

SCIENTIFIC REPORT	
Reference	Short Term Scientific Mission COST FA1304
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STSM Reference Code	COST-STSM -FA1304-081015-067690
STSM Title	Evaluation of the effects of sustained swimming on male reproductive development and potential application of swimming to control early maturation in male sea bass (<i>Dicentrarchus labrax</i>)

Summary



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The objective of the work carried out during this STSM was to evaluate the effects of sustained swimming on male reproductive development in an economically important species, namely the European sea bass (*D. labrax*), that is commonly subject to precocious testicular maturation promoted by the actual rearing conditions. Under common aquaculture conditions, fish are optimally fed in order to ensure that they grow as fast as possible resulting in the deposition of sufficient energy reserves to trigger their sexual maturation prematurely when compared with their wild counterparts. The STSM was performed between October and December of 2015, at the Department of Physiology and Immunology at the Universitat de Barcelona (Spain) and was supervised by Dr. Josep V. Planas. Previous collaborative studies between IMARES and the University of Barcelona, pointed out that sustained swimming results in a decrease in the gonadosomatic index of juvenile male sea bass. Starting from this experimental result, testicular mRNA expression levels of genes involved in gonadal development and growth were analyzed by qPCR in fish subjected or not to a swimming training regime (U_{opt}) in order to establish, on a more fine molecular level, the effectiveness of swimming in shifting the energy reserves that are at the base of the trade-off between growth and reproduction at the onset of puberty. Moreover, hematoxylin-eosin stained histological sections of testicular samples from juvenile sea bass subjected or not to sustained swimming were examined to accurately determine the different spermatogenic stages and accurately quantify the relative abundance of the various germ cells (spermatogonia, spermatocyte, spermatid, spermatozoa).

The main results obtained reveal that juvenile male European sea bass subjected to swimming show a strong decrease in the expression of genes related to steroidogenesis and gametogenesis when compared to the control group. This STSM successfully achieved the main objectives initially defined, allowing to strengthen the notion that swimming may be a feasible strategy to decrease male gonadal development and address the significant issue of male precocious maturation in the European sea bass aquaculture.