DIVERSIFY: An EU-project exploring the biological and socioeconomic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry

New species for EU aquaculture

Co-funded by the Seventh Framework Programme of the European Union

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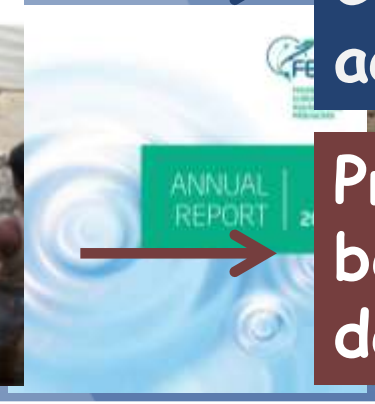
Seafood consumption in the world/EU

- 50% of seafood worldwide from Aquaculture (vs wild Fisheries)
- 10% of seafood in the EU from Aquaculture
- 65% of seafood in the EU imported!!!!



Strong interest by the European Commission to increase EU aquaculture production (marine)

Production of current species cannot be increased a lot (not enough demand)

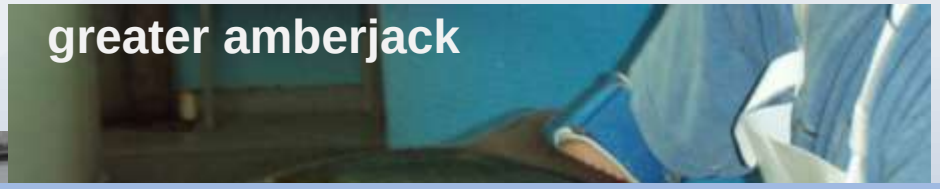
Problems with Mediterranean species



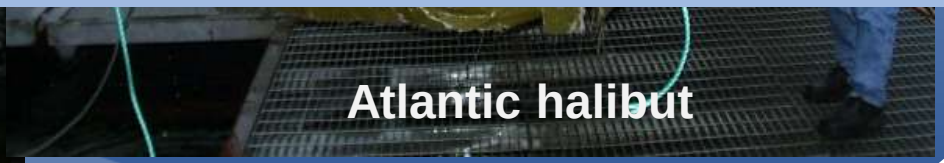
- Consumers prefer fillets, steaks, ready-to-cook
- Small, plate size (difficult to prepare, bones)
- Larger fish more expensive to grow (3 y !!!!)



Choice of new/emerging species



grey mullet
(herbivorous, extensive)



Bottlenecks of the six species

- **meagre** (*variable growth, limited genetic variation, nutrition, health*)

- **greater amberjack** (*reproduction, juvenile production, parasites*)

- **wreckfish** (broostock availability, *reproduction, juvenile production*)

- **Atlantic halibut** (*reproduction, juvenile production, health*)

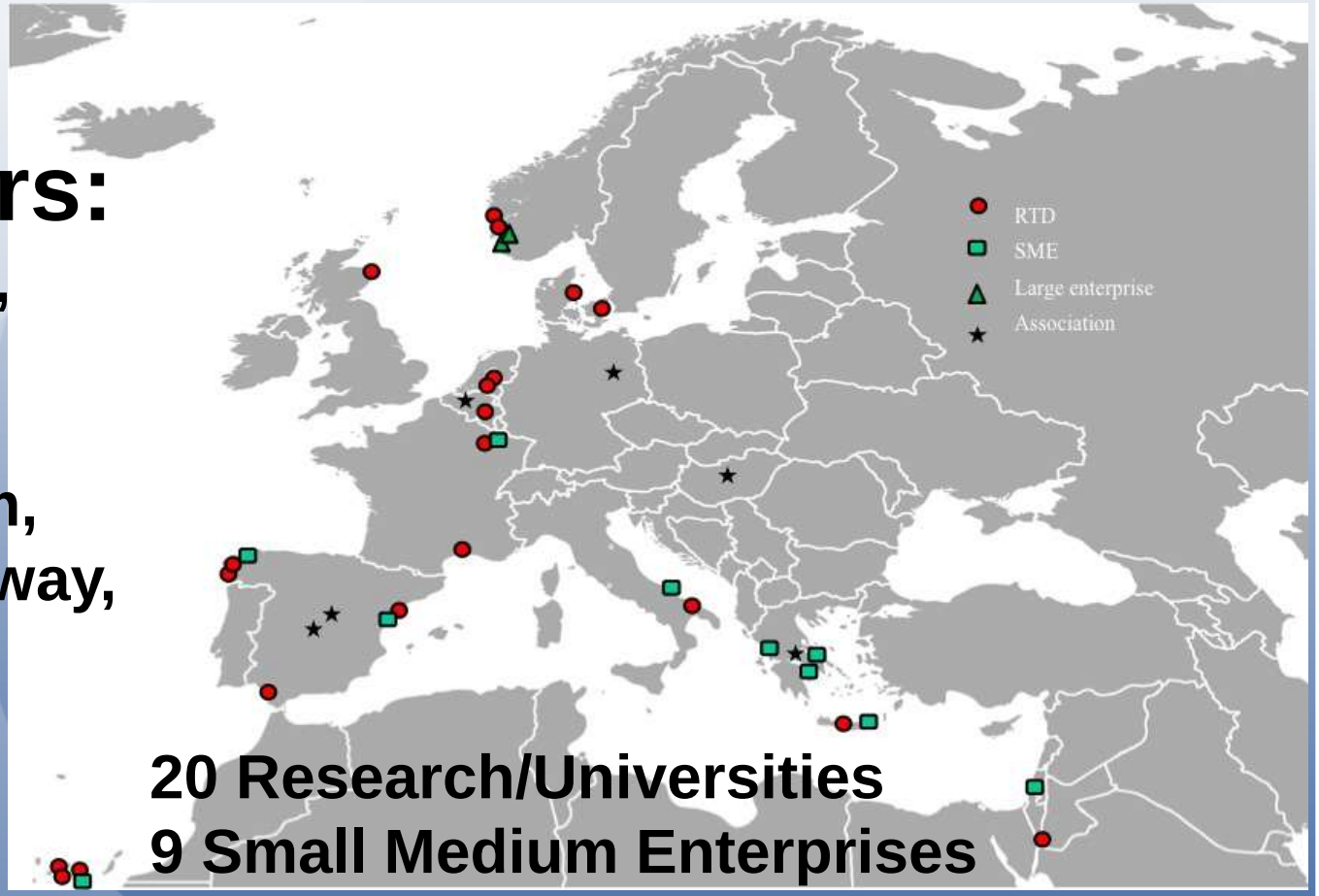
- **grey mullet** (*reproduction, larval rearing, nutrition*)

- **pikeperch** (*juvenile production*)

Partnership of DIVERSIFY

37 partners:

Greece, Spain, Netherlands, France, Italy, Israel, Belgium, Denmark, Norway, UK, Germany and Hungary



20 Research/Universities
9 Small Medium Enterprises
2 Large companies
5 Professional associations
1 NGO

Reproduction & Genetics (21%)

- **Successful spawning in greater amberjack, Atlantic halibut, wreckfish and grey mullet**
- **Genetic description of captive broodstocks of meagre and pikeperch**
- **Paired-spawning and *in vitro fertilization* methods in meagre and wreckfish**

Nutrition (16%)

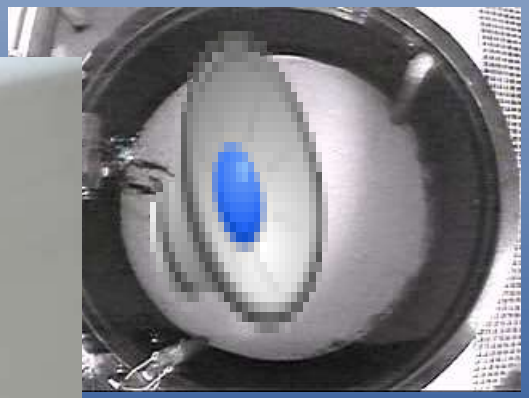
- Development of enrichment media for live feeds, and weaning diets in meagre and greater amberjack
- Nutrient content of wild wreckfish and their gonads
- Effect of Taurine in larval feeds for grey mullet
- Relation between nutrition and Systemic Gramulomatosis in meagre

Larval husbandry (16%)

- Production of greater amberjack and grey mullet larvae, and establishment of rearing protocols
- First wreckfish larval rearing studies (Spain, Greece)
- Effects of various environmental factors (light intensity, water renewal rate, water flow direction and tank cleaning timing) on larval rearing of pikeperch

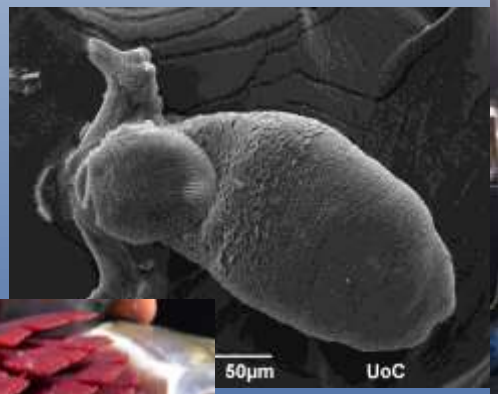
Growout husbandry (20%)

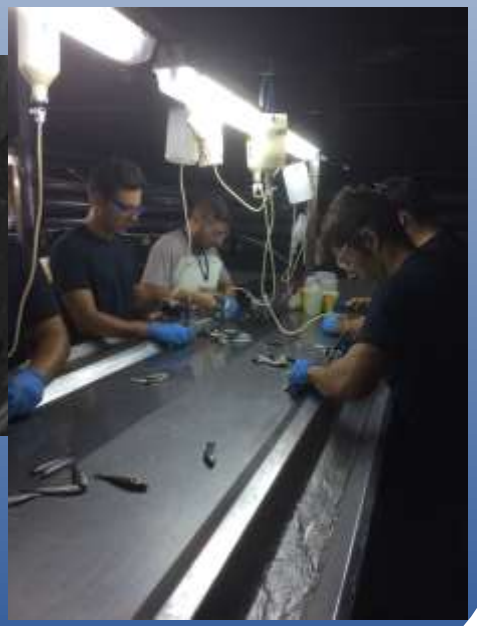
- Study of meagre feeding behavior in response to physical/optical stimuli
- Multifactorial study on pikeperch production (growth, immune and physiological status)
- Effect of cage depth on the behavior of meagre during growout



Fish health (13%)

- Study of the ontogeny of the immune system in meagre
- Production of VNN capsid protein for vaccine development in Atlantic halibut
- Identification of important parasites in greater amberjack





Socioeconomics (20%)

- Identification of the institutional and organizational context in which the new species can be introduced
- Identification of consumer segments for the candidate fish species
- Production of ideas for development of value added products

Dissemination – initial brochure

PARTNERS

The DIVERSIFY consortium integrates a multidisciplinary group of partners from 12 European countries. It is made up mainly of research and academic institutions, and also includes nine small or medium-sized enterprises (SMEs), three large enterprises, five professional associations and one consumer non-governmental organisation (NGO).

Aarhus Universitet (AU), Denmark
Aquaculture Forkys AE (FORKYS), Greece
Argosaronikos Fish Farms S.A. (ARGO), Greece
Asialor SARL (ASIALOR), France
Asociación Empresarial de Productores de Cultivos Marinos (APROMAR), Spain
Asociación Nacional de Fabricantes de Conservas de Pescados y Mariscos-Centro Técnico Nacional de Conservación de Productos de la Pesca (ANFACO), Spain
Ayuntamiento de A Coruña (MC2), Spain
Azienda Agricola Ittica Caldoli (ITTICAL), Italy
Bundesverband Der Deutschen Fischindustrie und des Fischgrosshandels E.V. (BVFi), Germany
Canarias Explotaciones Marinas SL (CANEXMAR), Spain
Conselleria do Mar - Xunta de Galicia (CMRM), Spain
CTAQUA, Aquaculture Technological Center of Andalucia (CTAQUA), Spain
Culmárex Group (CULMAREX), Spain
Danmarks Tekniske Universitet (DTU), Denmark
Dor Dgey Yam LTD (DOR), Israel
European Food Information Council (EUFIC), Belgium
Federation of Greek Maricultures (FGM), Greece
Fundación Canaria Parque Científico Tecnológico de la Universidad de Las Palmas de Gran Canaria (FCPCT), Spain
Hellenic Center for Marine Research (HCMR), Greece
Hellenic Research House (HRH), Greece
Hungarian Aquaculture Association (MASZ), Hungary
Institut de Recerca i Tecnologia Agralimentàries (IRTA), Spain
Instituto Español de Oceanografía (IEO), Spain
Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER), France
Institute of Marine Research (IMR), Norway
IOLR-National Center for Mariculture (IOLR), Israel

PARTNERS

Irida S.A. – Feed production (IRIDA), Greece
LEI-Wageningen UR (DLO/LEI), the Netherlands
Nasjonal Institutt for Enaerings-Og Sjomatforskning (NIFES), Norway
Skretting Aquaculture Research Center (SARC), Norway
Sterling White Halibut (SWH), Norway
Technische Universiteit Eindhoven (TU/e), the Netherlands
The University of Aberdeen (UNIABDN), United Kingdom
Universidad de La Laguna (ULL), Spain
Università degli Studi di Bari Aldo Moro (UNIBA), Italy
Université de Lorraine (UL), France
Université de Namur ASBL (FUNDP), Belgium
Vas. Geitonas & Co LTD EE (GEI), Greece

PROJECT COORDINATOR

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DIVERSIFY

Exploring the biological and socioeconomic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry.

www.diversifyfish.eu

KEEP UP TO DATE WITH THE LATEST NEWS IN THE PROJECT:

www.facebook.com/diversifyfish
www.twitter.com/diversifyfish

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration (KBBE-2013-GA No 603121).

attract consumers.

WHY HAVE THESE FISH SPECIES BEEN SELECTED?

The selected species include the meagre *(Argyrosomus regius)*, greater amberjack *(Seriola dumerili)*, wreckfish *(Polyprion americanus)*, Atlantic halibut *(Hippoglossus hippoglossus)*, grey mullet *(Mugil cephalus)* and pikeperch *(Sander lucioperca)*. Originating from a wide range of climatic and geographic regions within Europe, the six species have been chosen based on their biological and economic potential. They have a large size/fast growth rate, enabling the production of a variety of value-added aquatic products, which are expected to attract consumers and be successfully commercialised.

FISH SPECIES AND BUDGET ALLOCATION

Atlantic halibut	Greater amberjack	Grey mullet	Meagre	Pikeperch	Wreckfish
Hippoglossus hippoglossus	*Seriola dumerili*	*Mugil cephalus*	*Argyrosomus regius*	*Sander lucioperca*	*Polyprion americanus*
13.2%	31.3%	11.3%	22.9%	14.2%	7.1%

techniques for culturing new/emerging finfish species that will be safe, sustainable, and attractive to consumers and markets.

2

Wide dissemination of this information to key stakeholders (aquaculture producers, retailers, processors and consumer groups).

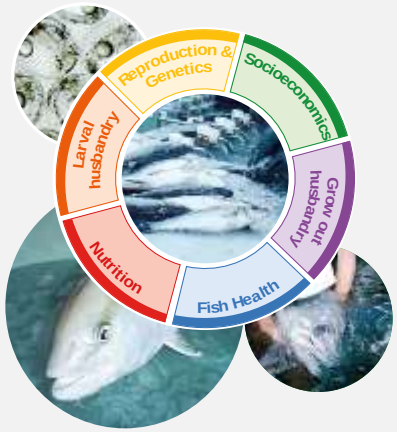
to ensure the successful market positioning of each species.

4

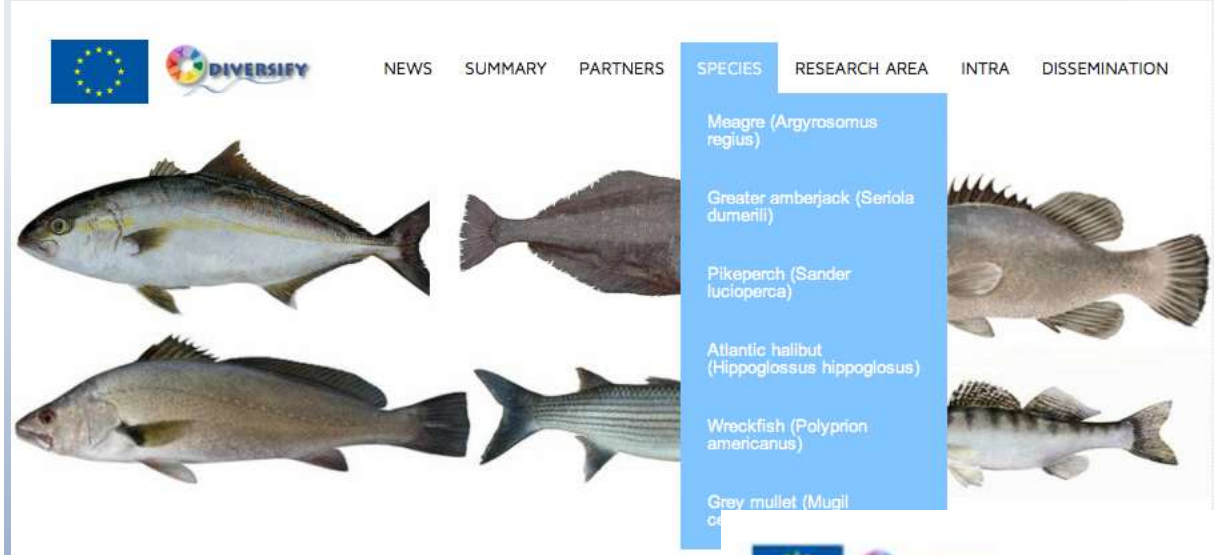
Increased value of European aquaculture products, which will result in increased economic prospects of the sector.
An efficient, sustainable and market-oriented expansion of the European aquaculture sector.

RESEARCH AREAS

Studies will be carried out in the six selected species across a number of different scientific disciplines:

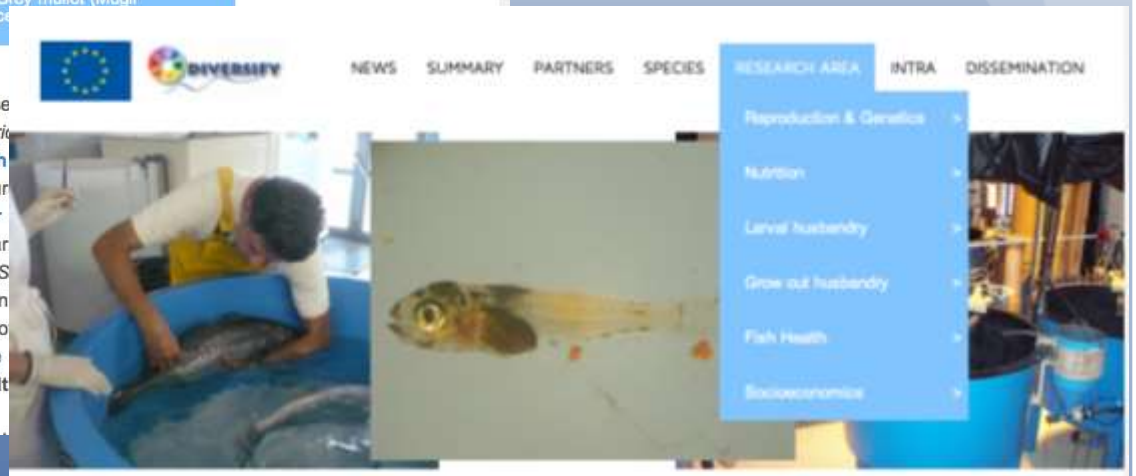


Dissemination – www.diversifyfish.eu



SPECIES SELECTION FOR DIVERSIFY

DIVERSIFY focuse
amberjack (*Seri*
culture, **wreckfish**
marine cage cultur
marine cold-water
herbivore for war
and **pikeperch** (*S*
using Recirculation
selected based bo
and to **cover the**
different aquacult



PERT DIAGRAM SHOWING THE STRUCTURE OF THE RESEARCH UNDER EACH WORK PACKAGE AND THEIR INTERACTIONS

To facilitate the work in DIVERSIFY, the research tasks designed to address the identified bottlenecks in each selected species have been separated by scientific discipline, so separate WPs address work in a specific discipline and species. The WPs were then **organized in Groups of WP (GWP) according to Research Area first, and then according to species**. This was done in order to **bring together researchers with similar expertise** (*e.g.*, reproduction, nutrition, larval rearing, etc.), but working in different species, thus increasing the potential for problem solving in each area of research.

Dissemination – magazine articles

Publish two species-articles every year

www.diversifyfish.eu

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