

SCIENTIFIC REPORT	
Reference	Short Term Scientific Mission COST FA1304
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STSM Reference Code	COST-STSM -FA1304-35326
STSM Title	Using sustained exercise to enhance brain plasticity, cognition and foraging behaviour in Atlantic salmon

1. Summary

The rearing environment in aquaculture facilities determines fish development, quality and welfare. Producing high quality fish is important for both fish production for human consumption and restocking programs. Current stocking programs introduce millions of juvenile Atlantic salmon in rivers in Northern Europe every year. Unfortunately, fish reared in hatcheries often have lower survival rates than wild fish because they lack the neuronal and behavioural plasticity to adapt to life in the wild. To improve the welfare and performance of stocked fish and to increase the efficacy of stocking programs, we are searching for methods to improve fish quality in hatcheries. A promising tool to realize this is swimming exercise. Exercise in mammals has been shown to enhance brain plasticity and boost cognition (exercised rats solve a maze quicker). During this STSM, we determined if an 8-week exercise regime can enhance brain plasticity, cognition (as measured by a maze test) and foraging behaviour of salmon parr. The study was conducted at Wageningen University & Research under supervision of Dr. Arjan Palstra. Having just completed the experimental work, we are currently in the process of quantifying the expression of brain plasticity markers such as *bdnf* and *cfos* in the telencephalon of exercised and control fish. First results are expected in early 2018. In terms of growth, exercised fish showed significantly higher growth rates and resumed feeding more quickly after being handled than control fish.

