UPDATE ON FISH DISEASE SITUATION IN THE MEDITERRANEAN BASIN 2017

Annual Workshop of the National Reference Laboratories

May 30-31st 2018

Niccoló Vendramin

PhD student

Aquatic Animal Health Group
European Reference Laboratory for Fish Diseases
DTU Aqua National Institute for Aquatic Resources

PRODUCTION VOLUMES

TOTAL PRODUCTION	YEAR											
COUNTRY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TURKEY	114.206	124.530	136.573	149.589	155.802	164.197	187.136	210.824	231.672	232.152	234.000	247.754
GREECE	90.958	115.392	130.872	148.509	138.513	122.590	111.217	116.073	125.580	115.580	112.159	108.959
SPAIN	52.685	61.862	62293	65.835	69866	63.200	61.992	59.920	55.694	59.356	64.186	64.754
ITALY	62.258	62.534	63.815	64.073	65137	64.382	64.781	58.100	57.590	57.990	55.480	53.790
FRANCE	48.908	50.987	49491	47110	45.954	44.342	45.980	44.540	40.205	41.641	44.521	45.471
CROATIA	6.699	7.343	6.913	7653	9946	9823	10681	8.822	8.512	10.201	12.093	13.881
PORTUGAL	4166	4367	4.274	4024	4.097	4.674	5130	7000	3.635	5.760	5.919	5.023
SLOVENIA	1145	1206	1051	1091	995	701	958	842	897	1020	1029	286
BOSNIA	7010	7551	7358	7502	7550	7550	4920	3586	2874	3357	4451	1168
SERBIA	0	4835	6609	7534	7440	8155	7629	7662	5936	7168	7387	6085
Albania	613	697	729	1043	1059	1086	722	1274	1290	924	1300	500
Macedonia	843	588	1041	1287	1540	1491	1368	1306	1340	1 214	991	217
Marocco	2014	921	1274	394	425	447	402	449	710	887	761	384
Algeria	358	272	361	2775	2159	1755	2240	2641	2189	2380	1 325	1353
Tunisia	2483	2 676	3097	3432	4747	5256	7965	8462	12071	11123	14 263	16030
Israele	22408	22117	21434	20017	19177	19895	20817	20342	22252	20166	20 855	18421
Giordania	561	560	509	540	440	541	575	600	720	885	885	885
Libano	803	803	803	955	1055	1155	1255	1255	1255	1115	1115	15
Siria	8533	8902	8425	8595	8697	8610	7500	6200	4000	3000	2500	2500
Egitto	536450	594717	635429	693684	705290	918 793	986054	1016629	1091688	1129856	1174819	1370556
CYPRUS	2.118	2.552	2.229	2452	3.343	4.118	4.665	4.313	6.171	4.810	5.409	6.590
Montenegro	0.	184	211	414	355	590	640	630	630	680	624	138
MALTA	736	1936	2716	2702	2868	2916	2127	4336	5266	4917	5 913	6073
Lybya	241	240	240	10	10	10	10	10	10	10	10	10
Grand Total	**966.196**	**1.075.096**	**1.147.747**	**1.241.220**	**1.256.465**	**537.484**	**1.536.764**	**1.585.816**	**1.682.187**	**1.714.978**	**1.729.639**	**1.970.843**

WHICH SPECIES OF FISH WE HAVE TO DEAL WITH?

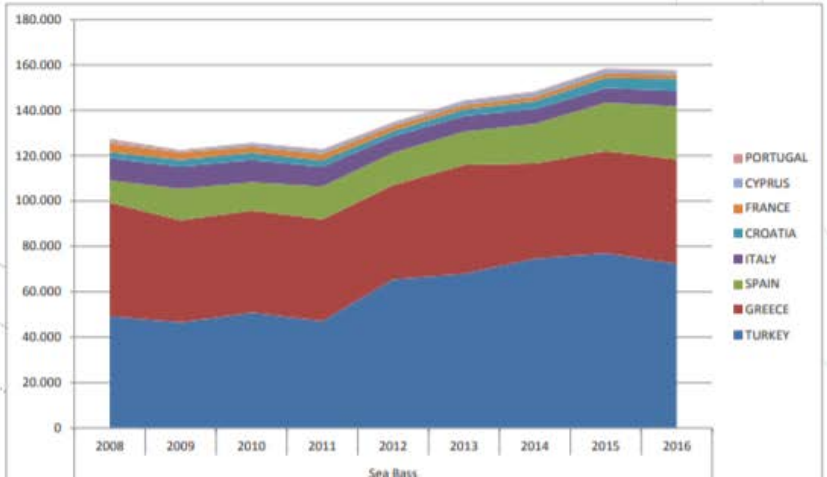
Sea Bass production –tonns

EUROPEAN SEABASS (DICENTRARCHUS LABRAX)

Sea bass production (tons) 2008-2016

PRODUCTION (tons)		YEAR								
SPECIES	COUNTRY	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sea Bass	TURKEY	49.270	46.554	50.796	47.013	65.512	67.912	74.653	77.000	72.342
	GREECE	50.000	45.000	45.000	45.000	41.500	48.000	42.000	45.000	46.000
	SPAIN	9.840	13.840	12.495	14.370	14.270	14.700	17.376	21.324	23.445
	ITALY	9.800	9.800	9.800	8.700	7.200	6.800	6.500	6.450	6.800
	FRANCE	3.968	3.204	2.779	3.000	2.300	1.970	2.021	1.980	1.928
	CROATIA	2.700	3.000	3.200	2.785	2.375	3.014	3.500	4.500	5.291
	CYPRUS	752	703	1.237	1.500	1.096	1.621	1.817	1.725	1.442
	PORTUGAL	1.069	444	396	480	500	400	500	500	450
Total Sea Bass		127.399	122.545	125.703	122.848	134.753	144.417	148.367	158.479	157.698

SOURCE: FEAP - MedAqua species commission
NOTE: Malta is not included due to lack of reliable data



WHICH SPECIES OF FISH WE HAVE TO DEAL WITH?

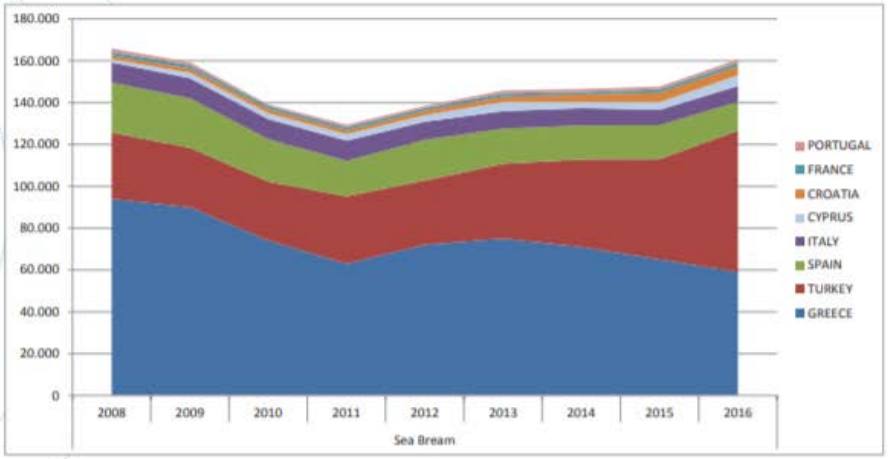
Sea Bream production –tonns

GILTHEAD SEABREAM (SPARUS AURATA)

Sea bream production (tons) 2008-2016

PRODUCTION (tons)		YEAR								
SPECIES	COUNTRY	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sea Bream	TURKEY	31.670	28.362	28.157	32.187	30.743	35.701	41.873	48.000	67.612
	GREECE	94.000	90.000	74.000	63.000	72.000	75.000	71.000	65.000	59.000
	SPAIN	23.930	23.690	20.360	16.930	19.430	16.800	16.230	16.231	13.740
	ITALY	9.600	9.600	9.600	9.700	8.700	8.400	8.200	7.360	7.600
	CYPRUS	1.600	2.572	2.799	3.065	3.121	4.444	2.919	3.656	5.136
	CROATIA	1.800	2.000	2.000	1.793	2.105	2.466	3.640	4.500	4.304
	FRANCE	1.636	1.648	1.377	1.500	1.300	1.477	1.105	1.502	1.671
	PORTUGAL	1.635	1.383	851	1.200	1.000	1.500	1.500	1.400	1.500
Total Sea Bream		165.871	159.255	139.144	129.375	138.399	145.788	146.467	147.649	160.563

SOURCE: FEAP - Mediterranean Aquaculture Commission
NOTE: Malta is not included due to lack of reliable data



WHICH SPECIES OF FISH WE HAVE TO DEAL WITH?

Sea bream production –thousands of juveniles

JUVENILE PRODUCTION OF EUROPEAN SEABASS & GILTHEAD SEABREAM

Sea bass & sea bream juveniles production (thousands) 2008-2016

PRODUCTION '000 juveniles		YEAR								
SPECIES	COUNTRY	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sea Bass	TURKEY	180.000	117.500	105.000	149.000	205.000	172.000	178.000	220.000	242.500
	GREECE	195.700	180.000	180.000	174.000	184.000	192.000	175.000	175.000	180.000
	FRANCE	35.307	39.732	39.800	45.742	46.000	46.542	48.382	55.575	43.437
	SPAIN	34.000	24.650	28.199	33.150	36.423	31.125	43.328	24.903	34.129
	ITALY	55.000	55.000	55.000	48.000	40.000	45.000	42.000	27.500	26.000
	CYPRUS	3.500	3.610	2.522	4.359	5.280	3.955	4.334	6.964	3.301
	CROATIA	13.000	8.100	9.000	8.600	8.100	5.100	1.000	1.000	10.000
	PORTUGAL	2.214	2.182	1.290	1.500	0	0	0	0	0
Total Sea Bass		518.721	430.774	420.811	464.351	524.803	495.722	492.044	510.942	539.367
Sea Bream	GREECE	214.000	150.000	160.000	242.000	245.000	266.000	237.000	245.000	268.000
	TURKEY	80.000	72.000	85.000	140.000	185.000	138.000	149.000	120.000	214.000
	ITALY	50.000	48.000	48.000	62.000	70.000	65.000	67.000	60.000	75.000
	SPAIN	47.282	32.180	36.451	52.900	54.985	51.420	65.786	39.250	43.254
	FRANCE	31.317	22.300	29.100	41.742	30.400	43.728	47.103	54.510	68.783
	CYPRUS	13.000	8.589	8.929	18.479	7.976	14.267	23.588	27.927	27.190
	CROATIA	7.000	6.000	8.929	6.900	5.400	3.400	0	0	4.000
	PORTUGAL	21.722	3.810	1.378	1.000	0	0	0	0	0
Total Sea Bream		464.321	342.879	377.787	565.021	598.761	581.815	589.477	546.687	700.227
TOTAL SEA BASS & SEA BREAM		**983.042**	**773.653**	**798.598**	**1.029.372**	**1.123.564**	**1.077.537**	**1.081.521**	**1.057.629**	**1.239.594**

SOURCE: FEAP - MedAqua species commission
NOTE: Malta is not included due to lack of reliable data

AIM:

Continue yearly survey in the area giving the opportunity to stakeholders to share their opinion targeting main problems, follow trends and highlight emergence of new disease

Contributions from 16 Experts

16- Marine

12- Freshwater

Legislative frame

CD 2006/88

- Bass and bream are not in the list of susceptible species **BUT**

Article 10

Animal health surveillance scheme

Member States shall ensure that a risk-based animal health surveillance scheme is **applied in all farms and farming areas**, as appropriate for the type of production.

shall aim at the detection of:

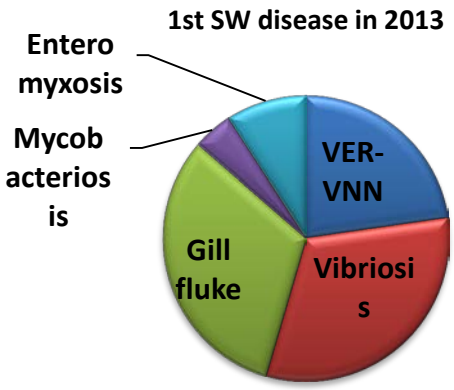
(a) ***any increased mortality in all farms*** and farming areas as appropriate for the type of production;

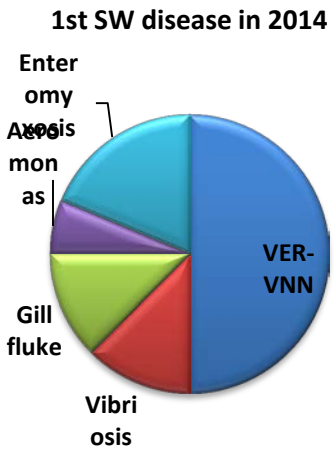
(b) the ***diseases listed*** in Part II of Annex IV, in farms and farming areas were **species susceptible** to those diseases are present

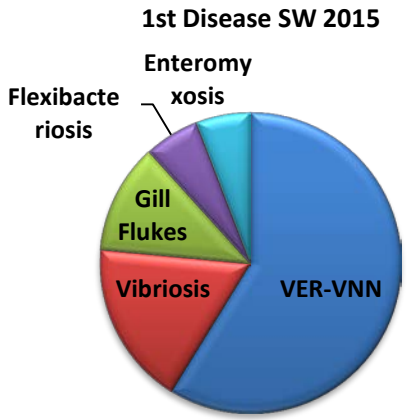
Questionnaire template

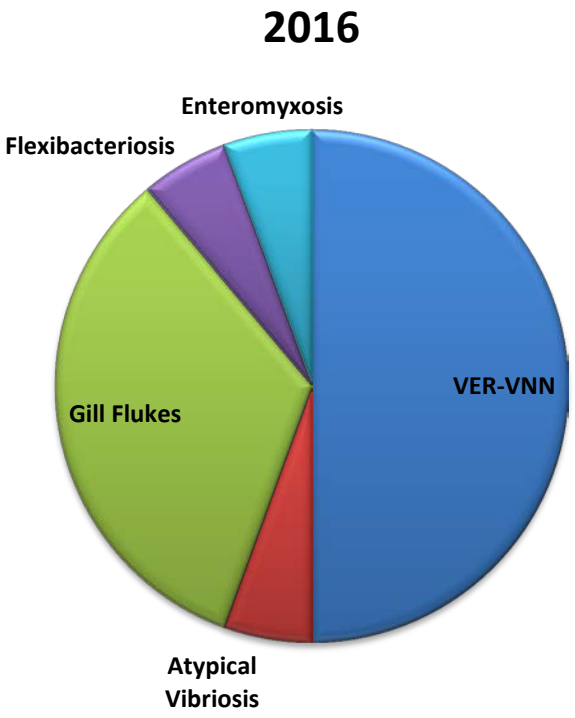
Third disease to be considered for its impact in the aquaculture sector	
Name	
Aetiology	
Symptoms / Diagnosis	
Control methods applied	
Area of interest	
Species affected / size	
Rearing sector affected (Hatchery/nursery/ongrowing)	
DISEASE CHARACTERIZATION	
Impact on production	
Impact on Economy	
Legislative consequences	

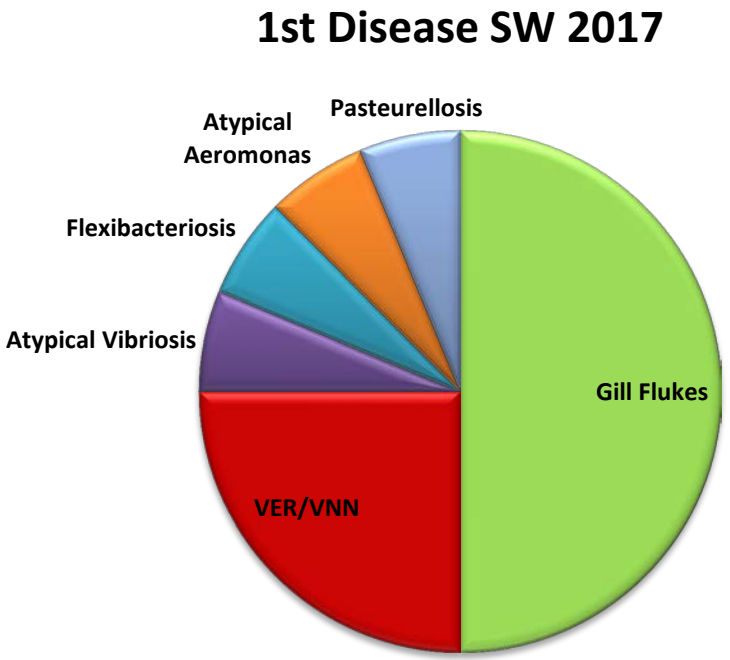
Salt Water Results



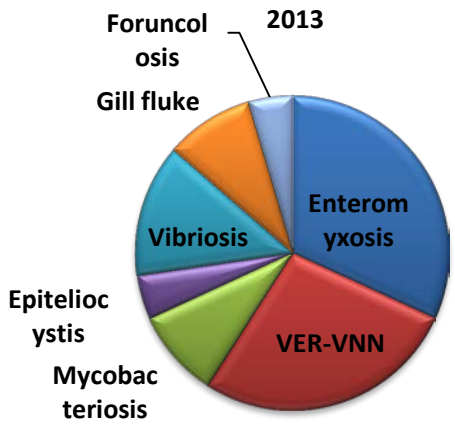


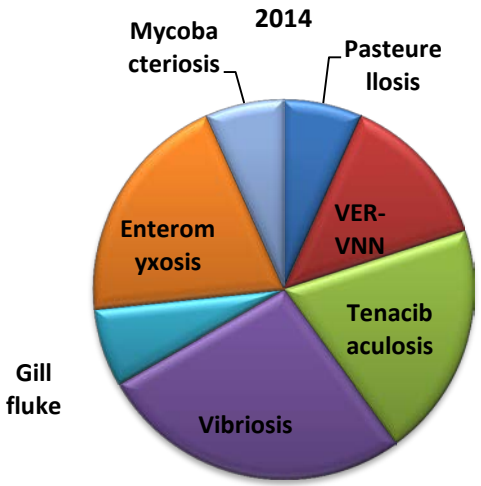


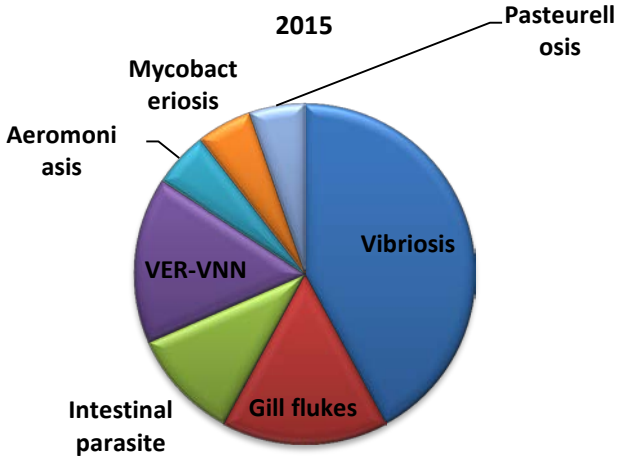




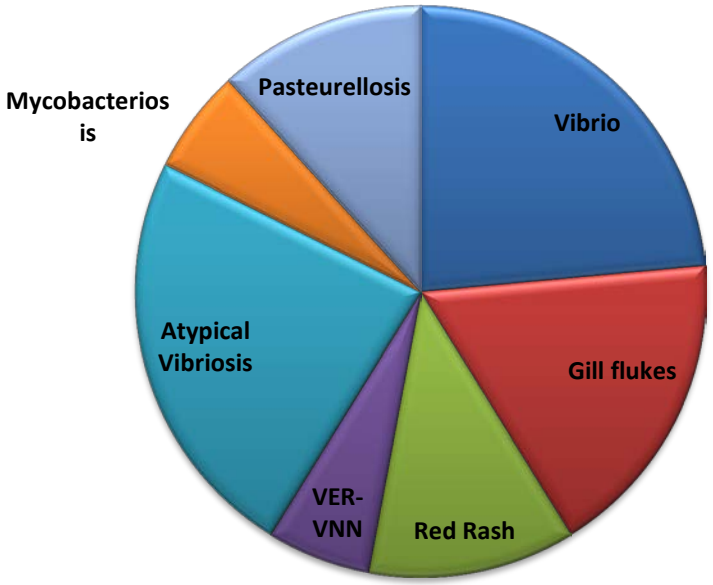
2nd Dis. Salt Water Results



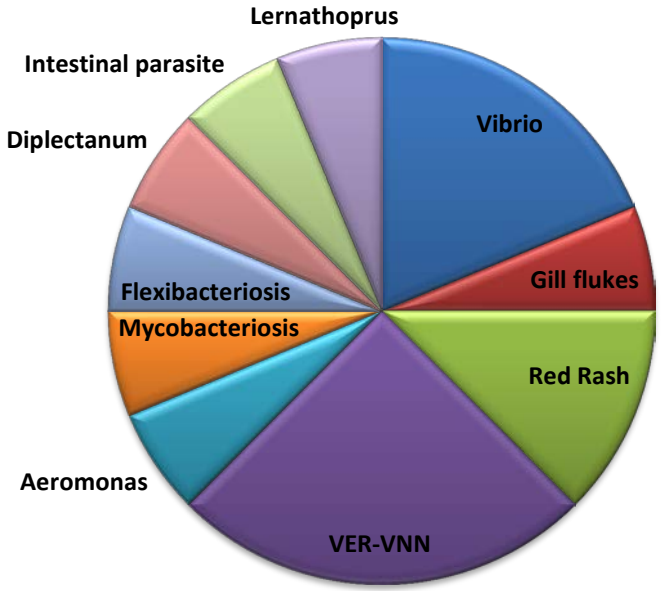




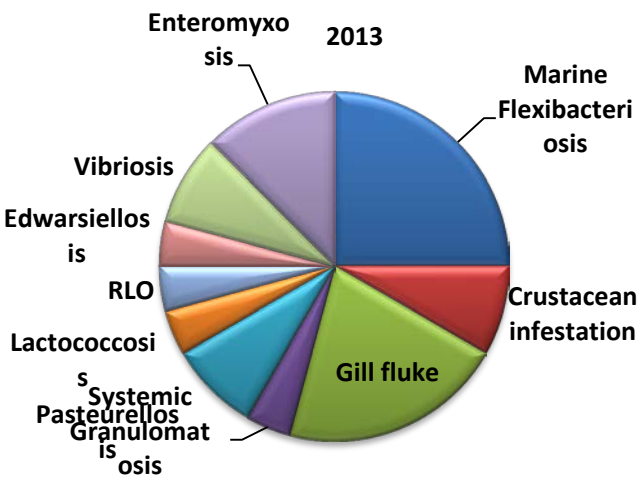
2016

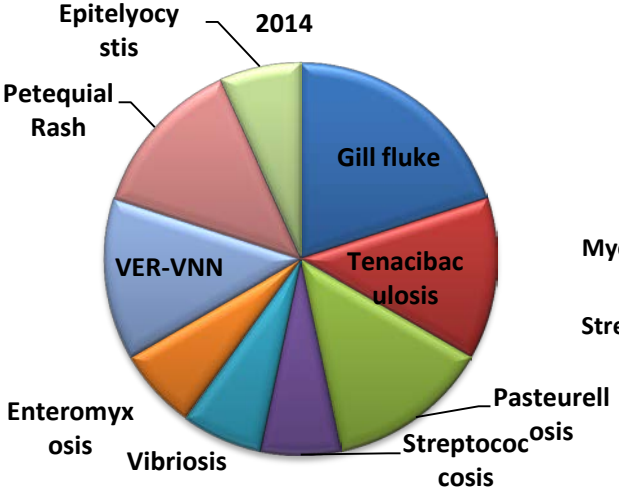


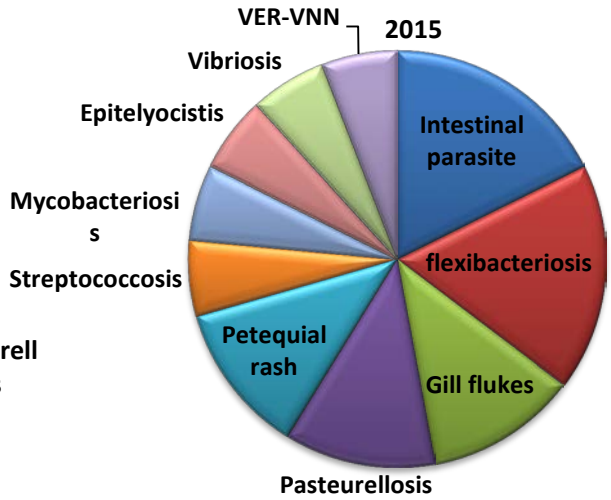
2nd Disease SW 2017



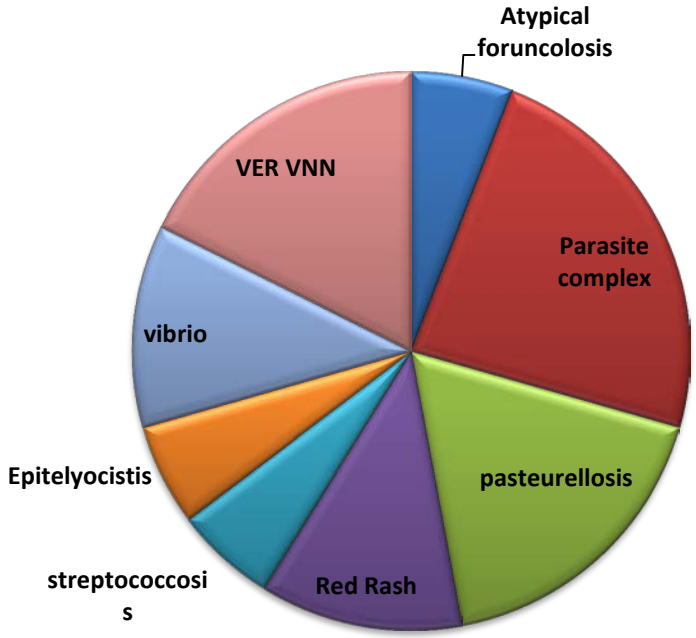
3rd Dis. Salt Water Results



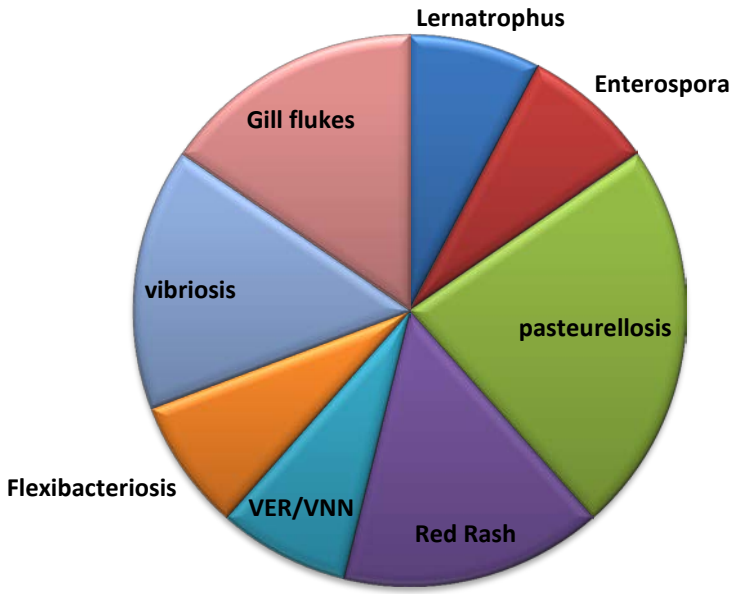




2016

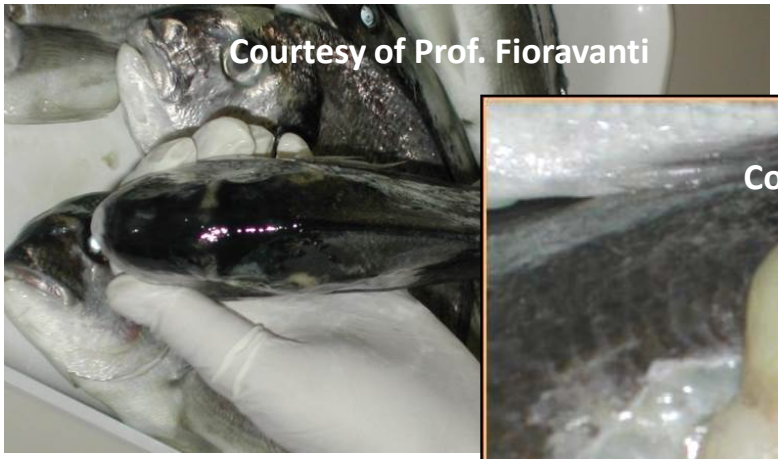


3rd Disease SW 2017



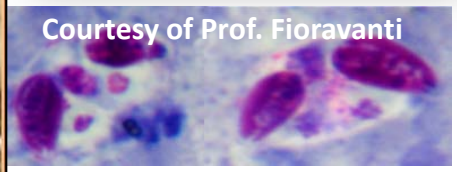
Results Marine gill parasitosis

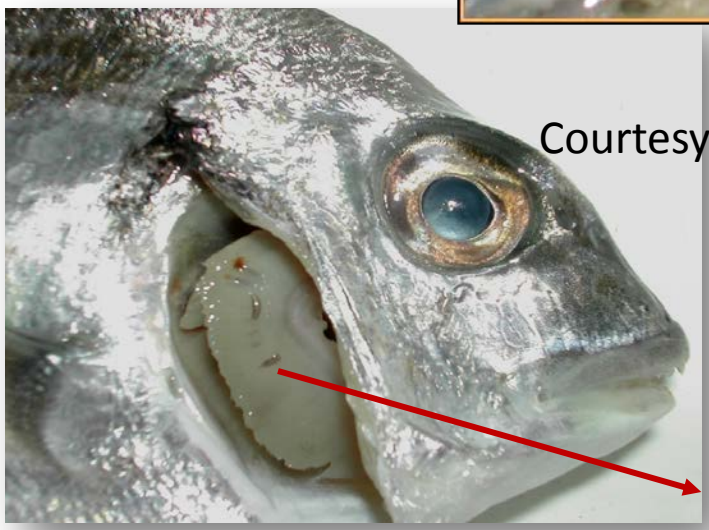
Third disease to be considered for its impact in the aquaculture sector	
Name	PARASITIC DISEASES OF SPARIDS: GILL DISEASES - SPARICOTYLOSIS, INFECTION BY APOROCOTYLIDS ENTERIC DISEASES - ENTEROMYXOSIS, ENTEROSPOROSIS
Aetiology	Gill parasites: Sparicotyle chrysophrii (Monogenea, Polyopisthocotylea) – Cardicola aurata (Digenea, Aporocotylidae) Enteric parasites: Enteromyxum leei (Myxozoa) - Enterospora nucleophila (Microsporidia)
Symptoms / Diagnosis	SPARICOTYLOSIS: gill anemia in gilthead seabream INFECTION BY APOROCOTYLIDS: gill disease (anemia, necrosis) Diagnosis: Clinical diagnosis, necropsy, parasite detection/identification +detection of Aporocotylids eggs in gills (adults in circulatory system) + PCR for early stages of E. leei + PCR for E. nucleophila infection
Control methods applied	Change of cage nets or careful tank bottom cleaning in land-based farm, reduction of biomass density (for Sparicotyle), increased distance from the bottom / moving the cages to deeper sites (for Aporocotylid infections) Control of introduced fish, water filtration/disinfection, reduction of biomass density, morts removal, careful tank cleaning, Problem: lack of licensed effective antiparasitic treatments
Area of interest	
Species affected / size	SPARICOTYLOSIS: gilthead seabream – all sizes INFECTION BY APOROCOTYLIDS: gilthead seabream - all sizes, mainly juveniles clinically affected
Rearing sector affected (Hatchery/nursery/ongrowing)	Ongrowing (Enteromyxosis in intensive land-based farms)
Legislative consequences	2

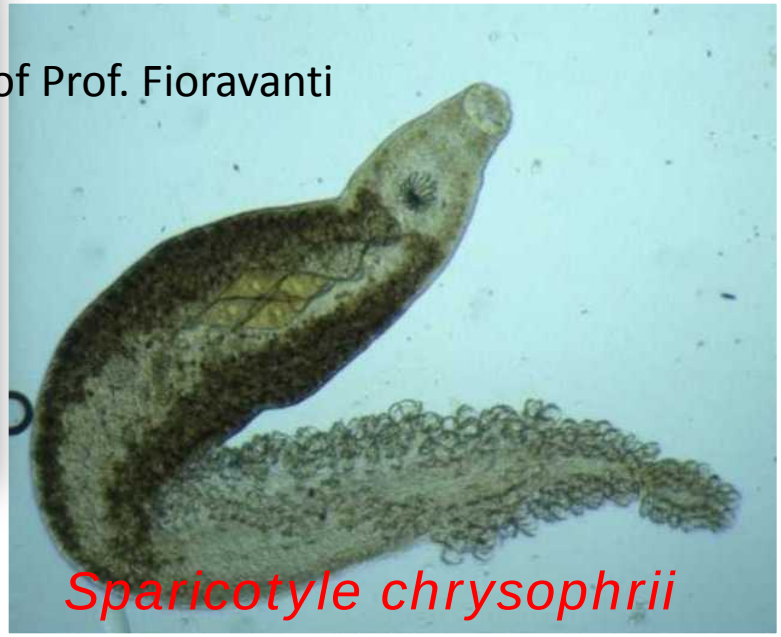

Courtesy of Prof. Fioravanti


Courtesy of Prof. Fioravanti


Courtesy of Prof. Fioravanti

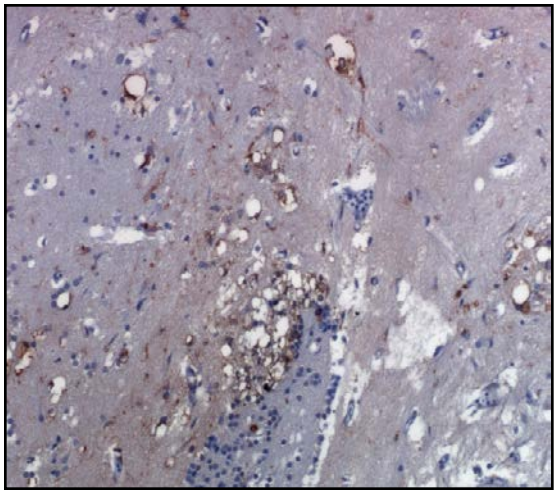

Courtesy of Prof. Fioravanti


Courtesy of Prof. Fioravanti


Sparicotyle chrysophrii

Results – Marine - VIRUS

- VER/VNN is by far the most important disease in 2016, and the importance is increasing since 2013
- Field trial of vaccine prototypes in progress
- Sea bass remain target species mainly at larval/nursery stage, with implication for market size as well
- Sea bream larval stage
- Commercial vaccine licenced



Results – Marine 2 - Bacteria

Major constraint for Marine acquaculture despite the availability of terapeutic treatment and (few) vaccines

- **Vibrio (***Vibrio Anguillarum* **plus atypical vibriosis** i.e. ***Vibrio harveyi*****:** uncoordinated swimming behavior, progressive weight loss, exophthalmos, keratitis, skin lesions)
- INFECTION WITH AEROMONAS (A.salmonicida and A.Veronii)

Red Rash Syndrome

- Aetiology unknown
- Affect mostly adult gilthead sea bream
- Observed mainly in cages
- Seasonal appearance during cold months, syndrome tend to solve when temperature rise again.
- High morbidity – low mortality – problem in marketability of the fish
- Effective treatment possible with antibiotics (Oxytetracycline)

Infestation with Lernathropus

Reported by 2 expert as increasing
1- slow growht
2- poor quality of the harvested fish (evident parasite do not allow to sell the fish)
3- lack of treatment (need to obtain permission from local authorithies for the ”cascade”)

Two new large research programs on Med. Acquaculture

MedAID aims to increase the overall competitiveness and sustainability of the Mediterranean marine fish farming aquaculture sector, throughout the whole value chain.

WP 4 health (NVI;DTU;CVI;IZSVe;Veteau;SNTM;and more)

DTU contribution

1) Test and optimize recombinant vaccine prototype for VNN (see Sofie presentation tomorrow)
2) Disease mapping
3) Diagnostic tests

and

Thank all of you for your attention

And thanks all experts for providing interesting replies:

- **Panos varvarigos**
- **Thanos Prapas**
- **Daniel Gijon**
- **Alain le breton**
- **Nadav Davidovich**
- **Maria Letizia Fioravanti**
- **Snjezana Zrncic**
- **Fabio Borghesan**
- **Panos Chiristophilogiannis**
- **Thomas Siampras**
- **Carlos Zarza**
- **Mercè Isern**
- **Marino Prearo**