



**University of La Laguna (ULL) and Spanish Institute of Oceanography (IEO)
Tenerife, Spain
23-25 January 2018**

Minutes of the Annual Coordination Meeting 2018 (for Y5)

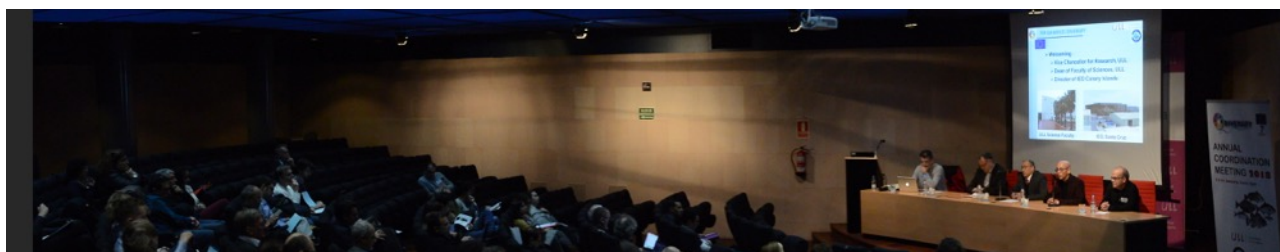


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Objectives

The objectives of the Annual Coordination Meeting (ACM) 2018 were to:

- (a) Present a number of Task-specific results of the accomplished work during Y3 and 4 to the consortium members,
- (b) Review and evaluate closely the work carried out in all Work Packages (WP) in the six Scientific Disciplines,



- (c) Plan the remaining work to be implemented in the WPs in the last year of the project,
- (d) Present the dissemination activities of the consortium (WP 31),
- (e) Plan the Species-specific Knowledge-Transfer workshops (WP 31) which will take place in 2018,
- (f) Inform the consortium of the issues and budget transfers to be covered in the Amendment 4,
- (g) Emphasize to the Partners the importance of preparing and submitting as large a number of scientific articles before the end of the project,
- (h) Address some issues relevant to the 3rd Scientific and Financial Report.

Description

The ACM 2018 was hosted by Drs. José Pérez and Covadonga Rodríguez (ULL), and Salvador Jerez and Virginia Martín (IEO). It was held at two venues between 23-25 January 2018 (**Fig. 1**). The task-specific presentations during Days 1 and 2 took place at the Faculty of Sciences, ULL. The Group Work Package (GWP) workshops took place at the IEO facilities in Santa Cruz. The 3-day meeting was attended by 79 persons: 78 coming from the DIVERSIFY consortium and only 1 invited guest from outside the consortium. No representative attended from Beneficiaries P25. DOR, P26. GEI, P27. FORKYS, P34. BVFi and 35. MASZ, the latter two having previous commitments that they could not modify, while the PI from P2. FCPCT was again missing (having missed four ACMs so far, out of a total of five).

As for all previous ACMs, information regarding the meeting was uploaded continually on the project's web site (<http://www.diversifyfish.eu/2018-annual-coordination-meeting-jan.html>) to ensure that all participants had access to the most updated information. The Agenda (**Tables 1, 2 and 3**) was developed with assistance from GWP leaders and consisted of:

- (a) DAY 1 and 2: A common session for all participants presenting Task-specific presentations from various WPs,
- (b) DAY 2: A presentation of the WP 31 Dissemination presenting the dissemination activities of the consortium, and organizing the preparation of Deliverables as well as of manuscripts for scientific articles,
- (c) DAY 2: Presentations by the Species leaders of the organization of the Species-specific Knowledge-transfer Workshops that will be held during 2018,
- (d) DAY 2: Presentation by the Project Coordinator (PC) dealing with the status of the 3rd Periodic Report, financial issues, the preparation of Amendment 4, various management issues and the preparation of two (2) books from DIVERSIFY research.
- (e) DAY 3: The Group Work Package (GWP) workshops for each scientific discipline, for the coordination of the work during Y5 of the project.



Figure 1. The two venues of the Annual Coordination Meeting 2018, held in Tenerife, Spain. The Faculty of Sciences, University of La Laguna (left) and the IEO facilities in Santa Cruz (right).



DAY 1 and 2 – Task presentations of implemented work

The morning session started with a welcoming by the following dignitaries, who honored our meeting with their presences and expressed their great satisfaction for their organizations’ participation in DIVERSIFY and in hosting the meeting:

1. The Vice Chancellor for Research of ULL, Dr. Francisco Almeida
2. The Dean of the Faculty of Sciences of ULL, Dr. Nestor Torres
3. The director of IEO Canary Islands, Dr. Luis Lopez

Then followed a presentation by the Project Coordinator (PC), Dr. C.C. Mylonas, presenting the Agenda for the meeting and covering some logistics (**Fig. 2**).

Annual Coordination Meeting, Tenerife, Spain 23-25 January 2018

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

ULL Science Faculty | IEO, Santa Cruz

ACM 2018 AGENDA

- Day 1- Tuesday (U La Laguna)
 - Task presentations (Partners)
- Day 2- Wednesday (U La Laguna)
 - Task presentations (Partners)
 - Dissemination (R. Robles)
 - Species Workshops (Species Leaders)
 - Consortium management (PC)
- Day 3- Thursday (IEO Santa Cruz)
 - Group WP workshops

AGENDA – Day 1 and 2

Please submit your presentation in time!!!
Pick up name badges
Sign for attendance

Time	Topic	Presenter	Host
08:30	Welcome register	ULL, IEO, IANIGLA & MAREANO	ULL
09:00	Introduction to the meeting and presentation of the meeting agenda	Francisco Almeida	ULL
09:30	Task presentations (Partners)	Various	ULL
10:30	Break		
11:00	Task presentations (Partners)	Various	ULL
12:00	Lunch		
13:00	Task presentations (Partners)	Various	ULL
14:00	Dissemination (R. Robles)	R. Robles	ULL
15:00	Species Workshops (Species Leaders)	Various	ULL
16:00	Consortium management (PC)	PC	ULL
17:00	Break		
18:00	Dinner		

AGENDA – Day 3 (IEO Santa Cruz)

GWP leaders record and report minutes!!!!
Sign for attendance

Time	Activity	Location
08:30	Breakfast	ULL
09:00	GWP 2 Report (parallel)	ULL
09:30	GWP 3 Report (parallel)	ULL
10:00	GWP 4 Report (parallel)	ULL
10:30	GWP 5 Report (parallel)	ULL
11:00	Break	
11:30	GWP 6 Report (parallel)	ULL
12:00	GWP 7 Report (parallel)	ULL
12:30	Lunch	IEO
13:00	GWP 2 Report (parallel)	ULL
13:30	GWP 3 Report (parallel)	ULL
14:00	GWP 4 Report (parallel)	ULL
14:30	GWP 5 Report (parallel)	ULL
15:00	Break	
15:30	GWP 6 Report (parallel)	ULL
16:00	GWP 7 Report (parallel)	ULL
16:30	Break	
17:00	Dinner	IEO

Figure 2. The opening slides of the presentation of the PC for the Annual Coordination Meeting 2018, explaining the Agenda of the meeting (upper right) and the slides explaining the organization of the DAY 1 & 2 presentations (lower left) and the DAY 3 GWP workshop with the four parallel sessions (lower right).



Table 1. Agenda of DAY 1 of the Annual Coordination Meeting 2018, which took place on the 23-25 January 2018, at the Faculty of Sciences, University of La Laguna, Spain.

DAY 1		Tuesday (Open Day presentations)			
Start	End		Title	Presenter	Details
8,00	9,00		Registration		Pick up badges
9,00	9,30		Welcome-Logistics	Perez, Jose Antonio & Mylonas, Constantinos	HCMR/ULL
9,30	9,50	1	Induced gametogenesis in flat-head grey mullet using recombinant gonadotropins	Ramos, Sandra	IRTA
9,50	10,10	2	Annual cycles of gonadotropins and sex steroids in plasma of farmed and wild-caught female Atlantic halibut	Norberg, Birgitta	IMR
10,10	10,30	3	Spawning induction of F1 greater amberjack in eastern Atlantic	Jerez, Salvador	IEO
10,30	10,50	4	Broodstock management and spawning induction in greater amberjack in tanks and sea cages in Greece	Mylonas, Constantinos	HCMR
10,50	11,30	Coffee			
11,30	11,50	5	Comparison of programmed and auto-demand type feeding of meagre in tanks	Duncan, Neil	IRTA
11,50	12,10	6	Effect of dietary fatty acids on spawn quality in greater amberjack broodstock	Djellata, Adnane	FCPCT
12,10	12,30	7	Some insights in lipid metabolism of larvae from novel aquaculture candidate species	Rodriguez, Covadonga	ULL
12,30	12,50	8	How to achieve predictable and stable juvenile production in marine fish- an industrial approach	Erstad, Borre	SWH
12,50	13,10	9	Effect of of phospholipids on lipid metabolism in Atlantic halibut	Sæle, Øystein	NIFES
13,10	15,00	Lunch on site (Faculty of Sciences), 10 euro			
15,00	15,20	10	Designing weaning diets based on the ontogeny of digestive tract enzyme activity during the carnivorous-omnivorous transition in grey mullet juveniles	Koven, Bill	IOLR
15,20	15,40	11	Greater amberjack larval rearing in IEO: effect of live prey enrichments and feeding regime	Martin, Virginia	IEO
15,40	16,00	12	Requirements for n-3 HUFA of meagre fingerlings	Carvalho, Marta	FCPCT
16,00	16,20	13	Test of different feeding methods on growth performance and feeding behavior of meagre	Papadakis, Ioannis	HCMR
16,20	17,00	Coffee			
17,00	17,20	14	Identification and expression of type I interferons in meagre	Secombes, Chris	UNIABDN
17,20	17,40	15	Dietary use of prebiotics in greater amberjack juveniles: effects on growth performance, immune gene expression and disease resistance against <i>Neobenedenia girellae</i>	Fernandez Montero, Alvaro	FCPCT
17,40	18,00	16	Epitheliocystis disease; results and progress	Katharios, Pantelis	HCMR
20,30	Dinner at REAL CASINO de Tenerife, Plaza de la Candelaria 12 (consortium dinner)				



The format of the task-specific presentations for DAY 1 & 2 (**Table 1** and **2**), as it was adopted also for the ACM 2017 meeting in Barcelona, Spain, allowed a large number of the RTD partners to present their work (some for the first time) –which in many cases was done in collaboration with the SMEs and Large companies participating in the project, as well as work to be presented from all Scientific Disciplines. In total, 21 presentations from 16 RTD partners were presented, representing collaboration with the two large companies and six SMEs from the DIVERSIFY consortium (**Fig. 3**).



Figure 3. The opening slides from some of the task-specific presentations of some of the RTD partners of the consortium during DAY 1 & 2.

**Table 2.** Agenda of DAY 2 of the Annual Coordination Meeting 2018, which took place on the 23-25 January 2018, at the Faculty of Sciences, University of La Laguna, Spain.

DAY 2		Wednesday (Open Day presentations & Consortium Management)			
Start	End		Title	Presenter	Details
8,00	9,00		Registration		Pick up badges
9,00	9,20	1	Overview of consumer behavior-related affairs in the frame of DIVERSIFY and their key findings	Krystallis, Thanassis	HRH
9,20	9,40	2	The effect of message framing on consumers' attitudes and purchase intentions towards new DIVERSIFY products	Banovic, Marija	AU
9,40	10,00	3	Feasibility study, the contributions of partners needed	Stokkers, Robert / Tacken, Gemma	SWR/DLO
10,00	10,20	4	Business model and marketing strategy development	Nijssen, Ed / van der Borgh, Michel	TU/e
10,20	10,40	5	EU funded projects: why communication matters?	Abundancia, Carlos	EUFIC
10,40	11,30	Coffee			
11,30	12,30		Dissemination activities, articles and species leaflets	Robles, Rocio	CT-AQUA
12,30	13,00		Meagre one-day workshop	Estevez, Alicia	IRTA
13,00	13,30		Greater amberjack one-day workshop	Papandroulakis, Nikos	HCMR
13,30	15,00	Lunch on site (Faculty of Sciences), 10 euro			
15,00	15,30		Pikeperch one-day workshop	Fontaine, Pascal	UL
15,30	16,00		Atlantic halibut one-day workshop	Norberg, Birgita	IMR
16,00	16,30		Wreckfish one-day workshop	Alvarez, Blanca	IEO
16,30	17,00		Grey mullet one-day workshop	Koven, Bill & Corriero, Aldo	IOLR/UNIBA
17,00	17,30	Coffee			
17,30	18,15		Preparation of books on meagre and amberjack biology and culture	Mylonas, Constantinos	HCMR
18,15	19,00		3rd Periodic Report, Amendment 4, Budget and Deliverables - General Assembly	Mylonas, Constantinos	HCMR
Dinner on your own, explore the city!					

Dissemination

At the end of the specific task presentations of Day 2, there was a presentation by the WP 31 Dissemination leader, Dr. Rocio Robles. As always, and to remind our partners of the great significance of this WP for our project, the presentation began with a brief reiteration of the WP's many objectives, emphasizing the need for all Partners to participate actively in the preparation of dissemination materials and activities (Fig. 4). Then there was a presentation of the various dissemination activities carried out during the 3rd Reporting Period (2016-2017), which included the publication of Newsletters that are uploaded at the website of the project and two more species-focused articles published at the quarterly magazine of the European



Aquaculture Society (for Atlantic halibut and wreckfish), as well as a special 21-page featured article presenting work from DIVERSIFY in all species published in September 2017, just before the annual EAS meeting in Dubrovnik. There, a special “DIVERSIFY” session was again held (Deliverable 31.20 EAS Special session). The Special Session was titled “DIVERSIFY- New/emerging finfish species (EU project)”. The session opened with a summary presentation for DIVERSIFY, given by the PC of the project -see *Deliverable 31.19 Annual presentation of DIVERSIFY (Y4) at a relevant conference*. Instead of the Species Leaders giving summary presentations, Task-specific presentations were given by a number of researchers from the consortium (15 presentations). The Special Session lasted for the whole day (10:30 to 17:00) and an estimated of 60-120 persons were present at the different presentations in the designated room.

The Dissemination leader also discussed about the scientific articles that have been published so far and the number of manuscripts in preparation. The partners were encouraged to submit their work for publication as soon as the Deliverables are submitted, in order to disseminate the work carried out in the project.



Figure 4. Photos from the presentation of WP31 leader Dr. Rocio Robles on Day 2.



As regards the DIVERSIFY website, the partners were informed that the website of the project (www.diversifyfish.eu) has been modified in order to make it easier for the visitors to locate recent findings of the project, as well as the scientific articles that are now being produced and published (Fig. 4). In addition, a new page has been added to the website to provide information on the species-specific knowledge transfer workshops that are planned for 2018.

Once again, the Dissemination WP leader discussed the issue of uploading dissemination activities on the ECAS portal, as well as preparing the work done in DIVERSIFY for submission to scientific magazines (Fig. 5). Currently, we have more than 200 dissemination actions and 23 scientific articles published. The contractual requirements of the DIVERSIFY are 2 articles per GWP per year, which makes for a total of 60 articles. As mentioned earlier, a change was done on the project's website, by moving the "Scientific Publications" page to the main menu bar, so that visitors will have a more rapid and direct access to the scientific work of the Consortium.



Figure 5. Representative slides from the discussion on uploading dissemination activities and publications on the ECAS portal.

In agreement with the intentions of the consortium to be as open as possible and to disseminate the results as promptly as possible, all the presentations of the ACM 2018 were uploaded on the website of the project within a week after the end of the meeting (end of January 2018), to be available to all interested stakeholders.

Species-specific know-how transfer seminars

In WP 31 Dissemination, we have planned to hold six seminars/workshops during the last year of the project, one for each of the species of DIVERSIFY. This was **Task 31.5 Full-day seminars on "Know-how Transfer" of the aquaculture for each of the studied species (led by CTAQUA and the Species Leader Partner)**. According to the DOW, these seminars will include 30 min presentations on selected aspects (e.g., reproduction and spawning induction, final product diversification and quality, socioeconomic issues and marketing, etc.), given by DIVERSIFY Partners, but also from any authorities in the species (European or world-wide depending on the species), whose work was not part of the project. Aquaculturists (mainly), but also European aquaculture support companies (feed, pharmaceutical, equipment, engineering, etc.), researchers and educators, government organizations and other important institutions (FAO, Globefish) will be invited to attend these meetings. The cost of the invited speakers and the registration of the participants



will be covered by the project (max 50 participants). The seminars will be organized by the SLs (HCMR, IRTA, UNIBA, IMR, IEO, UL) in countries where the particular species are cultured --or has the potential to be cultured -- and/or is located centrally in a region with interested aquaculture operations. One seminar will be organized for each of the selected species. The result of this task will be Deliverables D31.29 to 34. Species-specific “Know-how transfer” seminars for the aquaculture industry, presenting the progress achieved through DIVERSIFY in the production technology.

During Day 2 of the ACM 2018, each Species Leader (SL) presented some information regarding the organization of these workshops (Fig. 6). The location and time that each of these workshops will take place have been decided, and the SL begun choosing the speakers that will present, both from within DIVERSIFY and from outside.

Wreckfish one-day workshop
Blanca Álvarez-Blázquez & Montse Pérez
Diversity ACM 2018, Tenerife, Spain
CENTRO OCEANOGRÁFICO DE VIGO 1917-2017

Specific research presentations

10:00-10:30	Reproductive cycle for wreckfish in captivity. Dinos Mylonas (HCMR)
10:30-11:00	Reproduction of hapuku <i>Polyprion oxygenelos</i> in New Zealand. Matthew Wylie (University of Otago)
11:00-11:30	Larval rearing?. Alvin Setiawan (NIWA)
11:30-12:00	Wreckfish fishery in Madeira? Carlos Andrade (Director of AQ Madeira, Portugal)
12:30-13:00	Wreckfish genetics. Pablo Presa (UVIGO, Spain)
13:00-13:30	Industry experiences with wreckfish culture. Antonio Pizarro (Isidro de la Cal, Spain)
13:30-14:00	Tito Peleteiro (ex-IEO)?
16:00-16:30	Recommendations for nutrition of wreckfish breeders. Fátima Linares (Xunta de Galicia, Spain)
16:30-17:00	Advances in wreckfish reproduction and larval husbandry. José Luis Rodríguez Villanueva (IGAFa, Spain)/ Nikos??
17:00-17:30	?????

One-day workshop: Atlantic halibut Aquaculture

Co-funded by the Seventh Framework Programme of the European Union
DIVERSIFY
Sterling White Halibut
CENTRO OCEANOGRÁFICO DE VIGO 1917-2017

Tentative programme

08.30 – 09.15 Coffee and registration
09.15 – 09.30 Welcome
09.30 – 10.00 Halibut aquaculture – the beginning (Viktor Øiestad/??)
10.00 – 10.30 The Diversify Project (Dinos Mylonas, coordinator)
10.30 – 10.50 WP5 Broodstock Management (Birgitta Norberg)
10.50 – 11.10 Coffee break
11.10 – 11.40 WP11 Nutrition (Kristin Hamre/Covadonga Rodriguez)
11.40 – 12.00 WP17 Larval Husbandry (Torstein Harboe)
12.00 – 12.20 WP26 Health (Sonal Patel/Audun Nerland)
12.30 – 13.30 Lunch

DIVERSIFY: WP 31
Dissemination (task 31.5) :
« Know-how transfer on pikeperch - one full day »

UNIVERSITÉ DE LORRAINE

Previsional programme (30 minutes per presentation, including questions)

Part 1 - Introduction

- 9h00 – 9h15 : Presentation of the Diversify programme (C. Mylonas)
- 9h15 – 9h30 : Presentation of bottlenecks / pikeperch (P. Fontaine)

Part 2 – Market, consumers perception and new products

- 9h30-10h00 : Market obstacles and opportunities for pikeperch market (DLO, WP27, ??)
- 10h00 – 10h30 : The market opportunities related to new pikeperch products (HCMR, WP28??)

Coffee break

- 11h00 – 11h30 : The consumer perception of pikeperch products (AU, WP29, ??)
- 11h30 – 12h00 : Business model and marketing strategy for pikeperch products (TU, WP30, ??)

Figure 6. Representative slides from the presentations of the Species Leaders (SL) for the know-how transfer workshops to be held during the last year of the project (2018).



It was agreed that the final program for each workshop should be ready by the end of March, so that we will have ample time to publicize it to the Aquaculture sector throughout Europe, in order to give the chance to as many interested farmers as possible to attend. We have already added a page in our website with the tentative information, and full descriptions will be added as they become available (Fig. 7).

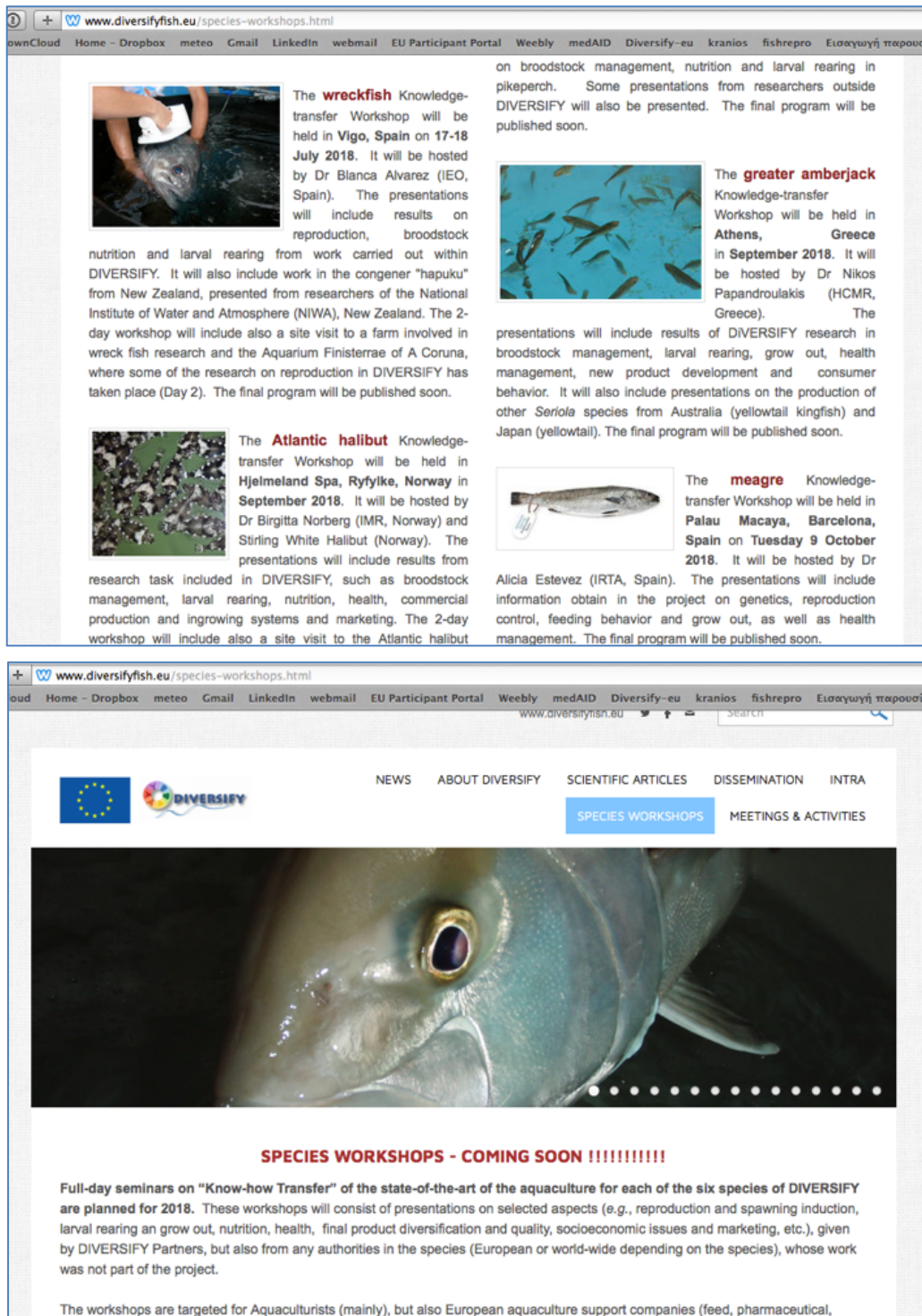


Figure 7. Captions of the DIVERSIFY website, showing the special page developed for the Species Know-how transfer workshops. More information will be added as it becomes available.



Preparation of books from DIVERSIFY work

It has been discussed already during the ACM 2017 in Barcelona, that it would be appropriate to consider publishing 1-2 species-specific books, based on work carried out in DIVERSIFY, but also counting on already published work over the past 10 years. Based on the available work, the PC suggested that the species that could be selected for these books are the meagre and greater amberjack (**Fig. 8**). In the months prior to the ACM 2018, the PC had contacted some partners to function as editors for these books. A preliminary Table of Contents has been prepared, and more work will be done during 2018, in order to (a) finalize the Table of Contents and then (b) identify the leading author for each chapter. We expect that the application for the book will be submitted sometime in 2019 to a publisher, and before the end of that year we will begin preparing the chapters. Expected date of publication of the books should be 2020-2021.

Regarding potential publishers, the PC has already made initial contacts with two companies, Blackwell Publishing and 5M Publishing. Both expressed their great interest to publish these books. The person in charge of the Fisheries and Aquaculture titles of 5M Publishing, Mr Nigel Balmforth was invited and attended the ACMs both in 2017 (Barcelona) and in 2018 (Tenerife). This year he gave also a brief presentation of his role in the process and expressed his support of the tentative Table of Contents. When we have a more final version, we will contact both publishers to see who we will select for the books.

Preparation of books from DIVERSIFY

1. Meagre (*Argyrosomus regius*) Biology and Aquaculture
Editors: Mylonas, C.C., Estevez, A., Duncan, N.
2020
5M Publishing or Wiley-Blackwell

2. Greater Amberjack (*Seriola dumeril*) Biology and Aquaculture
Editors: Mylonas, C.C., Papandroulakis, N., Montero, D.
2021
5M Publishing or Wiley-Blackwell

Meagre book from DIVERSIFY

- 1 Current Status of Sciaenid Aquaculture (IRTA)
- 2 Reproductive Biology (IRTA, HCMR)
- 3 Early Development (HCMR, IRTA, FCPCT, DTU, ULL)
- 4 Nutrition, Feeding and Grow out (FCPCT, IRTA, HCMR)
- 5 Skeletal Deformities and Fry Quality (IRTA, HCMR)
- 6 Stress Physiology (non DIVERSIFY, U Crete, UAB)
- 7 Diseases and Health Management (HCMR, FCPCT, IRTA, UNIABD)
- 8 Genetics and Genomic Research (HCMR, FCPCT, IRTA)
- 9 Final Product Quality (IRTA, HCMR, others?)
- 10 Markets, Marketing and Consumers (SWR, AU, HRH, others?)
- 11 Capture-based aquaculture (Egypt)??
- 12 Fisheries (Portugal, France) ???

Figure 8. Representative slides from the presentation of the PC regarding the preparation of two books, based on work carried out in diversify.

Reporting, Amendment 4, and Budget issues

The final section of Day 2 was dedicated to a presentation by the PC on a number of coordination and management issues. The PC first reported on the status of the deliverables from the project, presenting a list of submitted and delayed deliverables according to partner (**Fig. 9**). It was stressed that some partners seem to have fallen behind in the submission of their deliverables, and they were encouraged to speed up the process of writing them up, to prevent being labeled as “underperforming” by the final review (as it has happened for one partner). Overall, more than 50% of the total number of deliverables has been submitted, with 38 being delayed. We expect that with some rare exceptions, all of these deliverables will be completed and submitted in time, according to their description in the DOW.

Following this discussion, the PC presented the status of scientific manuscript preparation (**Fig. 9**). So far we have only published 22 articles, which is not a very high number for a consortium of this size, after 4 years of research! Obviously, the majority of the work is concluded and it is being submitted for publication at the end of a project (and mainly afterwards). However, it is the belief of the PC that we should manage to publish more than 60 scientific articles before the end of the project in 2018, and then continue to publish more afterwards. It is true that as the project had a duration of 5 years, many tasks were planned to take



advantage of this, and work was going on in some tasks for 3-5 years. Therefore, it should be expected that the work would be prepared for publication during the last year of the project. However, with more than 100 deliverables already completed and submitted, the PC expected that a larger number of publications would have resulted so far.

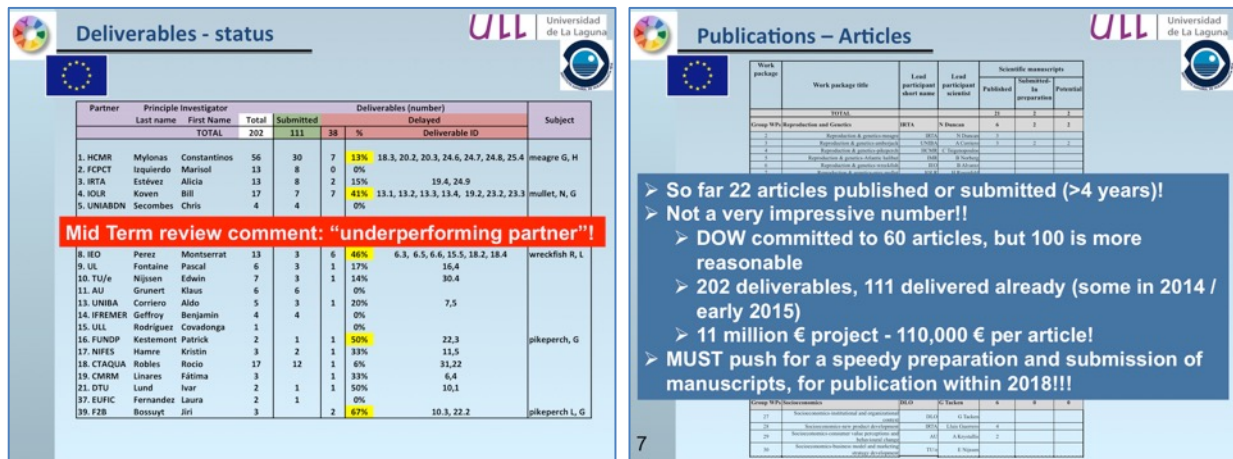


Figure 9. The status of the deliverables (left) and the publication of scientific articles (right).

The PC then reported on the submission of the final Amendment (4) and the budget modifications that it would include (Fig. 10). Most of these budget transfers have been already approved by the Scientific Officer (Dr. Marta Iglesias), and they refer to transfer of work between partners. Then the PC announced that following the suggestion of the SO, the final meeting of the project will be held in Brussels. This will be a 2-day meeting, with the first one being open to the public and the second day dealing with coordination issues. In the first day, we will invite a number of officers from relevant DGs as well as other organizations relevant to the aquaculture industry. The meeting will hopefully be held in the Covent Garden building, and our local partner EUFIC will play a major role in preparing the meeting. This concluded the presentation of the PC and the General Assembly was called to a close.

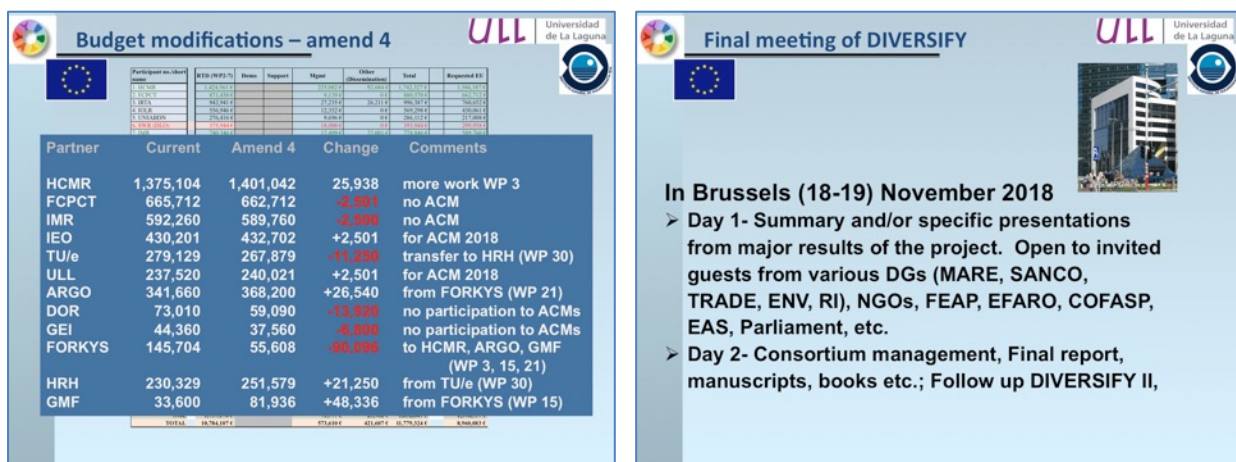


Figure 10. The slides showing the Amendment 4 budget modifications (left) and the announcement of the final meeting in Brussels (right).



DAY 3 – Scientific Discipline-specific workshops

During Day 3 of the meeting, six Workshop Sessions were organized according to Scientific Disciplines with the objective of (a) reviewing and evaluating the work carried out and (b) planning the work to be implemented in the various scientific WPs during the final fifth year (2018) of the project (**Table 3**).

Table 3. Agenda of DAY 3 of the Annual Coordination Meeting 2018, which took place on the 23-25 January 2018, at the IEO facilities in Santa Cruz, Spain.

DAY 3		25-lav		Thursday (GWP Workshops)			
Start	End	ROOM 1	ROOM 2	ROOM 3	ROOM 4		
9,00	9,30	GWP 2 Repro (wreckfish)	GWP 5 Grow out (amberjack)	GWP 3 Nutrition (mullet)	GWP 7 Socioeco		
9,30	10,00	GWP 2 Repro (wreckfish)	GWP 5 Grow out (amberjack)	GWP 3 Nutrition (amberjack)	GWP 7 Socioeco		
10,00	10,30	GWP 2 Repro (wreckfish)	GWP 5 Grow out (amberjack)	GWP 3 Nutrition (meagre)	GWP 7 Socioeco		
10,30	11,00		GWP 5 Grow out (meagre)	GWP 3 Nutrition (pikeperch)	GWP 7 Socioeco		
11,00	11,30	Coffee					
11,30	12,00		GWP 5 Grow out (meagre)	GWP 3 Nutrition (wreckfish)	GWP 7 Socioeco		
12,00	12,30	GWP 2 Repro (amberjack)	GWP 5 Grow out (mullet)	GWP 3 Nutrition (halibut)	GWP 7 Socioeco		
12,30	13,00	GWP 2 Repro(amberjack)	GWP 5 Grow out (pikeperch)	GWP 3 Nutrition	GWP 7 Socioeco		
13,00	13,30	GWP 2 Repro (amberjack)	GWP 5 Grow out	GWP 3 Nutrition	GWP 7 Socioeco		
13,30	15,00	Lunch on site (IEO), courtesy of IEO					
15,00	15,30	GWP 2 Repro (mullet)	GWP 6 Fish health (meagre)	GWP 4 Larval (wreckfish)	GWP 7 Socioeco		
15,30	16,00	GWP 2 Repro (mullet)	GWP 6 Fish health (meagre)	GWP 4 Larval (wreckfish)	GWP 7 Socioeco		
16,00	16,30	GWP 2 Repro (mullet)	GWP 6 Fish health (amberjack)	GWP 4 Larval (pikeperch)	GWP 7 Socioeco		
16,30	17,00		GWP 6 Fish health (amberjack)	GWP 4 Larval (halibut)	GWP 7 Socioeco		
17,00	17,30		GWP 6 Fish health (halibut)	GWP 4 Larval (mullet)	GWP 7 Socioeco		
17,30	18,00		GWP 6 Fish health	GWP 4 Larval (amberjack)	GWP 7 Socioeco		
18,00	18,30		GWP 6 Fish health	GWP 4 Larval (amberjack)	GWP 7 Socioeco		
Dinner on your own, explore the city!							

As before, the workshops of DAY 3 were running in parallel (4 Scientific Disciplines at a given time) in an attempt to minimize the potential time conflict for most Beneficiaries (**Fig. 11**). The duration of each session was decided by the GWP leader based on the number of WP included in the Scientific Discipline, as well as the amount of work that needed to be presented and discussed, and the workload expected for the upcoming year. As work in some WPs has been concluded (e.g. WP 2 Reproduction & Genetics – meagre, WP 4 Reproduction & Genetics – Pikeperch, and WP 5 Reproduction & Genetics – Atlantic halibut) some GWP sessions did not include work in some of the species included in the DOW. In addition, the Workshops were organized in a way that the WPs dealing with the same species were planned at different times during the



Workshops, to allow all scientists attending all the WPs of the same species. This was also achieved, to a degree, by the participation to the ACM 2018 of more than one scientist from some of the beneficiaries that are involved in many GWP. Unfortunately, as last year, P2. FCPCT that has the third largest budget in the project was represented only by a single scientist (Dr. Daniel Montero, the GWP leader for Nutrition), while the PI of the organization was not present at this ACM either. More problematic was the absence of the lead beneficiary of WP 9 Nutrition – greater amberjack (P2. FCPCT) and the Principle Investigator of P28. CANEXMAR, as task 9.2.2 includes work in the testing of a new feed for grow-out of greater amberjack that has not been done so far, and it seems unlikely that it will be done, given that we only have one year to complete the project. Unfortunately, there was nobody in the meeting to provide the necessary information. This issue prompted an investigation in the following weeks by the PC of the status of the work, and a notification of both the Scientific Officer (Dr. Marta Iglesias) and the Financial Officer (Mrs. Annemie Van Vaerenbergh).

The minutes prepared by the GWP leader of each scientific discipline from the different GWP workshops are presented in the following pages.



Figure 11. Photos from the DAY 3 Workshops in the various scientific discipline GWP.



Minutes of GWP Reproduction and Genetics workshop

Annual Coordination Meeting 2018, Day 3 (25/1/2019, 9:00-16:30)



By Dr. Neil Duncan, IRTA (GWP Leader)

Participants

Name	Institution	Wreckfish	Amberjack	Mullet
1 Constantinos Mylonas	HCMR	✓	✓	✓
2 Yannis Fakriadis	HCMR	✓	✓	✓
3 Neil Duncan	IRTA	✓	✓	✓
4 Sandra Ramos	IRTA	✓	✓	✓
5 Hanna Rosenfeld	IOLR	✓	✓	✓
6 Rosa Zupa	UNIBA	✓	✓	✓
7 Covadonga Rodrigez	ULL	✓	✓	✓
8 Aurelio Ortega	IEO	✓		
9 Blanca Alvarez-Blanquez	IEO-Vigo	✓		
10 Montse Perez Rodriguez	IEO-Vigo	✓		
11 Fatima Linares	CMRM	✓		
12 Antonio Vilar	MC2	✓		
13 Salvador Jerez	IEO-Canarias		✓	
14 Antoni O Lorenzo	ULL		✓	
15 Keilliopi Tsakoniti	GMF		✓	
16 Tasos Raftopoulos	ARGO		✓	
17 Hanolis Danil	ARGO		✓	

All work in reproduction and genetics has been completed in the WPs 2-meagre (*Argyrosomus regius*), 4-pikeperch (*Sander lucioperca*) and 5-Atlantic halibut (*Hippoglossus hippoglossus*). All deliverables have been completed in WPs 2-meagre and 4-pikeperch. The last deliverable (D5.3) in WP 5-halibut will be completed in the next months. Two papers on repeated induced spawning and the transcriptome have been published and one submitted on paired spawning from WP 2-meagre and a further three papers on *in vitro* spawning and genetics are expected to be submitted during 2018. In addition, two papers from WP Atlantic halibut on spawning and comparing wild and cultured fecundity and one paper from WP pikeperch on genetics are expected to be submitted during 2018.

WP 3 - Greater amberjack

Congratulations to Aldo Corriero and Rosa Zupa from UNIBA for already publishing 3 articles.

Amberjack is a success story with achieving control of reproduction which is being reflected in the publications. FCPCT has one publication submitted. IEO is writing a publication. HCMR is writing two publications.

HCMR Work from 2017. As fish do not mature in tanks, the fish were left in cages and moved to tanks to spawn. The procedure is, the fish were checked for maturity, selected, GnRHa applied and the fish moved to tanks. The fish remain in tanks for the induced spawning period and are moved back to cages after 3 weeks. Experiments were completed that tested different doses, a low and high dose. The same number of spawns were obtained with the two doses, but higher fecundity was obtained from higher dose. Experiments on timing of GnRHa application found fish had higher fecundity early in the spawning season. This work will be repeated in 2018.



Spawning and collection of eggs in sea cages, has not been successful. The deliverable will be prepared to report that this is not a successful technique. Eggs appear to sink and are difficult to collect. Is the sinking due to nutritional aspects of the eggs? Tests on egg buoyancy were made and eggs appeared to be neutrally to slightly negatively buoyant with movement related to water movement.

Work for 2018

HCMR and GMF: Experiment to look at reproductive capacity of the fish in cages. Effect of timing of GnRHa application during the spawning season.

HCMR and ARGO: Possible individual paired spawning experiment. Inductions will be made to obtain eggs for larval rearing.

IEO will not undertake any further reproduction work in 2018 for WP 3. A broodstock nutrition experiment will be made. Sex to be determined now in Jan-Feb to set up groups of 10 fish. The experimental diets will be fed from when groups are set up. Induced spawning will be made to see dietary effect on egg quality.

WP 6- Wreckfish

Papers / manuscripts: No paper on capture (task 6.1). Task 6.2 – reproductive cycle, paper written waiting on brain for assays and data. Will wait until summer and then submit. Sperm – possible article, but who will write the article? Ask Christian. Neil and Yannis other possibilities to lead publication. Spawning, not enough data in HCMR, initial idea was that it should be global publication with all data on spawning – Blanca to lead publication. After further evaluation, perhaps the best solution would be to have 1 paper for the HCMR stock/data and another with the three broodstocks in Spain, since the two locations had significant differences in management. Total 3 articles from wreckfish.

Task 6.1: Capture of broodstock. In 2017, one fish was caught, which died. New fishing sites with wrecks have been identified to improve the chances of obtaining large fish. More effort will also be made to capture juveniles from the surface water as juveniles can be found under floating objectives. However, these plans to increase effort to capture fish are faced with increasing competition (and effort) for wreckfish from a number of aquaculture companies (Pescanova, Isidro de la Cal) who are also actively trying to obtain breeders.

Mortalities have been a problem in the established broodstocks. No obvious reason for mortality (apart from 3 spawning females that died due to a husbandry error). A lot of fat indicates that diet is incorrect. Large ovarian cysts have also been a problem.

Task 6.2: Reproductive cycle. Natural spontaneous spawns have increased over the years (excluding the effect of mortality removing active breeders). Combination of natural spontaneous, natural stripping and GnRHa induced spontaneous.

Task 6.3: Induced spawning. Many spawns after GnRHa induction. However, spawns from just 2 females were viable, 1 in 2016 and 1 in 2017. Larvae survived until day 25. Induced ovulation and stripping. Eggs obtained 6 days after GnRHa. Injections acted faster and more successful than implants. All eggs collected were overripe.

Plans for 2018

IEO will leave fish and monitor spawning. MC2 will leave fish and monitor spawning. However, if there is no spawning MC2 will induce with GnRHa. IGAFa will also leave fish and monitor spawning. However, if there is no spawning IGAFa will induce with GnRHa.

Spawning article will be prepared already, not waiting for any more data, as this season may not provide more induced spawning data.

Deliverables, should all be prepared now with additional data included if forthcoming during 2018. Outstanding deliverable:

D6.3 Prepare now with description of all efforts to induce spawning



D6.4 Prepare collection methods now, if more data is obtained include it.

D6.5 Prepare reproductive cycle, need pituitary to finish, include nutritional analysis. Prepared by May.

D6.6 Prepare deliverable with what is considered best method for industry.

D6.7 Prepare now with description of all spontaneous spawning.

WP 7-Grey mullet

TASK 7.4: In 2016, hormone protocols were successful to produce millions of eggs. Problems were low fertilization rates which may be a behavioural problem. Spawning was a single female with 3 males. Objectives in 2017 were to improve protocol, 1) improve breeding unit, 2) out-of-season spawning with phase shifted photo-thermal regime, 3) improve broodstock diet.

Compared 1 female(F) x 3 male(M) 1m³ tank, → 2F x 3M 1m³ tank, → 3F x 6M 3m³ tank

Increasing number of female / males and tank size increased spawning success, but decreased hatching success. All 100% of females spawned in ratio 3 females with 3 males in large 5-m³ tank. Decrease in hatching success may be related to difficulty to collect eggs in larger tanks.

A 4 month phase shifted photo-thermal regime gave a 4 month phase shifted spawning period in January. In season protocols function in the same way in out-of-season stocks, which confirmed the protocol.

Broodstock diet: Mature wild fish were caught to give a reference of what was needed in the broodstock diet. Soybean oil was replaced in the broodstock diet with fish oil. No changes in egg quality, fertilisation or fecundity were obtained with different diets. Differences were observed in eggs with a more yellow / orange colour in eggs from broodstock fed with fish oil. Lipids are known to aid transport of carotenoids. Males fed with fish oil diet produced sperm for a longer period. Larval quality was improved, starvation stress test gave higher survival in larvae from broodstock fed with fish oil compared to soybean oil.

Work for 2018: IOLR are shifting photo-thermal regime to have spawning in March-April 2018. The natural spawning season in Sept-Oct 2018 will be difficult to include in the deliverable.

Work in IRTA did not use the IOLR protocol, as no spontaneous initiation of vitellogenesis was obtained. In IRTA a different recombinant FSH protocol was used to induce gametogenesis, but induced spawning was unsuccessful. However, this change of protocol was not necessary as a spontaneous initiation of vitellogenesis is not required for the DIVERSIFY IOLR protocol. IRTA will implement the IOLR protocol with wild caught fish. The following protocol will be implemented in 2018: inject rFSH + antagonist in July, no oocyte revision just injection, 3 weeks later 5mg/kg MT implant, photoperiod temperature 24-25, feeding broodstock diet, seawater, size of fish 1+kg, no sampling until September. In September maturity revision and induced spawning with GnRH_a + MET. Dinos has MT implants and will check to see if the implants are good.

TASK 7.4: First maturity in wild versus hatchery fish. In 2016 sampled 2 year old fish and in 2017 3 year old fish. All fish grow similarly and were immature in 2016. However, oocyte size in hatchery fish was significantly larger than in wild fish. In the 3 year old fish (2017) the GSI was significantly higher in hatchery females compared to wild females. Approximately 50% of hatchery females had 10-20% GSI, which is an ovary of sufficient size for bottarga. Hatchery females were about 800 g when 1st maturing and hatchery males 1st matured at 600 g with sperm production. Wild fish did not present this ovary development.

Publications, 3 to 4 papers are expected.

Gonadotropins in vitro and effectiveness of rFSH, Spawning induction work, Sexual maturity, wild fish verses hatchery fish - 1 or 2 papers. At least 2 papers should be submitted this year 2018



Minutes of GWP Nutrition workshop

Annual Coordination Meeting 2018, Day 3 (25/1/2019, 9:00-13:00)



By Dr. Daniel Montero, P2. FCPCT (GWP Leader)

Participants

Daniel Montero (FCPCT), Patrick Kestemont (UNAMUR), Ivar Lund (DTU) Grethe Rosenlund (SARC), Ramon Fontanillas (SARC), Marta Carvalho (FCPCT), Rosa Zupa (UNIBA), Virginia Martin (IEO-COC), Bill Koven (IOLR), Rocio Robles (CTAqua), Kristin Hamre (NIFES) Antonio Vilar (MC2), Fatima Linares (CMRM), Blanca Álvarez-Blazquez (IEO-COV), Carlos Abundancia (EUFIC), Hanna Rosenfeld (IOLR); Covadonga Rodríguez

Following the schedule proposed, there was a brief initial welcome from the GWP leader, Daniel Montero, who presented the publishable summary sent in the 3rd report.

After this, the sessions started with the results on *grey mullet*, being Bill Koven the responsible to present different results obtained. He started with those results on on-growing, then presenting results on 13.2.1, 13.4.1. & 13.4.2. Different questions were commented about the results. G. Rosenlund (SARC) asked why to use soybean oil in the diets and recommended to use other such as camelina or linseed oil with less variation w-6/w-3. She pointed out that the type of oil probably is affecting the results obtained with broodstocks. Kristin Hamre (NIFES) asked about the comparison of levels of vitelogenin (wild vs cultured). It was commented by B. Koven, H. Rosenfeld and R. Zupa that the methodology for fishing wild Grey Mullet is based on captures when fish enter into the lagoons, and then the animals are at the peak of vitelogenesis stage. B. Koven commented about the deliverables, all those delayed, that will be presented during the first months of 2018. Besides, he also commented that 4 or 5 manuscripts are currently planned to be submitted soon.

Regarding *greater amberjack*, next species presented by Daniel Montero, results from FCPCT were presented on Tuesday by Mr. Adnane Djellata, and studies on greater amberjack broodstock nutrition finished on time. On this task, IEO (Tenerife) had also some results, presented by Virginia Martin, who presented the diet formulated by SARC and pointed out that the experiment will start on February 2018. Daniel Montero asked how carotenoids and asthaxanthin are added to fresh mackerel (used as one of the experimental diets) and Virginia Martin commented that those ingredients are injected intramuscularly in the muscle of the mackerel. Kristin Hamre commented about the thiamine content in the mackerel. Daniel Montero commented that although deliverable 9.2. (Lys requirements of greater amberjack juveniles) was due on month 36 and submitted and accepted, no inputs were received neither from HCMR or CANEXMAR for the workshop and unfortunately has no information to show. Deliverables are on time and no deviations are observed at this moment of the project. Daniel Montero commented that at least two publications have



been submitted on greater amberjack broodstock nutrition and at least other 4 are in preparation with the results obtained in this WP.

Regarding *meagre*, Daniel Montero presented additional results on fatty acid requirements, presented previously by Marta Carvalho (FCPCT) on Tuesday. Specifically, Daniel Montero presented those on stress response conducted by Ivar Lund and co-workers, who measured the responses of meagre juveniles fed different fatty acid contents on the diet after a shallow water stress. Those results were in terms of plasma cortisol (physiological response) and serotonergic response (cognitive phase). Some comments on the relationship between the cognitive phase and the release of cortisol were done by Patrick Kestemont, Daniel Montero and Kristin Hamre. All deliverables on this WP has been sent on time and work on meagre have been finished. Two accepted publications on this WP, and at least other 4 in preparation

Regarding *pikeperch*, Ivar Lund presented some results on the multifactorial confirmatory experiment 1 and the different results obtained on pikeperch multifactorial experiments. Ramon Fontanillas asked if the diets are based on 100% plant ingredients to reach low Ca in diet and Patrick Kestemont commented that formulation was done by SPAROS and need to go back on formulations. Deliverable 10.1. is pending on the confirmatory experiments and is proposed to be sent in March, and Deliverable 10.2. was submitted. Some publications are in preparation and two articles are currently under review.

Regarding *wreckfish*, Fatima Linares presented those results obtained for emulsions to be used in larval nutrition and also, she presented the results obtained in broodstock nutrition. Grethe Rosenlund asked if the different amounts of eggs produce differences on fertilization and hatching, and Daniel Montero asked about the acceptance of the diets by the different groups of broodstock, and Blanca Alvarez commented that there are no differences on acceptance. Ivar Lund asked about the feeding regime for broodstock and how long before spawn, and Fatima commented that from March to July, but this year they had a too high maturation on January. Deliverables (D12.1. and 12.2.) are due on month 54 and 58.

Results on *Atlantic Halibut* were presented on Tuesday, and Kristin summarized the deliverables and manuscripts: D. 11.1: delivered on Dec 2016 and 1 manuscript on preparation. D.11.2: delivered in Dec. 2015. D. 11.3: delivered on Dec 2016 and one manuscript submitted. D.11.4: delivered Dec-2016. D.11.5: Deliverable due April 2018. One manuscript in preparation.

Finally, Daniel Montero thanks everybody for the collaborative work done within DIVERSIFY and the good quality of results. Most of the deliverables are in time and those delayed have been properly justified.

PC comments: The absence from the GWP workshop on Day 3 of the lead beneficiary of WP 9 Nutrition – greater amberjack (P2. FCPCT) and the Principle Investigator of P28. CANEXMAR was problematic, as task 9.2.2 includes work in the testing of a new feed for grow-out of greater amberjack that has not been done so far, and it seems unlikely that it will be done, given that we only have one year to complete the project. Unfortunately, there was nobody in the meeting to provide the necessary information. This issue prompted an investigation by the PC in the following days of the status of the work, and a notification of both the Scientific Officer (Dr. Marta Iglesias) and the Financial Officer (Mrs. Annemie Van Vaerenbergh). Below are the results of this investigation, as send to the EU officers.

Description of the subtask 9.2.2 from the DOW:

“Sub-task 9.2.2 (CANEXMAR): The grow-out diet developed ... will be tested at an SME level, in order to assay its efficiency to maximize growth potential and enhance fillet quality. Survival, growth feed utilization and fillet quality will be determined (CANEXMAR). This Sub-task will result in deliverable D9.3 Performance of grow-out diets developed in order to maximize growth potential.”

As of today, **Subtask 9.2.2** has not been initiated at all. As this task requires a full grow out period (12-24 months) to be implemented in order to collect the samples, and then some more time to analyze fillet quality, it seems highly unlikely that deliverable “D9.3. Performance of grow-out diets for greater amberjack developed in order to maximize growth potential” will be submitted at the end of the project. In a reply to



my inquiry, the partner said that the reason the task has not been implemented was because they never got any information from the scientific partners coordinating the task. Regardless of the reason why the work was not done, P28. CANEXMAR claims full expenses (and then some) for their involvement in WP 9, even though not a single piece of data has been provided from this subtask, and not a single word has been reported after 4 years in the project. The bottom line is that there is absolutely no data to show for this subtask, to justify paying any amount of money to this partner.



Minutes of GWP Larval Husbandry workshop

Annual Coordination Meeting 2018, Day 3 (25/1/2017, 15:00-18:30)



By Dr. William (Bill) Koven, P4. IOLR (GWP Leader)

In **meagre**, the results of deliverable D14.1 were published in *Aquaculture Research*; “Campoverde, C., Rodriguez, C., Perez, J., Gisbert, E., Estévez, A. 2017. Early weaning in meagre *Argyrosomus regius*: Effects on growth, survival, digestion and skeletal deformities. *Aquaculture Research*, 48: 5289-5299”.

In the **greater amberjack**, larval studies, Task 15.1 showed that rotifers enriched with marine lecithin supplemented with 20% Echium oil showed the best results, although they were not significant. Sub-task 15.2.1 found that the gene expression of GHRH, GH, IGF-I and II and IGFBPs were not affected by semi-intensive or intensive larval rearing while in Sub-task 15.2.2 the optimum egg stocking density, in terms of larval performance, was between 25 and 50 eggs l⁻¹. In Sub-task 15.2.3 the study of the ontogeny of the digestive system showed that enzyme activity measured for a particular age range is independent of the larval geographical origin and environmental rearing conditions. Nevertheless, amberjack larvae seem to efficiently digest dietary protein from 20-30 dph. These results were submitted in D15.2 “Efficient prey density and protocol of using immune modulators in greater amberjack larval rearing”. Sub-task 15.3.1 found that the semi-intensive tanks had higher current velocity (cm s⁻¹) at all depth layers than the mesocosm tanks. In Sub-task 15.3.2, the photoperiods of 24L:00D and 18L:6D did not generally affect larval growth or mRNA expression levels of IGF, GH and GnRH proteins. There were no marked differences in larval growth as a function of tank color (black, green, white) although white tank larvae exhibited the highest survival rate and expression of IGF-1 and GH while these measurements were the lowest in fish reared in the green tanks. The work done is fully described in deliverable D15.3. In Task 15.4, Development and validation of the industrial protocol was carried out during this period. NIREUS larval rearing trials showed that project modifications improved the performance of the larvae and, in particular, their survival rate. The hatchery transferred to the cages 48,300 juveniles of 25-50 g.

In the **pikeperch** studies, Task 16.1 demonstrated that weaned juveniles of 1.0-1.5 g mean body weight can be produced in 53 days, with relatively good survival (3.6-13.1%). A longer weaning duration increased mean swim bladder inflation and final biomass. In addition, discontinuous feeding increased the final biomass produced in tanks while co-feeding (6 days) and the onset of the weaning period (10 or 16 days dph) had no significant effect on the final biomass and the percent of inflated swim bladders, while the method of food distribution only affected the rate of swim bladder inflation. In conclusion, the results suggest that a later onset and longer duration of weaning followed by discontinuous feeding improved larval survival, growth and reduced deformities in pikeperch populations. Moreover, final biomass correlated with a higher initial larval density (100 larvae l⁻¹) and the use of larvae supplied by bigger females. The predatory behaviour of cannibals vs non-cannibals revealed that cannibals show less predatory behaviour than non-cannibals, but they were significantly more efficient in prey capture. The results indicated that predatory larvae have a more developed digestive system (higher levels of acid proteases in comparison to alkaline proteases) at the same age of non-predator larvae.



In Task 17 on **Atlantic halibut**, it was shown that larvae in the RAS had better growth and survival compared to the larvae in the FT system. In Sub-task 17.2 metagenomic studies aiming to identify probiotic candidates in the systems are underway. In Task 17.3 “production of on-grown *Artemia*” has been submitted as deliverable *D11.1 “Report on the nutrient profile of Artemia nauplii and on-grown Artemia”*. Sub Task 17.4 has been completed and submitted as deliverable D17.4 “Comparison of feeding on-grown *Artemia* versus *Artemia nauplii* on Atlantic halibut larval performance”.

In **wreckfish**, important advances have been made in the understanding of ontogeny and larval development and was submitted as deliverable D18.1, as well as the initial stages to develop an adequate larval feeding protocol. On the other hand, no evidence of larval feeding was observed in the digestive tract, which means there was complete dependence on endogenous feeding resulting in limited growth performance. The maximum period that the larvae survived never exceeded 27 days post hatching (dph). The optimal incubation temperature in these trials was shown to be $16\pm 0.8^{\circ}\text{C}$.

In **grey mullet**, Sub-task 19.1.1 determined algal type and the effective level of concentration and turbidity in rearing tanks to significantly improve larval performance. The long term significant effect of rotifer feeding on later developmental stages was also concluded. The results of this study were submitted in deliverable *D19.1 “Determine most effective type and concentration of algae used in grey mullet larval rearing”*. Moreover, larvae in the high *Nannochloropsis oculata* turbidity treatment significantly consumed more rotifers, as well as displaying better growth and survival than larvae exposed to the same turbidity derived from clay. This suggests a further advantage that live algae provides over its ability to produce turbidity in the larval rearing of grey mullet. Task 19.2 Compared the selected microalgae type and protocol (Task 19.1) with a lyophilized substitute and clearly demonstrated that there is no difference in larval performance, in terms of rotifer ingestion rate, swim bladder inflation, growth and survival if the fish are exposed to lyophilized or live *Nannochloropsis oculata* in the rearing tanks. Task 19.4 determined when to wean larvae and that a omnivorous weaning diet gave superior performance compared to a carnivorous or herbivorous diet, in terms of growth, size distribution and digestive tract maturation and enzyme production, during the trophic shift from larval carnivorous to juvenile omnivorous feeding.



Minutes of GWP Grow out husbandry workshop

Annual Coordination Meeting 2017, Day 3 (25/1/2017, 9:00-13:00)



By Dr. N. Papandroulakis, PI. HCMR (GWP Leader)

Participants

Nikos Papandroulakis (HCMR; npap@hcmr.gr), Alicia Estevez (IRTA; alicia.estevez@irta.cat), Alvaro Fernandez Montero (FCPTC;@ulpgc.es), Salvador Jerez (IEO; salvador.jerez@ieo.es), Elena Chaves Pozo (IEO; elena.chaves@ieo.es), Marta Arizcun (marta.arizcun@ieo.es) Patrick Kestemont <patrick.kestemont@unamur.be>, Bossuyt Jiri (Fish2Be, jiri@fish2be.eu), Bill Koven (bmkoven@gmail.com), Rocio Robles (CTAqua; r.robles@ctaquae.es), Yiannis Papadakis (HCMR), Kaliopi Tsakoniti (GMF k.tsakoniti@gmf-sa.gr), Tassos Raftopoulos (info@argosaronikos.gr), Manolis Daniil.

Not present: UL, GEI, DORAQUA, CANEXMAR, IRIDA

Summary

The experiments related to the definition of husbandry and feeding practices for **meagre** in cages were completed. The species was found to be able to feed both during day and night, with feed distributed in the surface of the cage or submerged without significant differences in performance. It was also shown that feeding behavior can be stimulated by various external stimuli. For the **greater amberjack**, the first trials in industrial scale cages were completed and the fish, after exhibiting a good growth performance have been already marketed. Several problems were anticipated during on growing, mostly related to parasite infections that were confronted with efficient methodologies developed during the implementation. Work on definition of feeding methods for fry and juveniles, of the optimal ranges of temperature and of stocking density ranges were also implemented. For **pikeperch**, the experimentally defined as optimum rearing conditions were tested in industrial farm conditions and the work is now focused on assessing the effects of the domestication level and geographical origin on growth and stress sensitivity. In **grey mullet**, the experiments with different stocking densities in monoculture and polyculture conditions using wild caught fry were completed in Greece and Spain and the results are to be analyzed as well as the experiments in monoculture with F1 juveniles in Israel. Furthermore, partners discussed the problems anticipated during the last 4 year's implementation period. It was recognized by all that the collaboration between academia and private sector was a significant issue. In all work packages (i.e. for all species), changes in partnership took place. In some cases, modifications of the original plan also occurred, while there were cases in which the plan was not



implemented at all (**PC comments:** See comments for WP 9 Nutrition-greater amberjack and WP 21 Grow out-greater amberjack).

It was agreed that the fact that farms ought to operate with not established/known species made the collaboration more difficult, especially as private farms had to adapt to the project's requirements. It was easier for farms to respond by some adaptations in their standard practice rather than by implementing trials with "difficult" planning. The need for collaboration is evident and more effort should be paid on the proper planning of the work to be implemented based on the experience gained during the DIVERSIFY.

WP 20-Meagre

T20.1 Deliverable completed

T20.2 HCMR presented the work implemented and planned

T20.2.1 The experiment and the analysis are completed. No deviations from DOW

T20.2.2 Both experiments completed. No deviations form DOW

T 20.3 HCMR presented the work done

T20.3.1, 2, experiments and analysis is completed. No deviations from DOW.

T20.3.3 Experiment with night feeding completed. Experiment with feeding method completed. Final analysis is due.

T20.3.4 Experiment completed. Analysis due.

Deliverables

D20.2, D20.3: The Deliverables are for middle 2018.

WP 21 Greater amberjack

In general, the work performed/planned is as in DOW.

T 21.1

T21.1.1 The first experiment completed in FORKYS. The second trial is ongoing in Argosaronikos, Expected to be completed by July 2018.

T21.1.2 CANEXMAR resolved the administrative issues for the installation of the submerged cage. A trial is under implementation but they use only a surfaced cage. No comparison. The performance is not appropriate as they do not use appropriate diets.

T 21.2

T21.2.1 Implementation as in DOW.

T21.2.2 all experiments implemented as in DOW.

T21.3

T21.3.1 all experiments implemented as in DOW.

T21.3.2 all experiments implemented as in DOW.

Deliverables 21.1 and 21.2 are expected to be ready on time.

PC comments: Based on communications after the conclusion of the GWP workshop between the PC, the GWP leader Dr. Nikos Papandroulakis (P1. HCMR) and Dr. Daniel Montero (P2. FCPCT) who was the only



researcher from P2. FCPCT that attended the ACM and also the GWP workshop on Day 3, it became apparent that **Task 21.1.2 Effect of cage type on performance** has not been implemented as described in the DOW, and it seems unlikely that it will be done during the last year of the project. Unfortunately, there was nobody from the partners who designed and where supposed to be responsible for this Task in the GWP workshop on Day 3 (P28. CANEXMAR and P2. FCPCT), in order to provide the necessary information/explanations. This issue prompted an investigation in the following weeks by the PC of the status of the work days, and a notification of both the Scientific Officer Dr. Marta Iglesias and the Financial officer Mrs. Annemie Van Vaerenberg. The conclusions of this investigation are explained below.

Description of the subtask or Action 21.1.2 from the DOW:

“Description of Action 21.1.2: (CANEXMAR) Effect of cage type on performance. A comparison of surface and submerged cages will be performed in trials with commercial cages (CANEXMAR) of 20 m diameter; 10 m depth, for 2 successive rearing periods of 12 months each. The final stocking density will be kept at 15 kg m³. Growth performance and health status will be estimated every second month (FCPCT). This Action will contribute to deliverable D21.2 Definition of optimum conditions for cage culture of greater amberjack.”

As of today, **Subtask 21.1.2** has been reported at this 3rd Periodic Report, but it is obvious that the work has not been implemented as described in the DOW. Specifically, the trial was supposed to last for 2 years and include a comparison between two types of cages (floating vs submersible cage), so it should have included 2 cages for 2 years. At the end, only a single floating cage was used and the study lasted for only 1 year. This was the result of several reasons, one being licensing problems that the company faced to deploy the submersible cage resulting in a delay to start the subtask. Another delay was caused due to heavy juvenile mortalities during transfer from the FCPCT hatchery to the cages. Lastly, another delay was caused by a breakage of the cages due to a storm and a loss of 80% of the juveniles from the cages. So, at the end a trial was done for only 1 year and in only 1 cage, so only 25% of the work has been carried out. The cost of the lost juveniles was not covered by this company, but by P2. FCPCT, since this was the agreement in the DOW. So, the company did not incur any monetary losses from the above delays. I accept that probably they did spend some money in the setting up of the cages in preparation of the experiments, but I do not see why they are claiming more than 100% of their DOW budget, for doing only 25% of the work described. As this study cannot be repeated now with one year remaining, the deliverable “D21.2 Definition of optimum conditions for cage culture of greater amberjack” that is based partly on work from this task, will not include all the data expected based on the DOW. My opinion is that P28. CANEXMAR is only justifiable to claim at most ~40% of their allocated budget for this WP, for doing only 25% of the work proposed.

WP22 Pike perch.

UNAMUR presented the work implemented and planned.

T22.1. Completed as in Dow.

T22.2 Implemented in Fish2Be facilities for fish between 10 and 150g, and in a sub-contractor (Inagro) for fish from 150 to 500g, because Fish2Be is mostly a hatchery and couldn't accommodate on-growing trial until a market size. Trial finished in mid-January 2018. Analysis is due.

T22.3 Trial implemented with two Czech (F0, F4) and a French (F0) strain in order to test both 2 levels of domestication and 2 geographical origins has been completed in January 2018. Analysis is due.

Deliverables 22.2 and 22.3 are to be ready by October at latest.

WP 23 Grey Mullet

T23.1 deliverable was submitted.

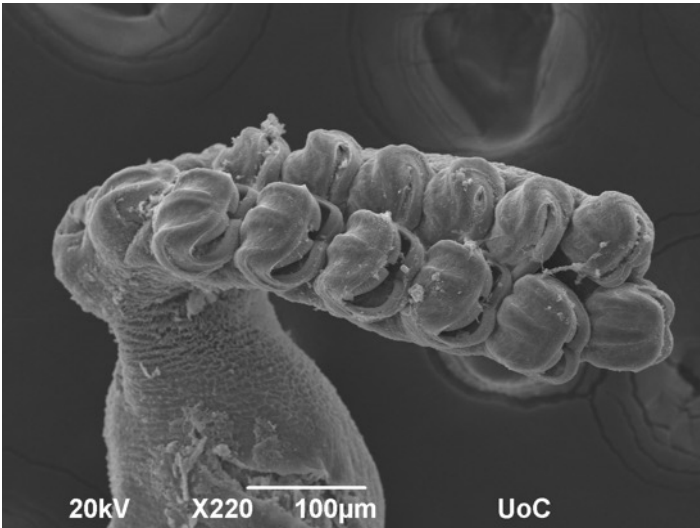
T 23.2, 3, 4 All experiments are completed and results analyzed.

Deliverable 23.2, due for May 2016 will be late, and 23.3 is expected with no difficulties.



Minutes of GWP Fish Health workshop

Annual Coordination Meeting 2018, Day 3 (25/1/2018, 15:00-18:30)



By Dr. C. Secombes, P6. UNIABDN (GWP Leader)

Present

C. Secombes, A. Estévez, Daniel Montero, P. Katharios, Salvador Jerez, Virginia Martín, José Pérez, Álvaro Fernandez Montero, Marta Carvalho, Ramón Fontanillas.

CS welcomed everyone to the meeting. The discussions were organized per WP/fish species, with a review of progress made against milestones/deliverables (DL), with a particular focus on what was to be completed by the end of the contract. No-one was present for WP26, so there is no reporting of what is planned for this last year.

WP24/meagre

A paper to describe systemic granulomatosis between HCMR and FCPCT is planned. A paper on the impact of dietary plant protein inclusion will follow.

DM reported that several papers have been submitted for publication on the nutritional studies and on *Nocardia*.

AE gave an update on task Task 24.6. The new trial will happen this spring, with fish due in March, that will be bath vaccinated (*Vibrio* vaccine) as will be small.

PK reported on the CUD studies, where borehole water (used by the majority of hatcheries in Greece) seems to be the cause. Use of CO₂ in order to induce the lesions didn't work; on-growing in seawater would solve the problem.

In task 24.11 pro/anti-oxidants had been trialed with fingerlings (~16g). No differences were seen in growth/survival, and no macroscopic lesions were seen. The fish were negative for *Nocardia*, but ~77% had granulomas in the liver. There was no effect of vitamin E/Mn/Se/Zn but enhanced vitamin C was beneficial, with reduced granuloma scores. Catalase/SOD activity was also increased in these fish.



DM reported that they will source wild meagre to confirm whether granulomas occur naturally in this species.

Re Task 24.24/15 it was agreed that samples should go to PK for good images of *Scianocotyle* infection for the manual

WP25/Greater amberjack

PK reported that DL25.4 was ready for submission but had been delayed due to a disease outbreak where a new species was identified.

Re DL25.5 AFM presented the results at the meeting and final analysis was on-going.

A report on DL25.6 was presented by SJ. Fish culture density didn't affect parasite egg numbers but mannose was looking hopeful as an anti-oncomiracidia attaching substance. New trials will begin in February, with 3 doses of mannose tested.

A discussion of DL25.7/8 was had to determine the best way to describe the infections seen to date and how to prepare the diagnostics manual.



Minutes of GWP Socioeconomics workshop

Annual Coordination Meeting 2018, Day 3 (25/1/2018, 9:00-18:30)



By Dr. G. Tacken, P5. SWR (GWP Leader)

Attendees:

Present: *Gemma Tacken (WUR, GWP-leader), Rocio Robles (CTAQUA), Hellas Saltavarea (HRH), Kostas Larentzakis (HRH), Thanasis Krystallis (HRH), colleague of Martina Ferreira Novio, Ricard Bou (IRTA), Lluís Guerrero (IRTA), Karen Brunsø (AU), Marija Banovic (AU), Ed Nijssen (TU/e), Michel van den Borgh (TU/e), Maren Vos (TU/e), Robert Stokkers (WUR), Covadonga Rodríguez (ULL), Javier Ojeda (APROMAR), Ioannis Pelekanakis (FGM) and Machiel Reinders (WUR, minutes)*

Current issues

Publications of GWP7

In total a number of 15 articles per GWP is acceptable. This implicates that we have to do 2 more in addition to the 13 that we have planned and submitted/accepted. To check we counted in the group again.

Current state-of-affairs regarding the papers:

- Luis / IRTA (WP28): 2 already published, 1 sent to the journal and 3 articles planned (in total: 6)
- Kriton (WP28): 3 papers published, 2 additional have been submitted, 1 more planned (6 in total).
- Cova / ULL (WP28): 1 possible paper
- Thanasis/ Marija (WP29): 1 published, 3 papers planned (in total 4)
- Ed/ Michel (WP30): 2 articles planned (in total 2)
- Feasibility: probably one paper
- Next to that, we have one promotion on this project, Oxana will defend her dissertation on 14 February. Her publications are included in the above-mentioned numbers. And one PhD thesis (Niki Alexi) conducted within DIVERSIFY has been submitted (University of Aarhus). Both were done in WP28

This implicates that we will easily reach the 15 papers as estimated.

Species workshops

We have been asked to participate in the species workshops, mainly with feasibility work, but if needed also other issues regarding market chances for the specific species.

- Audience of this workshop are farmers, so the story must not be too complicated/ academic.
- 5 workshops are planned: meagre (May, Barcelona Spain), grey mullet (14 May, Bari) pikeperch (June, Nancy), greater amberjack (September, Athens), halibut (September, Stavanger Norway),



- We make one similar presentation and use it at the 5 workshops (*but maybe highlight some country-specific results and some species-specific results*)
 - o Meagre - Barcelona: Luis (IRTA)
 - o Grey mullet - Bari: Thanasis (HRH)
 - o Pikeperch – Nancy: Gemma (WUR)
 - o Greater amberjack - Athens: Thanasis (HRH)
 - o Halibut - Stavanger: Gemma (WUR)
- Javier (APROMAR) wants to be involved in the organisation of the workshops as well (reviewing the presentations). He plans to go to all workshops in Southern-Europe.
- Topics that can be included in the presentation:
 - o Necessity to diversify/ entrepreneurship/ business models
 - o Product development
 - o Communication
 - o Feasibility/ production costs
 - o Market share projection
- Short presentation and emphasize the discussions/ interaction with the producers.
- The contact with the species leaders will be done by the presenter per location. They ask the species leaders whether they have an idea what they want to hear/ know. But basically the materials that we already have developed would be a good start.
- Hellas: how to deal with organisations that attend the workshops and that are potentially interested in follow-up consults (additional commercial work or spin-off projects)?
 - o Let's be honest to share with each other what comes out of the workshops.
 - o We have different interests (research, consultancy) and different adjacent expertise.

Dissemination meetings GWP7

Rocio has organised already 2 dissemination meetings for GWP7 in:

- Bremen
- Cadiz

There are 2 meetings planned:

- Verona 22 February 2018
- Athens June 2018

The presentations at these meetings will be done by Rocio, Marija, Gemma, Maren, Javier, Luis and a local representative.

Books

- Dinos is thinking about writing 2 books (one about meagre and one about greater amberjack) and we are asked to write a socio-economic chapter in both books. Also a chapter about product quality (WP28) is incorporated.
- Target group: researchers and students (mainly biologists).
- The same topics as we will provide in the presentations at the species workshops will be covered in the book, also given the fact that it should be relatively generic.



- It is important to address both the marketing & sales side, but also the cost side. Maybe use the Canvas business model as framework.

DIVERSIFY 2 (continuation)

- Dinos is planning to do the lobbying (input to the call text) for a follow-up project. This follow-up project will concern some of the current species (probably greater amberjack, meagre and grey mullet) and some new species.
- This follow-up will imply that we'll write the proposal in 2019 and start in 2020.
- Dinos has in mind that the socio-economic part will have a similar role in the new project as we have right now.
 - Think about what would be interesting as follow-up topics of what we have done in the current project. For example, look at current deliverables what can be interesting topics to follow-up.
 - Also use the workshops to get a feeling of urgent questions that practitioners have.
 - Compose a 1 page paper what we have in mind to do in the socio-economic part:
 - Project consists of 2 parts:
 1. Continuation of the current species: focus on promotional mix: go from strategic to a more operational level > experimentation with real projects in real contexts. Themes closer to the market, go one step further in feasibility.
 2. Development of new species: repetition of the work we have done in Diversify 1, but critically assess what is really needed and taking into account improvements that we can make in the study designs.
 - Also interesting to focus on the *circular economy* concept (using all parts of the fish, e.g., the skin) and sustainability.
 - Try to involve *more companies* (instead of associations), although it will be tough to get them on board. Think of producers, but also wholesalers, retailers and foodservice companies.
 - Keep in mind that for the current species we move to higher TRL levels: innovation action maybe is more applicable than research action.

Brussels meeting (19-20 November)

- Location: probably Covent Garden
- Target group: policy makers (European Commission)
- Day 1: Plenary presentations. From the socio-economic group 1 presentation is expected.
- Day 2: Work on proposal Diversify 2.

WORK TO BE DONE THIS YEAR

WP28

Task 28.3 Monitoring technical quality of the products

Sub-task 28.3.1 (Deliverables 28.5 and 28.6)

- **D28.5:** Kriton indicates (by email) that: "All composition and fatty acid analysis have been completed. Statistics for fatty acids are still pending. Some additional analysis (not required by deliverable) e.g. sterols contents are also going to take place. Everything is scheduled." > expected to be ready in May (as planned)



- Description of Deliverable 28.5 is not correct in the DoW (same text as text of D28.6). **Action:** Luis and Kriton write a new description of Deliverable 28.5 and provide it as an amendment to Dinos.
- **D28.6:** Kriton indicates (by email) that: “Descriptive analysis of all products have taken place by both IRTA and HCMR. Everything is completed, only write-up of the deliverable is pending.” > expected to be ready in May (as planned)

Sub-task 28.3.2 (Deliverable 28.7)

- Cova, Luis and Rocio will look together to bring the sensory outcomes and the technical quality characteristics together.
- Pascal will deliver extra samples of pikeperch and also for the other species there are enough samples (except for meagre). Kriton has to arrange additional samples for meagre.
- Deliverable has to be ready by the end of May, but some delay may occur. Data is expected by the end of March, then an estimation can be made when the deliverable will be ready. Deliverable expected to be ready at the end of June. However this has no implications for other Deliverables.

Sub-task 28.3.3 (Deliverable 28.8)

- Scope of the deliverable is not very clear. Kriton (by email) indicates: “Actually it is not clear what to be done here, since all is covered in previous deliverables (this was not written by me and I have no clue). I think of something like a general assay summing up and making some suggestions. In any case there is no experimental part and it is for us to decide how to write it up. Am I the responsible person for this deliverable?”
- We conclude that this task is kind of wrap-up of the work that has been done in WP28, although some new aspects are mentioned (e.g., packaging), but that can be relatively easily fit in.
 - o The outcomes can be used for the species workshops.
- IRTA is the formal leader of this task, but HCMR is content leader. WUR is also on this task, which is a bit strange given the requested expertise.
- Deliverable is due in September, which is no problem if this is just a wrap-up.

WP29

All work is done, except that there are still some publications to write.

- Marija wants to take the lead of all three articles. Luis, Machiel and Thanasis indicate that they want to be involved in the papers, but are not going to take the lead.
- **Action:** Marija, Luis, Thanasis and Machiel make a preparation plan of these papers (planning and distribution of the work)

WP30

Virtual market test (Task 30.2.2, Deliverables 30.5 and 30.6)

- Virtual market test is delayed: from September till December we didn't hear anything about the test. TU/e has no other explanation than that the fall was very busy.
 - o Ed doesn't think that delay will lead to delayed delivery of the deliverables. Gemma thinks this is very optimistic. Later on in the discussion it turns out that one month delay is needed.
- Current status: almost ready for fieldwork.



- HRH: the website/ platform is not just copy-paste in each country, but should be built apart for each country. Therefore, serious time has to be planned for building the questionnaires. HRH expects to need 1 month for programming.
- Maren presents the design of the experiment. Points of attention:
 - o Screening of participants: they should eat fish products and have some experience with online shopping (which can be any type of product).
 - o The idea of segments has been released in the experiment, but it would be good to control for these segments by incorporating the 3 underlying psychographic variables.
 - o First ask how often people buy anything online and then ask how often they consumer fish (products).
 - o Make answer categories mutually exclusive.
 - o Don't use the prime upfront (will bias results), but after participants made their selection and then ask whether they will reconsider their decision giving this information on Diversify.
 - o Goal framing: participants are asked to buy fish to prepare a meal *for their household* (neutral term, not everyone has a family). And include a control question how many people are in the household.
 - o Limit the number of products, so that you don't have a screen where you have to scroll very much.
 - o Incorporate different sorting/ navigation tasks: by fish category, by price, etcetera. Don't make it too complicated.
 - o Reasonable prices should be mentioned on the website. For the other fish products, prices that are used in the particular country are used, but for the Diversify species a decision should be made on price. Rocio can help with this. Also check prices for the wild fish.
 - o In the market test, participants have two choices: initial choice and revised choice after provision of Diversify information.
 - It should be possible for participants to select more portions.
 - Add an open-ended question: please tell us why you chose this fish?
 - o Manipulation check: provide it as a memory test (and participants should not be allowed to go back).
 - o Questions should be critically examined: what is rationale behind all these questions.
- Sample size: n=300 per country. Gemma reflects that this sample is rather low for such an important deliverable. However, the programming costs a lot of money, so we can't do more.
- Division of responsibilities:
 - o Eindhoven delivers all the pictures and the accompanying text,
 - o HRH uploads all these pictures and ensures that the shopping journey works (programming work)
 - o Dropbox with pictures of fish (for each country accompanied by description) composed by Marija is to be used for this purpose.
- Planning:
 - o Questionnaire should be final by the end of next week: which questions are needed to know and what is nice to know.
 - o Before half February all relevant information should be at HRH.



- At least one month is needed by HRH to make everything ready for the field work (programming time).
- Field work: 4 weeks are needed (April).
- Field work ready at the beginning of May.
- Ed makes an analysis plan: WUR, IRTA and Aarhus can help in analysing the data.
- Output of these analyses should be used as input for the market simulation modelling (Michel is doing this).
- Ed is writing everything down in the final **Deliverable 30.6, which will be ready by the end of June (delay of one month).**
 - Deliverable 30.5 (new product marketing strategies) is a description of the research protocol and should be finalised by March 2018.
- 2 publications are intended:
 - Outcomes of the experiment: what communication aspects of Diversify products attract people in a competitive context (maybe together with the communication experiment of WP29).
 - System dynamics model based on the virtual market test.

Feasibility study (Task 30.3.1, Deliverable 30.7)

- Robert is very optimistic that all relevant analyses can be done before the species workshop start. All species leaders are willing to participate and, in some cases, even the companies are involved.
- Division of work:
 - Technical assessment can be done with the help of IRTA.
 - Environmental impact assessment: discuss with the species leaders how to do this.
 - Socio-economic assessment can be done by WUR
 - For the stakeholder analysis, we can ask the companies to help.
- **Action: WUR makes a proposal of the information that is needed.**

Final report (Task 30.3.2, Deliverable 30.8)

- Suggestions for market strategies and market growth has to be brought together. Basically, it is a final wrap up/ conclusion of our work.
- The species workshops can be used to accomplish this: think upfront about what we want to know from the attendees.
- System dynamics simulation model: different parameters are used as compared to the simulation model of Task 30.2.2.
- **Action: WUR (Gemma and Machiel) make a first suggestion for Task 30.2.2.**

Presentation system dynamic model by Ed/ Michel:

- Basically, it constitutes a diffusion model: advertising management, channel management, price management, launch scale, manufacturing and inventory management, diffusion process and demand management.
- Input: draw on results regarding marketing mix from virtual market test
 - Countries (per country)
 - Promotion



- New (label)
- Price discount
- Product
- Price level
- Place
 - Location online retail channel
 - Distribution

Closing of the meeting

All people who are held responsible in this minutes take the actions needed. Gemma will monitor during the year whether everything is on track.

Thank you very all for your participation in this pleasant meeting again.

This concludes the minutes of the ACM 2018.



A group photo of some of the participants of DIVERSIFY ACM 2018 outside the Faculty of Sciences, University of La Laguna, Spain.