ACM 2017
BARCELONA , SPAIN

WRECKFISH LARVAL REARING TRIAL WP 18

3,5 years old
TL: 65 cm
W: 8,4 kg

- Task 18.1 & 18.2

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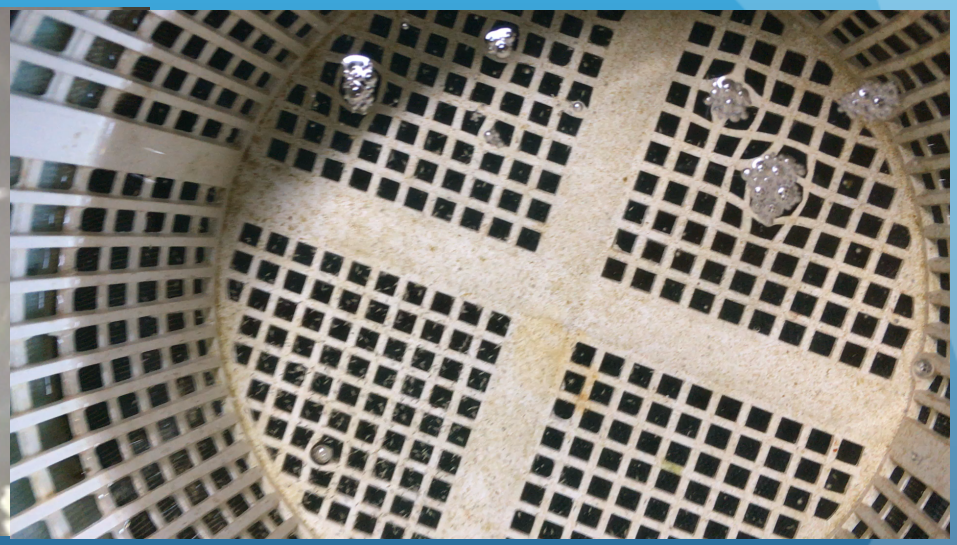
AQUARIUM FINISTERRAE

Objectives…

1) Task 18.1 Development of feeding methodology
2) Task 18.2 Defining optimun conditions for larval rearing.



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Aquarium Finisterrae A Coruña

- Transport in polystyrene boxes (24 hours of transport).
- Tag black blue ♀ 98102355554
  Tag Red black ♂ 98102356344
- Spawning 2015/06/05
  Hatching 2015/06/08
- 2 dph/2000 larva 5 l seawater
- Arrival at 19.5 ˚C, 19.5 mg/l O_2, 8 pH
- Incubation at 500 l tank

HCMR brood stock

- Induced spawning
- ~4000 eggs
- At 16.5 ˚C, 7.2 mg/l O_2, 8.2 pH
- Incubation at 2,000 l tank

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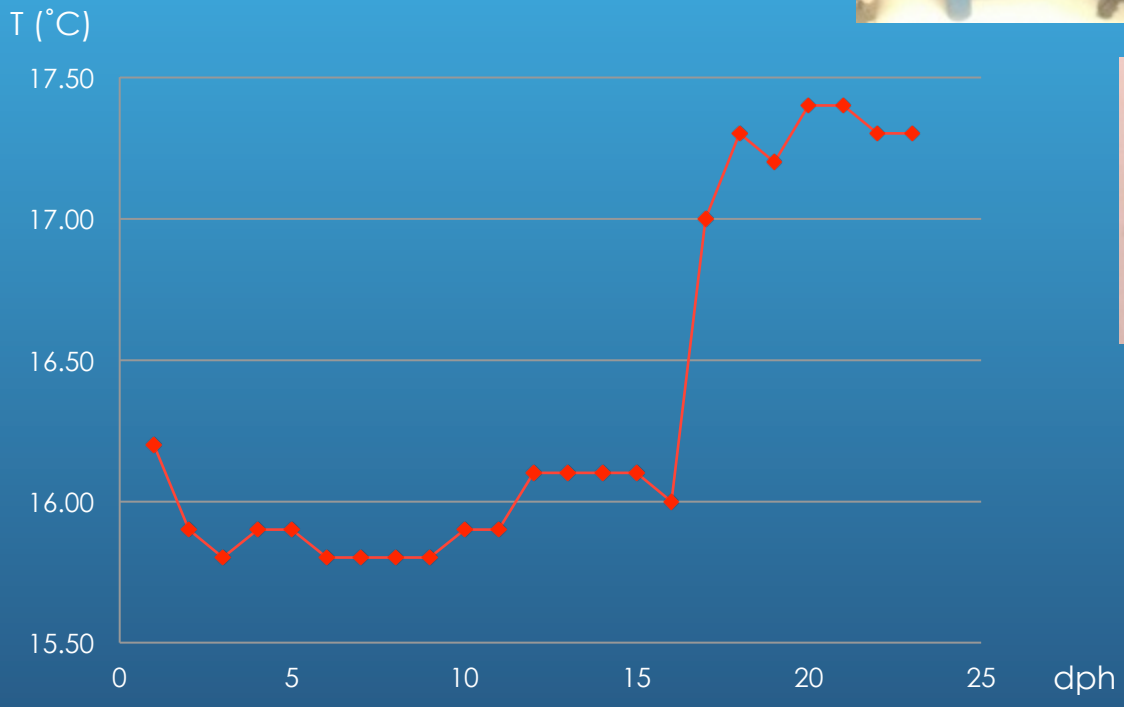
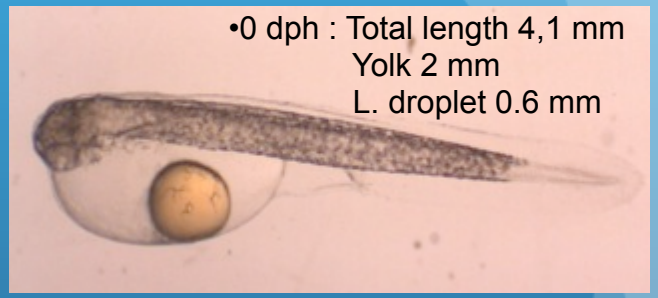
Two "rearing" trials in closed recirculating systems

Tanks of same shape different depth

- 2000 l tanks (May 2015)
- 500 l tanks (June (2015)





Conditions

- ~ 2 ind l^{-1}
- First feeding: 10 dph
- Feed with:
  - •Rotifers,
  - •Artemia AF (since 13 dph)
  - •Artemia EG (since 24 dph)

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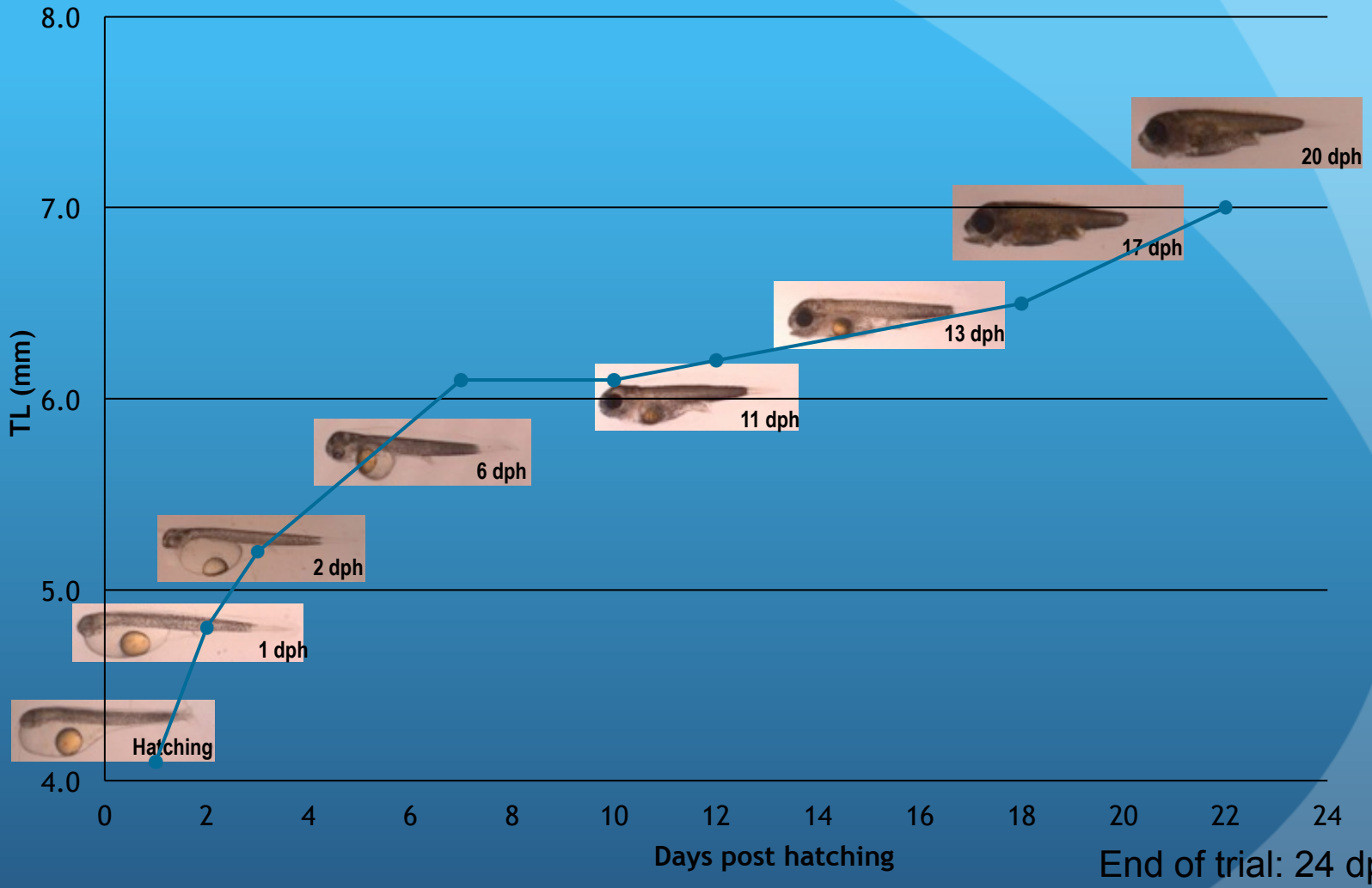
Growth performance



End of trial: 24 dph

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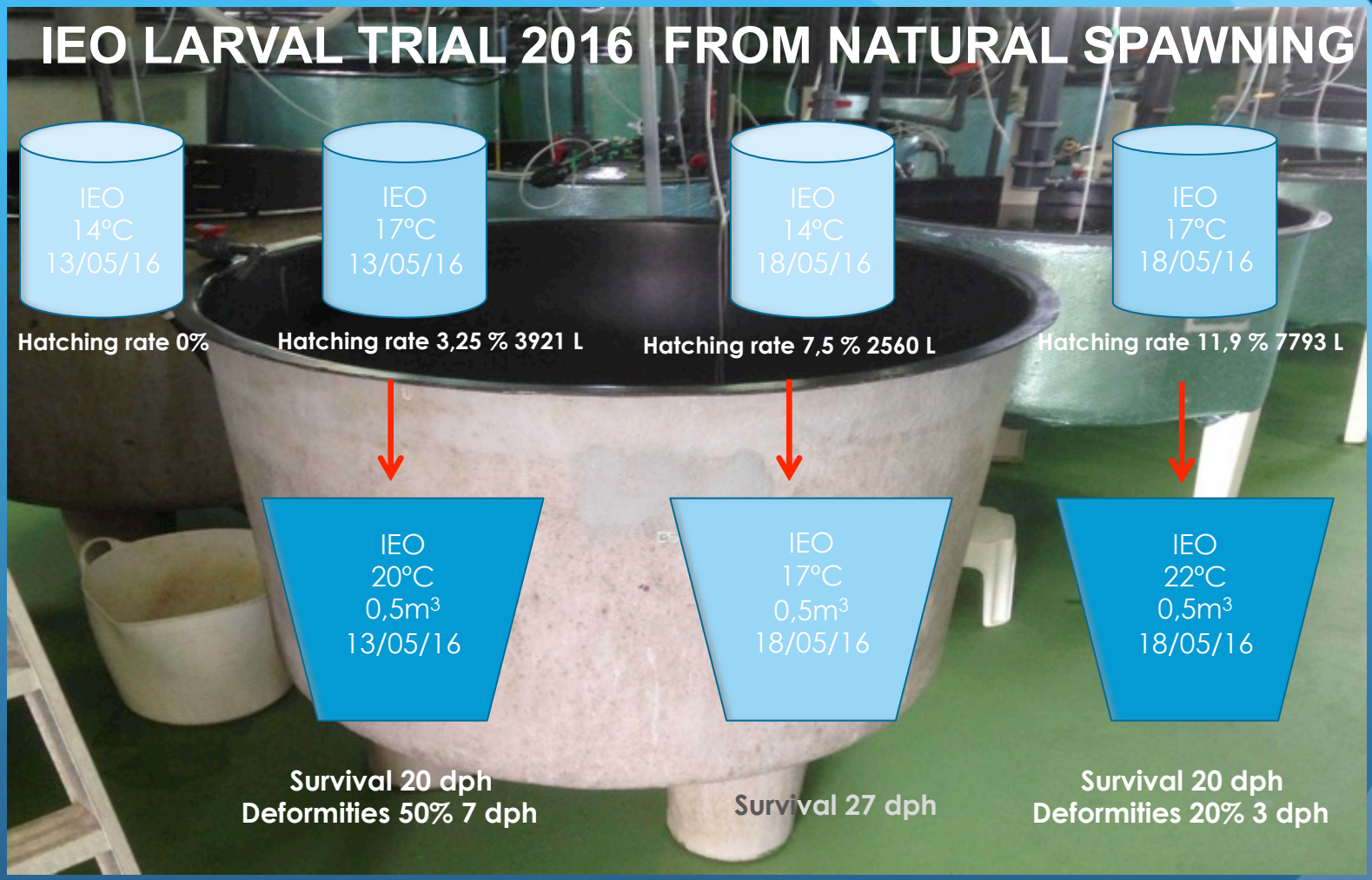
IEO LARVAL TRIAL 2016 FROM NATURAL SPAWNING



Conditions:

- First feeding detected : 15 dph
- Feed with:
  - •Rotifers,
  - •Artemia AF+EG

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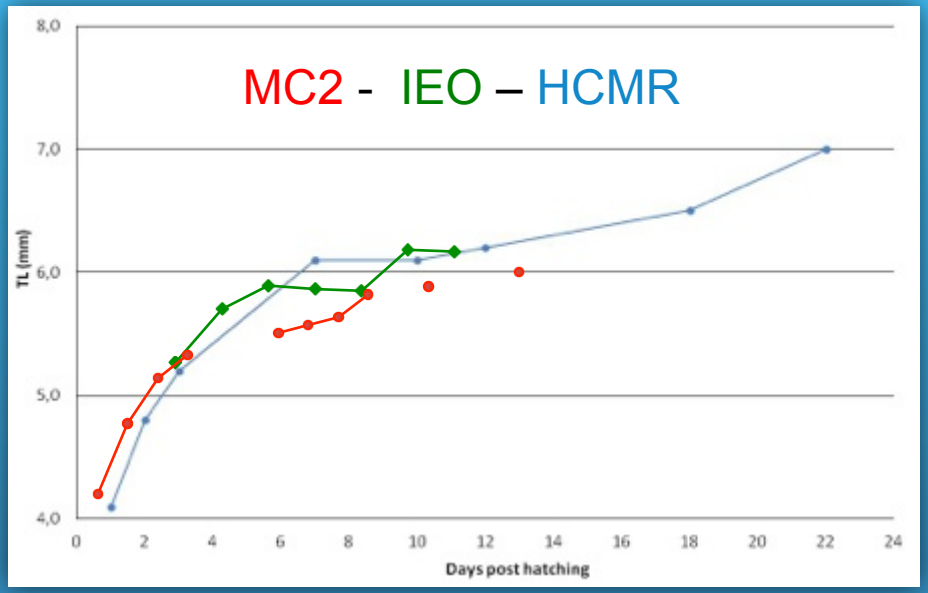
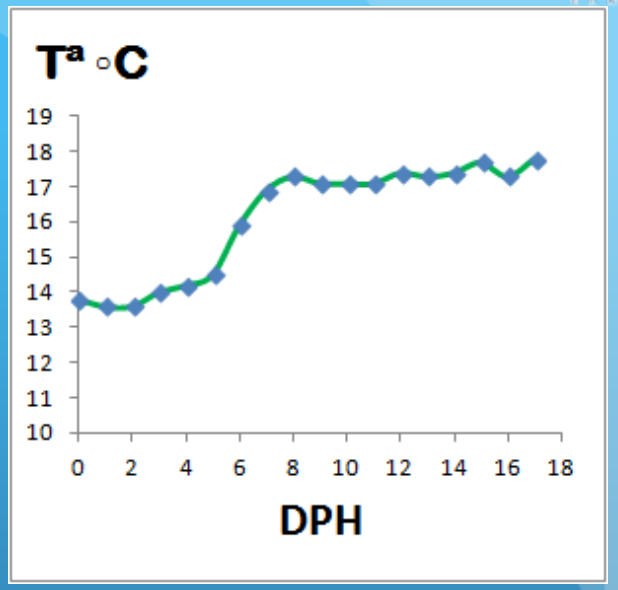
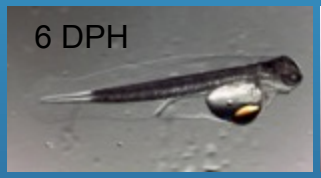
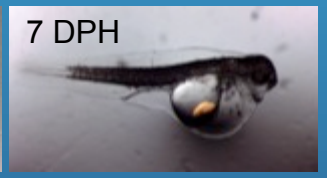
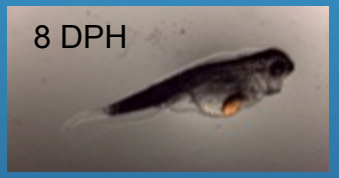
2) Defining optimum conditions for larval rearing

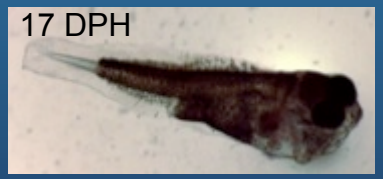












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2) Defining optimun conditions for larval rearing

SPAWN TYPE	STOCK	DATE	FEC (%)	HATCH (%)	LARVAE (nº)	LARVAL DENSITY (nº Larv/l)	MEAN Tª	FEED	SURVIVAL (dph)	WATER SYSTEM
1/ARTIF.	IEO	10-04-15	62		110	0,2	17,4	Enrich rot	14	CC UNTIL 10 DPH
2/NAT	MC2(IEO)	27-05-15	86	22	100	0,2	19,1		10	
3/NAT	MC2(IEO)	05-06-15	84	30	1000	2,0	18,4		10	
4/NAT	MC2	18-05-15	97	0,02	20	0,2	15,1	Enrich rot+copépods	10	WATER REN.
5/NAT	MC2	22-05-15	81	4,3	2600	52,0	14,7		18	
6/NAT	MC2	27-05-15	86	22	10600	12,4	14,5		18	
7/NAT	MC2	01-06-15	95	56	180000	24,3	14,4		22	
8/NAT	MC2	05-06-15	84	30	18500	15,6	14,7		17	
9/NAT	MC2	08-06-15	75	3	500	10,0	15,3		18	
10/INDUCED	HCMR	04-05-15	86	22	4000	2	16,3	Enrich rot +copépods+Artemia AF+EG	22	RAS
11/NAT	MC2 (HCMR)	27-05-15	84	30	2000	2	16,3		22	
1/NAT	IEO	15-03-16	70	3,25	3921	7,8	19,8	Enrich rot + ARTEMIA AF	20	CC UNTIL 12 DPH
2/NAT	IEO	18-05-16	75	11,9	7793	8,7	20,7	Enrich rot + ARTEMIA AF	20	CC UNTIL 9 DPH
				7,5	2560	2,8	16,2	Enrich rot + Artemia AF + EG	27	
3/NAT	IEO	20-05-16	88	5,3	1158	9,2	17,1	NONE	4	WATER REN.
4/NAT	MC2(IEO)	13-06-16	100	36	2500	2,8	18,3	Enrich rot + ARTEMIA AF	20	
5/INDUCED*	MC2(IEO)	12-07-16	85	65	1495	3,3	16,7	Enrich rot + ARTEMIA AF	23	
					3937 (tr)	8,8	16,8	Enrich rot + ARTEMIA AF	25	
6/NAT	MC2	26-05-16	98	2	1600	0,2	16,5	Copepod Tisbe + Acartia	22	CC
6/NAT	MC2	26-05-16	98	2	1000	1,0	17,5		11	WATER REN.
7/NAT	MC2	13-06-16	100	35	6000	10,0	17,5		10	
8/INDUCED*	MC2	08-07-16	49	13	600	0,1	15,5		3	CC
9/INDUCED*	MC2	12-07-16	85	65	6000	0,8	15,5		23	
10/INDUCED*	MC2	16-07-16	75	2	100	2,5	17,5	NONE	4	WATER REN.
11/INDUCED*	MC2	20-07-16	60	11	2500	62,5	17,5	Copepod Tisbe + Acartia	15	

Fecundity rate from 60 to 100 %
Hatching rate between 0 and 65 %
Survival 27 DPH

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		2013 MC2	2014 MC2	2015 IEO	2015 MC2	2016 IEO	2016 MC2
Feeding protocol	Brood stock	Squid, Hake, mackerel	Squid, Hake, mackerel	Specific Dry food for broodstock (Sparos2) + dry pellets (fish meal, squid, white/blue fish, mussels H_2O)	Non specific INVE Feeds for broodstock Mach 2015 + Squid, Hake, mackerel	Specific Dry food for broodstock (Sparos2) + dry pellets (fish meal, squid, white/blue fish, mussels H_2O)	Non specific INVE Feeds for broodstock Mach 2015 + Squid, Hake, mackerel
physical appearance	Eggs	Eggs turning purpure and die start prophilaxis	good appearance	good appearance	good appearance	good appearance	As long as not treated high % , bad appearance
Treatament	Eggs	Formol 40% 75 ppm	Formaline 40% 75 ppm	No	Pyceze (Bronopol) 10 ppm	No	No
Treatament	Larvae	Formol 40% 50 ppm	Formaline 40% 50 ppm	No	Pyceze (Bronopol) 10 ppm	No	No
days to hatch		7-8	6-7	4-5	5-6	4-5	5-6
T°C culture				14-15°C	14-16,5 °C	14-17°C	14-16,5 °C
Larval deformities		Larval deformities rate growing	Larval deformities rate growing	Larval deformities rate growing	Larval deformities rate growing	Larval deformities rate growing	Larval deformities rate growing
Larval feeding		Roti + Nauplius Copepods Tisbe	Roti + Nauplius Copepods Tisbe	Roti	Roti + Nauplius Copepods Tisbe	Roti + Nauplius + Metanauplius	Mesocosmos 8000. l *Tisbe* and *Acartia*
number of spawnigns		31	14	10	15	9	25
n° ♀ Spawning		6	6	1	3	1	4
dph reached	dph	6-8-17-20-22-24-34+ one adult	3-3-3-3-3-3-20 poor larval quality	14-10-10	10-17-18-18-18-22	20-(20-27)-4-20-(23-25)	3-4-10-15-22-23 Heathy larvae
Tank used		Larval rearing in Kreissel	Squared 100 l tanks	Cilindrical 500 l	Squared 100 l tanks	Cilindrical 500 l Replics 17 and 22 °C	Kreissel & Mesocosmos 8000 l
Microbiology		No	No	No	No	No	Pseudomona spp & Vibrio pelagius

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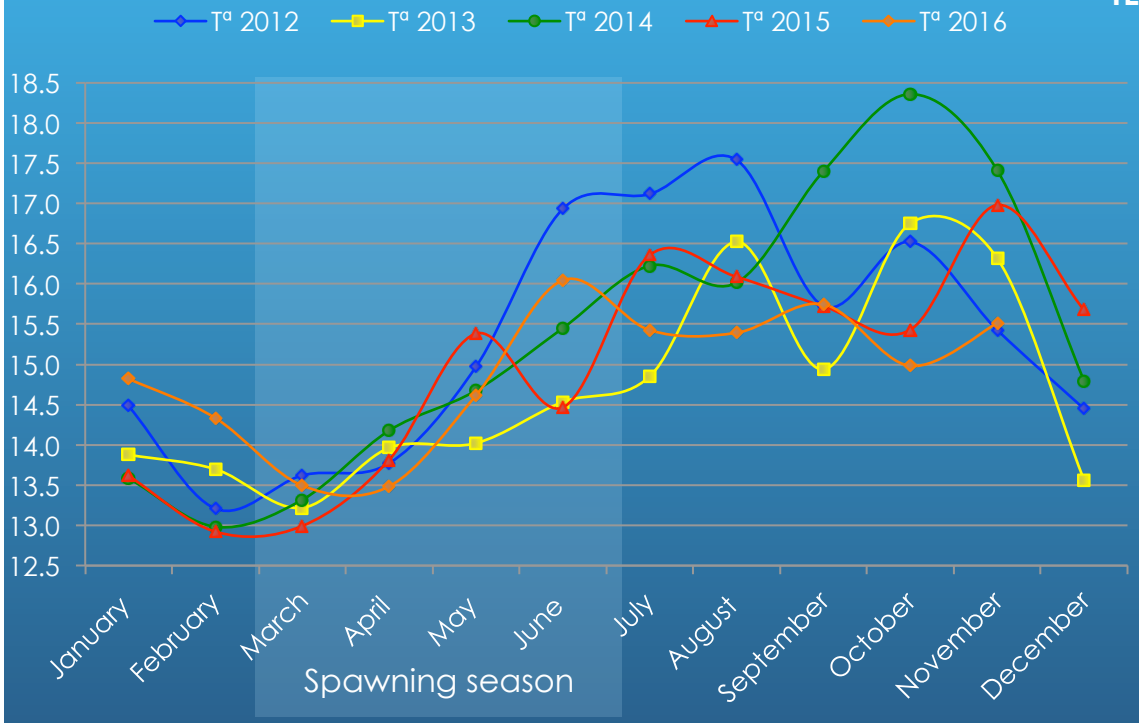
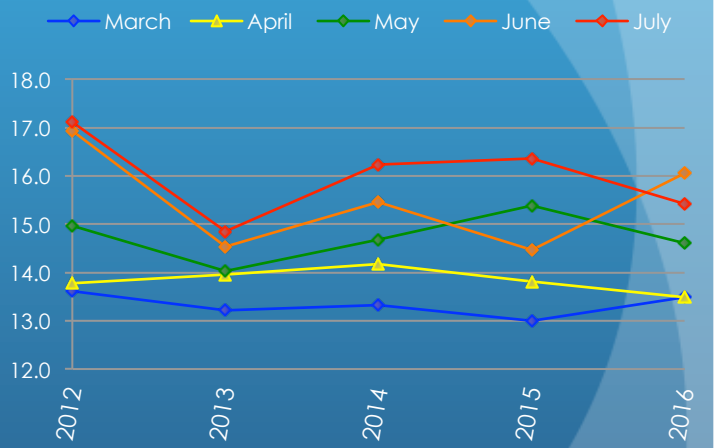
TEMPERATURES MC2 GALICIA NORTH



TEMPERATURES AVERAGE MC2 GALICIA NORTH SPAWNING SEASON



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LARVAL SURVIVAL DPH

HCMR IEO MC2

Crucial Turning point

09-05-13	18-05-13	22-05-13	13-06-13	20-06-13	03-07-13	02-06-14	10-04-15	04-05-15	18-05-15	22-05-15	27-05-15	27-05-15	27-05-15	01-06-15	05-06-15	05-06-15	08-06-15	15-03-16	18-05-16	18-05-16	20-05-16	26-05-16	26-05-16	13-06-16	13-06-16	08-07-16	12-07-16	12-07-16	12-07-16	16-07-16	20-07-16
MC2	MC2	MC2	MC2	MC2	MC2	MC2	IEO	HCMR	MC2	MC2	IEO	MC2	HCMR	MC2	IEO	MC2	MC2	IEO	IEO	IEO	IEO	MC2	MC2	IEO	MC2	MC2	IEO	IEO	MC2	MC2	MC2
33	26	22	17	13	20	20	14	22	10	18	10	18	24	22	10	17	18	20	20	27	4	22	11	20	10	3	23	25	23	4	15

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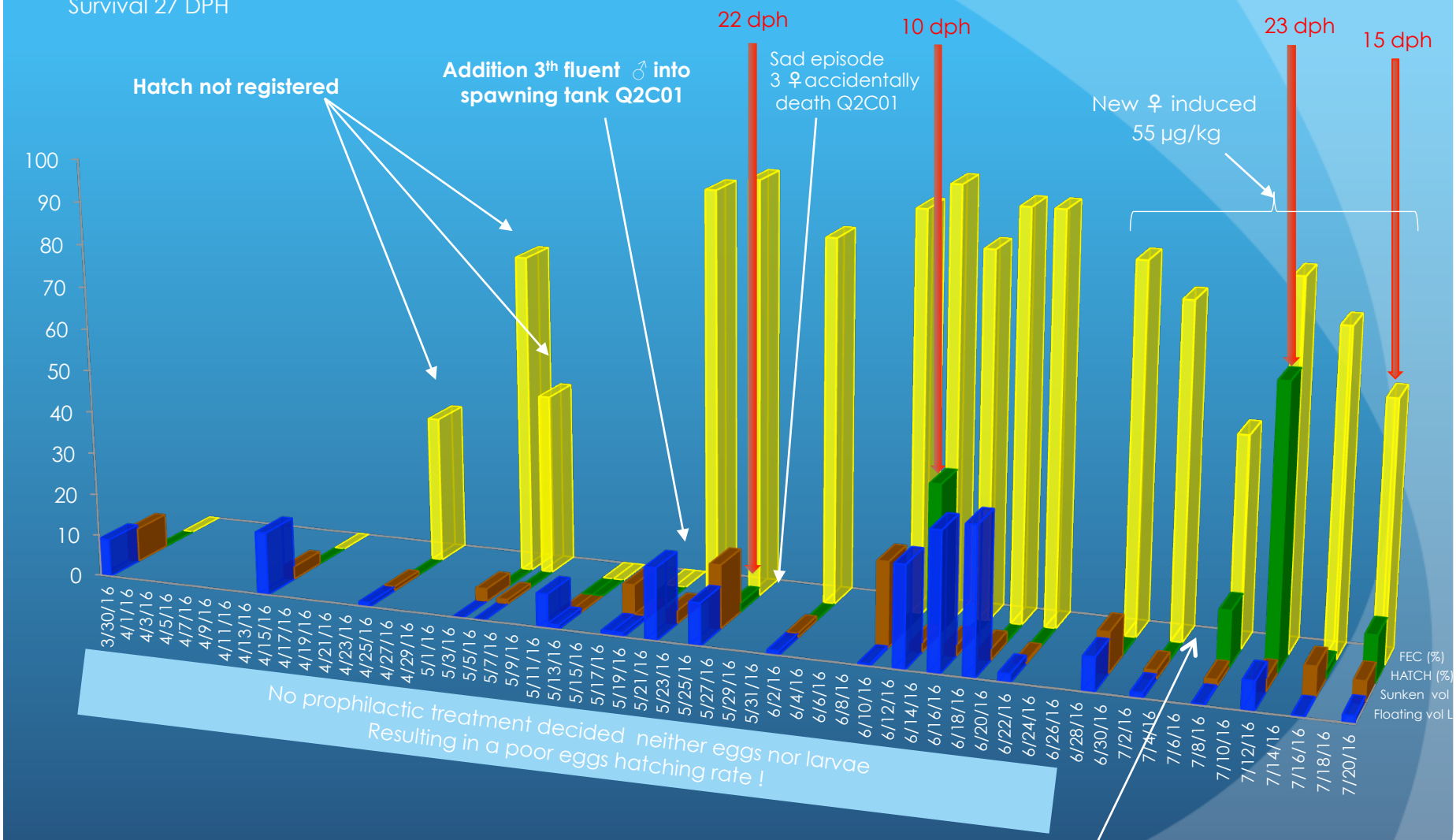
2016 MC2

EGGS VOL, SPAWNING VS HATCHING

Fecundity rate from 60 to 100 %
Hatching rate between 0 and 65 %
Survival 27 DPH



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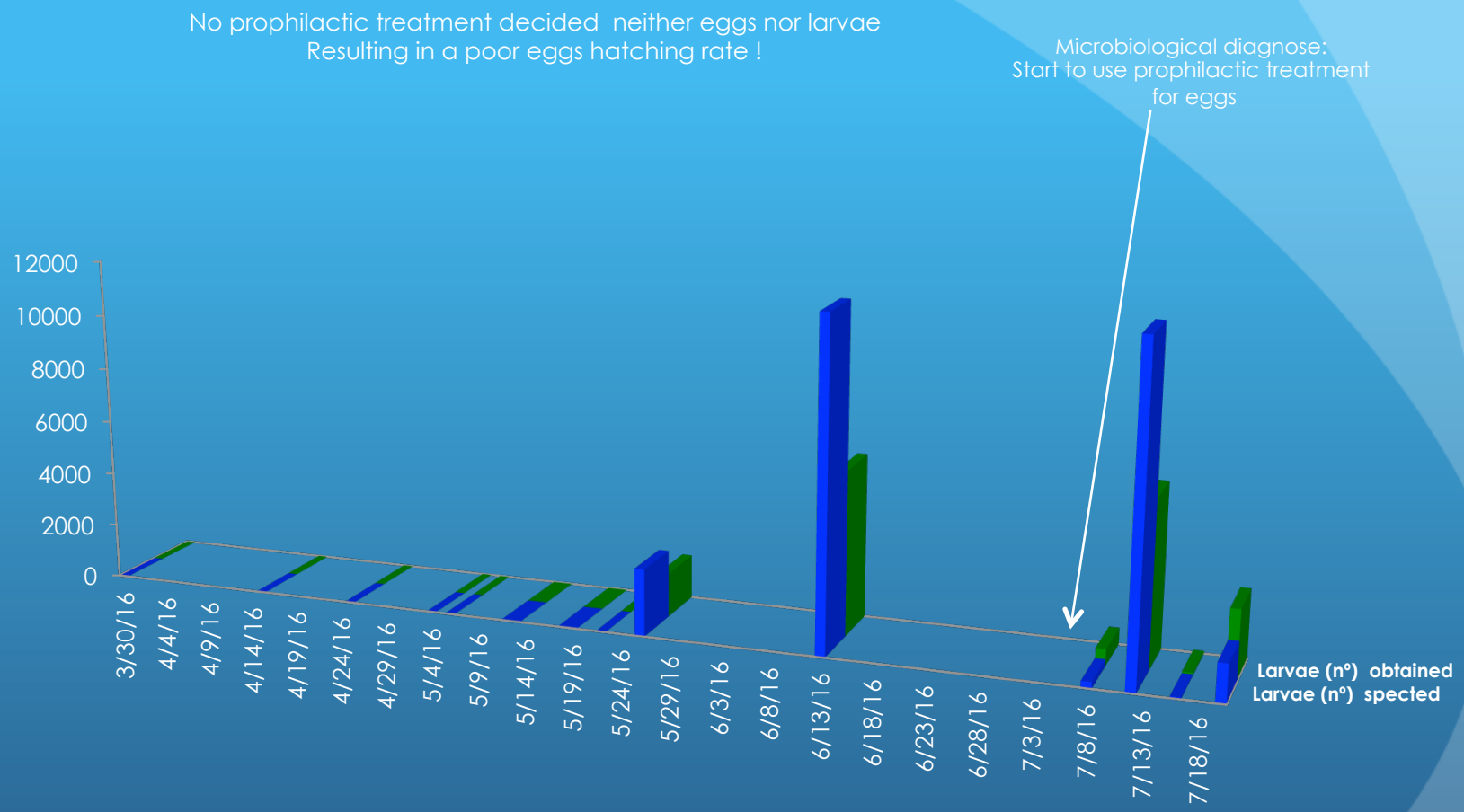
ed Vs Larvae (nº) obtained

Non prophilactic treatment decided neither eggs nor larvae
Resulting in a poor eggs hatching rate !



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Bottle neck…

Crucial point in the survival of larvae.

Sane larvae amount reduces as Insane larvae even reach 27 dph resulting a challenge for sampling purposes. Onto / Bioch

Larvae with food in the stomach have been detected in all systems. IEO,HCMR and MC 2, we recorded 22 dph healthy and fed larva.

Deformities rate should be classified and registered.

Deformities 14dph

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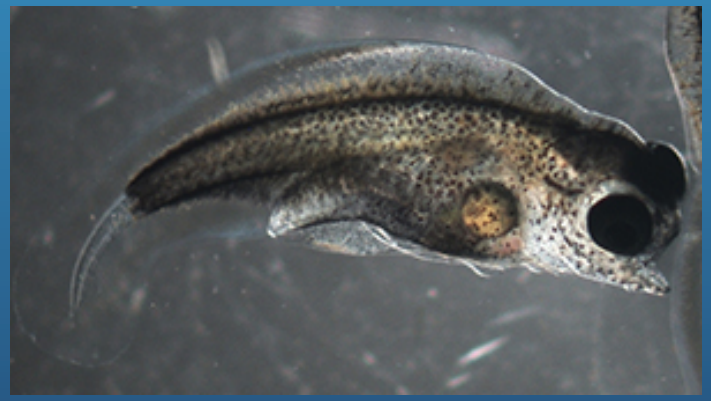
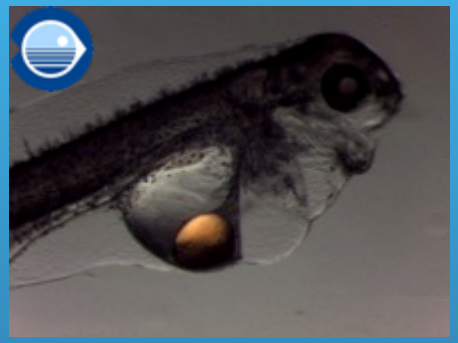
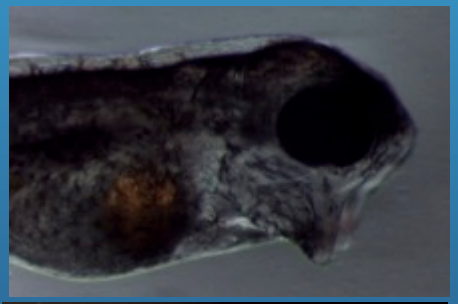
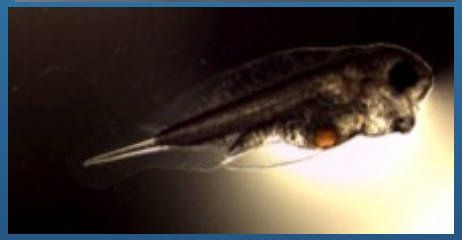
A syndrome related to swollen yolk sac.
Blue Sac Disease – (BSD) common in trout.
Several reasons suggested; most common toxicity from Nitrogen compounds such as ammonia , oxidative stress plays significant role.
Swollen Yolk Sac Syndrome (SYSS) described in Murray cod, (freshwater fish in Australia). Related to inadequate nutrition of the broodstock.

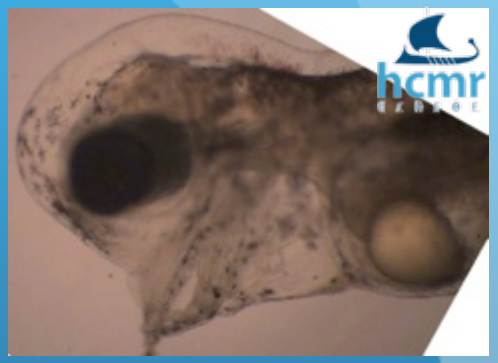
C & Z embrio and larvae shape.
Absence or deformed mouth or jaw at early larval stages











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Deformities middle larval development stages

Larvae deformities conduct to several hypothesis :

1.Bloodstocks deficient food diet:

Food has been improved in IEO with specific designed for Wreckfish diet: Sparos & FCPCT from UI P

MC2 broodstock supposed to be well feed has the got specific diet for broodstock Fish breeder Inve® but also they are fed with squid, hake and mackerel

However some essential compound may remain missed….

IEO researcher point that comparative analyse wild / captive Wreckfish gonades will be done next year.

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2. Larval feeding may also be critical:

However larvae have been reared in different ways on four different facilities since 2012.

1. *IEO : 27 dph, Rotifers, and Artemia AF and Artemia EG … Food detected on 18 dph.*
2. *MC2 : 23 dph. Rotifers, and Artemia AF & also copepods. Tisbe spp & Acartia spp year 2016.*
3. *HCMR. Enriched Rotifers, and Artemia AF and Artemia EG. Not sure if mesocosmos has been tried for Wreckfish…*
4. *Luso Hispana de Acuicultura. Staff from this fish farm grew-up first Wreckfish in 2013 from natural fertilized spawning and hatching from our broodstock MC2. They used Rotifers, Artemia, Copepods, and weaning dry diet.*

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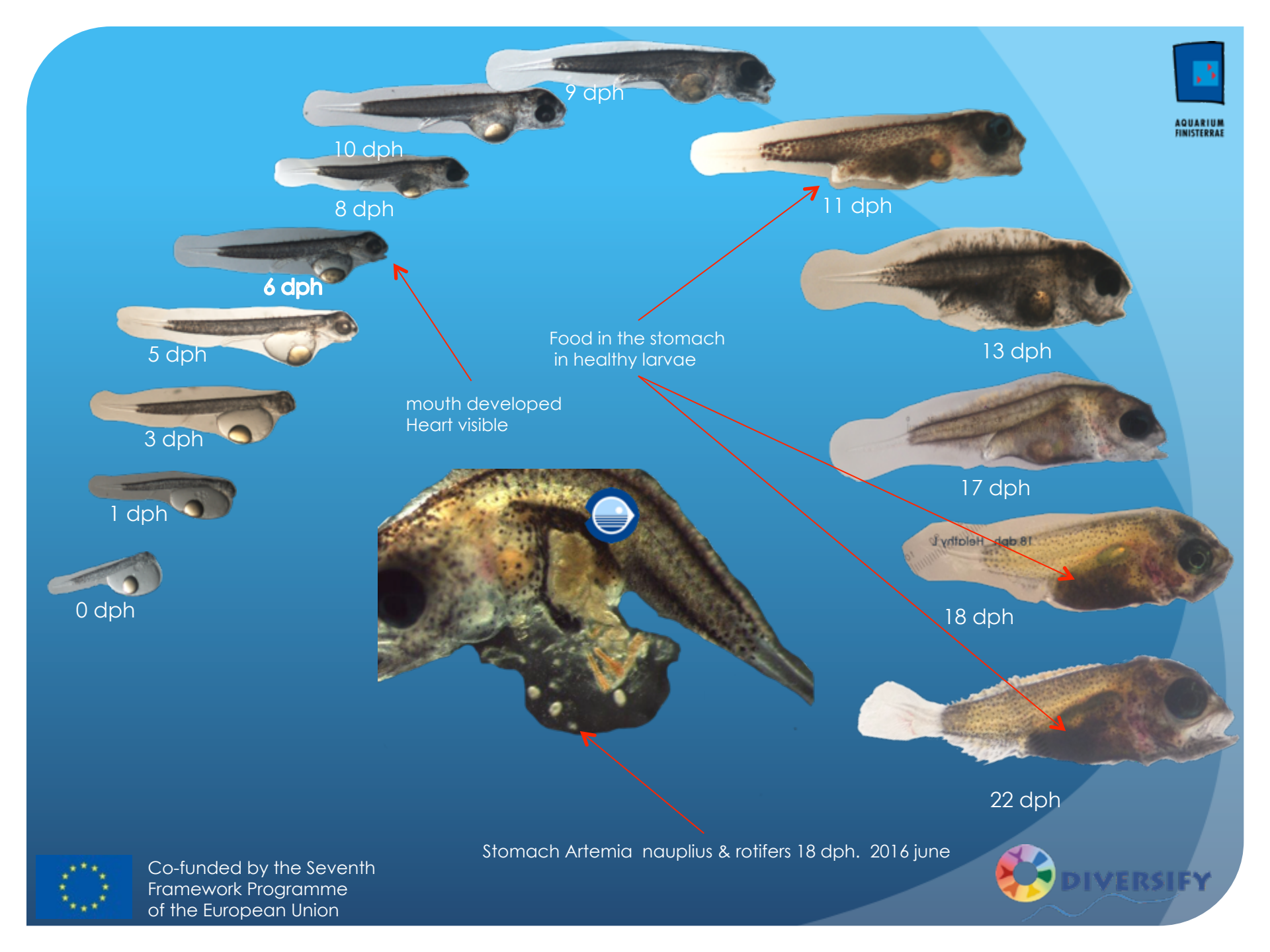
AQUARIUM FINISTERRAE
9 dph
10 dph
8 dph
11 dph
6 dph
13 dph
5 dph
Food in the stomach
in healthy larvae
mouth developed
Heart visible
3 dph
17 dph
1 dph
18 dph
0 dph
22 dph
Stomach Artemia nauplius & rotifers 18 dph. 2016 june
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Larval behaviour and feeding

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All common bottle neck regarding deformities and depletion of healthy larvae!

3. ***Additionally pathogenic*** *studies on eggs and larvae should carried-out as potential cause of deformities.*

4. ***Prophylactic protocol .***

- 2013 Prophylactic treatment (Formaline 75 ppm eggs).
- 2014 Prophylactic treatment (Formaline 75 ppm eggs)
- 2015 Prophylactic treatment eggs (Pyceze® Bronopol 50% /30 mn CC system/ days)
- 2016 Non prophylactic treatment. Before Microbiological analyse and conclusions

New line of discution have been itroducced after Ontogenic study of Dr Papadakis

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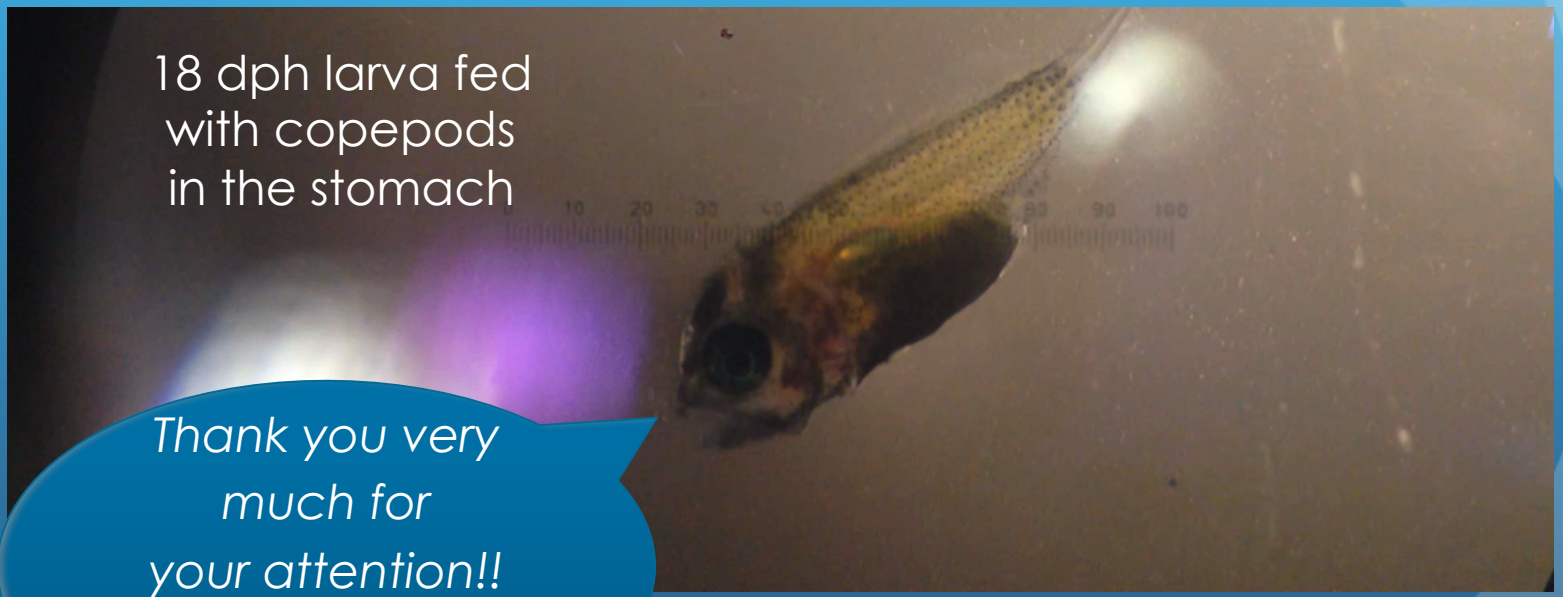

Thank you very much for your attention!! And see you next year

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