



European Union Reference Laboratory for Fish and Crustacean Diseases  
National Institute of Aquatic Resources, Technical University of Denmark



# Survey & Diagnosis of fish diseases in 2018

**Niccolò Vendramin, Niels Jørgen Olesen**  
***23<sup>rd</sup> Annual Workshop***

*of the National Reference Laboratories for Fish Diseases*  
*Copenhagen, Denmark, May 27<sup>th</sup> – 28<sup>th</sup> 2019*



# Survey & Diagnosis of listed fish diseases in the European Community 2018



An Annual questionnaire

1. **General data:** Number of farms and categorization
2. **Epidemiological data:** Number of outbreaks and increase/decrease in number of infected farms/severity
3. **Laboratory data, NRL and regional laboratories:** total number samples tested and samples tested positive for each disease
4. **Reports from the individual European countries:** general information on aquaculture production, fish health status, disease challenging production.

## Report on Survey and Diagnosis of Fish Diseases in Europe 2018

### Report


The report was collated in May, and is now submitted to all of you for validation.

Please check if the information given is correct!



# General production data taken from FIGIS & FEAP

FAO Home > Fisheries & Aquaculture

 Food and Agriculture Organization of the United Nations  
for a world without hunger

Fisheries and Aquaculture Department

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### Statistics

- Global Statistical Collections
- Regional Capture Statistical Collections
- All information collections
- Software
  - ARTFISH
  - OPEN ARTFISH
  - BEAM1 and 2
  - BEAM3

### FishStatJ - software for fishery statistical time series

FishStatJ is a Java-based desktop application which provides users with access to a variety of fishery statistical datasets. It consists of a main application and several workspaces that include the datasets.



#### FishStatJ key features

- statistical datasets browsing, data mining, charting and reporting
- filtering, grouping and aggregation through hierarchical dimensions



Prepared by the FEAP secretariat (Novembre 2017)  
contact: FEAP Secretariat - secretariat@feap.info

Data from FEAP are from 2016

Updated with info from 2017 from FIGIS (always 1 year gap between production data and health data provided by you)

There are discrepancies between the two sources (cyprinids).

# Additional relevant sources



Scottish Government  
Riaghaltas na h-Alba  
gov.scot

## Marine Scotland Science

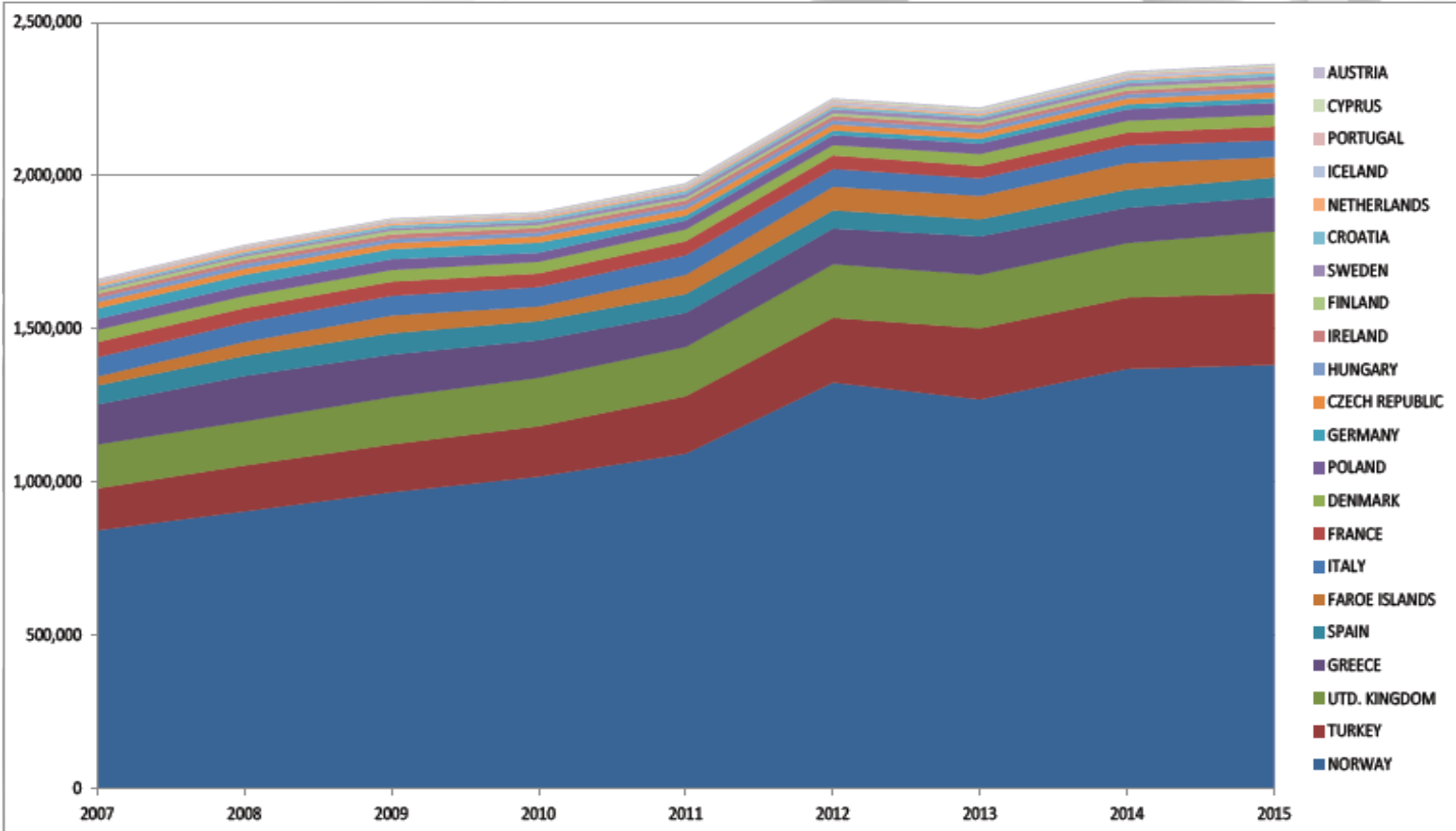
Scottish Fish Farm Production Survey 2017

Fiskehelse rapporten

2018

# Development of Fish Farming in Europe including Norway and Turkey

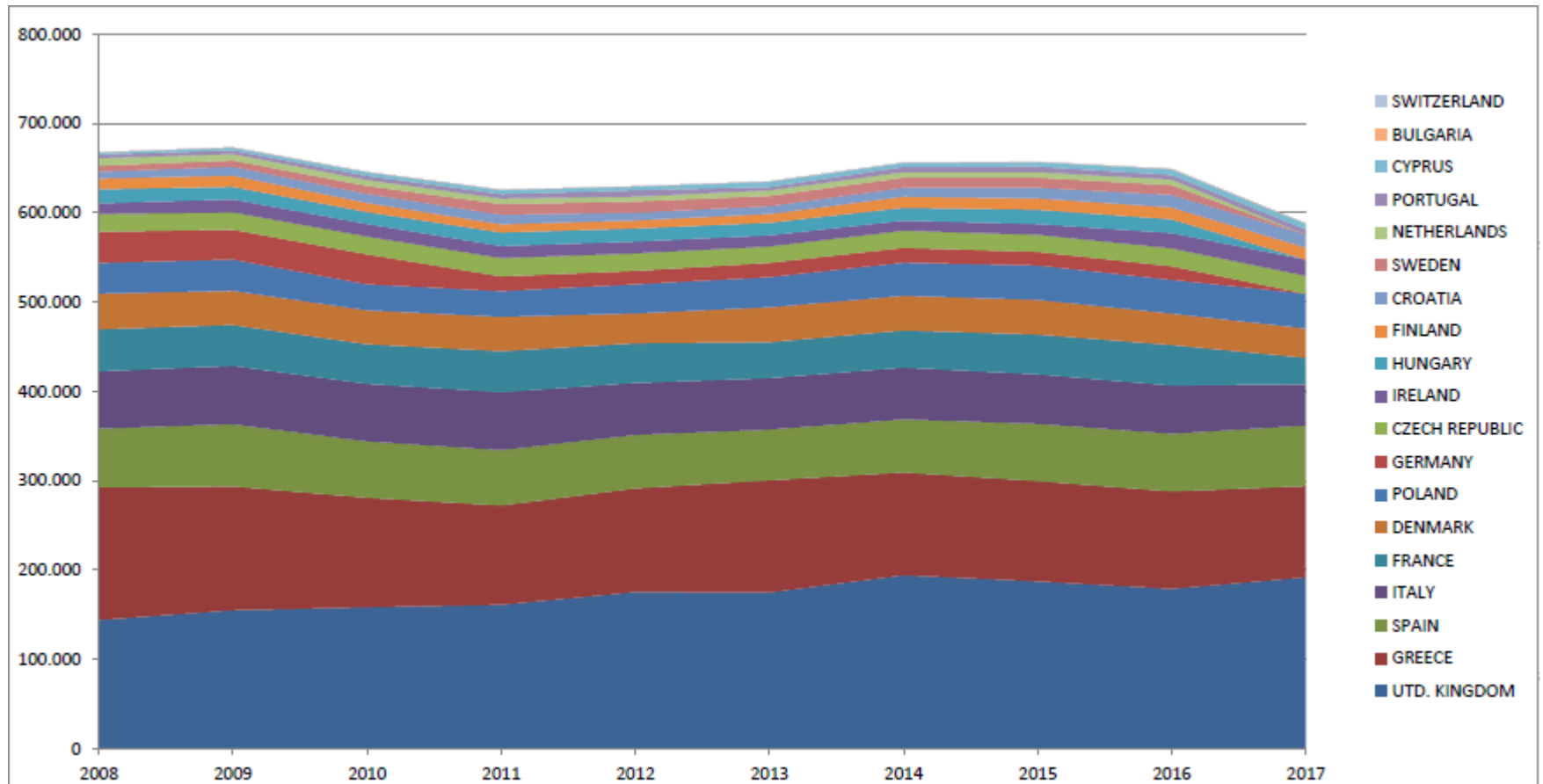
Data from FIGIS



	2015	2016	2017
Grand Total (tonns)	2.358.075	2.347.829	2.396.229

# Development of Fish Farming in EU 2008-2017

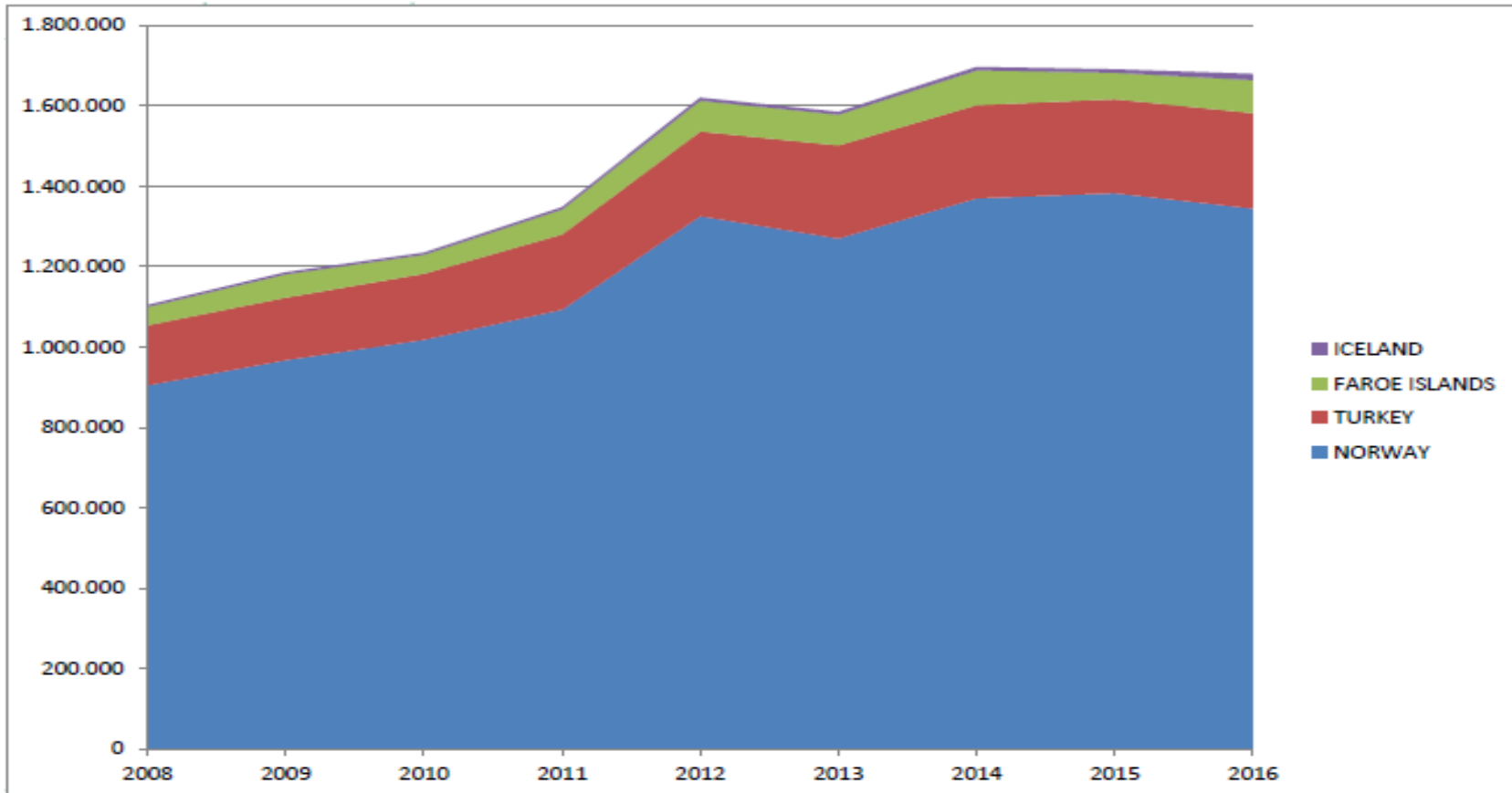
Data from FIGIS



	2015	2016	2017
Grand Total (tonns)	633.667	654.968	693.725

# Development of Fish Farming in non-EU 2008-2017

Data from FIGIS



	2015	2016	2017
Grand Total (tonns)	1.702.986	1.667.754	1.681.619



# FEAP Production Report per Species

The FEAP Production report includes data on the following fish species reared in European aquaculture

- **Atlantic salmon**
- **Rainbow trout [Large (>1.2kg) and portion-size (<1.2kg)]**
- **Halibut and cod**
- **Common carp and other cyprinid species**
- **Catfish species**
- **European eel**
- **Sturgeon and caviar**
- **Sea bass**
- **Sea bream**
- **Sea bass, sea bream juveniles**
- **Turbot, sole and meagre**

It appears from report provided by all contributors that in Europe there is a "constellation" of niche production which includes, Char, perch, pike perch, pike etc for which there are no general production data

What about tilapia?

# Atlantic salmon production (tons) 2008-2017



SPECIES	COUNTRY	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic salmon	NORWAY	751000	799000	870000	941001	1023000	1240000	1195000	1290000	1303346	1233619	1236353
	UTD. KINGDOM	129930	129545	142283	147412	150	162223	162234	163347	172146	163135	189707
	FAROE ISLANDS	22300	38800	51500	45400	60400	76800	76480	86449	80600	83300	86800
	IRELAND	11000	10000	12500	12500	12000	12000	11000	10000	13116	16300	18342
	ICELAND	1158	292	714	1068	1083	2923	3018	3965	3260	8420	11265
	FRANCE	18	0	0	802	700	300	300	300	300	300	300
TOTAL		915406	977637	1076997	1148183	1097333	1494246	1448032	1554061	1572768	1505074	1542767

Niche productions in Switzerland, Denmark (RAS)



# RT production



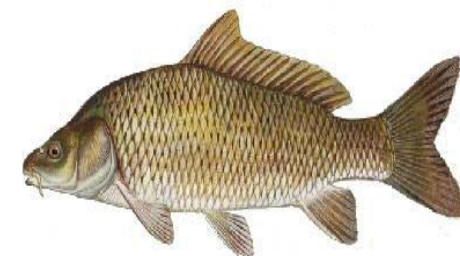
**Portion RT 2016**  
**233.654 t.**

**Large Rainbow Trout 2016**  
**153.954 t.**

Land Area	2015	2016	2017
Europe	177 343	195 246	199 925
	11 740	11 367	11 752
	91 661	105 044	86 276
	103 401	116 412	98 029
Turkey	100 411	99 712	101 761
	6 187	4 643	4 972
<b>Grand total</b>	<b>387 342</b>	<b>416 012</b>	<b>404 687</b>

# Carp production 2008-2017

Include common-, silver- and bighead carp



Land Area	Species	Scientific name	2015	2016	2017
Europe	Bighead carp	Hypophthalmichthys nobilis	6725	6671	8102
	Common carp*	Cyprinus carpio	157766	169412	170936
	Silver carp	Hypophthalmichthys molitrix	42638	57910	56320
<b>Total Europe</b>			207129	233993	235358

\*According to FEAP production is around 50K tonns /year (?)

# Sea bass production (tons) 2008-2017



Land Area	Ocean Area	Environment	Species	Scientific name	2015	2016	2017
Europe	Marine areas	Brackishwater	European seabass	Dicentrarchus labrax	4 103 F	5 448 F	4 823 F
		Marine	European seabass	Dicentrarchus labrax	64 794	75 768	73 407
	<b>Sub-total Marine areas</b>				68 896	81 216	78 231
<b>Total Europe</b>					68 896	81 216	78 231
Turkey	Marine areas	Marine	European seabass	Dicentrarchus labrax	75 164	80 847	99 971
<b>Grand total</b>					144 060	162 063	178 202

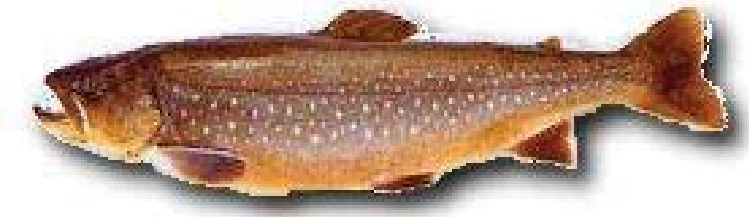
Turkey, Greece, Spain top producers

# Sea bream production (tons) 2008-2017



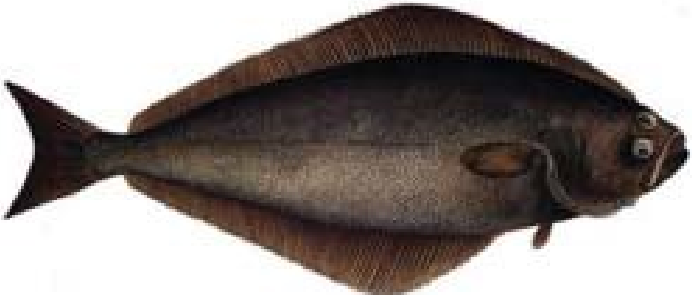
Land Area	Ocean Area Environment	Species	Scientific name	2015	2016	2017	
Europe	Marine areas	Brackishwater	Gilthead seabream	Sparus aurata	3 375 F	3 791 F	3 457 F
		Marine	Gilthead seabream	Sparus aurata	77 972	76 764	89 542
	<b>Sub-total Marine areas</b>				81 346	80 555	92 998
<b>Total Europe</b>				81 346	80 555	92 998	
Turkey	Marine areas	Marine	Gilthead seabream	Sparus aurata	51 844	58 254	61 090
<b>Grand total</b>				133 190	138 809	154 088	

# Arctic Char (6.377 t), Halibut (1.623 t) and Cod (521 t) production 2008-2017

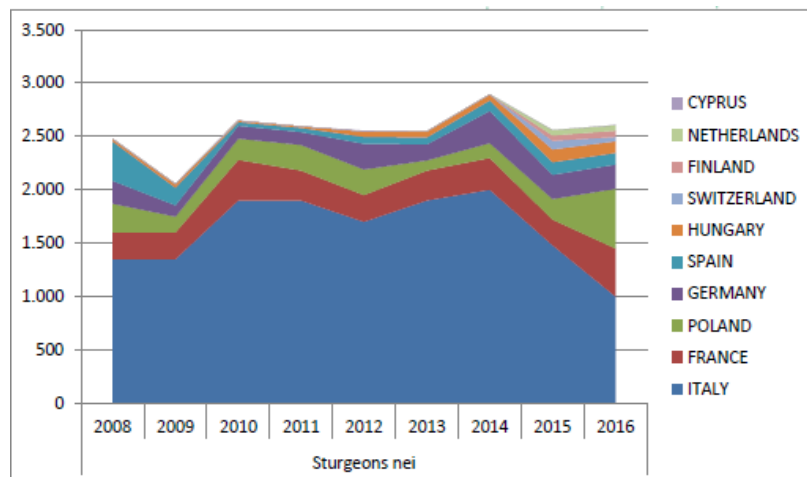


Land Area	2015	2016	2017
	1 653	1 991	1 581
Europe	3 937	4 084	4 454 F
	259	333	341
	4 196	4 417	4 795 F
<b>Total Europe</b>	5 849	6 408	6 377 F
<b>Grand total</b>	5 849	6 408	6 377 F

Land Area	Scientific name	2015	2016	2017
Europe	Gadus morhua	79	509	521
	Hippoglossus hippoglossus	1 299	1 528	1 623
		1 378	2 037	2 144
<b>Grand total</b>		1 378	2 037	2 144



# Sturgeon & caviar production (127 t) 2008-2016



SPECIES	COUNTRY	PRODUCTION (tons)	
		2015	2016
Caviar - Sturgeon	BELG.-LUXBG.	3	3
	FINLAND	4	4
	FRANCE	23	30
	GERMANY	17	15
	HUNGARY	2	3
	ITALY	35	38
	NETHERLANDS	2	2
	POLAND	10	15
	SPAIN	4	6
	BULGARIA	6	7
	LATVIA	2	3
SWITZERLAND	1	1	
<b>Caviar - Sturgeon Total</b>		<b>109</b>	<b>127</b>

Land Area	2015	2016	2017
Europe	6 385	5 324	5 649
Turkey	28	6	13
<b>Grand total</b>	<b>6 413</b>	<b>5 330</b>	<b>5 662</b>



# Eel production 2015-2017



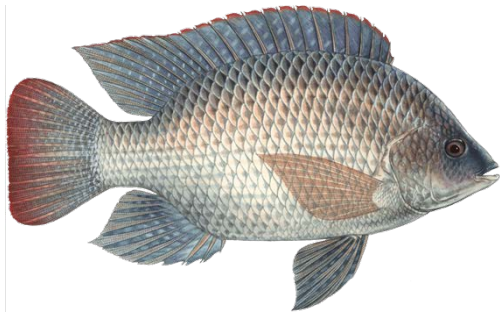
Pike-perch 820 tonns  
in Europe in 2017

Land Area	2015	2016	2017
Europe	5 029 F	5 622 F	5 359 F
	82 F	320 F	300 F
	718	567 F	279 F
	800	887 F	579 F
<b>Total Europe</b>	5 829	6 509 F	5 938 F
<b>Grand total</b>	5 829	6 509 F	5 938 F

# Turbot (11500 t.), sole (1.800 t.) & meagre (7000t) production 2008-2017



Land Area	Species	Scientific name	2015	2016	2017
Europe	Common sole	Solea solea	2	2	1
	Meagre	Argyrosomus regius	49 F	146 F	143 F
	Senegalese sole	Solea senegalensis	2	464	1
	Turbot	Psetta maxima	100 F	100 F	100 F
			153 F	712	244 F
	Common sole	Solea solea	147	9 F	5 F
	Meagre	Argyrosomus regius	2 015	4 653	6 038
	Senegalese sole	Solea senegalensis	1 130	1 047 F	1 817
	Turbot	Psetta maxima	10 094	10 017	11 472
			13 386	15 726	19 333
Turkey	Meagre	Argyrosomus regius	2 801	2 463	697
<b>Grand total</b>			16 340	18 901	20 274



# Is there tilapia production in Europe?



SHORT ANSWER – YES

WHERE ? Germany ,Spain, Sweden and The netherlands report small production of Tilapia

Any health concern regarding this species? Not reported

## REVIEWS IN Aquaculture

*Reviews in Aquaculture*, 1–15

doi: 10.1111/raq.12254

### **Tilapia lake virus: a threat to the global tilapia industry?**

Mona Dverdal Jansen<sup>1</sup> , Ha Thanh Dong<sup>2</sup> and Chadag Vishnumurthy Mohan<sup>3</sup>

<sup>1</sup> Norwegian Veterinary Institute, Oslo, Norway

<sup>2</sup> Department of Microbiology, Faculty of Science, King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, Thailand

<sup>3</sup> WorldFish, Penang, Malaysia

# Cleanerfish production- NOT for food consumption



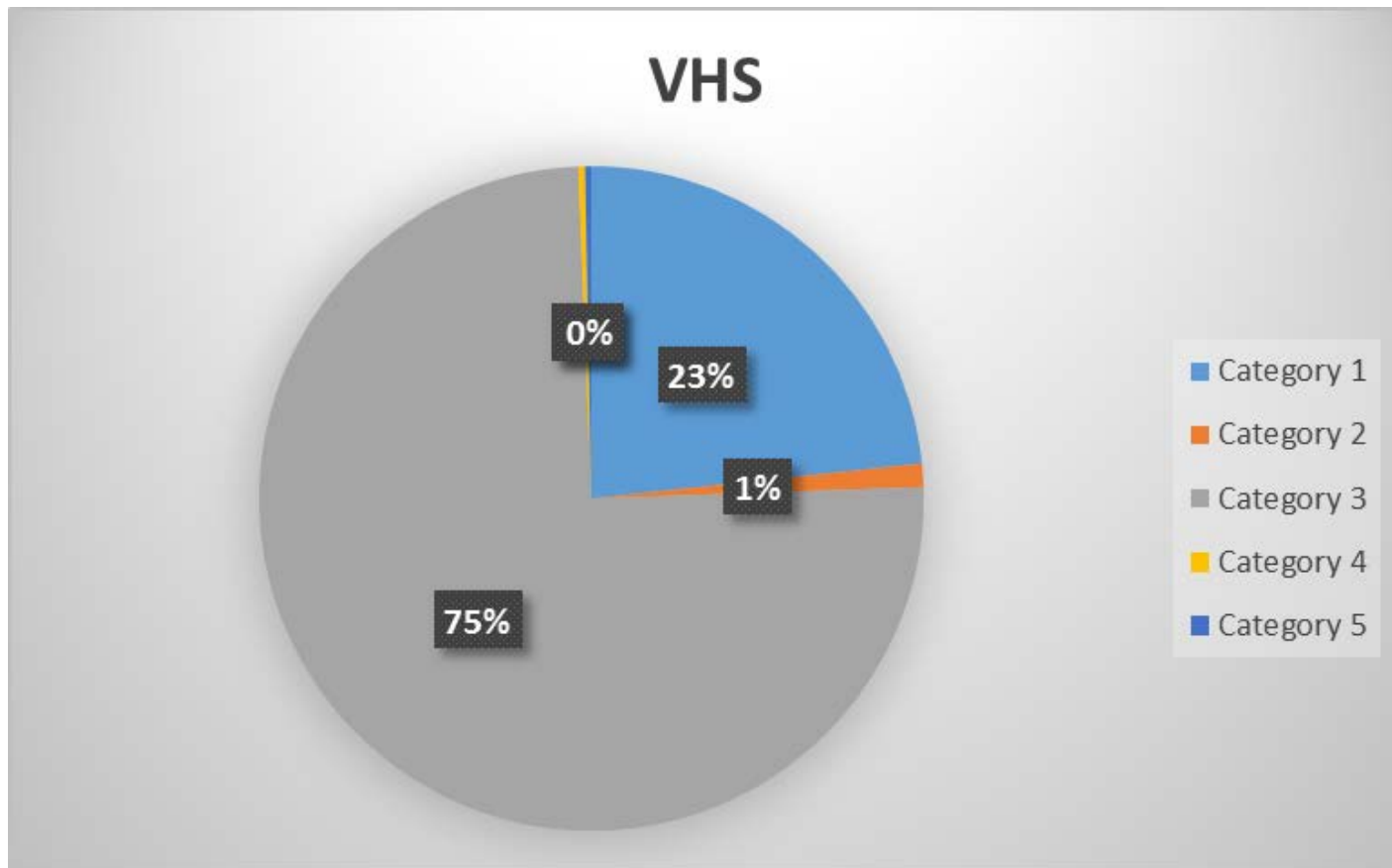
- in Norway 40 million of lumpfish and 1,6 million of Wrasse were produced,
- in Iceland 2,1 million of Lumpfish juveniles produced, and 3,4 million eggs and larve for export,
- In Scotland there were 6 sites producing 26 tonnes of lumpfish in 2017, 925,000 fish Also 4 sites producing 4 tonnes of wrasse with 58,000 fish.

## Health categorization

- Very close to complete data in Europe on the number APB's with species susceptible to the listed diseases in approved zones and compartments
- Raw data in S&D report 2018 Annex 2

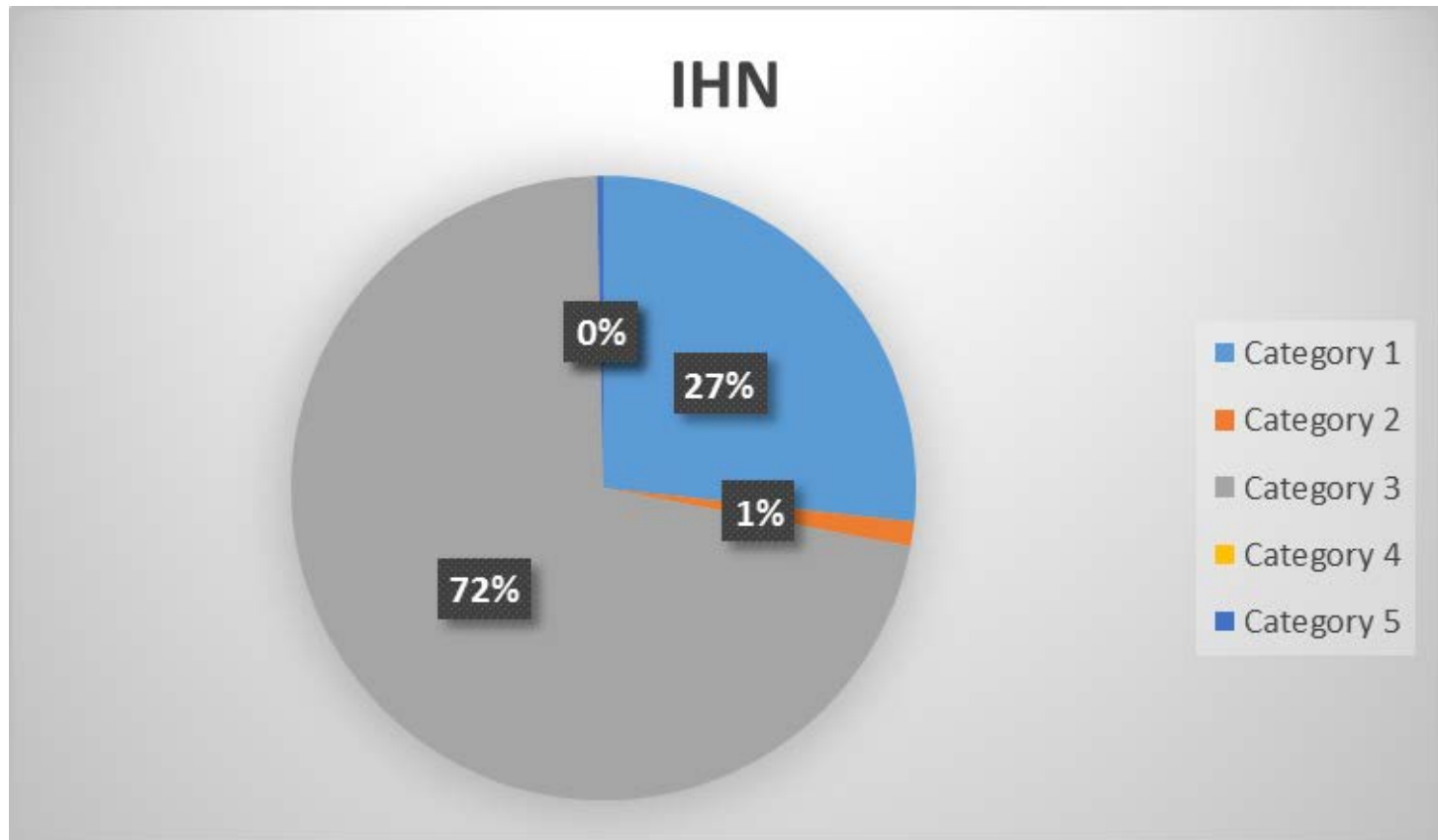
# Distribution of farms in zones and compartments according to category for VHS

Comprising 14317 fish farms



# Distribution of farms in zones and compartments according to category for IHN

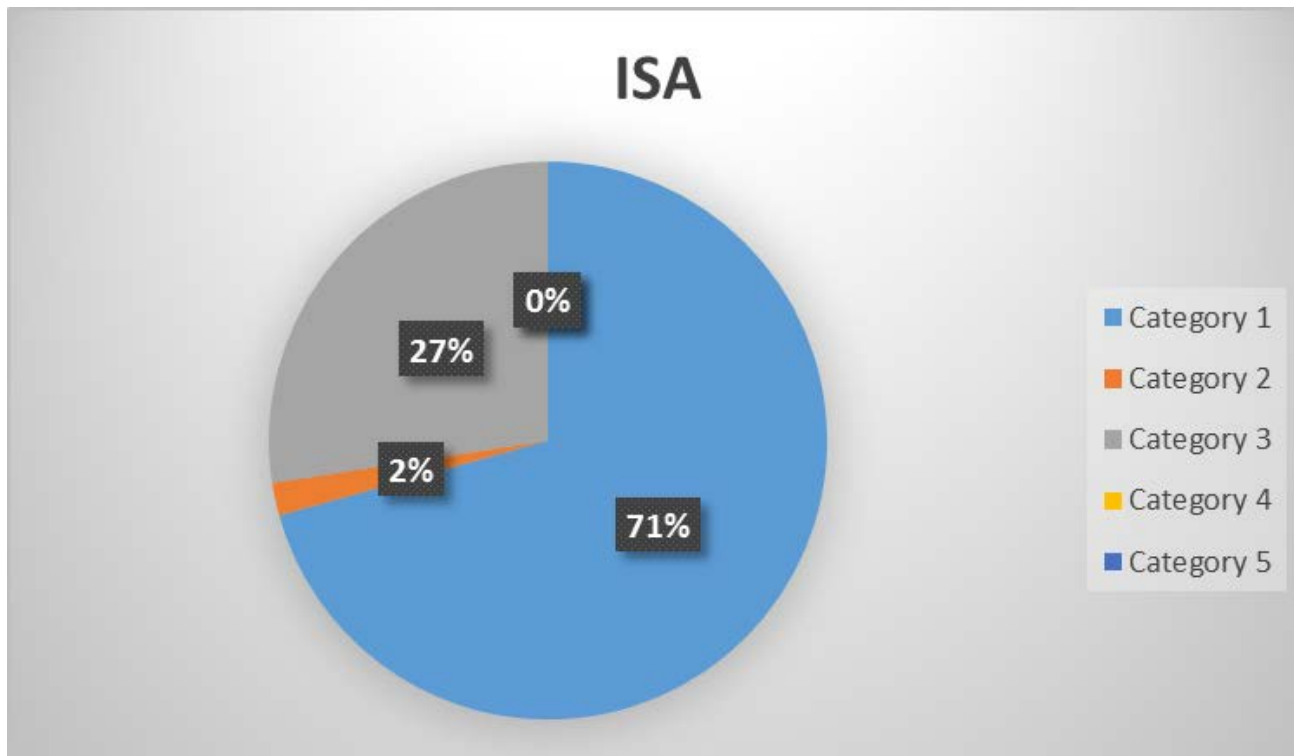
Comprising 12818 fish farms



## Distribution of farms in zones and compartments according to category for ISA

Comprising 6,196 salmonid fish farms

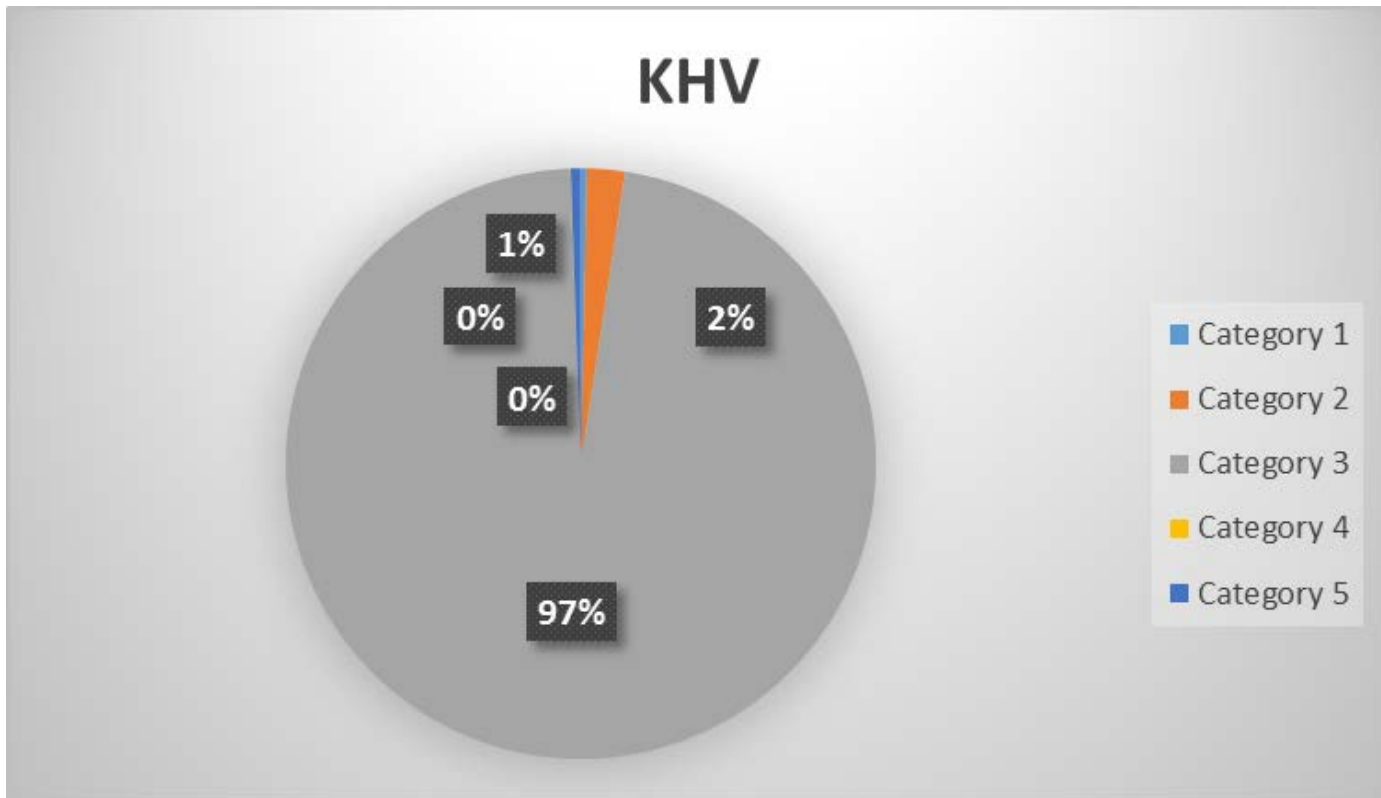
4,402 in Cat.1 and 1,677 in Cat.3





## Distribution of farms in zones and compartments according to category for KHV

Comprising 12,064 cyprinid fish farms  
11,705 in Cat.III and only 39 in cat.I. But 250 farms in control programs Cat II! And 67 farms in Cat V



# Epidemiological data

## Report in the booklet

- Content:
- Introduction and summary
- Reports from the individual countries
- Annex 1: Number of fish farms
- Annex 2: Categorization of farms
- Annex 3: Outbreaks of listed diseases
- Annex 4: Other disease problems
- Annex 5. Laboratory data (follow later)

## Report on Survey and Diagnosis of Fish Diseases in Europe 2018



## VHS in Europe 2018



- 48 VHS outbreaks reported in 2018
- 2 Austria
- 11 Belgium
- 1 Croatia
- 1 Detection in France – No symptoms
- 27 Germany (large variation between Lander)
- 1 new in Italy
- 4 in Poland
- 1 Slovakia

## Belgium VHS control



5 farms have been infected by VHS and have been / are subject to an eradication programme

6 put and take ponds have been infected by VHS and are subject to an eradication programme

Outbreaks of VHS most of the time with very low mortality. Concerning VHS in put and take ponds, the virus has been isolated from fish without any symptoms and mortality.

# France

## VHS control

### Surveillance of VHS

- In 2018, VHSV was detected, without any clinical signs, following epidemiological investigations which had put in evidence a link with another farm where VHS had been detected at the end of 2017. Partial sequencing of G gene showed a perfect identity with the isolate 2017. Despite no mortality was observed at all in the infected farm, a high potential of virulence was put in evidence through an in vivo assay performed on rainbow trout from ANSES hatchery.
- VHSV was detected also in 2 ponds on rainbow trout. Partial sequencing highlighted strong epidemiological link between the various outbreaks, with at least 99% nucleotide identity between isolates.



- Very detailed report on most länders concerning aquaculture production and their health status
- 27 VHS outbreaks, Baden-Württemberg: Overall decrease in VHS/IHN.
- Bavaria: VHS: no changes (2018: 6)
- Hesse: Increase in VHS .
- North Rhine-Westphalia: Significant increase in VHS infected fish farms. A single fish farm has been identified as source. Before this farm could be identified VHSV was transmitted to many previously free farms.
- Rhineland-Palatinate: Decrease in VHS..
- Saarland: increase in VHS (2017: 0, 2018: 2)
- Saxony-Anhalt: decrease in VHS (2017: 3; 2018: 0)



eradication program started in the late '70s for VHS (voluntary). In 1992 voluntary eradication programs in line with the European legislation (91/67/CE) were put in place on a national level. In 2008 the eradication campaigns were further implemented following the EU Council Directive 2006/88/EC.

Despite the long history of implementation of eradication programs, IHNV and VHSV are still persistent in Italy, causing recurrent disease outbreaks. In Italy at present there are 17 VHS and 13 IHN infected farms.



- Poland has 16 VHS free compartments
- In 2018 4 outbreak reported



- Compartment (farm) declared VHS free
- Farm infected with VHS



## IHN in Europe 2018

- 17 IHN outbreaks reported in 2018
- 2 Estonia
- 5 Finland
- 2 France
- 6 Germany
- 1 new in Italy
- 1 Slovenia

## Estonia IHN control

- 1 outbreak- presentation later on

## Finland IHN outbreak

- IHN was diagnosed in Finland for the first time in 2017 in three farms and two put and take ponds. All IHN-positive holding places have been emptied, disinfected and fallowed. Two-year surveillance program has been started or will start this year in the three zones and one compartment.

## France

### IHN control

#### Surveillance of IHN

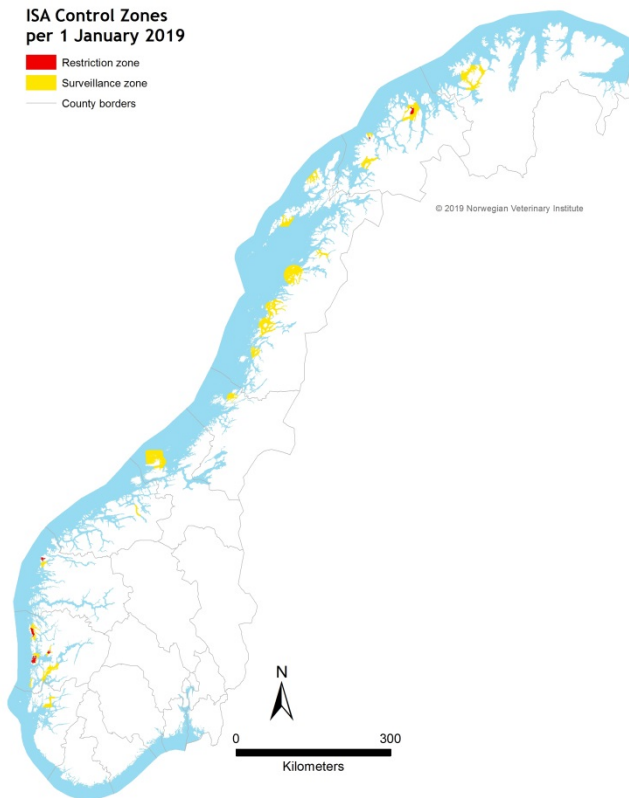
Three outbreaks of IHN were detected through targeted surveillance in 2017 in Normandie. Those detections occurred following mortality event or self-inspection, in one farm regularly declared infected by IHNV, and two others belonging to fish farmers owners of known infected fish. Partial G gene sequencing strengthened results of epidemiological investigations.

## Germany

Baden-Württemberg: Overall decrease in VHS/IHN.  
Bavaria: IHN: slight increase (2017:4; 2018: 6)

# ISA in Europe 2018

- Norway reported 13 new sites with ISAV HPR $\Delta$  (see 2 presentations later)
- 105 detection of ISAV HPR0 in Faroe Islands
- 1 detection if ISAV HPR0 in Denmark (wild broodstock for restocking)
- Isavirus HPR0 no longer listed in EU legislation but is in OIE
- At OIE level different approach from Diagnostic manual and Aquatic Code!



# KHV in Europe 2018



137 outbreaks in 2018

- 4 in Austria
- 2 Czech republic
- 1 Denmark
- 1 France
- 84 in Germany
- 6 Hungary
- 1 Italy
- 1 Lithuania
- 1 Poland
- 1 Romania
- 1 Slovenia
- 2 Sweden
- 31 UK (David Stone will present)
- 1 Switzerland

# Other fish diseases problems in Europe

## Rainbow trout



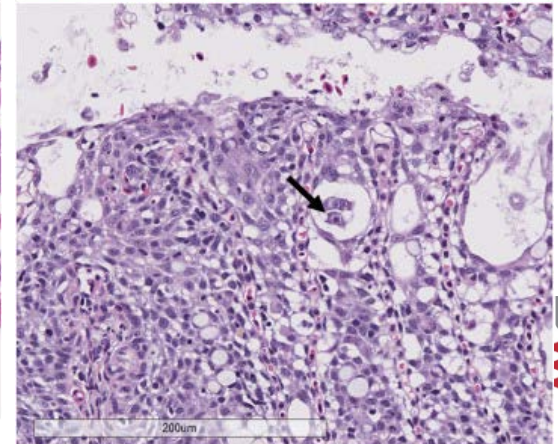
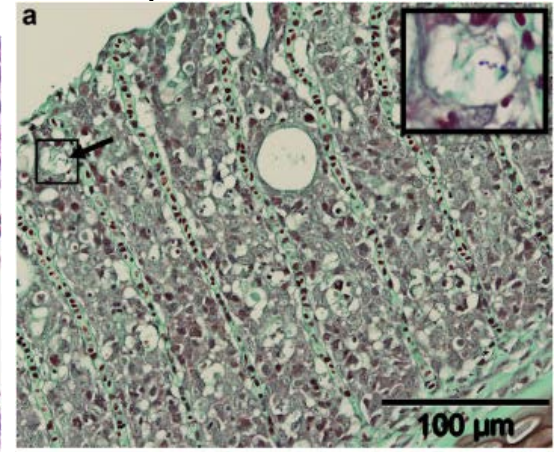
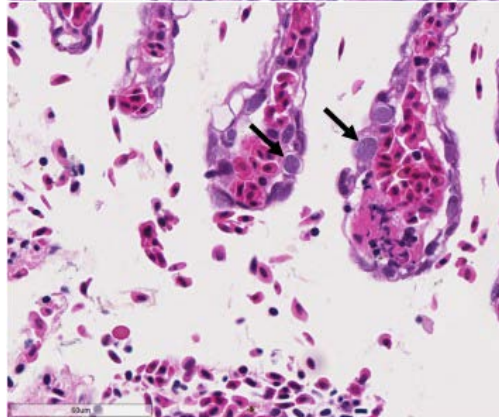
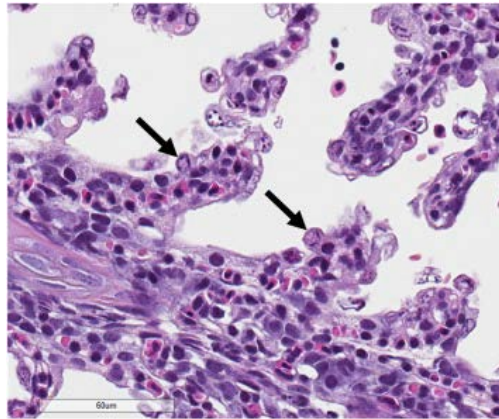
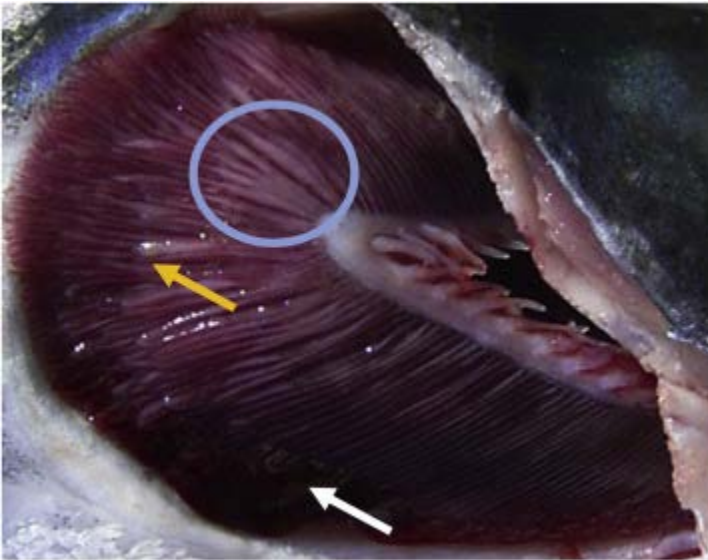
- In **rainbow trout** the major concerns are flavobacteriosis (RTFS), red mark syndrome (Jacob G. Schmidt), puffy skin, enteric redmouth, and infectious pancreatic necrosis but also, lactococcosis, bacterial kidney disease, proliferative kidney disease, new fluke challenges in Scotland (Eann Munro)
- In Denmark findings and disease outbreaks linked to PRV-3 in RAS (Niccolo Vendramin /Juliane Sørensen)

# Other fish diseases problems in Europe

## *Atlantic salmon*



- In **salmon** farming it is sea lice, pancreas disease, heart and skeletal muscle inflammation, cardiomyopathy syndrome (Neil Ruane), amoebic gill disease and CGD complex gill diseases (amoebic gill disease, salmon gill poxvirus, *Paranucleospora theridion* etc..). Ulcers from *Moritella* and *Aeromonas*.

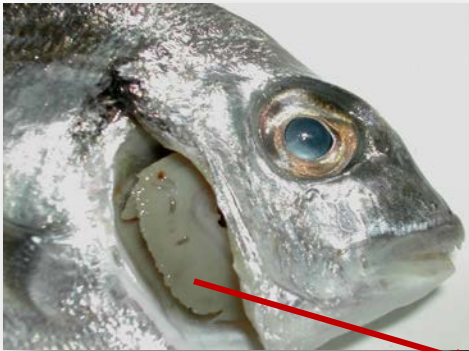


Herrero et al., 2018

# Other fish diseases problems in Europe seabass and seabream



- In **seabass** and **seabream** it is primarily VNN/VER, Tenacibaculosis, *Vibrio harveyi* infection, *Lernathropus kroyeri* infection, Microcotylosis, Sparicotyle sp. and Rash syndrome



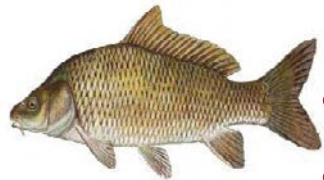
Courtesy of Prof.  
Fioravanti



Photo from C.Zarza



# Other fish diseases problems in Europe carp



- CEV still many new findings especially in Germany, Austria, Lithuania,
- No more SVCV found in Romania
- *Aeromonas hydrophila* infection and high juvenile mortality
- CyHV-II (Goldfish herpes virus) in Goldfish imported from China (Olga Haenen presentation)



# Other fish diseases problems in Europe

## Cleanerfish

- **Mostly reported bacterial infections**  
(v.anguillarum /alivibrio / pasteurellosis / tenacibaculum)
- **Reports of viral infections over the years**
  - VHS outbreak (Scotland genotype III, Iceland genotype IV)
  - Ranavirus detection
  - Nodavirus detection (Anna Toffan presentation)
  - new flavivirus (Norway)
  
  - PMCV – virus responsible of CMS
  
  - 2 new viruses discovered by PharmaqAnalytiq in 2018  
(1 totivirus and 1 coronavirus)

# Conclusion on S&D 2018

- **Stable production in EUROPE**
- **New productions (cleanerfish-increasing)**
- **VHS detection of virus without symptoms (Belgium, France)**
- **IHN detection**
- **13 ISA outbreaks in Norway**
- **>100 outbreaks of KHV (changes in upcoming legislation)**
- **Skin distress are problems for RT, AS, GSB**
- **Complex gill disease increasing importance**

**Thank you for all the significant work, efforts  
and time used for compiling these data!!  
And please use the report!**

**Thank you for  
your attention!**

