

SEASONAL VARIATIONS OF *Ichthyobodo necator* (HENNEGUY, 1883) IN FERAL BROWN TROUT AND ASSOCIATED MORTALITIES IN CULTURED FISH

BY CASTILLO, J.A., PERIBAÑEZ, M. AND LUCIENTES, J.

The flagellate protozoan *Ichthyobodo necator* is an obligate ectoparasite that occurs on the skin and gills of both marine and freshwater fish, causing a disease called Costiasis which can result in mortalities of fish, especially in the case of cultured salmonids.

During the Autumn of 1988, an increased mortality rate among farmed brown trout fry was reported at the Planduviar Hatchery in the Spanish Pyrenees, after preventive treatments were interrupted. This hatchery is supplied from the River Ara and the maximum temperature of the water in the fish-farm is 10°C throughout the year. Bacteriological, virological and parasitological investigations were carried out. The skin and gills of the diseased fish were heavily infected with *I. necator*.

After this investigation, both farmed and feral brown trout were sampled at regular intervals from October 1988 to the Summer of 1990 and the seasonal variations in infec-

tions by *I. necator* were recorded. Six fry (under one month old) from each tank were placed in a plastic flask with 50 ml of 10% formaldehyde. After 48 h. the formaldehyde solution with the fish was centrifuged at 600 g for 15 min and the debris was examined. Fingerlings and mature adults from the hatchery, as well as feral trout from the river, were examined by way of wet scrapings, and small pieces of gill and skin were processed in formaldehyde and then centrifuged. The parasite was also identified from histological sections from the gills and the skin of all the fish.

Fry under 10 cm in length were infected with *I. necator* in October 1988 and in June 1989, in both cases after the routine treatments had been interrupted. The parasite was found in 10 out of 12 and in 8 out of 12 indoor tanks, with the mortality rates being about 15% and 5% respectively. The highest mortality recorded was among the fry under one month old, even before their yolk sacs

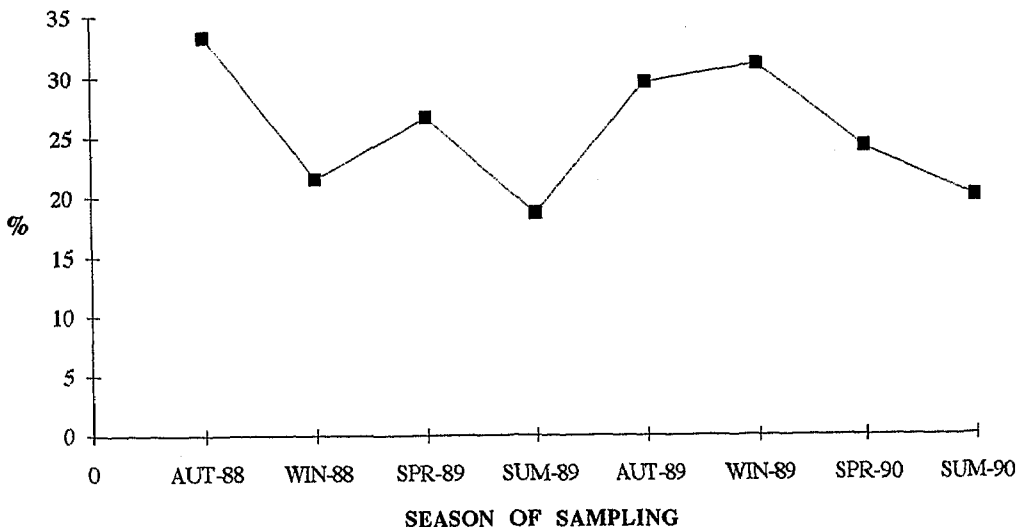


Fig.1. Seasonal prevalence of *I. necator* in feral brown trout during 1988-90.

had been absorbed.

Fingerlings (over 10 cm) in outdoor tanks had *I. necator* present on the skin and gills on the same dates as above; however, increased mortality rates were not observed.

Mature trout in the hatchery, which had previously been caught from the river for their spawn, were also infected in October 1988. Mature brown trout from the river showed *I. necator* at every sampling carried out during a period of two years; it is associated with cold water, always below 10°C, and its maximum prevalences are in the Autumn, rather than in the Summer when the water temperature is at its highest (Fig 1). Heavy infections by this parasite have also been related to the Autumn in cold waters (Bullock and Robertson, 1982); however, the parasite lives in a wide range of temperatures and it is considered that it multiplies most rapidly at about 25°C (Becker, 1977).

Infected fish appeared in farmed brown trout when the control measures were inadequate. Although mortality was not observed among fish older than one month, it reached 15% among the fry. Age is an important factor in the severity of the infection and, by contrast to other ectoparasitic infections, the highest rate in prevalence and in mortality by *I. necator* are usually among fry and young fingerlings, showing the preference of the parasite for attacking the youngest fish (Wood, 1968) or the immunity of adults as a consequence of previous infestations (Becker, 1977).

Infections were effectively controlled by formalin baths (1:3000 for 30 minutes). Preventive treatments in eggs and fry are necessary throughout the year in order to control new infections which pass into the hatchery from the reservoir host by way of the water supply drawn from the river.

Summary

Ichthyobodo necator has been found on the River Ara (Spanish Pyrenees) at every sampling carried out during a period of two years. It is associated with cold waters and the maximum prevalences were in the Autumn. Infected fish appeared in farmed brown trout with mortality rates reaching about 15% among the fry.

Acknowledgements

This work was supported by D.G.A Research Project P CA 4/88 and COMENA (D.G.A) funds.

References

- Becker C.D. (1977). Flagellate parasites of fish. In Parasitic Protozoa. Volume 1. (Edited by J.P Kreier), pp. 357-416. Academic Press. New York.
- Bullock A.M. and Robertson D.A. (1982). A note on the occurrence of *Ichthyobodo necator* (Henneguy, 1883) in a wild population of juvenile plaice, *Pleuronectes platessa* L.. J. Fish. Dis. 5, 531-533.
- Wood, J.W. (1968). Diseases of Pacific salmon; Their prevention and treatment. State of Washington, Department of Fisheries, Hatchery Division, Olympia, Washington.

Author's address:

Departamento de Patología Animal (Parasitología y Enfermedades Parasitarias). Facultad de Veterinaria. Universidad de Zaragoza. C/ Miguel Servet 177. 50013. Zaragoza. SPAIN