

Risk Factors Associated with Ectoprotezoa Infestation of Wild and Farmed Cyprinids

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Abstract : Intensive aquaculture is commonly associated with increased incidence of parasites. However, in Spain, the recent intensification of cyprinid production has not led to knowledge of the parasites that develop in the aquaculture facilities, the factors that affect their development and spread and the transmission between wild and cultivated fish species. The present study focuses on the knowledge of environmental factors, as well as host dependent factors, and their possible influence as risk factors in the incidence and intensity of parasitic infections. This work was conducted in the Duero River Basin, NW Spain. A total of 114 tenches (*Tinca tinca*) were caught in a fish farm and 667 specimens belonging to six species of cyprinid, not tench, in five rivers. An exhaustive search and microscopic identification of protozoa on skin and gills were carried out. Physical, chemical, and biological parameters of water samples from the capture points were determined. Only two ectoprotezoa were identified, *Ichthyophthirius multifiliis* and *Tripartiella* sp. In *I. multifiliis*, a high intensity of infection (more than 40 parasites on the body surface and more than 80 on gills) was determined in farmed tench (14%) and in Iberian barbel (*Luciobarbus bocagei*) (91%) and Duero nase (*Pseudochondrostoma duriense*) (71%) of middle stretches of rivers. The prevalence was similar between farmed tenches and cyprinids of middle courses. *Tripartiella* sp. was only found in barbels (prevalence in middle stretches, 0.7%) and in farmed tenches (63%), this species resulting in a high risk factor (odds ratio, OR= 1143) in the presence of the ciliate. There were no differences between the two species relative to the intensity of parasitization. Some of the physical, chemical and microbiological water quality parameters appear to be risk factors in the presence of *I. multifiliis*, with maximum OR of 8. Nevertheless, in *Tripartiella* sp., the risk is multiplied by 720 when the pH value exceeds 8.4, if we consider the total of the data, and it is increased more than 500 times if we only consider the values recorded in the fish farm (529 by nitrates > 3 mg/l; 530 by total coliforms > 100 CFU/100 ml). However, the high prevalence and risk of infection by *I. multifiliis* and *Tripartiella* sp. in fish farms should be related to environmental factors that dependent upon sampling point rather than in direct influence of the physical-chemical and biological parameters of the water. The high pH value recorded in the fish farm (9.62 ± 0.76) is the only parameter that we consider may have a substantial direct influence. Chronic exposure to alkaline pH levels can be a chronic stress generator, predisposing to parasitization by *Tripartiella* sp. In conclusion, often minor changes in ecosystem conditions, both natural and man-made, can modify the host-parasite relationship, resulting in an increase in the prevalence and intensity of parasitic infections in populations of cyprinids, sometimes causing disease outbreaks.

Keywords : cyprinids, fish, parasites, protozoa, risk factors

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