

## AQUAEXCEL TRAINING COURSES SERIES

Date: **18-22 November 2013** Location: **University of Stirling, Scotland**

### COURSE OUTLINE

**TITLE:** The Application of Chromosome Set Manipulations and the Importance of Gamete Collection and Management in Aquaculture

### COURSE DESCRIPTION

Chromosome Set Manipulation (CSM) technology is used in fish and shellfish aquaculture and has important applications in the development of unique genotypes for basic research (haploid, meiotic and mitotic gynogenetic and androgenetic individuals) and direct commercial applications to the aquaculture industry (sterile triploids and investigation and manipulation of sex-determination systems e.g. YY males). The workshop will give practical training in the collection, handling and storage of gametes for these purposes, from a range of species, but with a focus on salmonids and tilapias as examples. The course will compare and contrast the range of shock treatments that have been used to enhance the retention of the second meiotic and first mitotic divisions across species. The UV and X-ray inactivation of milt and ova DNA will be undertaken, and the optimisation of such procedures discussed. Methods for validation of the offspring from the various experiments will be discussed and a range of techniques (e.g. karyotyping, flow cytometry, genetic fingerprinting, sex ratio) demonstrated. Tilapia and trout will be used for the practical work but the teaching outcome should enable those completing the course to develop a programme of spawning induction, gamete management and CSM for research or commercial purposes in a new fish species. The course will use the experiences, examples and data generated through Work Package 9 (WP9) of the AQUAEXCEL project.

### COURSE CONTENT

Main parts of the course:

- Principles of CSM in aquatic organisms
- Applications of CSM in the management of aquatic organisms
- Gamete management
- Applications of gamete storage
- Tilapia reproductive biology
- Trout reproductive biology
- Cool storage and cryopreservation
- Application of technologies
- Gynogenesis and androgenesis
- Double haploids and isogenic lines
- Verification of ploidy status
- Aquaculture and restocking

#### COURSE 1

**Title:** Recirculating Aquaculture System (RAS) Technology  
**Course Provider:** Aquaculture and Fisheries Group, Wageningen University (the Netherlands), with the expertise of NOFIMA, IFREMER and IMARES  
**Location:** Wageningen University, the Netherlands  
**Date:** 22-25 April 2013

#### COURSE 2

**Title:** Contribution of Genomic Approaches to the Development of Sustainable Aquaculture for Temperate and Mediterranean Fish  
**Course Provider:** INRA  
**Location:** Rennes, France  
**Date:** 16-18 October 2013

#### COURSE 3

**Title:** The Application of Chromosome Set Manipulations and the Importance of Gamete Collection and Management in Aquaculture  
**Course Provider:** Institute of Aquaculture, University of Stirling  
**Location:** Stirling, UK  
**Date:** 18-22 November 2013

#### COURSE 4

**Title:** Efficient Utilisation of New Monitoring and Control Systems in Fish Experiments  
**Course Provider:** NTNU and SINTEF Sealab  
**Location:** University of Science and Technology (NTNU), Trondheim, Norway  
**Date:** 19-22 May 2014

**COURSE ORGANISERS:** Institute of Aquaculture (IoA), University of Stirling, with additional inputs from scientists based at l'Institut National de la Recherche Agronomique (INRA), France, and the Institute of Marine Research (IMR), Norway.

**TARGET AUDIENCE:** Participants should have some experience in the handling of live fish and want to gain experience in gamete handling and management and the application of CSM techniques in the course of their work or research.

### COURSE TUTORS:

- Professor Brendan McAndrew (IoA) • Professor Herve Miguad (IoA) • Dr David Penman (IoA) • Dr Tom Hansen (IMR)
- Dr Julien Bobe (INRA) • Dr Catherine Labbe (INRA)

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**Date:** 18-22 November 2013 **Location:** University of Stirling, Scotland

### COURSE OUTLINE

**LOCATION:** The course will be based in IoA, University of Stirling, Stirling, Scotland, and will use the on-campus tropical fish facilities and the coldwater facilities at the Buckieburn laboratory and Howietoun Fish Farm. [www.aqua.stir.ac.uk](http://www.aqua.stir.ac.uk)

**DATE:** 18-22 November 2013. Four full days, including an evening programme.

**REGISTRATION:** Visit [www.aquaexcel.eu/training\\_courses](http://www.aquaexcel.eu/training_courses) for online registration. Participants are requested to submit their CV and a brief description outlining their motivation for attending the course. In the case of the course being oversubscribed, priority will be given to those with active interests in the topic. Places will be confirmed at least one month before the start of the training course. Admittance to the course will be confirmed officially. Please do not make travel arrangements unless you have received official confirmation.

**FEES:** Course attendance is **FREE**, thanks to EC FP7 funding. Participants are expected to pay for their own travel, subsistence and accommodation.

**MAXIMUM PARTICIPANTS:** 25 people (CV & description of motivation for wanting to attend the course may be used as selection criteria).

**LANGUAGE OF INSTRUCTION AND MATERIAL:** English

### PRACTICAL INFORMATION

**TRAVEL TO LOCATION:** [www.stir.ac.uk/about/getting-here/](http://www.stir.ac.uk/about/getting-here/)

**ACCOMMODATION:** [www.stir.ac.uk/campus-life/accommodation/](http://www.stir.ac.uk/campus-life/accommodation/)

**OTHER INFORMATION:** The course will be run in November to coincide with the peak of the trout and salmon spawning season to ensure a good supply of fresh gametes. This time of year can be cold and wet, so participants should bring appropriate warm clothing. Participants will be expected to handle and strip live fish, protective clothes for this work will be supplied.

### PROGRAMME

Distance Learning Element:	The training will make use of distance learning elements via an AQUAEXCEL Moodle site. Participants will receive further information about this element after registration.
Field trips:	Trips will be run to look at the practical application of Triploid techniques in the trout and salmon industry in Scotland.
Units & Learning Outcomes	<ol style="list-style-type: none"> <li>1. Practical training in gamete collection and storage using gametes from trout and tilapia.</li> <li>2. Principles of CSM and practical training in the deactivation of paternal and maternal genomes and the timing of the physical shocks used to disrupt meiotic and mitotic events.</li> <li>3. Validation of the genotype of the offspring from various CSM using cytological and molecular techniques.</li> <li>4. Applications of CSM in research and industry.</li> </ol>