

**Final Coordination and Dissemination meeting
Brussels, 22-23 November 2018**



The DIVERSIFY project
Exploring the biological and socioeconomic potential of new/emerging fish species for the expansion of the European aquaculture industry



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



Constantinos (Dinos) Mylonas
Project Coordinator
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New species for EU aquaculture



37 partners:

20 Research/Universities

9 Small Medium Enterprises

2 Large companies

5 Professional associations

1 NGO

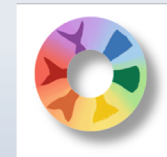


- Enhancing the EU aquaculture through species diversification

2013-2018

11,8 million €

Problem with Mediterranean species



- **Small (plate size), difficult to prepare, w/bones**
- **Consumers prefer fillets, steaks, ready-to-cook**
- **Growing fish larger is limited/inefficient (>3 y!)**



Choice of new/emerging species



greater amberjack



Pikeperch (fw, RAS)



grey mullet
(omnivorous, euryhaline)



Bottlenecks of the six species



- **meagre** (*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*)



Socioeconomics bottlenecks



- perception of aquaculture products
- market demand, buyer preferences
- new product development, value adding
- market development







After 5 years (2013-2018)



- Important knowledge acquired and rearing methods developed for all species,
- New products developed and evaluated,
- Consumer research in major EU markets,
- Business models developed for the selected species.



 <p>Meagre <i>Hypoclinemus regius</i></p> <p>Three different populations and a sufficient genetic variation was confirmed in a number of broodstocks around Europe. If managed properly there is sufficient genetic variation for breeding programs.</p> <p>Protocols for meagre paired spawning and for the acquisition of gametes for in vitro fertilization have been developed. As methods to implement breeding programs.</p> <p>A protocol for easy spawning was developed and the role of essential fatty acids and vitamins C, E and D in rearing diets was confirmed.</p> <p>Feeding in sea cages can be carried out during the day or at night using programmed feeders with good results. Outdoor and recirculation system can be used to improve feeding behaviour of meagre.</p> <p>Immune markers have been established for the muscle, additive and inflammatory responses of the immune system of meagre in order to develop vaccines in the future.</p> <p>Methods to prevent Chronic Ulcerative Dermatitis by measuring the extent of Systemic Granulomatosis and to address parasitic and bacterial infections have been developed.</p>	 <p>Atlantic halibut <i>Hippoglossoides hippoglossoides</i></p> <p>Use of GSBM implants advanced and synchronized spawning, resulting in improved egg production in F1 females. Though egg quality remains highly variable.</p> <p>Larvae fed well and had good survival when dry feed was introduced 28 days post first feeding in small systems. Full scale systems are needed to evaluate and improve these results in an industrial context.</p> <p>First feeding of larvae in RAS systems resulted in improved growth and development compared to flow through systems. Management practices of the microbial communities in the water and larvae of the two systems revealed interesting differences, which will be useful in industrial applications.</p> <p>A range of systems for expression of a coagulin protein from molluscs were tested for use in the development of a vaccine against VHS.</p>	 <p>Greater amberjack <i>Seriola lalandi</i></p> <p>Spontaneous reproduction in captivity is still problematic, but hormonal induction methods have been developed to induce spawning in fish maintained in tanks and sea cages, producing larger numbers of eggs of good quality for commercial larval rearing purposes.</p> <p>Healthier broodstock of 210 individuals were shown to undergo reproductive maturation in captivity.</p> <p>Significant breakthroughs were achieved in larval rearing, allowing the production of large numbers of juveniles adequate for commercial production. Husbandry practices were developed for successful transfer of juveniles to sea cages.</p> <p>On growing trials with commercialization resulted in important information on feeding patterns and stocking densities while the density temperature tolerance has been determined.</p> <p>Identification of immune markers and health management tools under exsitu culture conditions were developed, including probes for the early detection of pathobionts, and methods for control infections of the parasite <i>Zuivastius terribilis</i> and <i>Exocystomonas griseus</i>.</p>	 <p>Pikeperch <i>Sander lucioperca</i></p> <p>A genetic map comparing captive and wild broodstock was developed using microsatellite markers, to be used for breeding programs.</p> <p>Studies have identified optimal combinations of environmental, feeding and population factors to improve survival and growth during larval rearing in RAS.</p> <p>Essential fatty acids must be supplied in larval diets for normal development and to reduce stress sensitivity.</p> <p>Low light intensity and red-light spectrum is less stressful and the effect was confirmed in RAS farm conditions. Domestication level was shown to influence stress responsiveness and immune response.</p>	 <p>Grey mullet <i>Mullus barbatus</i></p> <p>Spontaneous reproduction in captivity remains a problem, but spawning was achieved using GSBM and microspore from the testes, producing millions of fertilized eggs. Optimization of the hormone based reproduction control protocol is still necessary.</p> <p>Eggs released during larval rearing provided beneficial effects in terms of earlier consumption, and waste survival and growth.</p> <p>After metamorphosis, commercial feeds for juveniles should be designed for the omnivorous feeding of this species and include higher levels of starch or other low cost amylolytic energetic compounds.</p> <p>Larvae have a high thaurine requirement during earlier feeding, and the benefits of this nutrient during early feeding was still observed during juvenile growth. Thaurine is essential not only for promoting growth in larvae, but also for other physiological pathways such as muscle function.</p> <p>Diets with low thaurine content can be used successfully for an growing without any detrimental effect on growth performance.</p>	 <p>Wreckfish <i>Polyprion americanus</i></p> <p>The reproductive cycle of wild-caught wreckfish was completed in captivity. Spontaneous spawning takes place in the Spring, with a period of 3-5 days. There may be full oviposition throughout the year.</p> <p>Based on evaluation of mature fish from the fishery, the nutrient requirements for an appropriate broodstock diet have been determined. The commercial broodstock diet produced, resulted in successful maturation and production of high-quality eggs.</p> <p>The ontogeny of the digestive and vision system have been described. Successful larval rearing was implemented in the last part of the project, resulting in the production of a small number of healthy produced juveniles, which is very encouraging for the efforts to incorporate this species in the aquaculture industry.</p>
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Important highlights

-wreckfish



- Reproductive cycle in captivity
- Methods for induction of spawning
- Spontaneous spawning with good egg quality
- Production of juveniles!



Important highlights

-grey mullet



- Development of hormonal therapies to enhance gametogenesis
- Induction of spawning with high egg production
- Production of juveniles for grow out



Important highlights

-greater amberjack









- Development of broodstock management and spawning induction methods
- Larval rearing methods and production of juveniles
- Commercial on-growing in sea cages
- Health management manual



Dissemination - www.diversifyfish.eu



www.diversifyfish.eu    

NEWS **ABOUT DIVERSIFY** SCIENTIFIC ARTICLES DISSEMINATION INTRA

Summary S WORKSHOPS MEETINGS & ACTIVITIES

Partners >

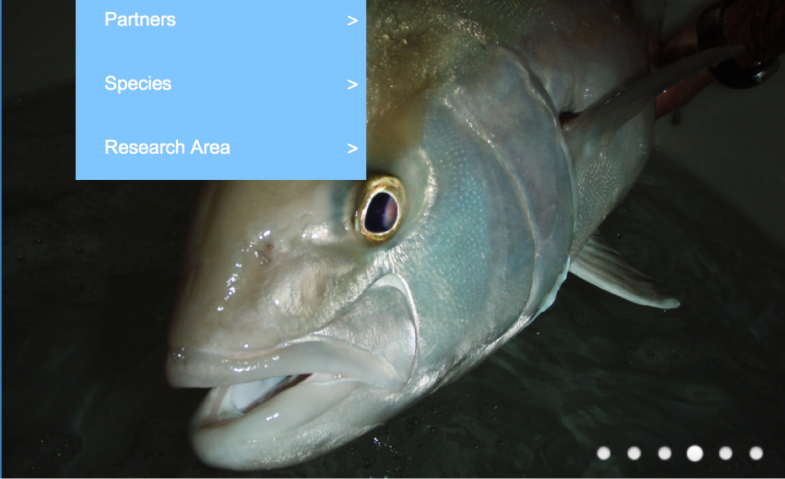
Species >

Research Area >

2018 FINAL COORDINATION MEETING

The meeting will be hosted by P37. EUFIC in Brussels, Belgium on 22-23 November 2018. It will be a 2-day meeting, with the first as an open day to disseminate the results of the project to relevant EU officers and stakeholders. The 2nd Day will be for consortium management

[Contact the Project Coordinator](#)

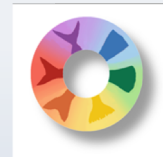


Final Coordination and Dissemination Meeting 2018
Thon Hotel Brussels City Center (Oslo I room)
22-23 November, Brussels, Belgium.

AGENDA FOR DAY 1 (THURSDAY, 22 NOVEMBER 2018)
DISSEMINATION, OPEN TO PUBLIC

8:30 – 9:30	Welcome and registration
9:30 – 10:00	The DIVERSIFY project; Dr. Constantinos C. Mylonas , (HCMR, Greece) Project Coordinator
10.00 - 10.30	The meagre (<i>Argyrosomus regius</i>): objectives and progress; Dr. Alicia Estevez (IRTA, Spain), meagre leader
10:30 - 11:00	The greater amberjack (<i>Seriola dumerili</i>): objectives and progress; Dr. Nikos Papandroulakis (HCMR, Greece),

Dissemination – popularized articles



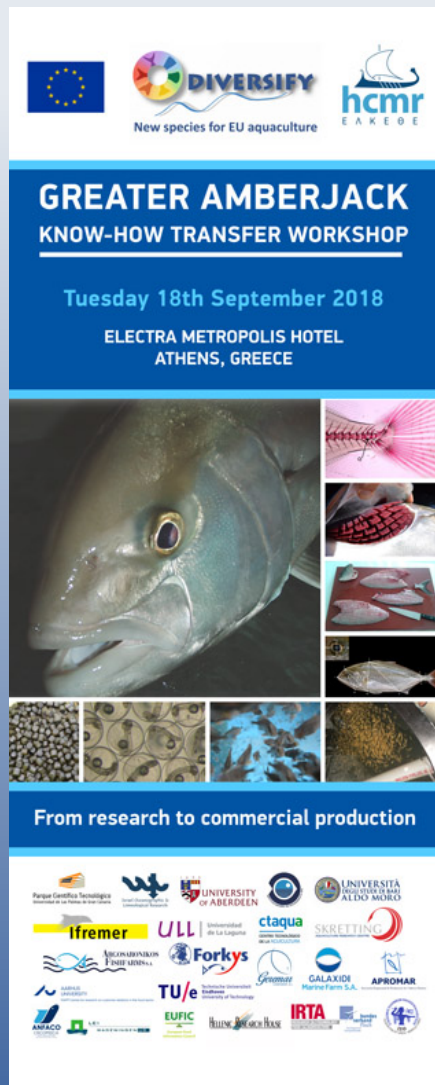
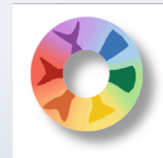
Exploring the biological and socio-economic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry






Co-funded by the 7th Framework Programme of the European Union

7FP-KBBE-2013-GA 602131, DIVERSIFY
www.diversifyfish.eu

Dissemination - species workshops






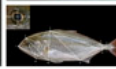


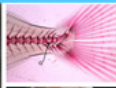



  
New species for EU aquaculture


GREATER AMBERJACK

KNOW-HOW TRANSFER WORKSHOP

Tuesday 18th September 2018
ELECTRA METROPOLIS HOTEL
ATHENS, GREECE



From research to commercial production



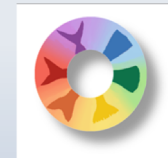
Parque Científico Tecnológico
Ifremer
UNIVERSITY OF ABERDEEN
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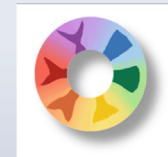
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Agenda

- Objectives and progress for each species by the Species Leaders
- Perspectives of the DIVERSIFY species and the European aquaculture market
- Technical assessment of the DIVERSIFY species and new product development
- Fish health
- Dissemination activities
- Future directions - Discussion

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11.00 - 11.30 Coffee break

13.00 - 14.30 Lunch break

Atlantic halibut

-degustation, Stirling White Halibut (P.22)

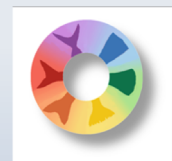


(Mr Magnus Skretting)



13.00 - 14.30 Lunch break

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