SUSTAINABLE AQUACULTURE MAGAZINE

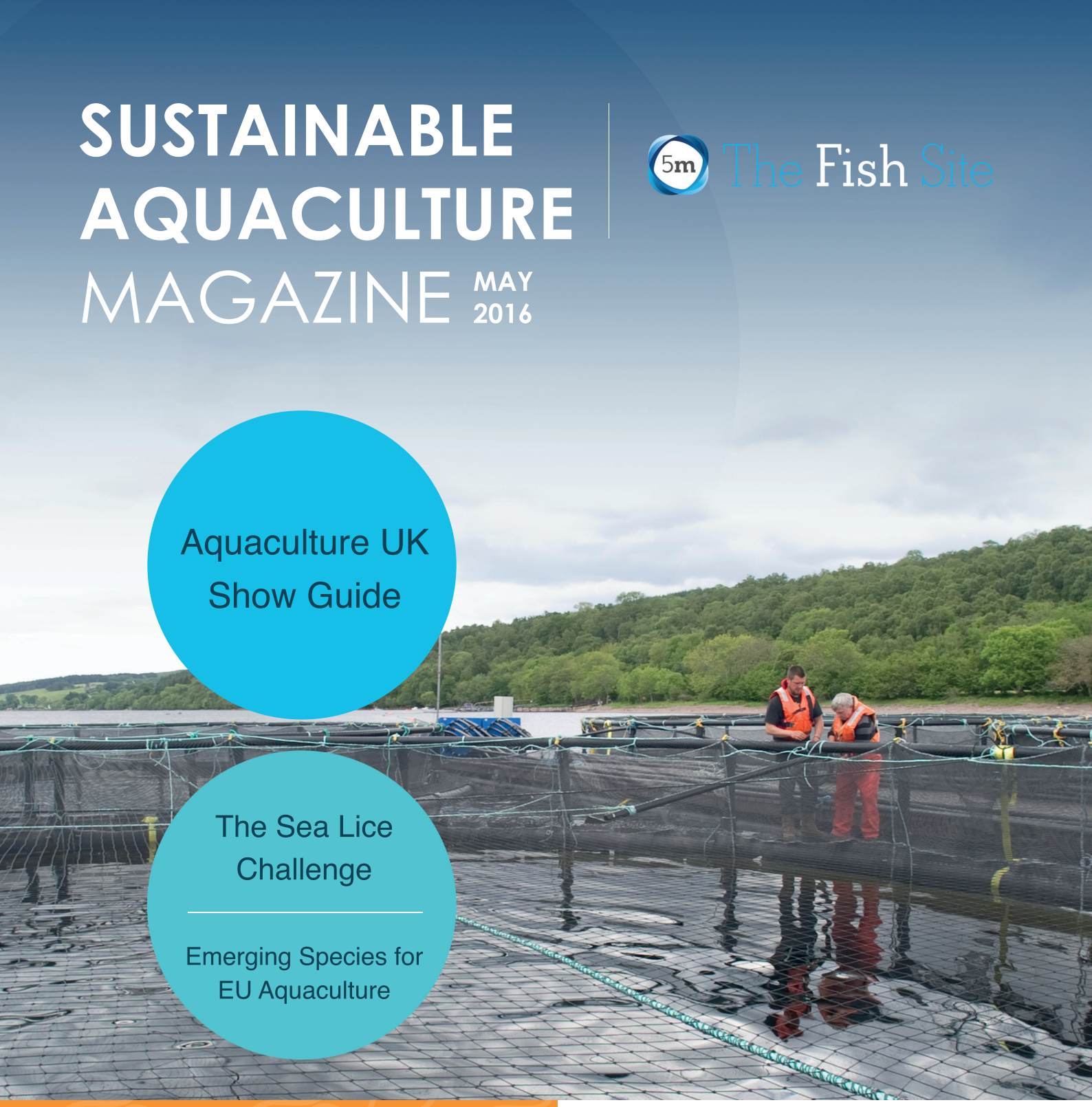
MAY 2016

The Fish Site

Aquaculture UK Show Guide

The Sea Lice Challenge

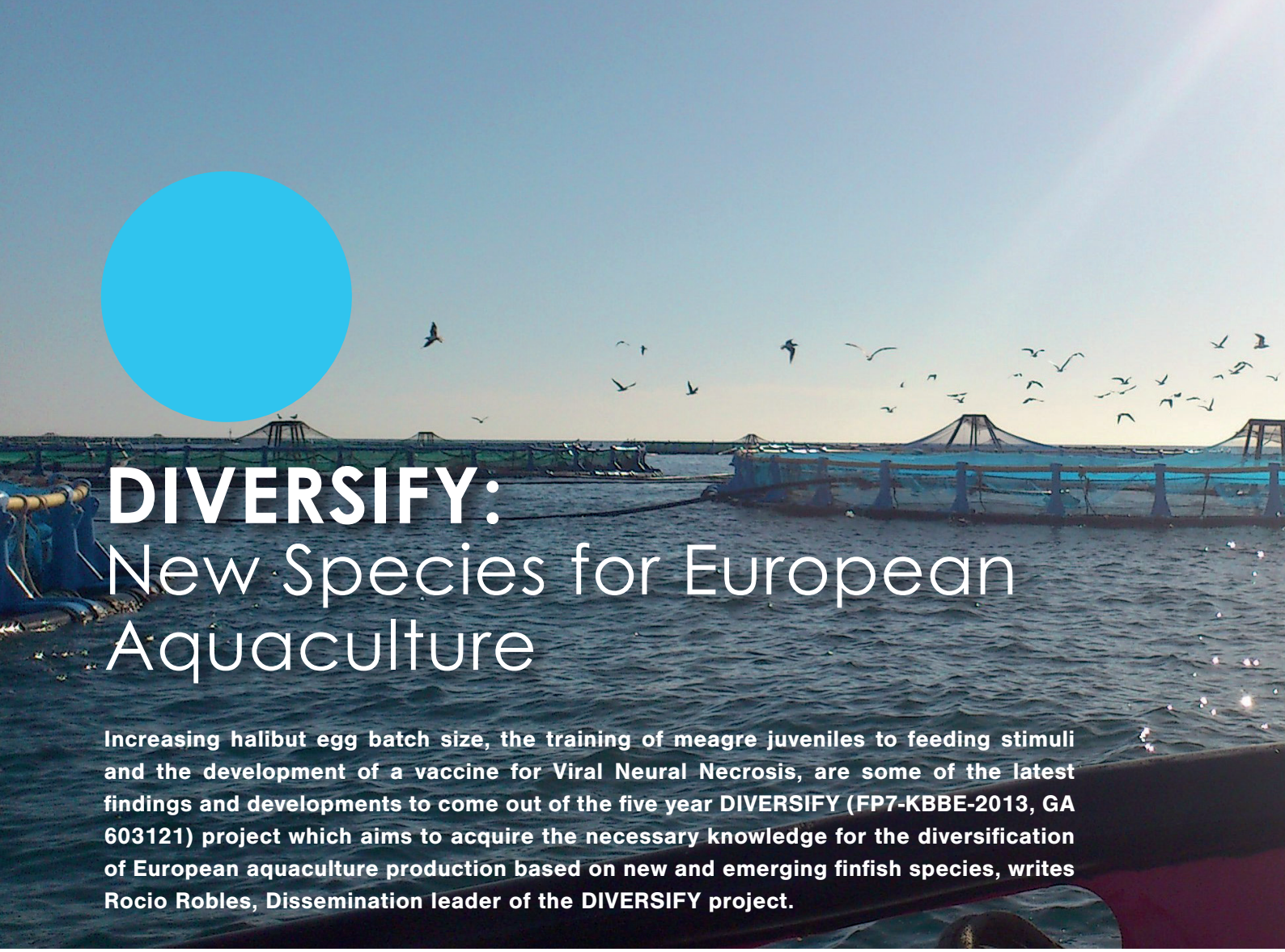
Emerging Species for EU Aquaculture



OFFICIAL SHOW GUIDE

25TH AND 26TH MAY 2016
AVIEMORE, SCOTLAND

AQUACULTUREUK



DIVERSIFY: New Species for European Aquaculture

Increasing halibut egg batch size, the training of meagre juveniles to feeding stimuli and the development of a vaccine for Viral Neural Necrosis, are some of the latest findings and developments to come out of the five year DIVERSIFY (FP7-KBBE-2013, GA 603121) project which aims to acquire the necessary knowledge for the diversification of European aquaculture production based on new and emerging finfish species, writes Rocio Robles, Dissemination leader of the DIVERSIFY project.

The project, which started in December 2013 and is coordinated by the Hellenic Center for Marine Research (HCMR), has a total budget of €11.8 million, making it one of the largest research projects in the area of aquaculture funded by the European Commission. The consortium of DIVERSIFY includes twenty research and academic institutions, two Large Enterprises, nine Small and Medium Enterprises (SME), five Professional Associations and one consumer NGO.

The project DIVERSIFY (www.diversifyfish.eu) has identified a number of new and emerging finfish species, with great potential for the expansion of the EU aquaculture industry.

The fish species included are: meagre (*Argyrosomus regius*) and greater amberjack (*Seriola dumerili*) for warm-water marine cage culture, wreckfish (*Polyprion americanus*) for warm and cool water marine cage culture, Atlantic halibut (*Hippoglossus hippoglossus*) for marine cold-water culture, grey mullet (*Mugil cephalus*) a euryhaline herbivore for pond/extensive culture, and pikeperch (*Sander lucioperca*) for freshwater intensive culture using recirculating systems.

Research is ongoing in all six scientific disciplines of reproduction and genetics, nutrition, larval and grow out husbandry, fish health, final product quality and socioeconomics.

Reproduction and Genetics

In the field of reproduction and genetics, the meagre and pikeperch broodstock genetic variation indicates that the status of the existing stock is healthy. Nevertheless, care is needed in forming base populations and managing crosses to produce families.

In meagre, families can be produced using a paired-spawning method with male rotation that has been developed. Greater amberjack have

been spawned successfully in facilities in both the Mediterranean and the Atlantic region. The reproductive dysfunction of wild greater amberjack held in captivity for more than four years in the Mediterranean has been described and compared to wild fish that were sampled at the moment of capture.

In Atlantic halibut, the use of hormonal implants synchronized egg production and increased the size of egg batches.

In the case of wreckfish, sperm production was good and protocols for the characterisation and preservation of sperm have been developed. The sperm of grey mullet has also been characterised using Computer Assisted Sperm Analysis (CASA) methods.

Nutrition

With regard to nutrition, it has been found that 0.4 per cent dietary highly unsaturated fatty acids (HUFA) is not enough to cover the essential fatty acid requirements of meagre larvae and that they seem to also have a high vitamin E and vitamin C requirements.

In the case of greater amberjack, the optimum Docosahaxaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA) levels in enrichment products for live prey have been determined in order to avoid slow growth and skull anomalies.

Atlantic halibut larvae showed no difference in larval performance when fed either nauplii or on-grown meta-nauplii Artemia until 28 days post first feeding.

Taurine in starter diets appeared to promote growth of grey mullet fry. However, the addition of taurine had no effect on meagre larvae. Finally, the fatty acid profile of wreckfish larvae showed little variation in the first ten days of life and underlined the importance of Arachidonic Acid (ARA) for this species.

Larval and Grow Out

In the area of larval and grow out husbandry, no compensatory growth was found in meagre juveniles after size grading.

On-growing of this species has shown evidence of the importance of cage depth for individuals

Greater Amberjack in cage.

"In greater amberjack, a temperature of 26°C allowed the best performance compared with 22°C or 17°C. This temperature also influenced better morphological development (elongated body shape)."

of 200g -1kg, as deeper nets result in better feed use.

It was also found that meagre juveniles could be trained to feed using stimuli such as light and air bubbles, providing a potential for a more effective feeding method in sea cages.

In greater amberjack, a temperature of 26°C allowed the best performance compared with 22°C or 17°C. This temperature also influenced better morphological development (elongated body shape).

For grey mullet, a weaning diet has been developed with high levels of fishmeal substitution with plant protein, which did not affect fish performance.

Fish Health

In the area of fish health, characterisation of the ontogeny of the immune response in meagre has been done, collecting tissue samples at various times post-hatching. Samples of different tissues from juveniles have been provided for analysis of immune gene expression.

A challenge test model with *Photobacterium damselae subsp. piscicida* in meagre and greater amberjack is under development. The monogenean *Zeuxapta seriolae* has been identified as the most prevalent and important parasitic pathogen for greater amberjack.

A passive collector device has been designed and tested to detect and quantify the level of infestation of monogenean parasites in rearing tanks.

Concerning Atlantic halibut, the production of Viral Neural Necrosis (VNN) capsid protein is in progress and successful expression in *E. coli*, tobacco plants and *Leishmania* has been achieved. The technique is under optimisation prior to larger scale production for vaccination.

Consumers Want Convenience

Besides the technical improvement of the selected species, the socio-economic research in DIVERSIFY includes solutions regarding the perception of aquaculture products, market demand, buyer preferences, new product development, value adding and market development.

These outcomes will help the EU aquaculture sector and the supply industry in targeted marketing and improvement of its international competitive position.

The macro-environmental context analysis indicated that most EU countries have a policy to increase fish consumption and that seafood consumption is already increasing in most EU countries.

This growth can only be realised at the expense of other protein sources, due to the stabilisation of the protein market during the last few years. Consumer preferences concerning farmed fish seem to converge to convenience and fresh standardised products, such as fish fillets, portioned meals and processed foods.

A consumer survey performed in the project has identified three consumer segments: (1) involved traditional consumers who know relatively more about fish and who have a more open mind to buying new fish products; (2) involved innovators: who know relatively more about and who have a more open mind to buying new fish products and (3) ambiguous indifferent: who know relatively less about fish and who are less open to buying new fish products.

Overall, the project has been making good progress in studying the six species and acquiring important knowledge for the development of culture methods. In the area of socioeconomics, DIVERSIFY has contributed to the identification of solutions to improve the perception of aquaculture products, market demand, buyer preferences, new product development and market development.

The results obtained so far have been presented at scientific conferences, as well as in the annual coordination meetings.

The results are also available on the project's website (**www.diversifyfish.eu/2016-annual-coordination-meeting-feb.html**). ■