National Veterinary Institute

Technical University of Denmark

DTU

European Union Reference Laboratory for Fish Diseases

National Veterinary Institute, Technical University of Denmark, Aarhus

FishPathogens.eu – a common tool to organize aquatic viruses

Helle Frank Skall, Susie Sommer Mikkelsen & Niels Jørgen Olesen

EPIZONE

FISH PATHOGENS

Aim and status

- To provide a platform for storing and (if wanted) sharing of information on different fish pathogens isolates.

  This includes: Isolate characteristics
  Geographical information
  Information on sequences available

- VHSV and IHNV database is public available.
- Betanodavirus database is close to finalization
- KHV and SVCV database is under development
- ISAV database layout is being discussed
- SAV?

Data

- VHSV
  - 546 public available isolate reports
  - 326 public available sequence reports

- IHNV
  - 92 public available isolate reports
  - 74 public available sequence reports

National Veterinary Institute

DTU

Betanodavirus database in final stage of development

FISH PATHOGENS

European Community Reference Laboratory for Fish Diseases
National Veterinary Institute, Technical University of Denmark, Århus

EPIZONE

Betanodavirus

Create account Log in Help

Home | Isolates | Search | Related Information | Statistics and Configuration

Introduction

Welcome to the Community Reference Laboratory Pathogens of Aquaculture Database for **Betanodavirus (NV)**.

The database contains publically available information on NV isolates and their sequences.

We encourage laboratories from all around the world to submit data on NV isolated in their laboratory.

This work was funded through FP6-2004-Food-3-A project EPIZONE and the European Commission financial aid for running the Community Reference Laboratory for Fish Diseases. The database is maintained by the Community Reference Laboratory for Fish Diseases and comments are welcome on info@fishpathogens.eu

If you make use of the data presented here, please cite the following article in addition to the primary data sources:

Fishpathogen.eu/noda: a free and handy online platform for Betanodavirus targeted research and data sharing
V Panzarin, SP Jonstrup, L Bigarré, SS Mikkelsen, M Baud, T Gray, PM Agapow, NJ Olesen (in prep.)

User Manuals

The following user manuals are available to provide assistance with using the fishpathogens.eu database.

- Manual for registering as user
- Manual for adding an isolate report

Geographical Distribution of Isolates

further information

56 isolate reports, 102 sequence reports

National Veterinary Institute

DTU

In preparation 2012

Fishpathogen.eu/noda: a free and handy online platform for Betanodavirus targeted research and data sharing

V Panzarin[1], SP Jonstrup[2], L Bigarré[3], SS Mikkelsen[2], M Baud[3], T Gray[4], PM Agapow[5], NJ Olesen[2]

[1] Research & Innovation Department - Division of Comparative Biomedical Sciences, OIE Reference Laboratory for Viral Encephalopathy and Retinopathy, Istituto Zooprofilattico Sperimentale delle Venezie, Viale dell'Università 10, 35020 Legnaro, PD, Italy
[2] Section for Fish Diseases, Division of Poultry, Fish and Fur Animals, National Veterinary Institute, Technical University of Denmark, DK-8200 Århus N, Denmark
[3] Fish Viral Pathologies Unit, Laboratoire de Ploufragan/Plouzané, ANSES, Technopole Brest-Iroise, 29200 Plouzané, France
[4] Symantix Ltd, Wiltshire SN4 9BN, United Kingdom
[5] Bioinformatics, Centre for Infections, Health Protection Agency (UK), 61 Colindale Avenue, London NW9 5EQ, United Kingdom

Publications

Journal of Fish Diseases 2009 doi:10.1111/j.1365-2761.2009.01073.x

FishPathogens.eu/vhsv: a user-friendly viral haemorrhagic septicaemia virus isolate and sequence database

S P Jonstrup[1], T Gray[2], S Kahns[1], H F Skall[1], M Snow[3] and N J Olesen[1]

1 Community Reference Laboratory for Fish Diseases, Section for Fish Diseases, Division of Poultry, Fish and Fur Animals, National Veterinary Institute, Technical University of Denmark, Århus N, Denmark
2 Symantix Ltd, Wiltshire, UK
3 Fisheries Research Services (FRS) Marine Laboratory, Aberdeen, UK

Journal of Fish Diseases 2010, **33**, 469–471 doi:10.1111/j.1365-2761.2010.01155.x

An isolate and sequence database of infectious haematopoietic necrosis virus (IHNV)

S P Jonstrup[1], H Schuetze[2], G Kurath[3], T Gray[4], B Bang Jensen[1] and N J Olesen[1]

1 Community Reference Laboratory for Fish Diseases, Section for Fish Diseases, Division of Poultry, Fish and Fur Animals, National Veterinary Institute, Technical University of Denmark, Århus N, Denmark
2 Federal Research Institute for Animal Health, Institute of Infectology, Greifswald-Insel Riems, Südufer, Germany
3 Western Fisheries Research Center; U.S. Geological Survey, Seattle, WA, USA
4 Symantix Ltd, Wiltshire, UK

DTU

Continuation of database

- The European Union Reference Laboratory (EURL) takes care of the database
- If another laboratory is designated as EURL the database will be transferred to the new EURL
- This provides a long-lived time frame for the database

Database design

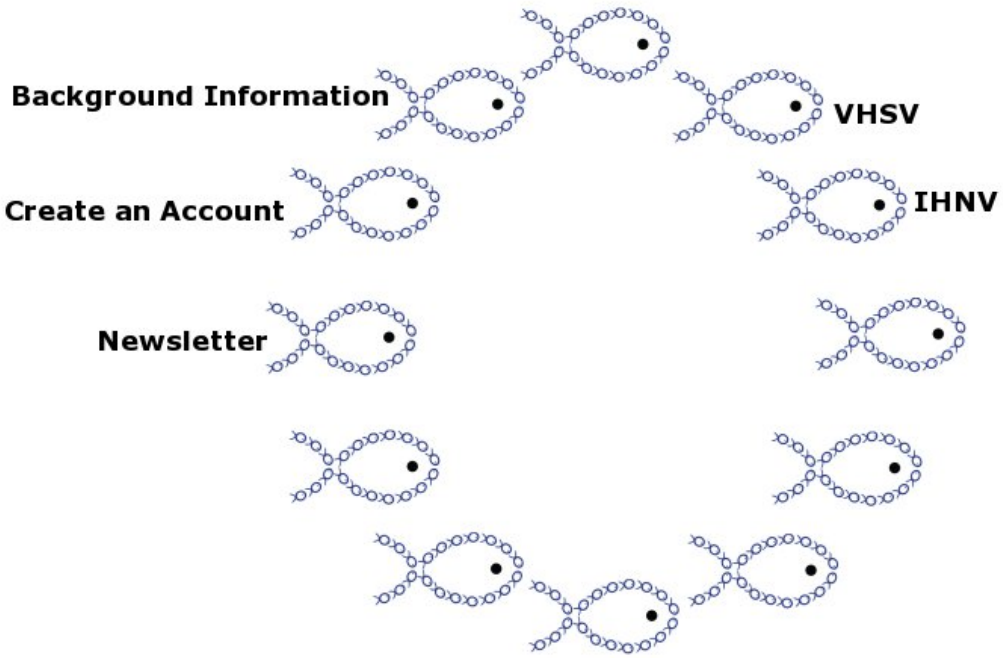
- Developed using Open Source software - low cost platform
- Use of controlled vocabulary (restricted list of values) improves the quality of searches in the database
- Division of data into isolate and sequence reports allows different users to add isolate and sequence reports and makes it easy for several sequences to be added to a single isolate
- Data are reviewed by a pathogen expert before it is made public available
- The database can easily be created multiple times for different pathogens

http://www.fishpathogens.eu/

FISH PATHOGENS

European Union Reference Laboratory for Fish Diseases
National Veterinary Institute, Technical University of Denmark, Aarhus

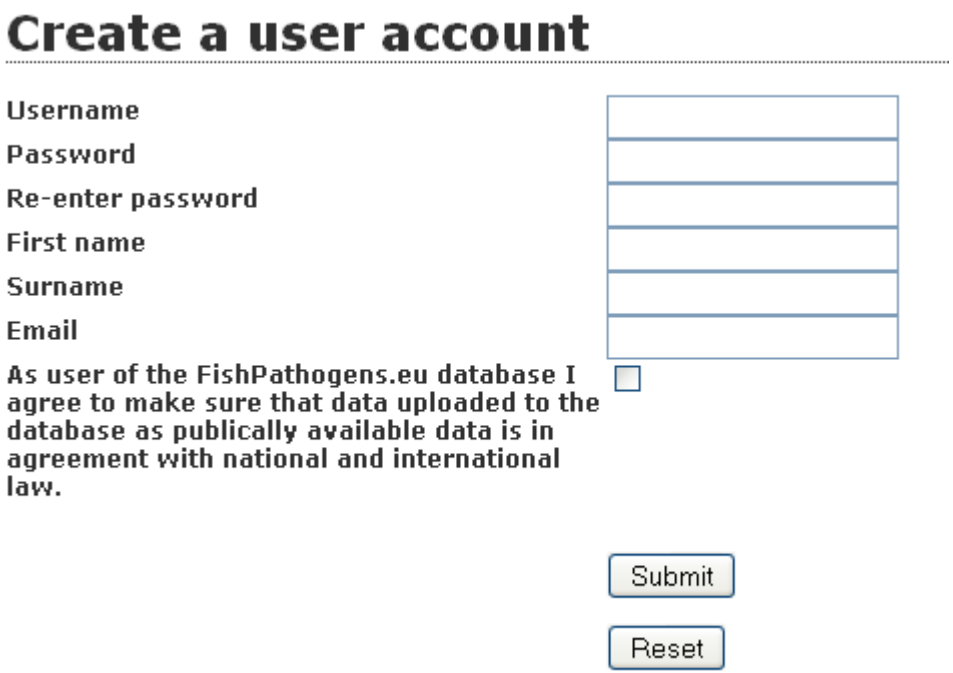
EPIZONE



IHNV database VHSV database Background Information Create an Account

DTU

Register as user

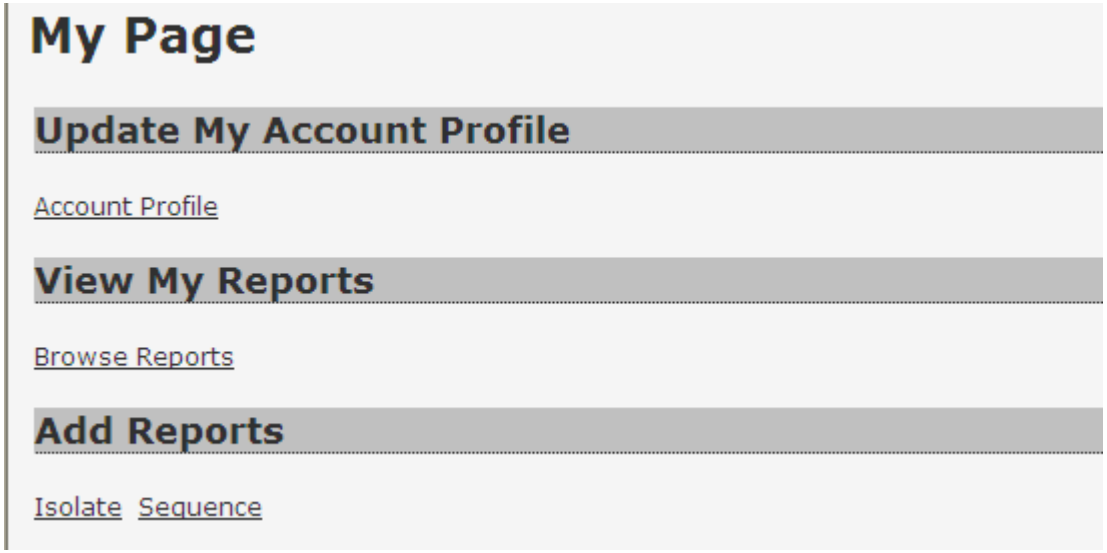


App. 130 registered users

National Veterinary Institute

DTU

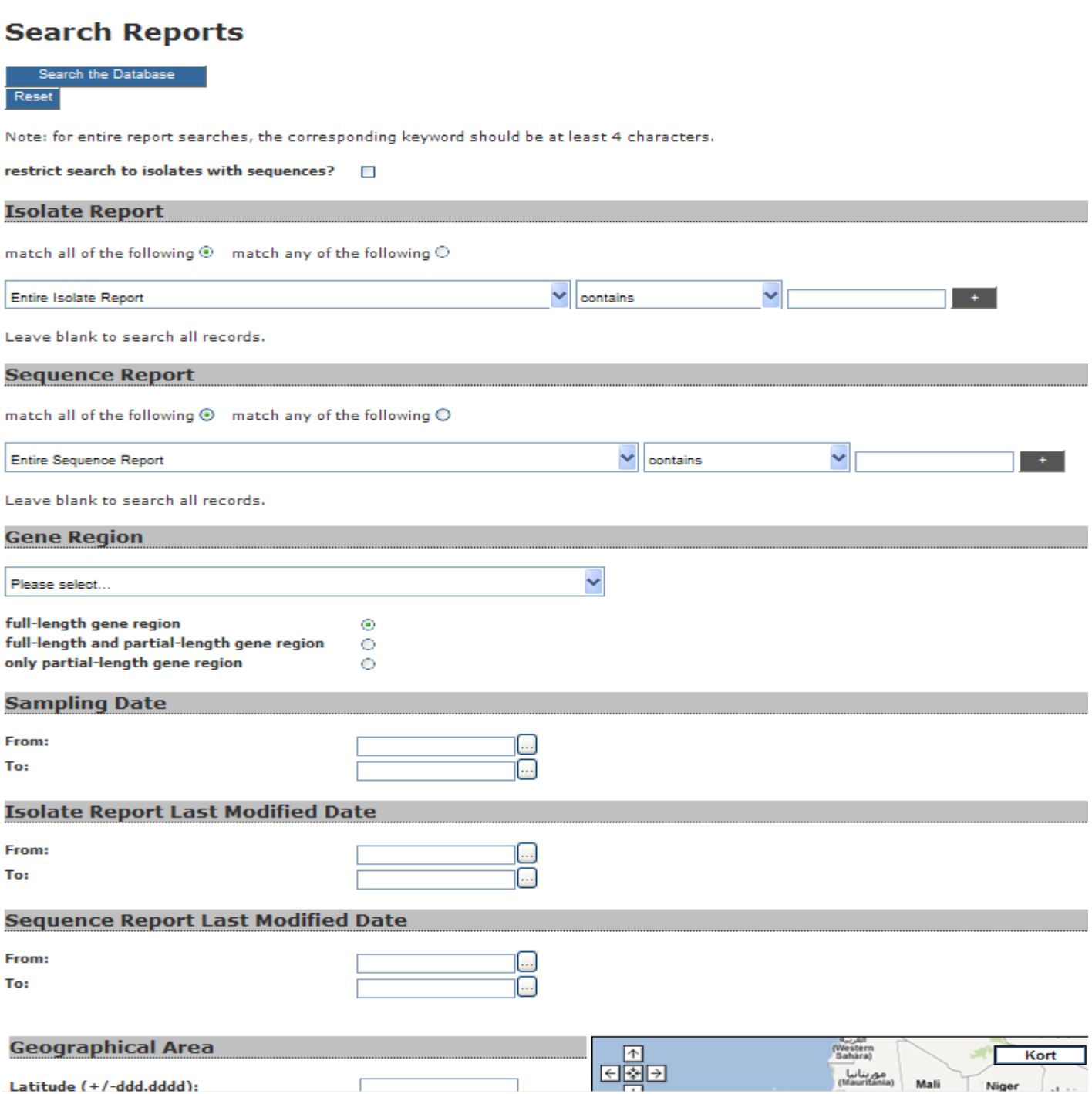
My page


My Page
Update My Account Profile
Account Profile
View My Reports
Browse Reports
Add Reports
Isolate Sequence

Searching

Standard search function

http://www.fishpathogens.eu/vhsv/search.php

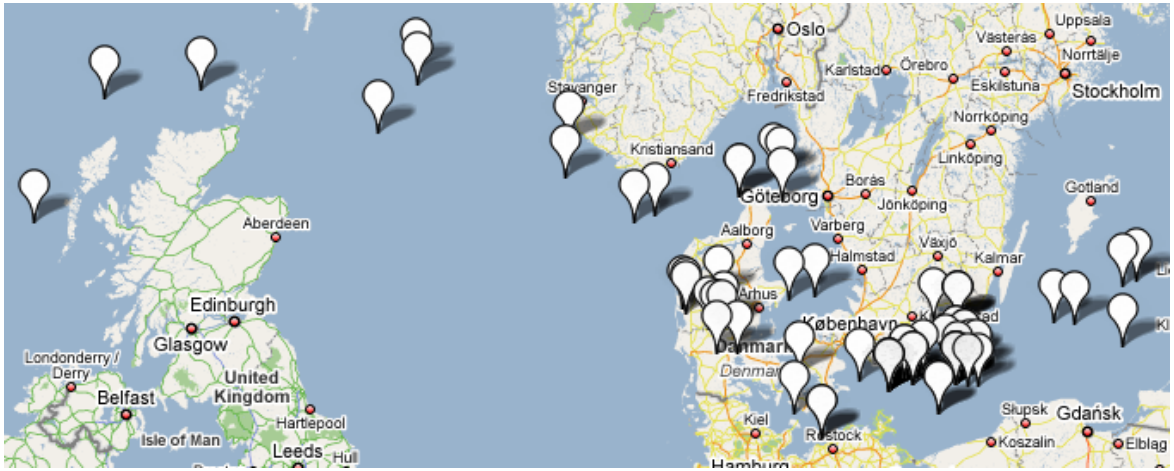


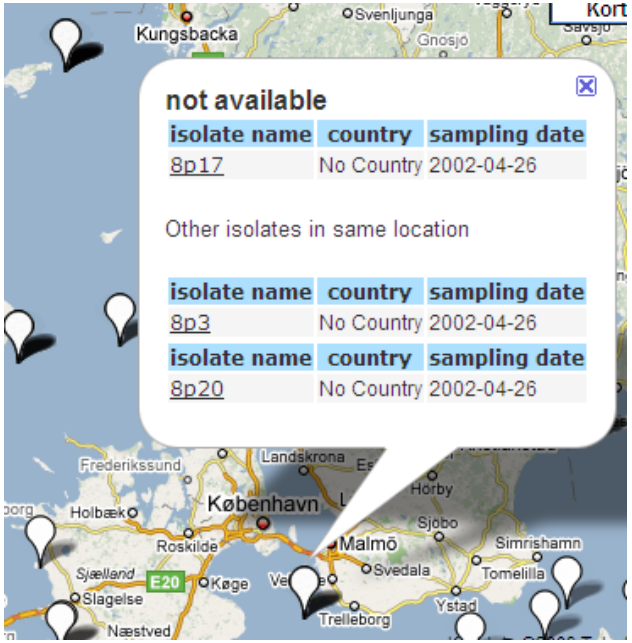
National Veterinary Institute

Browsing

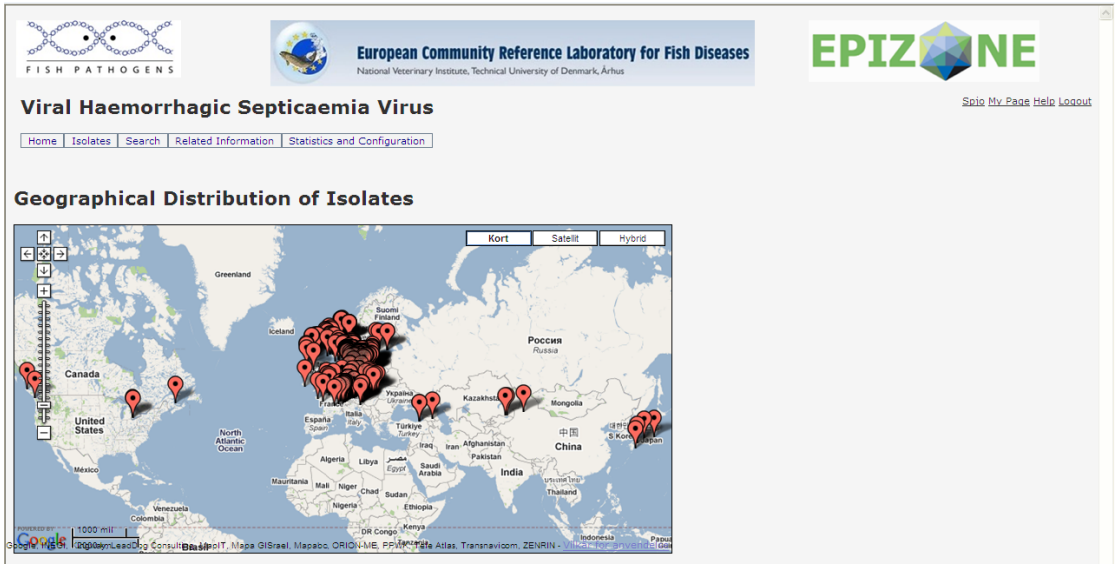
View Report	id asc desc	Isolate Name asc desc	Genotype Gene Region Publication Reference asc desc	Genotype asc desc	Genotype Subtype asc desc	Country asc desc	Date of Sampling asc desc	Host Aquatic Environment asc desc	Host Species Latin Name asc desc	Host Species Common Name asc desc	Disease Status of Host asc desc
2198	2198	DK-200020-1	15105533; 17026670	I	Ia	Denmark	2000-01-19	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2199	2199	DK-200027-3	15105533; 17026670	I	Ia	Denmark	2000-01-25	Fresh water	Oncorhynchus mykiss	rainbow trout	asymptomatic
2200	2200	DK-200029-1	15105533; 17026670	I	Ia	Denmark	2000-01-25	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2201	2201	DK-200051-1	15105533; 17026670	I	Ia	Denmark	2000-02-15	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2202	2202	DK-200070-4	15105533; 17026670	I	Ia	Denmark	2000-02-29	Fresh water	Oncorhynchus mykiss	rainbow trout	asymptomatic
2203	2203	DK-200079-1	15105533; 17026670	I	Ia	Denmark	2000-03-07	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2204	2204	DK-200098	15105533; 17026670	I	Ia	Denmark	2000-03-16	Fresh water	Oncorhynchus mykiss	rainbow trout	unknown
2205	2205	DK-200148	15105533; 17026670	I	Ia	Denmark	2000-04-11	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2206	2206	DK-200149	15105533; 17026670	I	Ia	Denmark	2000-04-11	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2207	2207	DK-Hededam	15105533; 17026670	I	I	Denmark	1970-04-22	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2208	2208	DK-2835	15105533|17026670|	I	Ic	Denmark	1982-07-00	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2209	2209	DK-3345	15584406	I	Ia	Denmark	1985-06-12	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2210	2210	DK-3592B	15105533; 17026670	I	Ia	Denmark	1986-04-00	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2211	2211	DK-3946	15105533; 17026670	I	Ia	Denmark	1987-05-18	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2212	2212	DK-3955	15584406	I	Ia	Denmark	1987-05-25	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2213	2213	DK-3956	15584406	I	Ia	Denmark	1987-05-25	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2214	2214	DK-3971	15105533; 17026670	I	Ia	Denmark	1987-06-00	unknown	unknown		unknown
2215	2215	DK-5123	15105533; 17026670	I	Ic	Denmark	1988-04-06	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2216	2216	DK-5131	15105533; 17026670	I	Ic	Denmark	1988-04-21	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2217	2217	DK-5133	15584406	I	Ia	Denmark	1988-04-25	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2218	2218	DK-5151	15105533; 17026670	I	Ia	Denmark	1988-05-16	Fresh water	Oncorhynchus mykiss	rainbow trout	unknown
2219	2219	DK-5243	15584406	I	Ia	Denmark	1988-06-29	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2220	2220	DK-5727	15105533; 17026670	I	Ia	Denmark	1989-11-28	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2221	2221	DK-5740	15105533; 17026670	I	Ia	Denmark	1990-02-11	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2222	2222	DK-5741	15105533; 17026670	I	Ia	Denmark	1990-02-11	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2224	2224	DK-6047	15584406	I	Ia	Denmark	1991-01-08	Sea water	Oncorhynchus mykiss	rainbow trout	clinical
2226	2226	DK-6143	15584406	I	Ia	Denmark	1991-05-00	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2227	2227	DK-7217	15584406	I	Ia	Denmark	1994-01-27	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2228	2228	DK-7300	15584406	I	Ia	Denmark	1994-04-20	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2229	2229	DK-7309	15584406	I	Ia	Denmark	1994-04-22	Fresh water	Oncorhynchus mykiss	rainbow trout	unknown
2230	2230	DK-7380	15105533; 17026670	I	Ia	Denmark	1994-05-20	unknown	unknown		clinical
2231	2231	DK-7655	15584406	I	Ia	Denmark	1994-11-24	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2232	2232	DK-7974	15105533; 17026670	I	Ia	Denmark	1995-05-16	Fresh water	Oncorhynchus mykiss	rainbow trout	clinical
2233	2233	DK-9695152	15584406	I	Ia	Denmark	1996-05-00	Sea water	Oncorhynchus mykiss	rainbow trout	clinical

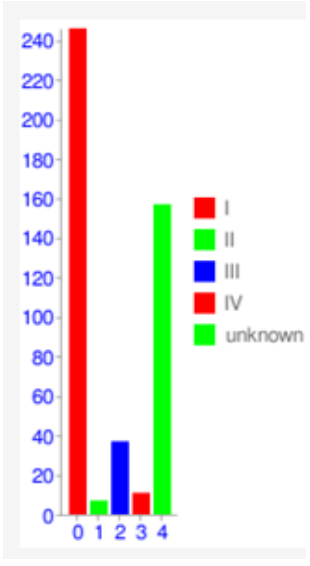
Map based search





Retrieving data






```
#\Name=CRL Database
#\ReleaseDate=Tue, 25 May 2010 12:14:46 CEST
#\RecordCount=185

> 1455/07 | GQ292534 | G-gene ORF  [1-1524] |
ATGGAATGGAACACTTTTTTCTTGGTGATCTTGATCATCATCATA
GGCCTGGCAAGGCACACTATCTTCTCGACGGCCAAATCATGCGAG

> 1e62 | AY546572 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTGGTGATCTTGATCATCATCATA
GACCCGGCAAGGCACACTATCTTCTCGACGGTCAAATCATGCGAG

> 1p12 | AY546574 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTGGTGATCTTGATCATCATCATA
GACCCGGCAAGGCACACTATCTTCTCGACGGTCAAATCATGCGAG

> 1p40 | AY546575 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTGGTGATCTTGATCATCATCATA
GACCCGGCAAGGCACACTATCTTCTCGACGGTCAAATCATGCGAG

> 1p52 | AY546576 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTAGTGATTTTGATCATCATCATA
GACCCGGTAAGGCACACTATCTTCTTGATGGTCAGATCATGCGAG

> 1p53 | AY546577 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTAGTGATTTTGATCATCATCATA
GACCCGGTAAGGCACACTATCTTCTTGATGGTCAGATCATGCGAG

> 1p55 | AY546578 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTAGTGATTTTGATCATCATCATA
GACCCGGTAAGGCACACTATCTTCTTGATGGTCAGATCATGCGAG

> 1p8 | AY546573 | G-gene ORF  [1-1524] | No
ATGGAATGGAATACTTTTTTCTTGGTGATCTTGATCATCATCATA
GACCCGGCAAGGCACACTATCTTCTCGACGGTCAAATCATGCGAG
```

Isolate Name	Genotype Subtype	Country	Date of Sampling	Host Species Common Name	Report Author Name
8p932	unknown	No Country	2002-05-05	Atlantic herring	Helle Frank Skall
8p931	unknown	No Country	2002-05-05	Atlantic herring	Helle Frank Skall
SE980422217	Ib	Sweden	1998-04-22	rainbow trout	eva.jansson@sva.se
SE000331098	Ib	Sweden	2000-03-30	rainbow trout	eva.jansson@sva.se
FiP02a.00	Id	Finland	2000-05-30	rainbow trout	Tuija
FiA01a.00	Id	Finland	2000-04-26	rainbow trout	Tuija
FiP02b.00	Id	Finland	2000-05-30	rainbow trout	Tuija
FIN-12.7.07/9/5	unknown	Finland	2007-07-11	rainbow trout	Tuija
GE-1.2	Ie	Georgia	1981-00-00	rainbow trout	Spjo
TR-WS13G	Ie	Turkey	2005-00-00	turbot	Spjo
TR-Bs13/15H	Ie	Turkey	2005-00-00	turbot	Spjo
F2006_00809_00058	Ia	Switzerland	2006-02-27	rainbow trout	Wahli
F2006_00834_00061	Ia	Switzerland	2006-03-01	rainbow trout	Wahli
F2006_00870_00062	Ia	Switzerland	2006-03-03	rainbow trout	Wahli
F2006_01278_00095	Ia	Switzerland	2006-04-03	rainbow trout	Wahli
F2006_01281_00096	Ia	Switzerland	2006-04-03	rainbow trout	Wahli
F2006_01282_00097	Ia	Switzerland	2006-04-03	rainbow trout	Wahli
F2006_01403_00116	Ia	Switzerland	2006-04-11	rainbow trout	Wahli
OBAMA #25	IVa	Japan	1999-00-00	bastard halibut	Spjo

Several search possibilities

Simple graphic tools to look at data

Download information to excel or your own phylogenetics program

Manuals available to help new users

National Veterinary Institute

DTU

FASTA Files

-Change search criteria- -Select a different search result- -Select output-

Nucleotide Sequences

```
#\Name=CRL Database
#\ReleaseDate=Thu, 13 Sep 12 11:10:15 +0200
#\RecordCount=84

> Datt107 | EU708734 | G-gene ORF  [1-1524] | Germany |
Ia
ATGGAATGGAACACCTCCTTCCTGGTGATCTTGATCATCATCATAGAGAGCACCAC
ACCACAGATCACTCAACGACCTCCGGTTGAAAACATCTCGACGTACCATGCAGATT
GGGACACTCCGCTATACACTCATCCCTCCAACTGCAGGGACGATTCCTTTGTCCCG
```

Protein Sequences

```
#\Name=CRL Database
#\ReleaseDate=Thu, 13 Sep 12 11:10:15 +0200
#\RecordCount=84

> Datt107 | EU708734 | G-gene ORF  [1-1524] | Germany |
Ia
MEWNTSFLVILIIIIESTTPQITQRPPVENISTYHADWDTPLYTHPSNCRDDSFVP
IRPAQLRCPHEFEDINKGLVSVPTQIIHLPLSVTSVSAVASGHYLHKVTYRVTCST
GFFGGQTIEKTILEAKMSRQEATNEASKDHEYPFFPEPSCIWMKNNVHKDITHYYK
```

Download Nucleotide FASTA File

Download Protein FASTA File

Produce FASTA Files

Gene Region

G-gene ORF

full-length gene region ◉

full-length and partial-length gene region ○

only partial-length gene region ○

European Union Reference Laboratory for Fish Diseases
National Veterinary Institute, Technical University of Denmark, Aarhus

Sequence Alignment

This web service accepts an input sequence and attempts to match it against a selection of database sequences, using either FASTA matching or by building a phylogeny using Neighbour-joining.

Step 1: Enter sequence, select method & region

Reset | Back | 0: Select pathogen | 2: Select sequences

Sequence to be aligned

```
ATGACGACCAAATCCGAGCACAGCGCAATCAGCTCCTCTCCACTCGTCCTCCGCGAGATGATC
ACACACAGACTAACATTCGACCCAAGTAACTACCTCAACTGCGACTTCAATAGGTCGGACATA
TCCACCACAAACTTCCTTGAAACGACCCTCCCTAGGATCTTGGGCGATTTGAGGGCCAGCACA
CGACTTCCCTACCTCCATGTGCTAGACATGAGGATAAGTCTCCTAGAGAGAACCCACTACATG
TTCAGGAACATCCCCTCCAGTCCCGCCATAACTGGCAGACGGTCGGATCCTGAACTCATCATT
ATTTCACATGCGGAAATGATGATCTTAACAAGTGGCTCTGAGTCCACCTCCTTAACATCCCCA
CCTTCTCTCAGATAG
```

Enter a molecular sequence of DNA, stop codon not included. If no sequence is entered, matching will only be done within the alignment of sequences selected later selected below. Note that FASTA matching requires an input sequence.

Method

- FASTA
- Neighbour-joining

How to align sequences.

Region

- G-gene ORF
- Genome (from N-gene ORF start to L-gene ORF end)
- L-gene ORF
- M (M2)-gene ORF
- N-gene ORF
- Nv-gene ORF
- P (M1)-gene ORF

The genomic region to be aligned against.

European Union Reference Laboratory for Fish Diseases
National Veterinary Institute, Technical University of Denmark, Aarhus

Sequence Alignment

This web service accepts an input sequence and attempts to match it against a selection of database sequences, using either FASTA matching or by building a phylogeny using Neighbour-joining.

Note: gene regions and matching method selected

Step 2: Select sequences and align

Reset | Back | 0: Select pathogen | 1: Select regions | 3: Align sequences

Select at least 3 sequences to be aligned. Select all or none.

Accession Number	Isolate Name	Sequencing Method	Genotype	Genotype Subtype	Author
Z93412	DK-Hededam	2 independent RT-PCR reactions sequenced both with forward and reverse primers	I	I	DMS00
DQ159198	DK-3592B	1 RT-PCR reaction sequenced both with forward and reverse primers	I	Ia	katjaej
DQ159199	DK-6137	1 RT-PCR reaction sequenced both with forward and reverse primers	I	Ia	katjaej
U47848	F1	1 RT-PCR reaction sequenced both with forward and reverse primers	I	I	Spjo
Z93414	DK-M.Rhabdo	2 independent RT-PCR reactions sequenced both with forward and reverse primers	I	Ib	DMS00
DQ159200	1p40	1 RT-PCR reaction sequenced both with forward and reverse primers	I	Ib	katjaej
DQ159193	1p49	1 RT-PCR reaction sequenced both with forward and reverse primers	II	II	katjaej
DQ159194	1p52	1 RT-PCR reaction sequenced both with forward and reverse primers	II	II	katjaej
DQ159195	1p53	1 RT-PCR reaction sequenced both with forward and reverse primers	II	II	katjaej
DQ162801	1p55	1 RT-PCR reaction sequenced both with forward and reverse primers	II	II	katjaej
FJ460591	SE000331098	3 independent RT-PCR reactions sequenced both with forward and reverse primers	I	Ib	snowm
AB490792	JF00Ehi1	unknown	IV	IVa	takit
am086354	FiA01a.00	2 independent RT-PCR reactions sequenced both with forward and reverse primers	I	Id	Tuija
am086356	FiP02a.00	2 independent RT-PCR reactions sequenced both with forward and reverse primers	I	Id	Tuija
am086356	FiP02b.00	2 independent RT-PCR reactions sequenced both with forward and reverse primers	I	Id	Tuija
DQ159201	GE_1.2	1 RT-PCR reaction sequenced both with forward and reverse primers	I	Ie	katjaej
AJ24[illegible]	FR07-71	unknown	I	Ia	Spjo
DQ[illegible]	UK-860/94	1 RT-PCR reaction sequenced both with forward and reverse primers	III	III	katjaej
DQ159197	AU-8/95	1 RT-PCR reaction sequenced both with forward and reverse primers	I	Ia	katjaej
EU481506	FA28.11.07	unknown	III	III	Spjo

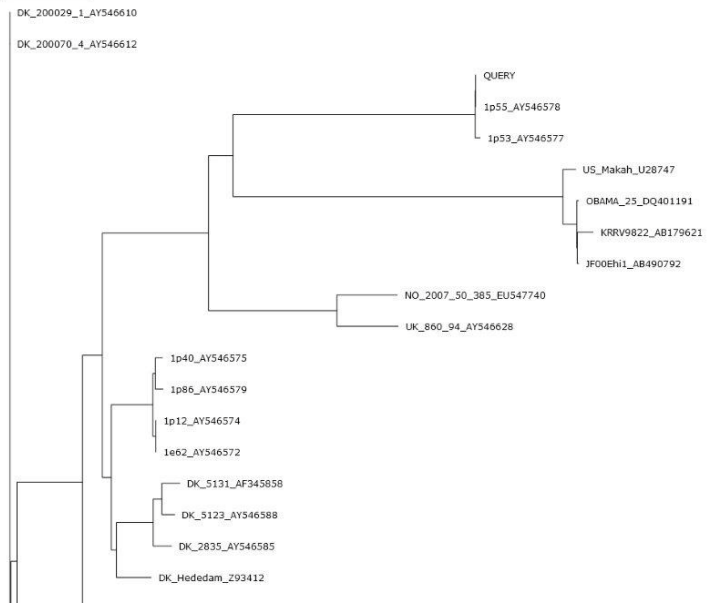
Sequence alignment and tree building

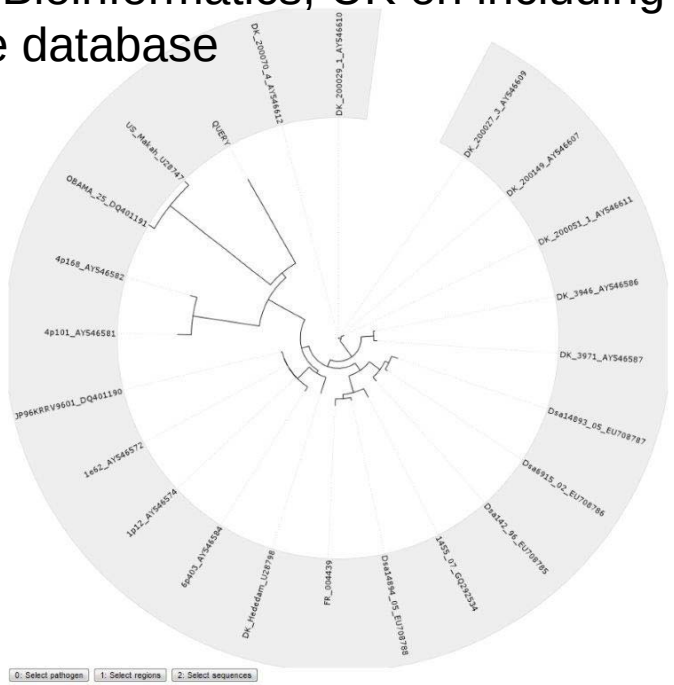
Cooperation with Mr. Paul-Michael Apagow from Bioinformatics, UK on including their genotyping tool into the database

Step 3: Show results

0: Select pathogen | 1: Select regions | 2: Select sequences

Save tree as text





0: Select pathogen | 1: Select regions | 2: Select sequences

Manuals

- Manual for registering as user
- Manual for adding an isolate report
- Manual for adding a sequence report
- Manual for looking at search results
- Manual for searching reports
- Manual for searching reports using BLAST
- Manuals as pdf file

Manual for adding an isolate report.

This manual aims to help you adding new isolates and their characteristics to our database. We are very grateful for your contribution. If you want to add a sequence of an isolate already in the database please go to "Manual for adding a sequence report". If questions arises that is not answered in this manual or you have other feed back please send it to info@fishpathogens.eu.

1. Go to the VHSV home site (http://www.fishpathogens.eu/vhsv/)

2. (Only relevant for unregistered users) If you are not already a registered user we advice you to register by following instructions in "Manual for registering as user".
If you do not wish to register (and get the advantages connected with this) it is still possible to add data by clicking "add isolate report" under "Isolates" in the top menu. Start by adding a contact name and e-mail (go to step 6).

3. If you are already a registered user press "log in" in upper right corner.

4. Fill in your username and password and press "Log in". This will bring you to your personal page "My page".
If you have forgotten your log in details it is also possible to get a new password sent to your e-mail address.

5. Under the headline "Add reports" press "Isolate".
Alternatively click "add isolate report" under "Isolates" in the top menu.

6. Before adding an isolate report please make sure that it is not already in the database, since only one report should exist pr. isolate. See "Manual for searching reports" for further information on how to do this. If an isolate has already been added that you have extra information about please contact us by info@fishpathogens.eu.

7. You will now be able to fill in data about your isolates. Fields marked with *** are required fields that need to be filled in. If you do not have the data it is often possible to answer "unknown" or similar. If you cannot find the pipe (|) on your keyboard just copy paste it in. Below are listed comments to some of the fields:

   a. "Isolate name": Give new isolates a unique name that always should be used in publication etc.
   b. "Synonyms": It is not preferable that an isolate is called different names, but especially old isolates sometimes have numerous names in the literature. These can be added here if they have arisen. But please do not invent new

SAV in the database?

As SAV has a single stranded positive sense RNA genome it will be easy to include SAV in the database

ORF1

- 4 non structural proteins
  - nsP1
  - nsP2
  - nsP3
  - nsP4

ORF2

- 5 non structural proteins
  - Capsid glycoprotein
  - E3
  - E2
  - 6K
  - gpE1

- 6 genotypes: SAV1 – SAV6

Thank you for your attention