

# Report on Survey and Diagnosis of Fish Diseases in Europe 2017

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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 2017.

The Questionnaire which is collated annually is the only comprehensive overview of the disease situation in fish farming 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. The questionnaire comprises 4 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 out breaks 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.
4. A National report describing health and surveillance situation in general. These reports are compiled into one and can be found on the website and in the present booklet.

## Production data from FEAP

The data on the European aquaculture production was this year again obtained from the [“European aquaculture production report 2008-2016”](#) Prepared by the FEAP secretariat October 2017. 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 the end of 2016 as data from 2017 will only be available in autumn 2018.

The total fish production in aquaculture in Europe decreased again a little after a steady increase until 2014 and is now at 2.297.571 t. Among the EU Member states the production has been almost horizontal in the past 10 years with a total production of 648.935 t., while the 4 non-EU countries Iceland, Faroe Islands, Turkey and Norway produce 1.648.634 t and also experienced a minor decrease in 2016 compared to previous years.

The Atlantic salmon production, account for 1.49 mill ton in 2016 against 1.55 mill ton in 2015, and is by far the largest contingency in Europe. The production of large rainbow trout in sea water has increased quite significantly in the recent years and accounts now for 153.954 t while the production of portion rainbow trout has decreased and was 233.654 t in 2016 production (maximum in 2013 with 259.970 t). After several years of increased production Turkey have experienced a 20% reduction from 2013 to 2016 but is 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 58.995 t produced in all. Both the production of sea bream and especially sea bass also increased in the Mediterranean countries with a production of 160.563 t and 157.698 t, respectively. Among other fish species of interest are eel (with 6.098t in 2016 no significant change since 2010 despite difficult access to elvers), sturgeon which is a promising species especially in view of its caviar production has been very stable in the past 10 years (2.635 t) while the caviar production increased with 20% from 2015 to 124 t in 2016, turbot (decrease from 12.748t in 2012 to 7.823t in 2013 and increased again to 9.907 t in 2016), the cod production have collapsed from 22.729t in 2009 to <1 t in 2016! The production of cleaner fish as lumpfish for lice control is increasing significantly (several cod farms took over the production of cleaner fish) but the total production has not been possible to retrieve.

## Number of fish farms in Europe

The total number of authorised/licensed fish farms in Europe was reported to be around 27.806 farms, with the largest contingency in Germany with 12.961 farms having a high number of very small production. Norway having by far the largest production in Europe license almost 1.400 farms/sites. An overview of the number in each country can be found in Annex 1.

## Health categorization of fish farms

Almost all Member States did reply to the questionnaire and provided very clear and correct answers. This year in all 12.743 farms with species susceptible to VHS were reported in categorized zones, 11.473 to IHN, 6.519 to ISA and 11.225 farms with cyprinids susceptible to KHV; 1.523 farms were reported as non-categorized

79% of the authorised trout farms in Europe are situated in category III zones for VHS and 76% for IHN, with 20% and 23% respectively in Category 1. For both diseases the remaining 1% 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 67% in Category I and 21% in category III. Only very few carp farms are approved KHV free in Category I (1%) and almost all are placed in Category III (97%) or in Category II 2%.

In Europe 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 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 is now adopted and includes all aquatic animals; in this connection the categorisation system will be simplified and be made more transparent on the other hand more lists will be adopted compared to the present lists of exotic and non-exotic diseases (from present 2 to 5 lists). Annex 2 provide the full list of farms in categorized zones.

## Outbreaks and severity of listed diseases in Europe

Only few participants reported that they observed major changes in the epidemiological situations in their respective countries. Overall only few new outbreaks of **VHS** were observed (Thuringia and Saxony-Anhalt (Germany), Switzerland) while a few reported decrease in severity (Czech Republic, Bavaria). For **IHN** increase was reported from Bavaria (from 2 to 4 cases) and especially the new and first epidemic in Finland have attracted attention (3 farms and 2 put-and take lakes - will be reported during the workshop). No new outbreaks of IHN were reported from Croatia or the Netherlands and decrease in Poland..

For **ISA** Norway reported 12 new sites with ISAV HPRΔ in 2016 and reported 14 in 2017. Unfortunately no report was received from the Faroe Islands. ISA was only reported from Norway.

Concerning **KHV** Czech republic reported one more outbreak compared to 2016, and UK reported 35 infected sites. Germany experienced increases in number of cases in Lower-Saxony, Saxony, Baden- Württemberg and in Bavaria. Lithuania observed a decrease in number of KHV positive samples as did Poland. Croatia has not encountered KHV before 2016 and did not find it in 2017. Annex 3 provides the full list of reports.

## Other fish diseases problems in Europe

A whole range of other disease problems in 2017 were reported:

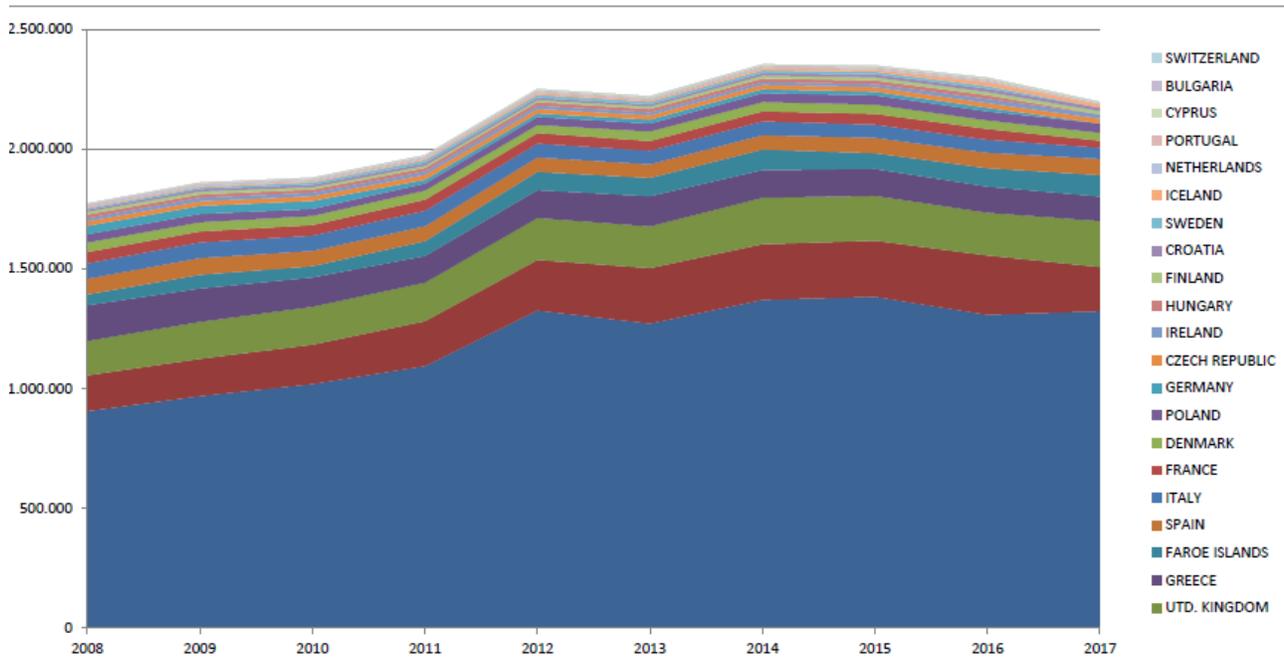
- In **rainbow trout** the major concerns are flavobacteriosis (RTFS), red mark syndrome, puffy skin, enteric redmouth, and infectious pancreatic necrosis but also, lactococcosis, proliferative kidney disease, ichthyophthiriasis, saprolegniosis, columnaris and furunculosis (especially in brown trout). More and more report BKD (bacterial kidney disease) as an increasing problem- possibly due to increased number of RAS in Europe. First outbreaks of HSMI-like disease in rainbow trout caused by PRV3 reported end of 2017.
- In **salmon** farming it is pancreas disease, heart and skeletal muscle inflammation, cardiomyopathy syndrome, yersiniosis! (Norway) amoebic gill disease, and moritella and in addition flavobacteriosis, furunculosis, and saprolegniosis (Baltic salmon).
- In **pike-perch** farming 1 new outbreak of perch rhabdovirus.
- In **cleaner fish** it seem like Flavivirus is one of the major problems. Lack of knowledge and poor management is likely the most important problem
- In **Carp** it is primarily CEV, *Aeromonas hydrophila*, SVC (in Romania) and parasites in general.
- In **seabass** and **seabream** it is primarily VNN/VER, tenacibaculosis, *Vibrio harvey*, *Sparicotyle chrysophrii*. *Aeromonas veronii* and *Lernathropus kroyeri* infection.

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*. Cardiomyopathy syndrome caused by PMCV is of increasing concern in Norway (reported later during the workshop) as is piscine reovirus infection in both Atlantic salmon (PRV1) and rainbow trout (PRV3). In continental Europe it is primarily bacterial diseases like RTFS, ERM and *Aeromonas* infections, and AGD – 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.

## Laboratory examinations

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 2017 on VHSV, IHNV, ISAV, KHV, SVCV, CEV, IPNV, SAV, and Nodavirus, respectively.

# Development of Fish Farming in Europe (2.297.571 tons) 2008-2016



## Reports from the individual European countries

### Austria

*Author/Institute:* Oskar Schachner

*Aquaculture production:* No significant changes from 2016. About 1000 t carp, 2000 t trout for consumption and restocking, mainly extensive flow through ponds (carps) and basins, single recirculation systems.

*Health status:* Eleven in category I declared VHSV & IHNV free. One farm in category II under VHSV & IHNV surveillance, 180 trout farms in VHSV, IHNV category III; 43 carp farms in KHV category III.

*Other disease problems:* Three cases of assumptive KHV outbreaks with no clear lab results using EU regulation implemented methods.

## Belgium



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

**Aquaculture production:** Salmonid production is located in the South part of Belgium. Cyprinid production in the North part. Few sites for bait fish production. One well-known farm for sturgeon and caviar production in recirculating system. Development of burbot (*Lota lota*) production.

**Health status:** No significant changes from 2016. Once again, isolation of VHS in brook trout fry with VHS symptoms and high mortality.

**Other disease problems:** RTFS is present in nearly all the Rainbow trout fry production site.

## Bosnia and Herzegovina



**Author/Institute:** T. Eterovic (delayed data, will be updated in a later version)

**Aquaculture production:** -

**Health status:** -

**Other disease problems:** -

## Bulgaria



**Author/Institute:** Petya Orozova

**Aquaculture production:** Traditionally, the largest is the production of rainbow trout and carp. Aquaculture production in Bulgaria in 2016-2017 was more than 15.432 tons. Increased yield of farmed species as *Salmo trutta fario*, *Oncorhynchus mykiss*, *Cyprinus carpio*, *Sillurus glanis*, *Ictalurus punctatus*, *Acipenser* spp. compared to the previous years. The main aquaculture species grown in the coastal waters of the country is *Mytilus edulis*. Aquaculture technology and systems: extensive and semi-intensive systems, 3 recirculation systems;

**Health status:** No one of the listed fish diseases according to council directive 2006/88/ES was detected.

**Other disease problems:** Bacterial infections: *Lactococcus garvieae* was isolated from diseased rainbow trouts. Viral infections: IPN virus was isolated from diseased rainbow trouts.

## Croatia

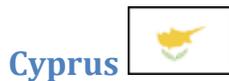


**Author/Institute:** Croatian Veterinary Institute, Zagreb

**Aquaculture production:** Warm water freshwater aquaculture is cultivating common carp, grass carp, bighead and silver carp as well as carfish, pike and pike-perch in small quantities in earthen ponds surface from 0.5 to 100 hectares. Coldwater freshwater aquaculture consists of farming rainbow trout and brown trout in concrete raceways. Some of the farms consists of hatchery and on growing units. Marine aquaculture is the most represented activity in Croatia with cultivation of European sea bass, Gilthead sea bream, dentex and meagre in farms with production from of 60 tons to 7000 tons. Tuna farming is represented by six farms that is based on the catching of small tuna in Mediterranean according to ICAAT quotas and feeding them until favorable weight. Almost whole production is sold to Japan.

**Health status:** There were no outbreaks of listed fish diseases, nor samples tested positive for listed diseases.

**Other disease problems:** The main challenges are bacterial diseases in marine aquaculture. The emergent bacteria was in 2017 *Vibrio harveyi* in sea bass producing some mortalities, growth retardation etc. In sea bream, it is parasitic infection with *Sparicotyle chrysophrii* with increased mortalities and requirements for frequent bath treatments.



**Author/Institute:** Veterinary Services

**Aquaculture production:** In Cyprus there are in operation (licensed) 9 marine open sea cage farms culturing mainly European sea bass and gilthead sea bream, 3 marine hatcheries, 1 land-based shrimp hatchery/farm and 7 small rainbow trout farms. The main marine species commercially cultured are the gilthead sea bream (*sparus aurata*) and European sea bass (*dicentrarchus labrax*).

**Health status:** No data provided for 2017

**Other disease problems:** No data provided for 2017



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

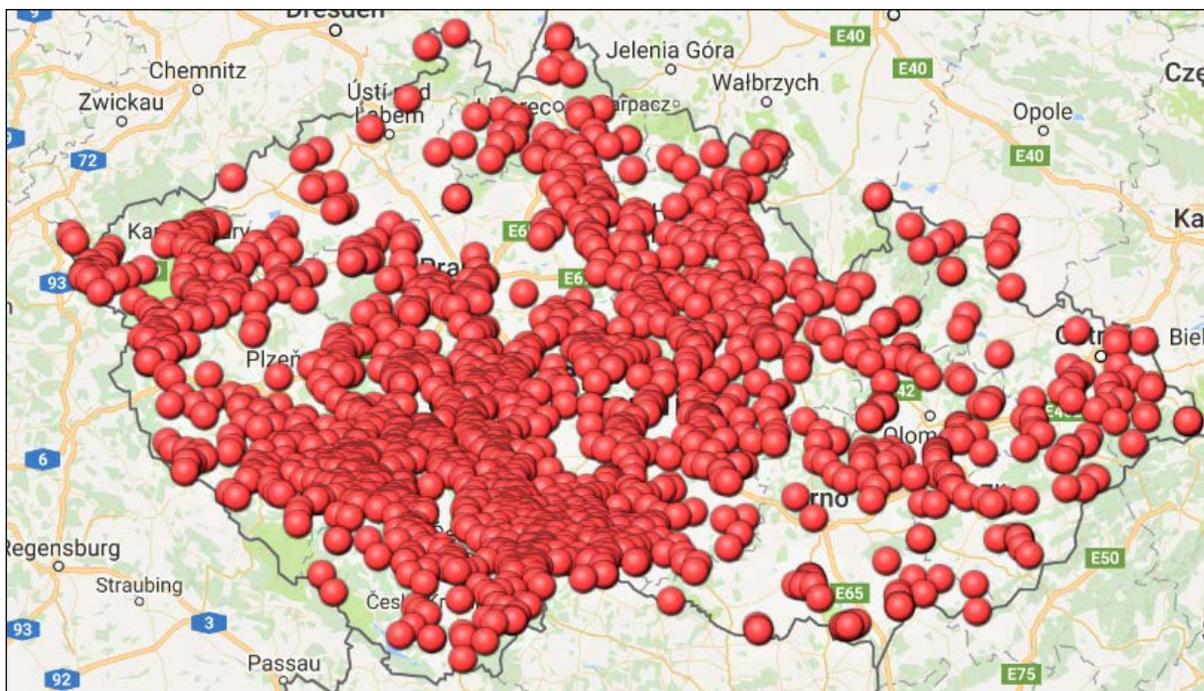
**Aquaculture production:** In the Czech Republic aquaculture production consist from ponds fish farming, salmonids fish farming and farming in fishing grounds. The main part of the production is pond fish farming. Common carp (*Cyprinus carpio*) is the main fish species kept in these ponds (87% of total production). The salmonids fish farming forms 4 % of the production and production of herbivorous fish usually forms 5%. The rest of the production forms other fish species (tench, predatory fish). The Czech pond fish farming has a long tradition and plays production role, role in drainage swampy areas and the important ecological and anti-flooding role. On the territory of the Czech Republic, there are more than 24 thousand ponds (mostly artificial built in the 15th and 16th century) covering the area of about 51 thousand hectares. Salmonid fish farming in the Czech Republic is in the recirculation systems or in the flow systems. Farming in fishing grounds consists of

river systems and maintaining fish communities in the localities, where recreational fishing is done by angling. In Czech Republic is proclaimed more than 2000 fishing grounds of the area approximately 42,000 hectares.

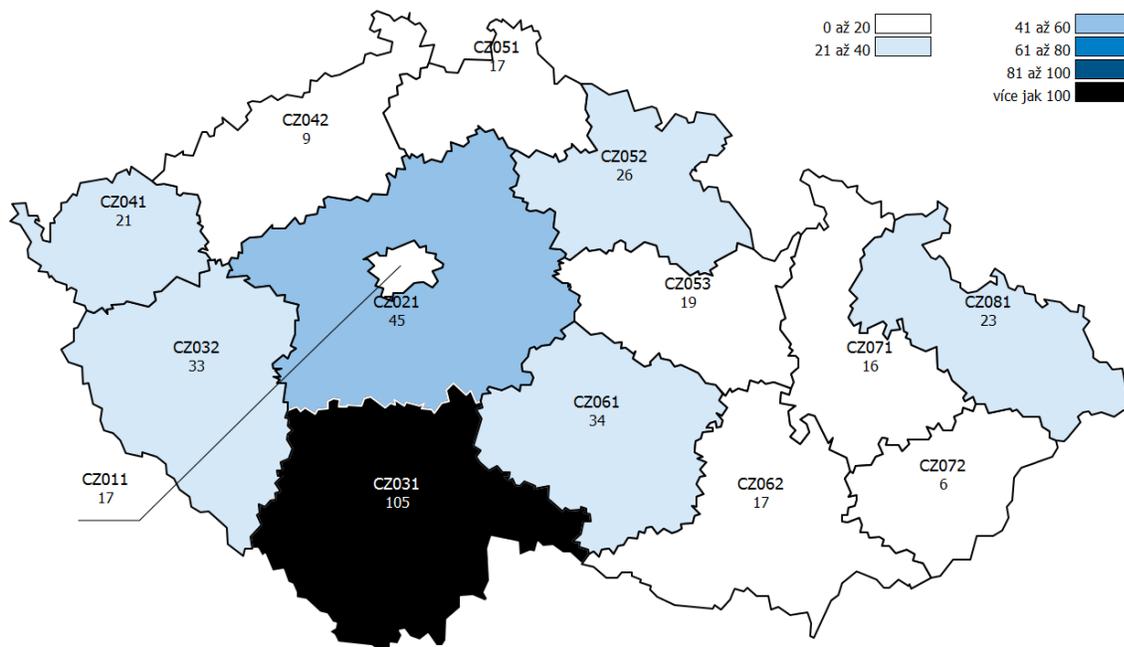
**Health status:** According to Council directive 2006/88/EC the Czech Republic has free health status for ISA and undetermined health status for VHS, IHN on the whole territory. The whole territory of the Czech Republic has undetermined health status for KHV except one holding which has status infected. At the national level, the Czech Republic performs the monitoring program for VHS, IHN and KHV.

**Other disease problems:**

1. Map of authorized aquaculture production business holdings 2017



2. Authorized aquaculture production business holdings density map 2017

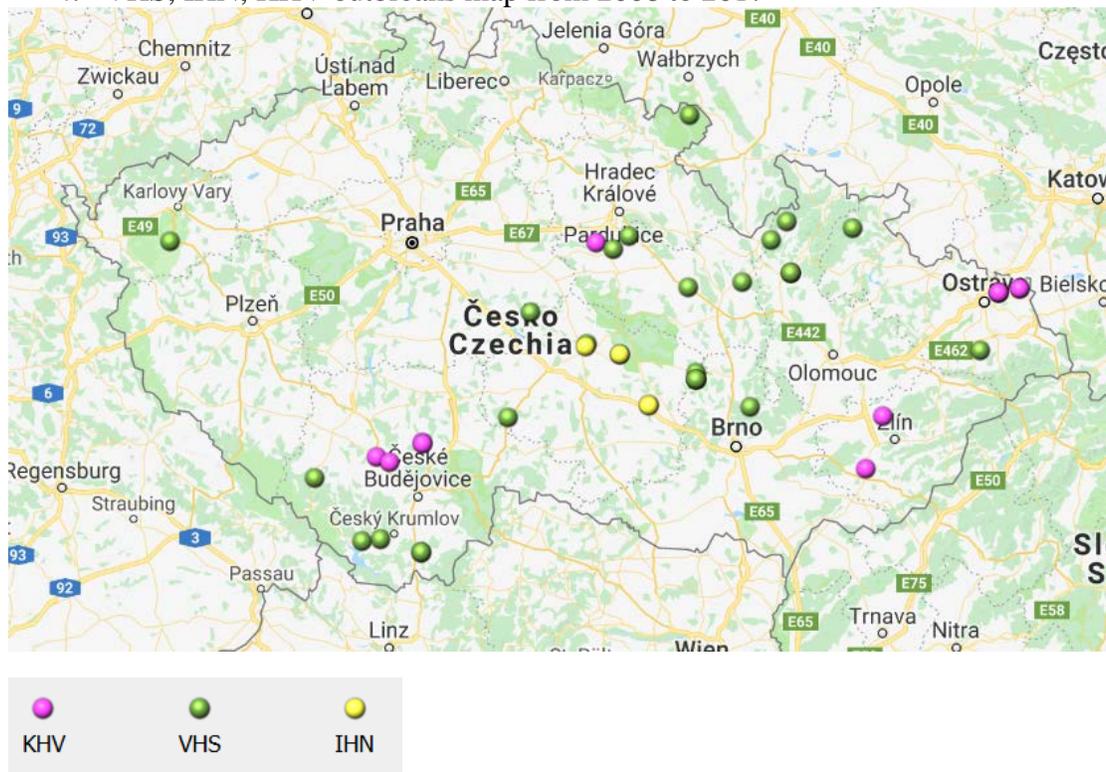


CZ 010	Capital City Prague
CZ 020	Central Bohemian Region
CZ 031	Southern Bohemian Region
CZ 032	Region of Plzeň
CZ 041	Region of Karlovy Vary
CZ 042	Region of Ústí nad Labem
CZ 051	Region of Liberec
CZ 052	Region of Hradec Králové
CZ 053	Region of Pardubice
CZ 061	Region of Vysočina
CZ 062	Southern Moravian Region
CZ 071	Region of Olomouc
CZ 072	Region of Zlín
CZ 080	Moravia-Silesian Region

### 3. Number of VHS, IHN, KHV outbreaks from 2008 to 2017

	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
2017	0	0	3

### 4. VHS, IHN, KHV outbreaks map from 2008 to 2017



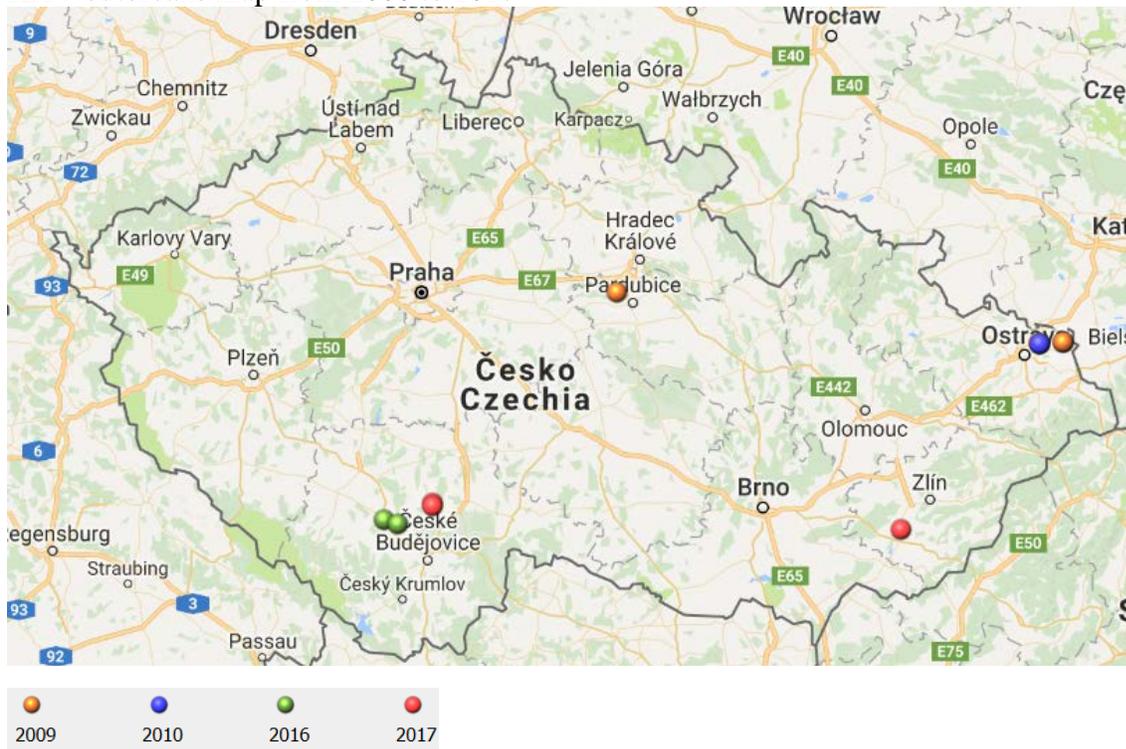
## 5. VHS outbreaks map from 2008 to 2017



6. IHN outbreaks map from 2008 to 2017



7. KHV outbreaks map from 2008 to 2017



## Denmark



**Author/Institute:** Morten Fruergaard-Andreasen (FVST) and Niels Jørgen Olesen DTU Aqua

**Aquaculture production:** In Denmark, there are approximately 230 active farms. 50% of these produces more than 100 tonnes per year. The most farmed fish species in Denmark is rainbow trout. The production takes place in freshwater recirculating farms and aims to produce small size rainbow trout. At the same time the seasonal production of RT in seawater for roe is developing and is expected to increase significantly in the future. Minor production focuses on Carp and eel. The knowledge and know-how on recirculating systems has contributed to the startup of projects for producing Atlantic salmon and pike perch.

**Health status:** All farms with susceptible species are inspected once per year by the veterinary authority. Samples for targeted surveillance are delivered to the NRL that perform accredited analysis for certifying freedom of listed diseases. All of Denmark is category I for IHN and ISA. From 31-12-2013 the whole terrestrial area is category I for VHS while the marine farms are category III for VHS. At a national level, Denmark conducts a plan for IPN and SVC, and furthermore some farms have achieved free status for BKD. The national plan relies on historical data and targeted surveillance.

**Other disease problems:** In 2017 piscine orthoreovirus 3 (PRV3) was detected for the first time in Denmark, the finding was linked to severe disease outbreaks in recirculated aquaculture systems (RAS) and further investigation is going on in 2018 in order to assess the impact of infections giving symptoms in rainbow trout similar to HSMI in Atlantic salmon. IPN is still widespread in production farms with occasional disease outbreaks. Among bacterial diseases, Rainbow Trout Fry Syndrome caused by *Flavobacterium psychrophilum* and Enteric Red Mouth Diseases caused by *Yersinia ruckeri* are considered relevant in freshwater phase, whereas clinical outbreaks of furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*) can occur in the saltwater production of rainbow trout. Of current interest is Red Mark Syndrome in Rainbow trout, where the aetiology was identified to a small intra-mitochondrial bacteria- *Candidatus Midichloria mitochondrii*. The disease is still causing severe problems as it affects table size rainbow trout.

## Estonia



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

**Aquaculture production:** There were 33 approved fish farms and 25 crustacean farms in Estonia in 2017 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 2017: 17 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 2017 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



**Author/Institute:** Debes Christiansen

**Aquaculture production:** No data submitted for 2017

**Health status:** No data submitted for 2017

**Other diseases and health related issues:** No data submitted for 2017



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

**Aquaculture production:** Amount of fish farmed for human consumption slightly decreased and was 14.4 M kg in 2016 (14.9 M kg 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. Two > 1 M kg RAS farms have started operating and one > 1 M kg offshore farms will start in 2018.

**Health status:** Finland has free status for ISA and SVC for the whole country, for VHS the whole country excluding Åland Islands, for IPN (genogroup 5) and SAV for continental area and for *G. salaris* for Northern Lapland. All the farms are in category III for KHV and WSD.

IHN was diagnosed in Finland for the first time in 2017 in three farms and two put and take ponds. The three farms do not belong to any of the categories at the moment. They, as well as the two put and take ponds, are under eradication, and surveillance program has not yet begun.

EHN, EUS, SVC, KHV, or ISA have never been diagnosed in Finland. Also, 2017 was the fifth year in a row when no VHS infections were detected in Åland Islands.

At the moment, we have risk based surveillance system including inspections in all authorized farms (active surveillance) and regular sampling (targeted surveillance) for VHSV, IHNV, ISAV, SAV, IPNV and BKD in certain farms cultivating sensitive species. Surveillance program for IHN has not yet begun.

**Other disease problems:** The most important indications for the antibiotic treatments are still *Flavobacterium psychrophilum* and *F. columnare*. These cause clinical disease in fry and fingerlings of several salmonid species (mostly rainbow trout). The mortalities caused by *Saprolegniaceae* are still increasing and the situation is worrying the fish farmers a lot. A research project together with the Finnish Fish Farmers Association, Universities and Research Institutes has been started in 2018.

In 2017, the number of samples tested as well as the number of samples tested positive for IPN increased from 2016 due to the increase of samples tested during November and December 2017, due to the IHN epidemic that started in November 2017.

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

***Aquaculture production:*** In France, the trout farming dominates production of continental fish farms with about 35,000 tons produced each year (Ministère de l'Agriculture, 2013). Rainbow trout represents 95% of this production. A total of 600 sites are active and correspond to 400 companies. Half of the production is carried out by two regions: Aquitaine and Brittany. The main part of this production (80%) is destined to human alimentation, the balance consisting of live fish for restocking rivers and recreational fishing. The French marine fish farming consists of about sixty companies which produce about 9,000 tons of fish, more particularly sea bass (4,300 tons), sea bream (1,900 tons) and salmon (1,500 tons), mainly intended to be exported. Sturgeon farming (200 tons) has been increasing in the past years, and might grow again in the future. The pond fish farms, whose business is harder to identify, produce about 12,000 tons of which 9000 tons consist of live fish for restocking rivers and lakes.

***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

In 2017, VHSV was detected, without any clinical signs, in the framework of official sanitary controls. It occurred in a disease free farm located in the East of France. Partial sequencing of G gene showed a strong identity with the isolates 2016 responsible for outbreaks in a close area (99.9%), highly suggesting an epidemiological link. Further investigations showed epidemiological link with another fish farm, where virological analyses were carried out. No virus could be detected. Nevertheless, serological tests led to positive results with 69% VHSV positive sera. A sentinel procedure was initiated to detect the presence of fish pathogens. After 6 weeks, fish were sampled for virological and serological analysis. VHSV could be detected by IFAT whereas no antibodies were detected by seroneutralization test. To notice the water temperature was quite weak (between 6 and 8°C, which could have contributed to a lower immune response). It remains surprising no clinical signs could be observed during the whole period, even on naïve fish.

#### Surveillance of IHN

Four outbreaks of IHN were detected through targeted surveillance in 2017 in Normandie. Those detections occurred following self-inspection. However, two out of the four fish farms were already declared infected and epidemiological links were demonstrated between new ones and fish farms already incriminated.

#### Surveillance of KHV

Two outbreaks of KHV were reported in 2017. The first case occurred in an aquarium in Paris, where mortality was observed on koi. The introduction of goldfish, which had been in contact with a koi from unknown origin, in the tank with koi a few weeks before could be incriminated in the mortality event.

The other reported case occurred in the North of France, in a private pond. The owner had bought the infected Koi in Belgium and had not applied quarantine protocol. KHV had been detected several times in Belgium in 2017.

***Other disease problems:*** Several outbreaks of Carp Edema Virus (CEV), located in distant French areas, were reported mostly during spring 2017, 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).

One case of PRV was also reported in the South of France. Sequencing could be performed and epidemiological data collection could bring more information about its prevalence in French fish farming.

EVEX has been regularly detected on elver after analysis as part of restocking program.

*Rickettsia* has also been detected on sea bass larvae in the south of France. Some nervous clinical signs were observed, and some cytopathic effect was obtained after one passage on cell line CHSE. *Rickettsia* were observed after histological analysis.



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

**Aquaculture production:**

Baden-Württemberg:	cultured species: mainly salmonids (rainbow trout, brown trout, charr), carp, pike, pike-perch, sturgeon environmental conditions: temperate climate; mainly well water or close-to-well stream water technologies: partially intake of atmospheric oxygen (Flobull, paddle aeration) or technically (liquefied oxygen); partially automatic feeding (also PC-based); degassing by irrigation or aeration; partial use of filters (barrel, biological) salmonids: natural ponds; runways, partially with recirculation; brood houses with runways and round tanks; few egg producers with hatcheries carp: natural ponds; mainly extensive use
Bavaria:	cultured species: mainly carp and rainbow trout environmental conditions: Carp: Approx. 20 000 ha water surface area in Bavaria corresponds to approx. 1/2 of the German aquaculture pond area. Annually 6 000 t of edible carp are produced in Bavaria. In these traditional carp ponds other species are usually kept, e.g. tench, pike, catfish, pike-perch, other cyprinids and smaller fish species. All farms are family-owned with traditional and extensive production in earthen ponds. Since the majority of ponds is supplied by surface waters dry and hot periods, as a result of climate changes, increasingly cause problems. There are also increasing problems with piscivorous predators. Salmonids: Salmon aquaculture is also based on family-owned farms that are dominated by rainbow and brown trout cultures, but also charr and grayling are kept. The previously produced 7.000 t of rainbow trout have declined during the last years, and has been partially replace by brown trout and charr since the latter are not subject to restrictions regarding containment measures. Climate changes characterized by high temperature periods followed by heavy rainfalls accompanied with floods had also a negative impact on salmonid farming. There is one high-tech circular system for shrimp culture ( <i>Litopenaeus vannamei</i> ) and two for African catfish ( <i>Clarias gariepinus</i> ) culture.
Berlin:	No reporting.

Brandenburg:	holdings with susceptible species according to directive 2006/88/EC: ponds (predominantly carp) und runways/ponds (predominantly rainbow trout and other salmonids). Two warm-water facilities use coolant water from coal power stations. All others use surface water. Due to the lack of water some runways do occasionally or permanently use semi-closed circular systems.
Bremen:	No reporting.
Hamburg:	No reporting.
Hesse:	cultured species: rainbow trout and other salmonids, sturgeon, pike-perch environmental conditions: low mountain range, many forests, common well water, rainbow trout technologies: occasionally circular systems; predominantly ponds (river and lake fisheries: Rhine, Main, Weser)
Meckl.-W. Pomerania:	cultured fish species: rainbow trout, sea trout, charr, pike, carp, sturgeon, maraene, tench, europ. and African catfish, eel, pike-perch, noble crayfish, burbot, white shrimp ( <i>Litopenaeus vannamei</i> ) technologies: ponds, concrete and natural runways and ponds, cold and warm water circular systems, net cages
Lower Saxony:	98 farms of the 759 registered farms are certified; in terms of the amount of production: predominantly rainbow trout; carp and other fish species are extensively cultured (side-line production); in circular systems are kept: eel, europ. and African catfish, pike-perch and ornamental fish.
North Rhine-Westphalia:	predominantly salmonids; flow-through facilities; predominantly in low mountain ranges; low level of mechanization
Rhineland-Palatinate:	cultured species: rainbow trout, brown trout, charr, other salmonids, carp, eel, koi, pike-perch, sturgeon, tench, orfe, goldfish, whitefish, roach, gudgeon, stone loach environmental conditions: fresh water, ponds, well water technologies: predominantly hobby holdings; sometimes use of seed fish; mostly private use; fishing ponds; sometimes use of filters and oxygen supply. aquaculture systems: traditional pond farms, predominantly ponds with connection to running natural waters, for certified farms also tanks/ponds
Saarland:	almost only fishing ponds; one salt water circulation system
Saxony:	several aquaculture systems, from traditional carp and trout ponds to closed circular systems; cultured species of economical importance in carp aquaculture: <i>Cyprinus carpio</i> , <i>Tinca tinca</i> , <i>Ctenopharyngodon idella</i> , <i>Acipenser spec.</i> cultured species of economical importance in trout aquaculture: <i>Onchorhynchus mykiss</i> , <i>Salvelinus fontinalis</i> cultured species in closed circular systems: <i>Sander lucioperca</i> , <i>Litopenaeus vannamei</i> , <i>Pangasianodon spec.</i> , <i>Tilapia</i> , <i>Clarias gariepinus</i> , <i>Perca fluviatilis</i>
Saxony-Anhalt:	cultured species: predominantly rainbow trout, carp; also brown trout, charr, pike-perch, sturgeon, maraene etc. environmental conditions: rainbow trout and carp in ponds, runways and net cages; middle European climate technologies: ponds, runways and net cages supplied by well or surface water; flow through or semi-circular systems; net cages in lakes; warm water circular systems; systems for the supply of oxygen protection from

	predators: covering with nets, sometimes roofs or indoor ponds
Schleswig-Holstein:	cultured species: salmonids, cyprinids, coregonids, <i>Acipenser</i> spp., percids, noble crayfish, eel, shellfish, oysters etc. environmental conditions: well and surface water technologies: net-cages, earthen ponds, pools, shellfish culture aquaculture systems: open, semi-circular and closed circular systems
Thuringia:	carp: predominantly kept in extensive holdings and for hobby/side-line farming; rainbow trout: cultured in three larger farms with runways; others in extensive holdings and for hobby/side-line farming brown trout and charr: kept for hobby/side-line farming or for restocking

#### *Health status:*

Baden-Württemberg:	health status in 2017 fairly good; surveillance: risk based targeted and active surveillance for VHS and IHN by responsible authorities and qualified services (e.g. fish health service) KHV: all Cat. III, partially active and targeted surveillance ISA: disease free status; usually passive surveillance of farms; for farms keeping salmon: targeted surveillance
Bavaria:	Fish farms are surveyed by the states veterinary services, by the states fish health service and by three aquaculture cooperatives.
Berlin:	No reporting.
Brandenburg:	Almost every year outbreaks in salmonid stocks were registered; suspicion of intake due to fish transportation; all certified farms are subject to surveillance by a qualified veterinary service; frequency of surveillance depends on risk assessment. Registered farms are subject to passive surveillance.
Bremen:	No reporting.
Hamburg:	No reporting.
Hesse:	5 farms in Cat. I: targeted surveillance with sampling 1 farm was in Cat V: targeted surveillance with sampling all others in Cat. III: active surveillance (routine controls, sampling); some farms are subject to targeted surveillance (mandatory sampling)
Meckl.-W. Pomerania:	passive surveillance
Lower Saxony:	Health status is depicted under 1.2 of the maps. Official declaration of a VHS outbreak in one farm was abrogated after emptying, killing, cleaning and disinfection. KHV-I was officially declared in ornamental holdings only (commercial and non-commercial). 17 out of 33 KHV-I outbreaks could be declared as abrogated after emptying, killing, cleaning and disinfection. Active health surveillance of certified farms is executed

	by the Veterinary University in Hannover and through qualified services. Official surveillance is done by the states veterinary agency. The states diagnostic institute and the Hannover Veterinary University are responsible for the health surveillance (clinical surveillance, laboratory diagnostics) and for the maintenance of the health status I. Surveillance with regard to ISA is passive.
North Rhine-Westphalia:	Most farms are only registered but not categorized; most categorized farms are in Cat. III. Few farms are in Cat I. This depends on the trading structure and the geographical conditions. Veterinary authorities provide a passive or targeted surveillance and are supported by fish health services. In a few cases own controls are provided by local vets.
Rhineland-Palatinate:	Mostly Cat. III; two controls annually through qualified services, one control by vet authorities. Official controls according to the risk level, samples are investigated in the states veterinary laboratory. Epidemiological data bases are regularly updated.
Saarland:	No reporting.
Saxony:	9 Cat. I compartments regarding KHV-I, IHN, VHS; Majority of certified holdings are in Cat. III. Surveillance according to directive 2006/88/EC is provided by a qualified service. 1. Within the program of the Saxon States Ministry for Social Affairs and Consumer Protection and the Saxon Animal Disease Insurance for the eradication of fish diseases (except KHV-I) from Nov. 13th of 2013. The program basically includes advice and diagnosis regarding diseases listed under annex IV part II of directive 2006/88/EG of salmonids and the respective prophylactic measures. 2. Within the KHV eradication program an amended version of the joint program of the Saxon States Ministry for Social Affairs and Consumer Protection and the Saxon Animal Disease Insurance on the prophylaxis and eradication of koi herpes virus infections (KHV-I) in Saxon Fish Farms came into place (KHV Eradication Program) from April 13th of 2016).
Saxony-Anhalt:	Cat I for VHS, IHN: water system of river Bode with 4 farms (see attachment 1, map), targeted surveillance (clinical control and sampling by states qualified fish health services) in collaboration with the veterinary diagnostic institute where diagnostic is done by European standards; in the lower buffer zones wild fish a regularly sampled; only fishes from Cat. I farms are allowed for restocking. Cat. III for VHS, IHN, KHV-I: risk based surveillance by states qualified fish health services. Susceptible species are subject to risk-based surveillance in certified farms at least once per year on notifiable diseases.
Schleswig-Holstein:	Two farms in Cat I: rainbow and brown trout, sturgeon. All other farms in Cat. III. Surveillance by States Vet Authorities in collaboration with qualified services attached to the Chamber of Agriculture.
Thuringia:	Inconspicuous. Surveillance is made according to directive 2006/88/EC in collaboration with the fish health services of other German states.

*Other disease problems:*

Baden-Württemberg:	<p>Partially lack of water due to hot summers with high water temperatures and the resulting lack of oxygen, in turn causing stress and increased parasite pressure.</p> <p><b>ERM:</b> Yersinia ruckeri is endemic in some river systems (different Yersinia strains - Hagermann and EX5), affected are mainly rainbow trout of all age classes, diagnostics are done with classical bacteriological methods using active surveillance; in highly affected farms vaccination using immersion or oral delivery (booster) is used.</p> <p><b>CEV:</b> in koi / carp, morbidity (multifactorial disease) was mainly recorded in spring, detection by PCR at NRL, Veterinary University Hannover and states veterinary institute.</p> <p><b>Flavobacteriosis (RTFS):</b> mainly Flavob. psychrophilum; affected was mainly rainbow trout fry during the brood house phase. Diagnostics using classical bacteriological methods; Prophylactic measures: improvement of brood house hygiene, reduction of stocking density, salt immersion, vitamins.</p> <p><b>Proliferative Kidney Disease (PKD):</b> According to a local research facility PKD can be detected increasingly in open waters; it can also cause losses in farms connected to open waters (small rivers);</p> <p>Diagnostics: pathomorphological, histological, PCR. A monitoring aims at data on the distribution of the disease agent and at management measures for affected farms.</p>
Bavaria:	Emerging diseases were infections with SAV (PD) and CEV (KSD).
Berlin:	No reporting.
Brandenburg:	No reporting.
Bremen:	No reporting.
Hamburg:	No reporting.
Hesse:	Flavobacter sp./Flexibacter psychrophilum in rainbow trout fry; diagnostic methods: bacterial culture and MALDI-TOF-MS; no control and prophylactic measures taken.
Meckl.-W. Pomerania:	no other diseases or challenges recorded
Lower Saxony:	Koi sleepy disease (KSD / CEV) was in focus again. Detection of CEV in connection with morbidity and mortality in koi and edible carp of different age classes. Fish farmers were informed and made aware on the potential risk. Bathing in sodium chloride solution was suggested to minimize losses.
North Rhine-Westphalia:	No reporting.
Rhineland-Palatinate:	No reporting.
Saarland:	No reporting.
Saxony:	No reporting.
Saxony-Anhalt:	Yersinia ruckeri infections: vaccination of rainbow trout PKD: one runway farm for rainbow trout was kept empty because of high losses through previous years.
Schleswig-	No abnormalities reported.

Holstein:	
Thuringia:	PKD in rainbow trout especially in farms connected to larger surface water supplies.



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

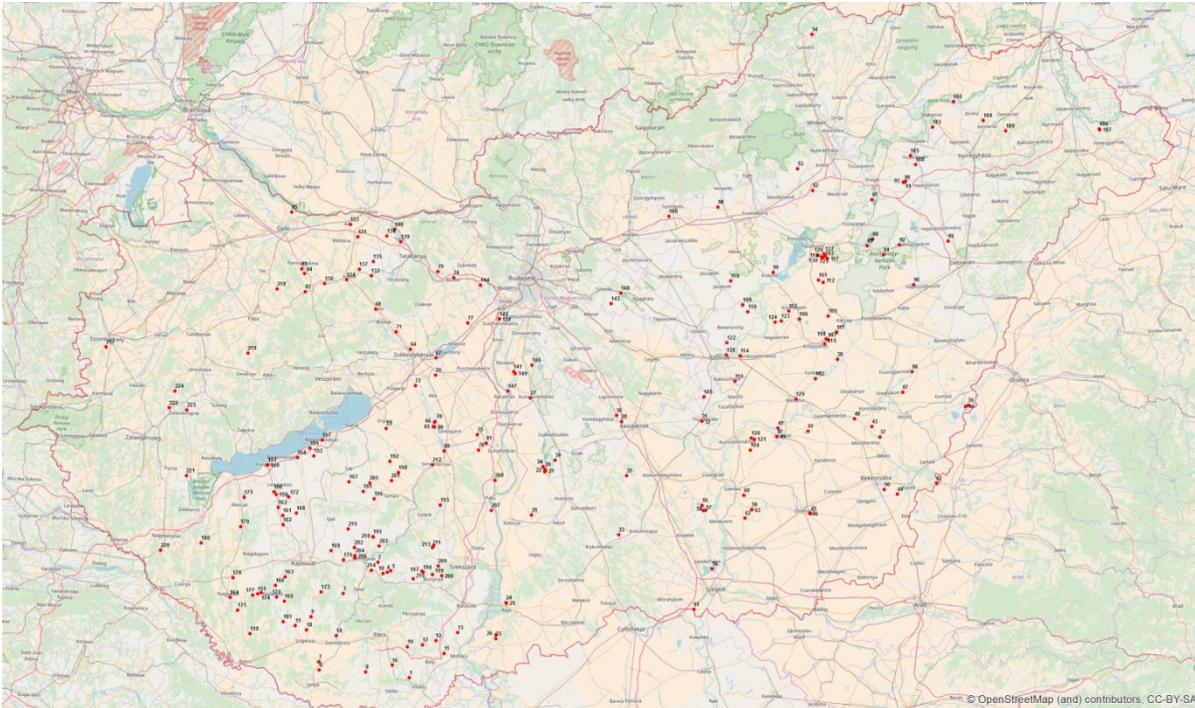
**Aquaculture production:** Marine farming of Mediterranean fish species in cages-mainly dominated by seabream and seabass.

**Health status:** The health status has not changed since last year. We are applying mainly passive surveillance for the listed diseases.

**Other disease problems:** The main problems challenging the industry are the monogenean trematode *Sparicotylae chrysophrii* affecting seabream and VNN-virus affecting mainly seabass. I would include as emerging pathogens *Aeromonas veronii* and *Lernathropus kroyeri* both affecting seabass.

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

**Aquaculture production:** The geographical, water and climate conditions in Hungary are suitable for traditional pond fish husbandry and in some cases for intensive fish production. Fish farms are mainly situated on the northern and southern part of the Great Hungarian Plain and on the south Transdanubian Region.



Extensive fish farms are still the main production units in the aquaculture. They produce 83.1 % of the whole Hungarian fish production. There are 227 fish farms producing carp. In 2017, production on intensive and extensive farms was 23499 tons.

The major farmed species is carp. Carp constitute 62% of the fish production for consumption.

There are 16 intensive farms in Hungary producing around 16.9 % of the fish production. The fish production by intensive farms was 3969 tons. The African sharptooth catfish and sturgeon are provided by the intensive fish farms. The African catfish provides the 81 % of the intensive fish production.

There are four trout farms using fresh water flow system in Hungary.

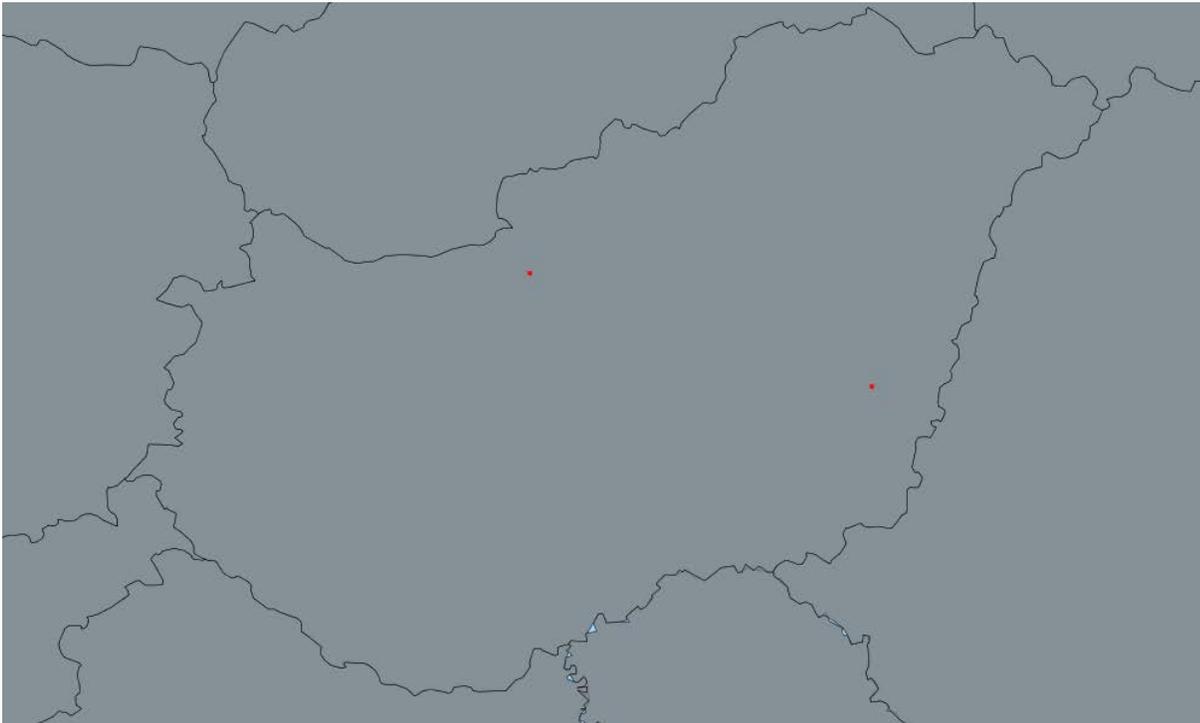
Historically the fish consumption is low in Hungary. It is around 5.7 kg/person/year, an increasing tendency could be observed during the last year.

**Health status:** Hungary has implemented an approved targeted surveillance program for KHV (whole territory of Hungary) in accordance with Commission Decision 2010/171/EU.

The sampling process at farms is supervised by the district veterinary officer. The farms producing fish only for consumption are not involved in the surveillance program. Put and take fisheries are also excluded. Last year, 214 epidemiological units of 190 fish farms were sampled.

Sampling of wild fish from natural waters is carried out in spring. All farms located within the 20 km wide zone alongside of the country border have to send samples/fish twice a year.

In 2017 one fish farm and one fishing pond found positive by KHV.



Due to the 2009/177/EC, the whole territory of Hungary is declared disease-free of infectious salmon anaemia (ISA).

According to Annex I to Decision 2010/221/EU, the whole territory is free of SVC (due to 2010/761/EU). Hungary continues monitoring based on risk assessment. In 2017 29 fish farms were sampled.

There are no surveillance and eradication programmes for IHN and VHS but the farms with susceptible species (like trout and pike) are examined yearly by virological methods. In 2017, 22 fish farms were sampled.

**Other disease problems:** In 2017, the main cause of increased mortalities was CEV at spring time and early summer. Mainly the put and take fisheries, fishing ponds noticed increased mortalities. Protozoan infections (*Trichodina* spp., *Ichthyobodo necator*, *Ichthyophthirius multifiliis* *Chilodonella* spp.) monogenean parasites (*Dactylogyrus*, spp., *Gyrodactylus* spp.) and bacterial dermatopathies (*Aeromonas* spp.) were in the background of economic losses in many cases.

The most examined fish species was carp.

One of the major problems in aquaculture industry is the availability of very few- authorized medicines.



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

**Aquaculture production:** Farmed species: Atlantic salmon, Arctic charr, rainbow trout, Senegalese sole, Atlantic cod. Land- and shore based facilities and sea cages.

**Health status:** None detected

**Other disease problems:** Emerging pathogens: *Tenacibaculum* and *Flavobacter* spp.



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

**Aquaculture production:** Aquaculture production in Ireland increased in 2017, up to a total of 20,600 tonnes. This is dominated by marine Atlantic salmon production of 20,000 tonnes. Freshwater rainbow trout farming takes place mainly in flow through pond farms and produced around 600 tonnes. Regarding non-salmon species, one perch farm was operational in 2016 and one farm specializing in the production of ornamental fish including koi carp.

**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 five rivers are sampled annually for *G. salaris* surveillance.

**Other disease problems:** 2017 saw the occurrence of cardiomyopathy syndrome on two sites, one of which contained young S1 smolts. 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 eight sites) in terms of freshwater treatment survival and attributing causes of mortality. One marine salmon site developed winter ulcer disease. For rainbow trout production in freshwater, rainbow trout fry syndrome and enteric redmouth persist on the same farms.



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

**Health status:** Shellfish (65%) and finfish farming (35%) represent the national aquaculture sector. 60% of the Italian production sites are located in the north, 18% in the center and 22% in the south. Finfish farming is divided into freshwater and marine fish species. According to FEAP production report, in 2016 the output of freshwater farmed fish amounted approximately to 39,200 tonnes, of which rainbow trout and other salmonids

(36,300 tonnes) had the major share, followed by sturgeon (1,000 tonnes), European eel (850 tonnes), common carp (700 tonnes) and Black bullhead/American Catfish (350 tonnes). Production of the marine farmed fish amounted approximately to 14,590 tonnes, where seabream (7,600 tonnes) and seabass (6,800 tonnes) were the main farmed species followed by meagre (190 tonnes). Traditional extensive aquaculture is still carried out in the “valli” which are brackish lagoons, especially in the North-Eastern regions. More modern aquaculture techniques for freshwater and marine species include intensive farms in raceways or ponds and cage systems in the sea, respectively.

**Health status:** In Italy the first eradication program started in the late '70s for VHS as a voluntary campaign and only in the regions where trout farming was more widespread. 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 14 VHS and 12 IHN infected farms. Italy is declared free for ISAV and no detection of exotic disease listed in Annex IV according to EU Council Directive 2006/88/EC has been made so far.

**Other disease problems:** In 2017 in Italy the main problem for aquaculture was the low water supply in summer (in some farms a >50% reduction of the water inlet was registered until October 2017). The high temperatures associated to the low availability of water caused an increased incidence in rainbow trout farms of bacterial diseases, in particular lactococcosis and enteric redmouth disease, caused by *Yersinia ruckerii* biotype 1 and 2. In rainbow trout hatcheries, both RTFS and IPN persist as the main infective diseases. Brook trout (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*) farming is increasing in Italy and furunculosis caused by *A. salmonicida* is the main disease affecting this species. Autologous vaccines are used in some farms.

An increasing number of KHV detections has been observed in 2017. Three outbreaks were registered in ornamental koi carp farms.

In marine species, the most frequent viral disease detected was VER. The disease severely affected sea bass farms, favored by the hot summer temperatures, but an increasing incidence of the reassortant strain RGNNV/SJNNV in sea bream hatcheries, affecting larval stages only, has been registered. Atypical vibriosis (i.e. *V. ordalii*, *V. harveyi*, *V. alginolyticus*, *V. splendidus*) ranked as the second infective problem for marine species.

Parasitic problems were registered in inland sea bass farms only.



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

**Aquaculture production:** Aquaculture in Latvia produce only freshwater fish species in large artificial pounds (up to 400 ha surface), through-flow facilities and recirculation facilities. Main produced species in aquaculture are carp, rainbow trout, catfish and sturgeon. There are five governmental fish farms, which implement activity of the Fish Resources reproductive state program, mainly producing salmon and sea trout smolts in the framework of national restocking program. Total aquaculture production are about 900 tons per year.

**Health status:** Each aquaculture animal establishment shall conclude a contract with veterinarian, according to which vet ensures the veterinary surveillance of aquaculture animals. In the case of suspicion, the farmer is obliged to inform the veterinarian about mortality of aquatic animals and the veterinarian must investigate cause of mortality or inform FVS what will ensure epidemiological investigation. FVS veterinary inspectors are visiting farms annually to ensure the welfare and health status of fish. Within the framework of State infections disease surveillance plan, all aquaculture farms which distribute fry and fishes for further growing and restocking shall be sampled and tested for VHS, IHN and KHV annually. Laboratory surveillance program are performed for the IHN, VHS and KHV since year 2005. According to COUNCIL DIRECTIVE 2006/88/EC Annex IV part II (non-exotic fish disease list), aquaculture farms belong to the category 3 (Not known to be infected, but not subject to surveillance program for achieving disease free status).

**Other disease problems:** Additional virological, bacteriological or ichtiopathological investigations are not mandatory in Latvia. The most common bacterial disease problems are Aeromonosis and Pseudomonosis, mainly *Aeromonas hydrophyla*, *sobria* and uncommon *salmonicida*. Factors contributing the clinical diseases are: stress, inadequate welfare and water quality problems. Myxobacteriosis are often clinically diagnosed in salmonids. Some parasitic diseases such as argulosis, philometroidoses, ergasilosis, lerneosis, piscicolas and monogenetic flukes (such as *Gyrodactylus*) are presented in ponds. The protozoa parasites, chilodonella, trichodina and less frequently ichtiophthirius are diagnosed often in through-flow facilities. These diseases usually affect young fish. The general protection measures should be used for disease control: prevention, sanitation of ponds and fish treatment. Various chemical and disinfection substances are the most common medical treatment products against ectoparasites, antibiotics- against microbial diseases.

## Lithuania



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

**Aquaculture production:** In 2017 annual aquaculture production was 3 736 611 kg. Main species: European (mirror) carp (*Cyprinus carpio*) - 78 % of annual production; bighead (*Aristichthys nobilis*) – 4.4 %; grass (Chinese) carp (*Ctenopharyngodon idella*) – 1.9 %; African (sharptooth) catfish (*Clarias gariepinus*) – 4.4 %, Atlantic (sharp-nosed) sturgeon (*Acispenser oxyrhynchus*) – 3.2 %, rainbow trout (*Oncorhynchus mykiss*) – 2.8%. Most developed ponds aquaculture, which produced 87 % of annual production, close recirculating systems produced 8.7 %, flow through systems – 4.3 %.

**Health status:** Samples for official national veterinary control on listed fish diseases and other (bacterial, parasite) diseases are taken by National Food and Veterinary Service. Due to the lack of competence of fish sampling and insufficient laboratory diagnostic capacities of bacterial fish diseases the surveillance system should be improved.

**Other disease problems:** Introducing of new fish species, increasing of fish density in ponds and water tanks, lack of water animals health specialists becomes problems for the development of aquaculture sector. It is suspected that Spring Viremia of Carp and pathogens of bacterial diseases influence significant losses for aquaculture farms.



**Author/Institute:** Norwegian Veterinary Institute

**Aquaculture production:** There is a growth in the production of cleaner fish, especially lump sucker, which is the second largest species produced in number in Norway today. Sea lice treatment is a challenge considering health and welfare. The new methods with mechanical or thermal elimination of sea lice from the fish and the crowding and pumping in front of this treatment are in many situations a too tough treatment of the fish. A lot of new built hatcheries with RAS technology gives new health- and welfare challenges in smolt production.

**Health status:** There is no changes in outbreaks of listed diseases.

**Other disease problems:** Both the production, catch and use of cleaner fish show knowledge gaps.



**Author/Institute:** Marek Matras

**Aquaculture production:** No significant changes from 2016.

**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 and KHV. In 2017 were reported 1 outbreaks of VHS, 4 outbreaks of IHN and 1 outbreaks of KHV. At the national level, Poland performs the monitoring for VHS, IHN and KHV

**Other diseases and health related issues:** In 2017, carp edema virus was detected in 10 common carp and koi farms. The presence of the IPNV has also been confirmed.



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



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



**Aquaculture production:**

Table I describes the number of active fish farms per region (Map I), species and system (July 2017)

Table I

Region	Fish farms (2017)					Total nº
	Trout and carp	Marine fishes (sea bass, gilthead seabream)				
		Intensive	Semi-intense	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		2		4
Total	25	56				81

\*Included in the marine fish farms

Map I



**Health status:**

**CATEGORIZATION OF PORTUGUESE FISH FARMS (March/2018)**

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	2
FISH (Species)	Disease- free status to (KHV) (Number of fish farms)
Carp	1

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

Thus, by means of an official sanitary surveillance taken annually for the DGV, in the species of culture with the highest production in the Portuguese market, one confirms that diseases that are required by law to notify, have not been diagnosed.

**Other disease problems:** No data submitted

## Romania



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

**Aquaculture production:** 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 rain fed ponds, irrigated or flow-through systems). Environmental condition are specific for trout, sturgeon and cyprinids species rearing, as well as for pike, pikeperch and European catfish.

**Health status:** 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. 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 Programme 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:** The most frequent diseases in salmonids farms are those that involve the myxobacteria group in fry and in adult stage followed by yersiniosis. In cyprinid 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:** Aquaculture in Serbia is performed primarily in aquaculture objects: trout and carp farms. The total area under carp farms is about 14 000 ha. Area under trout farms is about 14 ha. On carp farms, following species are reared: carp, white bighead, gray bighead, white grass carp, and predators: wells and pikeperch. Rainbow trout is produced on trout farms. On some farms fry of warmwater fish: bream (*Abramis brama*), tench (*Tinca tinca*), crucian carp (*Carassius carassius*), "wild" carp (*Cyprinus carpio*) and coldwater fish species: brown trout (*Salmo trutta*), Danubian salmon (*Hucho hucho*), and grayling (*Thymallus thymallus*) are produced for stocking of running and stagnant aquatic ecosystems. Total production varies from 15 000 tons: 2000 tons of rainbow trout (of that number market size trout is about 75%) and about 13 000 tons of warmwater species (approx. 11 000 tons of carp and 2000 tons accompanying species). 70 to 75 % of the warm water species quantity is market size fish.

**Health status:** Serbia runs a surveillance programme for viral haemorrhagic septicaemia (VHS), infectious haematopoietic necrosis (IHN) and koi herpesvirus disease (KHVD) based on EU regulations and a monitoring programme for infectious pancreatic necrosis (IPN), spring viraemia of carp (SVC) and bacterial kidney disease (BKD). Serbia has a national legislation as basis for their surveillance and disease control in aquatic animals, as well as regulations listing notifiable diseases of concern. In addition to national legislation, the principles laid down in the Council Directive 2006/88/EC as regards animal health requirements for aquaculture animals and products thereof are accepted. The monitoring and surveillance for fish viral diseases has mainly been based on the testing procedures given in the Commission Decision 2001/183/EC while for the bacterial diseases, standard diagnostic procedures has been used for screening purposes.

**Other disease problems:** No data submitted



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

**Aquaculture production:** The level of aquaculture in Slovakia is increasing but it is still not good. It is necessary to contribute to increasing domestic production, including fish processing, quality improvement and added value, streamlining production processes, maintaining employment in the sector, increasing resource efficiency in order to protect the environment, aquaculture and processing data collection and communication capability, including the implementation of the system control, inspection and enforcement of Union law in line with the EU's Common Fisheries Policy.

**Health status:** The surveillance is carried out in accordance with Council Directive 2006/88 / EC on VHS and IHN twice a year in spring and autumn. At least 30 fish are collected as one sample. KHV surveillance is performed once a year in summer when the water temperature is over 18 degrees.

**Other disease problems:** Protection against fish-eating birds is not adequate and suitable parasite drugs are not available.



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

**Aquaculture production:** In Slovenia, there are 233 salmonid and 85 cyprinid fish farms. Most of them have low production capacity. The annual production is 945 600 tonnes of salmonids and 216 100 tonnes of cyprinids (source: Statistical office of Slovenia; data from 2016). Beside production of rainbow trout and carp for human consumption, also brown trout, marble trout, brook trout, grayling and some cyprinids are produced for the repopulation of open waters.

**Health status:** Recently the number of VHS/IHN declared free (Category I) farms has significantly increased and is now 20 farms. In addition, 14 fish farms are in the category II (approved surveillance programmes for VHS/IHN free status). Most of farms are officially in the Category III, however in fact these farms are not of

unknown health status. Fish farms trading with live fish are for many years annually checked for the presence of IHNV and VHSV with regard the National surveillance programme paid by AFSVSP (Annual Decree on the systematic monitoring of animal diseases and vaccination). There are no fish farms in Category IV while in the Category V, there are 5 VHSV infected, 22 IHNV infected and 14 KHV infected fish farms.

*Other disease problems:* See above



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

*Aquaculture production:* Spain has a wide variety of hydrological resources, where aquaculture is possible either in continental, brackish as well as seawater. Different aquaculture system can be found:

In continental water

- 1) Tanks are located beside a river. These tanks are usually rectangular and concrete made out, operating on two techniques:
  - a) flow-through, an open system where river water flows through the units via a race. The rainbow trout is the most important species produced by this system followed by carp and sturgeon
  - b) The recirculation, a closed system that consists of circulating water in the tanks and recycling it via pumping and processing units, are used in the rearing of eel and tilapia.
- 2) In ponds: the fish live in ponds where they feed off the ecosystem, this technique is used in the rearing of tench and carp

Seawater

- 1) Cage systems. Net-pens (cages) can be of different kinds but the principle is the same; every type is based on a natural exchange of water through pens. The most important specie cultivated in this system are: seabass, seabream, tuna, meagre, blackspot.
- 2) Onshore tanks. Square or circular cement tanks are used, with open-circuit pumped seawater. Aeration or oxygenation systems are normally used to maintain the water at oxygen saturation. Turbot and sole are reared in this system.
- 3) Esteros. The principle of esteros in southern Spain is as follow: fish were allowed to enter lagoons, after which the entrance was closed off, trapping them inside. The trapped fish fed naturally, until they were harvested. In this system seabass is usually cultured in polyculture with seabream, mullets, eels and meagre.

*Health status:* Spain is a country free of ISA. Around 90% of fish farm with susceptible species to VHS and INH are located on free zones for these diseases, according with annex V, part II of council directive 2006/88/EC and also the basin of main rivers on the northern half of Spain is considered as officially free, since the source of water to the estuary.

In the frame of official surveillance for these diseases the competent authorities of Community Autonomies (CCAA) have developed specific surveillance programs in accordance with the sampling plans and diagnostic methods laid down in Commission Implementing Decision (EU) (2015/1554) and are coordinated by Central Authority (MAPAMA / Ministry of Agriculture and Fisheries, Food and Environment).

*Other disease problems:* No data submitted

## Sweden

**Author/Institute:** Charlotte Axén/SVA

**Aquaculture production:** Mainly rainbow trout farmed for food in open cages or for put-and take. Also Arctic char in open cages. RAS is increasing and includes species as Tilapia, Clarias, Sturgeon and Atlantic salmon.

**Health status:** No listed diseases detected during the last years (last was VHSV in a sea farm (west coast) in ~2000. The board of agriculture risk classifies all farms according to risk of introduction of disease and risk of spread of disease. Farms in category I are sampled for virus and BKD each year and category II are sampled biannually. Most farms are in category III, where no sampling is performed unless there is suspicion of disease, meaning there is no active surveillance in a lot of farms.

**Other disease problems:** The major health issue is RTFS, and we see a trend of increasing resistance against oxolinic acid and oxytetracycline. Fortunately, no isolates have so far been resistant to florfenicol, the standard antibiotic used against RTFS in Sweden. We are not sure what is driving this resistance, since fish are rarely treated with oxolinic acid or oxytetracycline, it would be interesting to hear news on this from other EU countries (as I have heard, the same trend can be seen elsewhere)

## Switzerland

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

**Aquaculture production:** The main species is rainbow trout farmed in flow through facilities. A number of farms produce brown trout for restocking of rivers. New facilities aim for perch, pike-perch and salmon (most of them RAS). Attempts are made to produce shrimps (RAS-facilities).

**Health status:** One farm was affected by VHSV and immediately sanitized. On the same farm IPNV was detected which was sanitized together with VHSV. Controls are not yet established in all cantons. On suspect fish are sent in to the National fish disease laboratory which is also the reference lab for fish diseases.

**Other disease problems:** A major challenge in salmonid culture are Flavobacterium infections. Given the increasing number of farms producing percids, perchhabdovirus infections becomes a disease of concern.

## The Netherlands

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

**Aquaculture production:** The Netherlands has appr. 50 fish farms: indoor 25°C: 13 eel, 10 African catfish, 3 clausse, 2 tilapia, 2 pike perch, indoor, colder: a single turbot-, and sole farm, and a new big yellow tail kingfish farm; out/indoor 8 trout farms. Plus 58 put and take trout fisheries. In total 108 farms, production appr. 8500 ton/year. Data based on list of registered fish holding sites from the Ministry, supplemented with own experience.

**Health status:** Our country has a passive surveillance on the listed fish diseases of 2006/88/EC. So, only when there is a suspicion, samples are taken for diagnosis and the 2006/88/EC measurements are taken. All trout and one single carp farm(s) are in Cat. III.

**Other disease problems:** Apart from problems in eel farming with AngHV1, which are highly stress dependent there were no new detections of CEV. No new problems have occurred in 2017.

## Turkey

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

**Aquaculture production:** No data submitted

**Health status:** We do not have any categorization of fish farms in our country according to council directive 2006/88/EC.

**Other disease problems:** No data submitted

## England and Wales

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

**Aquaculture production:** Finfish 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 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 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 lump sucker *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 and as a result, facilities holding wrasse have been

subject to authorisation by the Fish Health Inspectorate in order to monitor the health and welfare of these fish

**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 2017 there were 23 outbreaks of KHV disease in managed fisheries in England (10 fewer than in 2016). All infected fisheries are subject to statutory controls. One outbreak of KHV disease occurred in an aquaponics unit which was culled and disinfected.

In addition, an outbreak of spring viraemia of carp (SVC) occurred in a managed fishery in England in 2017. The stocks in the affected fishery were culled, the fishery drained, disinfected and fallowed. The site remains under statutory movement controls. This was the first outbreak of SVC in the UK since 2011. An epidemiological investigation was conducted but the source of the infection was not identified.

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.

**Other disease problems:** Overall, the health status of farmed fish in England and Wales has shown an improvement in recent years. Important contributory factors include better supplies of water, and lower stocking densities on farms.

Major disease concerns in rainbow trout and brown trout farming in England and Wales remain the 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 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. The protozoan flagellate costia *Ichthyobodo necator* remains an important cause of morbidity and mortality in salmonid hatcheries. Restrictions on the availability of treatments, including the limited availability of antibiotics and vaccines are of major concern to the salmonid farming sector.

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 lump sucker and wrasse species. The microsporidian *Nucleospora cyclopteri* appears to be a widespread problem in lump sucker. 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:** The finfish sector in Northern Ireland produced approximately 1,100 metric tonnes of finfish, valued at £4.2 million in 2016. Of the 39 authorised aquaculture production businesses, 37 are inland and 2 are marine sites. The main species cultivated is Rainbow trout (*Oncorhynchus mykiss*) produced for the table market and for restocking angling waters. There is also significant production of Atlantic salmon (*Salmo salar*). Brown trout (*Salmo trutta*) and Carp (*Cyprinus carpio*), mainly for restocking, are also produced.

**Health status:** Category I status in respect of the listed diseases. The Agri-Food and Biosciences Institute (AFBI) carry out an annual programme of disease testing on behalf of DAERA to an agreed Service Level Agreement. This includes sampling and testing of finfish farms and wild fisheries for listed diseases and those diseases which Northern Ireland has Article 43 measures in place for. An annual programme of inspection is also carried out by DAERA Fish Health Inspectorate (FHI).

**Other disease problems:** Northern Ireland do not currently have any challenges in this respect.

## UK – Scotland

**Author/Institute:** Marine Scotland Science

**Aquaculture production:** There are 24 businesses operating 44 active sites for the production of rainbow trout. In 2016, 8,096 tonnes of rainbow trout were produced, 7,437 tonnes for the table market and 659 tonnes for restocking angling waters. Of the 44 active sites 32 sites reported production in 2016. Freshwater production accounted for 4,337 tonnes and seawater production the remaining 3,759 tonnes. Freshwater production was from sites operating cages, ponds, raceways, tanks and hatcheries and seawater production was all from cage site facilities. Over 9.9 million ova were laid down to hatch in 2016 with 9.6 million being imported from foreign sources while the remaining 0.3 million were from Scotland or other GB based fish farms.

42.9 million Atlantic salmon smolts were produced by 26 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 64 million ova were laid down to hatch with 58 million of these ova coming from foreign sources.

In 2016, the total production of Atlantic salmon was 162,817 tonnes. These fish were produced by 15 businesses operating 253 active sites. Fish production of 162,796 tonnes was from the seawater cage sites (248 sites) while 21 tonnes of production was reported from the seawater tank sites (5 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	12	15	41
Halibut	2	3	67
Lumpsucker	4	7	10
Wrasse	3	3	4

Lumpsucker 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 brook charr, sheepshead minnow, tiger trout and turbot produced in Scotland. The majority of trout production takes place in freshwater tanks, ponds and raceways with only 5 tonnes 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:** The status of Scotland (as part of the Great Britain zone under the UK Member State) with regard to the listed fish diseases is as follows:

EHN – Category I (Exotic to the EU)

VHS – Category I

IHN – Category I

KHV – Category III (no detection in Scotland, status for whole of UK)

ISA (HPR deleted) – Category I

Fish health inspectors carry out statutory inspection and testing programmes on fish farms throughout Scotland to:

- maintain the approved status of Great Britain as a disease-free area for ISA, VHS and IHN

- prevent the spread of listed diseases, through epizootic investigations and application of movement restrictions
- fulfil the monitoring required in support of the national measures for the control of SVC and *Gyrodactylus salaris*
- fulfil the monitoring required in support of the domestic controls for bacterial kidney disease
- enable detection of emerging diseases of fish

To meet the statutory requirement for maintenance of areas listed as free from listed diseases, we inspect all farms holding susceptible species as part of a risk-based active surveillance programme. The frequency of visits to individual farms is based upon the level of risk of disease emergence, or spread that they pose. Those farms posing the highest risk are visited every year, medium risk every second year and low risk every three years. Having areas listed as disease-free and national controls mean that only fish of equivalent health status can be imported into Great Britain, thereby safeguarding the health of our stocks.

In addition, passive surveillance is carried out between scheduled farm inspections by contacting sites, and also from the receipt of information from industry and health experts in the course of their work. Inspections and sampling are carried out on notification of the suspicion of listed or emerging diseases at a farm. Passive surveillance also allows an assessment to be undertaken on the current production status of a farm and on the most appropriate surveillance frequency for the farm.

If a farm is suspected or confirmed as being infected with a listed disease, surveillance is increased. The Fish Health Inspectorate is responsible for overseeing the withdrawal of fish from sites confirmed with a listed disease and the cleaning and disinfection of equipment on site. We will not allow infected farms to be restocked until the recommended fallow period has been completed.

If during a site inspection an inspector observes sick, moribund or abnormally behaving on a farm, then diagnostic samples may be taken. The purpose of these samples is to rule out the presence of a listed disease, or to identify other non-listed pathogens, including emerging diseases.

**Other disease problems:** 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 water jets, heated water and freshwater baths). Many sites using cleaner fish (wrasse and lumpsuckers).

Complex gill issues - Atlantic salmon (all seawater stages). This is often a complex clinical picture involving multiple agents and also environmental insults. Fish are affected by multiple pathogens such as *Paramoeba perurans*, salmon gill poxvirus, *Paranucleospora theridion*, *Parvicapsula pseudobranchicola*, *Candidatus syngnamydia salmonis*, *Candidatus branchiomonas cysticola* etc.

Cardiomyopathy syndrome (CMS), caused by piscine myocarditis virus (PMCV), has increased in prevalence within the Scottish Atlantic salmon aquaculture industry over the last few years and 8 cases were diagnosed in 2017.

The clinical picture also appears to be changing. Historically CMS affected harvest sized Atlantic salmon (>4 Kg) but we have recently observed clinical outbreaks in much smaller fish (<2Kg) and the disease appears to have a larger geographical spread throughout the country than previously reported.

A significant mortality event attributed to *Pasteurella skyensis* occurred on two Atlantic salmon sites in 2017. The fish were approximately 4Kg in size and it was reported that ~125 000 fish (500 tonnes) were lost during the disease outbreak.

## Annex 1: Number of fish Farms

Country	Total Number of authorized fish farms active in 2017 (farms/sites that were only active in parts of 2017 are also included)
Austria	237
Belgium	100
Bosnia and Herzegovina	Na
Bulgaria	637
Croatia	90
Cyprus	20
Czech Republic	1759
Denmark	230
England and Wales	297
Estonia	33 authorized fish farms (24 active in 2017)
Faroe Islands	Na
Finland	Na
France	Na
Germany	12.963
Greece	410
Hungary	227
Iceland	53
Ireland	63
Italy	795
Latvia	45
Lithuania	There are 89 registered aquaculture subject, which are engaged in three main activities: fish breeding (rearing), growing and trade in aquaculture animals.
Malta	Na
The Netherlands	108
North Ireland	39
Norway	The number of licenses for salmon and rainbow trout production at sea was 1051, with 826 active sea sites. The number of smolt licenses were 220. For other marine species there were 76 licenses, and 58 active sea sites. There were 71 (26.10.2017) licenses for land based production of marine species. In addition, there are 51 licenses for production of cleanerfish. Because some landbased cod- hatcheries have changed, their production to cleanerfish there may be some deviations in these numbers.
Poland	3713
Portugal	178
Romania	694
Scotland	375
Serbia	107
Slovakia	169
Slovenia	Na
Spain	299
Sweden	186
Switzerland	365 (Estimate, no official numbers available)
Turkey	Total number of marine and freshwater fish farms were 2308
<b>Total</b>	<b>27806</b>

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

Country	Number of farms 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>	11	11	0	0	1	1	0	0	180	180	180	43	0	0	0	0	1	1	0	0	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>Bosnia and Herzegovina</i>	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na
<i>Bulgaria</i>	0	0	0	0	16	16	15	64	38	37	32	92	0	0	0	0	0	0	0	0	420
<i>Croatia</i>	0	0	0	20	19	19	0	6	0	0	19	0	0	0	0	2	0	0	0	0	45
<i>Cyprus</i>	9	9	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	236	0	0	0	0	0	1103	202	0	1605	0	0	0	0	0	0	0	1	15
<i>Denmark</i>	195	219	219	0	0	0	0	0	24	0	0	4	0	0	0	0	0	0	0	0	7
<i>England and Wales</i>	171	171	171	2	0	0	0	0	0	0	0	138	0	0	0	0	0	0	0	0	10
<i>Estonia</i>	1	1	15	0	15	15	0	2	3	3	0	0	0	0	0	0	0	0	0	0	9
<i>Faroe Islands</i>	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na

Country	Number of farms 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>Finland</i>	454	250	269	0	0	0	0	0	0	0	0	24	33	0	0	0	0	0	0	0	0
<i>France</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Germany</i>	146	140	912	8	9	7	0	0	7101	6808	208	5067	0	0	0	0	18	5	0	36	208
<i>Greece</i>	0	0	0	0	0	0	0	0	62	62	62	7	0	0	0	0	0	0	0	0	341
<i>Hungary</i>	0	0	0	0	0	0	0	190	16	16	0	0	0	0	0	0	0	0	0	0	6
<i>Iceland</i>	3	31	3	0	0	0	0	0	28	0	28	0	0	0	0	0	0	0	0	0	26
<i>Ireland</i>	13	59	59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
<i>Italy</i>	189	178	513	0	10	10	0	0	329	315	0	102	0	0	0	0	14	12	0	0	183
<i>Latvia</i>	0	0	0	0	0	0	0	0	18	18	0	20	0	0	0	0	0	0	0	0	8
<i>Lithuania</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Malta</i>	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na
<i>The Netherlands</i>	0	0	0	0	0	0	0	0	66	66	66	1	0	0	0	0	0	0	0	0	41

Country	Number of farms 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>Northern Ireland</i>	31	33	33	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Norway</i>	826	826	34	0	0	0	190	0	0	0	588	0	0	0	14	0	0	0	0	0	0
<i>Poland</i>	16	18	519	1	0	0	0	0	502	497	0	3193	0	0	0	0	1	4	0	1	0
<i>Portugal</i>	27	27	178	1	2	2	178	0	0	0	178	0	0	0	178	0	0	0	178	0	0
<i>Romania</i>	0	0	189	0	7	7	0	0	215	112	0	364	0	0	0	0	0	0	0	1	17
<i>Scotland</i>	79	356	359	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1
<i>Serbia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Slovakia</i>	0	0	0	0	67	67	0	14	89	89	0	104	0	0	0	0	0	0	0	0	0
<i>Slovenia</i>	20	20	233	0	14	14	0	0	233	233	0	85	0	0	0	0	5	22	0	14	0
<i>Spain</i>	125	102	299	0	0	0	0	0	20	15	0	1	0	0	0	0	0	0	0	0	153
<i>Sweden</i>	164	164	164	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	19
<i>Switzerland</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Country	Number of farms 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>Turkey</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>	<b>2481</b>	<b>2616</b>	<b>4405</b>	<b>39</b>	<b>160</b>	<b>158</b>	<b>383</b>	<b>276</b>	<b>10027</b>	<b>8653</b>	<b>1361</b>	<b>10855</b>	<b>33</b>	<b>0</b>	<b>192</b>	<b>2</b>	<b>42</b>	<b>46</b>	<b>178</b>	<b>53</b>	<b>1523</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		
Austria	2	0	4	0	No	No
Belgium	1	0	5	0	No	Na
Bosnia and Herzegovina	Na	Na	Na	Na	Na	Na
Bulgaria	0	0	0	0	No	No
Croatia	0	0	0	0	Yes there is a decrease because there were neither new outbreaks, nor positive samples on the farms that eradicated diseases	No
Cyprus	0	0	0	0	Na	No
Czech Republic	0	0	3	0	In comparison to the previous year, there is decrease in the number of VHS outbreak. One outbreak was detected in 2015 and in 2016 were confirmed 3 outbreaks. In 2017, there was no outbreak of VHS. In comparison to previous year there was confirmed one KHV outbreak more. Two outbreaks in Southern bohemian Region (after fulfilling of all measures lay down in Directive 2006/88/ES and in Decision 2015/1554 - regaining undetermined health status) and one outbreak in Region of Zlín (for the first time applied only minimum control measures - status infected).	No
Denmark	0	0	1	0	No	No
England and Wales	0	0	30	0	35 sites reported as infected with KHV in 2016. No outbreaks on Fish Farms.	No
Estonia	0	0	0	0	No	No
Faroe Islands	Na	Na	Na	Na	Na	Na
Finland	0	5	0	0	Yes. Increase due to IHN epidemia in three farms and two put and take ponds.	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		
France	0	0	0	0	Na	No
Germany	32	5	136	0	<p>Baden-Württemberg: For koi - increase in KHV cases (1 large provider of ornamental fish had supplied many pet shops in Germany.).</p> <p>Bavaria: VHS: decrease (2016: 17; 2017: 6)  IHN: increase (2016: 2; 2017: 4)  KHV: significant increase (2016: 3; 2017: 15). (1 large provider of ornamental fish was identified as the source of infection.)  ISA: no difference (0)</p> <p>Berlin: No reporting.  Brandenburg: no  Bremen: No reporting.  Hamburg: No reporting.  Hesse: There was an increase in KHV infections among ornamental fish.  Mecklenburg-W. Pomerania: no  Lower Saxony: Yes, regarding KHV-I. 18 KHV-I outbreaks were connected with one KHV-I outbreak in a big trader of ornamental fish, while only ornamental fish holdings were identified as contacts; except one all of these holdings were not subjected to approval or registration; see also maps.  North Rhine-Westphalia: There was an increase in VHS infected fish farms; one farm was infected since 2012 and another one since 2013; all other infections have their probable origin in one and the same infected fish farm; the number of KHV-I outbreaks has increased, in most cases in connection with an outbreak in a big trader of ornamental fish in Lower Saxony.  Rhineland-Palatinate: No reporting.</p>	<p>Baden-Württemberg: no  Bavaria: There was a significant increase of KHV cases.  Berlin: No reporting.  Brandenburg: no  Bremen: No reporting.  Hamburg: No reporting.  Hesse: no  Mecklenburg-W. Pomerania: no  Lower Saxony: no  North Rhine-Westphalia: no  Rhineland-Palatinate: no  Saarland: no  Saxony: increase in severity regarding KHV-I  Saxony-Anhalt: no  Schleswig-Holstein: no  Thuringia: no</p>

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		
					<p>Saarland: There was an increase (previous year 0)</p> <p>Saxony: There was an increase in KHV-I outbreaks compared to 2016, both in edible and ornamental carp (koi).</p> <p>Saxony-Anhalt: There was a slight increase in VHS, but no case with acute signs of disease; all cases were detected during routine controls; increase in KHV-I due to trade with infected holdings.</p> <p>Schleswig-Holstein: no</p> <p>Thuringia: Yes; rare VHS outbreaks, the four outbreaks in 2017 were not epidemiologically related; 1 KHV outbreak has been detected in voluntarily surveyed carps imported from Czech Republic at the beginning of 2017.</p>	
<b>Greece</b>	0	0	0	0	No	No
<b>Hungary</b>	0	0	2	0	No	No
<b>Iceland</b>	0	0	0	0	No	No
<b>Ireland</b>	0	0	0	0	No	No
<b>Italy</b>	0	0	3	0	No	No
<b>Latvia</b>	0	0	0	0	No	No
<b>Lithuania</b>	0	0	0	0	Decrease in KHV positive samples. In 2016 there were 6 positive samples of KHV.	No
<b>Malta</b>	Na	Na	Na	Na	Na	Na
<b>The Netherlands</b>	0	0	9	0	No change. In 2016 there was 1 isolated IHN outbreak, but now new IHN suspicion occurred in 2017.	A slight decrease. We did not detect any CEV, and no IHNV.
<b>Northern Ireland</b>	0	0	0	0	No	NA
<b>Norway</b>	0	0	0	14	It was two more outbreaks of ILA in 2017 compared with 2016, but one less than in 2015.	No changes in ISA-outbreaks
<b>Poland</b>	1	4	1	0	Decrease in the number of fish farms infected with VHS, IHN and KHV.	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		
Portugal	0	0	0	0	No	No
Romania	0	0	0	0	Yes, a decrease	No
Scotland	0	0	0	0	No	No
Serbia	0	0	0	0	No	No
Slovakia	399	374	14	0	No	No
Slovenia	0	6	1	0	No	No
Spain	0	0	0	0	No	No
Sweden	0	0	0	0	No	No
Switzerland	1	0	0	0	In 2016 there was no outbreak of VHS, in 2017 one. The respective farm has been sanitized and subsequent samplings were all negative.	No
Turkey	0	0	0	0	No	No

## 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	Disease or symptoms	Fish species	Disease or symptoms
Austria	Brown trout, char	furunculosis	stocked rainbow trout	PKD	Koi	CEV	None	None
Belgium	Carp	CEV	None	None	None	None	None	None
Bosnia and Herzegovina	Na	Na	Na	Na	Na	Na	Na	Na
Bulgaria	rainbow trout (Oncorhynchus mykiss)	IPN	None	None	None	None	None	None
Croatia	Sea bass	Tenacibaculosis	Sea bass	Infection with <i>Vibrio harveyi</i>	Sea bream	Sparicotyle sp.	None	None
Cyprus	None	None	None	None	None	None	None	None
Czech Republic	None	None	None	None	None	None	None	None
Denmark	Rainbow trout	HSMI like disease in RAS caused by PRV3	Rainbow trout	Red mark syndrome caused by <i>Midichloria mitochondrii</i>	Rainbow trout	BKD primarily in RAS	None	None
England and Wales	rainbow trout (O.mykiss)	red mark syndrome	rainbow trout (O.mykiss)	puffy skin disease	None	None	None	None
Estonia	No.	None	None	None	None	None	None	None
Faroe Islands	Na	Na	Na	Na	Na	Na	Na	Na
Finland	rainbow trout	IPN	None	None	None	None	None	None
France	None	None	None	None	None	None	None	None
Germany (see annex 4a)			s					
Greece	SEABASS	VNN/VER	SEABASS	<i>Aeromonas veronii</i>	SEABREAM	<i>Sparicotylae chrysophrii</i>	SEABASS	<i>Lernathropus kroyeri</i>

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms
Hungary	None	None	None	None	None	None	None	None
Iceland	Atlantic salmon (Salmo salar)	2 outbreaks of BKD in 2017.	None	None	None	None	None	None
Ireland	Atlantic salmon	Pancreas disease	Atlantic salmon	Amoebic gill disease	Atlantic salmon	Cardiomyopathy syndrome	None	None
Italy	None	None	None	None	None	None	None	None
Latvia	Salmonidae	Aeromonosis	Cyprinidae	Aeromonosis	Coregonidae	Aeromonosis	None	None
Lithuania	Carp	Increase in fish juvenile mortality.	None	None	None	None	None	None
Malta	Na	Na	Na	Na	Na	Na	Na	Na
The Netherlands	Eel	AngHV-1 (6x), partly in double infections with EVEX (3/6) and E.tarda (1/6)	Eel	Pseudomonas anguilliseptica (2x)	Eel	Vibrio vulnificus (potentially zoonotic), 1x	Rainbow trout	Y. ruckeri (1x)
North Ireland	N/A- No known fish diseases.	None	None	None	None	None	None	None
Norway	Lump sucker	Problems with high mortality both in the production of juveniles and the use as cleaner fish in the salmon production. Flavivirus may be one of the problems, but ulcerations and bacterial infections may also kill a lot of fish. Perhaps too little knowledge about management is the most important challenge.			Atlantic salmon	PD, HSMB, CMS and yersiniosis	None	None
Poland	None	None	None	None	None	None	None	None
Portugal	N/A	N/A	None	None	None	None	None	None
Romania	Trout	Yersiniosis, IPN, furunculosis,	Carp	SVC	None	None	None	None

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms
		BKD						
Scotland	Atlantic salmon	As listed in 3.2 & 3.5 (Additional files attached)	Lumpfish	As listed in 3.2 (Additional files attached)	Brown trout	As listed in 3.2 (Additional files attached)	None	None
Serbia	Common carp	CEV	Prussian carp	CyHV-2	None	None	None	None
Slovakia	None	None	None	None	None	None	None	None
Slovenia	Rainbow trout	RTFS, Yersiniosis, Aeromonas infections	Other salmonids and grayling	Furunculosis	Carp	Aeromonas infections, parasites	None	None
Spain	None	None	None	None	None	None	None	None
Sweden	Rainbow trout, Arctic char	BKD	Rainbow trout	RTFS	None	None	None	None
Switzerland	Perch, Pike perch	New outbreak of Perchrhabdovirus	Rainbow and brown trout	Flavobacterial diseases (external and internal)	None	None	None	None
Turkey	Rainbow trout	IPNV	None	None	None	None	None	None

## Annex 4a: Germany

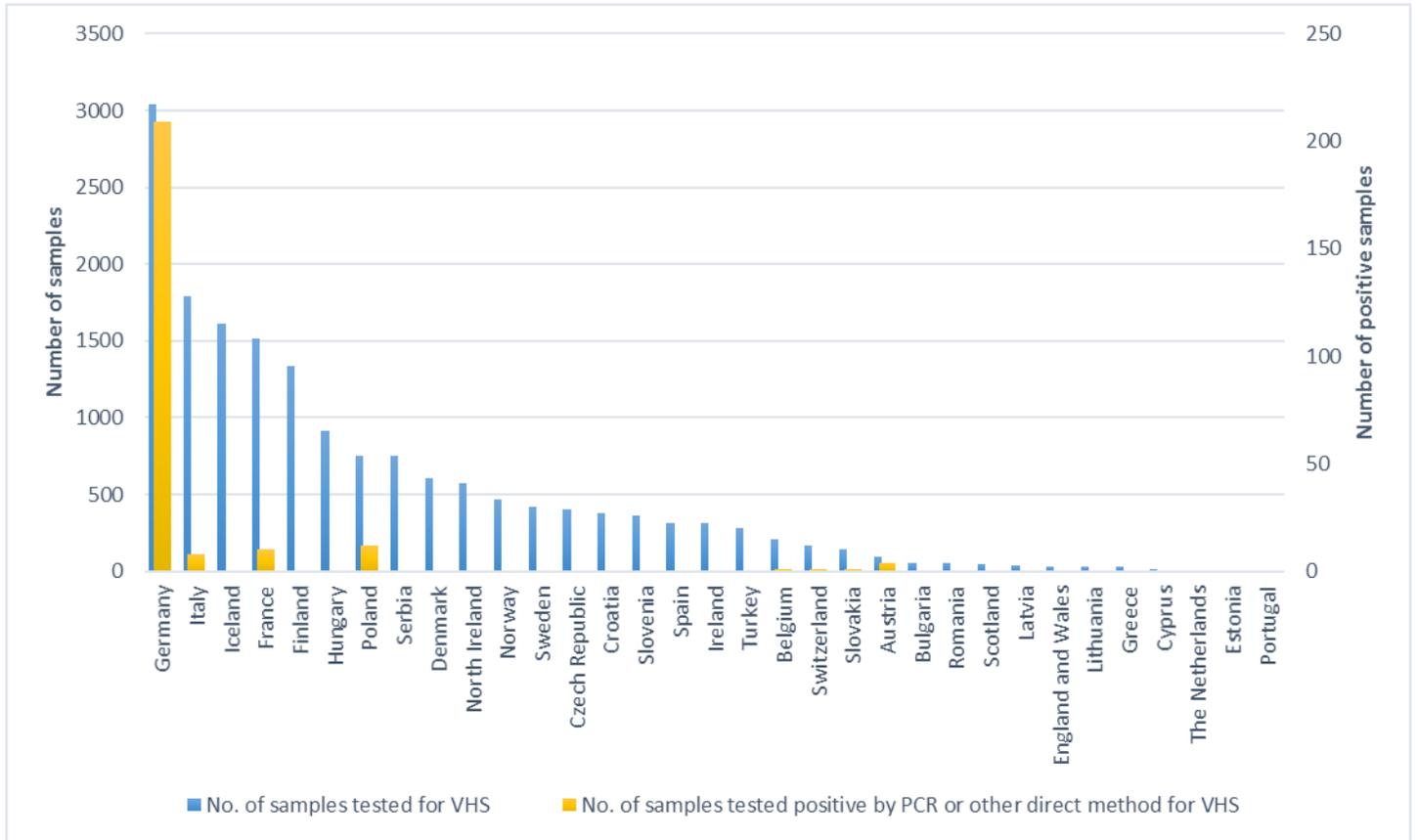
Fish Species	Disease or symptom
Baden-Württemberg: rainbow trout rainbow trout rainbow trout	flavobacteriosis, RTFS, in some cases with high losses ERM ichthyophthiriasis
Bavaria: charr, brown and lake trout salmonids salmonids rainbow trout salmonids	furunculosis, ulcers, generalized infections flavobacteriosis; RTFS, ulcers, skin infection ichthyophthiriasis, skin and gills affected ERM: generalized infections PKD: swollen kidneys, anaemia, immunodeficiency
Brandenburg: rainbow trout	BKD, IPN
Hamburg: no report	
Hesse: rainbow trout salmonids	Flavobacter sp./ Flexibacter psychrophilum PKD, Ichthyophthirius multifiliis
Mecklenburg-W. Pomerania: no report	
Lower Saxony: carp/koi	CEV, associated with morbidity and mortality
North Rhine-Westphalia: no report	
Rhineland-Palatinate: no report	
Saarland: no report	

Saxony: Cyprinus carpio Onchorhynchus mykiss Cyprinus carpio Cyprinus carpio	7 CEV outbreaks (gill swelling, enophthalmus, apathy, anorexia) furunculosis dilepididiosis suspicion of iridovirus infection; gill swelling, enophthalmus, anorexia
Saxony-Anhalt: no report	
Schleswig-Holstein: no report	
Thuringia: rainbow trout	PKD

## Annex 5: Laboratory data

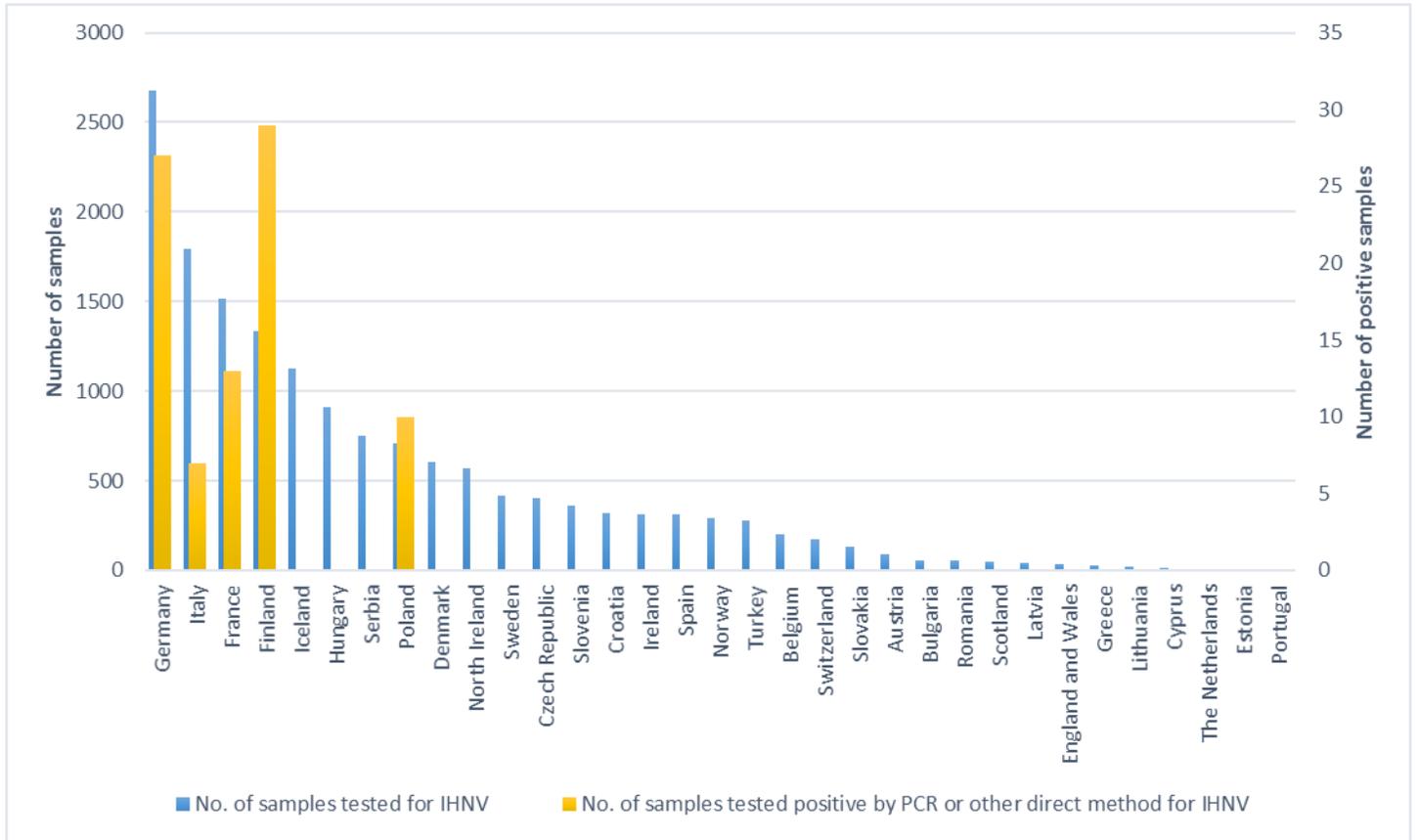
### Number of samples tested for VHSV in Europe in 2017

Country	No. of samples tested for VHS	No. of samples tested positive by PCR or other direct method for VHS
Germany	3041	209
Italy	1790	8
France	1514	10
Finland	1332	0
Iceland	1613	0
Hungary	911	0
Serbia	750	0
Poland	754	12
Denmark	602	0
North Ireland	570	0
Sweden	417	0
Czech Republic	403	0
Slovenia	360	0
Croatia	376	0
Ireland	311	0
Spain	313	0
Norway	467	0
Turkey	279	0
Belgium	204	1
Switzerland	170	1
Slovakia	141	1
Austria	94	4
Bulgaria	54	0
Romania	53	0
Scotland	49	0
Latvia	38	0
England and Wales	31	0
Greece	26	0
Lithuania	31	0
Cyprus	12	0
The Netherlands	7	0
Estonia	0	0
Portugal	0	0



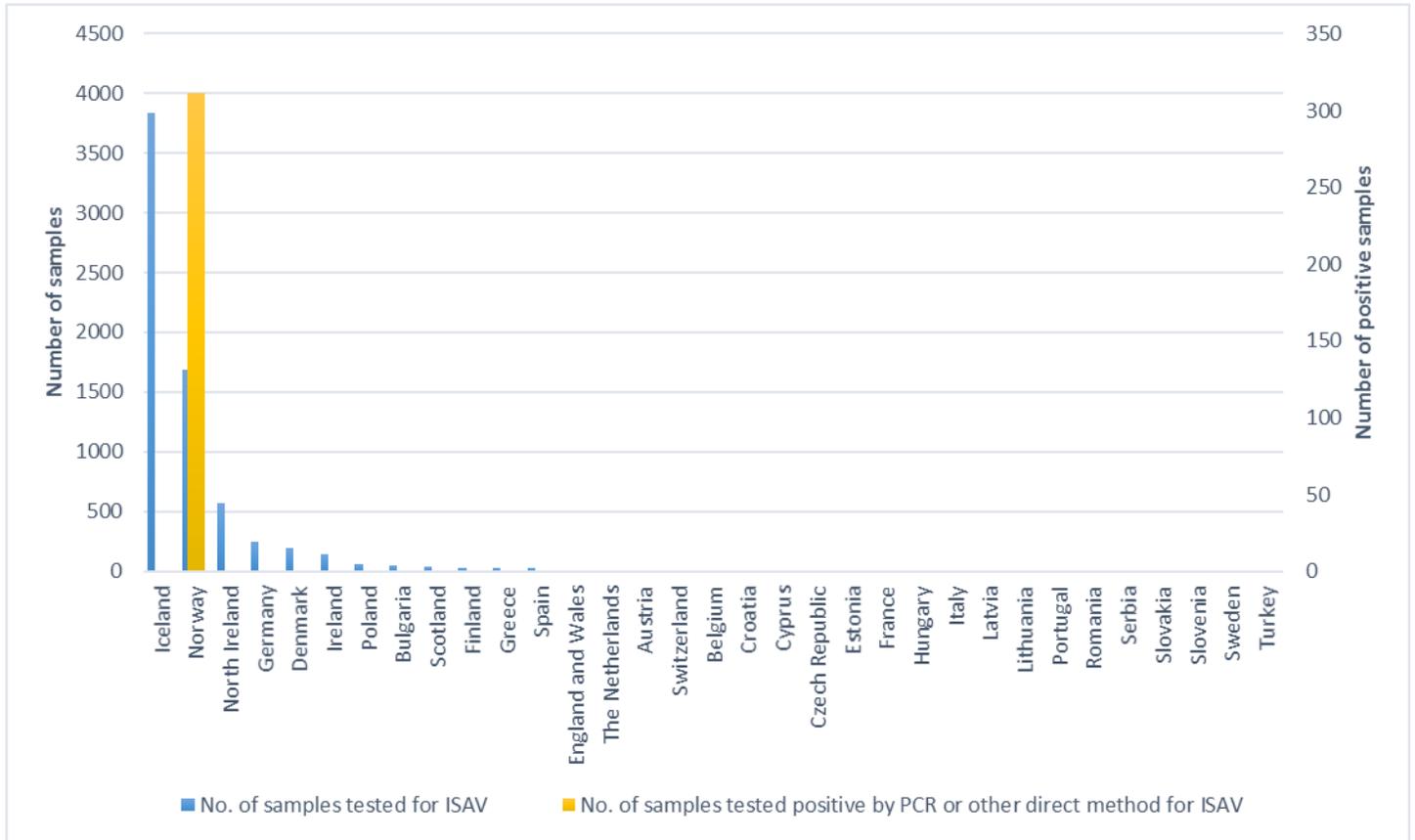
## Number of samples tested for IHNV in Europe in 2017

Country	No. of samples tested for IHNV	No. of samples tested positive by PCR or other direct method for IHNV
Germany	2675	27
Italy	1791	7
France	1514	13
Finland	1332	29
Iceland	1129	0
Hungary	911	0
Serbia	750	0
Poland	709	10
Denmark	602	0
North Ireland	570	0
Sweden	417	0
Czech Republic	403	0
Slovenia	360	0
Croatia	319	0
Ireland	311	0
Spain	310	0
Norway	292	0
Turkey	279	0
Belgium	204	0
Switzerland	170	0
Slovakia	130	0
Austria	92	0
Bulgaria	53	0
Romania	53	0
Scotland	48	0
Latvia	38	0
England and Wales	31	0
Greece	26	0
Lithuania	17	0
Cyprus	12	0
The Netherlands	6	0
Estonia	0	0
Portugal	0	0



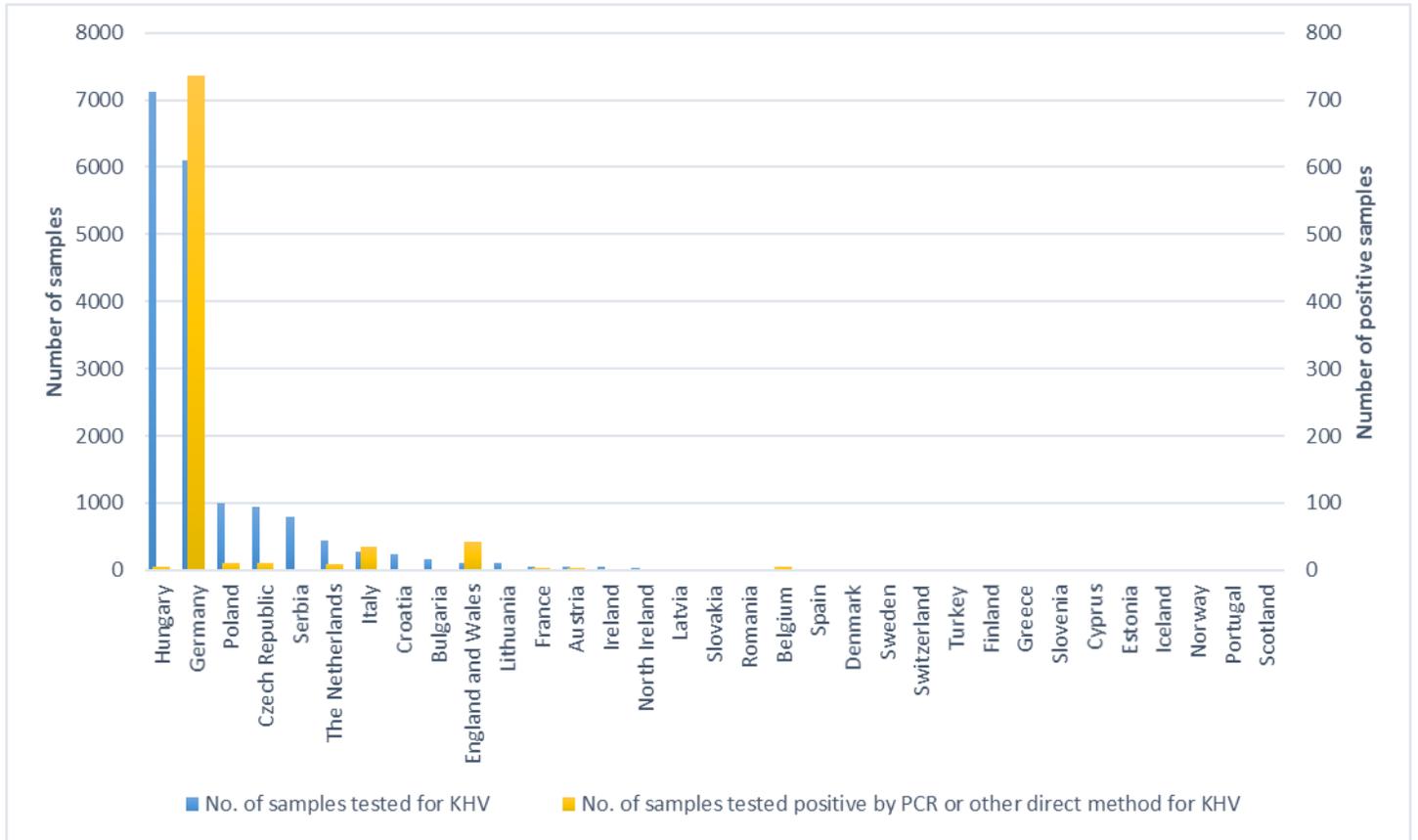
## Number of samples tested for ISAV in Europe in 2017

Country	No. of samples tested for ISAV	No. of samples tested positive by PCR or other direct method for ISAV
Iceland	3834	0
Norway	1689	311
North Ireland	570	0
Germany	243	0
Denmark	195	0
Ireland	140	0
Poland	60	0
Bulgaria	48	0
Scotland	39	0
Finland	28	0
Greece	26	0
Spain	22	0
England and Wales	6	0
The Netherlands	6	0
Austria	5	0
Switzerland	1	0
Belgium	0	0
Croatia	0	0
Cyprus	0	0
Czech Republic	0	0
Estonia	0	0
France	0	0
Hungary	0	0
Italy	0	0
Latvia	0	0
Lithuania	0	0
Portugal	0	0
Romania	0	0
Serbia	0	0
Slovakia	0	0
Slovenia	0	0
Sweden	0	0
Turkey	0	0



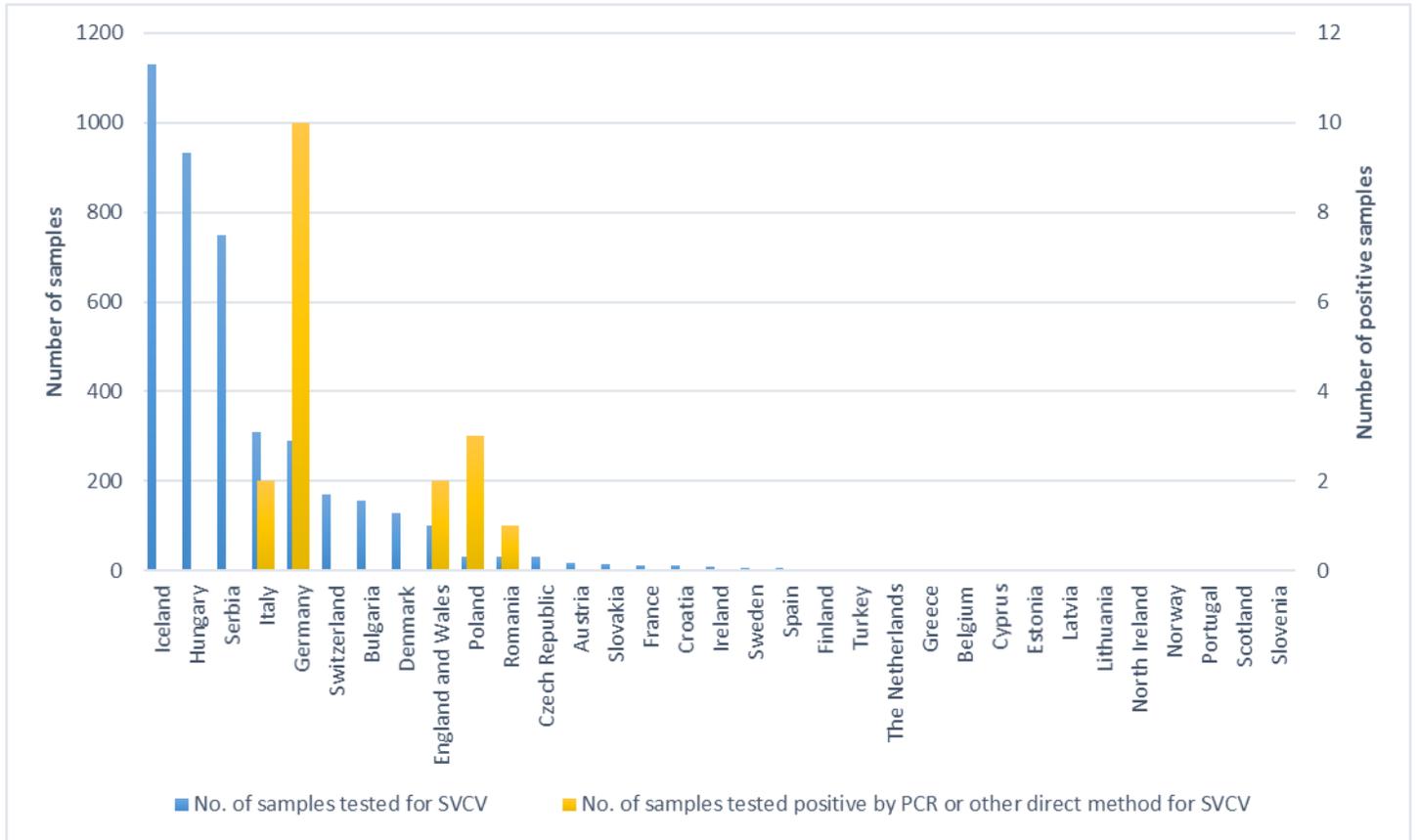
## Number of samples tested for KHV in Europe in 2017

Country	No. of samples tested for KHV	No. of samples tested positive by PCR or other direct method for KHV
Hungary	7118	6
Poland	1005	10
Czech Republic	947	10
Serbia	800	0
The Netherlands	442	9
Italy	280	35
Croatia	245	0
Germany	243	0
Bulgaria	156	0
England and Wales	107	43
Lithuania	106	0
France	57	3
Austria	54	3
Ireland	52	0
North Ireland	30	0
Latvia	17	0
Slovakia	14	0
Romania	12	0
Belgium	9	5
Spain	5	0
Denmark	4	1
Sweden	4	0
Switzerland	4	0
Turkey	4	0
Finland	2	0
Greece	2	0
Slovenia	1	0
Cyprus	0	0
Estonia	0	0
Iceland	0	0
Norway	0	0
Portugal	0	0
Scotland	0	0



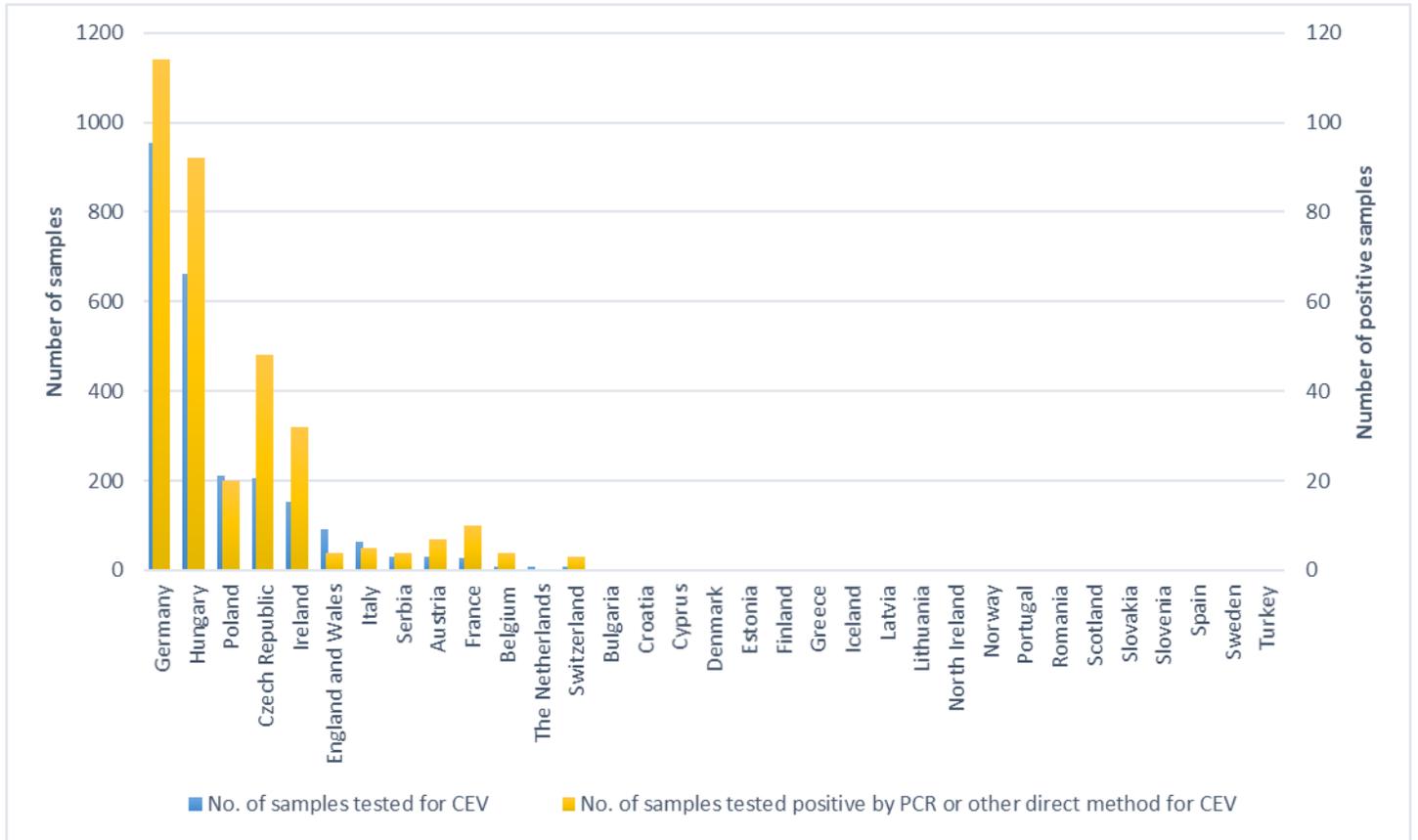
## Number of samples tested for SVCV in Europe in 2017

Country	No. of samples tested for SVCV	No. of samples tested positive by PCR or other direct method for SVCV
Iceland	1129	0
Hungary	932	0
Serbia	750	0
Italy	310	2
Germany	290	10
Switzerland	170	0
Bulgaria	156	0
Denmark	128	0
England and Wales	102	2
Poland	32	3
Romania	32	1
Czech Republic	31	0
Austria	18	0
Slovakia	14	0
France	12	0
Croatia	11	0
Ireland	10	0
Sweden	7	0
Spain	5	0
Finland	4	0
Turkey	4	0
The Netherlands	3	0
Greece	2	0
Belgium	0	0
Cyprus	0	0
Estonia	0	0
Latvia	0	0
Lithuania	0	0
North Ireland	0	0
Norway	0	0
Portugal	0	0
Scotland	0	0
Slovenia	0	0



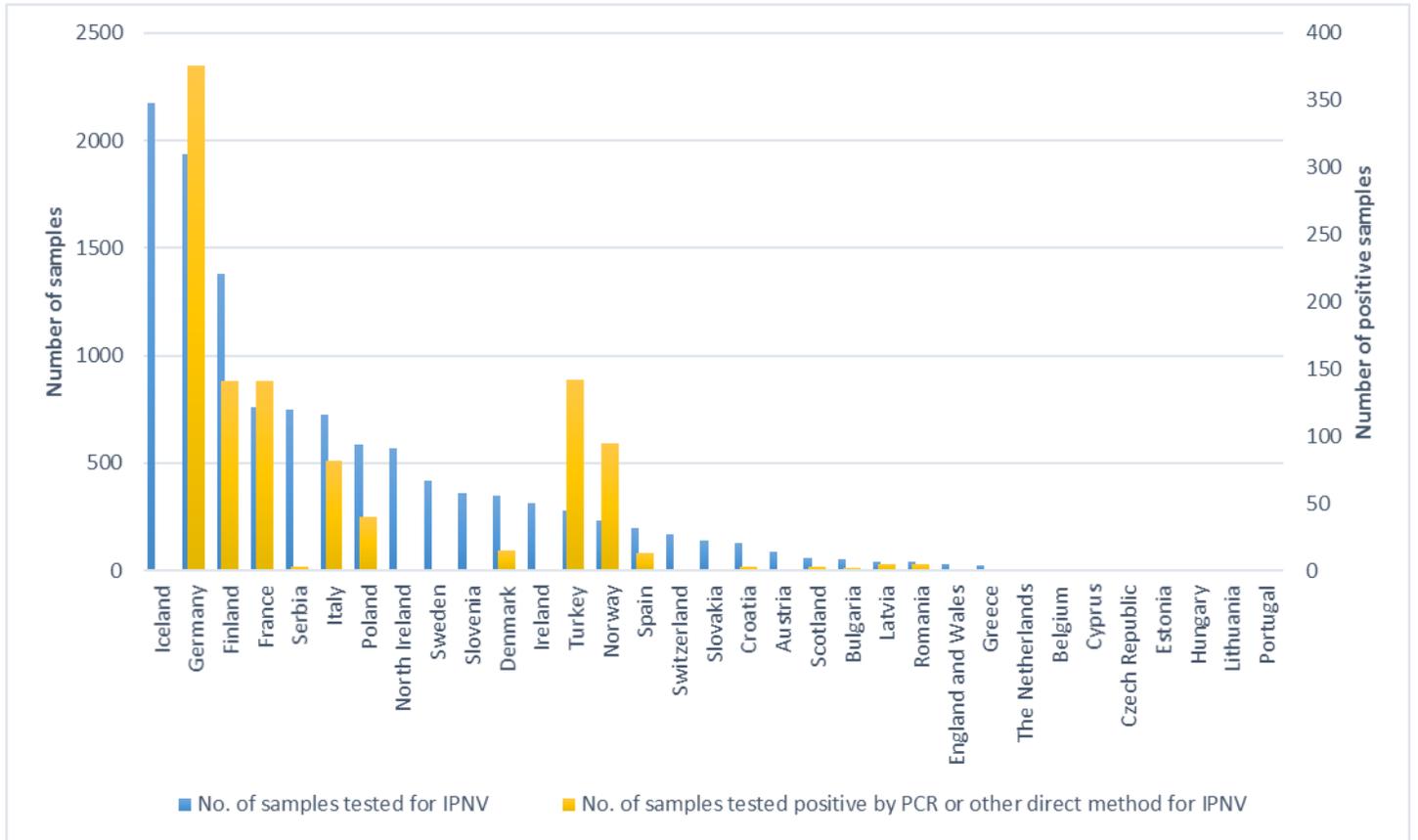
## Number of samples tested for CEV in Europe in 2017

Country	No. of samples tested for CEV	No. of samples tested positive by PCR or other direct method for CEV
Germany	955	114
Hungary	661	92
Poland	210	20
Czech Republic	207	48
Ireland	153	32
England and Wales	91	4
Italy	65	5
Serbia	30	4
Austria	29	7
France	27	10
Belgium	8	4
The Netherlands	8	0
Switzerland	7	3
Bulgaria	0	0
Croatia	0	0
Cyprus	0	0
Denmark	0	0
Estonia	0	0
Finland	0	0
Greece	0	0
Iceland	0	0
Latvia	0	0
Lithuania	0	0
North Ireland	0	0
Norway	0	0
Portugal	0	0
Romania	0	0
Scotland	0	0
Slovakia	0	0
Slovenia	0	0
Spain	0	0
Sweden	0	0
Turkey	0	0



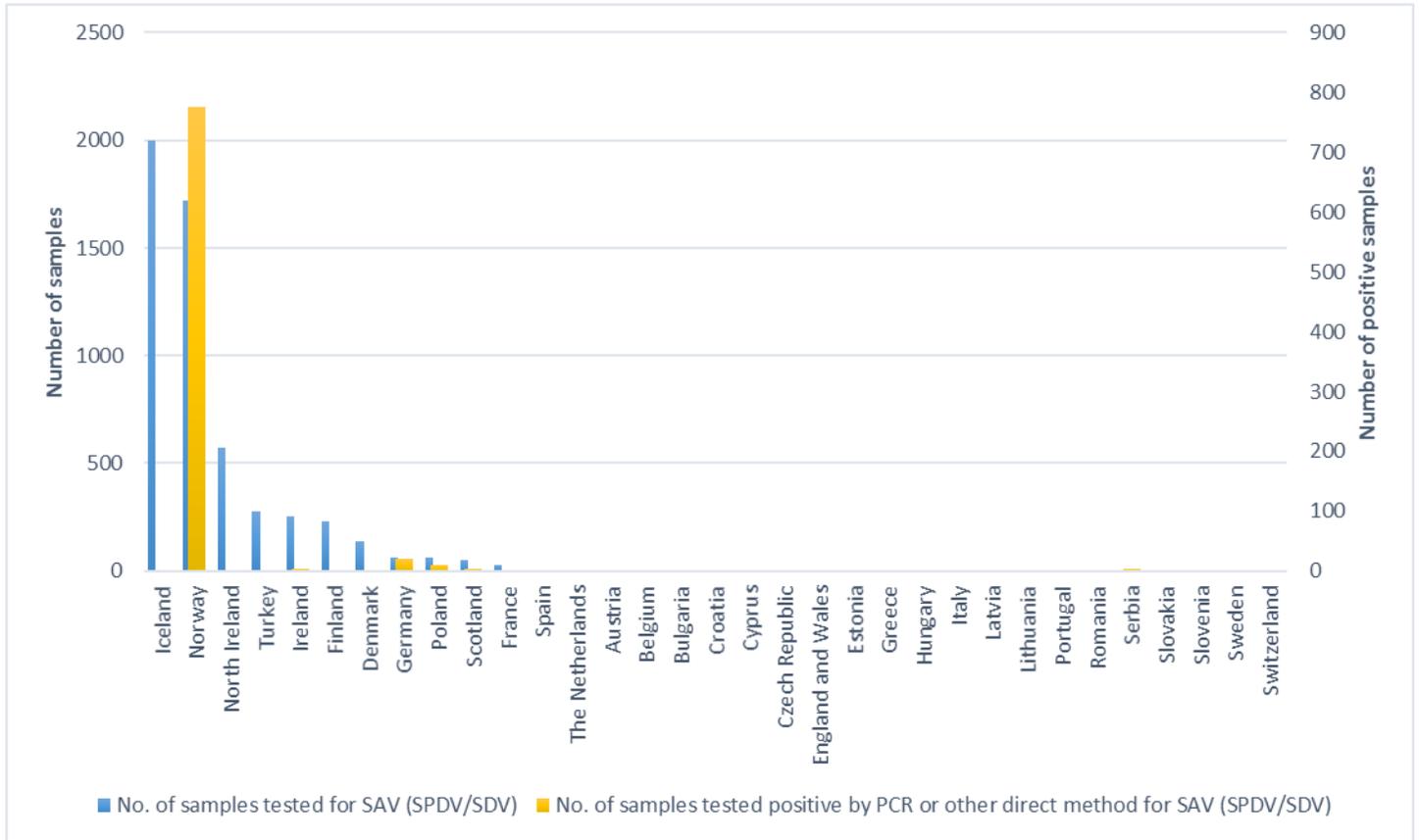
## Number of samples tested for IPNV in Europe in 2017

Country	No. of samples tested for IPNV	No. of samples tested positive by PCR or other direct method for IPNV
Iceland	2176	0
Germany	1939	376
Finland	1382	141
France	762	141
Serbia	750	3
Italy	725	82
Poland	585	40
North Ireland	570	0
Sweden	417	1
Slovenia	360	0
Denmark	350	15
Ireland	311	0
Turkey	279	142
Norway	232	95
Spain	198	13
Switzerland	170	1
Slovakia	141	0
Croatia	125	3
Austria	87	1
Scotland	61	3
Bulgaria	54	2
Latvia	38	5
Romania	38	5
England and Wales	30	0
Greece	26	0
The Netherlands	6	0
Belgium	0	0
Cyprus	0	0
Czech Republic	0	0
Estonia	0	0
Hungary	0	0
Lithuania	0	0
Portugal	0	0



## Number of samples tested for SAV (SPDV/SDV) in Europe in 2017

Country	No. of samples tested for SAV (SPDV/SDV)	No. of samples tested positive by PCR or other direct method for SAV (SPDV/SDV)
Iceland	1996	0
Norway	1723	776
North Ireland	570	0
Turkey	279	0
Ireland	256	4
Finland	230	0
Denmark	137	0
Germany	64	21
Poland	60	10
Scotland	48	4
France	25	0
Spain	5	1
The Netherlands	2	0
Austria	0	0
Belgium	0	0
Bulgaria	0	0
Croatia	0	0
Cyprus	0	0
Czech Republic	0	0
England and Wales	0	0
Estonia	0	0
Greece	0	0
Hungary	0	0
Italy	0	0
Latvia	0	0
Lithuania	0	0
Portugal	0	0
Romania	0	0
Serbia	0	4
Slovakia	0	0
Slovenia	0	0
Sweden	0	0
Switzerland	0	0



## Number of samples tested for Nodavirus in Europe in 2017

Country	No. of samples tested for Nodavirus	No. of samples tested positive by PCR or other direct method for Nodavirus
Italy	2555	254
Turkey	47	0
Greece	39	6
Croatia	33	0
Norway	17	0
France	11	0
Denmark	3	0
Spain	3	3
Germany	1	0
Scotland	1	0
Austria	0	0
Belgium	0	0
Bulgaria	0	0
Cyprus	0	0
Czech Republic	0	0
England and Wales	0	0
Estonia	0	0
Finland	0	0
Hungary	0	0
Iceland	0	0
Ireland	0	0
Latvia	0	0
Lithuania	0	0
North Ireland	0	0
Poland	0	0
Portugal	0	0
Romania	0	0
Serbia	0	0
Slovakia	0	0
Slovenia	0	0
Sweden	0	0
Switzerland	0	0
The Netherlands	0	0

