

SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

Action number: FA1304

STSM title: Is swimming linked to oxidative stress in fish?

STSM start and end date: 19/02/2018 to 20/03/2018

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SUMMARY

The aim of the STSM was to test if swimming speeds between optimal swimming speed (U_{opt}) and critical swimming speed (U_{crit}) may induce oxidative stress in key fish tissues (muscle/ liver/ heart) and evaluating how swimming activity may affect stress/ metabolic markers in blood, as a form to assess welfare under the experimental conditions. Swimming speeds above the U_{opt} and below the U_{crit} may involve the complete recruitment of all red muscular mass (aerobic energy production) as well as a significant proportion of white muscular mass (anaerobic energy production) for locomotion, and therefore an increased demand for energy and oxygen requirements to power muscle contraction.

Changes from the original proposal were introduced, as rainbow trout (*Oncorhynchus mykiss*) available to perform the experiment had large body size to be properly fit on the swimming tunnels to carry out the trials. Instead of rainbow trout, the European sea bass (*Dicentrarchus labrax*) is used in the trials, keeping in mind as well future experiments employing this species when testing the effects of swimming conditions and dietary treatments. Other change was related to the fact that using current experimental setup, U_{crit} could not be determined (see below for details), so we used data for sea bass available in literature. As a speed that could induce reactive oxygen species (ROS) formation in muscle mitochondria, which may result in oxidative stress, 72.5 cm/s (approx. 4.4 BL.s) was used. Moreover, a third group was included in the experimental trials, in which fish were subjected to alteration of swimming activity and resting, in order to induce higher levels of oxidative stress.

