	EUROPEAN COMMISSION RESEARCH AND INNOVATION DG	Periodic Report

Project No: 603121

Project Acronym: DIVERSIFY

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

Periodic Report

Period covered: from 01/12/2013 **to** 30/11/2014

Start date of project: 01/12/2013

Project coordinator name:
Dr. Constantinos Mylonas

Version: 1

Date of preparation: 19/12/2014

Date of submission (SESAM): 30/12/2014

Project coordinator organisation name:
HELLENIC CENTRE FOR MARINE RESEARCH

Periodic Report

PROJECT PERIODIC REPORT

Grant Agreement number:	603121
Project acronym:	DIVERSIFY
Project title:	Exploring the biological and socio-economic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry
Funding Scheme:	FP7-CP-TP
Date of latest version of Annex I against which the assessment will be made:	15/05/2014
Period number:	1st
Period covered - start date:	01/12/2013
Period covered - end date:	30/11/2014
Name of the scientific representative of the project's coordinator and organisation:	Dr. Constantinos Mylonas HELLENIC CENTRE FOR MARINE RESEARCH
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Declaration by the scientific representative of the project coordinator (1)

I, Dr. Constantinos Mylonas HELLENIC CENTRE FOR MARINE RESEARCH , as scientific representative of the coordinator of the project DIVERSIFY and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

The project has fully achieved its objectives and technical goals for the period.

The attached periodic report represents an accurate description of the work carried out in this project for this reporting period.

The public website is up to date.

To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 6) and if applicable with the certificate on financial statement.

All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name	Dr. Constantinos Mylonas HELLENIC CENTRE FOR MARINE RESEARCH
Date	30/12/2014

This declaration was visaed electronically byConstantinos MYLONAS(ECAS user name nmylocon) on 30/12/2014

1. Publishable summary

Summary description of project context and objectives

The European aquaculture sector is a modern industry employing 190,000 people (directly or indirectly), with a €7 billion ex-farm value. Many world-class researchers and facilities exist in research centers and universities throughout Europe, while the private sector employs highly skilled and educated personnel, with modern production facilities. This sector is well situated to be among world leaders in the efficient and sustainable production of safe seafood of the highest quality and nutritional value, taking into account consumer preferences and lifestyles, and the immense diversity of aquatic products from the wild, to which the consumer is accustomed.

Aquaculture is undertaken in all EU states, and plays an important role in the supply of high quality seafood to the European consumer. Europe has an increasing demand for a diverse range of fish products especially for fish fillets or processed products. However, while the worldwide contribution of aquaculture towards fish consumption is just shy of 50%, in the EU only 10% of the seafood consumption originated from EU aquaculture and the consumption of imported seafood is currently at 65% today. This situation can be attributed partially to a lack of diversity of aquaculture products and, perhaps more importantly, a lack of processed aquaculture products.

Even though some 35 aquatic species are cultured in Europe, finfish aquaculture production is dominated both in volume and value by a handful of species --such as Atlantic salmon (Salmo salar), rainbow trout (Oncorhynchus mykiss), common carp (Cyprinus carpio), European sea bass (Dicentrarchus labrax) and gilthead sea bream (Sparus aurata)-- that in turn limit the number of aquaculture products available in the market. An efficient, sustainable and market-oriented expansion of the EU aquaculture sector based on new species and products will reduce the dependence of the EU consumer on imports from countries of questionable, often, production, health, environmental and social standards, and reduce the pressure on over-exploited fisheries in the EU.

DIVERSIFY will provide knowledge where needed to solve bottlenecks in juvenile production, grow-out, nutrition and feeding husbandry, new product development and marketing of six new/emerging species. DIVERSIFY focuses on meagre (Argyrosomus regius) and greater amberjack (Seriola dumerili) for marine warm-water 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 warm-water pond, extensive and integrated culture, and pikeperch (Sanders lucioperca) for freshwater intensive culture using Recirculation Aquaculture Systems (RAS). These species were selected based both on their biological and economical potential, and to cover the entire European geographic area and stimulate different aquaculture types. Given their large size and/or fast growth, these species provide for high dress-out and fillet yield, short time to market and suitability for product diversification and development of value-added products. The expertise in the consortium and lessons learned, could provide in a 5 year period what took the Atlantic salmon industry 20 years of development.

A strong socioeconomic component is also included in DIVERSIFY, in order to address issues that are presently important bottlenecks in aquaculture consumption and diversification --which are beyond biological/production issues. The socioeconomic part of the project has an applied market development approach. In this component the perception of aquaculture products in general and products specifically, market demand, consumer and professional buyer preferences, new product development, value adding to raw products and market development have a central role. An important bottleneck in aquaculture consumption is that in many countries and/or segments of the EU market, aquaculture fish have a weaker image than wild fish. This threat to the expansion of the aquaculture sector must be recognized and addressed in parallel to any technological improvement of production methods or the addition of new fish species or products by the aquaculture industry.

The combination of biological, technological and socioeconomic research activities planned in DIVERSIFY are expected to support the diversification of the aquaculture industry and help in expanding production, increasing aquaculture products and development of new markets.

Description of work performed and main results

Diversify includes work in six scientific discipline, such as Reproduction & Genetics, Nutrition, Larval husbandry, Grow out husbandry, Fish health and Socioeconomics (including new product development).

In the area of Reproduction & Genetics, spawning was obtained from all species for which the aim was to improve reproductive control. Greater amberjack produced good quality eggs from spontaneous natural and GnRHa-induced spawnings. Atlantic halibut F1 fish could be induced with GnRHa implants to spawn earlier and produce higher fecundities compared to controls. Wreckfish obtained spontaneous natural spawning in tanks, GnRHa induced spawning in tanks and stripped gametes for in vitro fertilization. Work with grey mullet both increased percentage of fish maturing and synchronized gonadal development with treatments of recombinant FSH. Spawning was then successfully induced in most females, to provide millions of eggs and larvae. To provide tools for genetic improvement, captive broodstocks of both meagre and pikeperch were genetically characterized to demonstrate that the majority of broodstocks had sufficient variation for breeding programs and strategies were indicated on how the stocks could be improved.

After reproduction & genetics, the main issue for the development of emerging species for aquaculture is the success in the mass production of high quality juveniles. Frequently in new species, low larval survival rates and high bone malformation incidences are obtained, fry supply is not steady or health and welfare problems occur. All these problems have been associated in other species with the lack of adequate first feeding diets or even brood stock diets (i.e., Nutrition). Thus, the objectives of the first year of DIVERSIFY in Nutrition have been focusing mostly on the definition of the requirements for the most relevant nutrients during first feeding regimes, including live prey enrichments and weaning diets, and the formulation of adequate broodstock diets. The results obtained already have been able to improve weaning diets for meagre, demonstrating the importance of raising the essential highly unsaturated fatty acids (HUFA) levels and vitamins E and C. Greater amberjack enrichment products were also improved, in order to prevent bone malformations and promote maximum growth and survival. Also, an optimum method for the effective enrichment of rotifers for greater amberjack was developed, and specific diets for broodstock of amberjack and wreckfish were formulated.

In Larval husbandry, work in meagre showed that larvae that had been offered initially a half Artemia ration and weaned at 15 days post hatching (dph) onto a dry feed, were not significantly different than controls, in terms of growth, whereas survival in all treatments was also not markedly different. In greater amberjack, the larval rearing parameters were established, as well as carrying out studies to determine the most effective larval stocking density. In Atlantic halibut, a study is presently running to compare the efficacy of recirculation aquaculture system (RAS) and flow through (FT) for larval rearing. The first year study in grey mullet is currently underway, and will determine the effect of algal type and concentration in rearing tanks on larval performance.

Grow out husbandry represents the longest production phase in aquaculture and the procedures applied affect significantly the overall production performance. The tasks related to meagre focused on the study and improvement of growth dynamics with the development of appropriate feeding methods, and by improving the conditions of the rearing environment (depth and light conditions). In grey mullet, the first study related to the definition of an optimal weaning diet. The second study is a multi-factorial comparison of different stocking densities and rearing systems with individuals of different origin (wild VS F1) fed an improved diet.

In Fish health, the first diet trials to ameliorate the effects of systemic granulomatosis in meagre have been performed, using three levels of vitamin D. All the samplings were done and the analysis is on-going. Attempts have been made to isolate the aetiological agent of Epitheliocystis in greater amberjack during larval rearing. A first experiment has also been made to characterize the ontogeny of the immune response in meagre. First attempts to develop a challenge model have been performed with Photobacterium damselae subsp. piscicida in meagre and greater amberjack, and a collector device has been designed and tested to detect and quantify the level of infestation of monogenean parasites in greater amberjack without the need to manipulate the fish. Lastly, production of VNN capsid protein has been progressing well, and successful expression in E. coli,

tobacco plants and Leishmania has been achieved, and is currently being optimized.

In the Socioeconomics area, the macro-environmental context analysis indicated that most EU countries have a policy to increase fish consumption. This growth can only be realized at the expense of other protein sources. In sustainability certification, several schemes were identified in the market: (1) internationally recognized schemes such as HACCP, BRC and GLOBALGAP, (2) privately owned certification schemes such as Carrefour standards, (3) NGO-developed standards such as ACC and ASC and (4) country-specific supply chain certification schemes, such as Label Rouge and Crianza del Mar. In general, the consumption trend is that fresh fish and species with good filets and soft bones are preferred by EU consumers. More specific, the southern EU countries eat more whole fish, while northern countries prefer processed fish. Consumer preferences concerning farmed fish seem to converge to convenience and fresh standardized products, such as fish fillets, portioned meals and processed foods. Pre-seasoned is not preferred by consumers in the southern EU and frozen is generally perceived as lower quality. Analysis of the consumer survey identified three consumers segments: (1) involved traditional consumers (29%): who know relatively more about fish and buy traditional fish products; (2) involved innovators (36%): who know relatively more about fish and who have a more open mind to buy new fish products and (3) ambiguous indifferent (35%): who know relatively less about fish and who are less open to buy new fish products. Based on the first findings, more than 1/3 of the consumers in the five selected countries belong to the segment of 'Involved innovators' and could therefore potentially be open to buy new species.

Expected final results and potential impacts

DIVERSIFY is expected to advance the current knowledge beyond the state-of the art and impact on the current and near future activity of the European aquaculture industry. The diverse and complementary nature of the consortium will allow a number of key basic questions of various fields such as reproduction, development, growth, nutrition, adaptation and immunity to be addressed for a multitude of species. DIVERSIFY was designed to solve the main bottlenecks identified by the sector with regards to the incorporation of new fish species. These improvements will be set up on the conjunction of two sources of information: i) basic knowledge on biological processes affecting fish culture and ii) applied knowledge on the development of species-specific protocols for fish culture optimization. In particular, expected results and their potential impact on aquaculture science include:

Reproduction: The controlled availability of gametes is imperative for sustainable aquaculture. DIVERSIFY will provide improved understanding of the regulation of reproduction, as well as define optimal broodstock management conditions and broodstock diets in order to assure optimal gamete quality, and will develop species-specific spawning induction protocols. Improved reproductive function may, in turn, reduce the occurrence of skeletal deformities and poor larval and juvenile performance. In addition, specific tools such as ELISA assays for reproductive hormones will be developed with multiple scientific and industrial applications.

Genetics: DIVERSIFY will focus on the genetic characterization of actual broodstocks of meagre and pikeperch, the two species with current relevant industrial production, in order to overcome future inbreeding problems in these two species and solve current problems with variable growth rates (meagre) and stress sensitivity (pikeperch). Thus, the genetic characterization of fast and slow growing meagre (SNP approach) and the genetic diversity and stress sensitivity in pikeperch (microsatellite approach) will provide useful tools for improvement of actual culture practices, and establishing the basis for selective breeding programs that will serve to scale-up and improve their production in terms of quantity and quality.

Nutrition: The cost of feeding in aquaculture production is around 40-70% of total production cost. New species in aquaculture are fed with available diets designed for other species, which may constraint their growth performance and general condition. For this reason, it is important to develop species-specific feeds that consider the nutritional requirements of each species at different stages of development and that can improve their performance (e.g., FCR, growth rate), quality (e.g., morphology, fillet yield and product composition, and egg viability) and health condition (e.g.,

prevention of metabolic disorders). To achieve this goal, DIVERSIFY will establish the unknown nutritional requirements of several macro- and micronutrients and dietary energy needs for most of the species considered in the proposal. In addition, in order to fit larval needs, specific live prey enrichment products will be developed. Development of specific formulated feeds, live prey enrichment products and feeding protocols will result in new products that may be commercialized worldwide.

Growth and husbandry: A larval and juvenile rearing system is a complex environment, with numerous factors influencing larval development and performance, as well as behavior and survival. These factors can be environmental (light intensity, temperature, salinity, tank color, water current), nutritional (feed composition and availability, feeding frequency), social (fish density) and genetic. For species such as meagre, pikeperch, grey mullet and Atlantic halibut, improvements in terms of fish growth and husbandry will be addressed to refine the existing protocols (e.g., weaning schedule), procedures and facilities (e.g., semi-intensive and intensive rearing procedures, cage culture, RAS and flow-through systems) in order to solve existing bottlenecks (e.g., large size dispersion and high variable growth rates in the case of meagre, high cannibalism rates in pikeperch, low survival and larval quality in halibut and grey mullet). In contrast, emphasis will be given to developing new species-specific larval rearing protocols in the case of greater amberjack and wreckfish, since these are species with important knowledge gaps in these areas. This approach will increase our knowledge on the development of fish larvae in greater amberjack, wreckfish, Atlantic halibut, grey mullet and pikeperch that will serve to synchronize the state of development of the fish under different rearing conditions with the new or existing rearing technology. Finally, the output of these tasks will be the development and refining of rearing protocols for selected species that will result in the improvement of current practices, and an increase in production yields.

Health: Fish health is a key trait to be optimized in cultured fish. The effect of the developmental stage, rearing conditions and nutrition on the capacity to modulate specific immune responses will help predict vaccine responsiveness and fish health. DIVERSIFY will characterize the immune system of meagre and greater amberjack to identify key immune molecules as potential markers of immune system development, and induction of antiviral and antibacterial responses in preparation for vaccine development for disease management. In addition, potential solutions for specific bacterial infections and parasitoses will be investigated, providing means to prevent and/or minimize these issues at an industrial scale.
Also related, transport of live animals across large distances and introduction of allochthonous species to new geographic regions is a continual source of introduced and emerging diseases, and potentially zoonotic ones as well. A primary goal of this project - the improved efficiency of fish culture for the food sector - means that autochthonous species can be produced locally and reduce market drives for other aquatic species, and thereby eliminate the risks associated with the introduction of allochthonous species for cultivation that may do harm to local species diversity in the region of introduction. While preventing emerging or introduced aquatic diseases is not a goal or the focus of this project, it is an added positive impact that may have on the sector.

Sustainability: Sustainability of aquaculture production has a strong uphold in DIVERSIFY and has been considered from different points of view, most of them already mentioned above. To summarize, these concerns have been addressed by i) supporting the growth and expansion of the sector based on different production systems that can be regarded as more sustainable (cage culture – no competition with land resources; RAS- ecologically friendly, with efficient use of water; extensive pond-lagoon culture, with very low environmental effects and in some cases even contributing to the restoration of ecosystems – e.g., abandoned “Salinas”/salt marshes); ii) introduction of a herbivorous fish into the aquaculture sector, with positive influence in the environment where it is cultured (improving sediment quality, avoiding oxygen depletion and reducing ammonia levels) and requiring low or close to none input from marine-based feedstuffs; iii) an important focus of the proposal resides on the determination of species-specific dietary requirements, including the investigation of more sustainable ingredients, as well as feeding behaviour, which will result in less waste of diets and nutrients into the environment; iv) research will be conducted that will hopefully enable anticipated potential disease problems to have veterinary solutions prepared in time and, finally, v) considering consumer requirements, including changes in societal and ethnic demands, to enable a market-orientated growth of the aquaculture sector. Altogether, these factors will ensure a sustainable growth and expansion of aquaculture within the

EU and EEA member states.

So, overall, the main expected impact of DIVERSIFY will be the identification of the most appropriate new/emerging fish candidates for the future growth of the European marine and inland aquaculture and the improvement of production technologies for the selected species. Furthermore, DIVERSIFY is expected to have also a significant impact on removing bottlenecks in markets and consumer's perception and preferences. This will be achieved through identification of innovative opportunities for growth of the industry and increase of the EU consumption of aquaculture products through diversification of products and marketing approaches directed to improve consumer perception of aquaculture and develop new markets. Such an integrated combination of biological, technological and socioeconomic activities will lead to a reduction in the dependence of the EU on imports from third countries of questionable, at times, production, health, environmental and social standards.

Project public website address:	www.diversifyfish.eu

2. Core of the report

Project objectives, Work progress and achievements, and project management during the period

The Project Summary Pdf document contains the core of the report.

3. Deliverables and milestones tables

Deliverables (excluding the periodic and final reports)

Del. no.	Deliverable name	Version	WP no.	Lead beneficiary	Nature	Dissemination level	Delivery date from Annex I (proj month)	Actual / Forecast delivery date	Status	Comments
1	Kick-off meeting	1.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Other	RE	2	10/02/2014	Submitted	
2	Consortium Agreement	1.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Other	CO	3	20/03/2014	Submitted	
3	Annual Coordination M eeting for Y2	1.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Other	RE	13	28/11/2014	Submitted	
4	Periodic Report, incl udin g financial and ad ministr ative reports f or Mo 1-12	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	CO	14	31/01/2015	Not submitted	
5	Interactions with oth er p rojects	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	RE	18	31/05/2015	Not submitted	
6	Annual Coordination M eeting for Y3	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Other	RE	25	31/12/2015	Not submitted	
7	Mid-term evaluation o f progress	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	30	31/05/2016	Not submitted	
8	Periodic Report, incl udin g financial and ad ministr ative reports f or Mo 13-3 0	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	CO	32	31/07/2016	Not submitted	
9	Annual Coordination M	0.0	1	HELLENIC C	Report	RE	37	31/12/2016	Not submitted	

	eeting for Y4			ENTRE FOR MARINE RES EARCH						
10	Annual Coordination M eeting for Y5	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	RE	49	31/12/2017	Not submitted	
11	Periodic Report, incl udin g financial and ad ministr ative reports f or Mo 31-4 8	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	RE	50	31/01/2018	Not submitted	
12	Annual Coordination M eeting (Final)	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	RE	60	30/11/2018	Not submitted	
13	Periodic Report, incl udin g financial and ad ministr ative reports f or Mo 49-6 0	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	60	30/11/2018	Not submitted	
14	Final Report	0.0	1	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	RE	60	30/11/2018	Not submitted	
1	SNP library and chip to g enetically character ise m eagre or to use i n marker assisted bree ding progra ms (M18)	0.0	2	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	18	31/05/2015	Not submitted	
2	Genetic characterisat ion of different meag re capti ve broodstock s and e valuation of a vailable va riability (M12)	1.0	2	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	12	15/12/2014	Submitted	
3	Protocol for paired s pont aneous tank spawn ing of meagre	0.0	2	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	21	31/08/2015	Not submitted	

4	Identification of gen etic markers related t o growth for use in ma rker assisted breeding programs for meagre	0.0	2	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	30	31/05/2016	Not submitted	
5	Genetic characterisat ion of fast and slow growing meagre	0.0	2	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	30	31/05/2016	Not submitted	
6	Description of sperm c haracteristics and cry o preservation protoco l of meagre sperm	0.0	2	INSTITUT F RANCAIS DE RECHERCHE POUR L'EX PLOITATION DE LA MER	Report	PU	36	30/11/2016	Not submitted	
7	Protocol for the stri p sp awning of meagre females and in vitro fertilization	0.0	2	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	36	30/11/2016	Not submitted	
1	Establishment of quan tita tive PCR assays to m easure transcript l evels of target genes in greater amberjack (i.e., LH#, F SH#, le ptin, Vg and Vg recept or)	0.0	3	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	12	30/11/2014	Not submitted	It was not possible to se nd the pituitary samples (at -80°C) to P4. IOLR until the end of 2014
2	Establishment of horm one specific ELISAs fo r measuring LH, FSH a nd leptin in greater amber jack	0.0	3	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	18	31/05/2015	Not submitted	
3	Identification of pos sible reproductive dy sfunction of gametoge nesis of gre ater ambe rjack reared in capti vity based on the co m parative evaluation of f ish sampled in the wild, in terms of pro liferating	0.0	3	UNIVERSITA DEGLI STUDI DI BARI "ALDO MORO"	Report	PU	24	30/11/2015	Not submitted	
4	Establishment of a Co mputer Assisted Sperm	0.0	3	INSTITUT F RANCAIS DE	Report	PU	32	31/07/2016	Not submitted	

	Analysis (CASA) for the evaluation of grea ter a mberjack sperm			RECHERCHE POUR L'EX PLOITATION DE LA MER						
5	Description of the pr oces s of oogenesis in captive greater amber jack, inclu ding (a) a spects of growt h and body indices, (b) h ist ological evaluation o f ovarian development, (c) pituitary levels of FSH	0.0	3	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	46	30/09/2017	Not submitted	
6	Description of the pr oces s of spermatogene sis in c aptive greater amberjack, including (a) aspects of growth and body indices, (b) histological evaluation of testicular dev elop ment, (c) pituitar y level	0.0	3	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	46	30/09/2017	Not submitted	
7	Comparative effective ness of a GnRHa injecti o n vs GnRHa implant t reatment for the indu ctio n of spawning ofg reater a mberjack in t he eastern A tlantic	0.0	3	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	48	30/11/2017	Not submitted	
8	Dose response of GnRH a implant therapy for the induction of spaw ning in F1 generation broodstock of greate r amberjack in the eas tern Atlantic	0.0	3	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	54	31/05/2018	Not submitted	
9	Development of a spaw ning induction therapy for captive reared broodstock in the Medite rranean Sea based on the use of G nRHa in th e correct mode of administration (hormon e /implant), dose and ti mi ng of	0.0	3	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	

10	Method for inducing sp awning and collecting g reater amberjack eg gs in sea cages	0.0	3	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
1	Genetic analysis of d omesticatd pikeperch bro odstocks	1.0	4	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	12	19/11/2014	Submitted	
2	Population genetic ana lys is of wild and compa rison with domesticate d p ikeperch populatio ns to b e applied in fu ture breed ing programs of the speci es	0.0	4	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	16	31/03/2015	Not submitted	
1	Documentation of repr oductive performance in wild-captured vs c ultured female Atlanti c halibut	0.0	5	HAVFORSKNI NGSINSTITU TTET	Report	PU	30	31/05/2016	Not submitted	
2	An optimised GnRHa th erapy protocol to impr ov e spawning performan ce of F1/F2 Atlantic h alibut, and to increa se availabil ity of egg s of stable and predi ctable quality	0.0	5	HAVFORSKNI NGSINSTITU TTET	Report	PU	30	31/05/2016	Not submitted	
3	Identification of pot ential disturbances in reprod uctive develop ment in F1/F2 Atlanti c halibut females	0.0	5	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	
1	Computer Assisted Spe rm Analysis (CASA) fo r wreckfish sperm	0.0	6	INSTITUT F RANCAIS DE RECHERCHE POUR L'EX PLOITATION DE LA MER	Report	PU	24	30/11/2015	Not submitted	
2	Cryopreservation meth od for wreckfish	0.0	6	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	24	30/11/2015	Not submitted	
3	Spawning induction me	0.0	6	INSTITUTO	Report	PU	36	30/11/2016	Not submitted	

	thods with in vitro fe rt ilization of wreckf ish			ESPANOL DE OCEANOGRA FIA						
4	Establish reliable co llec tion methods and protocol s to form new wreckfish broodstock s	0.0	6	CONSELLERIA DO MAR - XUNTA DE GALICIA	Report	PU	36	30/11/2016	Not submitted	
5	Description of the re prod uctive cycle of wr eckfish	0.0	6	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	48	30/11/2017	Not submitted	
6	An in vitro fertilizat ion protocol to be empl oyed by the industry to spawn wreckfish	0.0	6	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	48	30/11/2017	Not submitted	
7	Spawning induction me thod for spontaneous s pa wning of wreckfish i n lar ge tanks	0.0	6	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
1	Establishment of a Co mputer Assisted Sperm Analysis (CASA) for the evaluation of grey mullet sperm	1.0	7	INSTITUT F RANCAIS DE RECHERCHE POUR L'EX PLOITATION DE LA MER	Report	PU	12	12/12/2014	Submitted	
2	Production of recombin ant bioactive LH and FS H assay for grey mullet	0.0	7	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	18	31/05/2015	Not submitted	
3	Comparative effective ness of hormonal treat me nts for spawning in ductio n in captive gr ey mullet	0.0	7	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	24	30/11/2015	Not submitted	
4	Protocol for shipping gre y mullet eggs	0.0	7	VAS. GEITO NAS & CO LTD EE	Report	PU	24	30/11/2015	Not submitted	
5	Description of the pr oces	0.0	7	UNIVERSITA	Report	PU	48	30/11/2017	Not submitted	

	s of oogenesis in captive -reared vs hat chery-produ ced grey m ullet, includin g aspects of growth, body in dices, and histologic al evaluation of ovarian d evelopment			DEGLI STUDI DI BARI "ALDO MORO"						
6	Culture procedure tha t id entifies the ongr owing pe riod for the production of grey mu llet roe (bottarga) f rom wild and hatchery juveniles	0.0	7	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	54	31/05/2018	Not submitted	
7	Development of a bree ding protocol for capt ive reared grey mulle t broo dstock based on opti mized hormonal tre at ment, group structur e and photo-thermal r egime	0.0	7	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	60	30/11/2018	Not submitted	
1	Improvement of larval weaning diets	0.0	8	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	24	30/11/2015	Not submitted	
2	Recommended essential fatty acids contents in diets to promote m eagre growth, welfare and healt h	0.0	8	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	48	30/11/2017	Not submitted	
1	Optimum levels and ra tios of essential fatt y acids in relation to Tau and combined PUF A-ca rotenoids in grea ter ambe rjack enrichmen t pro	0.0	9	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER	Report	PU	24	30/11/2015	Not submitted	

	ducts			SIDAD DE LAS PALMAS DE GR AN CANARIA						
2	Lys requirements of g reat er amberjack juve niles	0.0	9	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	36	30/11/2016	Not submitted	
3	Performance of grow-o ut diets for greater amberjac k developed i n order to m aximize gr owth potential	0.0	9	CANARIAS E XPLOTACION ES MARINAS SL	Report	PU	58	30/09/2018	Not submitted	
4	Recommended protein, c arotenoids, Tau and E FA levels in greater amberj ack broodstocks	0.0	9	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	58	30/09/2018	Not submitted	
1	Recommended Ca/P, vit amins and phospholipid s to improve larval de velop ment and reduce skeleton alterations in pikeperch	0.0	10	DANMARKS T EKNISKE UN IVERSITET	Report	PU	36	30/11/2016	Not submitted	
2	Protocol for optimal e arl y fatty acid enric hment to reduce stres s sensitivity in pikep erch	0.0	10	DANMARKS T EKNISKE UN IVERSITET	Report	PU	36	30/11/2016	Not submitted	
3	Formulation for a diet be tter adapted to pik eperch requirements	0.0	10	ASIALOR SARL	Report	PU	48	30/11/2017	Not submitted	
1	Report on nutrient pr ofile of Artemia naup lii and ongrown Artemi a from IMR and SWH	0.0	11	HAVFORSKNI NGSINSTITU TTET	Report	PU	24	30/11/2015	Not submitted	
2	Report on optimal cha racteristics of feed par ticles and feeding enviro nment for early weaning o f Atlantic ha libut larvae	0.0	11	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	
3	Report on the nutrien t re tention and diges tive phy siology in Atl antic halib ut larvae fed Artemia nau plii and on-grown Ar	0.0	11	NASJONALT INSTITUTT FOR ENAERINGS-OG SJOMATFO RSKNING	Report	PU	36	30/11/2016	Not submitted	

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4	Report on the nutrien t re tention and diges tive phy siology in Atl antic halib ut larvae reared in RAS vs FTS	0.0	11	NASJONALT INSTITUTT FOR ENAERINGS-OG SJOMATFO RSKNING	Report	PU	36	30/11/2016	Not submitted	
5	Report on the effect o f d ietary phospholipi ds on Atlantic halibut juveniles	0.0	11	NASJONALT INSTITUTT FOR ENAERINGS-OG SJOMATFO RSKNING	Report	PU	48	30/11/2017	Not submitted	
1	Effect of live prey e nric hment products on wr eckfish larval perf ormanc e	0.0	12	CONSELLERIA DO MAR - XUNTA DE GALICIA	Report	PU	54	31/05/2018	Not submitted	
2	Recommendations for wr eckfish broodstock fee ds	0.0	12	CONSELLERIA DO MAR - XUNTA DE GALICIA	Report	PU	57	31/08/2018	Not submitted	
1	Determine changes in t he essential fatty aci d requ irement as a fun ction of developmenta l stage and ambient s alinity in grey mullet	0.0	13	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	18	31/05/2015	Not submitted	
2	Determine a developme ntal stage ability to sy nthesize key enzyme s in Tau and bile acid synthesi s in grey m ullet	0.0	13	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	18	31/05/2015	Not submitted	
3	Determine the effects of pigments, essenti al fatty acids and Tau in grey mu llet broodstock diets on egg qua lity, fecundity, h atc hing success, larval f irst feeding and vit ellog enin expression accu mulat	0.0	13	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	36	30/11/2016	Not submitted	
4	Determine the effects of essential fatty ac ids and	0.0	13	ISRAEL OCE ANOGRAPHIC	Report	PU	48	30/11/2017	Not submitted	

	Tau in non-fis h meal fee ds on flesh and bottarga quality in grey mullet			AND LIMNO LOGICAL RE SEARCH LIM ITED						
5	Evaluate and maximize the dietary incorpora tion of a non-GMO genetically selected soyb ean meal that will in crease nutrient absor ption and reduce DT i nflammation	0.0	13	UNIVERSITA DEGLI STUDI DI BARI "ALDO MORO"	Report	PP	55	30/06/2018	Not submitted	
1	Improved larval rearin g p rotocol for meagre that i ncludes weanin g at an ear lier age leading to reduc ed cos t in live feed prod uctio n and better quality j uveniles	0.0	14	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	18	31/05/2015	Not submitted	
1	Effective greater amb erja ck larval stockin g densit ies	0.0	15	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	16	31/03/2015	Not submitted	
2	Efficient prey densit y an d protocol of usin g immune modulators i n greater amberjack larval rearing	0.0	15	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	27	29/02/2016	Not submitted	
3	Optimum hydrodynamics and light conditions du ring greater amberj ack la rval rearing	0.0	15	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	27	29/02/2016	Not submitted	
4	Ontogeny of greater a mberjack larval visua l a nd digestive syste m	0.0	15	HELLENIC C ENTRE FOR MARINE RES	Report	PU	27	29/02/2016	Not submitted	

				EARCH						
5	An industrial protoco l for greater amberja ck larval rearing	0.0	15	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	48	30/11/2017	Not submitted	
1	Determine effect of e nvir onmental factors on pike perch larval r earing	0.0	16	Université de L orraine	Report	PU	12	30/11/2014	Not submitted	The experiment will be repeated in Y2 due to technical problems (see WP 16, Deviations)
2	Determine effect of n utri tional factors on pikeper ch larval rea ring	0.0	16	Université de L orraine	Report	PU	24	30/11/2015	Not submitted	
3	Determine effect of p opulation factors on p ik eperch larval reari ng	0.0	16	Université de L orraine	Report	PU	36	30/11/2016	Not submitted	
4	Identification of opt imal combinations of f actors for pikeperch larval rear ing	0.0	16	Université de L orraine	Report	PU	48	30/11/2017	Not submitted	
5	Evaluation of selected re aring combinations for pi keperch on farm condition	0.0	16	Université de L orraine	Report	PU	57	31/08/2018	Not submitted	
6	Proposition of an ind ustr ial protocol for pikeperch rearing	0.0	16	ASIALOR SARL	Report	PU	57	31/08/2018	Not submitted	
1	Production protocol of on -grown Artemia	0.0	17	HAVFORSKNI NGSINSTITU TTET	Report	PU	24	30/11/2015	Not submitted	
2	Determine if RAS is a more effective proto col than FT for Atlanti c hal ibut larvae	0.0	17	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	
3	The effect of probioti cs on Atlantic halibu t larval microbiota a nd survival	0.0	17	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	
4	Comparison of feeding on-grown Artemia versu s Artemia nauplii on Atlan tic halibut larv al perfor mance	0.0	17	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	

5	Development of an ind ustrial protocol for pro biotic treatmen of halibut larvae	0.0	17	HAVFORSKNI NGSINSTITU TTET	Report	PU	48	30/11/2017	Not submitted	
1	Development of the di gestive system of wrec kf ish	0.0	18	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	36	30/11/2016	Not submitted	
2	Determine optimum tem perature conditions fo r rearing wreckfish l arvae	0.0	18	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	36	30/11/2016	Not submitted	
3	Develop a feeding pro tocol for wreckfish lar vae	0.0	18	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	36	30/11/2016	Not submitted	
4	Determine the most ef fective culture syste m (RAS vs flow-throug h) for wreckfish larva e	0.0	18	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	48	30/11/2017	Not submitted	
1	Determine most effect ive type and concentr ation of algae used in grey mullet larval r earing	0.0	19	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	24	30/11/2015	Not submitted	
2	Determining the effect of co-feeding ciliate s and rotifers on digestive tract maturati on and enzyme product ion	0.0	19	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	36	30/11/2016	Not submitted	
3	Determine weaning tim e and type of feed ac cor ding to the shift from ca rnivorous to o mnivorous feeding	0.0	19	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	36	30/11/2016	Not submitted	
4	Evaluate the effectiv enes s of replacing li ve algae with lyophiliz ed algae d uring grey m ullet larval	0.0	19	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA	Report	PU	48	30/11/2017	Not submitted	

	rearing			RIES.						
5	Evaluate an improved g rey mullet larval rear ing protocol in a com mercial hatchery	0.0	19	VAS. GEITO NAS & CO LTD EE	Report	PU	55	30/06/2018	Not submitted	
1	Methodology to avoid s ize variability in meag re juveniles	0.0	20	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	24	30/11/2015	Not submitted	
2	Definition of the opti mum conditions for cage culture of meagre (R epor t)	0.0	20	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	39	28/02/2017	Not submitted	
3	Methodology for meagre feeding	0.0	20	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	42	31/05/2017	Not submitted	
1	Definition of optimum fee ding methods for g reater amberjack grow out	0.0	21	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	42	31/05/2017	Not submitted	
2	Definition of optimum conditions for cage c ul ture of greater ambe rjack	0.0	21	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	57	31/08/2018	Not submitted	
1	Effects of multiple va ria bles on stress, imm une re sponse and growth pe rformances and re com mendations of optim al conditions for pik eperch grow out	0.0	22	UNIVERSITE DE NAMUR ASBL	Report	PU	24	30/11/2015	Not submitted	
2	Validation of optimal rea ring variables und er commercial farm con ditions	0.0	22	ASIALOR SARL	Report	PU	42	31/05/2017	Not submitted	

3	Effects of domesticati on level and geographi cal or igin on stress, immune re sponse and g rowth pe rformances and strain rec ommendatio n	0.0	22	UNIVERSITE DE NAMUR ASBL	Report	PU	48	30/11/2017	Not submitted	
1	Cost-effective weanin g st rategies for wild -caught grey mullet g row out and their effect on growth and healt h status	0.0	23	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	18	31/05/2015	Not submitted	
2	Stocking protocols fo r po nd monoculture gr ow out of F1 and wild caught grey mullet	0.0	23	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	30	31/05/2016	Not submitted	
3	Comparison of the proj ect's improved grey m ul let grow-out feed u nder t he different en viron mental and water con ditions in Israel, Greece and Spain	0.0	23	ISRAEL OCE ANOGRAPHIC AND LIMNO LOGICAL RE SEARCH LIM ITED	Report	PU	40	31/03/2017	Not submitted	
1	The effect of vitamin D i nclusions in diets in the development of Systemic Granulomato sis in me agre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	20	31/07/2015	Not submitted	
2	The effect of Ca/P rat io in the diet in the develo pment of System ic Gr anulomatosis in meagre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	24	30/11/2015	Not submitted	
3	Cloning of key marker genes of innate and ad a ptive immune responses in meagre	0.0	24	THE UNIVER SITY COURT OF THE UNIVERS ITY OF ABE RDEEN	Report	PU	26	31/01/2016	Not submitted	
4	Isolation and charact eriz ation of Nocardia from in fected meagre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	36	30/11/2016	Not submitted	

5	The effect of high pla nt protein diets in t he deve lopment of Systemic Granulomatosis i n me agre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	36	30/11/2016	Not submitted	
6	Experimental vaccine f or Nocardia for meagr e	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	42	31/05/2017	Not submitted	
7	Diagnostics protocol f or Chronic Ulcerative D ermatopathy in meag re, aetiological factors and so lutions	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	44	31/07/2017	Not submitted	
8	Report on the prevent ion/ treatment of Chro nic Ulcerative Dermato pathy in meagre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	44	31/07/2017	Not submitted	
9	Determination of effe ctiv e treatments for common monogenean par asites in meagre	0.0	24	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	48	30/11/2017	Not submitted	
10	Kinetics of antibody a nd cytokine productio n estab lished post-pa thogen exposure or stimulation with PAMPs	0.0	24	THE UNIVER SITY COURT OF THE UNIVERS ITY OF ABE RDEEN	Report	PU	48	30/11/2017	Not submitted	
11	Recommended levels of pro- and anti-oxidant n utrients to prevent Syste mic Granulomato sis in meagre	0.0	24	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	54	31/05/2018	Not submitted	
12	Determination of effi cacy of vaccination of meagre against Nocardia	0.0	24	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	54	31/05/2018	Not submitted	

13	Description of immune gene expression pre- and post-immunizatio n of me agre with Noca rdia	0.0	24	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	54	31/05/2018	Not submitted	
14	Diagnostics protocol f or Systemic Granuloma to sis, causes and solu tions in meagre	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
15	Report on the prevent ion/ treatment of Syst emic Granulomatosis i n meagr e	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
16	Report of the major b acte rial and viral di seases f ound in meagr e, and where useful treatments h ave been de veloped, complete pro tocols for th eir impl ementation by the indu stry will be provided	0.0	24	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	57	31/08/2018	Not submitted	
17	Diagnostic-recommenda tion manual for meagre f ish health	0.0	24	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	57	31/08/2018	Not submitted	
1	Marker genes of mucosa l immunity in greater a mberjack cloned and ways to increase thei r ex pression level de termined	0.0	25	THE UNIVER SITY COURT OF THE UNIVERS ITY OF ABE RDEEN	Report	PU	39	28/02/2017	Not submitted	
2	Mucus defences of grea ter amberjack analysed and immune potential c haracterised	0.0	25	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	39	28/02/2017	Not submitted	
3	Impact of dietary reg ime on parasite resis tance and mucosal def ences of gre	0.0	25	THE UNIVER SITY COURT OF THE UNIVERS	Report	PU	42	31/05/2017	Not submitted	

	ater ambe rjack juveniles			ITY OF ABE RDEEN						
4	Protocol for early di agno sis of epithelioc ystis du ring early sta ges of grea ter amberjack culture	0.0	25	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	44	31/07/2017	Not submitted	
5	Impact of oral admini stra tion of greater am berjack with mucus stimulation p roducts on i mmune re sistance to p arasitic inf ections a nd development of mol ecular markers for its evaluation	0.0	25	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	57	31/08/2018	Not submitted	
6	Rearing protocol agai nst monogenean parasit es	0.0	25	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	57	31/08/2018	Not submitted	
7	Report on the major b acterial and viral di seases found in great er ambe rjack, and where useful t reatments h ave been developed, co mplete protocols for their imple mentation by the industry will b e provid	0.0	25	FUNDACION CANARIA PA RQUE CIENT IFICO TECN OLOGICO DE LA UNIVER SIDAD DE LAS PALMAS DE GR AN CANARIA	Report	PU	57	31/08/2018	Not submitted	
8	Diagnostic-recommenda tion manual for greate r amberjack fish heal th	0.0	25	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	57	31/08/2018	Not submitted	
1	Assess the use of two euk aryotic expression system s; microalgae and a proto zoa (Leish mania tare ntolae) for production of nodavir us capsid protein	0.0	26	HAVFORSKNI NGSINSTITU TTET	Report	PU	24	30/11/2015	Not submitted	
2	Testing of the deliver y of vaccine candidat es thro ugh Artemia to Atlantic h alibut larvae	0.0	26	HAVFORSKNI NGSINSTITU TTET	Report	PU	36	30/11/2016	Not submitted	

3	Determine immune response and effectiveness of orally delivered VNN capsid protein on protection of Atlantic halibut larvae	0.0	26	HAVFORSKNINGSINSTITUTTET	Report	PU	40	31/03/2017	Not submitted	
1	Report on external environmental factors that affect or will affect the production chains of meagre, greater amberjack, pikeperch, Atlantic halibut, wreckfish and grey mullet	1.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PP	3	22/05/2014	Submitted	
2	Report on current certification schemes and standards and their business dynamics in the fish supply chain	1.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PP	3	07/03/2014	Submitted	The time required for this Deliverable was under-estimated
3	Report on competitive analysis for the supply chains of meagre, greater amberjack, pikeperch, Atlantic halibut, wreckfish and grey mullet	0.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PU	12	30/11/2014	Not submitted	More analysis is necessary
4	Report on trend mapping for the European aquaculture, seafood sector and protein market in the (near) future	1.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PU	12	05/12/2014	Submitted	
5	Report with results of international survey on industrial buyer s' attitudes and perceptions regarding cultured fish	1.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PU	12	28/11/2014	Submitted	
6	List of critical success factors for market acceptance	0.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PU	12	30/11/2014	Not submitted	The deliverable depends on D27.4, which is delayed
7	Report on the analysis of the business models and supply chains of the participating SME's	1.0	27	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	Report	PU	12	28/11/2014	Submitted	

1	Report with results o f fo cus groups with con s umers and experts regardi ng ideas for new products	0.0	28	AARHUS UNI VERSITET	Report	PU	14	31/01/2015	Not submitted	
2	List of ideas for new pro duct development	0.0	28	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	16	31/03/2015	Not submitted	
3	Report on product and process solutions fo r e ach species based on tech nological, physical and s ensory char acteristics	0.0	28	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	18	31/05/2015	Not submitted	
4	Physical prototypes o f ne w products from the selec ted species mea gre, great er amberjack, wreckfish, pikepe rch and grey m ullet	0.0	28	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	26	31/01/2016	Not submitted	
5	Report on results of q ual ity evaluation stu dy on b asic quality ch aracterist ics of the developed prod ucts	0.0	28	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
6	Report on results of s ens ory descriptive ana lysis of the develope d pro ducts	0.0	28	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
7	Report on correlation of technical quality with nu tritional - r earing history	0.0	28	UNIVERSIDAD DE LA LAGUNA	Report	PU	54	31/05/2018	Not submitted	
8	Technical assessment o f selected species	0.0	28	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PP	58	30/09/2018	Not submitted	
1	Dataset of consumers' per ceptions, attitude s, buyi ng intentions, consumptio n, willingness to buy and pay, an d value perceptio ns to wards the selected s p ecies in the five	1.0	29	STICHTING DIENST LAN DBOUWKUNDI G ONDERZOEK	Report	PU	9	27/08/2014	Submitted	

2	Report on the segment ation analysis based o n consumer value perc e ptions about the sel ected species in the f ive coun tries investiga ted (value -based segmentation task)	0.0	29	AARHUS UNI VERSITET	Report	PU	24	30/11/2015	Not submitted	
3	Development of the ac tual product samples f ro m the selected speci es for the sensory te sting with consumers in the five c ountries investigated	0.0	29	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	28	31/03/2016	Not submitted	
4	Report on the actual p rod ucts' sensory profi ling in the five count ries inve stigated	0.0	29	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	29	30/04/2016	Not submitted	
5	Development of the pr oduct mock-ups for use i n the experimentatio n wit h consumers in the five c ountries in vestigated	0.0	29	AARHUS UNI VERSITET	Report	PP	30	31/05/2016	Not submitted	
6	Report on the experim entation with product mo ck-ups in the five countr ies investigat ed and iden tification of the optimal intrins ic-extrinsic prod uct q uality profiles for t argeted segments	0.0	29	AARHUS UNI VERSITET	Report	PU	36	30/11/2016	Not submitted	
7	Development of the st imulus (i.e. written and broadcasted inform ation material) that will be used in the c ommunication e xperime nts in the five co untr ies investigated	0.0	29	AARHUS UNI VERSITET	Report	PP	42	31/05/2017	Not submitted	
8	Report on the experim entation with the com munication stimulus a nd evaluation of their effe ctiveness in cha nging con sumers attit udes and beha	0.0	29	AARHUS UNI VERSITET	Report	PU	44	31/07/2017	Not submitted	

	viour towa rds the product s coming from the selecte d									
1	Report on value propos iti ons for the produc ers and Partners	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	46	30/09/2017	Not submitted	
2	Report on indications of resources for cre ating cu stomer value for the spec ific produ cts	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	46	30/09/2017	Not submitted	
3	Guidelines to cultivat e b uyer-supplier rela tionshi ps per species	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	48	30/11/2017	Not submitted	
4	Revenue (pricing & co sts structures) model per spe cies	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	48	30/11/2017	Not submitted	
5	New product marketing strategies per speci es and product	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	52	31/03/2018	Not submitted	
6	Report on results of t est markets per specie s	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	54	31/05/2018	Not submitted	
7	Feasibility study	0.0	30	STICHTING DIENST LAN DBOUWKUNDI G ONDERZOEK	Report	PU	60	30/11/2018	Not submitted	
8	Report on EU and inte rnational market devel op ment plans and recom mendations	0.0	30	TECHNISCHE UNIVERSITEIT EINDHOVEN	Report	PU	58	30/09/2018	Not submitted	
1	Establishment of web s ite (fishDIVERSIFY.eu)	1.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	4	02/04/2014	Submitted	
2	Project logo and broc hure	1.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU	Report	PU	6	24/06/2014	Submitted	

				CIA						
3	Publication of the fi rst of two articles i n Food Today	1.0	31	EUROPEAN F OOD INFORM ATION COUN CIL AISBL	Report	PU	6	30/05/2014	Submitted	
4	Production and release of audiovisual materi al	1.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	6	24/06/2014	Submitted	
5	Collaboration agreeme nt with food industry and consumer organiza tion; linkage of websites	1.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	9	18/11/2014	Submitted	It proved to be much more difficult than expe cted to convince these organization to sign an agreement
6	Annual presentation o f DIVERSIFY (Y1) at a re levant conference (m ainly Aqua Europe mee tings, EU Forum) by the Project Coordinator	1.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	9	27/10/2014	Submitted	
7	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	12	30/11/2014	Not submitted	Wanted to wait for p reparation of the 1st Per iodic Report (Jan 2015) in order to select ma terial for the presentati on
8	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	18	31/05/2015	Not submitted	
9	Annual presentation o f DIVERSIFY (Y2) at a re levant conference (m ainly Aqua Europe mee tings, EU Forum) by the Project Coordinator	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	21	31/08/2015	Not submitted	
10	Presentations of DIVE	0.0	31	HELLENIC C	Report	PU	21	31/08/2015	Not submitted	

	RSIFY at the Aqua Eur ope meetings (Diversif i cation Sessions) by the S pecies leaders (Y2)			ENTRE FOR MARINE RES EARCH						
11	Scientific publication s in relevant journals	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	22	30/09/2015	Not submitted	
12	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	24	30/11/2015	Not submitted	
13	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	30	31/05/2016	Not submitted	
14	Annual presentation o f DIVERSIFY (Y3) at a re levant conference (m ainly Aqua Europe mee tings, EU Forum) by the Project Coordinator	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	33	31/08/2016	Not submitted	
15	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	36	30/11/2016	Not submitted	
16	Promotional workshops for specialized audie nce in fish market sector (Spai n, Greece, U K or Italy) (1st work shop)	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	37	31/12/2016	Not submitted	
17	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU	Report	PU	42	31/05/2017	Not submitted	

				CIA						
18	Promotional workshops (2nd) for specialize d a udience in fish mark et se ctor (Spain, UK, Italy or Greece)	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	43	30/06/2017	Not submitted	
19	Annual presentation o f DIVERSIFY (Y4) at a re levant conference (m ainly Aqua Europe mee tings, EU Forum) by the Project Coordinator	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	44	31/07/2017	Not submitted	
20	Presentations of DIVE RSIFY at the Aqua Eur ope meetings (Diversif i cation Sessions) by the S pecies leaders (Y4)	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	44	31/07/2017	Not submitted	
21	Presentation of DIVERS IFY at the European SE A FOOD Expo	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	44	31/07/2017	Not submitted	
22	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	48	30/11/2017	Not submitted	
23	Promotional workshops for specialized audie nce in fish market sector (Spai n, Greece, U K or Italy) (3rd work shop)	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	49	31/12/2017	Not submitted	
24	Technical leaflets	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	54	31/05/2018	Not submitted	

25	Audio-visual document with the project's act i vities and main achie vements	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	54	31/05/2018	Not submitted	
26	Audio-visual populari zati on document and pu bl ication of the secon d art icle in Food Today, elect ronic journa l of EUFIC	0.0	31	EUROPEAN F OOD INFORM ATION COUN CIL AISBL	Report	PU	54	31/05/2018	Not submitted	
27	Promotional workshops for specialized audie nce in fish market sector (Spai n, Greece, U K or Italy) (4th wor kshop)	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	55	30/06/2018	Not submitted	
28	Annual presentations o f DIVERSIFY at the Aqu a Europe meetings (EU Forum) by the Project Co ordinator (Y5)	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	57	31/08/2018	Not submitted	
29	"Know-how Transfer" s eminar for the aquacul tu re industry (Spain) , pres enting the progr ess achie ved in DIVER SIFY in the technolo gy for meagr e, greater amberjack, wre ckfish and/or grey mullet	0.0	31	INSTITUT DE RECERCA I TEC NOLOGIA AG ROALIMENTA RIES.	Report	PU	57	31/08/2018	Not submitted	
30	"Know-how Transfer" s eminar for the aquacul tu re industry (Greece), pre senting the pro gress achi eved in DIV ERSIFY in the technolo gy for meag re, greater amberjack, wr eckfis h and/or grey mulle t	0.0	31	HELLENIC C ENTRE FOR MARINE RES EARCH	Report	PU	57	31/08/2018	Not submitted	
31	Pikeperch "Know-how T ransfer" seminar for the aquaculture indust ry (po tential locatio n: France, Belgium, D enmark), presenting th e progress a chieved t hrough DIVE	0.0	31	Université de L orraine	Report	PU	58	30/09/2018	Not submitted	

	RSIFY in th e production technolo gy									
32	Atlantic halibut “Kno w-how Transfer” semin ar for the aquacultur e indus try (potential location: Norway), p resenting the progress achieved through D IVERSIFY in the produ ction technology	0.0	31	HAVFORSKNI NGSINSTITU TTET	Report	PU	58	30/09/2018	Not submitted	
33	“Know-how Transfer” s eminar for the aquacul tu re industry (Spain), pre senting the pro gress achi eved in DIV ERSIFY in the technolo gy for meag re, greater amberjack, wr eckfis h and/or grey mulle t	0.0	31	INSTITUTO ESPANOL DE OCEANOGRA FIA	Report	PU	59	31/10/2018	Not submitted	
34	“Know-how Transfer” s eminar for the aquacul tu re industry (Italy) , pres enting the progr ess achie ved in DIVER SIFY in the technolo gy for meagr e, greater amberjack, wre ckfish and/or grey mullet	0.0	31	UNIVERSITA DEGLI STUDI DI BARI "ALDO MORO"	Report	PU	59	31/10/2018	Not submitted	
35	Production and release of audiovisual materi al	0.0	31	FUNDACION CENTRO TEC NOLOGICO A CUICULTURA DE ANDALU CIA	Report	PU	60	30/11/2018	Not submitted	

Milestones

Milestone no.	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I	Achieved Yes/No	Actual / Forecast achievement date	Comments
1	Kickoff meeting and Annual coordination meeting for Y1	1	1	31/12/2012	Yes	30/01/2014	P1. HCMR, Crete, Gre ece

2	Annual coordination meeting for Y2	1	1	31/01/2014	Yes	20/03/2015	
3	Annual coordination meeting for Y2	1	1	31/01/2015	Yes	06/11/2014	P13. UNIBA, Bari, Italy
17	Database of genetic variability of pikeperch	4	1	30/11/2014	Yes	30/11/2014	EXCEL Database completed
19	Basic diet formulation for meagre grow out studies	8	2	30/11/2014	Yes	30/11/2014	Established
21	Basic diet formulation for greater amberjack grow out studies	9	2	30/11/2014	Yes	30/11/2014	Established
22	Definition of reproductive quality parameters to be studied in amberjack	9	2	30/11/2014	Yes	30/11/2014	Literature search completed
23	Definition of parameters for skeleton study in pikeperch	10	21	30/11/2014	Yes	30/11/2014	Established
27	Definition of methodology to study cost-benefit of grey mullet weaning studies	13	2	30/11/2014	No	30/11/2015	IOLR larval-juvenile experiments to determine carnivorous -omnivorous feeding shift still on-going. Results will enable IRTA to do weaning cost-benefit experiments
29	Successful maturation and spawning of eastern Atlantic or Mediterranean Sea wild, F1 generation greater amberjack producing good quality eggs	15	2	30/06/2014	Yes	30/06/2014	Provision of eggs for larval nutrition and rearing experiments in Greece and Spain.
34	Successful maturation and spawning of wreckfish to produce good quality eggs	6	8	30/04/2014	No	31/05/2015	Eggs were produced both in Greece and Spain, but their quality was poor and did not allow implementation of larval rearing experiments.
38	Successful maturation and spawning of grey	19	4	30/08/2014	Yes	31/10/2014	Millions of eggs of high quality were produced, al

	mullet broodstock to p roduce good quality eggs and larvae						lowing the start of larval rearing experiments
51	Design of primers for amplification of meagre target gene DNA seq uences	24	5	30/11/2014	Yes	30/11/2014	
63	Insights in the consumer and B2B market for c ultured fish	29	11	30/11/2014	Yes	30/11/2014	
70	Agreement on project logo for website and pub lications, this will prov ide a recognizable i mage of DIVERSIFY	31	1	01/06/2014	Yes	01/06/2014	
71	Design and printing of project brochure (hard -copy) including the project logo, inserts with project	31	18	01/06/2014	Yes	24/06/2014	
72	Agreements with food industry and consumers associations for web linkage	31	18	31/08/2014	Yes	20/11/2014	

4. Explanation of the use of the resources

The **explanation on the use of resources** was removed from the scientific periodic reports in SESAM. These deta ils now have to be entered in the cost statement forms in FORCE instea d.

Attachments	DIVERSIFY 1 Period Report 20141230a.pdf
Grant Agreement number:	603121
Project acronym:	DIVERSIFY
Project title:	Exploring the biological and socio-economic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry
Funding Scheme:	FP7-CP-TP
Project starting date:	01/12/2013
Project end date:	30/11/2018
Name of the scientific representative of the project's coordinator and organisation:	Dr. Constantinos Mylonas HELLENIC CENTRE FOR MARINE RESEARCH
Period covered - start date:	01/12/2013
Period covered - end date:	30/11/2014
Name	
Date	30/12/2014

This declaration was visaed electronically by Constantinos MYLONAS (ECAS user name nmylocon) on 30/12/2014