Rapid sex determination in Salmo salar

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**Duration:** 6 months

**Short introduction:**
In modern aquaculture, fish are exposed to unavoidable stressors, which can be detrimental to animal health and welfare. Individuality in stress reactions have to be included in the concept of animal welfare. Such differences often take the form of suites of traits, or stress coping styles (SCS), where traits like sympathetic reactivity, aggression and the tendency follow and develop routines show positive relationships.

The aim of this project is to determine the gender/sex in approx. 2000 juvenile salmons by a protocol derived from Eysturskard 2017. Besides determining the sex of the fish, the project will also integrate some statistical analysis. The fish has been subjected to a behavioural test (open field) in order to establish SCS. We will now examine if male and female juvenile salmon differ in behavioural profiles. This has never been studied before due to the difficulties in determining sex of juvenile salmon.

**Behavioural test – Open field**
The juveniles were tested in September-October 2017 in an open field test. A mirror was introduced in order to determine agonistic interactions as well as overall activity.

**Manual scoring – Behavioural Observation Research Interactive Software (BORIS)**
Some of the movies have been analysed partly in an observational software and the possibility exists to add to more analysis.

**Method:**
Morphological sexing of Atlantic salmon (*Salmo salar* L.) has proven to be difficult in immature stages as well as in adults. Non-lethal sex identification is therefore of crucial need. In 2013, the male-specific master sex-determining gene sdY (sexually dimorphic on the Y chromosome) was found to be conserved in nearly all salmonid species (Yano, Nicol, Jouanno, Quillet, Fostier, Guyomard & Guiguen 2013). A fragment of the first exon of the sdY gene was amplified and the polymerase chain reaction (PCR) products were revealed using agarose-gel electrophoresis (Eysturskard 2017).

Adipose fin from juvenile salmon will be used in order to do a rough DNA extraction and measure the potential possession (male) or not (female) of the gene *sdY*.

**Timeplan:**
1) Student will familiarize with lab procedure.
2) DNA “extraction” from adipose fin.
3) Blotting the DNA result on Agarose gel
4) Statistics and data analysis, compare behaviour of male and female fish
5) Summarizing results and writing report.

Specific aims:

The aim of this project is to explore sex differences in behaviour of juvenile salmon

References:

Aljanabi & Martinez, 1997. Universal and rapid salt extraction of high quality genomic DNA for PCR-based techniques.


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