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# **AQUAEXCEL and AQUAEXCEL2020: Research infrastructures projects for the benefit of European aquaculture**

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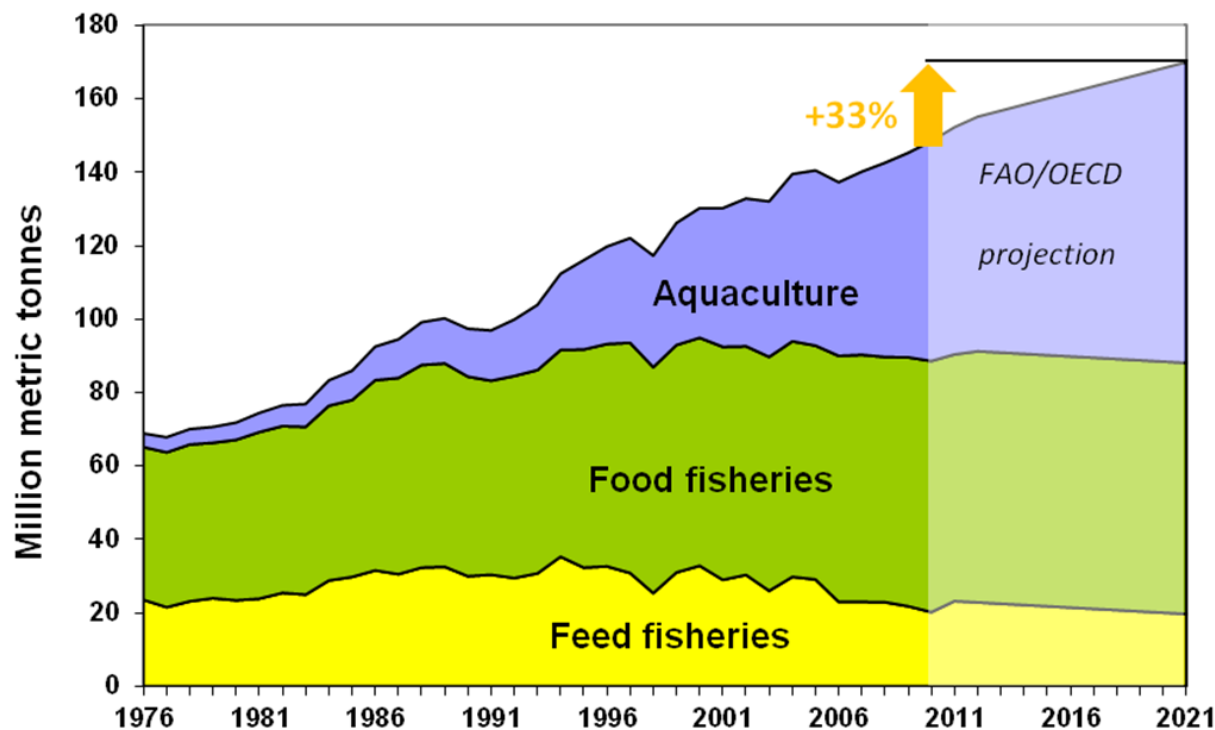


**AQUAEXCEL and AQUAEXCEL<sup>2020</sup>:  
RESEARCH INFRASTRUCTURE PROJECTS FOR THE  
BENEFIT OF EUROPEAN AQUACULTURE**

**Marc VANDEPUTTE**  
**AQUAEXCEL<sup>2020</sup> coordinator**  
**INRA, France**

**Paris, CRB Anim international seminar, 12 May 2017**

# Aquaculture: a growing challenge



EU level: production is now stagnating and 85% of seafood is imported

→ EU strategy to develop aquaculture production

→ Research to improve competitiveness and sustainability

# AQUAEXCEL<sup>2020</sup> – At a glance

## Aquaculture Infrastructures for Excellence in European Fish Research (towards 2020)

AQUAEXCEL	AQUAEXCEL <sup>2020</sup>
2011-2015 (4 years)	2015-2020 (5 years)
17 partners, 27 facilities	22 partners, 39 facilities
9.2 M€ grant	9.7 M€ grant

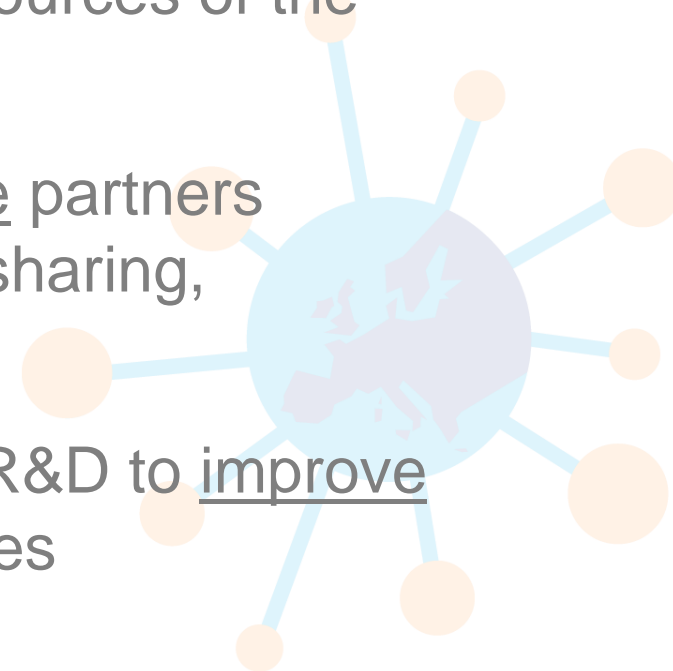
**Main goal:** to integrate and open the key aquaculture research infrastructures in Europe, covering all EU fish culture systems and competences

# Types of activities

**Transnational Access (TNA):** Give 'free of charge' access to the world-class infrastructures and resources of the consortium

**Networking Activities (NA):** Co-ordinate partners infrastructures (resource and know-how sharing, communication) and give visibility

**Joint Research Activities (JRA):** Joint R&D to improve the services provided by the infrastructures



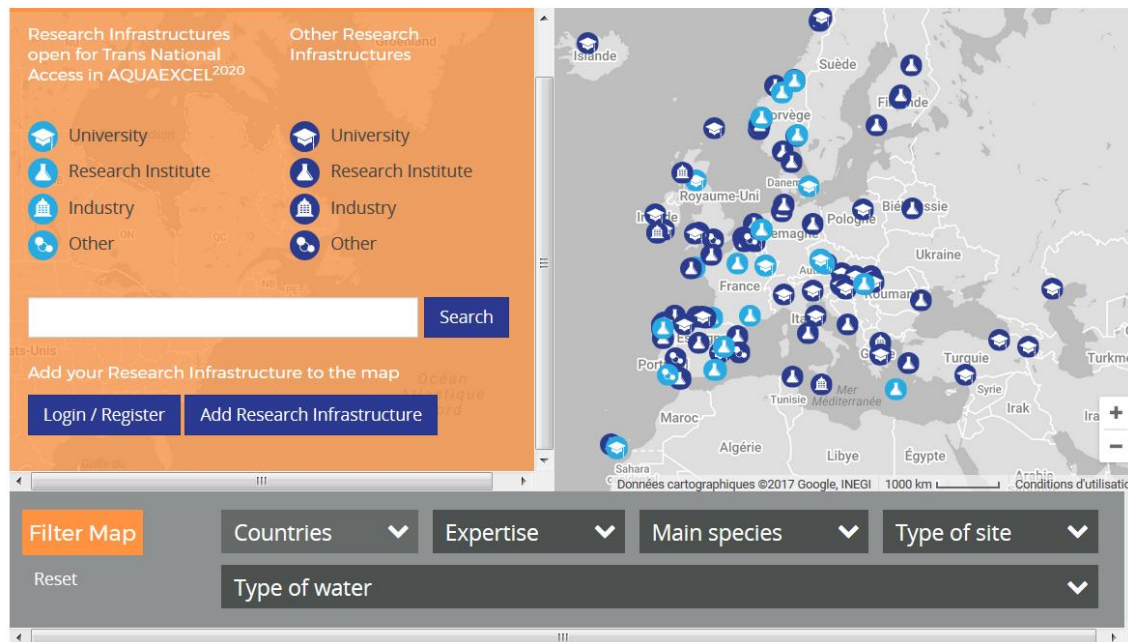
# AQUAEXCEL Networking activities

## The RI Map on [www.aquaexcel2020.eu](http://www.aquaexcel2020.eu)

AquaExcel Archive

### Interactive Map

For questions related to the map please contact AquaTT ([claudia@aquatt.ie](mailto:claudia@aquatt.ie)).



The screenshot shows the 'Interactive Map' interface. On the left, there is a search bar and a filter menu. The filter menu is divided into two columns: 'Research Infrastructures open for Trans National Access in AQUAEXCEL2020' and 'Other Research Infrastructures'. Both columns list categories: University, Research Institute, Industry, and Other. Below the filter menu, there are buttons for 'Login / Register' and 'Add Research Infrastructure'. The map itself shows Europe with many blue location markers. At the bottom, there is a 'Filter Map' section with dropdown menus for 'Countries', 'Expertise', 'Main species', 'Type of site', and 'Type of water'. A 'Reset' button is also present.

Currently 108 entries

Interactive menu

Searchable

Detailed information available

Page created on: Wed, 05/10/2016 - 17:32. Last update: Wed, 03/05/2017 - 12:37.

# AQUAEXCEL Networking activities

## ATOL / EOL ontologies



**AQUAEXCEL**  
Aquaculture Infrastructures for Excellence in European Fish Research  
Project number: 262336  
Combination of CP & CSA  
Seventh Framework Programme  
Capacities

**Deliverable 3.2**  
**Best practices & cross-applicability of methods to measure phenotypes**

Duration: 48 months

Due date of deliverable: M24  
Actual submission date: M28  
Start date of the project: March 1<sup>st</sup>, 2011  
Organisation name of lead contractor: ULPGC  
Revision: Bendik Fyhn Terjesen

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)  
Dissemination Level  
PU Public  
PP Restricted to other programme participants (including the Commission Services)  
RE Restricted to a group specified by the consortium (including the Commission Services)  
CO Confidential, only for members of the consortium (including the Commission Services)

[Link Table 2](#)

<b>Identifiant</b>	ATOL.0001653
<b>Name of Trait:</b>	Condition factor
<b>Definition:</b>	Indicator of the stoutness of an animal, obtain using the formula $K = (\text{body weight}[\text{g}] / \text{body length}^3[\text{cm}]) \times 100$
<b>SIMILAR TO:</b>	<i>if it's appropriate, in connection with other identifier number</i>
<b>MEASUREMENT METHOD:</b>	Condition factor = $K = (\text{body weight}[\text{g}] / \text{body length}^3[\text{cm}]) \times 100$ Where body length corresponds to the fork length (ATOL:0001658) and body weight (ATOL:0000351) to the total weight of the fish after draining.
<b>MATERIAL (biological, reagents &amp; instrumental):</b>	A scale (accuracy of 0.1 g) Measuring board (accuracy of 0.1 cm)
<b>UNIT AND RANGE OF VALUE:</b>	Length in cm; weight in gram, the condition factor is around 1 (0.5-3) (no unit)
<b>PARAMETERS TO MEASURE:</b>	Fork length of the fish Body weight of the fish
<b>BIBLIOGRAPHIC REFERENCES:</b>	Nash, R.D.M., Valencia, A.H., Geffen, A.J., 2006. The Origin of Fulton's Condition Factor. Setting the Record Straight. <i>Fisheries</i> 31, 236-238. ( <a href="http://folk.uib.no/infmag/infmag/reprints/NashETAL2006Fisheries.pdf">http://folk.uib.no/infmag/infmag/reprints/NashETAL2006Fisheries.pdf</a> ).
<b>SYNONYMS EXACT:</b>	Fulton index, condition factor, K
<b>OTHER ASPECTS TO INCLUDE:</b>	Depending on the fin integrity the standard length (ATOL:0001650) could be used instead of the fork length.
<b>RESEARCHER CONTRIBUTION (and date of the last modification):</b>	Ása Maria Espmark (NOFIMA) Bendik Fyhn Terjesen (NOFIMA) Léa Jorut (INRA) Pierre-Yves Le Bail (INRA) Jaume Pérez-Sánchez (CSIC) (20/06/13)

[Link Table 2](#)

+ measurement methods for 63 major traits



# AQUAEXCEL Networking: training courses

RAS technology @ Wageningen

Aquaculture Genomics @ INRA

Chromosome manipulations  
@ Stirling

New Monitoring Tech @ NTNU



Extended in **AQUAEXCEL<sup>2020</sup>**

9 courses in total



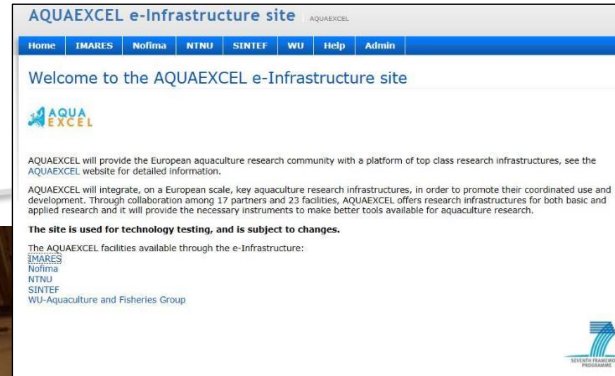
# AQUAEXCEL Joint research

## Access your infrastructure from your living room

IMARES



NOFIMA



SINTEF/ACE

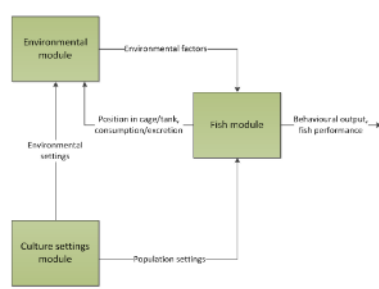
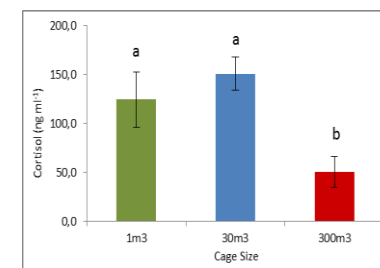
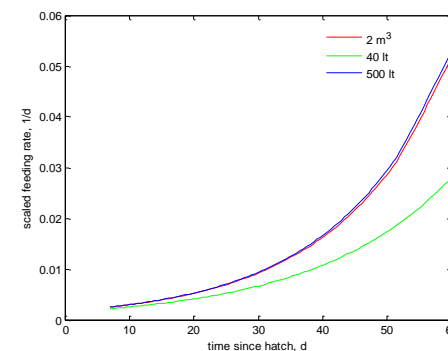
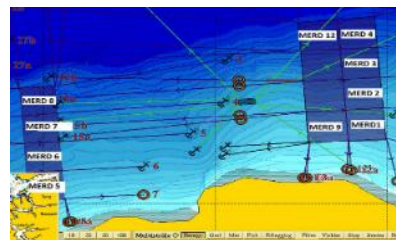


WUR



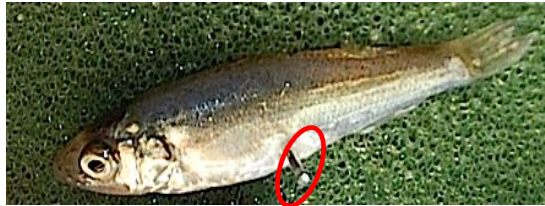
# AQUAEXCEL Joint research

## Effect of experimental unit size on results

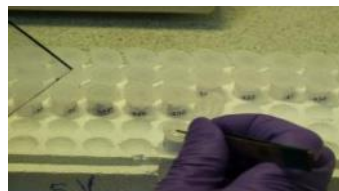
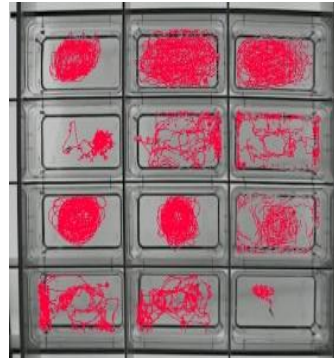


# AQUAEXCEL Joint research

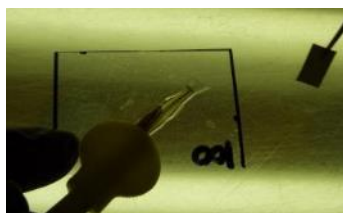
## Early individual tagging of sea bass and sea bream



Insertion of the NonaTec tag in the abdominal cavity of a 400 mg juvenile seabass



Sampling of the caudal fin for DNA collection



Sampling mucus on Whatmann paper and storage at  $-20^{\circ}\text{C}$

- Survival OK for BW > 400 mg
- No effect on growth
- Effect on swimming behaviour (disappears after 42 days)
- Reading success > 80%
- Survival OK
- DNA collected starting 71 dpf (43 mg)
- DNA quality/quantity OK for routine genotyping for fish > 87 dpf (248 mg)



Early individual electronic identification of sea bass using RFID microtags: A first example of early phenotyping of sex-related growth

Sébastien Ferrari<sup>ab</sup>, Béatrice Chatain<sup>bc</sup>, Xavier Cousin<sup>ad</sup>, Didier Leguay<sup>a</sup>, Alain Vergnet<sup>e</sup>, Marie-Odile Vidal<sup>f</sup>, Marc Vandeputte<sup>cg</sup>, Marie-Laure Bégout<sup>ah</sup>

<sup>a</sup> IFREMER, UR1307, CS 30077, 17123 St-Jean-de-Monts, France  
<sup>b</sup> INRAE, UR1307, CS 30077, 17123 St-Jean-de-Monts, France  
<sup>c</sup> IFREMER, UR1307, CS 30077, 17123 St-Jean-de-Monts, France  
<sup>d</sup> INRAE, UR1307, CS 30077, 17123 St-Jean-de-Monts, France  
<sup>e</sup> INRAE, UR1307, CS 30077, 17123 St-Jean-de-Monts, France  
<sup>f</sup> INRAE, UR1307, CS 30077, 17123 St-Jean-de-Monts, France



# AQUAEXCEL Joint research

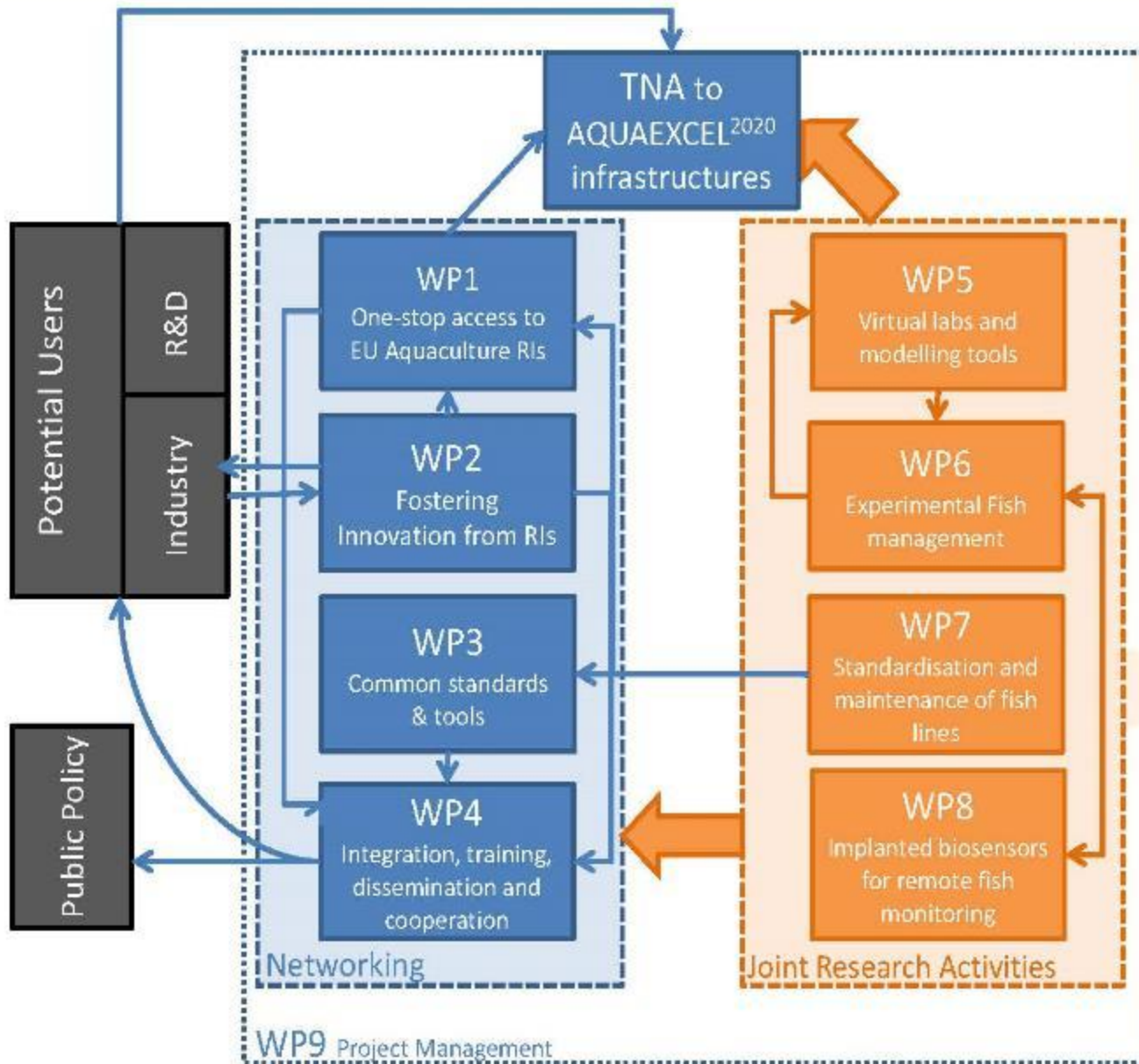
## Isogenic fish lines: the lab mouse of fish research



Already there:







# Project structure

Four workpackages focus on strengthening joint research activities, whilst four more involve TNA, industry links, developing common standards and tools and providing training and dissemination

# Networking activities

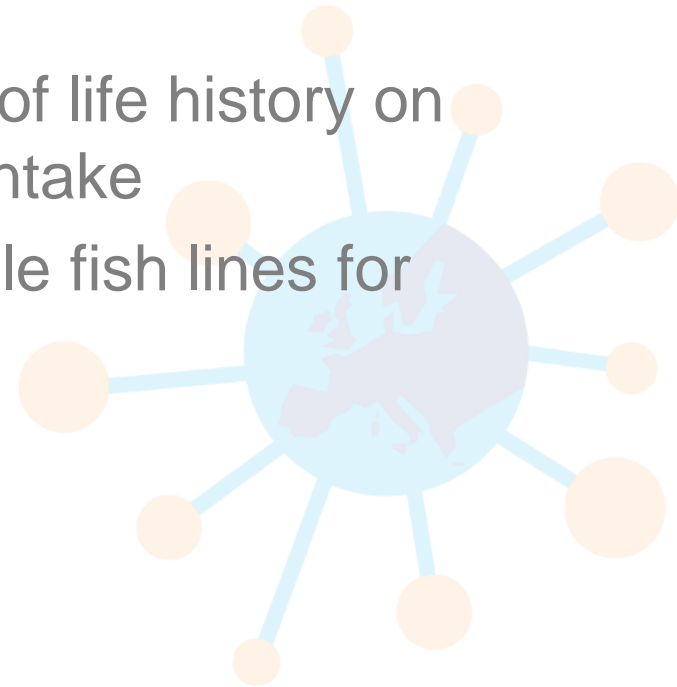
- Management of the TNA calls
- Fostering innovation through analysis and promotion of results by and Industry-Research Advisory Panel
- The Digital Fish: organize and share fish lines data
- An open access bioinformatics tool (Fish and Chips)
- Common procedures for cryobanking
- Data collection and interoperability
- “one stop shop” Web portal [www.aquaexcel2020.eu](http://www.aquaexcel2020.eu)
- Face-to-face and distance learning courses





# Joint research for better experiments

- Virtual modelling of aquaculture experimental facilities to help design/interpret experiments
- Experimental fish management: effect of life history on results, how to achieve maximal feed intake
- Development and maintenance of stable fish lines for experimental purposes
- Internal nano-sensors to monitor fish physiology/behavior in real time



# Transnational Access

## The numbers

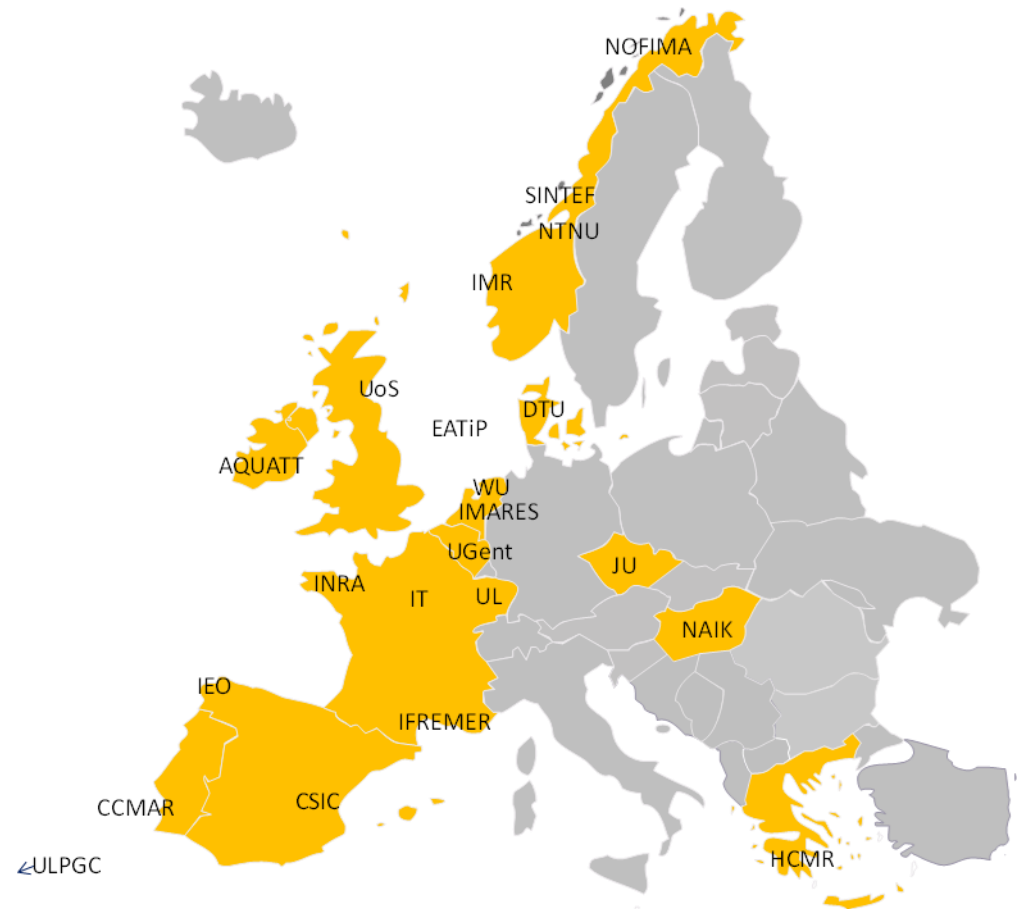
21 Host Organisations

39 Research Installations

~170 Funded Projects

~217 Users

~300 Applications





**ARE YOU INVOLVED IN AQUACULTURE RESEARCH?**

**AQUA EXCEL 2020**

**FIRST CALL**

**Apply for Fully EC-Funded Access to Top-Class Research Infrastructures with AQUAEXCEL 2020**

**AQUAEXCEL 2020 offers access to top-class research infrastructures for both basic and applied research, giving aquaculture research groups the opportunity to utilise AQUAEXCEL 2020's installations.**

The AQUAEXCEL 2020 project regularly invites proposals from European research groups for scientific research that utilises the installations of any of the participating Aquaculture Research Infrastructures.

These installations are made available to the research community for Terms and Conditions with the support of the European Union's Horizon 2020 Research and Innovation Programme.

Interested researchers can propose aquaculture research projects that:

- Involve research on any of the available fish species at the selected aquaculture research infrastructure
- Are compliant with the CATH Strategic Research & Innovation Agenda
- Involve visits of one or two people to a research infrastructure that provides data others not available in their own country for periods of up to three months.

Access to the research infrastructures and associated travel and subsistence expenses will be paid for under the project.

**THE FIRST CALL FOR ACCESS IS NOW OPEN - DEADLINE FOR APPLICATIONS 29 JANUARY 2016**  
For more information: [www.aquaexcel.eu](http://www.aquaexcel.eu)

**AVAILABLE RESEARCH INFRASTRUCTURES COVER**

- WATER ENVIRONMENT**  
Ecological Health and simple and 2D Water Quality Assessment
- FISH SPECIES**  
Salmon, Trout, Sea Bream, Sea Bass, Gilthead Sea loach, Carp, Catfish
- FIELDS OF EXPERTISE**  
Nutrient, Pathology, Health, Welfare, Genetic, Reproductive Health and 5th Phase of the Technology
- AQUACULTURE SYSTEMS**  
Recirculation, Flow-through, Cage, Harbours and Pond Systems
- MULTIPLE SCALES**  
Small, Medium and Large Scale Experiments

**AQUA EXCEL**  
[WWW.AQUAEXCEL.EU](http://WWW.AQUAEXCEL.EU)

The AQUA EXCEL 2020 project is funded by the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 652831. The project information is available on the project's website: [www.aquaexcel.eu](http://www.aquaexcel.eu)

# The TNA offer

## Access to the partner research installations for

- Researchers from public & private organisations
- Maximum 2 people for up to 3 months (remote access also possible)
- Use of facilities not available in own country
- Free (travel and subsistence expenses paid)

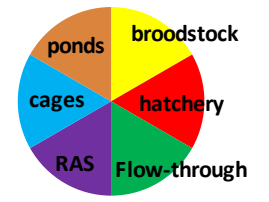
# Transnational access: all major EU fish species + new species

AQUAEXCEL partners  
New in AQUAEXCEL<sup>2020</sup>





# All types of infrastructures



## New in AQUAEXCEL 2020: Disease challenge testing



# What is the vision for 2020 ?

## In 2020, we will...

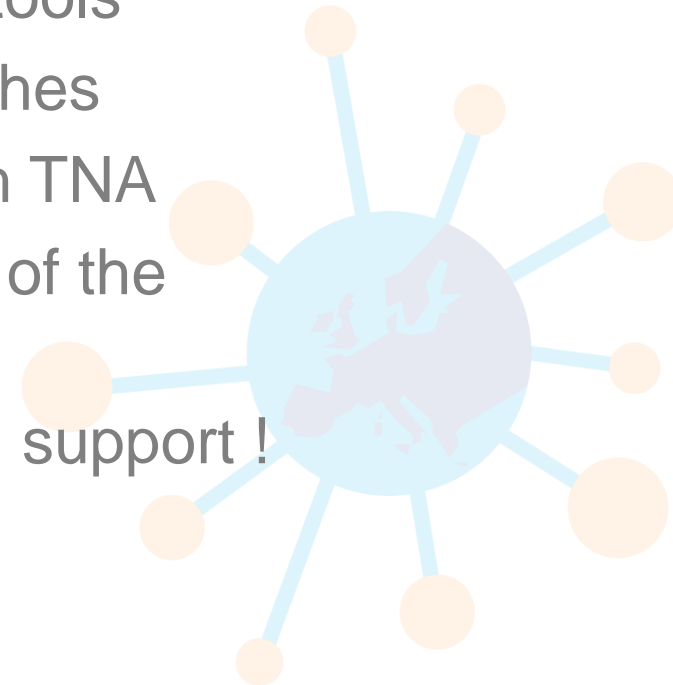
- have 180 TNA projects completed, many by SMEs and young scientists (trained in our AE<sup>2020</sup> courses)
- be able to track the background info of all our results
- See AQUAEXCEL<sup>2020</sup> results in all EU aquaculture conferences
- provide a documented catalogue of isogenic experimental lines of salmon, trout, sea bass and carp
- obtain better, industry meaningful results with less fish
- Follow experiments in real time with implanted fish and benchmark them with a priori simulation models

...prepare AQUAEXCEL<sup>2025</sup> ?

# What are the benefits ?

## For project partners

- Building a community of leading research organizations
- Sharing of experiences/ methods and tools
- Developing new experimental approaches
- Developing new collaborations through TNA
- But NOT subsidizing routine operation of the infrastructures
- Preparing an ERIC ? Need for national support !

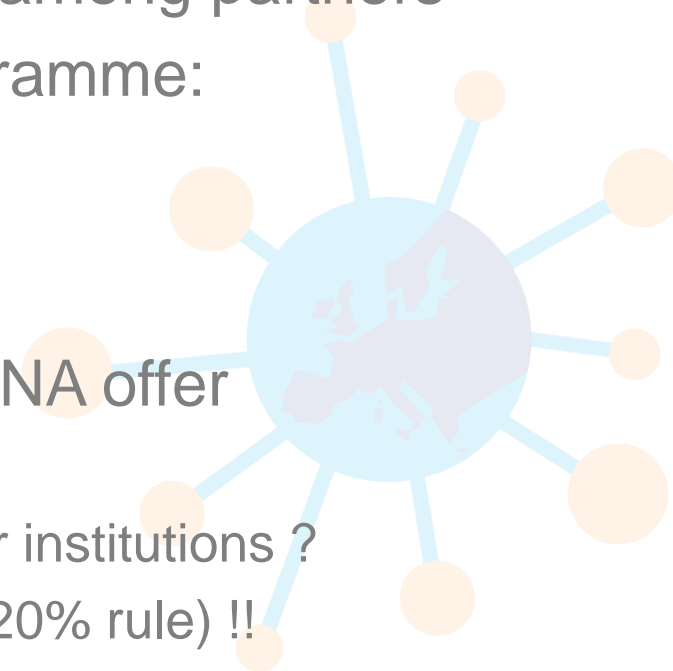




# Challenges for an infra project

## What do you need to build an infrastructures project ?

- Have a shared vision among top-level EU partners
- Identify complementarities / synergies among partners
- Have the right words in the Work Programme:
  - Easy for Networking Activities
  - Think well for Joint Research Activities:  
this is NOT problem-solving research
- The greatest challenge: an attractive TNA offer
  - What are your products and services ?
  - Would you use them if available in other institutions ?
  - Does not subsidize unused structures (20% rule) !!



# Thank You



**Marc Vandeputte**  
**marc.vandeputte@inra.fr**

