

Making a Splash

In this discussion, Drs Juan F Asturiano and Ákos Horvath explain the importance of standardised methodologies in aquatic gamete biology, and the work they have undertaken to introduce protocols and guidelines to the scientific community



relationships established between groups of research has been rewarding.

AH: Our group at the Department of Aquaculture at Szent István University has been working for many years to develop methods of sperm cryopreservation in aquatic species, but we are aware that there is only slow progress being made here.

avoiding the overlapping research funded by the EU, and maximising the dissemination of results. Our intention is to arrive from the 'street' level to the elaboration of recommendations for policy makers (national, EU, bilateral cooperations, etc.).

We are in constant contact by email or videoconferences, and we will organise at least one core group meeting per year throughout the four years of this Action, as well as the International Workshops on Biology of Fish Gametes.

Could you outline the primary objectives of the AQUAGAMETE European Cooperation in Science and Technology (COST) Action?

AH: The main objective of the Action is to harmonise and standardise evolving analytical methodologies used in assessing the quality of aquatic gametes, improving their different uses, enhancing aquatic resources and transfer from academia to the industry. This includes a very broad area of activities, but the bottom line is that we aim to produce replicable methods in aquatic gamete biology that will later harness their movement into aquaculture practice.

JFA: AQUAGAMETE aims to reach a consensus on protocols and guidelines (using internationally defined terminology, units of measurement and format of reporting) that permit the use of results in relational databanks for sound and common application in aquaculture research and commerce.

Can you describe your role in the implementation of AQUAGAMETE? What opportunities led you into this field of research?

JFA: Organising the network, writing the proposal with the help of some colleagues (in particular Dr Horvath and Professor Harald Rosenthal) and paying attention to the Action management have been an obvious effort. The formation of young researchers and the

Why is it important to reach a consensus on the use of protocols and guidelines, for research areas such as reproductive biology, genetic research, biotechnology and aquaculture?

AH: There are scientific reasons as well as technological ones. The most important scientific reason is that many methods – once they are published – are very difficult to replicate: the scientist follows the published protocol and observes completely different results. This is very common in fish gamete biology and it should not be this way. A standard format of reporting should be established and accepted by this segment of the scientific community in their best interests. The technological reasons are linked to our desire to see our methods applied to the practice: people involved in business do not use descriptions of experimental results as a protocol. They need clearly described technological steps of a given method (for example, an instructions manual) to use it.

AQUAGAMETE is divided into four Working Groups (WGs) led by researchers from different organisations. Can you elaborate on how collaboration is integral to furthering the aims of this project? How do you facilitate communication between the working groups?

JFA: The coordination of research in and between the WGs will be increased with specific meetings, with the main objective of

How do you ensure maximum outreach potential for AQUAGAMETE?

JFA: By means of dissemination:

- Our webpage and blog (www.aquagamete.webs.upv.es) helps in the aim of ensuring the dissemination of planned activities of the Action, showing results, documents (publications, conclusions, reports) and including links to other participating institutions to increase interactions
- The progress reports required by COST are published on their website (www.cost.eu)
- Press releases (for general audience) using the involved institutions' systems (ie, journalists, university radio/TV, regional TV, etc.)

Are you working to recruit new research groups?

AH: Yes, I would like to stress that although our partners in this COST Action are research groups or companies, this is by no means an exclusive club. If you are interested in collaborating with us please contact your national Management Committee members or the Chair and Vice-Chair of the Action for the latest news and updates, send us information regarding your research group or company which can be posted on the website and get involved in our activities. We will be more than happy to welcome you on board.

Aquatic species gametes

With an increasing global demand for responsible fishing and aquatic conservation, **AQUAGAMETE** project is conducting important studies into how understanding of aquatic gamete biology can be improved and transferred successfully from academia to industry

THE AQUAGAMETE EUROPEAN Cooperation in Science and Technology (COST) Action began its work in March 2013 with the collective objective of standardising protocols and methodologies in the field of aquatic gamete biology. The need for such standardisation was born out of the varying methodologies and techniques employed by individual research facilities, which often produced varying, and sometimes contradicting results. Leading scientists of the field recognised that enhancing the scientific community's understanding of aquatic gamete biology would require the introduction of standard practices and procedures to make the replication of results easier.

By establishing standardised practices, COST also hopes to bridge the gap between academia and industry through making their methodologies and techniques applicable to the growth of commerce. Until recently, the application of academic research in aquaculture to the commerce industry has been hampered by many variables, including: the diversity of fish species and aquatic environments; a lack of scientific networks; the absence of standardised techniques for the assessment of gamete quality; overlapping of research amongst research institutions; the high costs of experimentation; and a lack of commercial knowledge. The **AQUAGAMETE** COST Action aims to address all of these issues.

WORKING GROUPS

The project has received attention from many research institutions throughout the world, and the Management Committee is keen to welcome all researchers who feel they can add value to the studies. Working with such a large international consortium, however, could potentially lead to overlap in terms of the studies conducted. To overcome this, **AQUAGAMETE** is divided into four key Working Groups (WGs) each responsible for separate areas of research. WG 1 is tasked with the assessment of gamete quality. It is anticipated that their findings will provide invaluable information for farmers regarding expected larval supply and survival rate. WG 2 concentrates on gamete storage and preservation. The results of their findings are expected to help scientists and aquaculture companies in the conservation of genetic resources. Moreover, this could

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be hugely significant in terms of preventing the extinction of endangered species, or in preserving the genes of genetically favourable specimens or strains of the population. WG 3 deals with basic and applied studies on gamete biochemistry and physiology. This group supplies an understanding of the basic biological processes involved in the function of gametes (sperm motility mechanisms, gamete proteins, water and ion control in gametes, gametes oxidative stress and antioxidative protection, molecular mechanisms controlling oocyte competence). WG 4 is responsible for the dissemination and distribution of results from **AQUAGAMETE**. This is facilitated by the organisation of training courses and the coordination of meetings. This includes the International Workshops on the Biology of Fish Gametes (IWBFs), which are the primary forums in this field.

AQUACULTURE AND CRYOBANKING

Many aquatic species are threatened as a result of various environmental and human-induced factors, including pollution, overfishing, the isolation of their populations, and global warming. By developing standardised methodologies and protocols, **AQUAGAMETE** hopes to make advances in the development of techniques such as cryopreservation. By cryobanking the gametes (or similar cells) of endangered aquatic species, the biodiversity of their populations can be maintained, significantly increasing their chances of survival. The preservation of selected cultured lines is also significant to the conservation of aquatic species threatened by potential pathogens.

Adequate gamete management is also of significance to the aquaculture industry, as this ensures the supply of high quality larvae. Combining this management with the development of marker-assisted selection methods and increasing selection pressure adds even greater value to the technique.

SHORT-TERM SCIENTIFIC MISSIONS

Members of **AQUAGAMETE** are regularly tasked with short-term scientific missions (STSMs). The objective of these STSMs is usually to learn about a new technique or technology at a partner laboratory that is recognised by the scientific community as an authority in that particular field. As per COST's guidelines, preference is given to early-stage



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INTELLIGENCE

AQUAGAMETE

OBJECTIVES

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PARTNERS

35 research groups in 26 countries

FUNDING

COST Office. First grant period (2013-14): €134,000; duration – 4 years

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ÁKOS HORVÁTH is a senior scientist at the Department of Aquaculture of Szent István University in Gödöllő, Hungary. His main research area focuses on the development of sperm cryopreservation protocols for fish and their application to aquaculture practice.

scientists for STSMs, but there is also scope for more senior scientists to apply for these STSMs too. In the first round of STSMs two students were sent to a partner laboratory to study DNA and RNA-based molecular biology techniques in fish sperm. A third student studied the conservation of fish species via the use of sperm cryopreservation in aquaculture practice, a fourth was sent to a partner laboratory to learn the technique of nuclear transfer in fish, whilst a fifth student travelled abroad to analyse by radioimmunoassay (RIA) different steroids from plasma of fish submitted to different temperature regimes. During the second call, nine more STSMs were approved, and these will be performed during the next months. The benefits of this kind of research are manifold. Upon returning to their own laboratories researchers take with them previously unknown methodologies, as well as results gleaned from apparatus and resources unavailable to them in their own environment. They often also bring a different way of working, and different approaches to existing challenges. Not only do these STSMs help to improve the overall knowledge of aquatic biology for members of AQUAGAMETE, they also serve the purpose of strengthening relationships with partner research institutions, increasing the scope for future research, collaboration, and subsequent progress in the field.

EXPANDING AQUAGAMETE

The recent addition of Austria and Bulgaria takes the number of countries currently participating in AQUAGAMETE activities to an impressive 22, with applications from The Netherlands, Montenegro and Sweden pending. Face-to-face meetings and the AQUAGAMETE web and blog are the primary methods of communication that has thus far led to such a large number of participants on the project. Increasing the number of research groups allows for expansion of the project's scope, as different research groups often bring different methodologies, techniques and working practices which benefit the studies and findings of existing members. Acquiring participants from COST countries also provides an economic benefit to the project; the greater the number of participating COST countries, the larger the budget for the next grant period will be. However, this does not mean that AQUAGAMETE is only interested in



FEMALE EUROPEAN EEL BEING INJECTED WITH HORMONE

applications from COST countries, as countries that fall outside of the geographical area of COST may also receive direct funding from the cooperation due to the idea for harmonised and standardised methodologies in the field of research having been conceived before the COST action commenced. As such, geographically distant countries like Japan, Singapore, South Africa, Brazil, Chile, Canada and the US have already expressed an interest in collaborating on the project.

DISSEMINATING ACTIVITIES

The future growth and progress of AQUAGAMETE is dependent on interest from more research groups working in the field, and therefore dissemination of the project's activities and findings is vital. As well as up-to-date information on their website, AQUAGAMETE also organises training schools to promote their work. One such training school entitled 'Techniques for fish germline cryobanking' was held in May 2013 at the Institute of Marine Science of Andalusia in Cádiz (CSIC), Spain. The training school saw 20 students from 10 different countries learning new techniques, and discussing the benefits of standardised methodologies within the field. The present focus of AQUAGAMETE is the fourth IWBF to be held in Faro, Portugal in September 2013. The idea of establishing a set of standardised methodologies and protocols for aquatic gamete biology has merged during the past editions of these workshops, initiated in 2007. As such, it is of particular importance to AQUAGAMETE. The workshop also provides a forum for scientists to present their latest findings, offering AQUAGAMETE an invaluable opportunity to spread the word about the important research they are conducting in this field.



PARTICIPANTS OF FIRST AQUAGAMETE TRAINING SCHOOL

