UPDATE ON FISH DISEASE SITUATION IN THE MEDITERRANEAN BASIN 2012

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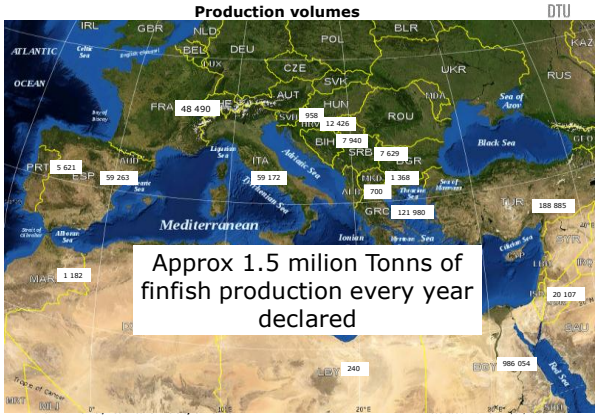
The Mediterranean basin

- point of connection for different continents (europe, Africa, Asia)

- great development of aquaculture, aside from traditional trout/carp farming, sea cage for marine high cost species

- different legislation, different control methods, but what about diseases?

Production volumes



Approx 1.5 milion Tonns of finfish production every year declared

WHICH SPECIES OF FISH WE HAVE TO DEAL TO?

COLD FRESHWATER:

Rainbow trout
Brown trout
Marble trout
Charr
Arctic charr
Grayling

FRESHWATER

WARMWATER
- CARP (*Cyprinus carpio*, *Cyprinus carpio koi*)
- Crucian carp (*Carassius carassius*)
- Catfish (*Ictalurus melas*, *Ictalurus americanus*…)
- Sturgeon (Different species + hybrids for Caviar production)
- Pike (*Esox lucius*)
- Eel (*Anguilla anguilla*)

Marine Mediterranean Fish

FARMED
Sea bass
Gilthead sea bream
Sole
Meagre
Amberjack
Tuna

AIM:

Establish a platform of reknowned experts involving relevant stakeholders able to share informations, target main problems suggest possible solutions and target future research programs/projects

Methods :

1. Involvment of experts (institutions and private consultants)
2. Questionnaire
3. Data collection and management

Questionnaire -1

- A simple questionnaire asking to rank the three most important diseases for both Freshwater and Saltwater environment was delivered to a panel consisting of 20 experts.
- The "importance" of the disease was intended as economic impact on the production
- Specification about pathogen, species affected, biological stage, diagnostic methods, controls methods applied were asked

Questionnaire-2

Saltwater environment

First 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)	

Experts:

20 experts contacted

- For Saltwater 13 questionnaires obtained
- For Freshwater 8 questionnaires obtained

Results – Marine 1

	a	b	c	d	e	f	g	h
1	VER/VNN		Enteromyxosis	VER/VNN	Amylodinium	Myxobacteriosis	Winter Disease	VER/VNN
2	Mycobacteriosis		Ciliatosis (Philasterides, Uronema)	Enteromyxosis	VER/VNN	Vibriosis	Vibriosis-Pasteurella	Vibriosis
3	Lactococcosis		Tenacibaculosis	Petequial Rush	Tenacibaculosis	Pasteurellosis	VER/VNN	Enteromyxosis/ Sparicotylosis
4						Isopods/ Ceratothoa	Enteromyxosis/ Microsporidiosis	
5							Red Rash syndrome	
6								
7								
8								

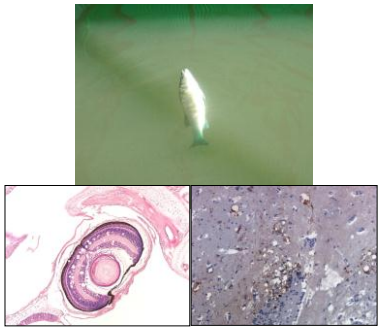
Results – Marine 2

	i	l	m	n	o	p
1	VER/VNN	Myxosporidiosis	VER/VNN	VER/VNN	VER/VNN	VER/VNN
2	Monogenean (Diplectanum , Microcotyle, Sparycotyle, furnestinia, gyrodactylus)	Epiteliocystis	Vibriosis	Microcotylosis	Mycobacteriosis	Sparycotylosis
3	AGD	Sphaerosporosis	Isopods	Aeromonas Septicemia	Lactococcosis	Pasteurellosis
4		Pasteurellosis				
5		VER/VNN				
6		Zeuxaphta seriolae				
7		White gill syndrome				
8		Granulomatosis in Meagre				

Results – Marine 3 - VIRUS

- VER/VNN so far the most important disease in the Marine Mediterranean aquaculture.
- Sea bass remain target species mainly at larval/nursery stage, with implication for market size as well
- Different species including Sea bream, meagre, sole, Grouper, etc.
- Interesting inputs: need for commercial vaccine and recognised certification for PCR test performed to check fry batch

VER/VNN



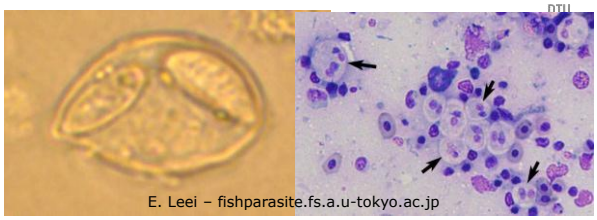
Results – Marine 3 - Bacteria

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

- Vibrio (*Vibrio harveyi*: uncoordinated swimming behavior, progressive weight loss, exophthalmos, keratitis, skin lesions),
- Pasteurella (Photobacterium damselae subsp. Piscida)
- Tenacibaculum (T. Maritimum)
- Lactococcosis and Mycobacteriosis (zoonosis)


Results Marine -4 Parasites

Name	PARASITIC DISEASES OF SPARIDS: ENTEROMYXOSIS AND SPARICOTYLOSIS
Aetiology	*Enteromyxum leei / Enteromyxum Scophtalmi* (Myxozoa) - *Sparicotyle chrysophrii* (Monogenea, Polyopisthocotylea)
Symptoms / Diagnosis	ENTEROMYXOSIS: enteritis (progressive weight loss in gilthead seabream, high mortality in sharpsnout seabream) SPARICOTYLOSIS: gill anemia in gilthead seabream Diagnosis: Clinical diagnosis, necropsy, parasite detection/identification
Control methods applied	Reduction of biomass density (if feasible) - lack of licensed effective antiparasitic treatments
Species affected / size	ENTEROMYXOSIS: gilthead seabream >100-150g, sharpsnout seabream <80g and other sparids , Turbot SPARICOTYLOSIS: gilthead seabream
Rearing sector affected (Hatchery/nursery/ongrowing)	Ongrowing During last years, Enteromyxum leei has led to the progressive abandonment of sharpsnout seabream farming in the Mediterranean area



Sparicotyle chrysophrii


Name	Infection with isopods
Aetiology	Isopod Cerathothoe oestroides / Anylocra
Symptoms / Diagnosis	Parasites on gills, in the mouth, on the skin/Clinical diagnosis
Control methods applied	Baths in sintetic pyrethroids
Area of interest	
Species affected / size	All sizes of sea bass and sea bream
Rearing sector affected (Hatchery/nursery/ongrowing)	In sea cages during the summer months; the most severe clinical appearance is in fry up to 50 grams due to obstruction of the oesophagus and eventual starvation

Unknown aetiology / Dismetabolic disease

Name	Winter Disease
Aetiology	Multifactorial, due to low temperatures and secondary infections
Symptoms / Diagnosis	Distended belly, pale gills, friable and pale liver, swollen intestine with thin walls. / clinical signs + histopathology
Control methods applied	Preventive Health diets
Area of interest	
Species affected / size	Sea Bream / 1st winter bream: low mortality, low weight loss; 2nd winter bream: less mortality, weight loss up to 15%*
Rearing sector affected (Hatchery/nursery/ongrowing)	On-growing farms


To be considered as well Petequial Rash Syndrome !!!

Results – FreshWater 1

	a	b	c	d	e	f	g	h
1		RTFS	Lactococcosis		VHS/IHN	RTFS	RTFS	VHS
2		Forunculosis	RTFS		RTFS	Red Mark Syndrome	RTGE	Lactococcosis
3		Red Mark Syndrome	Sleeping Disease		IPN	Swim Bladder inflamation in carp	Gill infection/ F.branchiophilum	RTFS
4							Amoebic gill infection	

Results – FreshWater 2

	i	l	m	n	o	p
1	Enteric Red Mouth			Lactococcosis	KHV	IPN
2	RTFS				Lactococcosis	NVA
3	Red Mark Syndrome				Forunculosis	ERM
4						

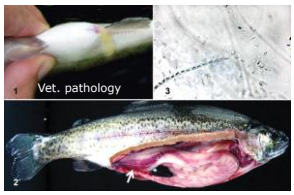
Results – FW 3 - Bacteria

Name	RTFS
Aetiology	Flavobacterium psychrophilum
Symptoms / Diagnosis	Melanosis, lethargic swimming, anemia (pale gills and systemic anemia), hemorrhages in visceral fat, spleen enlargement and swollening / Clinical diagnosis, necropsy, microscopic exam of Fuchsin-stained spleen smears, bacterial isolation
Control methods applied	Antibiotic treatment
Area of interest	
Species affected / size	Rainbow trout (fry)
Rearing sector affected (Hatchery/nursery/ongrowing)	Hatchery/nursery

Name	LACTOCOCCOSIS
Aetiology	Lactococcus garviae
Symptoms / Diagnosis	Melanosis, exophthalmos, lethargic swimming, anorexia, hemorrhages in eyes and internal organs, pale gills, enteritis / Clinical diagnosis, necropsy, bacterial isolation
Control methods applied	Vaccination (autologous vaccines by injection) + antibiotic treatment
Area of interest	
Species affected / size	Rainbow trout (sub-adults and adults)
Rearing sector affected (Hatchery/nursery/ongrowing)	Ongrowing (water temperature >15° C)

Results – FW 4 - Virus

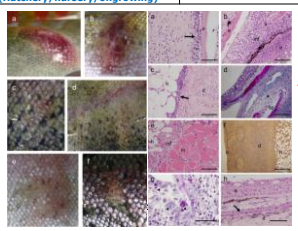
Unknown aetiology / Dismetabolic disease



Name	Rainbow Trout Gastroenteric Syndrome (RTGE)
Aetiology	*Candidatus Arthromitus*
Symptoms / Diagnosis	Distended belly, internally clear fluid in the stomach and yellowish fluid in the intestines. Withis faeces in the bottom of the tank. Diagnosis made by fresh preparation of intestinal content and observation of the bacteria. The bacteria cannot be isolated.
Control methods applied	Medicated feed (oxytetracycline)
Species affected / size	Rainbow trout / >20 g
Rearing sector affected (Hatchery/nursery/ongrowing)	Mainly in on-growing farms, some outbreaks in nurseries. Above 15-16 ºC

Unknown aetiology / Dismetabolic disease

Name	Red mark syndrome/strawberry disease
Aetiology	Not yet known
Symptoms / Diagnosis	Reddish lesions on the fish body (head,back, flank, vent, caudal peduncle) sometimes resembling foruncles, but interesting only the skin. No mortality, but serious processing problems. Clinical diagnosis, histological confirmation.
Control methods applied	Antibiotic treatments, at first adopted to avoid secondary bacterial infection, seem to have good results in removing symptoms.
Area of interest	
Species affected / size	Oncorhynchus mykiss > 150-200 g
Rearing sector affected (Hatchery/nursery/ongrowing)	ongrowing



Ú. McCarthy et al., 2013

Thank all of you for your attention

And thanks all experts for providing interesting replies:

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