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Abstracts

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STIMULATION OF THE SMOLTIFICATION BY HORMONAL TREATMENT IN THE ATLANTIC SALMON

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Three successive generations of Atlantic salmon were reared in Freshwater (FW) in the hatchery of Le Conquet in Brittany (48 ° N) in 1988, 1989 and 1990. Each batch of fishes smoltified each year in April at 15 months old. Fish were regularly sampled to check the growth and survival. At different dates of the year, these salmon were experimented in the Centre Océanologique de Bretagne in Brest in order to precociously trigger the parr-smolt transformation and to improve the sea water adaptability, using different hormonal treatments.

In October and December 1988, then in February 1989 at 6, 5 and 2 months of the "normal" end of smolting period and migration, mammalian growth hormone (oGH) implantations were able to stimulate the gill ($\text{Na}^+ - \text{K}^+$) - ATPase activity and to allow the fish (both pre-smolts of 28, 30 and 35 g and parr of 7 and 8 g) to control the osmotic disbalance (blood plasma osmotic pressure and chloride) after direct transfer from FW to full salinity sea water (35 ‰, SW). Survival (100, 94 and 100 % after one month) and growth were very high in pre-smolts. In the same conditions 36 and 45 % of parr survived and grew in SW. In April 1988, April and June 1989, during smolting periods, oGH did not allow us to improve the SW adaptability in smolts of 55, 47 and 71 g. All the fish well adapted to SW.

In October 1989, cortisol, mammalian prolactine (oPRL) and oGH in implantations and tri-iodothyronine (T_3) in the food were used in the same way : only oGH was able to stimulate the sea water adaptability of 38 g pre-smolts. Combined treatments cortisol + oGH / T_3 + oGH / oPRL + oGH increased the capacities of fishes to adapt and to grow in SW.

In January (in pre-smolts of 36 g) and June 1990 (in parr of 11 g), using a trout recombinant growth hormone (rtGH EUROGENTEC) to treat the fish in implantations, we obtained high survival (100 % in pre-smolts, 65 % in parr) and good growth after direct transfer to SW. Used rtGH is at least 40 times more potent than oGH.

From all the hormones used in our experiments to improve the full salinity sea water adaptability in small Atlantic salmon during the first year, (0 + age smolts) only growth hormone (both mammalian and recombinant) was able to stimulate all the components of the parr-smolt transformation. These treatments allow us to trigger the smolting phase early in the life of the fish and could be perhaps used in the future in aquaculture.