



Report on Survey and Diagnosis of Fish Diseases in Europe 2019



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Contents

Introduction.....	4
Production data from FEAP.....	4
Number of fish farms in Europe.....	5
Health categorization of fish farms.....	5
Outbreaks and severity of listed diseases in Europe.....	5
Other fish diseases problems in Europe.....	6
Laboratory examinations.....	6
Development of Fish Farming in EU 2008-2019.....	7
Reports from the individual European countries.....	8
Austria.....	8
Belgium.....	8
Bosnia and Herzegovina.....	8
Bulgaria.....	9
Croatia.....	11
Cyprus.....	11
Czech Republic.....	13
Denmark.....	14
Estonia.....	15
Faroe Islands.....	16
Finland.....	17
France.....	18
Germany.....	20
Greece.....	26
Hungary.....	27
Iceland.....	28
Ireland.....	29
Italy.....	30
Latvia.....	32
Lithuania.....	33
Malta.....	33
Norway.....	34
Poland.....	35
Portugal.....	36

Romania	38
Serbia.....	38
Slovakia.....	39
Slovenia	39
Spain	40
Sweden.....	42
Switzerland	43
The Netherlands.....	43
Turkey.....	43
England and Wales	45
Northern Ireland.....	46
Scotland.....	47
Annex 1: Number of fish Farms	49
Annex 2: Number of farms placed in the respective categories according to listed diseases.....	50
Graph plot of categorized fish farms in 2019	53
Annex 3: Outbreaks of listed diseases	54
Annex 4: Other Fish diseases problems.....	56
Annex 4a: Additional information	60
Germany.....	60
Italy	62
Annex 5: Laboratory data	65
Number of samples tested for VHSV in Europe in 2019.....	65
Number of samples tested for IHNV in Europe in 2019	67
Number of samples tested for ISAV in Europe in 2019	69
Number of samples tested for KHV in Europe in 2019.....	71
Number of samples tested for SVCV in Europe in 2018	73
Number of samples tested for CEV in Europe in 2019	75
Number of samples tested for IPNV in Europe in 2019	77
Number of samples tested for SAV (SPDV/SDV) in Europe in 2019	79
Number of samples tested for Nodavirus in Europe in 2019	81

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 2019. The Questionnaire is provided by the EU Reference Laboratory for Fish and Crustacean Diseases, it is collated annually and 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-crustacean.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 outbreaks and increase or decrease in number of infected farms and severity of outbreaks) but also including other diseases of interest.
3. Laboratory data from the NRLs and other laboratories, including the numbers of samples examined, and diagnoses of fish diseases made.
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 obtained from data provided by [FEAP](#). It was observed during the preparation of the report, that some discrepancies between the two sources were present. This will be discussed at the Annual Workshop. The report does not include information on the number of fish farms, and therefore these data were obtained directly in the questionnaire.

The total fish production in aquaculture in Europe, including Turkey and Norway, increased slightly from 2018 and is now at 2.574.333 t. Among the EU Member states the production has been almost horizontal in the past 10 years whereas has observed an increase of about 50.000 t in 2019 with a total production of 712.648 t.

The 4 non-EU countries Iceland, Faroe Islands, Turkey and Norway produce 1.861.685 t and also experienced a significant increase since 2018.

The Atlantic salmon production, accounts for 1.664.541 t in 2019, and is by far the largest contingency in Europe. The production of large rainbow trout in sea water accounts now for 160.165 t while the production of portion rainbow trout is of about 225200 t in 2019. Turkey is still the largest contributor of rainbow trout production with 103.000 t. The carp production is mainly in the Eastern part of Continental Europe, the data from FEAP reports approximately 62.000 t. Both the production of sea bream and especially sea bass also increased in the Mediterranean countries with a production of 208.197 t and 199476 t, respectively. Among other fish species of interest are eel (with 4.478 t in 2019 in decline from 2016); also sturgeon represents a promising species (2724 t in 2019) especially in view of its caviar production (166,5 t in 2018, no data updated in 2019).

Turbot production appear in slight increase (11.423 t in 2019 and 10.229 in 2018), the production of other “so called” minor species includes halibut (1.594 t), Arctic charr (6.915 t), sole (1.211 t) and meagre (8.115 t).

The production of cleaner fish as lumpfish and wrasse for lice control is increasing significantly. In 2019, 49,1 million of cleanerfish were deployed at sea. This figure consist of booth wild caught Cleaner fish and farmed ones. Cleanerfish currently used are lumpsuckers (*C.lumpus*) and various speices of Wrasse. According to the

Directorate of Fisheries 22.6 million lump sucker were produced in 2019. In Scotland production of lumpfish was assessed as equivalent to 660.000 fish and 4 sites producing 4 tonnes of wrasse with 59,000 fish.

Number of fish farms in Europe

The total number of authorised/licensed fish farms in Europe was reported to be around 30.704 farms, with the largest contingency in Germany with 13.911 farms having a high number of small producers. This estimate is considered to be very conservative. 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. It has to be acknowledged that it was not possible to retrieve the total number of active farms for all participants in the survey (4 missing) and for 3 member states, number of farm has been inferred by the categorisation.

Health categorization of fish farms

Almost all Member States did reply to the questionnaire and provided very clear and correct answers.

In 2019, 13.000 farms with species susceptible to VHS were reported in categorized zones, 12.601 to IHN, 6.666 to ISA and 10.871 farms with cyprinids susceptible to KHV.

71% of the authorised trout farms in Europe are situated in category III zones for VHS and 69% for IHN, with 26% and 28% respectively in Category 1. For both diseases the remaining of the farms are situated in category II, IV or V.

71% of the authorised farms in Europe with susceptible species for ISA are in category I, whereas 23% are in Cat. III (including 1042 farms in Norway and 34 farms in Faroe Island).

Only very few carp farms are approved KHV free in Category I (40 farms reported in Europe) and almost all are placed in Category III (94%) or in Category II 6%.

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?

It is envisaged that some of these issues will be solved with the implementation of the new Animal Health Law starting on 21st April 2021.

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. For **VHS**, 32 new outbreaks were reported in Europe in 2019, 13 of these were in Germany, importantly a number of confirmed VHSV infection in Austria (5) Belgium (5), Czech Republic (3), France (2), Italy (1), Poland (2), Switzerland (1).

For **IHN**, 30 new outbreaks were reported. The majority was in Germany (20), two countries with 2 outbreaks each (Austria, Estonia,) and six countries with one outbreak each (Czech republic, Poland, Slovakia, Slovenia, Switzerland, Italy).

For **ISA** Norway was the only country reporting outbreaks, and reported 10 new sites with ISAV HPRΔ in 2019.

For **KHVD**, 96 outbreaks were reported in 2019. The vast majority (49) in Germany, 17 in UK. The virus was reported for the first time in Norway, in total KHVD was reported from 14 countries in all. Annex 3 provides the full list of reports.

Other fish diseases problems in Europe

A whole range of other disease problems in 2019 were reported:

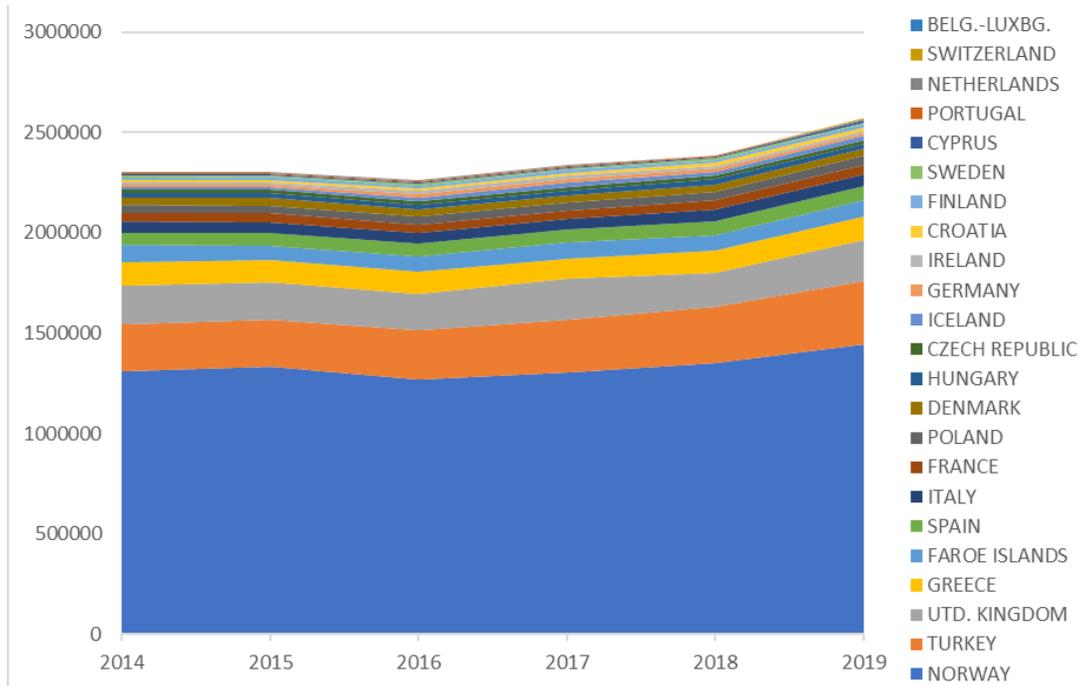
- In **rainbow trout** the major concerns are flavobacteriosis (RTFS), red mark syndrome, enteric redmouth, and infectious pancreatic necrosis but also, lactococcosis, ichthyophthiriasis, saprolegniosis. More and more report BKD (bacterial kidney disease) are reported.
- In **salmon** farming the major concern is sea lice; after the ectoparasite a number of disease problems cause concerns and includes pancreas disease, heart and skeletal muscle inflammation, cardiomyopathy syndrome, amoebic gill disease and complex gill disease CGD (amoebic gill disease, salmon gill poxvirus, *Paranucleospora theridion* etc.). Ulcers from *Moritella viscosa* and *Aliivibrio*.
- In **Cyprinid** it is primarily CEV, SVCV, *Aeromonas hydrophila*
In **seabass** and **seabream** it is primarily VNN/VER, tenacibaculosis, *Vibrio harvey*, *Sparicotyle chrysophrii*, *Aeromonas veronii* and *Lernathropus kroyeri* infection.

Laboratory examinations

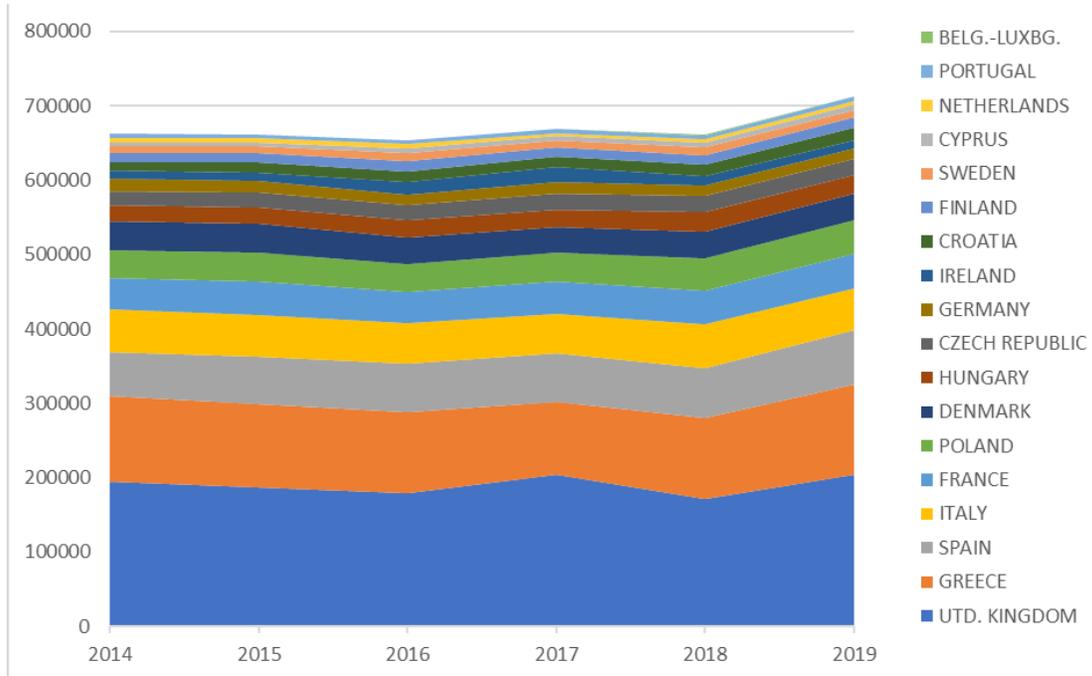
There are very large differences between countries on how many samples are tested on cell cultures, ranging from < 100 to several thousands. Annex 5 provide the total number of laboratory examinations conducted in Europe in 2017 on VHSV, IHNV, ISAV, KHV, SVCV, CEV, IPNV, SAV, and Nodavirus, respectively.

Development of Fish Farming in EU 2008-2019

FEAP data - Fish Farming Production in Europe



FEAP data - Fish Farming Production in EU Countries



Reports from the individual European countries

Austria

Author/Institute: Oskar Schachner- Vetmeduni Vienna

Aquaculture production: around 2.000t salmonids, 1.000 t carp for consumption and restocking , mainly extensive flow –through ponds (carps) and basins ,a few recirculation systems.

Health status: 11 farms in cat.I declared VHS and IHN free; 1 farm under VHS/IHN surveillance cat.II; all other in cat. III.

Other disease problems: 2 cases highly suspicious for KHV with no pos. confirmation using the approved methods.

Belgium

Author/Institute: F. Liefbrig- CER groupe

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 wellknown farm for sturgeon and caviar production in recirculating system. Development of burbot (*Lota lota*) production. Few RAS for pike perch and Jade perch production.

Health status: For the second year, different new outbreaks of VHS. The precise origine of all these infections have never been determined.

Other disease problems: N/A.

Bosnia and Herzegovina

Author/Institute: T. Eterovic - University of Sarajevo, Veterinary Faculty

Aquaculture production: - "Bosnia and Herzegovina has a very long tradition in the production of freshwater fish, trout and carp, due to the significant water wealth of seven water basins, a large number of river and mountain lakes and groundwater. Hatcheries and on-growing farms in Bosnia and Herzegovina have numerous and unequal capacities, surface area and annual production. According to the locality and species of fish breeding, fish ponds and on-growing farms are divided into salmonid,

cyprinid and marinas. In the aquaculture sector of Bosnia and Herzegovina, the most important fish species are: trout (rainbow trout and brook trout), carp (carp, grass carp, silver carp), and marine (European bass, gilt-head bream and common dentex) as well as molluscs (mussels and oysters). Most of the trout farms breed rainbow trout, but mixed farms breeding brown, brook and softmouth trout are also widespread.

Capacity for production and exploitation of fish in BiH, water resources, hydrological and ecological conditions, physico-chemical properties of watercourses, highly developed technologies such as breeding and fish processing, tradition in fish farming and production as well as constant growth of fish exports represent exceptional preconditions to increase fish production. According to a rough estimate, 65% of trout production in BiH is in the Federation, and 35% in the Republic of Srpska. Nearly all carp production is carried out in the Republic of Srpska. Production of marine species is concentrated in Neum where there are two cage farms with a total area of 0.36 ha. The total usable area of aquaculture installed capacity in BH is about 3,113 ha. The size of fishery exploitation in Bosnia and Herzegovina for trout fish farms is 91,026 m² and for carp fisheries 2,278 ha. The average production of table fish in Bosnia is about 5,000 tons."

Health status: - Annual monitoring program includes testing of all breeding salmonid farms for IHN and VHS salmonid farms and SVC in cyprinid farms. Fattening farms without breeding are not included in the surveillance. Because of the complicated government structure, farms are controlled by different levels of government, and surveillance fully covers only farms dedicated for fish export. Import of spawn is not included under strict surveillance program. At the national level Bosnia and Herzegovina is classified as IHN/VHS free country..

Other disease problems: - Concerning other diseases we had experience with furunculosis, vibriosis, BKD and Bacterial gill disease. Of the parasitic diseases common are *Gyrodactylus*, flagellates and ICH. IPN without clinical signs is constantly present in most of the tested fisheries



Author/Institute: Pety Orozova - National Diagnostic and Research Veterinary Medical Institute

Aquaculture production: In 2019 compared to 2018 there is a decrease in production and consumption of carp and sturgeon species (carp - 3695.488 tons and sturgeon – 114.333 tons). In 2019 compared to 2018, there is an increase in the production and consumption of trout fish (5044.851 tons).

Aquaculture methods

Bulgarian freshwater aquaculture takes a variety of forms: extensive or intensive, in natural settings or tanks, in flow-through or recirculation systems, traditional or modern, sheltered or exposed, and so on. The species produced by traditional extensive freshwater fish farming are zander, pike and different species of carp, catfish, roach etc.

The species produced by semi-intensive fish farming are carp, catfish, zander, tench, sturgeon, etc.

The species produced by intensive freshwater farming are trout, sturgeons, eel, catfish, tilapia etc. Carp in earthen ponds dominates the aquaculture of Bulgaria but in 2019 production of carp (3695.488 tons) is lower than production of trout (rainbow trout-5025.33 tons; brown trout-17.96 tons)

Salmonids

In 2019, the main product was portion-size rainbow trout (200-300 gm individual size) which attained 5043.29 tons.

Trout - Trout farming is done commercially in 63 registered farms. The main species is rainbow trout (*Oncorhynchus mykiss*), although there is limited production of brook trout - 1.563 tons (*Salvelinus fontinalis*) and brown trout - 17.958 tons (*Salmo trutta*).

Trout production is subdivided into two subsectors, namely that of “portion-size” and “large” trout. While portion trout is produced solely in fresh water, large trout is grown mainly in dams to a size exceeding

1 kg. All trout production can be classified as intensive, where raceways, tanks and cages (dam) predominate.

The vast majority of trout farms are family-owned. Many are equipped to do primary processing (gutting, gilling), while others have full processing facilities (e.g. filleting, smoking, preparation of patés).

Cyprinids

Five cyprinid species are popular and preferred in Bulgaria: the common carp (*Cyprinus carpio*), the silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Aristichthys nobilis*), grass carp (*Ctenopharyngodon idellus*) and tench (*Tinca tinca*).

Carp farming by 618 registered farms is done mainly in extensive or semi-intensive pond-based systems. Carp pond polyculture is the most practiced fish production system.

Sturgeons - Sturgeon production has been of interest to producers in Bulgaria, primarily as a result of investigations for caviar supply from mature fish. Of additional interest, however, is the use of hatcheries and production units to supply fish for restocking; Bulgaria is working at WWF projects for the re-introduction of sturgeon into the Danube river. Production for consumption in 2019 is 114.333 tons from 27 registered farms.

Eels - Eel production in Bulgaria is based on the ongrowing of juveniles (elvers) of the European eel (*Anguilla anguilla*), since no hatchery technology exists yet for artificial reproduction. Intensive farming uses concrete or earthen ponds. Water recirculation systems also use intensive farming criteria and have been the basis for recent developments in Bulgaria. No production data for 2019 yet. For 2018 it was 35 tons.

Health status: During the 2019 no listed pathogens were detected in Bulgarian fish farms.

Other disease problems: N/A

Croatia



Author/Institute: Snježana Zrnčić - Croatian Veterinary Institute, Zagreb

Aquaculture production: Warmwater freshwater aquaculture is cultivating common carp, grass carp, bighead and silver carp as well as catfish, pike and pike-perch in small quantities in earthen ponds surface from 0,5 to 100 hectares. Some of the carp farms have their own hatcheries. 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 while other import eggs from USA and Denmark. 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 5 farms that is based on the catching of small tuna in Mediterranean according to ICAAT quotas and feeding them until favourable weight. Almost whole production is sold to Japan.

Health status: National surveillance program consists of clinical inspection of farms twice a year and sampling and sending to the lab, once. All authorized farm are included in surveillance program. Out of 207 samples tested for the presence of KHV, 7 tested positive.

Other disease problems: The main challenges are bacterial and parasitic diseases in marine aquaculture. The most devastating bacteria in 2019 were *Vibrio harveyi* and *Tenacibaculum maritimum* in both sea bass and sea bream 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.

Cyprus



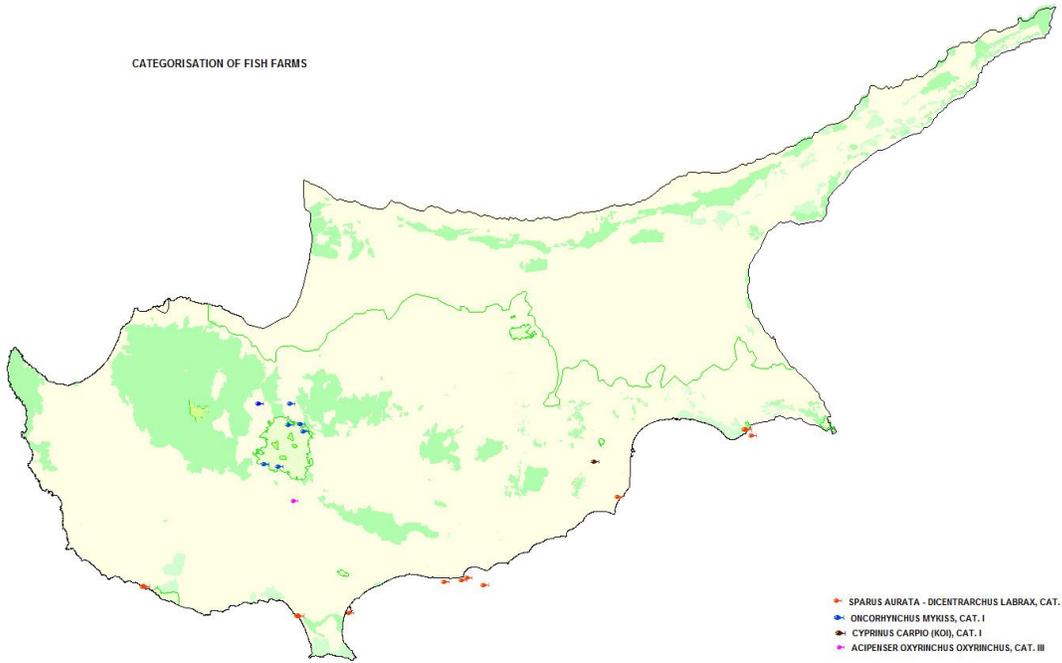
Author/Institute: Veterinary Services

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 8 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 update since 2018

Other disease problems: No update since 2018

CATEGORISATION OF FISH FARMS

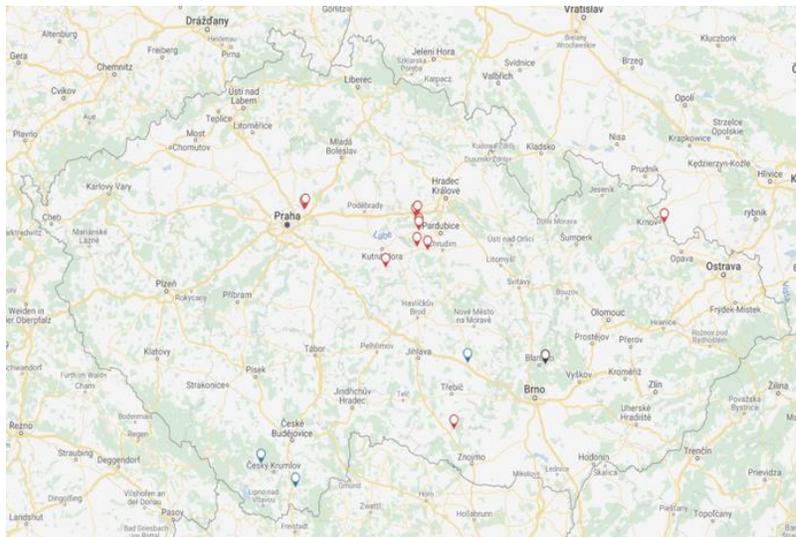


Author/Institute: Lubomír Pojezdal– Veterinary Research institute

Aquaculture production: In the Czech Republic, annual fish production is roughly 21 000 tons with quite flat trend. Around half of the production is live fish export; the rest is consumed locally. The majority of production facilities represent more than 24 thousand ponds covering the area of about 52 thousand hectares intended for farming of the common carp (*Cyprinus carpio*). This species forms 88% of total aquaculture production. Herbivorous fish (grass carp, silver carp etc.) from the same ponds usually form around 6% of the total production. The salmonids produced in around 30 recirculation or flow-through farms make around 3,5 % of the total aquaculture production. The rest of the production consists of other fish species reared in carp ponds (tench, predatory fish). The minor role regarding fish production in the Czech Republic holds Czech Anglers Union which manages over 2000 breeding ponds covering area of 2 650 hectares. Annual production of fish in breeding ponds and reservoirs is nearly 1 200 tons of fish and the Association produces their own fish for restocking of fisheries. The trend of RAS aquaculture system is slightly increasing, along with the indoor-farming of warm-water species (e.g. brown bullhead).

Health status: According to Council directive 2006/88/EC the Czech Republic is category I for ISA and category III for VHS (3 outbreaks in 2019) and IHN (1 outbreak in 2019) in the whole territory. The whole territory of the Czech Republic is also category III for KHV (11 outbreaks in 2019), except for one holding, which was re-confirmed as category V. At the national level, the Czech Republic performs monitoring programs for VHS, IHN and KHV.

Other disease problems: Carp edema virus outbreaks are causing losses in spring months and prompted the farmers to rear carp varieties less susceptible to the disease. Most areas of the country suffer from long-term lack of precipitation and unusually high summer temperatures resulting in occasional mass mortality events in pond-farmed fish.





Author/Institute: Morten Fruergaard-Andreasen (FVST) and Tine Iburg DTU Aqua

Aquaculture production: In Denmark, there is approximately 218 active farms. The most farmed fish species in Denmark is still rainbow trout. A major part of the production take place in fresh water recirculating farms. Production numbers from 2019 is not available yet, but based on 2018 numbers it is expected to be a total of approximately 47.000 tonnes of which approximately 40.000 tonnes is from rainbow trout . Egg production is still a major production and the numbers in 2019 are expected to be at least the same as in 2018. Minor production focus on Atlantic salmon, pike perch and eel.

Health status: All farms with susceptible species are inspected at least once per year by 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 all are category III for VHS. At a national level, Denmark conducts a plan for IPN and SVC. Furthermore some farms have achieved free status for BKD. The national plan relies on historical data and targeted surveillance.

Other disease problems: PRV-3 and IPN is still widespread in production farms with occasional disease outbreaks. Projects on PRV-3 is on-going at the NRL. Among bacterial diseases, Rainbow trout Fry Syndrome caused by *Flavobacterium psychrophilum* and Enteric Red Mouth Disease caused by *Yersinia ruckeri* are considered relevant in the fresh water phase, whereas clinical outbreaks of furunculosis (*Aeromonas salmonicida* subsp. *salmonicida*) can occur in the salt water production of rainbow trout. However, in many of these cases the NRL are not involved and it is difficult to know the real effect of these diseases on the Danish Aquaculture. Red Mark Syndrome is still a relevant problem in Danish Aquaculture, but the farms are now more experienced in handling the disease outbreaks than last year. Projects on Red Mark Syndrome is still on-going at the NRL.



Author/Institute: Triin Tedersoo Chief specialist on animal health Veterinary and Food Laboratory

Aquaculture production: "Estonia has fairly good prerequisites for the production of aquaculture products, both in terms of water resources and the amount of land. The fish farmers have invested in closed fish farming facilities which reuse water and enable farmers to grow and offer product all year. At the same time, there are fish farms which use so-called traditional methods of production with flow-through systems where the water flows through the farm to the estuary.

Aquatic organisms were produced in ponds, raceways and recirculation systems. Net pens were used in fresh water, in a power plant effluent water channel (this farm finished activity at the end of 2019).

The aquaculture establishments sold 944 tons of product in 2018 for a total worth of 4.2 million euros. The majority of the aquaculture product in Estonia is derived from land-based farms. Interest in offshore fish farming is growing and an increase in the production of fish species which are farmed offshore is to be expected in the future, especially Salmonidae. (there is one fish farm with sea cages). Increased production in the coming years will likely be due to more fish being farmed offshore. Mollusc farming areas, which are widespread in Europe, have not been registered in Estonia, but there are several ongoing scientific projects in that field. The main species farmed in Estonia is the rainbow trout, which is in competition with imported salmon and rainbow trout. The sales volume of locally farmed rainbow trout in 2018 was 800 tons, with a total value of over 3.3 million euros. The production volume of rainbow trout accounts for 85% of the fish farming production of Estonia. In addition to rainbow trout, other fish species have been farmed in Estonia, e.g. eel, sturgeon, carp, African catfish, silver carp, catfish, Acipenseridae, grass carp, common whitefish, etc. Farmed crustaceans include the European crayfish, which is also common in the wild.

Up to 5% of the aquaculture product has been exported abroad in the previous years. The main exported aquaculture product has been eel, which has been sold to a processing establishment in the Netherlands. Small quantities of Acipenseridae, rainbow trout, and European crayfish have also been exported.

Health status: There were 34 approved fish farms and 25 crustacean farms in Estonia in 2019 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 2019: 15 rainbow trout farms, two carp farms, two eel farms, four sturgeon farms, two arctic char farms, one African catfish farm and one state-financed farms for the cultivation of salmonids for restocking. Due to the Implementation Measures of National Infectious Animal Disease Control Programs in 2019 there were 15 fish farms which took part in surveillance for VHS/IHN (11 fish farms in Category II and 2 fish farm in category I), two fish farms took part in surveillance for KHV (category II). After the IHN outbreaks diagnosed in 2018 two rainbow trout farms were dealing with the eradication of the disease (category IV). Also samples from wild salmonids populations were taken from the rivers Kunda and Pärnu near the

infected farms. All results were negative. In addition to the surveillance of fish farms, the Veterinary and Food Board also conducts testing of fish in the Baltic Sea (sprat and Baltic herring) for VHS as of 2016. The reason for the surveillance of the Baltic Sea was that it was required for opening a new export market. The aims of the testing are to determine the epidemiological situation in the Baltic Sea and to prove that the caught fish originate from a disease-free area. Conducting such testing is one of the conditions for exporting the aforementioned fish species. All results were negative.

Other disease problems: - From other, than fish diseases, we could have a problems with such crustacean disease, as Crayfish plague. There were outbreaks of the disease in the past in the wild populations and in some crusacean farm in 2018, which was emptied after that due to the high mortality. Aetiological agent - *Aphanomyces astaci*, susceptible species in Estonia - European crayfish (*Astacus astacus*). Unfortunately, Crayfish plague is not a listed disease by Directive 2006/88, and not listed in the new Animal Health law Regulations. Prevention measures- to follow the biosafety measures in the farms and to try to avoid the importation of an invasive alien species of crayfish to the country.

Faroe Islands

Author/Institute: Debes Christiansen

Aquaculture production: A total of 85.000 tons of Atlantic salmon was produced in 2019 in the 24 marine farms with open net cages (10 - 25 at each site) in the Faroese fjørds and straits. This is a increase of approximately 5.000 tons from 2018

Health status: No outbreaks of the listed fish diseases were recorded in 2019. Official inspectors are inspecting and sampling each marine site four times a year and each freshwater smolt farm two times a year. Samples are routinely tested for ISAV, SAV, PMCV and AGD. In addition to official inspections private vets. are inspecting each site 12 times per year

Other diseases and health related issues: Sea lice infestations and treatment in heated water is the main fish health and welfare issues. Cases of CMS are increasing. We also experienced increasing problems with AGD. For the first time since the 90'ies we had outbreaks with furunculosis.

Author/Institute: Tuija Kantala – Finnish Food Authority

Aquaculture production: In 2018, 14.3 million kilograms of fish were cultivated for human consumption in Finland. This represented a decrease of about 0.3 million kilograms compared to 2017. Some 13.2 million kilograms of the production consisted of rainbow trout, representing over 90 % of all the food fish produced in Finland. Also 0.8 million kilograms of European whitefish were produced, which was almost the same as in the three previous years. Additionally, a total of circa 0.3 million kilograms of the other species were produced, including trout, arctic charr, sturgeon and pike perch. About half million kilograms of rainbow trout roe was produced for food. In addition to fish consumed as food, fish are also farmed in order to be stocked in nature. About 50 million fry – excluding newly hatched individuals – were produced for the purposes of stocking and further farming. National aquaculture strategy aims at strong increase in the production by 2022. Farmers are interested in RAS and offshore techniques to get a (environmental) permit for bigger production amounts.

Health status: Finland is free (class I) of VHS, IHN and ISA excluding class IV status for VHS in Åland Islands and class II IHN status in three zones and one compartment (31.12.2019).

- VHS was last time found in Åland Islands in 2012. Eradication program was finished in the beginning of 2020 and 2-year surveillance program has been started to restore VHS free status.
- IHN was found in six farms in 2017/2018. Two-year surveillance program has been started in the three zones and one compartment to restore IHN-free status.
- KHV or ISA have never been found in Finland
- Risk-based surveillance is in place in authorised, VHS/IHN/ISA free farms and also in KHV farms.
- Finland is free of SVC, continental parts are free of IPN (genogroup 5) and SAV, River Tenojoki and River Näämäjoki catchment areas are free of *G. salaris*. The water catchment areas of the Paatsjoki, Tuulomajoki, and Uutuanjoki are considered as *G. salaris* buffer zones.

Other disease problems: Saprolegniosis of farmed fish is regarded a serious problem, which is difficult to cope with. Especially the broodfish of land-locked salmon, brown trout and coregonids are very sensitive and many fish farms have stopped the farming of them because of the *Saprolegnia* mortality.



Author/Institute: Lénaïg Louboutin -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: Nouvelle-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 2019, only two outbreaks of VHSV were detected, in one specific area. The first case occurred following sampling performed for the national eradication plan; no clinical signs had been observed before. A few weeks later, the virus was detected also on dead rainbow trout in a pond. Following epidemiological investigations, introduction of fish coming from the first infected farm was put in evidence. Sequencing of complete G gene showed an almost perfect identity between the 2 isolates (99.9%).

Surveillance of IHN:

No IHN was detected through targeted surveillance in 2019 in France, showing the efficiency of targeted and systematic surveillance program on the territory.

Surveillance of KHV:

One outbreak of KHV was reported in 2019, in the East of France, where mortality was observed on koi in a private pond. The genotype profiles obtained for the virus was U/I profile (genotyping PCR (Bigarré et al, 2009)), which is quite common after introduction of vaccinated koi imported from Israël.

Another case was detected by a French laboratory, but with a low level of detection (very late Cts), and the NRL could not confirm the case. The analyzes had been performed following investigations led after detection of KHV in Belgium and evidence of introduction of fish from France in the infected site. "

Other disease problems:

Several outbreaks of Carp Edema Virus (CEV), located in distant French areas, were reported mostly during spring 2019, when temperature increased after winter period. Interestingly, in 2019, the first case was reported in January (sign of global warming?). CEV was detected either in Koi carps or common carps. Partial sequencing enabled to distinguish two lineages, related to the infected host (Koi or common carp). The number of cases seems to be increasing each year (fish farmers and owners are more and more informed about the disease and contact the NRL to perform analysis).

Five cases of PRV were also reported on rainbow trout or atlantic salmon in various farms. 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.



Aquaculture production:

Lander	Production
Baden-Württemberg:	<p>cultured species: mainly salmonids (rainbow trout, brown trout, char), carp, pike, pike-perch, sturgeon</p> <p>environmental conditions: temperate climate; mainly well water or close-to-well stream water</p> <p>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)</p> <p>salmonids: natural ponds; runways, partially with recirculation; brood houses with runways and round tanks; few egg producers with hatcheries</p> <p>carp: natural ponds; mainly extensive use</p>
Bavaria:	<p>Bavaria's aquaculture is basically divided into carp pond management and salmonid pond management. With about 20,000 ha pond area, half of the German pond area is located here. It produces about 6,000 t of carp on average over the years, and other species are kept as minor fish in the carp ponds, e.g. tench, pike, catfish, pike-perch, other cyprinid and small fish species. They are exclusively family businesses that manage pure earth ponds in a traditional, extensive manner. Since the ponds are largely filled with rainwater, low-precipitation years and pronounced summer heat periods are increasingly causing problems as a result of climate change, as is the increase in fish-eating wild animals.</p> <p>Salmonids are also produced in family businesses. Rainbow trout is still of the greatest economic importance, although the production volume has been falling continuously for several years. This is due to concerns about virus outbreaks or virus-related restrictions. Instead of rainbow trout, the companies are increasingly relying on the production of char and brown trout. In addition, climate change in particular affects domestic salmonid production. The long-lasting summers with record temperatures and the relatively low-water winters lead to a local reduction in the water supply. The result is a lack of water, excessively high water temperatures and a lack of oxygen in the farms. This leads to premature fishing and a decline in production. More and more farms are reacting to the change in climatic conditions with the increased use of additional equipment, for example additional oxygenation or reuse of water. High-tech re-circulation systems exist in Bavaria for the shrimp <i>Litopenaeus vannamei</i> (4), African catfish (<i>Clarias gariepinus</i>, 2) and the pike-perch (<i>Sander lucioperca</i>, 2).</p>
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:	All 7 companies registered in the state of Bremen are those where fish are kept but not placed on the market, e.g. scientific institutions and zoos or zoo-like institutions.
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, char, pike, carp, sturgeon, maraene, tench, European 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:	In NI there are 742 fish farms using different production forms. Of these 93 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, char, 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</i> spec. 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:	<p>cultured species: predominantly rainbow trout, carp; also brown trout, char, pike-perch, sturgeon, maraene etc.</p> <p>environmental conditions: rainbow trout and carp in ponds, runways and net cages; middle European climate</p> <p>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</p> <p>protection from predators: covering with nets, sometimes roofs or indoor ponds</p>
Schleswig-Holstein:	<p>cultured species: salmonids, cyprinids, coregonids, <i>Acipenser</i> spp., percids, noble crayfish, eel, shellfish, oysters etc.</p> <p>environmental conditions: well and surface water</p> <p>technologies: net-cages, earthen ponds, pools, shellfish culture</p> <p>aquaculture systems: open, semi-circular and closed circular systems</p>
Thuringia:	<p>carp: predominantly kept in extensive holdings and for hobby/side-line farming;</p> <p>rainbow trout: cultured in three larger farms with runways; others in extensive holdings and for hobby/side-line farming</p> <p>brown trout and char: kept for hobby/side-line farming or for restocking</p>

Health status:

Lander	Production
Baden-Württemberg:	<p>VHS and IHN with numerous disease free compartments and zones targeted surveillance for VHS and IHN in Cat I and III</p> <p>KHV: all Cat. III, partially active and targeted surveillance</p> <p>ISA: disease free status; usually passive surveillance of farms; for farms keeping salmons: targeted surveillance</p>
Bavaria:	Fish farms are surveyed by the states veterinary services, by the states fish health service and by three aquaculture cooperatives and Qualified Services.
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. KHV-I was officially declared in ornamental holdings only (one commercial and 8 non-commercial). 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. Lack of skilled/trained personal is mentioned.
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 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:	<p>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.</p> <p>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.</p>
Schleswig-Holstein:	<p>Two farms in Cat I: rainbow and brown trout, sturgeon.</p> <p>All other farms in Cat. III.</p> <p>Surveillance by States Vet Authorities in collaboration with Qualified Services attached to the Chamber of Agriculture.</p>
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>ERM: <i>Yersinia ruckeri</i> (different <i>Yersinia</i> strains - Hagermann and EX5) is endemic in some river systems and affects trout breeding and rainbow trout of all ages are affected; diagnostics are carried out using classical bacteriological methods (pathogen cultivation and differentiation); Examination of diseased fish (active surveillance); in problem farms vaccination using immersion vaccine is applied</p> <p>CEV: for Koi / other carp species; disease events (multifactorial disease), especially in spring, detection by means of PCR at CVUAS / FLI / TiHo</p> <p>Flavobacteriosis (RTFS): especially <i>F. psychrophilum</i>; Rainbow trout larvae are mostly affected during the hatching phase. Diagnostics using classical bacteriological methods (pathogen cultivation from organ material on Anacker-Ordal agar at 15 ° C). Preventive measures: optimization of hatchery hygiene, reduction of stocking density, salt baths, vitamin addition, disinfection of the inlet water. Therapy: antibiotic medication via feeding. In the very hot summer of 2019, problems due to lack of water and high water temperatures as well as, in some cases, increased parasitosis and bacterial diseases.</p> <p>Some fish deaths in small salmonid farms after a storm without evidence of pathogens (mostly adults): lack of oxygen, environmental factors</p>
Bavaria:	no changes to previous years
Berlin:	
Brandenburg:	No reporting.
Bremen:	No reporting.
Hamburg:	No reporting.
Hesse:	<i>Flavobacter</i> sp./ <i>Flexibacter psychrophilum</i> in rainbow trout fry; diagnostic methods: bacterial culture and MALDI-TOF-MS; no control and

	<p>prophylactic measures taken.</p> <p><i>Ichthyophthirius multifiliis</i> in salmonids in all stages of development; diagnostic methods native, using a light microscope; there are currently no control and preventive measures to minimize the negative effects.</p>
Meckl.-W. Pomerania:	
Lower Saxony:	<p>Koi sleepy disease (KSD / CEV) remains in focus despite the declining incidence. In the year under review, CEV was also demonstrated in connection with morbidity / mortality in both koi and edible carp of different age groups. The fish farmers were informed about the disease, sensitized and advised of the possibility (in particular koi-keeping) to reduce the losses by adding saline.</p>
North Rhine-Westphalia:	No reporting.
Rhineland-Palatinate:	No reporting.
Saarland:	No reporting.
Saxony:	<p>Ichthyophthiriosis, PKD, furunculosis in salmonids - the effects of which are reduced in part through hygiene measures and targeted antibiotic treatment in fish stocks. For ERM, vaccination is carried out prophylactically with approved vaccines. In cyprinids in traditional aquaculture, the increased influence of predators (cormorants, silver and gray herons) plays an important role. An attempt is being made to counteract this with frightening measures. In the case of Baltic maraene, problems with furunculosis were first treated by antibiotics and the use of autologous vaccines.</p>
Saxony-Anhalt:	<p>Aquaculture farms in Saxony-Anhalt were mainly affected by long-lasting droughts and heat in 2019. Due to the high water temperatures, the stocks had to be reduced massively in order to prevent bacterial and parasitic infections. There were certain losses from <i>Ichthyophthirius multifiliis</i>, which were microscopically verified and controlled by water or environmental disinfection, as well as by management measures.</p>
Schleswig-Holstein:	No abnormalities reported.
Thuringia:	<p>Proliferative kidney disease (PKD) of rainbow trout is particularly problematic in aquaculture farms with predominantly fresh water supplies through surface waters.</p>



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

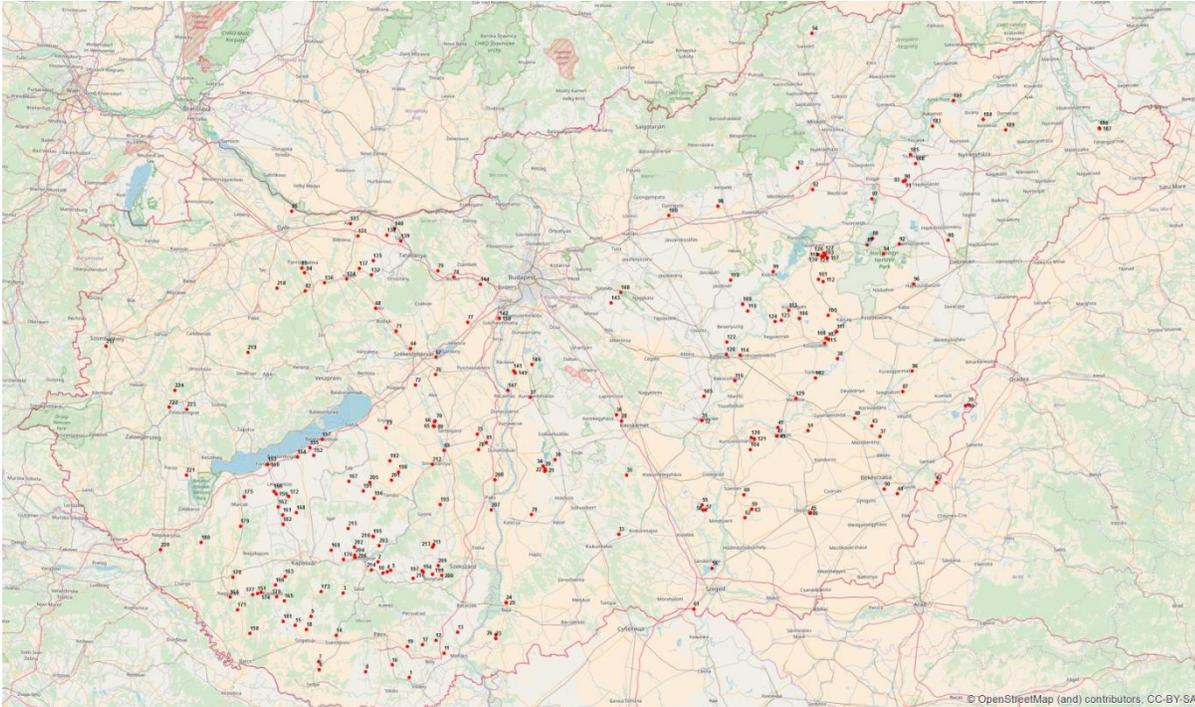
Aquaculture production: Marine farming of mediterranean fish species in cages-mainly dominated by seabream and seabass.

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: Peter Malik and Melinda Kocsis 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 Trans Danubian Region.



Extensive fish farms are still the main production units in the aquaculture. They produce 84,1% of the whole Hungarian fish production. There are 225 fish farms producing carp. Intensive and extensive farms production was 26787 tons.

The major farmed species is carp. The 79,5% of the edible fish production constitutes common carp, 9,5% silver carp, 3,3% grass carp, 1,7% catfish, 5,1% wild fish, 0,4% pikeperch, 0,02% pike, 0,48% others.

There are 20 intensive farms in Hungary producing around 15,9% of the fish production. The fish production by intensive farms was 4246 tons. The African sharptooth catfish and sturgeon are provided by the intensive fish farms. The 93,9% of the intensive fish production constitutes African catfish, 3,3% sturgeon, 1,7% trout, 1,1% others.

There are 4 trout farms using fresh water flow system in Hungary.

Historically the fish consumption is low in Hungary. It is around 6,7 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, 248 epidemiological units of 232 fish farms were sampled, diagnostic samples are included. In 2019 one fish farm found positive for 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 2019 32 fish farms were sampled.

There are surveillance program for IHN and VHS, the farms with susceptible species (like trouts and pike) are examined yearly by virological methods. In 2019, 20 fish farms were sampled.

Other disease problems: The problem in aquaculture industry is the availability of very few-authorized antiparasitic medicines.



Iceland

Author/Institute: Árni Kristmundsson Institute of Experimental Pathology at Keldur NRL Iceland

Aquaculture production: 90% of all fish farms in Iceland are landbased (flow-through system), but the salmon production is mostly increasing in sea-cages the last years. The total production in 2019 was as follows:

Atlantic salmon: 26.957 t.

Arctic char: 6.322 t.

Rainbow trout: 299 t.

Senegal sole: 377 t.

Cod: 4 t.

Total: 33.959 tonnes

Health status: The health status is very promising and no listed diseases have been detected the last years. The fish disease authority is performing targeted surveillance, with focus on the broodfish farms, with intensive samplings for detection of the most serious diseases. For instance, in 2019 there were taken totally 7.391 samples for ISA testing (7 farms), 4.488 for PD/SAV testing, 2.109 for VHS testing and 1.406 for IHN testing. In addition to the NRL in Iceland, quite many samples were tested in the Faroe Islands. All results were negative.

Other disease problems: The biggest challenge in the Icelandic aquaculture is Bacterial kidney disease, both in salmon and arctic char. BKD is found to be widespread in the wild salmonids, both in freshwater and seawater. BKD is an important part of the Icelandic national health program and a huge amount of samples are taken in a number of fish farms (in 2019: totally 5.464 samples in 21 farms) - and also from wild salmonids used as broodfish for the rivers (543 samples in 4 farms, out of them 5 positives). Eggs from positive females are destroyed. An avirulent marine IPNV was for the first time detected in late 2019 during a routine internal surveillance in farmed Atlantic salmon in seacage farm, but without any symptoms or mortality. IPNV has never been detected in the freshwater farms.



Author/Institute: Samantha White, Marine Institute

Aquaculture production: Finfish aquaculture production in Ireland was ca. 12,000 tonnes, of which 11,330 tonnes was Atlantic salmon production all of which is certified organic. Other production in Ireland includes the freshwater rearing of rainbow trout and perch, which takes place mainly in flow through pond farms and together produced < 1000 tonnes. One farm specialising in the production of ornamental fish including koi carp remained in production.

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

Other disease problems: In 2019, the principal disease issues reported in marine salmon aquaculture were complex gill disease and cardiomyopathy syndrome (CMS). *Paramoeba perurans* was detected in 11 of 12 sites from which samples were received for testing by the Marine Institute, and the parasite was reported on an additional 3 marine sites. Management of AGD is with freshwater treatments and treatment-associated losses were reported on 5 sites. In late summer and autumn, mortalities due to gill damage, exacerbated by jellyfish and algal blooms, were reported from 7 sites, triggering early harvest on 2 sites. Three cases of CMS were reported, while pancreas disease was reported as the principal cause of mortality on 2 sites, and recognised as a contributing factor in one site. *Piscirickettsia salmonis* was associated with relatively low level mortalities on 3 marine salmon farms in late autumn and winter. Furunculosis, caused by *Aeromonas salmonicida*, subsp. *salmonicida* recurred on one marine salmon farm during the year. Significant mortality associated with failed smolts was reported from 2 marine sites in late-spring and summer. No significant issues were reported from freshwater sites. Red rash in returning wild salmon was observed in June/July in Ireland, as with other northwest Atlantic countries.



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

Health status: According to API (Italian fish producer association), in 2019 the total production of fish amounted approximately to 61,800 tonnes, of which rainbow trout and other salmonids (37,900 tonnes) had the major share, followed by 19,400 tonnes of marine species (sea bass, sea bream and *Mugil Spp.*), sturgeon (1,000 tonnes), European eel (800 tonnes), common carp (650 tonnes), Black bullhead/American Catfish (450 tonnes) and drums (100 tonnes). The production of eggs and juveniles was also important and amounted to 380 million pieces (250 million of salmonids, 90 million of sea bream larvae and 40 millions of sea bass larvae). 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 16 VHS and 14 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: As in previous years, in 2019 the main problem for Italian aquaculture was the low water supply in summer. The high temperatures associated to the low availability of water caused an increased incidence in rainbow trout farms of bacterial diseases (in particular lactococcosis: an increased number of *L. garviae* outbreaks have been detected associated to a reduction of efficacy of commercially available vaccines). *Yersinia ruckeri* biotype 2 caused major problems to rainbow trout farms and no vaccine against this biotype is currently available.

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.

In marine species, the most frequent viral diseases detected were vibriosis and VER. An increased number of *Photobacterium damsela* outbreaks has been registered in both sea bass and sea bream farms in 2019. The reassortant strain RGNNV/SJNNV still caused major problem in sea bream hatcheries. Increasing reports of *Sparicotyle* infestation in sea bream offshore cages were made.

A reduction of marine production has been registered at the beginning of 2019 due to the storm that hit the Tirrenian coast destroying several sea cages.





Author/Institute: Zita Muižniece and Mārcis Ziņģis - Institute "BIOR"

Aquaculture production: Aquaculture in Latvia produced only freshwater fish species in large artificial ponds (up to 400 ha surface), through-flow facilities and recirculation facilities. Main produced species in aquaculture are carp, rainbow trout, cat fish, 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 farmer is obliged to inform veterinarian about mortality of aquatic animals and 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 hydrophila*, *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, piscicollis 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: Darius Nienius-National Food and Veterinary Risk

Aquaculture production: Total amount of aquaculture production in 2019 - 4 153 350 kg. Main farming fish species: Carp - 3 086 365 kg, African catfish - 311 188 kg, Rainbow trout - 182 429 kg, Sturgeon - 165 610 kg, Bighead carp 145 562 - kg. The majority part of aquaculture production is raised in open ponds. Ponds are filled with natural stream water.

Health status: No update since 2018

Other disease problems: No update since 2018

Malta



Author/Institute: Benedetto Zangrilli Veterinary and Phytosanitary Regulation Division

Aquaculture production: Two companies farm mostly Gilt-head Bream (*Sparus aurata*) and rarely Seabass (*Dicentrarchus labrax*). Both farms rear fish in cages at sea. Juveniles are bought from EU hatcheries and fed with pellet. Four Companies farm blue fin tuna (*Thunnus thynnus*) caught from wild stocks and fattened inside offshore cages fed with mackerels and herrings bought frozen.

Health status: passive surveillance is implemented for all farms

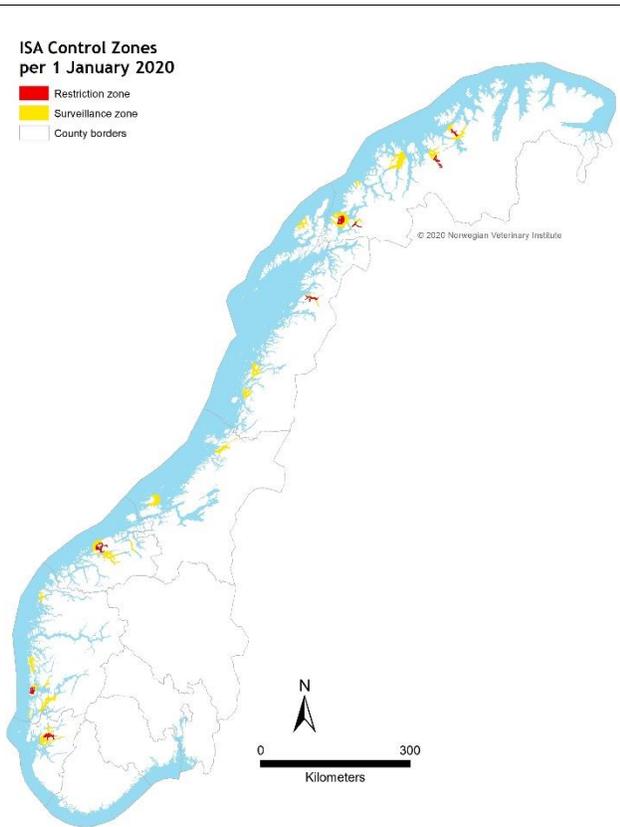
Other disease problems: -

Author/Institute: Norwegian Veterinary Institute

Aquaculture production: Atlantic salmon is the major species in aquaculture. A high number of cleaner fish is used for biological delousing.

Health status: We have a surveillance programme for VHSV and IHNV based on PCR. Most of the included samples are selected from those that are submitted for diagnostic investigation, while some samples from rainbow trout are taken exclusively for the surveillance programme. Last year, samples from pink salmon that were caught in the east of county Finnmark in the very north of Norway also were included. Beside the surveillance that are put in place in ISA-free compartments and due to ISA-outbreaks, a surveillance programme for detection of ISAV HPR0 in hatcheries was implemented last year.

Other disease problems: SAV2 was detected for the very first time in county Rogaland in the south-west of Norway - an area where SAV3 is considered to be endemic. An algal bloom challenged fish farms in the north of Norway last year.





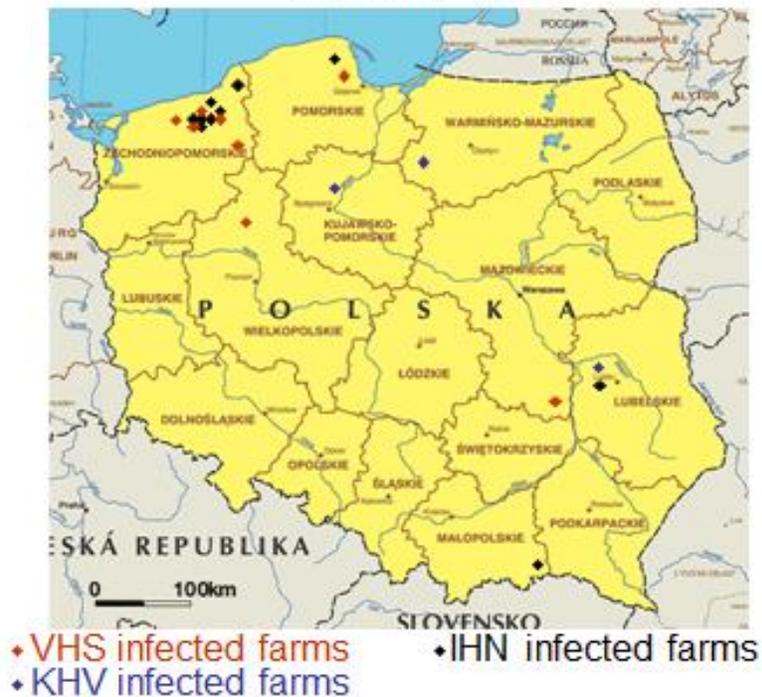
Author/Institute: Marek Matras - Pulawy

Aquaculture production: No significant changes from 2018.

Health status: According to Council directive 2006/88/EC Poland has free health status for ISA and 15 VHS free compartments, 17 IHN free compartments and one KHV free farm, rest of farms have undetermined health status for VHS, IHN a KHV. In 2019 were reported 1 outbreaks of KHV, 2 outbreaks of VHS and one case of IHN. At the national level Poland performed the monitoring for ISA, SDV and KSD.

Other diseases and health related issues: In 2019, carp edema virus was detected in 5 common carp and koi farms. The presence of the IPNV and SAV2 has also been confirmed.

Geographic distribution of VHS/IHN/KHV cases in Poland in 2012



Aquaculture production:

Table I - Number of active fish farms per region (Map I), species and system

Region	Fish farms					Total n°
	Trout and carp	Marine fishes (sea bass, gilthead seabream)				
		Intensive	Semi-intense	Extensive	Sole and Turbot *	
	Active	Active	Active	Active		
DSAVR Norte	13	0	2	0	(1)*	15
DSAVR Centro	12	0	15	1	(2)*	28
DSAVR Lisboa e Vale do Tejo	0	0	16	2	0	18
DSAVR Alentejo	1	0	2	2	0	5
DSAVR Algarve	0	0	7	0	0	7
Madeira	0	2		0		2
Total	26	49				75

*Included in the marine fish farms

Map I



Heath status

CATEGORIZATION OF PORTUGUESE FISH FARMS

Table II

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)

* Actually one is producing only sole

In Portugal, by means of an official sanitary surveillance taken annually for the DGAV, jointly with the INIAV, in the species of culture with the highest production, one confirms that diseases that are required by law to notify, have never 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 rainfed 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 cyprinids ponds bacterial infection with opportunistic agents are prevalent.

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

Serbia



Author/Institute: Vladimir Radosavljevic - University of Sarajevo

Aquaculture production: No update since 2018

Health status: No update since 2018

Other disease problems: No update since 2018

Slovakia



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

Aquaculture production: No significant changes from 2018. Number of active registered farms decreased little bit, in comparison with previous years.

Health status: "Health control of registered farms is included in the program of viral fish diseases surveillance. Inspection, examination and sampling of fish are realised by veterinarian inspectors. All samples are analysed for fish listed diseases in National Reference Laboratory in Dolny Kubin.

Other disease problems: No relevant data.

Slovenia



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

Aquaculture production: With regard Statistical office of Slovenia, data from 2018 the production of rainbow trout was 964 tonnes, other salmonids 102 tonnes, warm water fish 125 tonnes and marine fish and mollusc together 684 tonnes.

Health status: In Slovenia 31 farms/compartments/zones are declared free (Category I) and 2 fish farms/compartments/zones 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 3 VHSV infected, 24 IHNV infected and 3 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 sea water. 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 specie 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

Sea water

- 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 update since 2018



Author/Institute: Charlotte Axén-SVA

Aquaculture production: Mainly RT, second most common species arctic char. A few farms with other species carp, tilapia, African catfish, sturgeon, salmon. Landbased flow-through systems most common for fry and parr production, older fish in cages. Landbased RAS systems for warm water species, sturgeon and salmon.

Health status: Listed salmonid viruses not present in farms. Surveillance according to EU 2015/1554, cell cultures. Farms are categorized into risk classes by the CVA. RC 1= two control visits per year, sampling for virus and BKD every year, RC 2=one control visit per year, sampling every two years. RC 3= one control visit every second year, sampling only upon suspicion. RC 4 = no control visits or sampling unless there is suspicion

Other disease problems: ASS - the number of cases increased from one/year to four cases in 2019. Diagnosis by bacterial culturing, treated with antibiotic. Two of the farms belong to the same company, and there is also BKD present in these farms. Other *Aeromonas* infections seem to be increasing whereas RTFS that is usually a problem was not common (6 cases 2019 compared to the regular 15-30 confirmed cases/year). For BKD there was also an apparent increase in number of cases but 4 out of 6 cases were reinfection of recently sanitized farms, and one case was reappearing infection in broodstock in a landbased farm that had the last case about 10 years ago. A disease of unknown aetiology mainly in salmon but also some in trout fry appeared in all Baltic sea salmon/trout restocking units. Fry were affected at approximately 1-1.5 g size with loss of balance, lethargy and mortality. Viral and bacterial culture negative, histopathology of length sectioned fry negative. One farm also rears salmon fry of Atlantic salmon origin - these fry were unaffected. We believe this could have something to do with the declining health of the adult returners - something "transmissible" that deprives the fry of some essential nutrient, like M74/ thiamine deficiency (no signs of thiamine deficiency in investigated brains though). Samples have been collected from 15-20 broodstock females in four farms to enable analysis of mothers in case the problem occurs again this year.

Switzerland



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

Aquaculture production: The main aquaculture species in Switzerland produced for human consumption is rainbow trout, mainly in raceway farms. Perch and pike perch are increasingly raised, mainly in recirculation systems. A low number of farms (< 5) have started to produce salmon. Brown trout, char and whitefish are bred for stocking purposes.

Health status: In 2019, VHS and IHN were diagnosed. For both diseases, one farm was affected. In some cantons, regular controls of farms are established.

Other disease problems: *Perch rhabdovirus* is a disease of growing concern as it has been increasingly demonstrated in perch producing farms. In addition, systemic infections with *Aeromonas salmonicida* in perch (atypical furunculosis) is increasingly important, with clinical disease and mortality.

The Netherlands



Author/Institute: Olga Haenen, Wageningen Bioveterinary Research

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 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 are 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: For the first time since years a positive severe case of CEV has been diagnosed, in a carp farm, which cultures for restocking, in early summer.

Turkey



Author/Institute: Gulnur Kalayci – NRL Turkey

Aquaculture production: no update since 2018

Health status: We don't have any categorisation of fish farms in our country according to council directive 2006/88/EC.

Other disease problems: No update since 2018.



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

Aquaculture production: "The two main aquaculture sectors in England and Wales in terms of production volume are salmonid species and coarse and ornamental (carp family) fish species.

Rainbow trout 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. Over recent years there has been a trend towards an increased production of larger rainbow trout of 2-3Kg for the table market. There is also a significant production of brown trout mainly for restocking, and a small production of Arctic char for the table market. A small number of sites produce juvenile Atlantic salmon 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 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 and koi carp in a mixture of earth ponds and intensive indoor and outdoor tank systems. The last few years has seen a small number of sites established for the production, holding and supply of wrasse and lumpsuckers for use as cleaner fish by the Scottish salmon industry. This sector has potential to grow as harvesting of wild wrasse for this purpose has resulted in a decline in populations in England. "

Health status: England and Wales are officially recognised in EU legislation (Commission decision 2009/177 as amended) as having Category I status (declared-disease free) for: VHS, IHN, ISA, with one approved compartment farm and two importers also having KHV disease free status. The status for KHV disease, with the exception of the approved compartments, is Category III (not known to be infected). In addition England and Wales are officially recognised as having freedom from SVC and G. salaris under Article 43 (of Commission Decision 2006/88) national measures. In 2019 the official service successfully completed a disease surveillance programme for SVC on a recreational fishery which experienced an outbreak of this disease in 2017. Statutory controls on this fishery have now been rescinded. There are no diseases subject to surveillance for control and eradication (category II). A national programme of risk-based targeted surveillance is implemented for all of the EU non-exotic diseases and for those subject to article 43 national measures. The risk-based programme consists of a minimum annual stock health inspection carried out by the Official Service (the Fish Health Inspectorate, Cefas) at the time appropriate for disease expression. APB's assessed as higher risk or having poor statutory compliance are subject to an increased level of surveillance, however, industry compliance with legislation remains high. Passive surveillance systems are implemented through fish farmers, fishery managers, fish health consultants, veterinarians, and the obligation to report suspicion of notifiable or emerging disease to the Official Service is enshrined in national legislation.

Other disease problems: "Overall the health status of farmed fish in England and Wales remains high, important contributory factors include good supplies of water this year, and lower stocking densities on farms. In addition, the Fish Health Inspectorate work with all APB's to ensure each site has its own Biosecurity Measures Plan, as appropriate to their activities and associated risk, these are reviewed annually during compliance inspections undertaken by the Fish Health Inspectorate.

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) - although reports have been lower during 2019 than in previous years. The new condition termed cranial maxilla fibrosis identified on one rainbow trout farm during 2018 was not reported again during 2019, however research has continued on the characterisation of this condition and to try and identify the aetiological agent. 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 *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 remain a major concern to the salmonid farming sector."



Northern Ireland

Author/Institute: Donna Lyons - Department of Agriculture, Environment and Rural Affairs

Aquaculture production: The finfish sector in Northern Ireland produced approximately 1110 metric tonnes of finfish, valued at £6.8 million in 2018. Of the 20 authorised aquaculture production businesses, 18 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*). In addition Brown trout (*Salmo trutta*) and Carp (*Cyprinus carpio*), are also produced mainly for restocking purposes.

Health status: Northern Ireland has Category I status in respect of the finfish listed diseases. All farms are authorised by DAERA and operate to agreed biosecurity plans. DAERA carry out an annual programme of compliance inspection and disease testing. The disease testing is carried out by the Agri-Food and Biosciences Institute (AFBI) on behalf of DAERA, to an agreed Service Level Agreement. The sampling programme includes the testing of finfish farms and wild fisheries for listed diseases and those diseases which Northern Ireland has Article 43 measures in place for.

Other disease problems: Currently Northern Ireland do not have any challenges to report in this respect.

Author/Institute: Eann Munro-Marine Scotland Science

Aquaculture production: There are 23 businesses operating 53 active sites for the production of rainbow trout. In 2018, 6,413 tonnes of rainbow trout were produced, 5,874 tonnes for the table market and 539 tonnes for restocking angling waters. Of the 53 active sites 29 sites reported production in 2018. Freshwater production accounted for 3,050 tonnes and seawater production the remaining 3,363 tonnes. Freshwater production was from sites operating cages, ponds, raceways, tanks and hatcheries and seawater production was all from cage site facilities. Over 6.3 million ova were laid down to hatch in 2018 with 5.8 million being imported from foreign sources while the remaining 0.5 million were from Scotland or other GB based fish farms.

47.1 million Atlantic salmon smolts were produced by 24 businesses operating 71 active sites during 2018. The principal types of facility used for the production of smolts in freshwater are cages (27 sites) or tanks and raceways (44 sites). Within the tanks and raceways bracket there are also two recirculation units currently in operation. Over 70 million ova were laid down to hatch with 61 million of these ova coming from foreign sources.

In 2018, the total production of Atlantic salmon was 156,025 tonnes. These fish were produced by 12 businesses operating 221 active sites. Fish production of 155,990 tonnes was from the seawater cage sites (217 sites) while 35 tonnes of production was reported from the seawater tank sites (4 sites) currently in operation. Most seawater tank capacity has been re-deployed for the production of other species or salmon broodstock.

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

Species Farmed	Number of Businesses	Number of active Sites	Production (Tonnage)
Sea/Brown Trout	9	12	20
Halibut	1	3	*
Lumpsucker	2	4	14
Wrasse	3	5	6

*Production occurred in 2018 but cannot be shown without revealing the figure for an individual business.

Lumpersucker 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 and tiger trout produced in Scotland. In 2018, all trout production took place in freshwater tanks, ponds and raceways although in previous years small amounts have been produced in seawater cages. Halibut, wrasse and lumpsuckers are produced in seawater tank sites.

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 re-stocked 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 a major control issue in seawater production. 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). Some seawater sites are experiencing complex gill issues which also impact on treatments for sea lice as gill health is compromised. Fish are affected by multiple pathogens at the same time such as *Neoparamoeba perurans*, salmon gill poxvirus, *Paranucleospora theridion* etc.

Increased mortality levels in Atlantic salmon on a number of seawater sites in association with *Pasteurella skyensis*.

Annex 1: Number of fish Farms

Country	Total Number of fish farms authorized or active in 2019 in the country (farms/sites that were active in 2019 or part of 2019).
Austria	237 (* 2018 data)
Belgium	100
Bulgaria	631 (*2018 data)
Cyprus	21
Czech Republic	1849
Denmark	218
Estonia	34 authorized fish farms (23 active in 2019)
Finland	601
France	599
Germany	13.911
Greece	404
Hungary	227
Ireland	70
Italy	807
Latvia	45
Lithuania	89
Malta	6
Netherlands	appr. 108
Poland	4108
Portugal	78
Romania	530
Slovakia	97
Slovenia	309
Spain	291
Sweden	190
England and Wales	259
Scotland	386
Northern Ireland	20
Croatia	38
Turkey	Marine farms:426 Freshwater farms:1860 Total number of fish farms:2286
Albania	N/A
Bosnia and Herzegovina	70
Iceland	50
Norway	1529
Switzerland	365 (2018 data)
Faroe Islands	1 brood stock farm, 9 smolt farms, 24 marine production farms
Total	30704

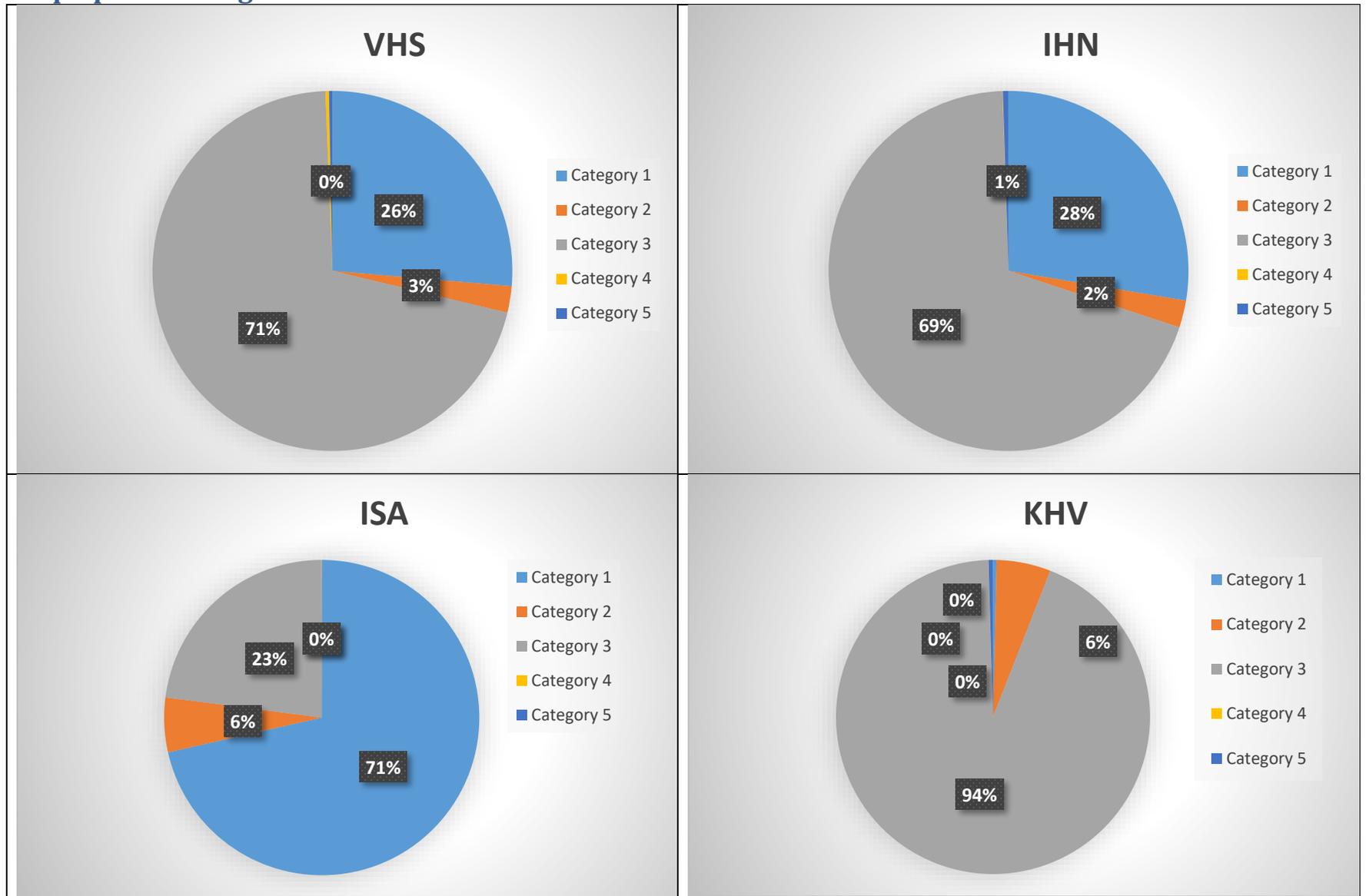
Annex 2: Number of farms placed in the respective categories according to listed diseases

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	7	1	1	0	1	89	87	114	90	0	0	0	0	1	0	0	0	0
<i>Belgium</i>	1	1	0	0	0	0	0	0	0	0	0	0	11	0	0	0	3	3	0	0	0
<i>Bosnia and Herzegovina</i>	0	0	0	0	35	35	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0
<i>Bulgaria</i>	0	0	0	0	32	32	32	309	31	31	31	309	no	no	no	no	no	no	no	no	27 sturgeon farms
<i>Croatia</i>	0	0	0	18	19	19	0	13	0	0	0	0	0	0	0	2	0	0	0	1	37
<i>Cyprus</i>	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
<i>Czech Republic</i>	0	0	249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15
<i>Denmark</i>	178	206	206	0	0	0	0	0	24	0	0	3	0	0	0	0	0	0	0	0	9
<i>England and Wales</i>	173	173	156	1	0	0	0	0	0	0	0	131	0	0	0	0	0	0	0	0	10
<i>Estonia</i>	2	2	15	0	13	11	0	2	0	0	0	0	0	2	0	0	0	0	0	0	8
<i>Faroe Islands</i>	0	0	0	N/A	0	0	0	N/A	34	34	34	N/A	0	0	0	N/A	0	0	0	N/A	0
<i>Finland</i>	427	276	297	0	0	6	0	0	0	0	0	14	29	0	0	0	0	0	0	0	impossible to count
<i>France</i>	282	285	600	1	81	77	0	0	235	235	0	0	1	2	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>Germany</i>	146	132	867	7	10	7	0	0	7.360	7.010	153	5.519	0	0	0	0	15	22	0	43	97
<i>Greece</i>	0	0	0	0	0	0	0	0	62	62	62	7	0	0	0	0	0	0	0	0	320
<i>Hungary</i>	0	0	0	0	22	22	0	248	0	0	0	0	0	0	0	0	0	0	0	0	No data.
<i>Iceland</i>	3	29	3	0	0	0	0	0	26	0	26	0	0	0	0	0	0	0	0	0	18
<i>Ireland</i>	16	68	68	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Italy</i>	195	190	538	0	7	7	0	0	345	326	0	116	0	0	0	0	16	14	0	0	204
<i>Latvia</i>	0	0	0	0	0	0	0	0	17	17	0	22	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>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
<i>The Netherlands</i>	0	0	0	0	0	0	0	0	66	66	66	1	0	0	0	0	0	0	0	0	appr. 41
<i>Northern Ireland</i>	20	20	20	3	20	20	20	3	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Norway</i>	1529	1369	4	0	0	0	321	0	0	0	1042	0	0	0	2	0	0	0	0	0	0
<i>Poland</i>	15	17	572	1	0	0	0	0	555	554	0	3534	0	0	0	0	2	1	0	1	0
<i>Portugal</i>	26	26	78	1	2	2	*	0	0	0	*	0	0	0	*	0	0	0	0	0	0
<i>Romania</i>	0	0	50	0	0	0	0	0	166	135	0	285	0	0	0	0	0	0	0	1	57
<i>Scotland</i>	74	371	373	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	11

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>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	66	66	0	31	26	26	0	11	0	0	0	0	0	0	0	0	0
<i>Slovenia</i>	31	31	169	0	2	2	0	0	123	105	0	124	0	0	0	0	3	24	0	3	2
<i>Spain</i>	120	100	332	0	0	0	0	0	24	19	0	1	0	0	0	0	0	0	0	0	0
<i>Sweden</i>	169	169	166	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	16
<i>Switzerland</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Turkey</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3426	3484	4763	40	310	307	373	607	9183	8742	1528	10172	41	4	2	2	40	64	0	50	832

Graph plot of categorized fish farms in 2019



Annex 3: Outbreaks of listed diseases

COUNTRY	2.1 Number of outbreaks			
	VHS	IHN	KHVD	ISA
Austria	5	2	1	0
Belgium	5	0	1	0
Bosnia and Herzegovina	0	0	0	0
Bulgaria	0	0	0	0
Croatia	0	0	1	0
Cyprus	0	0	0	0
Czech Republic	3	1	11	0
Denmark	0	0	6	0
England and Wales	0	0	17	0
Estonia	0	2	0	0
Faroe Islands	0	0	0	0
Finland	0	0	0	0
France	2	0	0	0
Germany	13	20	49	0
Greece	0	0	0	0
Hungary	0	0	1	0
Iceland	0	0	0	0
Ireland	0	0	1	0
Italy	1	1	0	0
Latvia	0	0	0	0
Lithuania	0	0	0	0
Malta	0	0	0	0
The Netherlands	0	0	3	0
Northern Ireland	0	0	0	0

COUNTRY	2.1 Number of outbreaks			
	VHS	IHN	KHVD	ISA
Norway	0	0	1	10
Poland	2	1	1	0
Portugal	0	0	0	0
Romania	0	0	2	0
Scotland	0	0	0	0
Serbia	0	0	0	0
Slovakia	0	1	1	0
Slovenia	0	1	0	0
Spain	0	0	0	0
Sweden	0	0	0	0
Switzerland	1	1	0	0
Turkey	0	0	0	0
TOTAL	32	30	96	10

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	rainbow trout	Eva Lewisch: "gill disease of unknown etiology"	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0
Bosnia and Herzegovina	0	0	0	0	0	0	0	0
Bulgaria	Rainbow trout (Oncorhynchus mykiss)	IPN symptoms and mortality	0	0	0	0	0	0
Croatia	Sea bass	Infection with Vibrio harveyi	Sea bass	Infection with Tenacibaculum sp.	Sea bream	Sparicotyle sp.	Sea bream	Red rash
Cyprus	0	0	0	0	0	0	0	0
Czech Republic	Common carp	carp edema virus	Common carp	Aeromonas sp.	Rainbow trout	Aeromonas salmonicida	0	0
Denmark	0	0	0	0	0	0	0	0
England and Wales	0	0	0	0	0	0	0	0
Estonia	Aeromonas spp.	Rainbow trout, Sturgeon spp., Carps	0	0	0	0	0	0
Faroe Islands	Atlantic salmon	Sea Lice, CMS, AGD, BKD, Vinter ulcers, Furunkulosis	LumpSuckers	Pasteurellosis, Tenacibaculum	na	na	na	na

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
Finland	Several Salmonid species; land-locked salmon, brown trout, Baltic salmon and Coregonids affected most severely	Saprolegniosis: occurrence between (and inside) farms rather unpredictable, often associated with maturation of broodfish/spawning, problems most common in ca. 2,5-14 degrees C water temperatures.	Rainbow trout	IPN genogroup 2 nowadays spread in many inland watersheds. May increase mortality, when in combination with bacteria (flavobacteria)	0	0	0	0
France	Perch and other percidae	Perch rhabdovirus (19 samples analyzed)	White fish	Sphaerothecum destruens	Salmonid	Renibacterium salmoninarum	Salmonid, anguilla	Flavobacterium
Germany	(see annex 4a)							
Greece	SEABASS	VNN/VER	SEABASS	Aeromonas veronii	SEABREAM	Sparicotylae chrysophrii	SEABASS	Lernathropus kroyeri
Hungary	-	0	0	0	0	0	0	0
Iceland	0	0	0	0	0	0	0	0
Ireland	Atlantic salmon	Pancreas disease,	Salmo salar	Amoebic gill disease/gill pathologies	Oncorhynchus mykiss	Rainbow trout fry syndrome, enteric	Cyprinus carpio	Koi sleepy disease

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
		cardiomyopathy syndrome				redmouth disease		
Italy	See ANNEX 4a							
Latvia	Salmonidae	Aeromonosis	Cyprinidae	Aeromonosis	0	0	0	0
Lithuania	Eel	Increased eel mortality in natural water bodies. Suspected endoparasite – <i>Anguillicola crassus</i> .	0	0	Carp	Laboratory confirmed one Spring Carp Viraemia case in the private (non commercial) pond.	0	0
Malta	<i>Sparus Aurata</i>	<i>Pasteurella</i> spp	0	0	0	0	0	0
The Netherlands	Common carp (kept in open ponds, fish were 1 year, 7-15 cm length)	CEV detected after 95% (1700 fish) mortality at 22 degrees C, KHV negative, as diagnosed end of June 2019.			0	0	0	0
North Ireland	Rainbow and Brown trout	Furunculosis and Saprolegnia Fungus & Exo Parasites, Red Mark Syndrome	Salmon	Pancreas Disease	0	0	0	0
Norway	Atlantic salmon	PD, HSMB and CMS			0	0	0	0
Poland	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0

COUNTRY	Fish diseases problems other than VHS, IHN, KHV or ISA							
	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms	Fish species	Disease or symptoms
Romania	Rainbow trout	IPN	0	0	0	0	0	0
Scotland	Atlantic salmon							
Serbia	0	0	0	0	0	0	0	0
Slovakia	carp	SVCV	rainbow trout	IPNV	carp	CEV	0	0
Slovenia	salmonids	RTFS, Aeromonas infections	carps	parasites	0	0	0	0
Spain	0	0	0	0	0	0	0	0
Sweden	Arctic char, brown trout	ASS	salmonids	Aeromonas except ASS or ASA	Baltic salmon and Baltic sea trout	unknown (see 3.5)	0	0
Switzerland	Perch, Pike perch	Rhabdovirus infections in perch (PRV)	Rainbow trout	RTFS, BGD	0	0	0	0
Turkey	Rainbow trout	IPN	0	0	0	0	0	0

Annex 4a: Additional information

Germany

3.2. Other diseases or pathogens identified in NRL or regional laboratories (e.g. A. invadans, G. salaris, Piscine reovirus, Piscine myocarditis virus, R. salmoninarum, Francisella, Piscirickettsia, Carp edema virus, Cyprinid herpesvirus 1 & 2, Red Mark Syndrome, Rainbow Trout Fry Syndrome (RTFS), Enteric Red Mouth (ERM), Furunculosis, Vibriosis, Pasteurellosis etc.):			
<i>State</i>	<i>Fish species</i>	<i>Disease or pathogen</i>	<i>Number of fish farms/cases</i>
Baden-Württemberg:	rainbow trout	RTFS	22 farms, 65 cases
	rainbow trout, char	furunculosis	11 farms, 19 cases
	rainbow trout	ERM	4 farms, 8 cases
	rainbow trout	Amoebic Gill Disease	6 farms, 7 cases
	rainbow trout	PKD	6 farms, 6 cases
	rainbow trout	BKD	2 farms, 2 cases
	salmonids	Gyrodactylus	10 farms, 14 cases
Bavaria	rainbow trout, char	ERM	18
	char, brown trout, sea trout, rainbow trout	furunculosis	50
	char, brown trout, sea trout, rainbow trout	Flavobacterium psychrophilum	25
	grayling	Renibacterium salmoninarum	2
Berlin:			
Brandenburg	Poecilia sphenops (silver molly)	Vibrio algiolyticus	1
	char	Aeromonas salmonicida	1
	rainbow trout	Yersinia ruckerii	1
	Characiformes spp.	Mycobacterium peregrinum	1
Bremen:	no report		
Hamburg:	no report		
Hesse	rainbow trout	furunculosis	3

	salmonids	ERM	10
	salmonids	RTFS	12
	cyprinids	CEV	1
Meckl.-W. Pomerania:	guppy, pike koi, roach, tench, pike-perch	Aeromonas spp.	5
	perch, pike-perch, surgeonfishes, butterflyfish, angelfish	Vibriosis	2
Lower Saxony:	rainbow trout	furunculosis (Aeromonas salmonicida ssp. Salmonicida)	6 farms, 7 cases
	rainbow trout	ERM (Yersinia ruckeri)	4 farms, 6 cases
	rainbow trout	RTFS (Flavobacterium psychrophilum)	21 farms, 12 cases
	koi	CEV	9 farms, 9 cases
	carp	CEV	2 farms, 2 cases
	ornamental fish, zebrafish (lab fish)	mycobacteria	10 farms, 11 cases
	pike-perch, zebrafish	vibriosis	2 farms, 2 cases
	salt water fish	vibriosis	8 farms, 13 cases
North Rhine- Westphalia:	rainbow trout	Aeromonas salmonicida ssp. Salmonicida	6
	rainbow trout	Yersinia ruckeri	6
	rainbow trout	Pseudomonas fluorescens	2
Rhineland- Palatinate:	No reporting		
Saarland:	No reporting		
Saxony:	sturgeon	herpesvirus	1
Saxony-Anhalt: :	rainbow trout	Yersinia ruckeri	1
	brown trout	Aeromonas salmonicida	1

Schleswig-Holstein:	No reporting		
Thuringia:	rainbow trout	Flavobacterium psychrophilum	3
	rainbow trout	Aeromonas salmonicida	1
	rainbow trout	Yersinia ruckeri	3
	rainbow trout	Tetracapsuloides bryosalmonae	1
	rainbow trout	Renibacterium salmoninarum	1

Italy

3. Laboratory data (as of 31.12.2019)	Answer	
3.1 Number of samples tested positive in NRL and regional laboratories in your country:		
Number of positive samples from diagnostic case from your country. NB fill with 0 both if not tested or not detected.	No. of samples tested for the presence of the following viruses	No. of samples tested <u>positive</u> by cell cultivation, PCR or other methods
Other: Sturgeons virus	44	20
Other: Cyprinid Herpesvirus	33	17
Other: Eel virus	10	0
Other: Catfish virus	6	1
Other: Ranavirus	12	0
3.2 Other diseases or pathogens identified in NRL or regional laboratories (e.g. <i>A. invadans</i>, <i>G. salaris</i>, <i>Piscine reovirus</i>, <i>Piscine myocarditis virus</i>, <i>R. salmoninarum</i>, <i>Francisella</i>, <i>Piscirickettsia</i>, Carp edema virus, <i>Cyprinid herpesvirus 1 & 2</i>, <i>Red Mark Syndrome</i>, etc.):		
<i>Fish species</i>	<i>Disease or pathogen</i>	<i>Number of fish farms/cases</i>
Black bass (<i>Micropterus salmoides</i>)	A. veronii biovar. sobria	2
	Aeromonas salmonicida	5
Blacktip reef shark (<i>Carcharhinus melanopterus</i>)	Vagococcus fluvialis	1
	Vibrio harveyi	1
Brook trout (<i>Salvelinus fontinalis</i>)	A. salmonicida subsp. salmonicida	3
	Lactococcus garvieae	1
	Aeromonas salmonicida	2
	Aeromonas spp.	1
Brook barbel (<i>Barbus caninus</i>)	Aeromonas spp.	1
Brown trout (<i>Salmo trutta fario</i>)	A. salmonicida subsp. salmonicida	3
	Aeromonas spp.	2

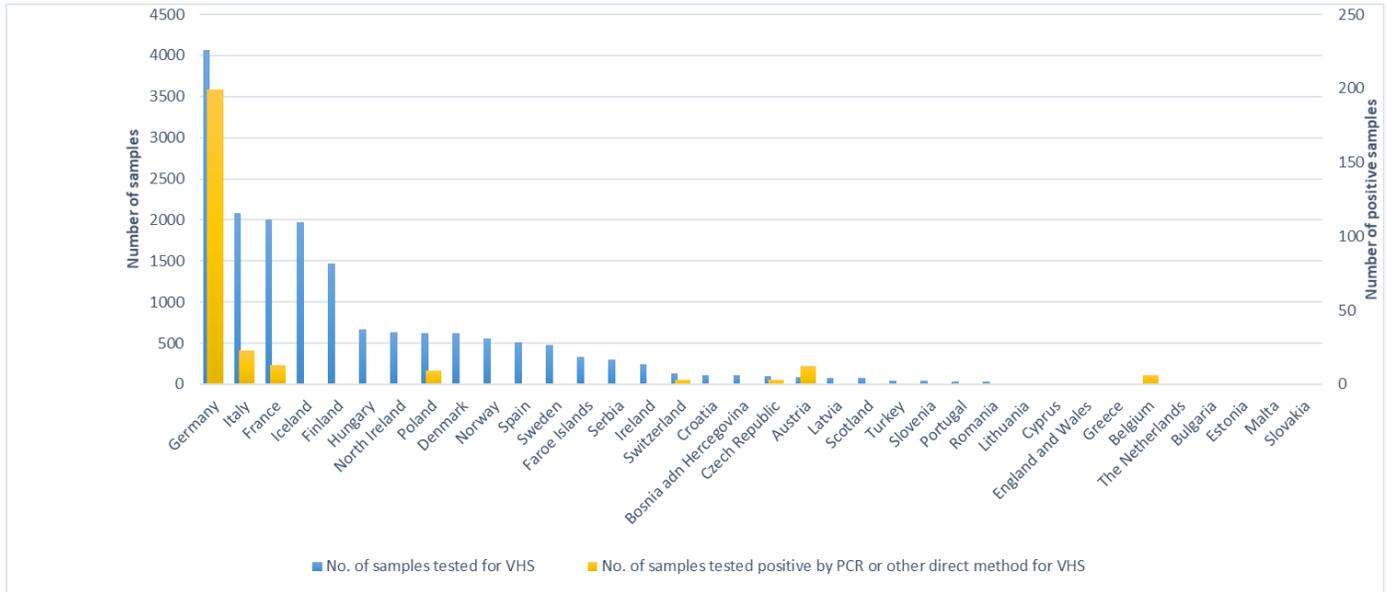
	Trichodina	1
	Aeromonas salmonicida	1
Carp (<i>Cyprinus carpio</i>)	Shewanella putrefaciens	6
	Motile aeromonas (A. hydrophila/caviae/sobria/bestiarium/veronii)	16
	A. veronii biovar. sobria	19
	Pseudomonas spp.	3
	Brevundimonas vesicularis	1
	Aeromonas salmonicida	1
	Aeromonas spp.	1
	Aeromonas hydrophila	2
	Aeromonas sobria	1
	Monogenea	1
	Plesiomonas shigelloides	1
	Chub (<i>Squalius cephalus</i>)	Aeromonas Veronii/Sobria
Eel (<i>Anguilla anguilla</i>)	Eel Virus European X	2
	Motile aeromonas (A. hydrophila/caviae/sobria/bestiarium/veronii)	1
	Aeromonas sobria	1
European catfish (<i>Ameiurus melas</i>)	Catfish Iridovirus	1
	Motile aeromonas (A. hydrophila/caviae/sobria/bestiarium/veronii)	9
Gilt-head seabream (<i>Sparus aurata</i>)	Motile aeromonas (A. hydrophila/caviae/sobria/bestiarium/veronii)	10
	Photobacterium damsela sub. damsela	2
	Vibriosis (V. anguillarum, V. alginolyticus, V. damsela, V. harveyi, V. parahaemolyticus)	18
	Vibrio harveyi	1
	Photobacterium damsela	1
Goldfish (<i>Carassius auratus</i>)	Aeromonas sobria	1
Grayling (<i>Thymallus thymallus</i>)	Motile aeromonas (A. hydrophila/caviae/sobria/bestiarium/veronii)	6
	Aeromonas salmonicida	3
Marble trout (<i>Salmo trutta marmoratus</i>)	Aeromonas hydrophila	2
	Aeromonas spp.	1
Ocellate river stingray (<i>Potamotrygon motoro</i>)	Aeromonas hydrophila	1
Ornamental Fish	Aeromonas hydrophila	1
	Dactylogyrus spp.	1
Northern pike (<i>Exos lucius</i>)	Aeromonas hydrophila	1

Perch (<i>Perca fluviatilis</i>)	Perch Rhabdovirus	3
Rainbow trout (<i>Oncorhynchus mykiss</i>)	<i>Yersinia ruckeri</i>	4
	<i>Lactococcus garvieae</i>	18
	Nodular Gill Disease	16
	<i>Aeromonas hydrophila</i>	8
	<i>Aeromonas</i> spp.	2
	<i>Aeromonas salmonicida</i>	15
	<i>Aeromonas eucrenophyla</i>	1
	<i>Yersinia ruckeri</i> biotype 1	6
	<i>Yersinia ruckeri</i> biotype 2	13
	<i>Streptococcus</i> spp.	1
	<i>Aeromonas sobria</i>	2
	<i>Flavobacterium</i> spp.	2
	<i>Gyrodactylus</i> spp.	4
	Motile aeromonas (<i>A. hydrophila/caviae/sobria/bestiarium/v. eronii</i>)	3
	Redtail catfish (<i>Phractocephalus hemiliopterus</i>)	<i>Aeromonas hydrophila</i>
<i>Salmo trutta</i> spp.	<i>Lactococcus garviae</i>	5
	<i>Carnobacterium maltaromaticum</i>	4
	<i>Renibacterium salmoninarum</i>	2
	PKD (<i>Tetracapsuloides bryosalmonae</i>)	3
Sea bass (<i>Dicentrarchus labrax</i>)	Vibriosis (<i>V. anguillarum</i> , <i>V. alginolyticus</i> , <i>V. spp</i>)	19
	<i>Vibrio harveyi</i>	39
	Motile aeromonas (<i>A. veronii/ A. veronii</i> biovar. <i>sobria</i>)	4
	<i>Aeromonas sobria</i>	3
	<i>Photobacterium damsela</i> sub. <i>piscicida</i>	25
	<i>Aeromonas veronii</i>	2
	<i>Vibrio alginolyticus</i>	2
	<i>Diplectanum aequans</i>	3
	<i>Diplectanum</i> spp.	2
	<i>Photobacterium damsela</i> sub. <i>Damsela</i>	6
	Siberian sturgeon (<i>Acipenser baerii</i>)	<i>Yersinia ruckeri</i>
Sturgeon (<i>Acipenseridae</i>)	<i>Lactococcus garvieae</i>	1
	<i>Acipenser Iridovirus-European (AcIV-E)</i>	7

Annex 5: Laboratory data

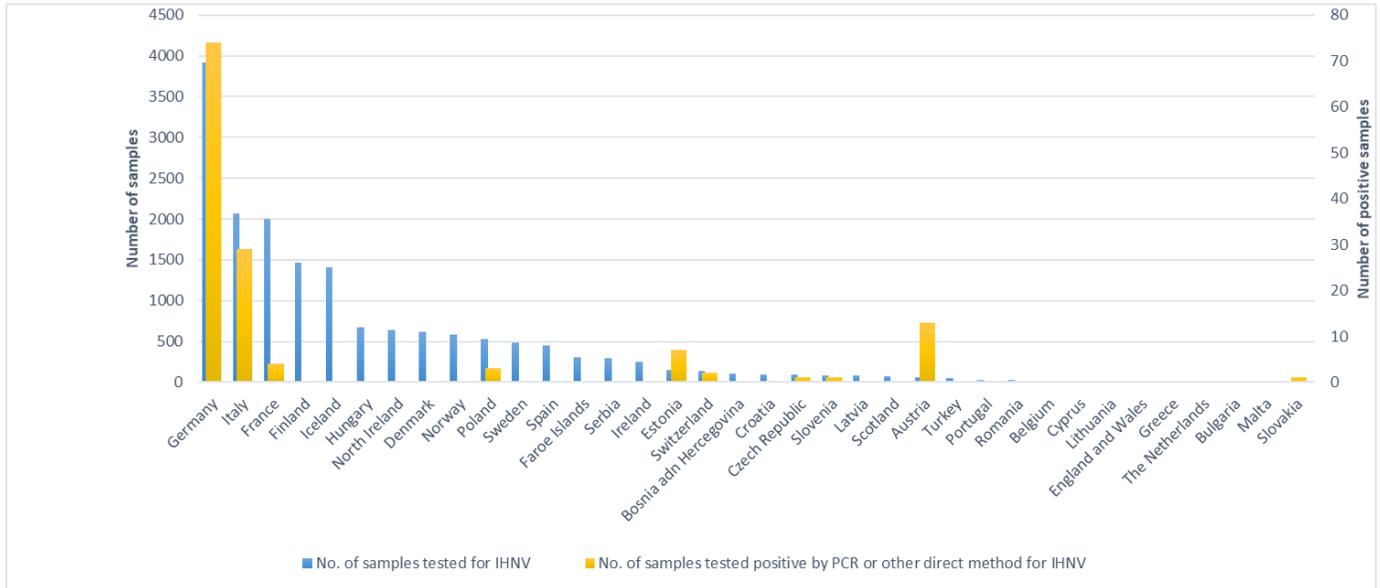
Number of samples tested for VHSV in Europe in 2019

Country	No. of samples tested for VHS	No. of samples tested positive by PCR or other direct method for VHS
Germany	4063	199
Italy	2081	23
France	2008	13
Iceland	1967	0
Finland	1464	0
Hungary	669	0
North Ireland	636	0
Poland	625	9
Denmark	622	0
Norway	559	0
Spain	507	0
Sweden	480	0
Faroe Islands	333	0
Serbia	300	0
Ireland	247	0
Switzerland	136	3
Croatia	109	0
Bosnia and Hercegovina	105	0
Czech Republic	95	3
Austria	82	12
Latvia	79	0
Scotland	75	0
Turkey	47	0
Slovenia	44	0
Portugal	29	0
Romania	27	0
Lithuania	13	0
Cyprus	10	0
England and Wales	8	0
Greece	8	0
Belgium	6	6
The Netherlands	6	0
Bulgaria	0	0
Estonia	0	0
Malta	0	0
Slovakia	0	0



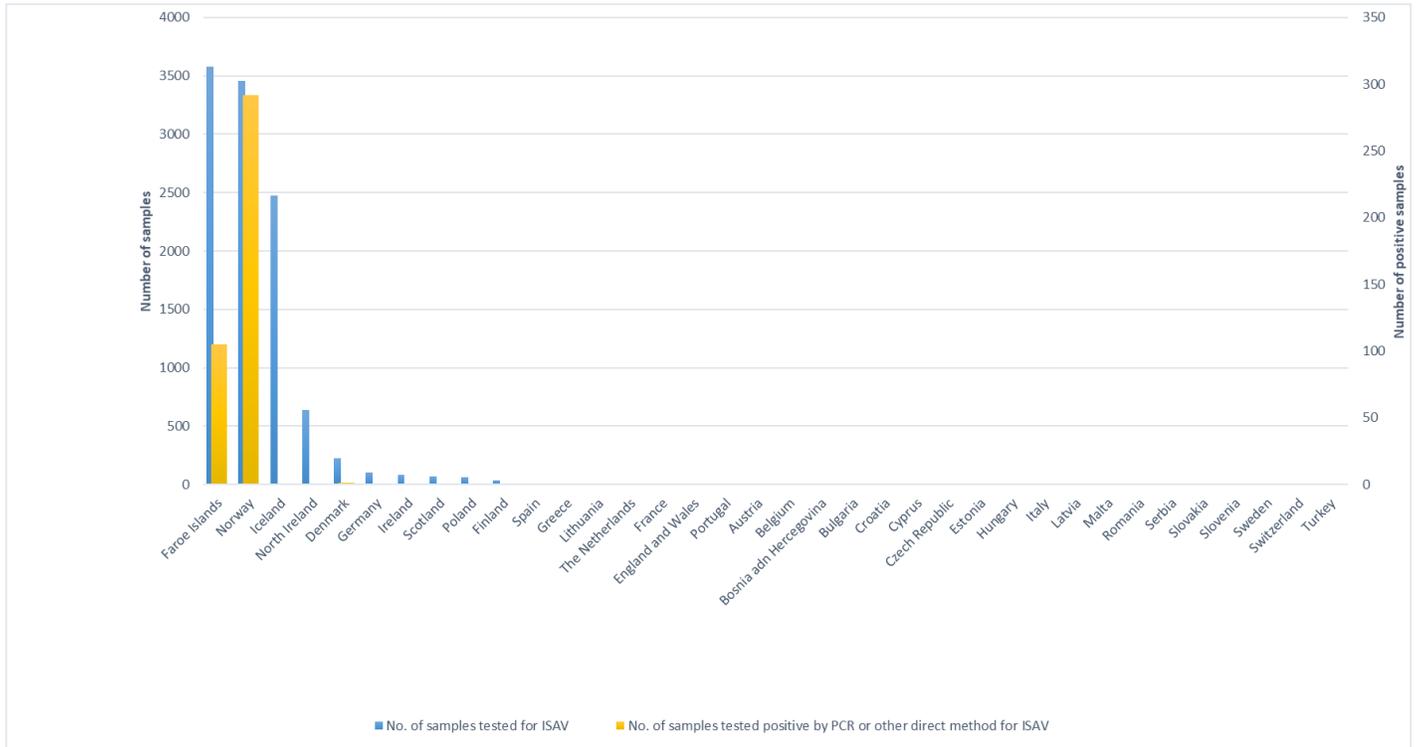
Number of samples tested for IHNV in Europe in 2019

Country	No. of samples tested for IHNV	No. of samples tested positive by PCR or other direct method for IHNV
Germany	3914	74
Italy	2071	29
France	2005	4
Finland	1464	0
Iceland	1406	0
Hungary	669	0
North Ireland	636	0
Denmark	622	0
Norway	585	0
Poland	526	3
Sweden	480	0
Spain	447	0
Faroe Islands	308	0
Serbia	300	0
Ireland	247	0
Estonia	155	7
Switzerland	136	2
Bosnia and Hercegovina	105	0
Croatia	99	0
Czech Republic	95	1
Slovenia	86	1
Latvia	79	0
Scotland	74	0
Austria	57	13
Turkey	47	0
Portugal	28	0
Romania	27	0
Belgium	11	0
Cyprus	10	0
Lithuania	9	0
England and Wales	8	0
Greece	8	0
The Netherlands	6	0
Bulgaria	0	0
Malta	0	0
Slovakia	0	1



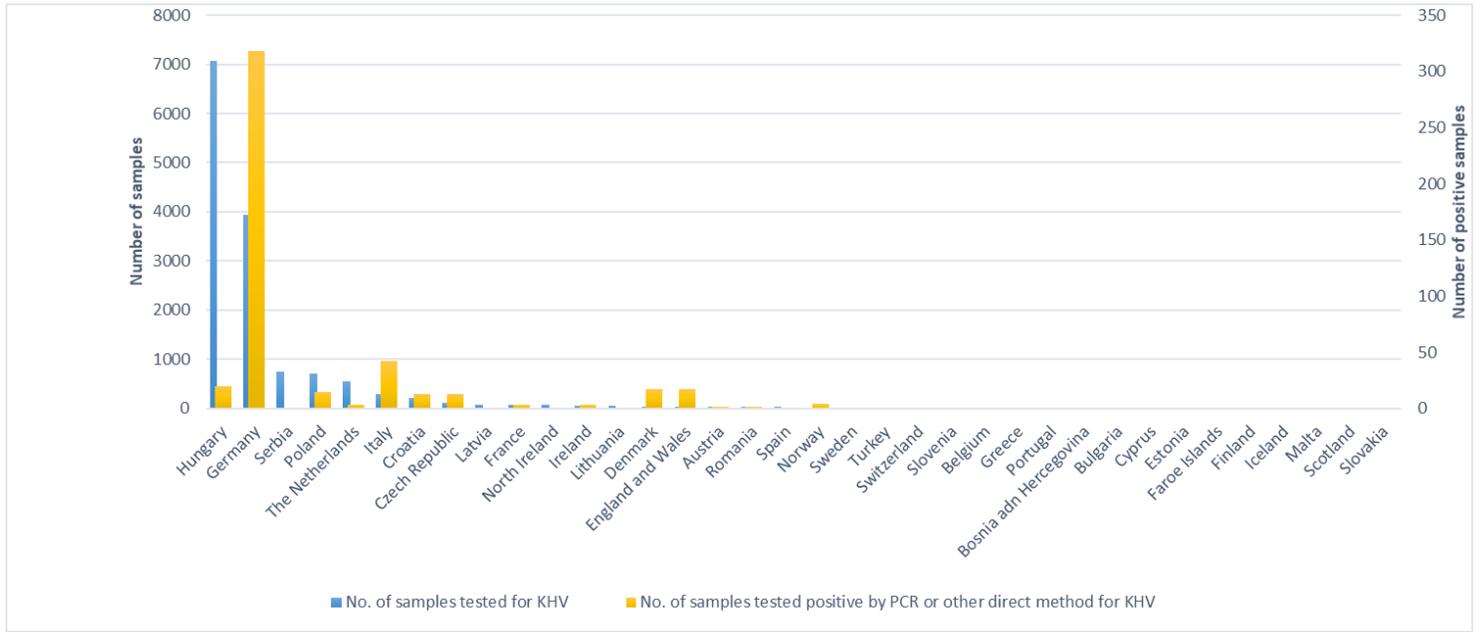
Number of samples tested for ISAV in Europe in 2019

Country	No. of samples tested for ISAV	No. of samples tested positive by PCR or other direct method for ISAV
Faroe Islands	3576	105
Norway	3458	292
Iceland	2474	0
North Ireland	636	0
Denmark	224	1
Germany	105	0
Ireland	79	0
Scotland	70	0
Poland	60	0
Finland	38	0
Spain	10	0
Greece	8	0
Lithuania	8	0
The Netherlands	6	0
France	4	0
England and Wales	3	0
Portugal	1	0
Austria	0	0
Belgium	0	0
Bosnia and Hercegovina	0	0
Bulgaria	0	0
Croatia	0	0
Cyprus	0	0
Czech Republic	0	0
Estonia	0	0
Hungary	0	0
Italy	0	0
Latvia	0	0
Malta	0	0
Romania	0	0
Serbia	0	0
Slovakia	0	0
Slovenia	0	0
Sweden	0	0
Switzerland	0	0
Turkey	0	0



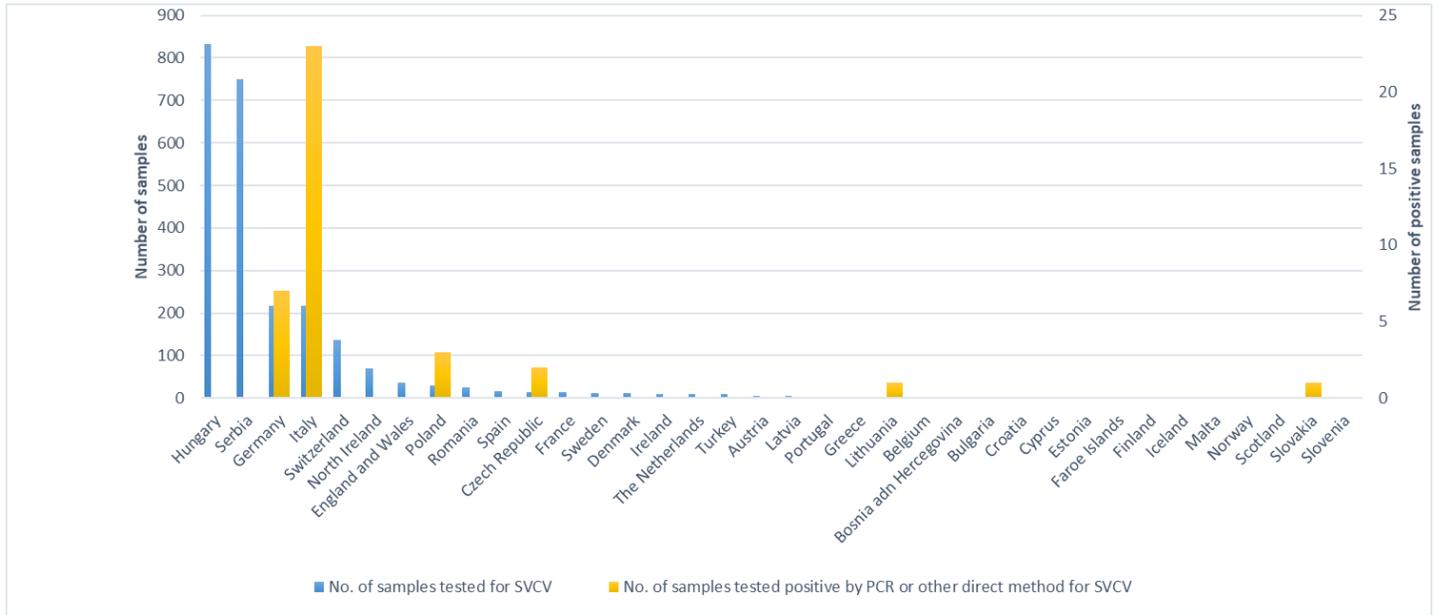
Number of samples tested for KHV in Europe in 2019

Country	No. of samples tested for KHV	No. of samples tested positive by PCR or other direct method for KHV
Hungary	7072	20
Germany	3946	318
Serbia	750	0
Poland	715	15
The Netherlands	548	3
Italy	298	42
Croatia	220	13
Czech Republic	107	13
Latvia	85	0
France	71	3
North Ireland	70	0
Ireland	56	3
Lithuania	47	0
Denmark	42	17
England and Wales	39	17
Austria	33	2
Romania	27	2
Spain	26	0
Norway	16	4
Sweden	12	0
Turkey	10	0
Switzerland	8	0
Slovenia	3	1
Belgium	1	1
Greece	1	0
Portugal	1	0
Bosnia adn Hercegovina	0	0
Bulgaria	0	0
Cyprus	0	0
Estonia	0	0
Faroe Islands	0	0
Finland	0	0
Iceland	0	0
Malta	0	0
Scotland	0	0
Slovakia	0	1



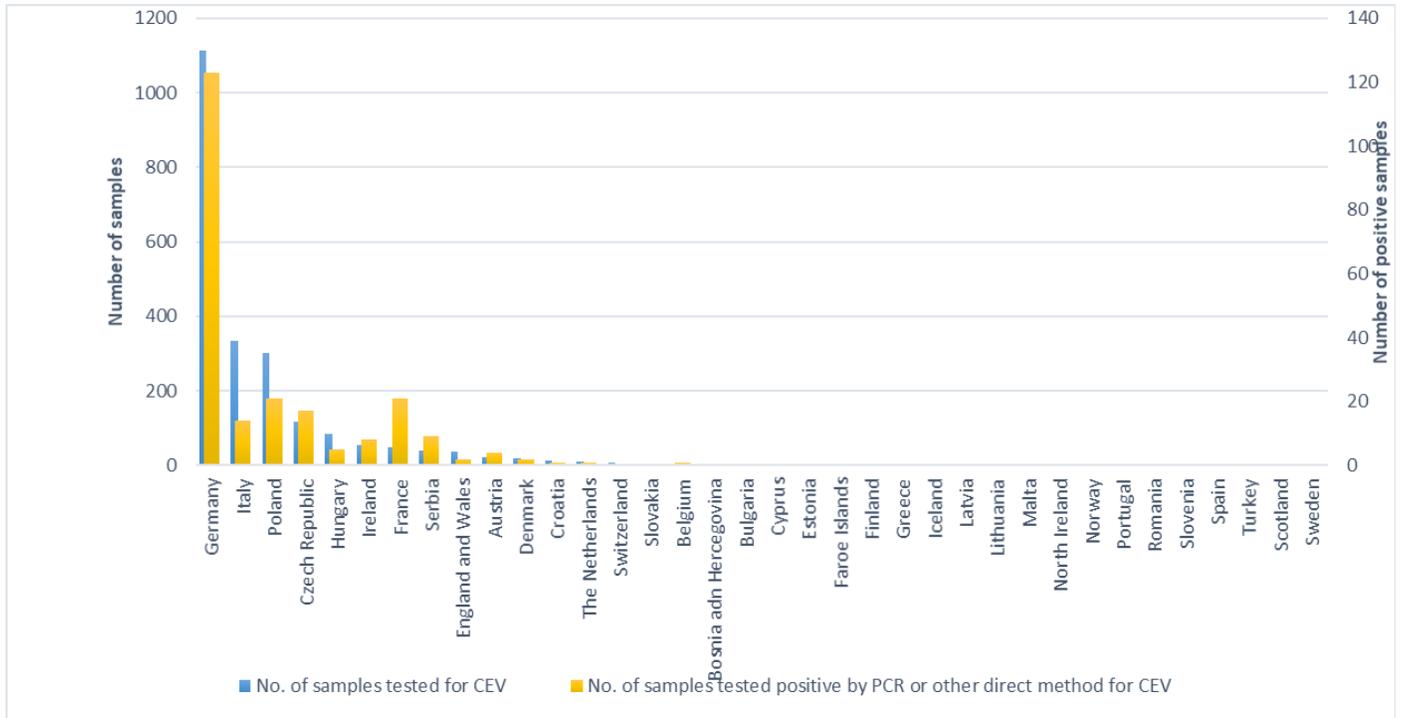
Number of samples tested for SVCV in Europe in 2018

Country	No. of samples tested for SVCV	No. of samples tested positive by PCR or other direct method for SVCV
Hungary	832	0
Serbia	750	0
Germany	216	7
Italy	216	23
Switzerland	136	0
North Ireland	70	0
England and Wales	36	0
Poland	30	3
Romania	26	0
Spain	16	0
Czech Republic	15	2
France	15	0
Sweden	13	0
Denmark	11	0
Ireland	10	0
The Netherlands	10	0
Turkey	9	0
Austria	6	0
Latvia	6	0
Portugal	3	0
Greece	1	0
Lithuania	1	1
Belgium	0	0
Bosnia and Hercegovina	0	0
Bulgaria	0	0
Croatia	0	0
Cyprus	0	0
Estonia	0	0
Faroe Islands	0	0
Finland	0	0
Iceland	0	0
Malta	0	0
Norway	0	0
Scotland	0	0
Slovakia	0	1
Slovenia	0	0



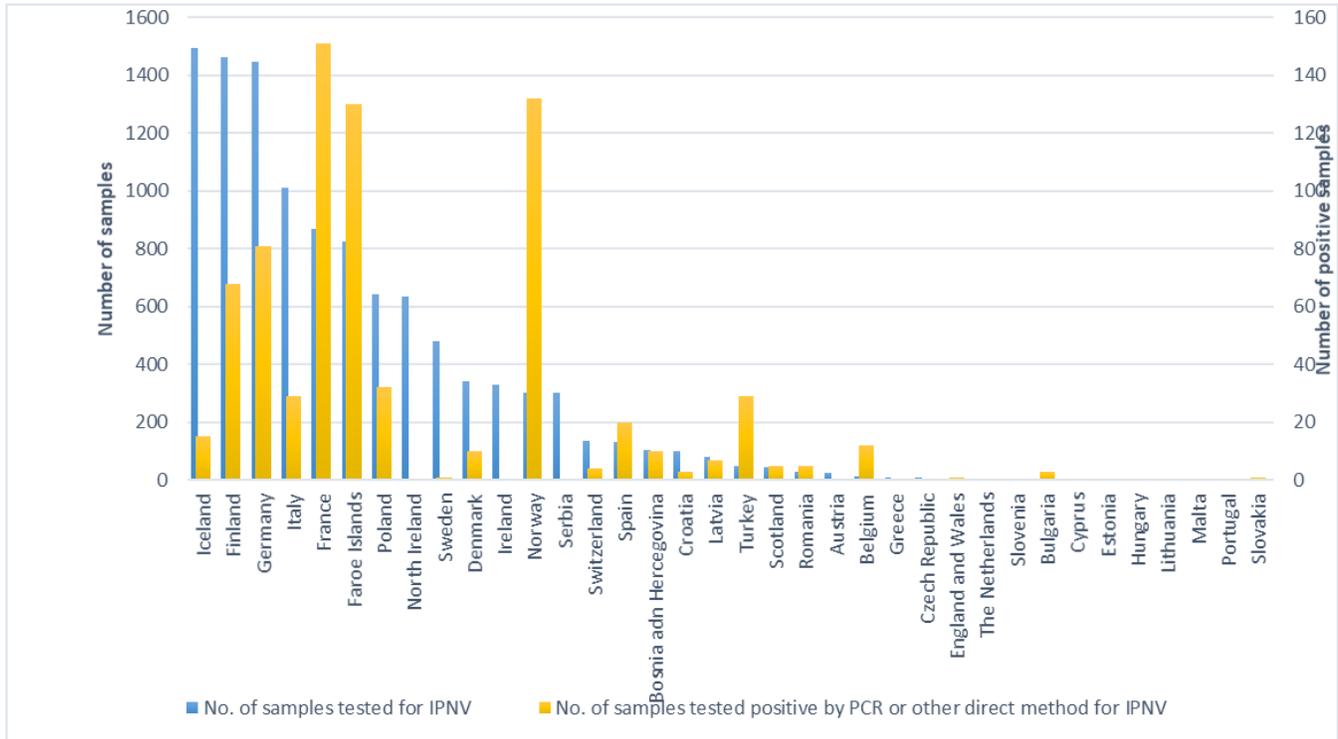
Number of samples tested for CEV in Europe in 2019

Country	No. of samples tested for CEV	No. of samples tested positive by PCR or other direct method for CEV
Germany	1113	123
Italy	335	14
Poland	300	21
Czech Republic	117	17
Hungary	85	5
Ireland	56	8
France	50	21
Serbia	40	9
England and Wales	36	2
Austria	23	4
Denmark	19	2
Croatia	12	1
The Netherlands	11	1
Switzerland	6	0
Slovakia	1	0
Belgium	1	1
Bosnia and Hercegovina	0	0
Bulgaria	0	0
Cyprus	0	0
Estonia	0	0
Faroe Islands	0	0
Finland	0	0
Greece	0	0
Iceland	0	0
Latvia	0	0
Lithuania	0	0
Malta	0	0
North Ireland	0	0
Norway	0	0
Portugal	0	0
Romania	0	0
Slovenia	0	0
Spain	0	0
Turkey	0	0
Scotland	0	0
Sweden	0	0



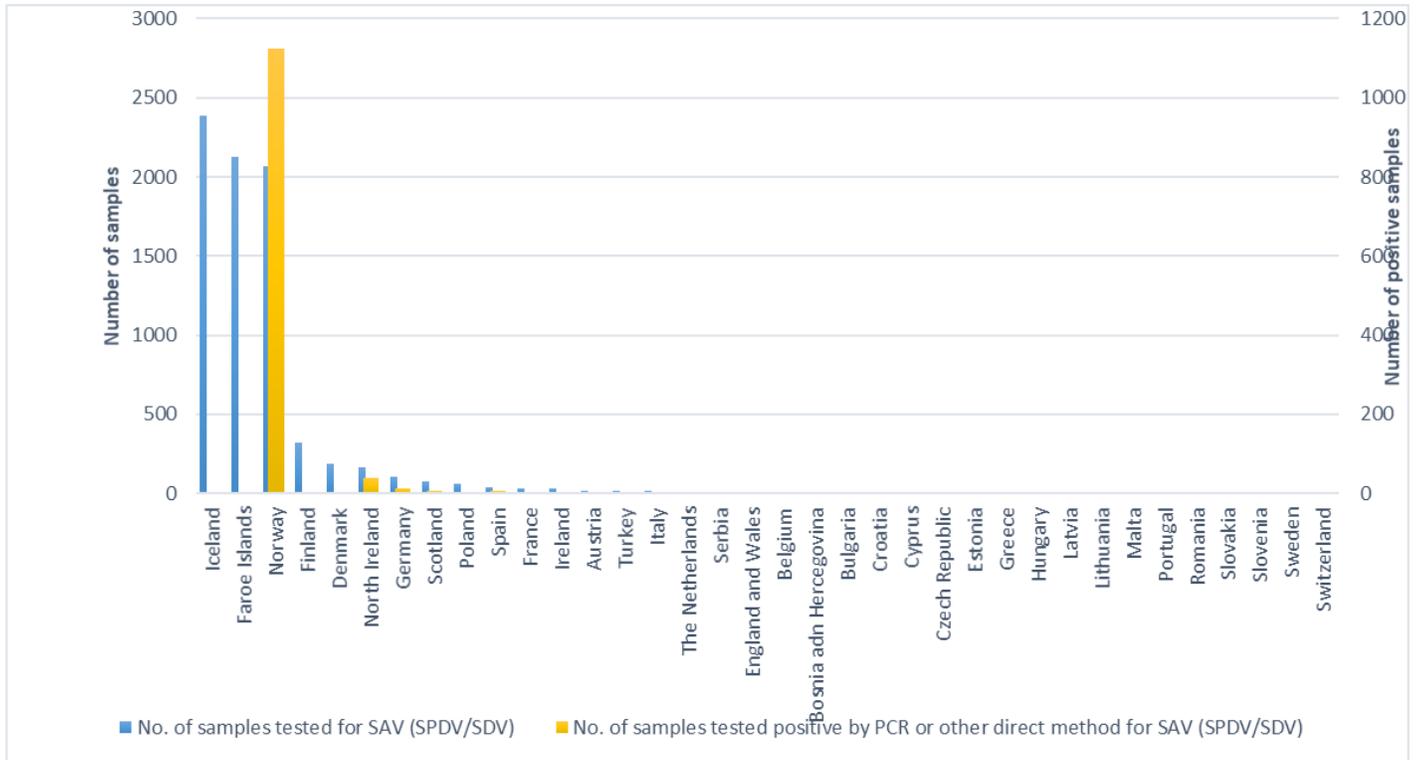
Number of samples tested for IPNV in Europe in 2019

Country	No. of samples tested for IPNV	No. of samples tested positive by PCR or other direct method for IPNV
Iceland	1493	15
Finland	1464	68
Germany	1446	81
Italy	1011	29
France	870	151
Faroe Islands	825	130
Poland	644	32
North Ireland	636	0
Sweden	480	1
Denmark	342	10
Ireland	330	0
Norway	301	132
Serbia	300	0
Switzerland	136	4
Spain	132	20
Bosnia adn Hercegovina	105	10
Croatia	99	3
Latvia	79	7
Turkey	47	29
Scotland	45	5
Romania	27	5
Austria	25	0
Belgium	12	12
Greece	8	0
Czech Republic	7	0
England and Wales	6	1
The Netherlands	6	0
Slovenia	3	0
Bulgaria	0	3
Cyprus	0	0
Estonia	0	0
Hungary	0	0
Lithuania	0	0
Malta	0	0
Portugal	0	0
Slovakia	0	1



Number of samples tested for SAV (SPDV/SDV) in Europe in 2019

Country	No. of samples tested for SAV	No. of samples tested positive by PCR or other direct method for SAV
Iceland	2389	0
Faroe Islands	2128	0
Norway	2069	1125
Finland	321	0
Denmark	188	0
North Ireland	167	38
Germany	106	11
Scotland	74	8
Poland	60	3
Spain	42	6
France	34	0
Ireland	32	0
Austria	20	5
Turkey	20	0
Italy	15	0
The Netherlands	6	0
Serbia	3	1
England and Wales	1	0
Belgium	0	0
Bosnia and Hercegovina	0	0
Bulgaria	0	0
Croatia	0	0
Cyprus	0	0
Czech Republic	0	0
Estonia	0	0
Greece	0	0
Hungary	0	0
Latvia	0	0
Lithuania	0	0
Malta	0	0
Portugal	0	0
Romania	0	0
Slovakia	0	0
Slovenia	0	0
Sweden	0	0
Switzerland	0	0



Number of samples tested for Nodavirus in Europe in 2019

Country	No. of samples tested for Nodavirus	No. of samples tested positive by PCR or other direct method for Nodavirus
Italy	2256	201
France	49	8
Turkey	34	2
Croatia	23	0
Spain	20	0
Greece	11	2
Germany	8	0
Norway	6	0
Austria	1	0
Scotland	1	0
Iceland	0	0
Belgium	0	0
Bosnia and Hercegovina	0	0
Bulgaria	0	0
Cyprus	0	0
Czech Republic	0	0
England and Wales	0	0
Estonia	0	0
Faroe Islands	0	0
Finland	0	0
Hungary	0	0
Ireland	0	0
Latvia	0	0
Lithuania	0	0
Malta	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
Denmark	0	0

