TROUT, *SALMO TRUTTA*, MOVEMENTS IN RIVER ESTORÃOS

(LIMA BASIN, NORTH PORTUGAL)

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EXTENDED ABSTRACT ONLY – DO NOT CITE

Different patterns of fish movements have been described. Some authors consider that fish populations are relatively discrete units exhibiting restricted movement (Gerking 1959), but others consider that populations are composed by mobile and sedentary fractions (Baglinière et al., 1989; Ovidio, 1999), and that frequently switch behaviour (Ovidio, 1999; Elliot, 1994). Several factors have been pointed to explain stream fish movements and amongst them we can refer spawning needs, responses to seasonally changes, either ecological or biological factors, and even genetic differences.

Radio-telemetry was used to monitored trout, *Salmo trutta*, movements in river Estorãos, a small tributary of river Lima (North Portugal) (Figure 1), in order to establish different patterns of life cycle.

River Estorãos is the most southern catchments of the Iberian Peninsula where trout anadromous form has been described (Valente, 1993). The last 6 Km of the river are accessible to all species. However 2.2 Km further are also available, but only during flood periods as a consequence of several small artificial barriers.

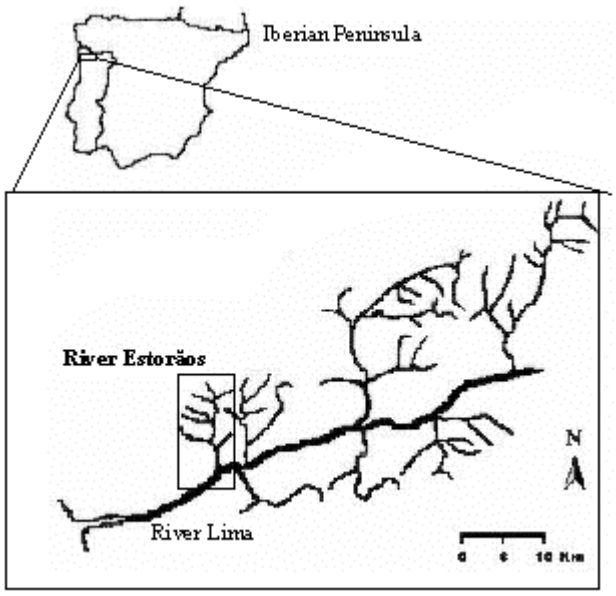

Figure 1 – Location of river Estorãos (Lima basin, North Portugal).

Fourteeen trout (fork length ranging from 24.6 to 46.6 cm; weight ranging from 161.8 to 967 g), were caught in two trap systems (placed 1.1 and 5.5 Km of the river confluence, respectively trap 2 and trap 1) or electrofishing.

An internal transmitter (Model 357 A.T.S. Inc., less than 2% of the body mass, 40 MHz) was surgically implanted in the abdominal cavity.

Trout were monitoried in two different periods, six from February to June 2000 and eight from November 2001 to April 2002. The location of each trout was registed at least once every day (February to April 2000 and November 2001 to April 2002) and three times a week during May to June 2000.

Water temperature, water velocity and flow were also registed, both periods.

Three different life cycle strategies seem to be adopted by trout population in river Estorãos (and in the Lima basin). A fraction of the population, apparently the bigger, seems to spent the hole life cycle in river Estorãos, exhibing only small movements with occasional longer displacements (Figure 2, trouts 3 and 4). Another fraction, much smaller, displays long

distance movements between river Lima and river Estorãos, specially during spawning period (Figure 2, trout 5). Another small number of trout represents the third life cycle strategy, characterised by long distance migrations between river Estorãos and the Lima estuary and/or sea. This last strategy was evidencied by the capture, in trap systems, of both smolts and adult sea trout, and the capture of marked trout in the sea. Trouts 1 and 2 are example of strategies tipe II and III.

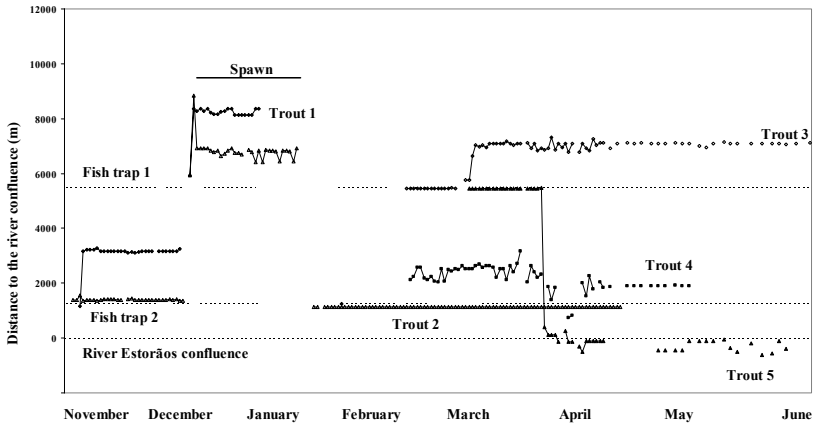

Figure 2 – Squematic movements exhibited by some tagged trout, indicating distance travelled. Trout 1 and 2 were monitoried between November 2001 and April 2002. Trout 3, 4 and 5 monitoried between February and June 2000. Empty spaces in traps locations outpoint flood periods, without trap control.

Major movements detected appeared to be associeted with spawning and post-spawning behaviour. The larger upstream displacement detected was aproximatlly of 7200 m (in 3 days) (Figure 2, trout 1). This site was reached by three monitoried individuals, and further upstream movements were limited by an untransposable dam. Most of this movements occured during night, and were associeted with rain periods followed the increase of the flow. Downstream displacements were monitoried up to the confluence with river Lima. We were unable of controling further displacements in river Lima.

From 04/01/02 to 03/02/02 we observed trout spawning, however, and dispite monitoried trout stayed in the proximity of the reads locations, we did not observed any tagged individual in spawning activity.

A preliminary statistical analysis indicates a probable relationship between movements detected and the environmental variables studied. Most of the movements (80 %) occured at temperatures between 9 and 15 ºC. At temperatures lower than 9 ºC movements of more than 500 m were not observed. For river flow values higger than 2 $m^3.s^{-1}$ the number of movements longer than 500 m duplicates.

Our results confirm the presence of three life cycle strategies as referred by other authors (Baglinière et al., Elliot, 1994; 1989; Ovidio, 1999). However the migratory fraction seems to be reduced.

Our results stress the need for the knowledge of fish life cycle variability to the development of management and conservation of fish populations, and to the need of acessible river corridors for migratory species.

Acknowledgements

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