

# Report on Survey and Diagnosis of Fish Diseases in Europe 2016

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## Introduction

This report is based on the data from the questionnaire on Survey and Diagnosis of the listed fish diseases in Europe (S&D) for 2016.

The questionnaire, which is collated annually, is the only comprehensive overview of the disease situation in aquaculture in Europe. The information has been made available on the EURL web site ([www.eurl-fish.eu](http://www.eurl-fish.eu)), where all raw data can be obtained. Last year the S&D was changed significantly, where we asked each Member State to write a report and submit it to the EURL together with few questions. This year the same template was submitted but asking only for changes since the previous year in order to avoid duplicating earlier information. The questionnaire comprises 3 parts:

1. General data on aquaculture fish production: Number of fish farms, and the health categorization according to Council Directive 2006/88/EC, and information on national surveillance programmes.
2. Epidemiological data on the disease situation in each Member State with focus on the listed diseases (information on number of outbreaks and increase or decrease in number of infected farms and severity of outbreaks) but also including other diseases of interest.
3. Laboratory data from the NRLs and other laboratories, including the numbers of samples examined, and diagnoses of fish diseases made.

## Production data from FEAP

The data on the European aquaculture production was this year obtained from the [“European aquaculture production report 2007-2015”](#) Prepared by the FEAP secretariat October 2016. Again this year we validated the data against the FIGIS database and concluded that there were no major discrepancies except for the common carp production estimated by FEAP to be only 1/3 of the production data we obtained from FIGIS. The report does not include information on the number of fish farms, and therefore these data were obtained directly in the questionnaire. The report only provides data from back to 2015 as data from 2016 will only be available in autumn 2017. The total fish production in aquaculture in Europe increased again both in 2014 and in 2015 after a decrease in 2013 and is now at 2,359,705 t, the highest level ever. The increase however is almost only due to increases in non-EU Member states. Among the Member states the production has been almost horizontal in the past 10 years with a 30.000 t increase in 2015 to 674,493 t. The Atlantic salmon production, account for 1,57 mill ton against 1.55 mill ton in 2014, and is by far the largest contingency in Europe. The rainbow trout production is again below 400 000 t after steady increases in the previous years. The decrease is due to reduced production of table size rainbow trout, while production of large rainbow trout is increasing. After several years of increased production Turkey have experienced an almost 20% reduction from 2013 to 2015 but are still the largest contributor of table size rainbow trout with > 100 000 t production. The carp production is still mainly in the Eastern part of Continental Europe and is very stable with 57.610 t produced in all. Both the production of sea bream and especially sea bass also increased in the Mediterranean countries with a production of 147.640 t and 158.479 t, respectively. Among other fish species of interest are eel (with 6.266t in 2015 no significant increase since 2010), sturgeon (2.559 t) and caciari with 20% increase from 2014 to 127 t, turbot (decrease from 12.748t to 7.823t in 2013 and increase again to 11.270 in 2015), the cod production have collapsed from 22.729t in 2009 to 78t in 2015. The production of cleaner fish as lumpfish for lice control is increasing significantly but the total production has not been possible to retrieve.

### Health categorization of fish farms:

Many countries provided very clear and correct answers and almost all Member States did reply to the questionnaire when compared to the previous year's providing a rather complete overview of the status of fish health categorization in Europe. This year in all 12.680 farms with susceptible species were included in the questionnaire as categorized while a total of 30.810 fish farms were reported. The number of categorized farms is unfortunately very variable from year to year which more reflects changes in the way of reporting than de-facto changes. There was a significant increase in the reported number of farms in categorized zones and compartments (From 8.505 in 2012 to 14.508 in 2015 for VHS and from 7.360 in 2012 to 12.130 in 2015 for KHV!) this was especially due to Germany who successfully included almost all their farms in categorized zones.

74% of the authorised trout farms in Europe are situated in category III zones for VHS and 70% for IHN, with 23% and 27% respectively in Category I. For both diseases the remaining 3% of the farms are situated in category II, IV or V. In all countries except Norway almost all salmonid farms are in Category I for ISA with 73% in Category I and 27% in category III. Only very few carp farms are approved KHV free in Category I (1%) and almost all are placed in Category III (96%) or in Category II 3%.

There are still several different views on how categorisation shall be performed, e.g. should VHS free marine rainbow trout farms be placed in Category III or I when considering the risk of infection with VHSV from the marine environment?

Commission Decision 2015-1554 provide the guidelines for obtaining disease-free health statuses with regard to ISA and to contain infection with HPR deleted ISAV, saying that detection of Isavirus HPR0 will not compromise the health status of a fish farm and is not notifiable to the EU (in contrast to OIE where detection of ISAV HPR0 is still notifiable). Some Member states do not include small registered APBs in the categorisation (e.g. hobby farms) but according to 2006/88/EC Annex III health categorisation comprise all APBs in the Member states, zones and compartments for each category. Only fish species listed as susceptible for the given listed disease shall be included in the categorization. Therefore important aquaculture species as sea bass, sea bream, meagre, eel and pike-perch are not included in the European health surveillance for specific diseases.

The new Animal Health Law has now been adopted and includes all aquatic animals; in this connection the categorisation system will be simplified and be made more transparent.

### Outbreaks and severity of listed diseases in Europe

Concerning the epidemiological data on the non-exotic diseases a moderate increase in the number of **VHS** infected farms and outbreaks were observed in Belgium (in brook trout farm!), Bavaria (9 new cases), a new outbreak of VHS in Romania and 3 outbreaks in Czech Republic. Decrease in severity observed in Mecklenburg-Western Pomeranian and in Saxony, and only 1 farm positive in Switzerland, no VHSV positive samples were found in Croatia and no other reports of changed severity of VHS was given.

For **IHN** only few reports were given: increase in Saxony with 3 IHNV outbreaks without losses, 1 new IHN outbreak in the Netherlands, no new outbreaks in Croatia.

For **ISA** Norway reported 12 new sites with ISAV HPRΔ and Faroe Islands reported 1 finding of HPRΔ in 2016 without clinical symptoms and with an outbreak in 2017, no other reports on ISA.

Concerning **KHV** Germany reported increases in number of infected farms in Saxony and Rhineland-Palatina. In Ireland and in Lithuania 1 outbreak in garden ponds reported, in the Netherlands 2 outbreaks in open water carps. In England and Wales 33 outbreaks were reported in 2016 (only 11 in 2015). In Croatia KHV was reported from 2 farms and 2 ponds for sport fishing- Croatia have not encountered KHV before.

### Other fish diseases problems in EU

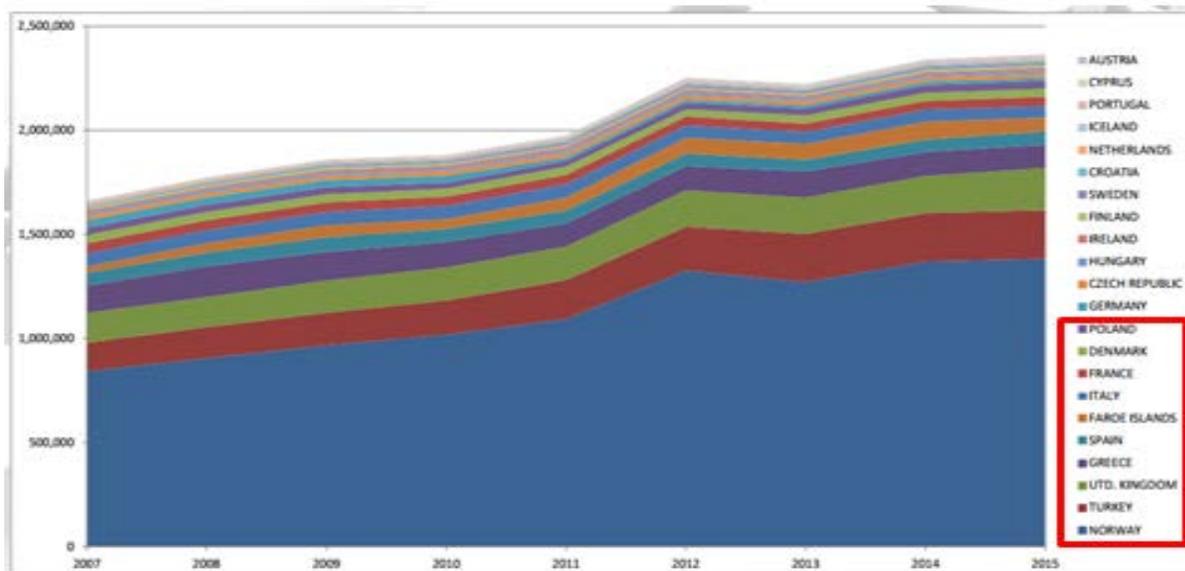
A whole range of other disease problems in 2016 were reported:

- In **rainbow trout** the major concerns are flavobacteriosis (RTFS), red mark syndrome, puffy skin, enteric redmouth, and infectious pancreatic necrosis but also, lactococcosis, bacterial kidney disease, proliferative kidney disease, ichthyophthiriasis, saprolegniosis, columnaris and furunculosis (especially in brown trout).
- In **salmon** farming it is sea lice, pancreatic disease, heart and skeletal muscle inflammation, cardiomyopathy syndrome, amoebic gill disease, and moritella and in addition flavobacteriosis, furunculosis, and saprolegniosis (Baltic salmon). In Norway detection of PRV-om have been made in more than 100 samples.
- In **pike-perch** farming 1 outbreak of perch rhabdovirus with 100% mortality in larvae.
- In **cleaner fish** it is primarily vibriosis and *A. salmonicida* infection giving problems
- In **carp** it is primarily *Aeromonas hydrophila*, SVC (in Romania)
- In **seabass** and **seabream** it is primarily VNN/VER, *Lernathropus kroyeri* infection, Microcotylosis and Rash syndrome

In northern European countries the most common problems in the salmon production are thus sea lice, PD, and AGD, in addition several countries reported finding of Winter Ulcer Disease in salmon caused by *Moritella viscosa*. In continental Europe it is primarily bacterial diseases like ERM and *Aeromonas* infections, AGD and RTFS – but also red mark syndrome is causing severe problems. Parasite infestations as Ich is still a very serious problem especially in view of the foreseen prohibition of use of formalin, while problems in the Mediterranean countries are the same as in continental except for Lactococcosis which is more common in Southern Europe and Nodavirus infection in mariculture which definitely plays an important role and as a bottleneck for especially the seabass production.

There are very large differences between countries on how many samples are tested on cell cultures, ranging from < 100 to several thousands. Annex 5 provide the total number of laboratory examinations conducted in Europe in 2016 on VHSV, IHNV, ISAV, KHV, SVCV, CEV, IPNV, SAV, and Nodavirus, respectively.

## Development of Fish Farming in Europe (tons) 2007-2015



### Reports from the individual European countries

**Austria** 

*Author/Institute:* Oskar Schachner

*Aquaculture production:* No significant changes from 2015

*Health status:* No significant changes from 2015 1x VHSV & IPNV, 5x IPNV detected in case of rainbow trout released into open water

*Other disease problems:* No significant changes from 2015; Inapparent Tetracapsuloides bryosalmonis manifestation at brown trouts and single rainbow trouts in open waters

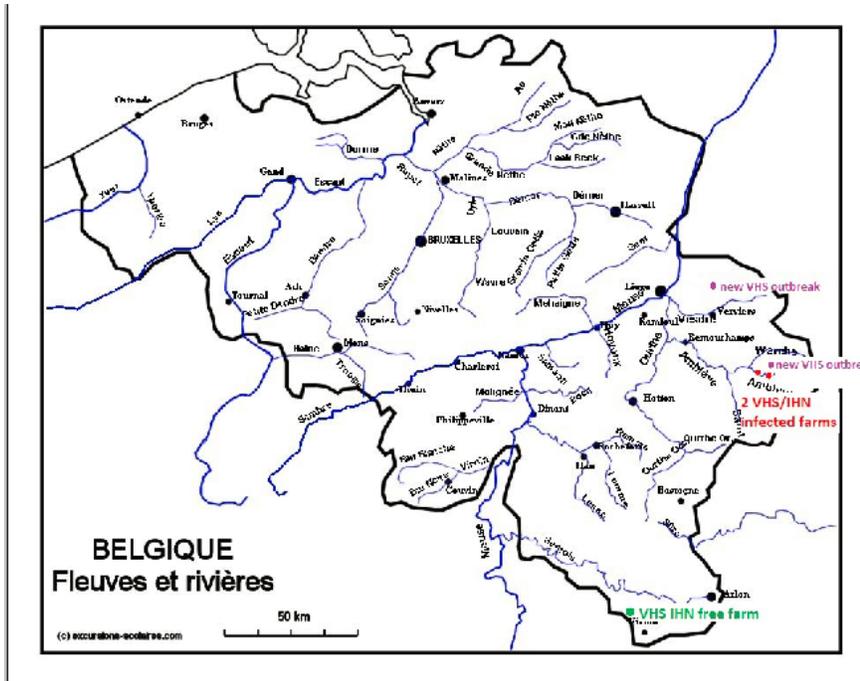
**Belgium** 

*Author/Institute:* CER Groupe, F.Lieffrig

*Aquaculture production:* No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** 3 outbreaks of perch rabdovirus (isolation in our lab by cell cultures and identification par Laurent Bigarré - ANSES Brest) with total mortality of the larvae.



## Bosnia and Herzegovina



**Author/Institute:** T. Eterovic

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

## Bulgaria



**Author/Institute:** No information

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015



**Author/Institute:** CROATIAN VETERINARY INSTITUTE, ZAGREB

**Aquaculture production:** No significant changes from 2015

**Health status:** Until 2016, there were no outbreaks of KHVD. The first one was detected in 2 separated farms and ponds for angling where sport fishermen bought carps from infected farm

**Other disease problems:** No significant changes from 2015



**Author/Institute:** Veterinary Services

**Aquaculture production:** In 2016, there were in operation three marine fish hatcheries, one inland shrimp hatchery/ grow-out unit and nine private offshore cage grow-out units culturing mainly sea bass and sea bream. Additionally, there were in operation seven small fresh water aquaculture units, culturing mainly rainbow trout. The marine hatcheries and the trout farms are operating in land based facilities using tanks and concrete reeways. The shrimp hatchery farm is also operating in Land facilities with earthen lined ponds for the groout outs and tanks for the hatchery. All marine oofshore aquaculture units are loacted on the south of the island and they are uusine marine cage technology. Aquaculture production of table size in 2016 is estimated to reach about 6.500 tons with a value of approximately €35 million. The fry production for 2016 is expected to reach 25 million at a value of approximately € 4,5 million. Additionally, aquaculture provides with a direct full employment to about 350 people and additionally contributes significantly in the creation of employment opportunities to other ancillary occupations. It has to be noted that all aquaculture activities are carried out on an intensive bases. Addtionally we would like to emphasize that the above values of production are based on estimates. Final values for 2016 are expected in the second semester of 2016.

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015



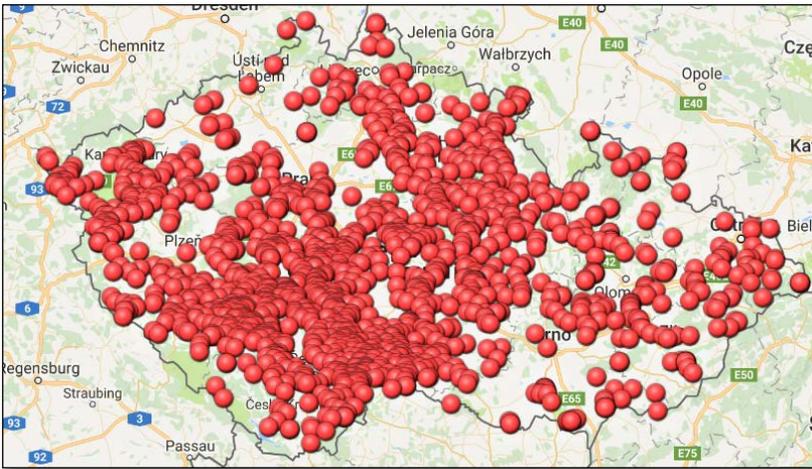
**Author/Institute:** MVDr. Marie Vágnerová/State veterinary administration of the Czech Republic and Tomas Vesely (NRL, CEV note)

**Aquaculture production:** No significant changes from 2015

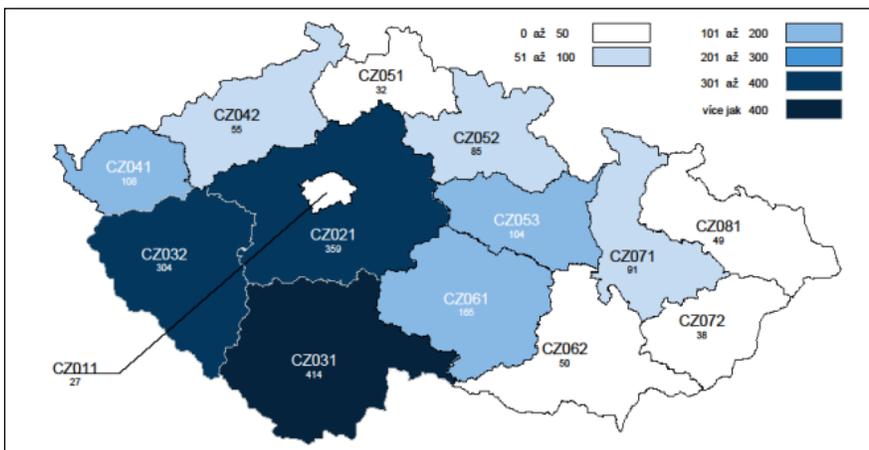
**Health status:** No significant changes from 2015

**Other disease problems:** Confirmation of SVCV in the country in 2016

1. Map of authorised aquaculture production business holdings



2. Authorised aquaculture production business holdings density map



### 3. Number of VHS, IHN, KHV outbreaks from 2008 to 2016

	VHS	IHN	KHV
	Number of outbreaks	Number of outbreaks	Number of outbreaks
2008	3	0	0
2009	0	0	5
2010	2	1	1
2011	1	1	0
2012	0	0	0
2013	5	0	0
2014	12	4	0
2015	1	0	0
2016	3	0	2

### 4. VHS, IHN, KHV outbreaks map from 2008 to 2016



## 5. VHS outbreaks map from 2008 to 2016



## 6. IHN outbreaks map from 2008 to 2016



## 7. KHV outbreaks map from 2008 to 2016



Denmark



**Author/Institute:** Henrik Korsholm DFVA, Niels Jørgen Olesen and Niccolò Vendramin DTU Veterinary

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

## Estonia



**Author/Institute:** Olga Piirik Chief Specialist Animal Health Office Veterinary and Food Board

**Aquaculture production:** There were 32 approved fish farms and 23 crustacean farms in Estonia in 2016 for which the cultivation of aquatic organisms is the principally important activity. There were next fish farms by species and by location actively operated in Estonia in 2016 : 16 rainbow trout farms, two carp farms, two eel farms, five sturgeon farms, two arctic char farms, one European perch farm, one African catfish farm and one state-financed farms for the cultivation of salmonids for restocking. Aquatic organisms were produced in ponds, raceways and recirculation systems. Net pens were used only in fresh water, in a power plant effluent water channel.

**Health status:** Due to the Implementation Measures of National Infectious Animal Disease Control Programmes in 2016 there were 15 fish farms which took part in surveillance for VHS/IHN (14 fish farms in Category II and 1 fish farm in category I), two fish farms took part in surveillance for KHV (category II).

**Other disease problems:** No significant changes from 2015

## Faroe Islands



**Author/Institute:** Debes Christiansen

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other diseases and health related issues:** No significant changes from 2015

## Finland

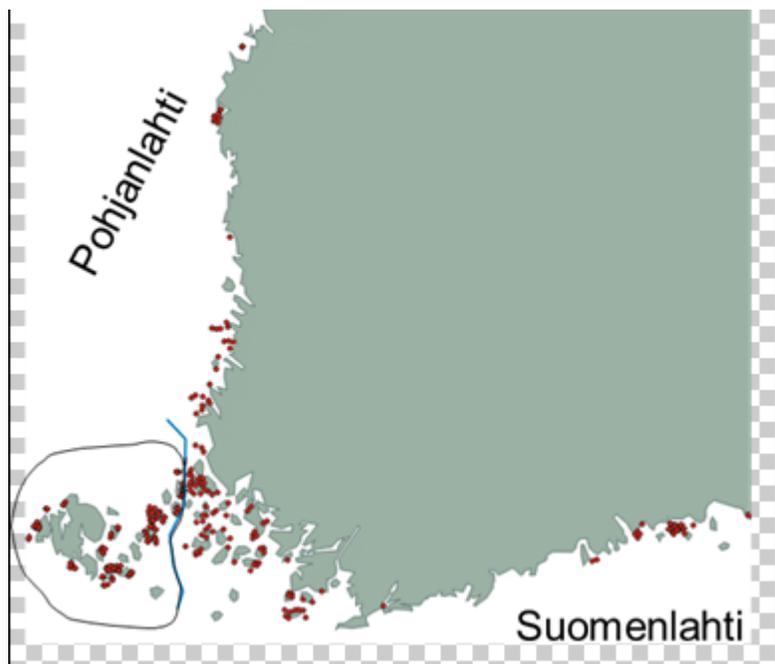


**Author/Institute:** Finnish Food Safety Authority Evira

**Aquaculture production:** Amount of fish farmed for human production has slightly increased and was 14,9 M kg in 2015. This is due to rainbow trout production that increased to 13.9 M kg (90 % of the production) in 2015. National aquaculture strategy aims at strong increase in the production by 2022. Farmers are interested in RAS and offshore techniques to get a (environmental) permit for bigger production amounts.

**Health status:** Continental areas of Finland got a free status for SAV in 2016. SAV is added to the risk based surveillance program.

**Other disease problems:** No significant changes from 2015



**Author/Institute:** ANSES Unité Pathologies Virales des Poissons

**Aquaculture production:** No significant changes from 2015

**Health status:** The following listed fish diseases: VHS, IHN, and KHV are present on French territory, but free-disease zones are recognized, and to achieve or maintain disease-free health status with regard to VHS and IHN, fish farms are subject to surveillance programs.

**Surveillance of VHS**

One outbreak of VHS was reported in 2016 in the framework of outbreak surveillance, in the East of France. It occurred in a farm frequently found as infected by VHSV (previous infections reported in 2011, 2014 and 2015). Partial sequencing of G gene showed a strong identity with the isolate responsible for immediately previous outbreak (99.3%), highly suggesting an epidemiological link. The incriminated farm was not located in a free-disease area. After each confirmed case, the fish farm underwent following, and local veterinarian services try to improve health and sanitary practices. This year, to go further the authorities decided to sample fish in several ponds owned by the same fish farmer in the same area, and analysis on northern pikes were carried out by the NRL. VHSV was detected in one of the 7 ponds where fish were sampled, and sequencing put in evidence a high RNA identity shared with VHSV isolated on rainbow trout from the incriminated fish farm.

**Surveillance of IHN**

One outbreak of IHN was detected through targeted surveillance in 2016, in the Seine-Maritime département. This outbreak was highlighted following self-inspection. The incriminated farm, located in a non-free disease zone, was located

in the same area as another fish farm in which IHNV was detected in 2015.

#### Surveillance of KHV

Two outbreaks of KHV were reported in 2016. This first case occurred in the South of France, in a private pond. The owner had bought the infected Koi in a garden center. One of the providers of that garden center was also affected by high mortality and KHV was detected in several Koi batches. Apparently, this wholesaler had bought those koi in Israel, with, for some of them, a certificate of disease-free status.

The second outbreak occurred in the Middle of France, also in a private pond. This time, the owner had bought Koi from Belgium, those fish being imported first from Japan.

**Other disease problems:** Several outbreaks of Carp Edema Virus (CEV), located in distant French areas, were reported mostly during spring 2016, when temperature increased after winter period. CEV was detected either in Koi carps or common carps. Partial sequencing allowed to distinguish two lineages, related to the infected host (Koi or common carp). Regarding goldfish, Cyprinid Herpesvirus CyHV2 was also detected in several ponds of distinct areas. Several cases of Perch Rhabdoviruses were also reported in the East of France. Sequencing was performed. Epidemiological data collection could bring more information about its prevalence in French fish farming. Eventually, it can be noticed the detection of Betanodaviruses (NNV) in samples of sea bream from a farm located in Brittany. Those sea bream had been imported from Greece, but did not show any clinical signs. Sequencing put in evidence high homology with other strains of NNV isolated in sea bream from Greece (2006) and France (2009), but also in sole from Portugal (2004).

## Germany

**Author/Institute:** Uwe Fischer, FLI

**Aquaculture production:** Bavaria yes: trend to move from rainbow trout to char. Climate change: heat and droughts in summer, low precipitation during winter, heavy rain falls with floodings - difficult to keep carp and salmonids under those circumstances Saxonyyes: closed-circulation systems established for European perch, shrimp (*Litopenaeus vannamei*), tilapia, clarias, pike-perch, red claw crayfish (*Cherax quadricarinatus*), whitefish. Others no

**Health status:** Saxony yes:

surveillance on voluntary basis:

1. program financed by the Saxon Ministry and the Saxon Animal Disease Insurance (except for KHV-D); program includes advice, diagnostics on notifiable diseases and prophylactic measures
2. program on KHV

Others no

**Other disease problems:** Lower Saxony yes: increase in KSD incidence in common carp and koi among all age classes, often with clinical symptoms and high mortality (Vet School Hannover). Saxony-Anhaltinia yes:

1. *Yersinia ruckeri* and *Aeromonas salmonicida* infections single salmonid stocks affected seasonal increased losses  
diagnosis: bacteriology + resistogram • sometimes antibiotic therapy depending on resistogram and disease patterns•  
prophylaxis: immunisation against *Y.ruckeri*

2. PKD: few farms with seasonal high losses in rainbow trout (in 2016 up to 90%). Diagnostics: pathomorphology and histology. No therapy available; One farm temporarily closed in 2017; better hygiene management (PKD status in wild fish unknown) Others no

## Greece

**Author/Institute:** Dr Athanasios Prapas/VETERINARY CENTER OF ATHENS

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

## Hungary

**Author/Institute:** NRL Fish Hungary , NFCSO VDD

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** First detection of CEV by PCR.

## Iceland

**Author/Institute:** Icelandic Food and Veterinary Authority

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

Ireland



**Author/Institute:** Neil Ruane, Marine Institute

**Aquaculture production:** Aquaculture production in Ireland increased in 2016, up to a total of 17,620 tonnes. This is dominated by marine Atlantic salmon production of 16,900 tonnes. Freshwater rainbow trout farming takes place mainly in flow through pond farms and produced around 705 tonnes. Regarding non-salmon species, one perch farm was operational in 2016 and one farm specialising in the production of ornamental fish including koi carp. Total production from these farms was around 15 tonnes.

**Health status:** Ireland has category I status for listed diseases according to council directive 2006/88/EC i.e. ISA, IHN, VHS and KHV. All farms containing susceptible species are sampled on an annual basis. In addition, under commission decision 2010/221/EU Ireland has additional guarantees for BKD, SVC and infection with *Gyrodactylus salaris*. All farms with susceptible species are sampled on an annual basis. Additionally wild Atlantic salmon from 2 - 5 rivers are sampled annually for *G. salaris* surveillance.

**Other disease problems:** Marine Atlantic salmon farming continues to be challenged by sea lice, although anecdotal reports from the farms suggest that the use of cleaner fish has had a positive effect in reducing the burden of sea lice on the fish. 2016 saw an increase of cardiomyopathy syndrome (4 sites), affecting large pre-harvest salmon. AGD occurred on all but one marine site but was managed with regular freshwater treatments. Difficulties are encountered when AGD-affected fish develop pancreas disease (PD was diagnosed on 8 sites) in terms of freshwater treatment survival and attributing causes of mortality. 3 marine salmon sites developed winter ulcer disease and there was one case of furunculosis. Overall marine survival was good in 2016 contributing to the increased production. Freshwater diseases include white spot (ich) in both rainbow trout and Atlantic salmon and rainbow trout fry syndrome. The sole perch farm in operation in 2016 had an outbreak of perch rhabdovirus.

Italy



**Author/Institute:** Arcangeli G.; Toffan A; Manfrin A.; Dalla Pozza A.

**Health status:** No significant changes from 2015

**Health status:** In Italy at present there are 15 VHS and 12 IHN infected farms.

**Other disease problems:** Even in 2016 the main problem for aquaculture was the low water supply (in some farms a 50% reduction of the water inlet was registered). The low availability of water caused an increased seriousness of bacterial diseases and gill problems in rainbow trout farms.



Latvia

**Author/Institute:** Mārtiņš Seržants - Food and Veterinary Service and Mārcis Ziņģis - Institute "BIOR", Aquaculture, research and education center

**Aquaculture production:** Total aquaculture production are about 800 tons per year

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015



Lithuania

**Author/Institute:** State Food and Veterinary Service

**Aquaculture production:** There are fish breeding, aquaculture animal keeping, incubation establishments. The key species that are kept are: the pike, crucian carp, tench, grass carp, wels catfish, European whitefish, sturgeon, African sharptooth catfish, rainbow trout, zander, etc. Fish are farmed in ponds and in private water bodies, closed in farms with recirculating systems.

**Health status;** Lithuania doesn't have health status for listed fish disease according to council directive 2006/88/EC. By order of Director the State Food and Veterinary Service (SFVS) annually adopts an official veterinary monitoring plan for contagious animal diseases with the indication of the numbers of samples to be collected by territorial SFVSs at aquaculture establishments for non-exotic diseases (VHS, IHN, ISA and KHV). Territorial SFVSs regularly check aquaculture establishments, samples are collected in view of the risk of infection and spread of diseases

**Other disease problems:** Establishments perform self-control analyses; virusological, bacteriological and chemical analyses as well as analyses for parasitoses are performed with fish samples at the National Food and Veterinary Risk Assessment Institute.

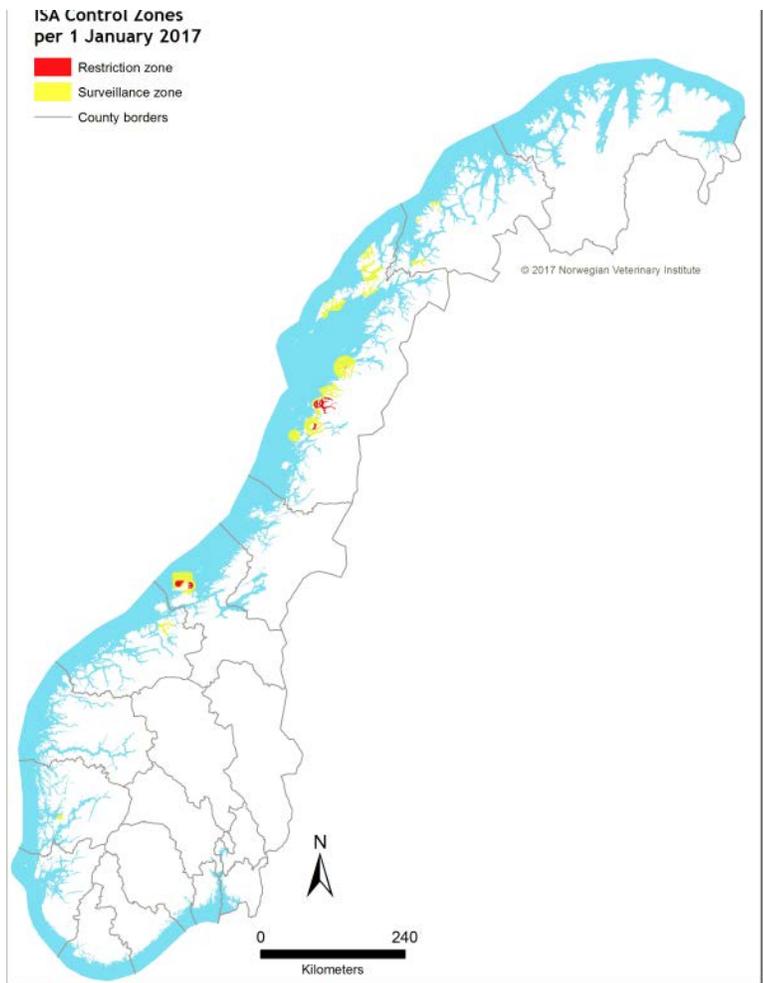


**Author/Institute:** Norwegian Veterinary Institute

**Aquaculture production:** In 2016 there is a 7 % reduction of the salmon production compared with 2015 (1 234 200 tons). The production of lumpsucker has increased 17,5 mill i 2016

**Health status:** No significant changes from 2015

**Other disease problems:** Because of the increased resistance against pharmaceuticals for delicing, the use of mechanical treatments has increased quite a lot. Most of the farmers have succeeded in keeping the number of sealice below the limits in our regulations, but the mortality because of delicing has increased. This is a challenge concerning the fish welfare.



**Author/Institute:** Marek Matras

**Aquaculture production:** In Poland aquaculture production consist from traditional common carp farming and salmonids fish farming. Main produced species in aquaculture are common carp, rainbow trout, cat fish, and sturgeon. Common carp (*Cyprinus carpio*) is the main fish species kept in traditional ponds (about 17.000t, 48% of total production).The most farmed salmonid fish species in Poland is rainbow trout (about 42% of total production and 89% in salmonids production). Salmonids are kept in natural and concrete ponds; few recirculation systems, Common carp mostly in natural ponds.

**Health status:** According to Council directive 2006/88/EC Poland has free health status for ISA and 16 VHS free compartments, 18 IHN free compartments and one KHV free farm, rest of farms have undetermined health status for VHS, IHN a KHV. In 2016 were reported 6 outbreaks of VHS, 8 outbreaks of IHN and 2 outbreaks of KHV. At the national level Poland performs the monitoring for VHS, IHN and KHV

**Other diseases and health related issues:** In 2016, carp edema virus was detected in 14 common carp and koi farms.The presence of the IPNV and SVCV has also been confirmed.



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



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



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



*Author/Institute:*

***Aquaculture production:*** No significant changes from 2015

The Table I describes the number of active fish farms per region (Map I), species and system (July 2016)

**Table I**

Region	Fish farms (2016)					Total n°
	Trout and carp	Marine fishes (sea bass, gilthead seabream)				
		Intensive	Semi-intensive	Extensive	Sole and Turbot *	
	Active	Active	Active	Active		
DSVRN	15	1	1	0	(1)*	17
DSVRC	9	3	18	1	(2)*	31
DSVRLVT	0	0	15	4	0	19
DSVRA	1	1	1	0	0	3
DSVRAIg	0	1	6	0	0	7
Açores	0	0			0	0
Madeira	0	2		1		3
Total	25	55				80

\*Included in the marine fish farms



## CATEGORIZATION OF PORTUGUESE FISH FARMS (March/2017)

FISH (Species)	Disease- free status to (VHS/IHN) (Number of fish farms))
Trout	24
Turbot	3
FISH (Species)	Surveillance Programme (VHS/IHN)(Number of fish farms)
Trout	1
FISH (Species)	Disease- free status to (KHV) (Number of fish farms)
Carp	1

**The whole country is declared disease-free (Category I) to (ISA)**

*Other disease problems:* No significant changes from 2015



*Author/Institute:* Costea Mihaela /Institute for Diagnosis and Animal Health

*Aquaculture production:* No significant changes from 2015 Aquaculture production in Romania consists mainly from salmonid, cyprinid and sturgeon species. In aquacultured species of Salmonids rainbow trout prevails, followed by brown trout. A particularity of Romanian aquaculture is breeding of common carp together with Asiatic species of carp, crucian carp, pike, pikeperch and European catfish. Farming systems for salmonids and sturgeon are both land based system as tanks, with rarely recycling systems in high control enclosed system and water-based systems (cages and pens). For cyprinids are land-based systems with rainfed ponds, irrigated or flow-through systems). Environmental conditions are specific for trout, sturgeon and cyprinids species rearing, as well as for pike, pikeperch and European catfish.

*Health status:* YES, were changes in the health status for one trout farm infected with VHS virus and for one common carp farm infected with KHV. According the Council Directive 2006/88/EC, the health status of fish listed diseases in Romania is category III for VHS, IHN and KHV and category I for ISA, according of Commission Decision 177/2009. For 2016 we had one outbreak with VHS in a trout farm and one outbreak with KHV in a common carp farm, consequently two farms are in category V, one for VHS and one for KHV.

The surveillance of fish listed diseases is based on active surveillance.

Details about who and what have to do relating every fish diseases are mentioned in the Surveillance Program that are approved by National Sanitary Veterinary and Food Safety Authority.

Inspection, examination and sampling of aquatic animals are performed by county veterinary services and samples analyzing for fish listed diseases are carried out by National Reference Laboratory.

**Other disease problems:** No significant changes from 2015 The most frequent diseases in salmonids farms are those that involve the myxobacteria group like RTFS in fry and bacterial gill diseases or cold water diseases in adult stage followed by yersiniosis.

In cyprinids ponds bacterial infection with opportunistic agents are prevalent.

Diagnosis of bacterial diseases are performed by bacteriological exams. Control and prevention measures put in place to mitigate the impact of bacterial diseases on production are: disinfection, reducing of stress from manipulation, decreasing density of population, treatments with antimicrobial substances, optimization of rearing condition .

**Serbia** 

**Author/Institute:** Vladimir Radosavljevic

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

**Slovakia** 

**Author/Institute:** Veterinary and Food institute Dolný Kubín

**Aquaculture production:** No information received in 2017

**Health status:** No information received in 2017

**Other disease problems:** No information received in 2017

**Slovenia** 

**Author/Institute:** Vlasta Jencic / National Veterinary Institute, Veterinary Faculty University of Ljubljana

**Aquaculture production:** No significant changes from 2015

**Health status:** The number of fish farms in the Category I and Category II have significantly increased due to the fact that from 1 January 2019 we will allow repopulation of open waters only from fish farms in Category I.

**Other disease problems:** No significant changes from 2015

## Spain



*Author/Institute:* Pilar Fernández Somalo /Central Veterinary Laboratory (MAGRAMA)

*Aquaculture production:* No significant changes from 2015

*Health status:* No significant changes from 2015

*Other disease problems:* No significant changes from 2015

## Sweden



*Author/Institute:* Charlotte Axén/SVA

*Aquaculture production:* Salmon is "test-farmed" in one saltwater, landbased RAS (otherwise salmon is only used for restocking purposes)

*Health status:* No significant changes from 2015

*Other disease problems:* IPN has been identified in the inland zone. The effects are yet unknown

## Switzerland



*Author/Institute:* Thomas Wahli, Centre for Fish and Wildlife Health

*Aquaculture production:* In Switzerland the main fish species for consumption is rainbow trout in flow through-facilities (spring and riverwater). Few recirculation facilities produce sturgeon, perch and pike perch. There are increasing attempts to set up small scale recirculation facilities for pikeperch production.

*Health status:* No significant changes from 2015

*Other disease problems:* No significant changes from 2015

## The Netherlands



*Author/Institute:* Dr. Olga Haenen, Central Veterinary Institute, part of Wageningen UR

*Aquaculture production:* No significant changes from 2015

*Health status:* No significant changes from 2015

**Other disease problems:** No, the IHN was a single outbreak, and after-checks were negative

## Turkey

**Author/Institute:** Gulnur Kalayci – NRL Turkey

**Aquaculture production:** No significant changes from 2015

**Health status:** No significant changes from 2015

**Other disease problems:** No significant changes from 2015

## England and Wales

**Author/Institute:** Kevin Denham/ Centre for Environment, Fisheries and Aquaculture Science (Cefas)

**Aquaculture production:** Fin fish farming in England and Wales is diverse and dominated by small and medium scale enterprises. The two main sectors in terms of production volume are salmonid species and coarse and ornamental (carp family) fish species.

Rainbow trout *Oncorhynchus mykiss* is the main species of salmonid produced, all of which is currently farmed in freshwater mainly using traditional flow through earth pond, raceway or tank systems. There are a small number of sites that use cage systems suspended in freshwater lakes. Rainbow trout are produced for the table market and for restocking angling waters. There is also a significant production of brown trout *Salmo trutta* mainly for restocking, and a small but increasing production of Arctic char *Salvelinus alpinus* for the table market. A small number of sites produce juvenile Atlantic salmon *Salmo salar* for stock enhancement programmes and for the marine aquaculture industry in Scotland.

The other major sector is the production of coarse fish species primarily for stocking into angling waters and dominated by common carp *Cyprinus carpio* mainly produced in extensive earth ponds. There is some production of other species such as barbel *Barbus barbus*, roach *Rutilus rutilus* and chub *Leuciscus cephalus* for stocking angling waters, and a small production of common carp for the table. The main species of ornamental fish produced are goldfish *Carassius auratus* and koi carp *Cyprinus carpio* in a mixture of earth ponds and intensive indoor and outdoor tank systems.

The use of cleaner fish as a biological control for sea lice in marine salmon farming in Scotland has resulted in a demand for lumpsucker *Cyclopterus lumpus* and several species of wrasse, *Labridae*. Three fish farms have been established for the production of cleaner fish. Concerns have been expressed about over-exploitation of wild populations of wrasse for use in aquaculture in England.

**Health status:** England and Wales are recognized as being free from the major listed diseases IHN, VHS and ISA.

As far as KHV disease is concerned the aquaculture sector appears to be largely free from this disease. However outbreaks of KHV disease occur in common carp in managed fisheries when water temperatures are conducive to the expression of clinical disease. In 2016 there were 33 outbreaks of KHV disease in managed fisheries in England. All infected fisheries are subject to statutory controls.

In addition England and Wales are free from the diseases gyrodactylosis caused by *Gyrodactylus salaris*, and spring viraemia of carp (SVC) which are controlled under Article 43 of Council Directive 2006/88/EC.

Each aquaculture production business (APB) in England and Wales is subject to a minimum of an annual compliance and disease surveillance inspection by the official service, the Cefas Fish Health Inspectorate. APB's that farm mixed species (e.g. salmonids and carp) receive additional disease surveillance inspections at a time appropriate to the clinical expression of the diseases subject to control. Surveillance programmes are risk based and APB's that are assessed as higher risk or have poor statutory compliance are subject to a higher level of surveillance. Passive surveillance systems have also been implemented through veterinarians, fish farmers, fish health consultants and fishery managers.

An active targeted surveillance programme for listed diseases and diseases controlled under Article 43 measures is in place for imported live fish. There were no instances of the detection of listed diseases in fish sampled under the import surveillance programme in 2016.

**Other disease problems:** In recent years the major disease concerns in rainbow trout and brown trout farming in England and Wales have been associated with two skin diseases of unknown aetiology, red mark syndrome (RMS) and puffy skin disease (PSD).

Both of these conditions have emerged in the past 10 years or so, have separate and distinct clinical expression, cause low mortality in affected fish but are of considerable economic importance as a result of unsightly lesions causing rejection at processing (or in fish for restocking), and culling of affected animals. Earlier studies study found RMS reported in 41 % and PSD in 37% of rainbow trout farms. The conditions generally become evident in partially grown fish and those near harvesting. Antibiotic therapies can reduce the incidence of RMS in farmed trout but use is complicated by the long withdrawal periods. RMS can spontaneously resolve in older fish, but PSD tends to be more persistent and has been recorded in fish stocked into managed fisheries from affected farms. An epidemiological study is underway in England and Wales to investigate the current incidence of both conditions and identify potential causative agents.

Other diseases that are recognized by fish health professionals as important in rainbow trout production in England and Wales are rainbow trout fry syndrome (RTFS), caused by the bacterium *Flavobacterium psychrophilum*; white spot disease, caused by the ectoparasite *Ichthyophthirius multifiliis*; enteric redmouth disease (ERM), caused by the bacterium *Yersinia ruckeri*; proliferative kidney disease caused by the myxozoan parasite *Tetracapsuloides bryosalmonae* and bacterial gill disease (BGD) caused by *Flavobacterium* spp. Restrictions on the availability of treatments, including the limited availability of antibiotics and vaccines, and potential further constraints on the use of formalin are of major concern to the salmonid farming sector.

In addition furunculosis caused by *Aeromonas salmonicida* is re-emerging in brown trout farming due to the absence of a suitable vaccine.

Following the establishment of fish farms producing cleaner fish for use in the biological control of sea lice, studies are underway into the diseases of lumpsucker and wrasse species. The microsporidian *Nucleospora cyclopteri* appears to be a widespread problem in lumpsucker. Wild caught wrasse are susceptible to infection with various *Vibrio* sp. when held in captivity.

In carp production the major concerns are ectoparasitic infestations such as white spot *Ichthyophthirius multifiliis*, and costia *Ichthyobodo necator*, and the emergence of viral conditions which primarily affect carp in managed fisheries such as carp edema-like virus and the cyprinid herpesviruses. The FHI provides advice on the application of biosecurity measures risk mitigation to reduce the spread of these diseases.

## Northern Ireland



**Author/Institute:** Donna Lyons

**Aquaculture production:** No significant change. In 2015, the aquaculture sector in Northern Ireland produced over 1,100 metric tonnes of finfish, valued at £4.3 million. There are 41 authorised fin fish farms, in Northern Ireland covering 39 inland and 2 marine sites. There has been no new aquaculture production businesses authorized in 2016. The main species cultivated are rainbow trout (*Oncorhynchus mykiss*) produced for the table market and for restocking angling waters. There is also a significant production of Atlantic salmon (*Salmo salar*). Brown trout (*Salmo trutta*) and carp (*Cyprinus carpio*), mainly for restocking, are also produced.

**Health status:** No significant changes from 2015. Northern Ireland has a high fish health status and is declared disease free from a number of listed diseases, including freedom from VHS, IHN, ISA and KHV. A surveillance programme, which includes annual disease testing from fish farms and wild stocks, routine inspection of fish imports by the Fish Health Inspectorate (FHI) and an annual inspection of fish farms by the FHI is implemented.

**Other disease problems:** No significant changes from 2015 There are currently no other diseases or health related issues affecting or challenging the aquaculture industry in Northern Ireland.

## UK – Scotland



**Author/Institute:** Marine Scotland Science

**Aquaculture production:** There are 24 businesses operating 45 active sites for the production of rainbow trout. In 2015, 8,588 tonnes of rainbow trout were produced, 8,033 tonnes for the table market and 555 tonnes for restocking angling waters. Of the 45 active sites 30 sites reported production in 2015. Freshwater production accounted for 3,910 tonnes and seawater production the remaining 4,678 tonnes. Freshwater production was from sites operating cages, ponds, raceways, tanks and hatcheries and seawater production was all from cage site facilities. Over 12 million ova were laid down to hatch in 2015 with 11 million being imported from foreign sources while the remaining 1 million were from Scotland or other GB based fish farms.

Over 44.5 million Atlantic salmon smolts were produced by 25 businesses operating 87 active sites. The principal types of facility used for the production of smolts in freshwater are cages (38 sites) or tanks and raceways (49 sites). Within the tanks and raceways bracket there are also two recirculation units currently in operation. Over 68 million ova were laid down to hatch with 61 million of these ova coming from foreign sources.

In 2015, the total production of Atlantic salmon was 171,722 tonnes. These fish were produced by 16 businesses operating 254 active sites. Fish production of 171,543 tonnes was from the seawater cage sites (250 sites) while 179 tonnes of production was reported from the seawater tank sites (4 sites) currently in

operation. Most seawater tank capacity has been re-deployed for the production of other species or salmon broodstock.

As well as Atlantic salmon and rainbow trout the Scottish aquaculture industry also produces a small quantity of brown/sea trout, halibut, lumpsuckers and wrasse.

Species Farmed	Number of Businesses	Number of active Sites	Production (Tonnage)
Sea/Brown Trout	14	18	42
Halibut	2	3	56
Lumpsucker	4	4	6
Wrasse	3	4	3

Lumpsuckers and wrasse are produced for use as biological controls for parasites in the marine Atlantic salmon farming industry. There was also very small amounts of Arctic charr, brook charr, carp, sheepshead minnow, tiger trout and turbot produced in Scotland. In 2015 all trout production took place in freshwater tanks, ponds and raceways although in previous years small amounts were produced in seawater cages. Halibut, wrasse and lumpsuckers are mainly produced in seawater tank sites with one seawater cage site carrying out halibut production.

**Health status:** No significant changes from 2015

**Other disease problems:** Update to other diseases currently challenging the aquaculture industry. Sea lice (*Lepeophtheirus salmonis*) - Atlantic salmon (all seawater stages). Still main issue in seawater. On site monitoring by farm staff. Prophylactic treatments or as required when level rise above the suggested criteria for treatment (bath treatments, in-feed, mechanical removal using brushes, water jets, heated water and freshwater baths). Many sites using cleaner fish (wrasse and lumpsuckers). Complex gill issues - Atlantic salmon (all seawater stages). Some seawater sites are experiencing complex gill issues which also impact on treatments for sea lice as gill health is compromised. Fish are affected by multiple pathogens at the same time such as amoebic gill disease, salmon gill poxvirus, *Paranucleospora theridion* etc.

## Annex 1 Number of fish Farms

<b>Total Number of fish farms authorized or active in 2016</b> <b>Only farms/sites that were active in 2016 or part of 2016 are included</b>			
Albania		Italy	791
Austria	233 ?	Kosovos	
Belgium	112	Latvia	160
Bosnia and Herzegovina	70	Lithuania	20
Bulgaria	535	Netherlands	102
Croatia	90	Northern Ireland	41
Cyprus	19	Norway	1067 licenses for salmonids, with 799 active sea sites, and 189 hatchery licenses. 69 sites for marine species at sea sites and 60 hatchery-licensis.
Czech Republic	1713	Poland	4074
Denmark	228	Portugal	
England and Wales	281	Rep. of Macedonia	
Estonia	32 authorized fish farms (22 active in 2016)	Romania	676
Faroe Islands	35	Scotland	420
Finland	575	Serbia	107
France	1750 (including 705 fish farms authorized)	Slovakia	
Germany	14.626	Slovenia	233 salmonid and 85 cyprinid farms
Greece	410	Spain	282
Hungary	224	Sweden	170
Iceland	53	Switzerland	360 (Estimate, no official numbers available)
Ireland	58	Turkey	Total number of marine and freshwater fish farms were 2377
<b>Total</b>			<b>30026</b>

## Annex 2: Number of farms in country placed in the respective categories according to listed diseases

	Number of farms in country placed in the respective categories according to listed diseases																				Number of farms not in any category
	Category I Declared disease-free				Category II Subject to a surveillance programme				Category III Not known to be infected but not subject to surveillance programme for achieving disease free status				Category IV Known to be infected but subject to an eradication programme				Category V Known to be infected. Subject to minimum control measures				
	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	
<i>Austria</i>	10	10	0	0	1	1	0	0	0	0	0	0	0	0	0	0	3	2	1	1	0
<i>Belgium</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0
<i>Bulgaria</i>	11	30	30	104	0	0	0	0	67	48	48	0	0	0	0	0	0	0	0	0	0
<i>Cyprus</i>	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
<i>Czech Republic</i>	0	0	227	0	0	0	0	0	1065	195	0	1568	0	0	0	0	3	0	0	2	15
<i>Denmark</i>	198	228	228	0	0	0	0	0	30	0	0	6	0	0	0	0	0	0	0	0	7
<i>Estonia</i>	1	1	15	0	15	15	0	2	2	2	0	0	0	0	0	0	0	0	0	0	9
<i>Finland</i>	454	253	269	0	0	0	0	0	0	0	0	24	33	0	0	0	0	0	0	0	0
<i>France</i>	276	280	0	0	50	47	0	0	479	478	0	328	0	0	0	0	4	3	0	2	0
<i>Germany</i>	175	160	1351	3	168	163	0	129	6946	6620	162	4904	0	0	0	0	23	4	0	34	112
<i>Greece</i>	0	0	62	0	0	0	0	0	62	62	0	7	0	0	0	0	0	0	0	0	341

	Number of farms in country placed in the respective categories according to listed diseases																				Number of farms not in any category
	Category I Declared disease-free				Category II Subject to a surveillance programme				Category III Not known to be infected but not subject to surveillance programme for achieving disease free status				Category IV Known to be infected but subject to an eradication programme				Category V Known to be infected. Subject to minimum control measures				
	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	
<i>Hungary</i>	0	0	0	0	0	0	0	190	18	18	0	0	0	0	0	0	0	0	0	0	7
<i>Ireland</i>	14	54	54	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
<i>Italy</i>	179	173	512		8	8	0	0	340	321	0	105	0	0	0	0	12	12	0	0	182
<i>Latvia</i>	0	0	0	0	0	0	0	0	80	80	0	80	0	0	0	0	0	0	0	0	30
<i>Lithuania</i>	18	18	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Netherlands</i>	0	0	0	0	0	0	0	0	66	66	66	1	0	0	0	0	0	0	0	0	35
<i>Poland</i>	16	18	0	1	0	0	0	0	564	560	0	3465	0	0	0	0	6	8	0	2	20
<i>Portugal</i>	27	27	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Romania</i>	0	0	109	0	0	0	0	0	184	112	0	456	0	0	0	0	1	0	0	1	22
<i>Slovakia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Slovenia</i>	16	16	0	0	18	18	0	0	0	0	0	0	0	0	0	0	5	18	0	13	0
<i>Spain</i>	131	112	131	0	0	0	0	0	17	13	0	0	0	0	0	0	0	0	0	0	134

	Number of farms in country placed in the respective categories according to listed diseases																				Number of farms not in any category
	Category I Declared disease-free				Category II Subject to a surveillance programme				Category III Not known to be infected but not subject to surveillance programme for achieving disease free status				Category IV Known to be infected but subject to an eradication programme				Category V Known to be infected. Subject to minimum control measures				
	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	
<i>Sweden</i>	168	168	168	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>England and Wales</i>	0	165	0	2	0	0	0	0	0	0	0	118	0	0	0	0	0	0	0	0	12
<i>Scotland</i>	74	360	363	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1
<i>Northern Ireland</i>	37	37	37	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Croatia</i>	0	0	0	0	20	19	0	0	0	0	23	0	0	0	0	2	3	4	0	0	45
<i>Turkey</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Albania</i>																					
<i>Bosnia and Herzegovina</i>	0	0	0	0	35	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>Iceland</i>	4	27	3	0	0	0	0	0	23	0	24	0	0	0	0	0	0	0	0	0	26
<i>Norway</i>	1117	1117	49	0	0	0	0	0	1068	0	0	0	0	0	0	0	0	0	0	0	0
<i>Switzerland</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Faroe Islands</i>	1	1	0	0	34	34	35	0	0	0	0	0	0	0	0	0	0	0	1	0	0

	Number of farms in country placed in the respective categories according to listed diseases																				Number of farms not in any category
	Category I Declared disease-free				Category II Subject to a surveillance programme				Category III Not known to be infected but not subject to surveillance programme for achieving disease free status				Category IV Known to be infected but subject to an eradication programme				Category V Known to be infected. Subject to minimum control measures				
	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	VHS	IHN	ISA	KHV	
<i>Kosovos</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Serbia</i>	0	0	0	0	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rep. of Macedonia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	2936	3264	3608	120	<b>2.776</b>	<b>359</b>	<b>35</b>	<b>321</b>	<b>9.943</b>	<b>8.575</b>	<b>323</b>	<b>11.065</b>	<b>33</b>	-	-	<b>2</b>	<b>63</b>	<b>53</b>	<b>2</b>	<b>55</b>	<b>1.014</b>

### Annex 3 Outbreaks of listed diseases

COUNTRY	2.1 Number of outbreaks				2.2 Is there a general increase or decrease in the severity of infections with listed diseases compared to previous years? If yes please specify:	2.3 Is there an increase or decrease in the number of fish farms infected with listed diseases compared to previous years? Yes/No If yes please specify:
	VHS	IHN	KHV	ISA		
<b>Austria</b>	6	0	1	0	no	no
<b>Belgium</b>	2	0	2	0	2 new outbreaks of VHS. One site has been eradicated. The other one, located in the Flamish part of the country has not been eradicated. 2 KHV outbreaks in Hobbyists Grand Duché Luxembourg	One VHS outbreak in brook trout (Salvelinus fontinalis)
<b>Bulgaria</b>	NO	NO	NO	NO	NO	NO
<b>Cyprus</b>	0	0	0	0	0	0
<b>Czech Republic</b>	3	0	2	0	"In comparison to the previous year there is slight increase in the number of VHS outbreak. One outbreak was detected in 2015. In 2016 we confirm 3 outbreaks. After six years without occurrence we confirmed two KHV outbreaks in quite large carp ponds.	
<b>Denmark</b>	"	no				
<b>Estonia</b>	0	0	1	0	no	no
<b>Finland</b>	0	0	0	0	No.	No.
<b>France</b>	0	0	0	0	No	No

COUNTRY	2.1 Number of outbreaks				2.2 Is there a general increase or decrease in the severity of infections with listed diseases compared to previous years? If yes please specify:	2.3 Is there an increase or decrease in the number of fish farms infected with listed diseases compared to previous years? Yes/No If yes please specify:
	VHS	IHN	KHV	ISA		
<b>Germany</b>					"Baden-Württemberg: decline in disease incidence Bavaria: increase in VHS infections (9 in 2016) Mecklenburg-Western Pomerania: decline in disease incidence, no notifiable diseases in 2016 Lower Saxony: no VHS between 2013 and 2015. In 2016 one VHS outbreak, however no VHS in contact farms. Decrease in KHV incidence. Rhineland-Palatina: some increase in KHVD, no other notifiable disease. Saxony: some increase in KHVD; increase in IHN; some decrease in VHS	" Saxony: 3 IHN outbreaks without losses"
<b>Greece</b>	0	0	0	0	NO	NO
<b>Hungary</b>	0	0	4	0	No	No
<b>Ireland</b>	0	0	1	0	No change. KHV was diagnosed in an enclosed garden pond which is not part of the official surveillance programme. All fish were culled and pond drained.	No change.
<b>Italy</b>	1	0	0	0	0	0
<b>Latvia</b>	0	0	0	0	No	No
<b>Lithuania</b>	0	0	1	0	No one of fish farm was found to be infected. One case of KHV has been found in the private pond used for fishing purposes.	One case of KHV has been found in the private pond used for fishing purposes.
<b>Netherlands</b>	0	1	5	0	We had a new, single IHN outbreak. In 2011 we had had the previous IHN outbreak. Furthermore, 2 KHV outbreaks in wild carp, which occurs now and then. x positive: 2 outbreaks in open water in carp; 3 koi batches positive from 40 in closed facilities	Slight increase: IHNV (1x), KHV in wild carp (2x)

COUNTRY	2.1 Number of outbreaks				2.2 Is there a general increase or decrease in the severity of infections with listed diseases compared to previous years? If yes please specify:	2.3 Is there an increase or decrease in the number of fish farms infected with listed diseases compared to previous years? Yes/No If yes please specify:
	VHS	IHN	KHV	ISA		
<b>Poland</b>	6	8	2	0	Decrease in the number of fish farms infected with VHS, increase in the number of farms infected with IHN, number of fish farms infected with KHV same as in previous year.	no
<b>Portugal</b>	0	0	0	0	No	No
<b>Romania</b>	1	0	4	0	YES We had one outbreak with VHS and four outbreaks with KHV (three in garden koi carp ponds and one in a common carp farm)"	
<b>Slovakia</b>						
<b>Slovenia</b>	none	1	none	none	No	No
<b>Spain</b>	0	0	0	0	NO	NO
<b>Sweden</b>	0	0	0	0	No	no
<b>England and Wales</b>	0	0	35	0	No change	Overall there has been an increase in cases of KHV disease in managed fisheries with 33 outbreaks in 2016 (as compared with 11 cases in 2015). Prolonged environmental conditions conducive to expression of KHV disease is thought to have contributed to the increased number of outbreaks. The aquaculture sector remains essentially free from KHV disease. Reported disease events in the salmonid sector has shown a decline over previous years.
<b>Scotland</b>	0	0	0	0	No change	No change

COUNTRY	2.1 Number of outbreaks				2.2 Is there a general increase or decrease in the severity of infections with listed diseases compared to previous years? If yes please specify:	2.3 Is there an increase or decrease in the number of fish farms infected with listed diseases compared to previous years? Yes/No If yes please specify:
	VHS	IHN	KHV	ISA		
<b>Northern Ireland</b>	0	0	0	0	No change - no disease outbreaks	No change - no disease outbreaks.
<b>Croatia</b>	0	0	4	0	There is an increase in number of outbreaks compared to last year; two outbreaks of KHV in the fish farms and also two outbreaks in the ponds governed by sports fishermen. At the other hand, there were no positive samples of IHNV and VHSV on the rainbow trout farms during 2016.	Increase; so far as there were no KHV outbreaks in Croatia in previous year, now we are faced also with this problem.
<b>Turkey</b>	0	0	0	0	No	No
<b>Albania</b>	Nd	Nd	Nd	Nd	Nd	Nd
<b>Bosnia and Herzegovina</b>	0	0	0	0	No	No
<b>Iceland</b>	0	0	0	0	NO	NO
<b>Norway</b>	0	0	N/A	12	No farms with susceptible species for KHV in the country.	0
<b>Switzerland</b>	0	0	0	0	Yes, in 2015 there was one farm with VHSV and 2 farms with IHNV. KHV is not a notifiable disease in Switzerland. Further Switzerland is considered as ISA-free. IPN, a notifiable disease in Switzerland, was found in one farm. Fish did not display any symptoms nor mortality.	As no VHS nor IHN cases were detected, this question can not be answered.
<b>Serbia</b>	0	0	0	0	No	No
<b>Faroe Island</b>	0	0	0	0	One farm was tested ISAV-HPRdel positive by qPCR summer 2016. No increased mortality or clinical signs of ISA. Despite intensive surveillance and testing we were not able to confirm the ISA suspicion in 2016. However the ISA outbreak was confirmed in mars 2017.	NO

COUNTRY	2.1 Number of outbreaks				2.2 Is there a general increase or decrease in the severity of infections with listed diseases compared to previous years? If yes please specify:	2.3 Is there an increase or decrease in the number of fish farms infected with listed diseases compared to previous years? Yes/No If yes please specify:
	VHS	IHN	KHV	ISA		
<b>Rep. of Macedonia</b>	Nd	Nd	Nd	Nd	Nd	Nd

## Annex 4 Other Fish diseases problems

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	disease or symptoms	Fish species	disease or symptoms	Fish species	symptoms	Fish species	disease or symptoms
Austria	brown trout, char	furunculosis	stocked rainbow trout	PKD	0	0	0	0
Belgium	Pike perch	Outbreaks of perch rhabdovirus (identificat° L. Bigarré, Brest)	0	0	0	100 % mortality of the larvae	0	0
Bulgaria	RAINBOW TROUT	IPN	0	Yersinia ruckeri ; Renibacterium salmoninarum	CARP	Aeromonas hydrophila	0	0
Cyprus	<i>Seriola dumerili</i> and <i>Siganus rivulatus</i>	VNN (Nodavirus)	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0
Estonia	No.	0	0	0	0	0	0	0
Finland	rainbow trout	RTFS, columnaris, IPN, saprolegniosis	lake trout, sea trout, salmon	flavobacteria, atypical furunculosis, saprolegniosis	whitefish	parasites, saprolegniosis, edwardsiellosis, Pseudomonas sp.	0	0
France	0	0	0	0	0	0	0	0

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	disease or symptoms	Fish species	disease or symptoms	Fish species	symptoms	Fish species	disease or symptoms
Germany	rainbow trout/salmonids	"Flavo/RTFS (hatcheries)	Germany	rainbow trout/salmonids	"Flavo/RTFS (hatcheries)	Germany	rainbow trout/salmonids	"Flavo/RTFS (hatcheries)
Greece	Seabass	VNN/VER	Seabass	Lernathropus kroyeri infestation	Seabream	Microcotylosis	Seabream	Rash syndrome
Hungary	0	0	0	0	0	0	0	0
Ireland	Atlantic salmon	AGD, Pancreas disease, Cardiomyopathy syndrome	Lumpfish	Pseudomonas anguilliseptica, AGD	0	0	0	0
Italy	0	0	0	0	0	0	0	0
Latvia	Cyprinidae	Aeromonosis	Salmonidae	Aeromonosis	Acipenseridae	Aeromonosis	Coregonidae, Percidae	Aeromonosis
Lithuania	0	0	0	0	0	0	0	0
Netherlands	please see below	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0
Portugal	N/A	N/A	0	0	0	0	0	0
Romania	rainbow trout	yersiniosis, furunculosis	rainbow trout	myxobacteriosis	rainbow trout	IPN	common carp	SVC

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	disease or symptoms	Fish species	disease or symptoms	Fish species	symptoms	Fish species	disease or symptoms
Slovakia	Carp	0	Eel	0	Flatfish	0	Sea bream / Sea bass	0
Slovenia	salmonids	Furunculosis and other Aeromonas infections, RTFS	carp	parasites, Aeromonas infections	0	0	0	0
Spain	Sea bass	Nodavirus	0	0	0	0	0	0
Sweden	Arctic char, RT	BKD	RT	RTFS	0	0	0	0
England and Wales	rainbow trout	red mark syndrome	rainbow trout	puffy skin disease	Atlantic salmon/sea trout	Saprolegnia	0	0
Scotland	Atlantic salmon	As listed in 3.2. Also sea lice and complex gill issues	Rainbow trout	As listed in 3.2.	Wrasse	As listed in 3.2.	0	0
Northern Ireland	N/A	No known diseases.	0	0	0	0	0	0
Croatia	RTFS	swollen abdomen due to ascites, enlarged spleen	Carp erythrodermatitis	skin lesions from hemorrhages to deep ulceration	Red mark syndrome	reddening on the skin, lesions of different size	0	0
Turkey	Rainbowtrout	IPNV	0	0	0	0	0	0

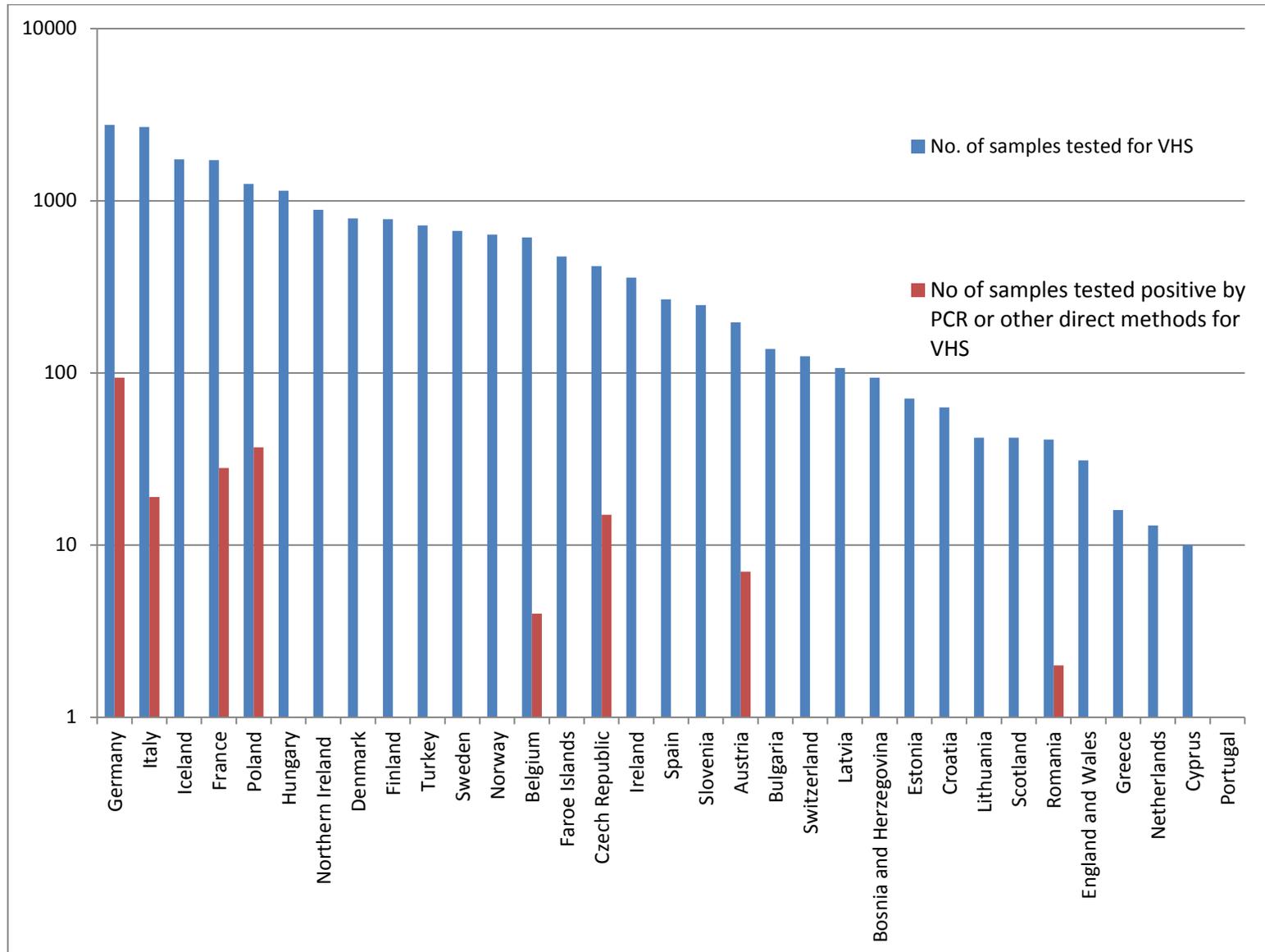
COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	disease or symptoms	Fish species	disease or symptoms	Fish species	symptoms	Fish species	disease or symptoms
Albania	0	0	0	0	0	0	0	0
Bosnia and Herzegovina	0	0	0	0	0	0	0	0
Iceland	Atl. salmon (Salmo salar) and Arctic charr (Salvelinus alpinus)	3 outbreaks of BKD in 2016; all smoltfarms with some connection to the wild environment.	0	0	0	0	0	0
Norway	Atlantic Salmon	Pancreas disease, heart- and skeletal muscle disease, cardiomyopathy syndrome	Rainbow trout	Pancreas disease	Lumpsucker	Bacterial infections, skin ulcers	0	0
Switzerland	Rainbow trout	RTFS, bacterial gill disease	Brown and rainbow trout	Ichthyobodo-infections	0	0	0	0
Faroe Islands	brown trout, char	furunculosis	stocked rainbow trout	PKD	0	0	0	0
Kosovos	brown trout, char	furunculosis	stocked rainbow trout	PKD	0	0	0	0
Serbia	Rainbow trout	IPN	0	0	Cyprinus carpio	motile aeromonad septicaemia	Rainbow trout	BKD

## Annex 5 Laboratory data

### No. of samples tested for VHSV in EUROPE in 2016

Country	No. of samples tested for VHS	No of samples tested positive by PCR or other direct methods for VHS
Germany	2757	94
Italy	2678	19
Iceland	1739	
France	1721	28
Poland	1253	37
Hungary	1143	
Northern Ireland	885	
Denmark	790	
Finland	781	
Turkey	720	
Sweden	667	1
Norway	636	
Belgium	612	4
Faroe Islands	474	
Czech Republic	417	15
Ireland	357	
Spain	268	
Slovenia	248	
Austria	197	7
Bulgaria	138	
Switzerland	125	
Latvia	107	
Bosnia and Herzegovina	94	
Estonia	71	
Croatia	63	
Lithuania	42	
Scotland	42	
Romania	41	2
England and Wales	31	
Greece	16	
Netherlands	13	

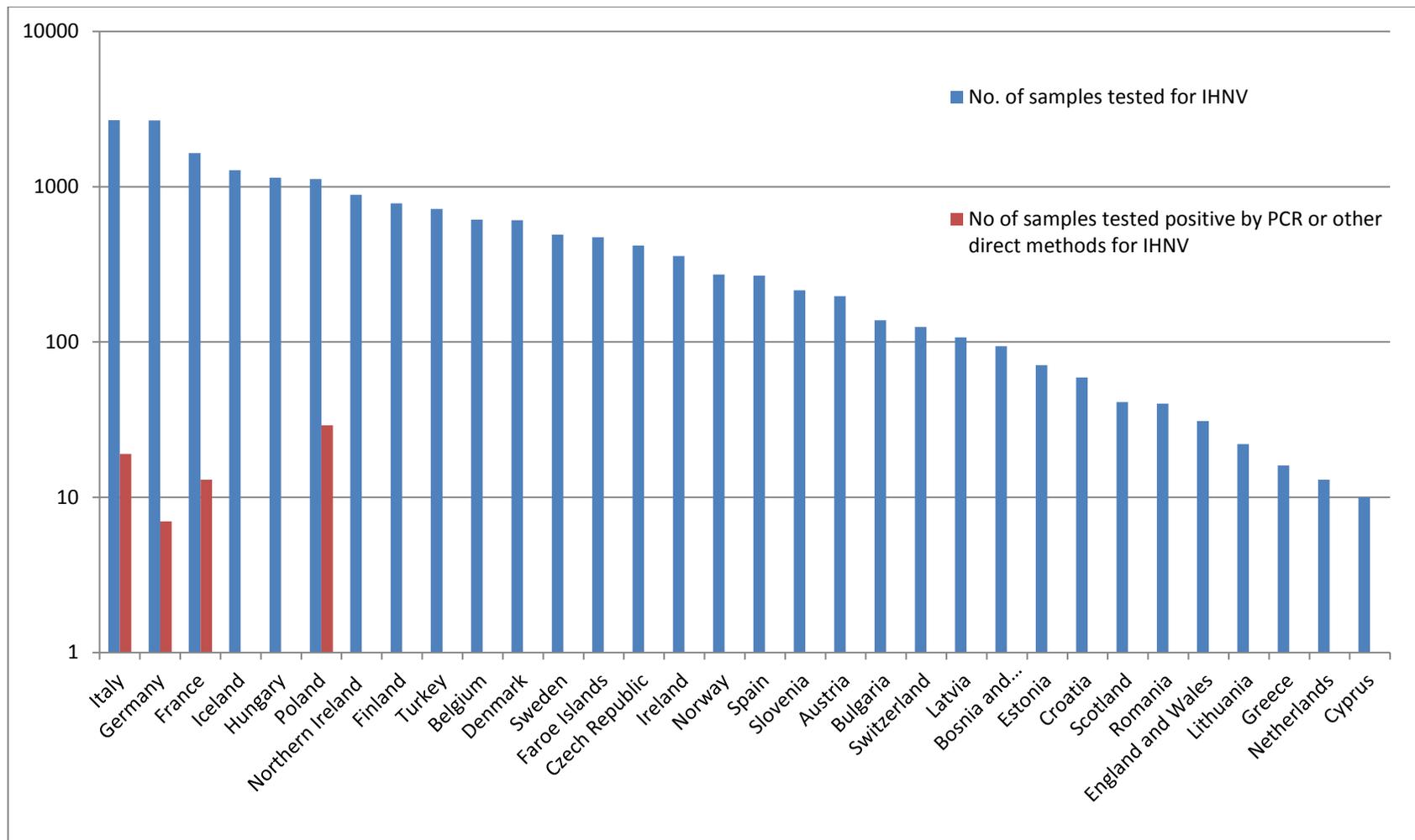
Cyprus	10	
Portugal		
Slovakia	N/A	N/A
Kosovos	N/A	N/A
Albania	N/A	N/A
Rep. of Macedonia	N/A	N/A



## No. of samples tested for IHNV in EUROPE in 2016

Country	No. of samples tested for IHNV	No of samples tested positive by PCR or other direct methods for IHNV
Italy	2678	19
Germany	2676	7
France	1644	13
Iceland	1277	
Hungary	1143	
Poland	1121	29
Northern Ireland	885	
Finland	781	
Turkey	720	
Belgium	612	
Denmark	608	
Sweden	492	
Faroe Islands	472	
Czech Republic	417	
Ireland	357	
Norway	272	
Spain	268	
Slovenia	215	1
Austria	197	
Bulgaria	138	
Switzerland	125	
Latvia	107	
Bosnia and Herzegovina	94	
Estonia	71	
Croatia	59	
Scotland	41	
Romania	40	
England and Wales	31	
Lithuania	22	
Greece	16	
Netherlands	13	1
Cyprus	10	
Portugal	0	0
Slovakia	N/A	N/A

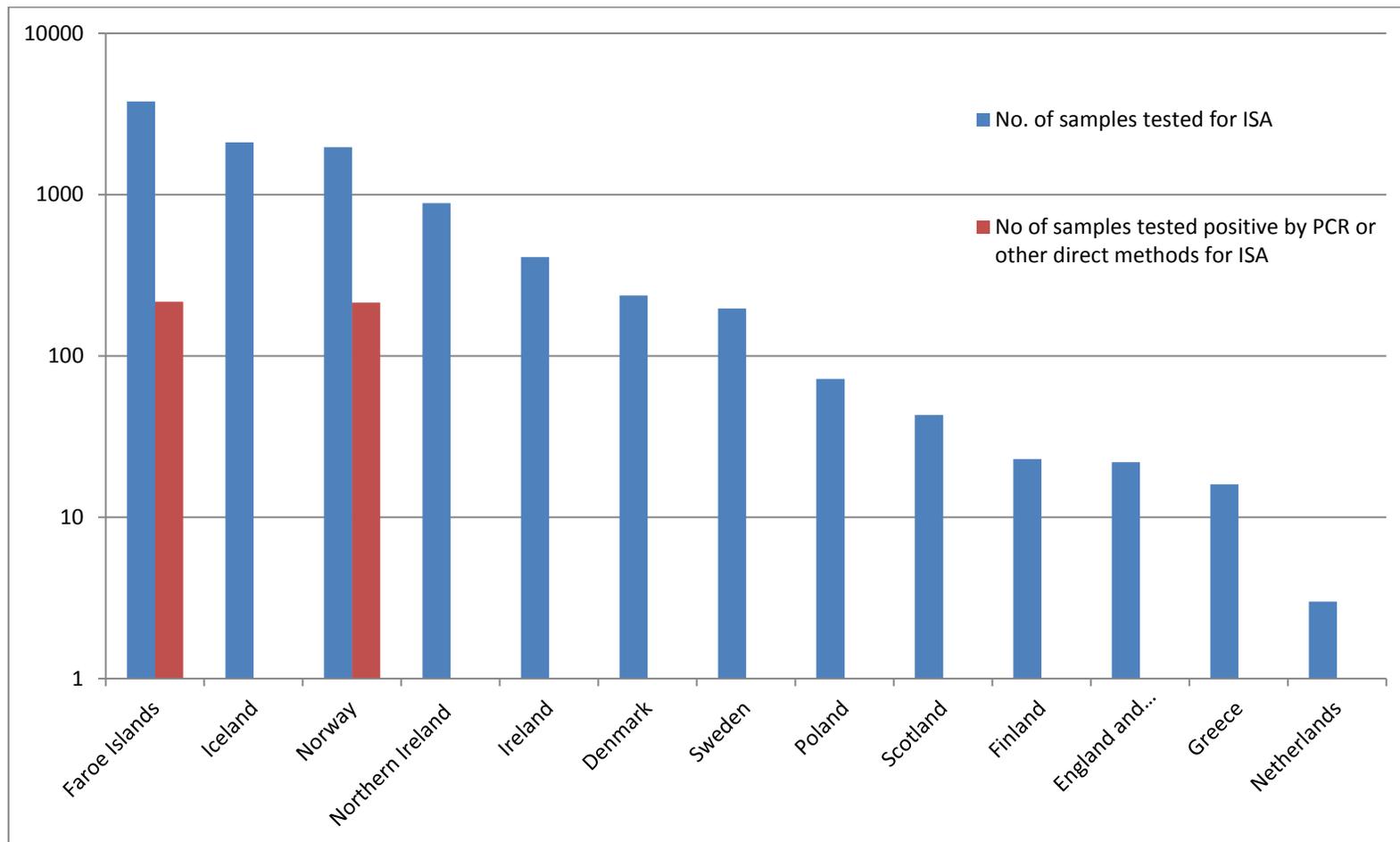
Kosovos	N/A	N/A
Albania	N/A	N/A



## No. of samples tested for ISAV in EUROPE in 2016

Country	No. of samples tested for ISA	No of samples tested positive by PCR or other direct methods for ISA
Faroe Islands	3783	217
Iceland	2112	
Norway	1970	214
Northern Ireland	885	
Ireland	410	
Denmark	237	
Sweden	197	
Poland	72	
Scotland	43	
Finland	23	
England and Wales	22	
Greece	16	
Netherlands	3	
Austria		
Belgium		
Bulgaria		
Cyprus		
Czech Republic		
Estonia		
France		
Germany		
Hungary		
Italy		
Latvia		
Lithuania		
Portugal		
Romania		
Slovakia		
Slovenia		
Spain		
Croatia		
Turkey		
Bosnia and Herzegovina		
Switzerland		

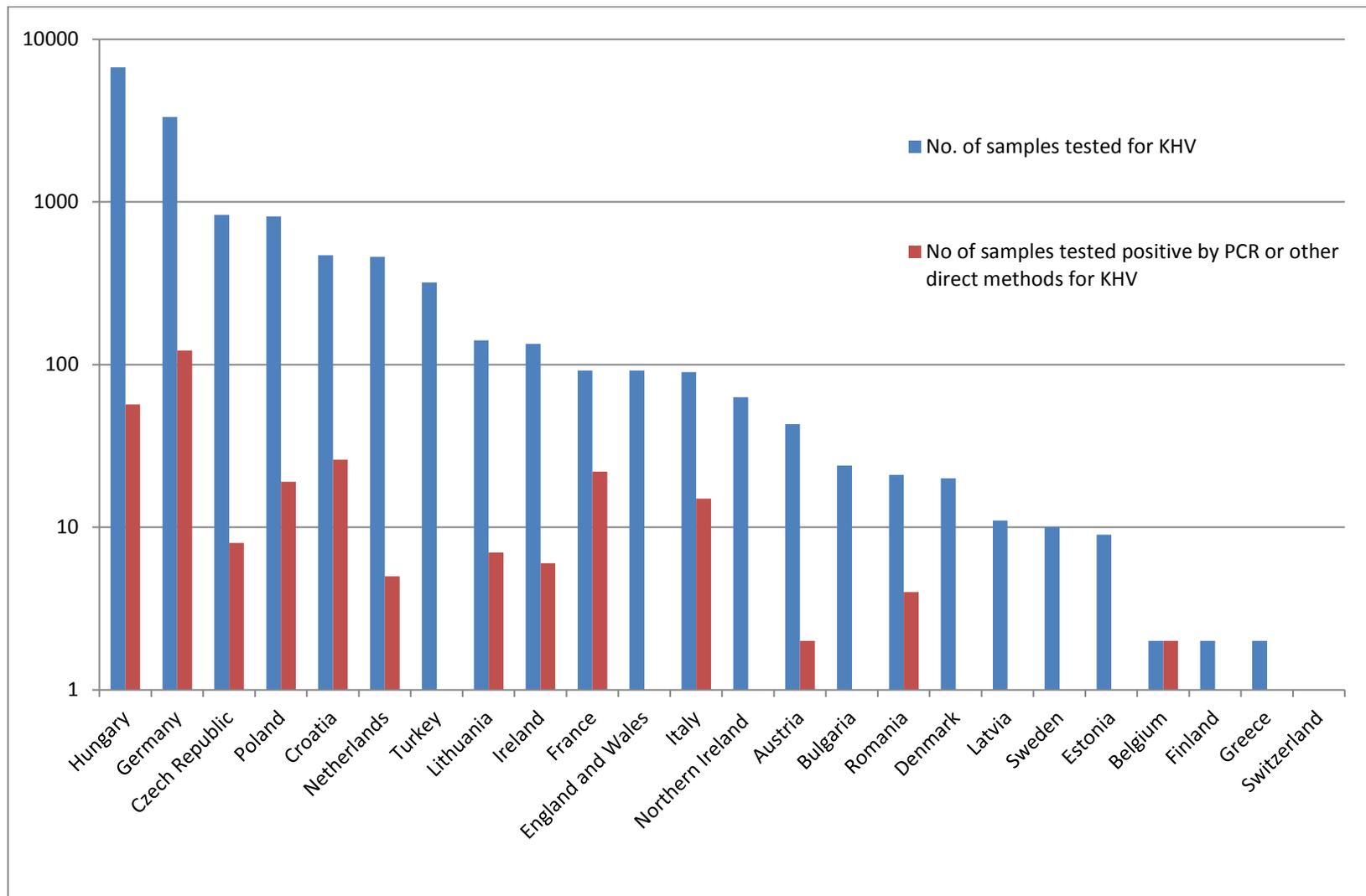
Kosovos	N/A	N/A
Albania	N/A	N/A
Rep. of Macedonia	N/A	N/A



## No. of samples tested for KHV in EUROPE in 2016

Country	No. of samples tested for KHV	No of samples tested positive by PCR or other direct methods for KHV
Hungary	6723	57
Germany	3332	122
Czech Republic	832	8
Poland	813	19
Croatia	470	26
Netherlands	460	5
Turkey	320	
Lithuania	141	7
Ireland	134	6
France	92	22
England and Wales	92	35 *
Italy	90	15
Northern Ireland	63	
Austria	43	2
Bulgaria	24	
Romania	21	4
Denmark	20	1
Latvia	11	
Sweden	10	
Estonia	9	
Belgium	2	2
Finland	2	
Greece	2	
Switzerland	1	
Cyprus		
Portugal		
Slovakia		
Slovenia		
Spain		
Scotland		
Bosnia and Herzegovina		
Iceland		
Norway		
Faroe Islands		

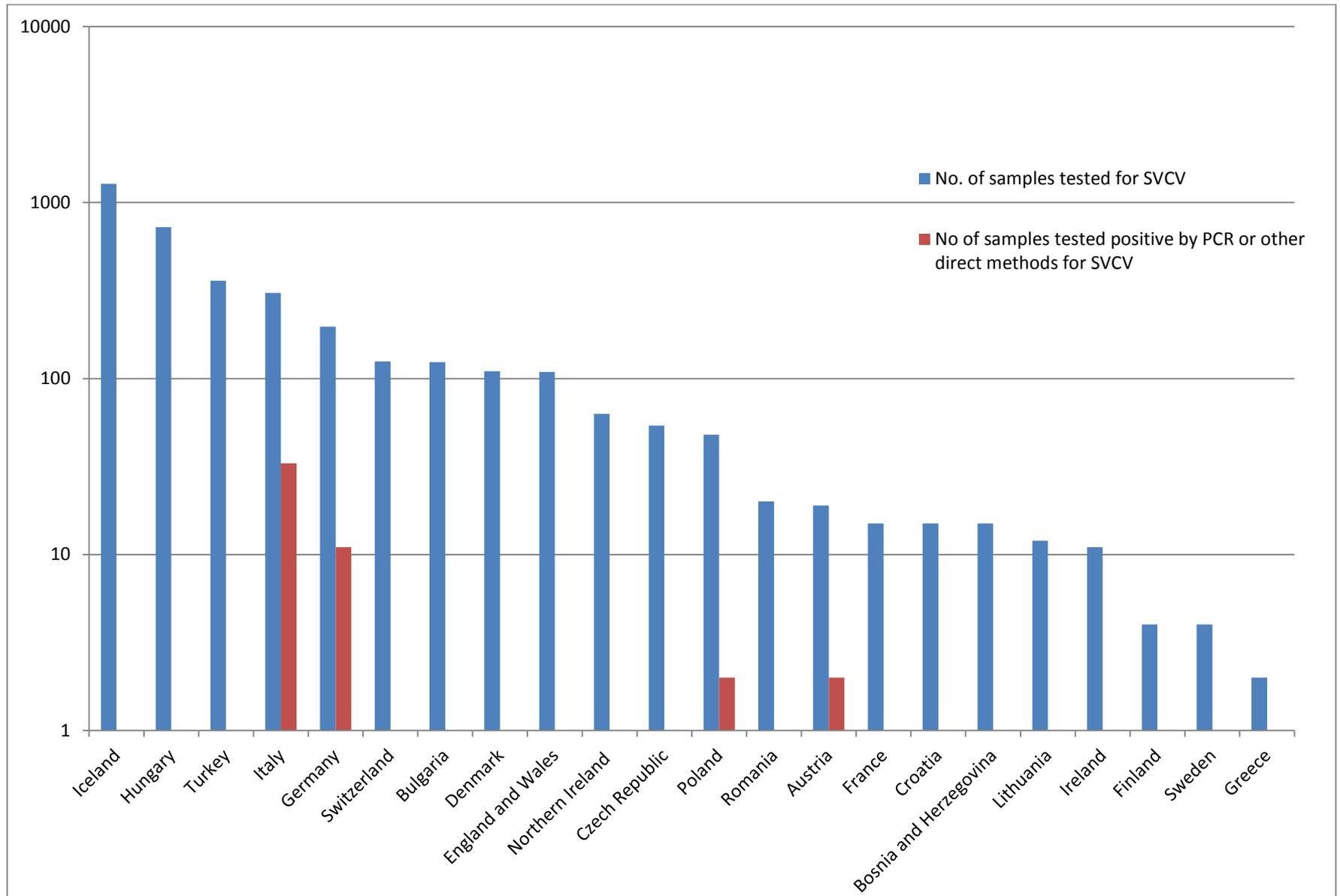
Kosovos	N/A	N/A
Albania	N/A	N/A
Rep. of Macedonia	N/A	N/A



## No. of samples tested for SVCV in EUROPE in 2016

Country	No. of samples tested for SVCV	No of samples tested positive by PCR or other direct methods for SVCV
Iceland	1277	
Hungary	724	
Turkey	360	
Italy	306	33
Germany	197	11
Switzerland	125	
Bulgaria	124	1
Denmark	110	
England and Wales	109	
Northern Ireland	63	
Czech Republic	54	1
Poland	48	2
Romania	20	1
Austria	19	2
France	15	
Croatia	15	
Bosnia and Herzegovina	15	
Lithuania	12	
Ireland	11	
Finland	4	
Sweden	4	
Greece	2	
Netherlands	1	
Belgium		
Cyprus		
Estonia		
Latvia		
Portugal		
Slovakia		
Slovenia		
Spain		
Scotland		
Norway		

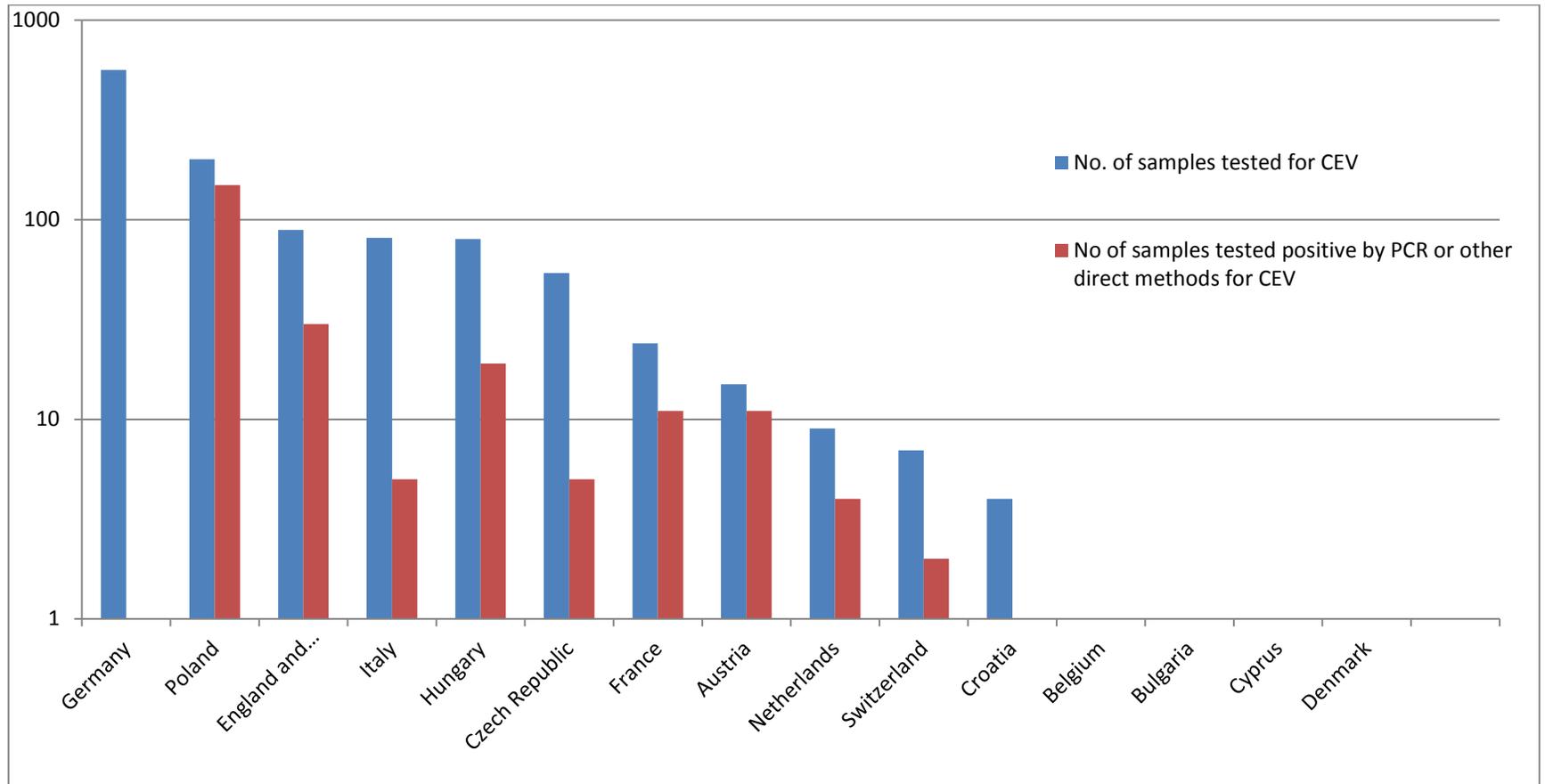
Faroe Islands		
Kosovos		
Albania		



## No. of samples tested for CEV in EUROPE in 2016

Country	No. of samples tested for CEV	No of samples tested positive by PCR or other direct methods for CEV
Germany	563	149
Poland	201	30
England and Wales	89	5
Italy	81	19
Hungary	80	5
Czech Republic	54	11
France	24	11
Austria	15	4
Netherlands	9	2
Switzerland	7	
Croatia	4	
Belgium		
Bulgaria		
Cyprus		
Denmark		
Estonia		
Finland		
Greece		
Ireland		
Latvia		
Lithuania		
Portugal		
Romania		
Slovakia		
Slovenia		
Spain		
Sweden		
Scotland		
Northern Ireland		
Turkey		
Bosnia and Herzegovina		
Iceland		
Norway		
Faroe Islands		

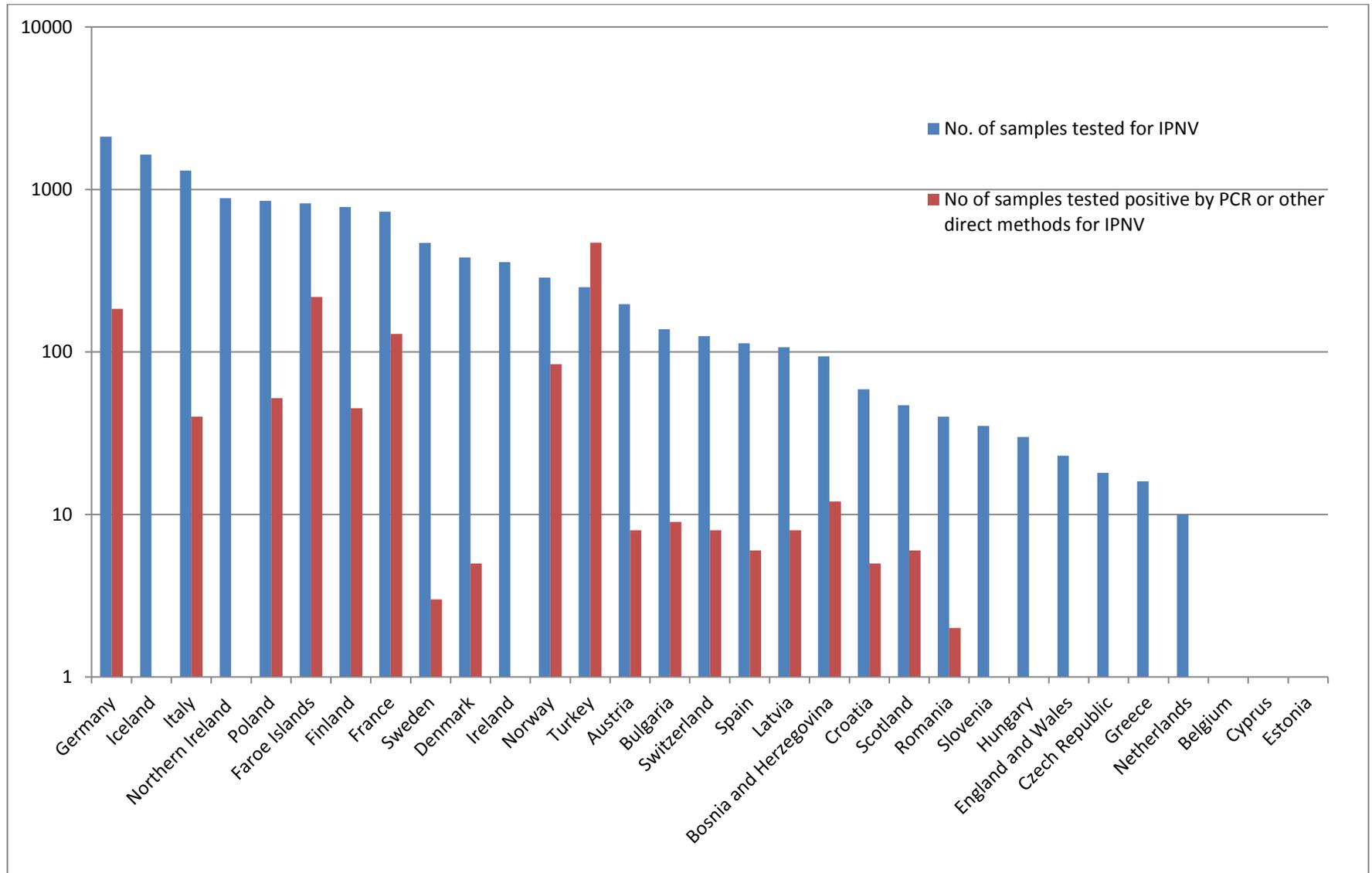
Kosovos		
Albania		
Rep. of Macedonia		



## No. of samples tested for IPNV in EUROPE in 2016

Country	No. of samples tested for IPNV	No of samples tested positive by PCR or other direct methods for IPNV
Germany	2117	184
Iceland	1636	
Italy	1305	40
Northern Ireland	885	
Poland	850	52
Faroe Islands	821	218
Finland	781	45
France	729	129
Sweden	469	3
Denmark	381	5
Ireland	357	
Norway	287	84
Turkey	250	470
Austria	197	8
Bulgaria	138	9
Switzerland	125	8
Spain	113	6
Latvia	107	8
Bosnia and Herzegovina	94	12
Croatia	59	5
Scotland	47	6
Romania	40	2
Slovenia	35	
Hungary	30	
England and Wales	23	1
Czech Republic	18	
Greece	16	
Netherlands	10	1
Belgium		
Cyprus		
Estonia		
Lithuania		
Portugal		
Slovakia		

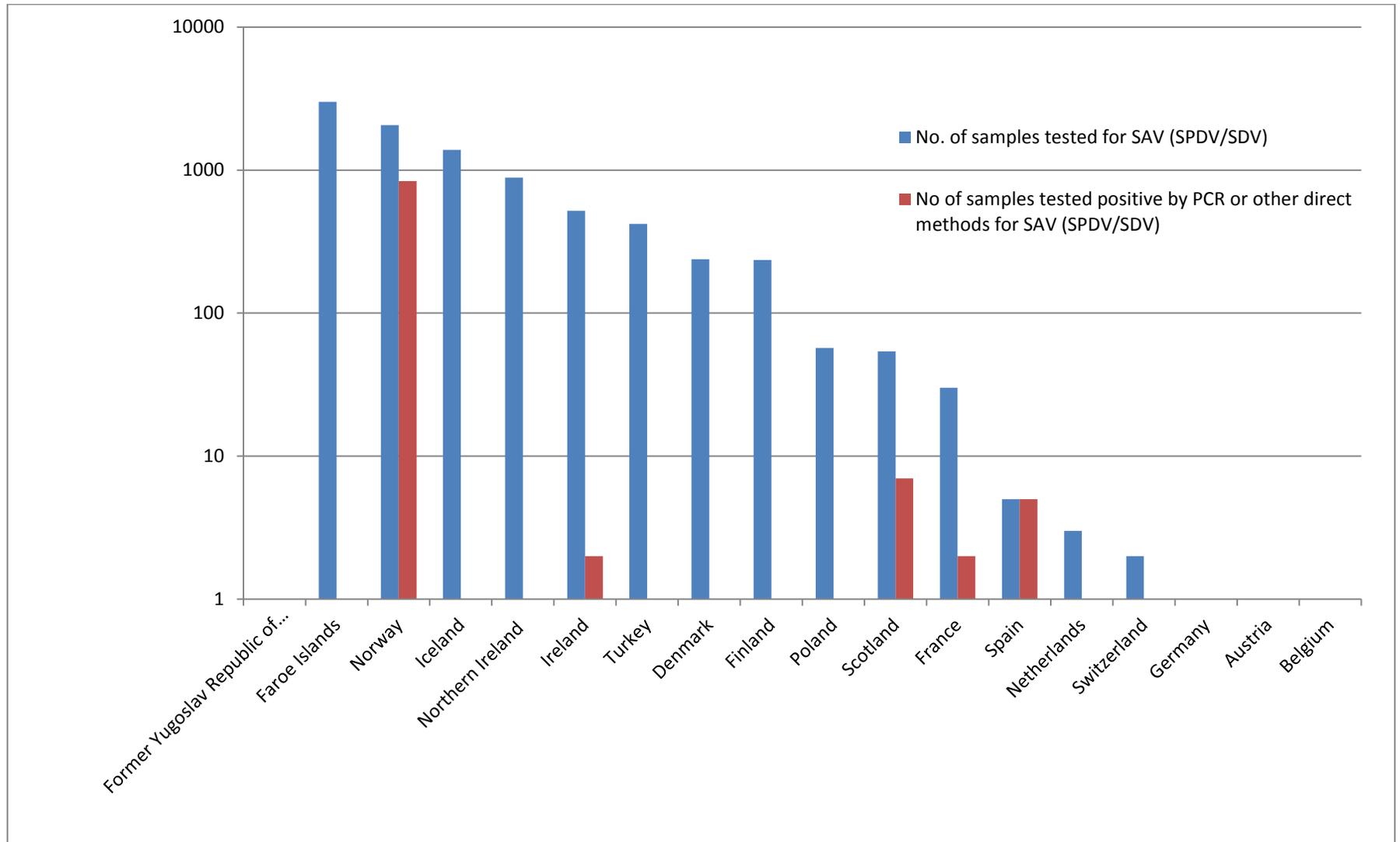
Kosovos		
Albania		
Rep. of Macedonia		



## No. of samples tested for SAV (SPDV/SDV) in EUROPE in 2016

Country	No. of samples tested for SAV (SPDV/SDV)	No of samples tested positive by PCR or other direct methods for SAV (SPDV/SDV)
Sweden	ND	ND
Croatia	n/a	
England and Wales	-	-
Faroe Islands	2999	
Norway	2067	837
Iceland	1386	
Northern Ireland	885	
Ireland	520	2
Turkey	420	
Denmark	238	
Finland	235	
Poland	57	
Scotland	54	7 (PCR)
France	30	2
Spain	5	5
Netherlands	3	
Switzerland	2	
Germany	1	
Austria		
Belgium		
Bulgaria		
Cyprus		
Czech Republic		
Estonia		
Greece		
Hungary		
Italy		
Latvia		
Lithuania		
Portugal		
Romania		
Slovakia		
Slovenia		
Bosnia and Herzegovina		

Kosovos		
Albania		
Rep. of Macedonia		



## No. of samples tested for Nodavirus in EUROPE in 2016

Country	No. of samples tested for Nodavirus	No of samples tested positive by PCR or other direct methods for Nodavirus
Italy	3182	548
Turkey	1140	
Greece	135	35
France	65	8
Croatia	25	
Denmark	17	
Spain	13	1
Norway	4	
Cyprus	3	
Germany	3	
Austria		
Belgium		
Bulgaria		
Czech Republic		
Estonia		
Finland		
Hungary		
Ireland		
Latvia		
Lithuania		
Netherlands		
Portugal		
Romania		
Slovakia		
Slovenia		
Scotland		
Northern Ireland		
Bosnia and Herzegovina		
Iceland		
Switzerland		
Faroe Islands		
Sweden	ND	ND
Poland	NB	NB
England and Wales	-	-

Serbia		
Kosovos	N/A	N/A
Albania	N/A	N/A
Rep. of Macedonia	N/A	N/A

