

Do Dominant Fish Grow the Fastest ?

Stead, S. M.^{1&2}

¹Department of Zoology, University of Aberdeen, Tillydrone Avenue,
Aberdeen, AB9 2TN, Scotland, U.K.

Phone: (0224) 295303

FAX : (0224) 295511

Houlihan, D. F.¹, McLay, H. A.² and Johnstone, R.²

²SOAFD Marine Laboratory, P.O. Box 101, Victoria Road,
Aberdeen, AB9 8DB, Scotland, U.K.

240 Atlantic salmon were anaesthetized (MS-222, 0.1 g l⁻³) weighed (initial wet weight 30.0 ± 2.0g) and randomly allocated to one of six tanks (identical to the stock tanks) on 19 March 1993. Initially, each tank contained 40 fish, individually marked by alcian blue injection on the ventral surface. The tanks were divided into three groups so that replicate tanks were fed either a low, medium or high ration (0.5, 1.0 and 3.0% b.w. day⁻¹, respectively).

Photoperiod varied between 10 and 15 hours of daylight during the study (19 March - 11 November 1993). The experiment was conducted under ambient fresh- (mean = 8.8°C, range 6 to 14°C) and sea water (mean = 11.4°C, range 8 to 13.5°C) temperatures.

Following an initial acclimatization period (19 March - 13 April 1993) individual food consumption was monitored using X-radiography on four occasions during the freshwater phase (14 April - 15 May 1993) and on five occasions after all the fish had been transferred to sea water (16 May - 11 November 1993).

The data collected in this experiment was compiled in to four phases : freshwater (14/04/93 - 13/05/93), transfer (16/05/93 - 07/06/93), short sea water (13/07/93 - 10/08/93) and full sea water (13/07/93 - 11/11/93). A short sea water phase was included because both of the tanks on 3.0% b.w. day⁻¹ rations suffered 100% mortalities due to a failure in sea water supply. This extra phase allowed comparison of the data for all of the tanks up to this time.

Individual specific growth rates increased significantly with increasing ration size in the freshwater phase and both the sea water phases. In contrast, during the transfer phase individual specific growth rates were highest in the low ration groups and least in the high ration groups.

Figure 1 shows the specific growth rates in freshwater (a and c) and sea water (b and d) for individual fish in two of the six tanks, tank 1 was fed a low ration (0.5 % b.w. day⁻¹) and tank 2 was fed a medium ration (1.0 % b.w. day⁻¹). The individual specific growth rates for each of the two tanks in freshwater are ranked in descending order and the respective specific growth rates for the corresponding fish in the sea water phase are plotted directly below. The fish with the highest and lowest specific growth rates in the freshwater phase do not grow the fastest or the slowest in the sea water phase.

This paper aims to explore the relationships between individual growth and feeding rates of Atlantic salmon at different ration levels.

FIG. 1. Effects of ration size and seawater transfer on specific growth rates of individual Atlantic salmon.

