus* sp., *Truttaedacnitis* sp., *Cystidicoloides tenuissima*, *Rhabdochona canadensis*, *Spinitectus gracilis*, *Epistylis* sp., *Trichodina* sp., and *Salmincola*

edwardsii. The only parasite found in common with our study was *Trichodina*.

We can conclude that parasitic infections in farmed trouts still represent a common problem which might occasionally stand for economic losses.

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