

Parasites as health indicators in wild fish populations

Abstract

More often than not, when we are watching TV or reading the news, we see these images of piles of fish agonizing and dying on the shores of numerous rivers and lakes, and we can't help to wonder what is happening with the aquatic ecosystems worldwide. *Can we drink that water and eat those fish anymore?* We also think. In the last few decades, since the first studies on fish parasitology until now, the scientific community has made great advances on this subject and can provide us with some useful information regarding management and prevention. Here, we present you another opinion, based on the conclusions of some researchers, about a new role for the fish parasite communities, this time as helpers and indicators of the health status of the wild fish populations and the whole aquatic ecosystem.

Keywords: Parasites, Fish populations, Mortalities, Health indicators, Water quality

Volume 3 Issue 1 - 2015

Gonzalo Illan

Independent Aquaculture Consultant, Spain

Correspondence: Gonzalo Illan, Tel +34610425220,
Email gonzaloillan@hotmail.com

Received: October 24, 2015 | **Published:** October 29, 2015

Introduction

Parasites play a key role in natural ecosystems, mainly considering that their life cycles are developed among different hosts, either vertebrates or invertebrates. Hence they play an important role on the ecological balance of the aquatic ecosystems, sometimes acting as a control mechanism of the size of wild fish populations. And also for this reason, they are involved in fish mortalities in inland water ways, especially during the warm summer months.¹ But how do these organisms shift from a harmless and even positive role to such a harmful state? Whether we see them or not, in natural populations of animals and plants, parasites are always present, normally under a complex and dynamic balance within the populations of living things.

Conclusion

Under normal circumstances, fish, the apex of most aquatic trophic chains, are always infected by a considerable number of parasites. However, there may occur a slight change within the environment, of natural or anthropic origin, the scenario may change in a very significant way, affecting the parasite-host balance and thus leading to an epizootic situation where one or more types of parasites can thrive. This situation may last for long depending on how affected has been the balance and the health status of the fish population. Even though the original situation may come back to normal eventually, and a new balance can be established again, these populations can lose a part of their members during the disease outbreak.²

These losses, sometimes including a big part of the population, and of course their environmental and economic impact, are difficult to estimate, especially in rivers or other natural ecosystems. Moreover, we still can't get even close to calculate the loss of fish biomass as a result of a parasite epidemic. In order to do that, we would have to know how the fish growth and reproduction are affected as a consequence of the process of infestation and mechanical damage.^{3,4} As expected, the human intervention on the fish habitat usually makes things worse. It's being observed that some hydraulic modifications have caused a negative effect on the hydrological, physicochemical and biological parameters of the water, leading to the impoverishing of the fragmented habitat and the life conditions for the fish populations.⁵ Some of the more studied effects are related with the building of small dams on the river basins, which creates a new type of habitat more similar to a reservoir or a small lake and eventually changes the ecological balance and also the host-parasite relationship, with the

fatal consequences mentioned above. Examples of these phenomena are very well documented.^{6,7}

But this is not the only case. In the last few years we all have probably seen in the news quite a few events, frequently related with water pollution that have ended up in disastrous fish mass mortalities. These cases won't stop unless we are able to get more information about the aquatic ecosystems, analyze what have caused them and take the due measures in the shortest time possible. In other words, we have to change from a reactive to a *preventive* perspective. For all this reasons, and as many authors,⁸ are stressing in the last few years, researchers and environmental agencies must learn to use the value of the fish parasites (presence, abundance and diversity) as real *indicators* of the health of their fish host and the whole ecosystems. In order to do that in an effective way, we have to recognize the importance of the small living things regarding the functioning of the habitats and ecosystems, and to provide those who are involved with its management with the necessary information, training and tools to do their job.

Acknowledgements

The author is grateful to the staff of the Regional Government of Castile and Leon, especially to the environmental agents who helped me out with the fish and water sampling during the years of my doctoral research, and the Fish Pathology Laboratory, University of Zaragoza (Spain), for their technical assistance.

Conflicts of interest

None.

References

1. Petrushevski GK, Shulman SS (1961) The parasitic diseases of fishes in the natural waters of the USSR. In: Dogiel et al. (Eds.), Parasitology of Fishes. Oliver and Boyd Ltd., London.
2. Dogiel VA, Petrushevski GK, Polyanski YI (1961) Parasitology of Fishes. Oliver and Boyd Ltd., London.
3. Bauer ON (1961) Relationships between host fishes and their parasites. In: Dogiel et al. (Eds.), Parasitology of Fishes. Oliver and Boyd Ltd, London.
4. Hoffman GL (1998) Parasites of North American Freshwater Fishes (2nd edn), Comstock Publishing Associates, USA, pp. 539.

5. Loot G, Reyjol Y, Poulet N, Simkova A, Blanchet S, et al. (2007) Effects of small weirs on fish parasite communities. *Parasitol Res* 101(5): 1265-1276.
6. Illán G (2012) Description and epidemiological characterization of the parasite fauna of cyprinid fish in the upper and medium basin of the Duero River (Spain). Veterinary Faculty, University of Zaragoza. Doctoral Thesis.
7. Álvarez-Pellitero P (2012) Fish parasites. Part 1. Parasites of continental fish of the Duero basin (NW Spain). An approach to aspects of the host-parasite relationships. Lambert Academic Publishing.
8. Valtonen ET, Holmes JC, Aronen J, Rautalahti I (2003) Parasite communities as indicators of recovery from pollution: parasites of roach (*Rutilus rutilus*) and perch (*Perca fluviatilis*) in central Finland. *Parasitology* 126(7): 43-52.