

project news

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SEAFARE is an Atlantic Area Transnational Programme project aiming to provide tools and technologies for sustainable and environmentally-friendly aquaculture. The aquaculture industry is an important contributor to economic and social well-being, particularly in rural peripheral areas of the European Atlantic Area. However, there are concerns that aquaculture affects local ecosystems and has potentially negative impacts. Therefore, the need to promote sustainable aquaculture practices in Europe's coastal and marine areas is as great as ever.

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SEAFARE's IMTA results

The **SEAFARE** project is coming to an end and some of its results are ready for uptake. One of the most important contributions from the project to the aquaculture sector of the European Atlantic Area is the development of the integrated multitrophic aquaculture (IMTA) systems, implemented by Instituto Português do Mar e da Atmosfera (IPMA) in the Algarve, south Portugal.

The IPMA's Aquaculture Research Station in Olhão (EPP0) has facilities which can support research at a semi-industrial level, enabling the immediate transfer of the results to producers. The experimental facilities at EPP0 include a hatchery supported by several laboratories, earthen ponds for semi-intensive fish production (17) and a unit for fish handling and processing. Several experiments have assessed the physiology of growth and performance of new species such as the meagre (*Argyrosomus regius*) and the sea bream (*Diplodus sargus*), promoting the diversification of the aquaculture industry by providing a greater range of species.

The work carried out in the IPMA facilities has also contributed to the development of fish culture procedures to enable sustainable aquaculture exploitation of marshy wetlands.

There are several sites characterised by vast marshy areas in the Atlantic Area, especially along the Gulf of Cadiz, a short distance from the IPMA infrastructures. For such areas it is very important to understand how aquaculture can be safely conducted in protected zones in order to open new and alternative opportunities for the European aquaculture industry and create strength through diversity within the context of an integrated coastal zone management approach.

In this issue of **SEAFARE** Project News, Pedro Pousao, Head of EPP0, talks to us about the research IPMA has developed in Olhao, its potential application, and the benefits that the new techniques and methodologies being developed may have for the European aquaculture industry. This issue also features a report from the **SEAFARE** project meeting which was hosted by IPMA in July, and details of the upcoming stakeholder event relating to the potential benefits of implementing wetland aquaculture in the Gulf of Cadiz area, to be held in Seville, Spain, in October.

Interview with Pedro Pousao



1. Please tell us a little about yourself.

I initially started off working in aquariums and then I completed a degree in biology at the University of Lisbon, Portugal. My first experiences in the aquaculture sector were with freshwater eels. In 1984 I started working with reproduction and larval breeding of marine fish such as seabream, seabass and sole at the Instituto Português do Mar e da Atmosfera (IPMA) and started

to develop its fish culture research facilities. In 1990 I also worked in the first private company to develop earthen pond aquaculture. I currently hold a senior researcher position and I am head of the Aquaculture Research Station in Olhao.

2. What is IPMA's role in the SEAFARE Project?

Firstly, we are involved in the development of integrated multitrophic aquaculture (IMTA) and polyculture in earthen ponds. These activities will lead to increased productivity in earthen ponds dedicated to aquaculture, making them more competitive than aquaculture farms that grow fish in cages in the sea. This work could indirectly contribute to the development of depressed rural areas where these ponds were abandoned after they were used for agriculture.

Secondly, we have conducted research on the protection of the native Portuguese oyster species *Crassostrea angulata* at the Shellfish Research Station in Tavira. IPMA has been working with the genetics of the oyster to identify places where it is still possible to find pure populations of the Portuguese oyster, and have tried to improve its reproduction and growth in order to make it more attractive to oyster producers. We have explored how to obtain a more attractive product for the consumers in terms of taste and feel.



3. Can you explain what exactly IMTA systems are?

In the same system you can have different trophic levels such as algae, fish and molluscs. These aquaculture systems are fully integrated, by which I mean that in the same system we can find fish, macroalgae that clean the water as they feed on products emerging from the metabolism of the fish, and other microalgae that appear as a result of this process. In our case study system there were also oysters that fed on the microalgae that appeared in the system. IMTA systems are more environmentally friendly than traditional monoculture systems because the system itself removes nutrients from the water and less energy is required to maintain the system.

4. What is innovative about this work?

Multitrophic aquaculture has become popular during recent years. However, there is not a lot of bibliography about it, and in a way you could say everybody working on IMTA systems is pioneer at a certain level! I could say that we are pioneers in developing this technology in earthen ponds.

5. What species have been studied in relation to IMTA systems?

We have been testing two different oyster species, the native Portuguese oyster (*Crassostrea angulata*), and the Pacific oyster (*Crassostrea gigas*). The fish species we have been working with include the sea bream (*Sparus aurata*), the meagre (*Argyrosomus regius*), and two different diploodus species (*Diplodus cervinus* and *Diplodus sargus*).

6. In your opinion, which species are most suitable for implementing IMTA systems?

We know that the meagre grows faster than the seabream, and the seabream grows faster than the diploodus. However it is not only a question of production, it is also a question of market and demand. The seabream is well known and easy to sell. The *Diplodus sargus* is very popular in Portugal, and when producing small quantities you can put them on the local market at reasonable prices. This is not intensive aquaculture, we focus our research on small production and trying to obtain a high quality product suitable for selling in local markets. All of the species initially have the same suitability for production in IMTA systems but it is the market that decides which ones will be most suitable according to the existent demand.

7. Are there any specific environmental conditions required to implement IMTA systems?

You need to have access to good quality water. The IMTA systems in earthen ponds require less water renewal than conventional systems, which implies less energy consumption.

8. Where are IMTA systems currently being implemented?

IMTA has been empirically developed and used in Asia for centuries. Research on the subject started in the late 20th century in

Western countries due to the increasing awareness of the need to mitigate ecological effects caused by excessive fishing and aquaculture. Today IMTA is being used on a commercial scale or at research level in countries all over the world.

9. What work will you be concentrating on in the remaining months of the project?

We have one last trial in which we have been testing a new fish feed which replaces 50% of the fish protein and fish oil with vegetable oils. The trial will finish in mid October and then we will analyse the results. If it works we could create new fish feed which would use less fish than currently produced feeds.

10. What are the main objectives you have been able to achieve through SEAFARE?

We have generated a lot of data about multitrophic aquaculture and polyculture of fish and this data will potentially lead to diversification of the aquaculture sector in the region. We have worked on developing technology to obtain a better substrate for the oyster in the IMTA systems and we have promoted the preservation of the Portuguese oyster. I would say these are the main outcomes we have achieved thanks to the SEAFARE project.



Huge Potential Evident as SEAFARE Nears Completion

The **SEAFARE** project held a two-day project meeting at the Instituto Português do Mar e da Atmosfera (IPMA) aquaculture research station in Olhao, Portugal, from the 16-17 July 2013. The meeting provided an opportunity for the partners to present and discuss their progress and expected outputs as the project nears its expected endpoint in December 2013. From these interactions, the significant potential of the project's research to positively impact policy, industry and society became clear. The meeting was attended by representatives from Bangor University (UK), the Andalusian Institute of Agricultural Research and Training (IFAPA) (Spain), AquaTT (Ireland), and the meeting host IPMA.

Mr Daniel Lee, **SEAFARE** project coordinator, said: "We are facing a busy period between now and the end of the project. We have achieved very interesting results during the project's lifetime, such as the work related to wetlands aquaculture carried out in Veta la Palma in Spain or the earthen ponds here in South Portugal, and we will ensure the new knowledge generated goes to the right stakeholders to facilitate its uptake."

Dr Pedro Poussao, the manager of the IPMA aquaculture research station in Olhao, said: "It has been a pleasure to host this very productive meeting. We have proved that the integrated multitrophic aquaculture systems are workable and productive in earthen ponds and that they can also be implemented in wetlands aquaculture farms to increase their productivity. This could represent an opportunity to create employment in depressed rural areas. We are looking forward to attending the Seville workshop and presenting our results to policy makers and managers along with industry!"



Reclaiming Wetlands for Aquaculture: Upcoming Stakeholder Event in Seville

The **SEAFARE** project will hold a one-day stakeholder event in the Instituto de Investigacion y Formacion Agraria y Pesquera (IFAPA) in Seville, Spain, on 30 October 2013. The event will focus on the potential benefits of implementing wetland aquaculture in the Gulf of Cadiz area and aims to address policy makers, environmental managers and fish producers from Spain and Portugal.

The morning session will include a series of presentations outlining the work carried out by the **SEAFARE** project and the main outputs of the project relating to integrated multitrophic aquaculture (IMTA) systems, fish polyculture and the ecosystem services that this type of aquaculture can offer to society. The morning will finish with a round table session during which policy makers and environmental managers will have the chance to ask more detailed questions about the specificities of wetlands aquaculture systems.

The event will include a visit to the facilities of Veta la Palma in the afternoon. Veta la Palma is an aquaculture farm located on an island in the Guadalquivir River, 10 miles inland from the

Atlantic Ocean, and is a good example of how aquaculture can be used as a driver for wetland reconstruction. The attendees will have the opportunity to see for themselves how beneficial the implementation of wetlands aquaculture in the region can be from both economic and ecological perspectives.

If you would like more information about **SEAFARE**, please contact the project communication officer:

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The **SEAFARE** project addresses important issues about conducting sustainable aquaculture. The knowledge generated by the project will be transferred to the private sector and to other stakeholders (i.e. coastal policy makers, conservationists). The **SEAFARE** project is dedicated to solving specific problems within the aquaculture industry and will deliver workable solutions to achieve a more sustainable future for aquaculture.