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**PANDA**

Permanent network to strengthen expertise on infectious diseases of  
aquaculture species and scientific advice to EU policy

Coordination Action

Scientific support to policies

**Work Package 2**

**Risk analysis of exotic, emerging and re-emerging disease hazards**

**Annex 1: Tables for hazard data**

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Dr Barry Hill,  
Centre for Environment, Fisheries and Aquaculture Science  
United Kingdom

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<b>PU</b>	Public	PU
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

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## **Annex 1 - Tables for hazard data<sup>1</sup>**

Annex 1.1: Disease agents (or disease) considered for hazard scoring (incl. host ranges, geographical distribution, disease listing (91/67/EC and OIE), exotic status (relevant to the EU) and whether they satisfy the OIE disease listing /notification criteria).

Annex 1.2: Disease agents exotic to the EU

Annex 1.3: Disease agents present in the EU but with limited distribution

Annex 1.4: Disease agents present in the EU but with widespread or unknown distribution

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<sup>1</sup>Main sources of data derived from:

AFFA (2002a, 2002b)

AQIS (1999a, 1999b)

Anon (2006)

Aquatic Animal Diseases Significant to Australia (2004)

Bondad-Reantaso *et al.* (2001)

Bulletin of the EAFP (22: 1-6, 2002; 23: 1-6, 2003 and 24: 1-6, 2004)

Fisheries and Oceans, Canada: Synopsis of Infectious Diseases and Parasites of Commercially Exploited Shellfish (<http://www.pac.dfo-mpo.gc.ca/sci/shelldis>)

OIE (2006)

OIE International Database on Aquatic Animal Diseases (<http://www.collabcen.net/toWeb/eq2.asp>)

Speare and Berger, Global distribution of chytridiomycosis in amphibians.

<http://www.jcu.edu.au/school/phtm/PHTM/frogs/chyglob.htm>

Stone *et al.* (1997).

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
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### 1.1 All disease agents (or disease) considered for hazard scoring

Causal agents are characterised by host range, geographical distribution, disease listing (EC/91/67 and OIE), their exotic status (relevant to the EU) and whether they satisfy the OIE disease listing /notification criteria.

N.B. The OIE disease listing criteria have been used as a pre-filter for hazard determination. Criteria A (consequences) and B (spread) refer to certain parameters (see Annex 2.1) that support a listing. The additional criterium C (diagnosis) is not considered as part of the pre-filter but it is incorporated into the associated hazard scoring system.

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67- listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B) Add comment if necessary	For hazard scoring
<b>Fish-viral</b>							
Aquabirnaviridae	<b>Many</b>	Ubiquitous	✘	✘	No	No	No
Birnavirus (non-EVE) infection	<i>Anguilla anguilla</i>	Netherlands	✘	✘	No	No	No
Bream rhabdovirus	<i>Abramis brama</i>	Ireland (Northern)	✘	✘	No	No	No
Common carp coronavirus	<i>Cyprinus carpio</i>	Japan	✘	✘	Yes	Insufficient information	No
Eel rhabdovirus - EVA	<i>Anguilla rostrata</i>	Japan	✘	✘	Yes	Same as eel virus European and pathogenic for rainbow trout	No
Eel rhabdovirus - EVEX	<i>Anguilla anguilla</i>	Japan and Italy	✘	✘	No	Isolated in Italy and possibly in France. Pathogenic for rainbow trout.	No
Eel virus European	<i>Anguilla anguilla, A. japonica and Tilapia mossambica</i>	Japan, Taiwan ?and Europe	✘	✘	No	Same as eel rhabdovirus	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
Erythrocytic necrosis virus (Viral erythrocytic necrosis)	<b><i>Gadus morhua, Clupea harengus, C. pallasii, Oncorhynchus spp. and Dicentrarchus labrax</i></b>	Canada, Chile, Europe (Spain), Greenland, Taiwan and USA	✗	✗	No	OK	No
Esox lymphosarcoma retrovirus	<b><i>Esox lucius and Esox masquinongy</i></b>	Canada, Finland, Ireland, Sweden and USA	✗	✗	No	No	No
Esox sarcoma retrovirus	<b><i>Esox lucius</i></b>	Sweden	✗	✗	No	No	No
Gill lamellar pillar cell necrosis virus	<b><i>Anguilla japonica and ?A. anguilla</i></b>	Europe and Japan	✗	✗	?No	No	No
Golden shiner virus	<b><i>Notemigonus crysoleucas</i></b>	USA	✗	✗	Yes	Low mortality related to only one species	No
Goldfish haematopoietic necrosis virus	<b><i>Carassius auratus</i></b>	Japan	✗	✗	Yes	Not pathogenic for carps	No
Grass carp reovirus	<b><i>Ctenopharyngodon idella, Mylopharyngodon piceus, Pseudorasbora parva and Gobiocypris rarus</i></b>	China	✗	✗	Yes	Severe outbreaks in the affected species which are not important for Europe	No
<i>Herpesviridae</i> -Channel catfish virus (Ictaluridae herpes virus type 1)	<b><i>Ictalurus punctatus, Ictalurus furcatus and I. catus</i></b>	Honduras, Russian Federation and USA	✗	✓	Yes	?Yes	Yes
<i>Herpesviridae</i> - Cyprinid herpesvirus	<b><i>Cyprinus carpio, Leuciscus cephalus and Rutilus. rutilus</i></b>	China, Europe, Israel, Japan and South Korea,	✗	✗	No	No	No
<i>Herpesviridae</i> -Herpes virus anguillae	<b><i>Anguilla japonica and A. anguilla</i></b>	Asia, Japan, Taiwan and Europe (?France, ?Hungary, Netherlands and Italy)	✗	✗	No	<i>A. anguilla</i> elvers may suffer high mortality	No
<i>Herpesviridae</i> - Herpes virus of black catfish	<b><i>Ictalurus melas</i></b>	Italy	✗	✗	No	Frequent isolation with high mortalities	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Herpesviridae</i> -Herpes virus salmonis type 1	<b><i>Oncorhynchus mykiss</i> and <i>O. tshawytscha</i></b>	USA (Washington)	✘	✘	Yes	Infection shows severe disease only by IP and IM inoculation	No
<i>Herpesviridae</i> -Koi herpes virus	<b><i>Cyprinus carpio</i></b>	Europe (Austria, Belgium, Denmark, France, Germany, Israel, the Netherlands, Switzerland, UK), Japan, Taiwan and the USA	✘	✘	No	Yes	Yes
<i>Herpesviridae</i> - <i>Oncorhynchus masou</i> virus (salmonid herpes virus type 2)	<b><i>Oncorhynchus nerka</i>, <i>O. masou</i>, <i>O. keta</i>, <i>O. kisutch</i> and <i>O. mykiss</i></b>	India, Japan, Kuwait, as well as ?Eastern Asia and ?UK	✘	✓	Yes	Yes	Yes
<i>Herpesviridae</i> -Pilchard herpes virus	<b><i>Sardinops sagax</i></b>	Australia and New Zealand	✘	✘	Yes	Tremendous impact in wild fish, but the host species is not present in Europe	No
<i>Herpesviridae</i> -white sturgeon herpesvirus-1	<b><i>Acipenser transmontanus</i></b>	USA	✘	✘	Yes	Potential impact but the host species is not present in Europe	No
<i>Herpesviridae</i> -white sturgeon herpesvirus-2	<b><i>Acipenser transmontanus</i></b>	USA	✘	✘	Yes	Potential impact but the host species is not present in Europe	No
Infectious haematopoietic necrosis virus	<b><i>Oncorhynchus mykiss</i>, <i>O. nerka</i>, <i>O. tshawytscha</i>, <i>O. keta</i>, <i>O. masou</i>, <i>O. rhodurus</i>, <i>O. kisutch</i>, <i>Salmo salar</i>, <i>Esox lucius</i>, <i>Sparus aurata</i> and <i>Scophthalmus maximus</i></b>	North America (Western Pacific), Continental Europe and Asia	✓ (II)	✓	No	Yes	Yes
Infectious pancreatic necrosis virus	<b><i>Oncorhynchus mykiss</i>, <i>Salvelinus fontinalis</i>, <i>Salmo trutta</i>, <i>Salmo salar</i>,</b>	Asia, Europe (Denmark, Finland, France, Germany,	✓ (III)	✓	No	Yes	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>Oncorhynchus</i> spp., <i>Seriola quinqueradiata</i> , <i>Scophthalmus maximus</i> , <i>Hippoglossus hippoglossus</i> , <i>Gadus morhua</i> , <i>Misgurnus anguillicaudatus</i> , <i>Esox lucius</i> , <i>Astacus astacus</i> , Anguillidae, Atherinidae, Bothidae, Carangidae, Cotostomidae, Cichlidae, Clupeidae, Cobitidae, Coregonidae, Cyprinidae, Esocidae, Moronidae, Paralichthyidae, Percidae, Poecilidae, Sciaenidae, Soleidae and Thymallidae	Greece, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, Turkey, UK and Yugoslavia), as well as North and South America					
Infectious salmon anaemia virus	<b><i>Oncorhynchus kisutch</i></b> , <b><i>Salmo salar</i></b> , <b><i>Salmo trutta</i></b> , <b><i>Pollachius virens</i></b> , <b><i>Gadus morhua</i></b> , <i>Oncorhynchus mykiss</i> , <i>Clupea harengus</i> and <i>Lepeophtheirus salmonis</i>	Canada (New Brunswick and Nova Scotia), Chile, the Faeroe Islands, ?Ireland, Norway, UK (Scotland and the Shetland Islands) and USA (Maine)	✓ (I)	✓	?No	Yes	Yes
<i>Iridoviridae</i> -Epizootic haematopoietic necrosis virus	<b><i>Perca fluviatilis</i></b> and <b><i>Oncorhynchus mykiss</i></b> (EHNV), <b><i>Siluris glanis</i></b> (ESV), <b><i>Ictalurus melas</i></b> (ECV), with <i>Macquaria australasica</i> , <i>Maccullochella peeli</i> , <i>Gambusia affinis</i> , <i>Bidyanus bidyanus</i> and <i>Galaxias olidus</i> (EHNV)	Australia, Dominican Republic, Europe (Belgium, Finland, France, Germany, Italy, Slovenia: sheat fish virus, ESV), India, Kuwait, Pakistan, Peru and ?Vanuatu	✗	✓	Yes (only EHNV)	Yes	Yes
<i>Iridoviridae</i> -European catfish iridovirus	<b><i>Ictalurus melas</i></b>	France and Italy	✗	✗	No	No	No
<i>Iridoviridae</i> -Japanese eel iridovirus	<b><i>Anguilla japonica</i></b>	?Europe (France, Italy and Germany) and Japan	✗	✗	?No	In Italy an Iridovirus has been isolated from eels imported from New Zealand	No
<i>Iridoviridae</i> - Largemouth bass iridovirus: Santee Cooper ranavirus	<b><i>Morone salmoides</i></b> , <b><i>Morone saxatilis</i></b> <b><i>Poecilia reticulata</i></b> (imported from	USA	✗	✗	Yes	No	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
(SCRV) <i>Iridoviridae</i> -Lymphocystis Disease virus (Lymphocystis)	Asia <b>Clupeidae, Osmeridae, Serranidae, Paralichthidae, Lutjanidae, Percidae, Sciaenidae, Chaetodontidae, Cichlidae, Gobiidae and Soleidae</b>	Europe, North and Central America, Australia, Africa, Hawaii, the South Pacific and Asia	✘	✘	No	Present in many species	No
<i>Iridoviridae</i> -Mandarin fish iridovirus	<b><i>Siniperca chuatsi</i></b>	China	✘	✘ (✓ as RSBI)	Yes	The causal agent is the red sea bream iridovirus RSBIV; Impact in several reared species and potentially may affect European species	No (see RSBI)
<i>Iridoviridae</i> -Red sea bream iridovirus	<b><i>Pagrus major, Seriola quinqueradiata, Seriola spp., Lateolabrax sp., Oplegnathus fasciatus, Epinephelus malabaricus, Epinephelus spp., Lates calcarifer, Thunnus thynnus, ?Perciformes, ?Pleuronectiformes and ?Tetradontiformes</i></b>	China, Hong Kong, Western Japan, Korea, Malaysia, Philippines, Singapore, Taipei and ?Thailand	✘	✓	Yes	Yes	Yes
<i>Iridoviridae</i> -White sturgeon iridovirus	<b><i>Acipenser transmontanus, A. gueldenstaedtii, A. baeri and A. fluvescens</i></b>	Canada, North America Pacific NW (California, Idaho, Oregon and Washington) and ?Northern Europe (Russia)	✘	✓	?Yes	Yes	Yes
Marbled goby aquabirnavirus	<b><i>Oxyeotris marmoratus</i></b>	Cambodia, Malaysia, Singapore, Thailand and Vietnam	✘	✘	Yes	Insufficient data	No
New Japan virus	<b><i>Oncorhynchus kisutch, O. mykiss, Salvelinus sp. and Plecoglossus altivelis</i></b>	Northern Japan	✘	✘	Yes	Insufficient data	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
Pacific salmon anaemia virus/erythrocytic inclusion body syndrome	<b><i>Oncorhynchus spp.</i></b> and <b><i>Salmo salar</i></b>	Japan, Norway and Ireland	✘	✘	?No	No	No
Perch/Pike-perch fry rhabdovirus	<b><i>Perca fluviatilis</i></b> and <b><i>Sander lucioperca</i></b>	France	✘	✘	No	No	No
Pike fry rhabdovirus	<b><i>Esox lucius</i></b> , <b><i>Ctenopharyngodon idella</i></b> , <b><i>Tinca tinca</i></b> , <b><i>Blicca bjoerkna</i></b> and <b><i>Psuedorasbora parva</i></b>	Europe	✘	✘	No	No	No
Salmon leukaemia virus	<b><i>Oncorhynchus tshawytscha</i></b> , <b><i>O. masou</i></b> and <b><i>Salmo salar</i></b>	Canada (British Colombia)	✘	✘	Yes	Insufficient data	No
Snakehead rhabdovirus	<b><i>Channa striata</i></b>	Thailand	✘	✘	Yes	Significant impact in aquaculture and wild but no host speies in Europe	No
Spring viraemia of carp virus	<b><i>Cyprinus carpio</i></b> , <b><i>Ctenopharyngodon idellus</i></b> , <b><i>Hypophthalmichthys molitrix</i></b> , <b><i>Aristichthys nobilis</i></b> , <b><i>Carassius carassius</i></b> , <b><i>C. auratus</i></b> , <b><i>Rutilus rutilus</i></b> , <b><i>Cyprinus carpio</i></b> , <b><i>Leuciscus idus</i></b> , <b><i>Tinca tinca</i></b> , <b><i>Silurus glanis</i></b> , <b><i>Esox lucius</i></b> , <b><i>Argulus foliacus</i></b> and <b><i>Piscicola piscicola</i></b>	China (P.R.), Continental Europe (parts of): (Austria, Belarus, Bosnia, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Italy, Kuwait, Lithuania, Macedonia, Moldavia, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, UK, Ukraine and Yugoslavia), as well as Bolivia, Brazil, Canada, Laos, USA and Vanuatu	✓ (III)	✓	No	Yes	Yes
Tilapia larvae encephalitis virus	<b><i>Oreochromis aureus</i></b> and <b><i>O. niloticus niloticus</i></b>	Israel	✘	✘	?Yes	Insufficient data	No
<i>Togaviridae</i> -Pancreas disease	<b><i>Salmo salar</i></b>	France, Ireland, Norway, Spain, UK (Scotland) and USA	✘	✘	No	No	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
Viral encephalopathy and retinopathy	<i>Lates calcarifer</i> , <i>Dicentrarchus labrax</i> , <i>Scophthalmus maximus</i> , <i>Hippoglossus hippoglossus</i> , <i>Oplegnathus fasciatus</i> , <i>Epinephelus akaara</i> , <i>E. fuscogutatus</i> , <i>E. malabaricus</i> , <i>E. moara</i> , <i>E. septemfasciatus</i> , <i>E. tauvina</i> , <i>E. coioides</i> , <i>Cromileptes altivelis</i> , <i>Takifugu rubripes</i> , <i>Verasper moseri</i> , <i>Paralichthys olivaceus</i> and <i>Pseudocaranx dentex</i>	Asia, Australia, Canada, China, Europe (the Mediterranean: France, Greece, Italy, Malta, Norway, Portugal, Spain and UK), Hong Kong, Indonesia, Japan, Korea, Malaysia, Martinique, Philippines, Singapore, Taiwan, Thailand and the USA	✘	✓	No	No	No
Viral haemorrhagic septicaemia virus	<i>Oncorhynchus mykiss</i> , <i>Salmo trutta</i> , <i>Thymallus thymallus</i> , <i>Coregonus</i> spp., <i>Esox lucius</i> , <i>Micropterus salmoides</i> , <i>Paralichthys olivaceus</i> , <i>Scophthalmus maximus</i> , <i>Oncorhynchus</i> spp., <i>Gadus macrocephalus</i> , <i>Clupea pallasii</i> , <i>Aplodinotus grunniens</i> , <i>Lepomis macrochirus</i> , <i>Micropterus dolomieu</i> , <i>Pomoxis nigromaculatus</i> , <i>Neogobius melanostomus</i> , <i>Esox masquinongy</i> , <i>Dorosoma cepedianum</i> , <i>Stizostedion vitreum</i> , <i>Morone chrysops</i> , <i>Perca flavescens</i> , <i>Moxostoma macrolepidotum</i> , <i>Gadus morua</i> , <i>Dicentrarchus labrax</i> , <i>Melanogrammus aeglefinus</i> , <i>Rhinonemus cimbrius</i> , <i>Sprattus sprattus</i> , <i>Clupea harengus</i> , <i>Trisopterus esmarkii</i> , <i>Micromesistius poutassou</i> , <i>Merlangius merlangius</i> and <i>Argentina sphyraena</i>	Continental Europe (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, USSR and UK), Brazil, India, Kuwait, Kyrgyzstan, Laos, Malaysia, North Sea, Pakistan, Atlantic Ocean, Baltic Sea, USA (Pacific NW, New York, Michigan, Ohio), Canada (Pacific NW and Ontario) and Japan	✓ (II)	✓	No	Yes	Yes
Viral oedema of carp	<b><i>Cyprinus carpio</i></b>	Japan	✘	✘	Yes	Insufficient data	No
Walleye sarcoma retrovirus	<b><i>Stizostedion vitreum</i></b>	Canada and USA	✘	✘	Yes	No consequences, threat or impact in	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
						aquaculture. Only one species affected	
<b>Fish-bacterial</b>							
<i>Aeromonas hydrophila</i>	Many but secondary infection	Many	✘	✘	No	No, but may be of public health concern, although not associated with fish	No
<i>Aeromonas salmonicida</i> (furunculosis)	<b>Salmonidae, Labridae, Cyprinidae, Scophthalmus maximus, Gadus morhua, Pollchius viriens,</b>	Australia (atypical strain), Canada, Europe (Norway, Sweden, UK and others), Japan and USA	✓ (III)	✘	No	Yes	Yes
<i>Citrobacter freundii</i>	<b>Oncorhynchus mykiss, Salmo salar, Carassius auratus and Mola mola</b>	Australia, Europe (Scotland and Spain) and USA	✘	✘	No	No, but may be of public health concern, although not associated with fish	No
<i>Clostridium botulinum</i>	<b>Oncorhynchus spp.</b>	Europe (Denmark, UK) and USA	✘	✘	No	No, but is of public health concern, although not associated with fish	No
<i>Edwardsiella ictaluri</i> (enteric septicaemia of catfish)	<b>Ictalurus punctatus, I. furcatus, Ameiurus catus, A. nebulosus, Clarias batrachus and Salmonidae</b>	Taiwan, Thailand, Vietnam and USA	✘	✓	Yes	Yes	Yes
<i>Edwardsiella tarda</i>	<b>Ictalurus spp., Anguilla spp., Oreochromis spp. and Salmonidae</b>	Africa, Asia, Australia, Europe (Belgium, Czechoslovakia, Germany, Israel, Italy, Norway and	✘	✘	No	Yes, although parameter 7 relating to declaration of	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
		Spain), USA and Venezuela				free zones or countries based on surveillance may be difficult.	
<i>Epitheliocystis</i> (?Clamydia)	<b>Many</b>	Many	✘	✘	?	No	No
<i>Flavobacterium (Flexibacter) spp.</i> , <i>Flavobacterium psychrophilum</i> , <i>Tenacibaculum maritimum</i> ( <i>Flexibacter maritimus</i> )	<b>Many</b>	Many	✘	✘	No	Yes but only certain strains (e.g. <i>F. psychrophilum</i> )	Yes
<i>Lactococcus spp. (Lactococcus garviae)</i>	<i>Seriola quinqueradiata</i> , <i>Seriola dumerili</i> , <i>Seriola lalandi</i> , <i>Anguilla anguilla / japonica</i> , <i>Oncorhynchus mykiss</i> , <i>Oreochromis sp.</i> , <i>Paralichthys olivaceous</i> , <i>Scophthalmus maximus</i> , <i>Sebastes schlegali</i> , <i>Mugil cephalus</i> , <i>Coris aygula</i> and <i>Macrobranchium rosenbergii</i>	Australia (Tasmania, Victoria), Europe (Italy, Spain, Turkey), Israel, Japan, South Africa Taiwan and USA	✘	✘	No	Yes  Associated with mastitis in dairy cattle and endocarditis in humans	Yes
<i>Micrococcus luteus</i>	<b><i>Oncorhynchus mykiss</i></b>	?	✘	✘	?	No	No
<i>Mycobacterium spp (marinum, fortuitum, chelonae)</i>	<b>Many</b>	Many	✘	✘	No	Yes but only certain strains (e.g. <i>M. marinum</i> )	Yes
<i>Nocardia spp.</i>	<b>Salmonidae, <i>Seriola quinqueradiata</i> and ornamental species</b>	Australia and Japan	✘	✘	?Yes	No	No
<i>Photobacterium (Vibrio) damsela</i>	<b>Many</b>	Many	✘	✘	No	?No	No
<i>Photobacterium piscicida</i>	<b><i>Anguilla reinhardtii</i>, <i>Chromis punctipinnis</i>, <i>Dicentrarchus labrax</i>, <i>Scophthalmus maximus</i>, <i>Seriola quinqueradiata</i>, <i>Solea senegalensis</i> and <i>Sparus aurata</i></b>	Europe (Mediterranean), Japan and USA	✘	✘	No	Yes	Yes
<i>Piscirickettsia</i> -like spp.	<b><i>Atactoscion noblis</i>, <i>Dicentrarchus sp.</i>, <i>Oncorhynchus spp.</i>, <i>Oreochromis spp.</i>, <i>Salmo salar</i>, <i>Sarotherodon spp.</i> and</b>	Canada (British Columbia), Europe (France, Ireland, UK-Scotland), Taiwan	✘	✘	?	No	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>Panaque suttoni</i>	Scotland), Taiwan					
<i>Piscirickettsia salmonis</i> (Piscirickettsiosis)	<b><i>Oncorhynchus kisutch</i>, <i>O. tshawytscha</i>, <i>O. masou</i>, <i>O. mykiss</i>, <i>O. gorbuscha</i>, <i>Salmo salar</i> and <i>Atractoscion nobilis</i></b>	Canada, Chile, Europe (Ireland, Norway, UK-Scotland) and USA	✘	✓	No	Yes	Yes
<i>Pseudomonas anguilliseptica</i>	<b><i>Acanthopagrus schlegeli</i>, <i>Anguilla anguilla</i>, <i>Carassius auratus</i>, <i>Clupea harengus</i>, <i>Coregonus</i> sp., <i>Dicentrarchus labrax</i>, <i>Epinephelus coioides</i>, <i>Oncorhynchus mykiss</i>, <i>Pagellus bogarave</i>, <i>Plecoglossus altivelis</i>, <i>Pseudocaranx dentex</i>, <i>Salmo salar</i>, <i>S. trutta</i>, <i>Scophthalmus maximus</i> and <i>Sparus aurata</i></b>	Japan, Europe (Denmark, France, Portugal, Spain, UK-Scotland)	✘	✘	No	Yes	Yes
<i>Pseudomonas fluorescens</i>	<b><i>Oncorhynchus mykiss</i> and <i>Carassius auratus</i></b>	?	✘	✘	?	No	No
<i>Renibacterium salmoninarum</i> (bacterial kidney disease)	<b><i>Oncorhynchus</i> spp., <i>Salmo salar</i> and <b>Salmonidae</b></b>	Canada, Chile, Iceland, Japan, Western Europe (Denmark, Finland, France, Germany, Italy, Norway, Poland, Portugal, Spain, Sweden, UK and Yugoslavia), North America and ?Turkey	✓ (III)	✓	No	Yes	Yes
<i>Streptococcus</i> spp. <i>Streptococcus agalactiae</i>	<b><i>Sparus aurata</i>, <i>Liza klunzingeri</i>, <i>Pampus argenteus</i>, <i>Oreochromis</i> spp.</b>	Kuwait, Israel, USA	✘	✘	?Yes	Yes	Yes
<i>Streptococcus iniae</i>	<b><i>Oncorhynchus mykiss</i>, <i>Paralichthys olivaceous</i>, <i>Sardinops melanostictus</i>, <i>Brevoortia patronus</i>, <i>Morone saxatilis</i>, <b>Cichlidae</b>, <i>Lates calcarifer</i> and <i>Danio rerio</i></b>	Australia, China, Europe (Italy, Spain) and Israel	✘	✘	No	Yes	Yes
<i>Vibrio</i> spp. (?consider species separately: <i>L. (V.) anguillarum</i> , <i>V.</i>	<b>Many marine species: <i>Scophthalmus maximus</i>, <i>Mullus</i> spp., <i>Pagrus major</i>,</b>	Many: Australia, Canada, Europe (Denmark, Greece,	✘	✘	No	Yes, but only some strains	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>cholerae</i> , <i>V. ordalii</i> , <i>V. pelagius</i> , <i>V. salmonicida</i> , <i>V. vulnificus</i> biotype 2)	<b><i>Gadus morhua</i>, <i>Pseudopleuronectes americanus</i>, <i>Salmo salar</i>, <i>Sebastes schlegeli</i>, <i>Salmonidae</i>, <i>Solea senegalensis</i> and <i>Carassius auratus</i>, <i>Lates calcarifer</i> (<i>V. cholerae</i>)</b>	Italy, Norway, Spain, UK), Faeroe Islands Japan, Iceland and USA				some strains	
<i>Yersinia ruckeri</i> (Enteric redmouth disease)	<b><i>Oncorhynchus mykiss</i>, <i>O. kisutch</i>, <i>O. tshawytscha</i>, <i>O. masou</i>, <i>O. clarki</i>, <i>Salmo salar</i>, <i>Salmo trutta</i>, <i>Scophthalmus maximus</i>, <i>Anguilla anguilla</i>, <i>Solea solea</i></b>	Australia (atypical), Europe and USA	✓ (III)	✗	No	Yes	Yes
<b>Fish-parasitic</b>							
<b>Cestodes</b>							
<i>Atractolytocestus huronensis</i>	<b><i>Cyprinus carpio</i> and <i>Catostomus commersoni</i></b>	Canada, Czech Republic, Hungary and North America	✗	✗	?No	No	No
<i>Atractolytocestus sagittatus</i>	<b><i>Cyprinus carpio</i></b>	Asia and Russia (Astrakhan)	✗	✗	?Yes	No	No
<i>Bothriocephalus achellognathi</i>	<b><i>Cyprinus carpio</i>, <i>Carassius auratus</i>, <i>Ctenopharyngodon idellus</i>, and plankton eating fish</b>	Australia and Europe	✗	✗	No	A: yes B: 4, 6; 7?	No
<i>Caryophyllaeus fimbriceps</i> and <i>C. laticeps</i>	<b><i>Cyprinus carpio</i> and other <i>Cyprinidae</i></b>	Europe, Russia	✗	✗	No	No	No
<i>Eubothrium</i> spp.	<b><i>Oncorhynchus</i> spp., <i>Salmonidae</i>, <i>Salmo salar</i>, <i>Lota lota</i>, <i>Morone americanus</i>, <i>Myxocephalus quadricornis</i>, <i>Micropterus salmonoides</i> and <i>Mylocheilus saurinae</i></b>	Europe and North America	✗	✗	No	A: yes B: 4, 6; 7?	No
<i>Khawia sinensis</i>	<b><i>Cyprinus carpio</i> and other <i>Cyprinidae</i></b>	China, Europe, Japan, Russia	✗	✗	No	A: yes B: 4, 6; 7?	No
<i>Triaenophorus</i> spp.	<b><i>Stizostedion</i> spp., <i>Esox</i> spp., <i>Coregonus</i> spp., <i>Percopsis</i> spp., <i>Salmonidae</i> and <i>Perca</i> spp.</b>	Europe and USA	✗	✗	No	A: yes B: 4, 6; 7?	No
<b>Crustaceans</b>							

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Argulus</i> spp.	<b><i>Cyprinus carpio</i>, Cyprinidae and Salmonidae</b>	Asia and Europe	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Caligus elongatus</i> and <i>Lepeophtheirus salmonis</i>	<b><i>Salmo salar</i> and <i>Oncorhynchus</i> spp.</b>	Europe (Ireland, Norway, Scotland)	✘	✘	No	A: yes B: 4, 6; 7?	Yes
<i>Caligus teres</i>	<b><i>Oncorhynchus mykiss</i> and <i>O. kisutch</i></b>	Chile	✘	✘	?Yes	Unknown	No
<i>Caligus rogercresseyi</i>	<b><i>Salmo salar</i></b>	Chile	✘	✘	?Yes	Unknown	No
<i>Ceratothoa</i> spp., <i>Mothocya</i> spp. and <i>Nerocila</i> spp.	<b><i>Boops boops</i>, <i>Dicentrarchus labrax</i>, <i>Diplodus annularis</i>, <i>Girella punctata</i>, <i>Sparidae</i>, <i>Carangidae</i>, <i>Clupeidae</i>, <i>Maenidae</i>, <i>Scorpaenidae</i>, <i>Mugilidae</i> and <i>Salmonidae</i></b>	Australia, Chile and ?Europe (Turkey)	✘	✘	?No	A: yes B: 4, 6; 7?	No
<i>Ergasilus sieboldi</i> and <i>Ergasilus</i> spp.	<b><i>Tinca tinca</i></b> and many other freshwater and brackish species	Australia and Europe	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Lernaea elegans</i> , <i>L. cyprinacea</i> and <i>Lernaea</i> spp.	<b><i>Cyprinus carpio</i>, <i>Carassius auratus</i>, <i>Carassius</i> spp., <i>Cyprinidae</i>, <i>Oncorhynchus mykiss</i>, <i>Rana rana</i> and <i>Rana</i> spp.</b>	Brazil, Europe, Uruguay	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Lernaeocera branchialis</i>	<b>Gadoid species and other marine fish</b>	?	✘	✘	?	?Yes	No
<b>Digeneans</b>							
<i>Clinostomum marginatum</i>	Many		✘	✘	?	?No	No
<i>Cryptocotyle lingua</i>	<b>Clupeidae</b> and ornamental marine species	Western Atlantic	✘	✘	?	A: yes B: 4, 6; 7?	No
Sanguinicolidae ( <i>Sanguinicola</i> spp.)	<b>Cyprinidae, Salmonidae Sparidae</b> , and <i>Seriola</i> sp.	Europe, Mediterranean	✘	✘	No	No (except in massive infections)	No
<b>Monogeneans</b>							
<i>Benedenia</i> spp.	<b>Many (marine teleost) species</b>	?	✘	✘	?	?Yes (depending on the species). Insufficient information	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Dactylogyrus</i> spp.	<b>Cyprinidae and other freshwater ornamental species</b>	Asia, Australia, Europe, Israel, Japan and North America	✘	✘	No	No	No
<i>Diplectasnum</i> spp.	<b><i>Dicentrarchus labrax</i></b>	Europe	✘	✘	No	?No (damage in juveniles and broodstock in massive infections)	No
<i>Gyrodactylus</i> spp.	<b>Teleosts, amphibians, Cyprinidae and other freshwater species</b>	Many	✘	✘	No	?Yes (depending on the species)	No
<i>Gyrodactylus salaris</i> (Gyrodactylosis)	<b><i>Salmo salar</i>, <i>Oncorhynchus mykiss</i>, <i>Salvelinus alpinus</i>, <i>S. fontinalis</i>, <i>Thymallus thymallus</i>, <i>Salvelinus namaycush</i> and <i>Salmo trutta</i></b>	Bosnia, Denmark, Finland, France, Germany, Norway, Portugal, Russian Federation, Spain and Sweden, as well as ?Czech Republic, ?Georgia and ?Ukraine	✓ (III)	✓	No	Yes	Yes
<i>Sparicotyle chrysophrii</i> and other Microcotylidae	<b><i>Sparus aurata</i> and other marine teleost species</b>	Europe (Mediterranean)	✘	✘	No	Yes (depending on the species and intensity); B7?	No
<i>Zeuxapta seriolae</i>	<b><i>Seriola dumerili</i>, <i>Seriola</i> spp.</b>	Australia, Europe (Balearic Islands, Italy, Spain) Japan	✘	✘	No	?Yes	No
<b>Myxozoa</b>							
<i>Ceratomyxa shasta</i>	<b>Salmonidae</b>	Canada (NW Pacific) and USA (NW Pacific)	✘	✘	Yes	Yes	Yes
<i>Ceratomyxa sparusaurati</i>	<b><i>Sparus aurata</i> and <i>Pagellus bogaraveo</i></b>	Adriatic	✘	✘	No	No	No
<i>Ceratomyxa</i> spp.	<b><i>Dicentrarchus labrax</i>, Sparidae and other marine fish</b>	Many	✘	✘	No	No	No
<i>Enteromyxum (Myxidium) leei</i>	<b><i>Diplodus puntazzo</i>, <i>Sparus aurata</i> and other marine species</b>	Mediterranean	✘	✘	No	Yes	Yes
<i>Enteromyxum scopthalmi</i>	<b><i>Scophthalmus maximus</i></b>	Atlantic	✘	✘	No	Yes	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Henneguya salminicola</i> and <i>Henneguya</i> spp.	<b><i>Oncorhynchus</i> spp., <i>Sciaenops ocellata</i>, <i>Sparus aurata</i>, <i>Ictalurus punctatus</i>, <i>Lagodon rhomboids</i>, <i>Lates calcarifer</i>, <i>Perca fluviatilis</i>, <i>Acanthopagrus australis</i> and other marine fish</b>	Asia, Australia, Europe (Italy), Tunisia and North America (Pacific)	✘	✘	?No (some species)	A: yes B: 4, 6; 7?	No
<i>Hoferellus</i> spp.	<b>Cyprinidae and <i>Carassius auratus</i></b>	Asia, Australia, Europe, Japan and North America	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Kudoa thyrsites</i> and <i>Kudoa</i> spp.	<b>Salmonidae, Clupeidae, <i>Merluccius productus</i>, <i>Morone saxatilis</i>, <i>Seriola quinqueradiata</i>, <i>Lates calcarifer</i>, <i>Seriola grandis</i>, <i>Seriola lalandi</i>, <i>Thunnus maccoyii</i> and other marine fish</b>	Australia, Japan and North America	✘	✘	?Yes	A: yes B: 4, 6; 7?	No
<i>Myxobolus</i> sp.	<b><i>Diplodus puntazzo</i></b>	Adriatic	✘	✘	No	No	No
<i>Myxobolus cerebralis</i>	<b>Salmonidae</b>	Asia, Europe, North and South America and New Zealand	✘	✘	No	Yes	Yes
<i>Parvicapsula</i> spp.	<b><i>Oncorhynchus</i> spp., <i>O. mykiss</i>, <i>O. clarki</i>, <i>Salmo salar</i>, <i>Sciaenops ocellatus</i>, <i>Liza macrolepis</i> and reservoir marine fish species</b>	Australia, Canada (Pacific NW) and USA (Pacific NW)	✘	✘	Yes	Unknown	No
<i>Parvicapsula pseudobranchicola</i>	<b><i>Salmo salar</i></b>	Norway	✘	✘	?Yes	Unknown	Yes
<i>Sphaerospora renicola</i>	<b><i>Cyprinus carpio</i>, <i>Carassius</i> spp.</b>	Europe (Bulgaria, Hungary, Russia)	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Sphaerospora</i> spp.	<b><i>Epinephelus malabaricus</i>, <i>Dicentrarchus labrax</i></b>	Europe (Adriatic, Mediterranean), Israel	✘	✘	No	?No (depending on the species)	No
<i>Tetracapsuloides bryosalmonae</i> (Proliferative kidney disease)	<b>Salmonidae and <i>Oncorhynchus</i> spp.</b>	Canada, Europe and USA	✘	✘	No	Yes	Yes
<b>Nematodes</b>							
<i>Anguillicola crassus</i>	<b><i>Anguilla anguilla</i> and <i>Anguilla japonicus</i></b>	Asia and Europe (Netherlands, Spain, Sweden, UK)	✘	✘	No	A: yes B: 4, 6; 7?	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Anisakis</i> spp.	<b>Many</b>	Many	✘	✘	No	A: 1?, 3 B: 4, 6; 7?	No
<i>Camallanus</i> spp.	<b>Many (freshwater tropical) species</b>	Many	✘	✘	?	?No	No
<i>Capillaria</i> spp.	<b>Many (freshwater tropical) species</b>	Many	✘	✘	?	?No	No
<i>Philometroides cyprini</i> ( <i>Philometra lusiana</i> )	<b><i>Cyprinus carpio</i></b>	USSR	✘	✘	?Yes	A: yes B: 4, 6; 7?	No
<i>Philometroides fulvidraconi</i> and <i>Philometroides</i> spp.	<b><i>Pelteobagrus fulvidraco</i>, <i>Macquaria ambigua</i></b>	?	✘	✘	?Yes	?No	No
<b>Protozoa</b>							
<i>Acanthamoeba</i> spp.	? <i>Tilapia aureus</i> , <i>Silurus glanis</i> , <i>Carassius auratus</i> and <i>Rutilus rutilus</i>	?	✘	✘	?	Unknown	No
<i>Brooklynella hostilis</i>	<b><i>Sparus aurata</i> and other marine species</b>	Many	✘	✘	?	A: yes B: 4, 6; 7?	No
<i>Chilodonella</i> spp.	<b>Salmonidae and Cyprinidae</b>	Europe, Middle East	✘	✘	?	?Yes (mainly in tropical fish and under stress); B7?	No
<i>Cryptobia</i> spp.	<b>Salmonidae, <i>Cyprinus carpio</i>, <i>Carassius auratus</i>, Pleuronectidae, <i>Tinca tinca</i>, <i>Rutilus rutilus</i>, <i>Godidae</i> and other species</b>	Many	✘	✘	?	No (ectoparasites until now not very significant in European fish)	No
<i>Cryptocaryon irritans</i>	Many	Many	✘	✘	?	A: yes B: 4, 6; 7?	No
<i>Dermocystidium</i> spp.	?	?	✘	✘	?	?No	No
<i>Dermocystidium cyprini</i>	<b><i>Cyprinus carpio</i></b>	Europe	✘	✘	No	?No	No
<i>Eimeria sardinae</i>	<b>Clupeidae (<i>Clupea harengus</i>, <i>Sardina pilchardus</i>, <i>Sardinella aurita</i>, <i>Sardinella maderensis</i>)</b>	Northern Hemisphere	✘	✘	?No	No	No
<i>Eimeria</i> spp.	<b><i>Dicentrarchus labrax</i>, <i>Sparus aurata</i>, <i>Anguilla</i> sp</b>	Mediterranean and others?	✘	✘	No	No?	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>Anguilla</i> sp.						
<i>Enterocytozoon salmonis</i>	<b><i>Oncorhynchus tshawytscha</i>, <i>O. mykiss</i> and <i>Salmo salar</i></b>	Chile and USA (California, Idaho and Washington)	✘	✘	Yes	?No for European fish	No
<i>Glugea stephani</i> and <i>Glugea</i> spp.	<b>Flatfish, Atherinids, pilchards, Galaxids, <i>Hippocampus erectus</i> and <i>Nothobranchius</i> spp.</b>	Europe, North Atlantic	✘	✘	No	No, but depending on fish species and intensity	No
<i>Goussia gadi</i> , <i>G. subepithelialis</i> and <i>Goussia</i> spp.	<b>Gadoids, Cyprinids, <i>Carassius auratus</i></b>	Australia, Baltic Sea, Europe, North Atlantic Ocean, North Sea and South Pacific Ocean, USA	✘	✘	No	Unknown	No
<i>Goussia sparix</i>	<b><i>Sparus aurata</i></b>	Mediterranean	✘	✘	No	No	No
<i>Heterosporis anguillarum</i>	<b><i>Anguilla japonica</i></b>	Japan	✘	✘	Yes	?No	No
<i>Ichthyophonus hoferi</i> and <i>Ichthyophonus</i> sp.	<b><i>Salmo trutta</i>, <i>Oncorhynchus mykiss</i>, <i>Clupea harengus</i> and other marine finfish</b>	Many	✘	✘	?No	A: yes B: 4, 6; 7?	No
<i>Ichthyophthirius multifiliis</i>	<b>Many</b>	Many	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Loma salmonae</i>	<b><i>Oncorhynchus</i> spp., <i>O. mykiss</i> and <i>Salvelinus fontinalis</i></b>	Canada (British Columbia) and USA (California and Washington)	✘	✘	?Yes; possibly importe d to France with <i>O.</i> <i>kisutch</i>	A: yes B: 4, 6; 7?	No
<i>Microsporidium takedai</i> and <i>Microsporidium</i> spp.	<b><i>Oncorhynchus</i> spp., <i>O. mykiss</i>, <i>Salmo</i> <i>trutta</i>, <i>Taurulus bubalis</i>, <i>Seriola</i> <i>quinqueradiata</i>, <i>Pagrus major</i> and</b>	Japan	✘	✘	?Yes	?No	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<b>?flounder</b>						
<i>Neoparamoeba pemaquidensis</i> (amoebic gill disease)	<b><i>Salmo salar, Scophthalmus maximus, Oncorhynchus kisutch</i></b>	Australia (Tasmania), Europe (Spain), USA (West coast)	✘	✘	Yes <sup>2</sup>	A: yes B: 4, 6; 7?	Yes
<i>Neoparamoeba</i> spp.	<i>Scophthalmus maximus, Dicentrarchus labrax, Sparus aurata</i>	Atlantic, Mediterranean	✘	✘	No	A: yes B: 4, 6; 7?	No
<i>Pleistophora</i> spp.	<b><i>Macrozoarces americanus, Drepanopsetta hippoglossoides, Solea solea, Hippoglossoides platessoides, Anarhichas lupus, A. minor, Sciaena australis, other marine fish</i></b> and ornamentals, Cyprinids and other freshwater fish	Australia, Europe (Mediterranean, North Sea) and North America	✘	✘	No	No (pathogenicity depending on intensity and fish species)	No
<i>Scyphidia</i> spp.	<b><i>Oncorhynchus mykiss</i></b> and cichlids	Europe	✘	✘	No	?No	No
<i>Spironucleus (Hexamita) salmonis</i>	<b>Salmonidae</b>	Canada (British Columbia), and possibly Germany	✘	✘	?No	?No	No
<i>Spironucleus barkhanus</i>	<b>Salmonidae</b>	Norway	✘	✘	?Yes	Unknown	Yes
<i>Tetrahymena</i> spp.	<b>Cichlids, tetras</b> and <i>Salmo salar</i>	Many	✘	✘	No	No	No
<i>Tetramicra brevifillum</i>	<b><i>Scophthalmus maximus, Lophius budegassa</i></b>	Europe, North Atlantic	✘	✘	No	A:1 (mainly certain effect on product quality) B: 4, 6; 7?	No
<i>Trichodina</i> spp.	<b><i>Mullus barbatus, Gadus morhua, Perciformes, Carassius spp., Cyprinus carpio</i></b>	Australia, Europe, Japan, Sri Lanka	✘	✘	No	No (mainly opportunistic, damage in massive infections)	No
<i>Trichodinella</i> spp.	<b>Many</b>	Many	✘	✘	?No	No (mainly opportunistic, damage in	No

<sup>2</sup> Since the completion of the hazard identification exercise AMD has been described in turbot from Spain ([http://www.fao.org/fi/website/FIRetrieveAction.do?dom=culturespecies&xml=Psetta\\_maxima\\_es.xml](http://www.fao.org/fi/website/FIRetrieveAction.do?dom=culturespecies&xml=Psetta_maxima_es.xml)).

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
						massive infections)	
<i>Trichophrya</i> spp.	?	?	✘	✘	?	?No	No
<i>Tripartiella</i> spp.	?	?	✘	✘	?	No (mainly opportunistic, damage in massive infections)	No
<i>Trypanoplasma borreli</i>	<b><i>Cyprinus carpio</i>, <i>Scardinius erythrophthalmus</i>, <i>Ctenopharyngodon idella</i>, <i>Carassius auratus</i>, <i>Tinca tinca</i>, <i>Leuciscus idus</i> and <i>Rutilus rutilus</i></b>	Asia and Europe	✘	✘	No	A: yes B: 4, 6, 7?	No
<i>Trypanoplasma bullocki</i>	<b>Many marine finfish, flatfish</b>	North America (Atlantic Coast)	✘	✘	?Yes	A: yes B: 4, 6, 7?	Yes
<i>Trypanoplasma (Cryptobia) salmositica</i>	<b>Salmonids</b> and other freshwater fish	North America	✘	✘	Yes	Yes	Yes
<i>Trypanosoma</i> spp.	<b><i>Gadus morhua</i>, Pleuronectiformes, Perciformes, Anguillidae</b>	?Many	✘	✘	?	?No (pathogenicity depends on species and host)	No
<i>Trypanosoma carasii</i> (= <i>T. danilewskyi</i> )	<b><i>Carassius auratus</i>, <i>Cyprinus carpio</i></b>	Europe	✘	✘	No	A: yes B: 4, 6, 7?	No
<b>Fish-fungal</b>							
<i>Aphanomyces invadans</i> (Epizootic ulcerative syndrome; EUS)	<b><i>Anguillidae</i> spp., <i>Anabas testudineus</i>, <i>Bidyanus bidyanus</i>, <i>Caranx</i> spp., <i>Plecoglossus altivelis</i>, <i>Clarius</i> spp., <i>Channa striatus</i>, <i>Cichlidae</i>, <i>Cyprinidae</i>, <i>Lates calcarifer</i>, <i>Mugil cephalus</i>, <i>Bagridae</i>, <i>Siluridae</i> and many other different species (including possibly <i>Brevoortia tyrannus</i>) and <i>Cinetodes froggatti</i>, <i>Kurtus gulliveri</i>, <i>Platycephalus fuscus</i>, <i>Scatophagus argus</i> and <i>Toxotes chartareus</i></b>	Australia, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, USA and Vietnam	✘	✓	Yes	Yes B: 7?	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Branchiomyces</i> spp. ( <i>sanguinus</i> and <i>demigrans</i> )	<b><i>Cyprinus carpio</i>, <i>Tinca tinca</i>, <i>Anguilla</i> spp. and <i>Esox lucius</i></b>	?	✘	✘	?	No	No
<i>Exophiala</i> spp.	<b><i>Sillaginodes punctata</i>, <i>Xanthichthys ringens</i>, <i>Gadus morhua</i>, <i>Salmo clarkii</i>, <i>Salmo salar</i></b>	Australia, Northern Hemisphere	✘	✘	?No	No	No
<i>Saprolegnia</i> spp.	Many	Worldwide	✘	✘	No	No	No
<b>Molluscs-viral</b>							
Agemaki birnavirus	<b><i>Sinonovacula constricta</i></b>	Japan	✘	✘	Yes	No	No
Akoya oyster disease	<b><i>Pinctada fucata martensii</i> and ?<i>Pinctada maxima</i>, <i>Chlamys nobilis</i>, <i>Crassostrea gigas</i> and <i>Pinctada margaritifera</i></b>	China, Japan and ?French Polynesia	✘	✘	Yes	Unknown	Yes
Arenavirus – Hyriopsis cumingii plague	<b><i>Hyriopsis cumingii</i></b>	China	✘	✘	Yes	No	No
Digestive epithelial virosis (small RNA viruses)	<b><i>Perna canaliculus</i>, <i>Pecten novaezelandiae</i>, <i>Saccostrea glomerata</i> and <i>Paphies ventricosa</i></b>	?Australia and New Zealand	✘	✘	Yes	No	No
Gill necrosis virus disease	<b><i>Crassostrea gigas</i> and ?<i>Ostrea edulis</i></b>	Europe (France, Portugal, Spain and the UK)	✘	✘	No	?Yes	Yes
Haemocytic infection virus disease	<b><i>Crassostrea angulata</i> and <i>Crassostrea gigas</i></b>	Europe (France and Spain)	✘	✘	No	?Yes	Yes
<i>Herpesviridae</i> (Herpesvirosis – Oyster herpes-like virus disease)	<b><i>Ostrea edulis</i> and <i>Crassostrea gigas</i></b>	?	✘	✘	No	Yes	Yes
<i>Herpesviridae</i> (Herpes virus infection of larval <i>Crassostrea gigas</i> )	<b><i>Crassostrea gigas</i> and possibly <i>Crassostrea virginica</i>, <i>Ostrea edulis</i>, <i>Ostrea angasi</i>, <i>Ostrea chilensis</i>, <i>Ruditapes decussatus</i>, <i>Ruditapes philippinarum</i>, <i>Pecten maximus</i>, <i>Crassostrea angulata</i> and <i>Crassostrea rivularis</i></b>	Australia, Europe (France, ?Spain and ?UK), New Zealand and possibly Mexico and USA	✘	✘	No	Yes	Yes

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
Icosahedral virus-like disease of carpet-shell clams	<b><i>Ruditapes decussatus</i></b> , <i>Crassostrea gigas</i> and <i>Ruditapes pullastra</i>	Europe (Spain-Galicia)	✘	✘	No	Unknown	Yes
<i>Iridoviridae</i> (Iridovirosis – Oyster velar virus disease)	<b><i>Crassostrea gigas</i></b>	USA (Washington State)	✘	✘	?Yes	Yes	Yes
Papova-like virus – viral gametocytic hypertrophy	<b><i>Crassostrea virginica</i></b> , <b><i>Crassostrea gigas</i></b> , <b><i>Saccostrea glomerata</i></b> , <b><i>Crassostrea rhizophorae</i></b> , <b><i>Ostrea conchaphila</i></b> and ? <i>Pinctada maxima</i> and <i>Mya arenaria</i>	Australia, Canada, Japan, Korea and USA	✘	✘	Yes	No	No
Picorna-like virus – Granulomacystosis	<b><i>Mytilus edulis</i></b>	Denmark and ?UK	✘	✘	No	No	No
<b>Molluscs-bacterial</b>							
Bacterial abscess disease	<b><i>Placopecten magellanicus</i></b>	Canada (Atlantic Coast) and USA	✘	✘	Yes	No	No
<i>Candidatus Xenohalictis californiensis</i> (withering syndrome)	<b><i>Haliotis</i> spp.</b> (e.g. black abalone <i>H. cracherodii</i> , red abalone <i>H. rufescens</i> , pink abalone <i>H. corrugata</i> , green abalone <i>H. fulgens</i> white abalone <i>H. sorenseni</i> , and European abalone <i>H. tuberculata</i> )	USA (California), Mexico (Baja California), Europe (Ireland, Spain), Iceland	✘	✓	No <sup>3</sup>	Yes	Yes
Extracellular giant “rickettsiae”	<b><i>Crassostrea gigas</i></b>	Europe (Spain)	✘	✘	No	No	No
Giant clam rickettsiosis – Rickettsia-like organism	<b><i>Hippopus hippopus</i></b>	Philippines and ?Federal States of Micronesia	✘	✘	Yes	No	No
Hinge ligament disease – Cytophaga-like bacteria	<b><i>Crassostrea gigas</i></b> , <b><i>Crassostrea virginica</i></b> , <b><i>Ostrea edulis</i></b> , <b><i>Mercenaria mercenaria</i></b> , <b><i>Ruditapes philippinarum</i></b> and <b><i>Siliqua patula</i></b>	Possibly ubiquitous	✘	✘	?	No	No
Juvenile oyster disease – Rosebacter-group disease	<b><i>Crassostrea virginica</i></b>	USA (East Coast)	✘	✘	Yes	No	No
Mycoplasmiasis of scallops – Mycoplasma-like organism	<b><i>Patinopecten yessoensis</i></b> and <b><i>Pecten novaezelandiae</i></b>	Canada (British Columbia) and New Zealand	✘	✘	Yes	No	No

<sup>3</sup> Exotic when this exercise started in 2004

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
Mycoplasma-like organism		and New Zealand					
Nuclear inclusion X – large rickettsial-like organism	<b><i>Siliqua patula</i></b>	Canada and the USA	✘	✘	Yes	No	No
Pacific oyster nocardiosis – <i>Nocardia crassostreae</i>	<b><i>Crassostrea gigas</i></b> and ? <i>Mytilus edulis</i>	Canada (British Columbia), Europe (Netherlands), Japan and the USA	✘	✘	No <sup>4</sup>	Yes	Yes
Rickettsiales of scallops – Rickettsia-like and Chlamydia-like organisms	<b><i>Placopecten magellanicus, Pecten maximus, Pecten novaeselandie and Argopecten irradians</i></b>	Europe (France, Scotland, Sweden), New Zealand and the USA	✘	✘	No	No	No
<i>Vibrio splendidus</i> -like ( <i>V. lentus</i> )	<b><i>Crassostrea gigas</i></b> and <b><i>Octopus vulgaris</i></b>	Europe (Spain - Galicia and Valencia)	✘	✘	No	Yes	Yes
<i>Vibrio tapetis</i> (Brown Ring Disease)	<b><i>Tapes philippinarum, Venerupis aurea</i></b> and <b><i>Cerastoderma edule</i></b>	Europe (France, ?Ireland, Italy, Portugal, Spain and UK)	✘	✘	No	Yes	Yes
<b>Molluscs-parasitic</b>							
Apicomplexan parasite X	<b><i>Ostrea chilensis</i></b> and <b><i>Perna canaliculus</i></b>	New Zealand	✘	✘	Yes	No	No
<i>Bonamia exitiosus</i> (?= <i>Bonamia</i> sp.)	<b><i>Ostrea chilensis, O. angasi, O. denselammellosa, Ostrea</i></b> spp. <b><i>Tiostrea</i></b> spp. and <b><i>Crassostrea rivularis</i></b>	Australia (Western Australia, Victoria and Tasmania) and New Zealand (South Island and southern North Island),	✘	✓	Yes	Yes	Yes
<i>Bonamia ostreae</i>	<b><i>Ostrea edulis, O. conchaphila, O. puelchana, O. angasi, O. chilensis, Ostrea</i></b> spp. <b><i>Tiostrea</i></b> spp. and <b><i>Crassostrea rivularis</i></b>	Canada (British Columbia), Denmark, France, Ireland, Italy, Kuwait, Netherlands, Spain, UK (excl. Scotland) and USA (California, Maine and Washington)	✓ (II)	✓	No	Yes	Yes
<i>Haplosporidium amoricum</i> (European oyster minchiniasis)	<b><i>Ostrea edulis</i></b> and <b><i>Ostrea angasi</i></b>	Europe (France and the Netherlands)	✘	✘	No	No	No
<i>Haplosporidium costale</i>	<b><i>Crassostrea virginica</i></b>	USA (Atlantic Coast) and Canada (Nova Scotia)	✘	✓	Yes	No	No

<sup>4</sup> Exotic when this exercise started in 2004

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Haplosporidium nelsoni</i>	<b><i>Crassostrea virginica</i>, <i>C. gigas</i> and <i>Ostrea angasi</i></b>	Canada (Nova Scotia) USA (Atlantic Coast and California), Canada (Nova Scotia), Korea, Kuwait, Japan, France and Netherlands	✘	✓	No	Yes	Yes
<i>Haplosporidium tapetis</i> (Carpet clam haplosporidiosis)	<b><i>Ruditapes decussatus</i> and <i>Ruditapes philippinarum</i></b>	Europe (France, Spain and Portugal)	✘	✘	No	No	No
<i>Haplosporidium tumefaciens</i> (Haplosporidiosis of mussels)	<b><i>Mytilus californianus</i></b>	USA (California)	✘	✘	Yes	No	No
<i>Marteilioides branchialis</i> (Marteilioidosis)	<b><i>Saccostrea commercialis</i></b>	Australia (NSW)	✘	✘	Yes	No	No
<i>Marteilioides chungmuenis</i> (Marteilioidosis)	<b><i>Crassostrea gigas</i></b>	China, Japan, Korea	✘	✘	Yes	Yes	Yes
<i>Marteilia</i> spp. (Marteiliosis)	<b><i>Tiostrea chilensis</i>, <i>Ostrea angasi</i>, <i>O. edulis</i>, <i>O. puelchana</i>, <i>Cerastoderma edule</i>, <i>Mytilus edulis</i>, <i>Mytilus galloprovincialis</i>, <i>Crassostrea gigas</i> and <i>C. virginica</i></b>	Greece (Thermaikos Gulf), ?Korea and Kuwait	✘	✘	No	Yes	Yes
<i>Marteilia christensenii</i>	<b><i>Scrobicularia plana</i></b>	Europe (France)	✘	✘	No	Yes	Yes
<i>Marteilia lengehi</i>	<b><i>Saccostrea cucullata</i></b>	Persian Gulf and Western Australia	✘	✘	Yes	No	No
<i>Marteilia maurini</i>	<b><i>Mytilus galloprovincialis</i> and <i>Mytilus edulis</i></b>	Europe (France, Italy and Spain)	✘	✘	No	Yes	Yes
<i>Marteilia refringens</i>	<b><i>Ostrea edulis</i>, <i>Ostrea</i> spp., <i>Cerastoderma edule</i>, <i>Crassostrea gigas</i>, <i>Crassostrea virginica</i>, <i>Mytilus edulis</i> and <i>Mytilus galloprovincialis</i></b>	France, Greece, Italy, Morocco, Netherlands, Portugal, Spain and ?UK (Southern England)	✓ (II)	✓	No	Yes	Yes
<i>Marteilia sydneyi</i>	<b><i>Saccostrea glomerata</i> and <i>Saccostrea echinata</i></b>	Australia (NSW, Queensland and Western Australia)	✘	✓	Yes	No	No
<i>Microsporidium</i> sp. (Microsporidiosis of queen scallops)	<b><i>Aequipecten opercularis</i></b>	Europe (UK)	✘	✘	No	No	No

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Microsporidium rapuae</i> (Microsporidiosis of dredge oysters)	<b><i>Ostrea chilensis</i></b>	New Zealand (Foveaux Strait)	✘	✘	Yes	No	No
<i>Mikrocytos mackini</i>	<b><i>Crassostrea gigas, Ostrea edulis, O. conchaphila,</i> and <i>Crassostrea virginica</i></b>	Canada (SW Pacific Coast and Vancouver Island), USA (Washington)	✘	✓	Yes	Yes	Yes
<i>Mikrocytos roughleyi</i>	<b><i>Saccostrea glomerata</i> (<i>S. commercialis</i>)</b>	Australia (NSW and ?Western Australia)	✘	✓	Yes	No	No
<i>Mytilicola intestinalis</i>	<b><i>Ostrea edulis, Ruditapes decussatus, Cerastoderma edule, Mytilus edulis</i> and <i>Mytilus galloprovincialis</i></b>	Europe (Denmark, Ireland, Italy and UK)	✘	✘	No	No	No
<i>Pectenophilus ornatus</i>	<b><i>Pectinopecten yessoensis</i> and <i>Chlamys farreri.</i></b>	Japan	✘	✘	Yes	No	No
<i>Perkinsus marinus</i>	<b><i>Crassostrea virginica, C. gigas</i> and <i>C. ariakensis</i></b>	USA (East Coast and Gulf of Mexico, introduced in Hawaii), Venezuela, Puerto Rico, Cuba and Brazil	✘	✓	Yes	Yes	Yes
<i>Perkinsus olseni/atlanticus</i>	<b><i>Haliotis ruber, H. cyclobates, H. scalaris, H. laevigata, Anadara trapezia, Ruditapes philippinarum</i> and <i>Austrovenus stutchburyi/Ruditapes decussatus</i></b>	Eastern and Southern Australia, New Zealand, Korea, Japan and Europe (France, Italy, Portugal and Spain)	✘	✓	No	Yes	Yes
<i>Perkinsus qugwadi</i> (Perkinsosis of scallops)	<b><i>Patinopecten yessoensis</i></b>	Canada (British Columbia) and ?Japan and ?Russia	✘	✘	Yes	No	No
<i>Pseudoperkinsus karlsoni</i>	<b><i>Argopecten irradians</i></b>	Canada (Atlantic Coast) and USA	✘	✘	Yes	No	No
Quahuag parasite unknown	<b><i>Mercenaria mercenaria</i></b>	Canada and USA (East Coast)	✘	✘	Yes	Yes	Yes
Scallop protozoan G	<b><i>Patinopecten yessoensis</i></b>	Canada (British Columbia), ?Europe (Ireland) and ?Japan	✘	✘	?No	No	No
<i>Steinhausia</i> sp. (microsporidian)	<b><i>Cerastoderma edule</i></b>	France	✘	✘	No	No	No
<b>Molluscs-fungal</b>							

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Ostracoblabe implexa</i> – Shell disease	<b><i>Ostrea edulis, Crassostrea gigas, Crassostrea angulata, Saccostrea cucullata, Pinctada margaritifera</i></b>	Canada, Europe (Ireland and UK) and India	✘	✘	No	No	No
<i>Sirolopidium zoophthorum</i> – Larval mycosis	<b><i>Crassostrea virginica, Argopecten irradians, Mercenaria mercenaria and Ruditapes decussatus</i></b>	USA (East Coast)	✘	✘	Yes	No	No
<b>Molluscs-miscellaneous</b>							
Annelida – Mud worm disease – <i>Polydora</i> spp., <i>Boccardia</i> spp., Sabellid worms	<b>Many</b>	Many	✘	✘	?No	No	No
Malpeque disease	<b><i>Crassostrea virginica</i></b>	Canada (Atlantic Coast)	✘	✘	Yes	No	No
Shellboring sponges – <i>Cliona</i> spp.	<b><i>Pinctada</i> spp., <i>Crassostrea</i> spp., <i>Saccostrea</i> spp., <i>Ostrea</i> spp. and <i>Mytilus edulis</i></b>	Australia, North America and Scandinavia	✘	✘	Yes	No	No
<b>Crustaceans-viral</b>							
AaBV (Astacus astacus bacilliform virus)	<b><i>Astacus astacus</i></b> <sup>5</sup>	Europe (Finland, Norway and Germany)	✘	✘	No	Unknown	Yes
ApBV (Austropotamobius pallipes bacilliform virus)	<b><i>Austropotamobius pallipes</i></b>	France	✘	✘	No	Unknown	Yes
<i>Baculoviridae</i> -Baculoviral midgut gland necrosis virus	<b><i>Penaeus japonicus, P. monodon, P. plebejus, P. chinensis and P. semisulcatus</i></b>	Japan (Kyushu and Chugoku), Korea RO, Philippines, ?Australia and ?Indonesia	✘	✘	Yes	No	No
<i>Baculoviridae</i> -Spherical baculovirosis ( <i>Penaeus monodon</i> -type baculovirus)	<b><i>Penaeus monodon</i>, as well as other penaeid shrimps and prawns</b>	Australia, East Asia, South-East Asia, India, East Africa, ?West Africa, the Middle East, ?the Mediterranean, many Indo-Pacific countries, as well as the Pacific region (Tahiti and Hawaii), North America, South America, Taiwan, Thailand, Vietnam	✘	✓	Yes	No	No

<sup>5</sup> No real data on host range of this virus.

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<i>Baculoviridae</i> -Tetrahedral baculovirosis ( <i>Baculovirus penaei</i> and Monodon baculovirus)	<b><i>Penaeus duorarum</i>, <i>P. aztecus</i>, <i>P. setiferus</i>, <i>P. vannamei</i>, <i>P. stylirostris</i>, <i>P. marginatus</i>, <i>P. monodon</i>, <i>Crassostrea virginica</i>, <i>P. penicillatus</i>, <i>P. schmitti</i>, <i>P. paulensis</i> and <i>P. subtilis</i></b>	and the Caribbean Americas: Gulf of Mexico to Central Brazil and from Peru to Mexico, Hawaii, USA, Australia, East Africa, Middle East, Indo-Pacific countries, as well as south and east Asia	✘	✓	Yes	No	No
CdBV (Cherax destructor bacilliform virus)	<b><i>Cherax destructor</i></b>	Australia	✘	✘	Yes <sup>6</sup>	No	No
Cherax destructor picorna-like virus	<b><i>Cherax destructor</i></b>	Australia	✘	✘	Yes	No	No
CdSPV (Cherax destructor systemic parvo-like virus)	<b><i>Cherax destructor</i></b>	Australia	✘	✘	Yes	No	No
CGV (Cherax Giardiavirus-like virus)	<b><i>Cherax quadricarinatus</i></b>	Australia	✘	✘	Yes	No	No
CqBV (Cherax quadricarinatus bacilliform virus)	<b><i>Cherax quadricarinatus</i></b>	Australia, USA, Ecuador	✘	✘	Yes	No	No
<i>CpSBV</i> (bunya-like virus)	<b><i>Cancer pagurus</i></b>	?	✘	✘	?No	Unknown	No
CqPV (Cherax quadricarinatus parvo-like virus)	<b><i>Cherax quadricarinatus</i></b>	Australia	✘	✘	Yes	No	No
CqRV (Cherax quadricarinatus reo-like virus)	<b><i>Cherax quadricarinatus</i></b>	Australia	✘	✘	Yes	No	No
<i>Coronaviridae</i> -Gill associated virus disease	<b><i>Penaeus monodon</i>, <i>P. esculentus</i>, <i>P. merguensis</i> and <i>P. japonicus</i></b>	Australia (Queensland)	✘	✘	No	No <sup>7</sup>	No
<i>Coronaviridae</i> -Yellowhead virus	<b><i>Penaeus</i> spp., <i>Penaeus monodon</i>, <i>P. japonicus</i>, <i>P. vannamei</i>, <i>P. setiferus</i>, <i>P. aztecus</i>, <i>P. duorarum</i>, <i>P. stylirostris</i>, <i>Palaemon styliiferus</i>, <i>Fenneropenaeus</i></b>	Asia, Australia, Bangladesh, China PR, India, Indonesia, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand,	✘	✓	Yes	Yes	Yes

<sup>6</sup> According to Holdich (2001) BFPP 367: 611, *Cherax destructor* has established wild populations in Spain and it is likely there is no data on the occurrence of pathogens in populations (B. Edgerton, pers com.).

<sup>7</sup> GAV is considered by OIE to be a member of the yellow head group.

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>merguiensis</i> , <i>Metapenaeus ensis</i> , <i>Euphausia</i> spp. and <i>Acetes</i> spp.	USA (Texas) and Vietnam					
MrNV and XSV (White tail disease of freshwater prawn)	<b><i>Macrobrachium rosenbergii</i></b>	Martinique, India, Thailand	✘	✘	Yes	?Yes	No
<i>Nimaviridae</i> -White spot virus	<b><i>Penaeus japonicus</i>, <i>P. chinensis</i>, <i>P. indicus</i>, <i>P. merguiensis</i>, <i>P. monodon</i>, <i>P. setiferus</i>, <i>P. stylirostris</i>, <i>P. vannamei</i>, <i>P. aztecus</i> and <i>P. duodarum</i></b>	Bangladesh, Brazil, China PR, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Hong Kong, India, Indonesia, Iran, Japan, Korea RO, Malaysia, Mexico, Myanmar, Nicaragua, Panama, Peru, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Togo, USA, and Vietnam	✘	✓	Yes	Yes	Yes
PIBV (Pacifastacus leniusculus bacilliform virus)	<b><i>Pacifastacus leniusculus</i></b>	USA	✘	✘	?Yes <sup>8</sup>	No	No
<i>Parvoviridae</i> -Infectious hypodermal and haematopoietic necrosis virus	<b><i>Penaeus vannamei</i>, <i>P. stylirostris</i>, <i>P. occidentalis</i>, <i>P. monodon</i>, <i>P. semisulcatus</i>, <i>P. schmitti</i>, <i>P. californiensis</i>, <i>P. japonicus</i>, <i>P. setiferus</i>, <i>P. aztecus</i>, <i>P. chinensis</i>, <i>P. merguiensis</i>, <i>P. indicus</i> and <i>P. duorarum</i></b>	Australia, China, Costa Rica, Ecuador, French Polynesia, Guam, Guatemala, Honduras, India, Indonesia, Iran, Malaysia, Mexico, Myanmar, New Caledonia, Panama, Philippines, Peru, Singapore, Taiwan, Thailand and USA	✘	✓	Yes	Yes	Yes
? <i>Parvoviridae</i> -Spawner-isolated mortality virus disease	<b><i>Penaeus monodon</i>, <i>Cherax quadricarinatus</i>, <i>Penaeus esculentus</i>, <i>P. japonicus</i>, <i>P. merguiensis</i> and <i>Metapenaeus ensis</i></b>	Australia (Queensland), India, Philippines and Sri Lanka	✘	✓	Yes	?No	No
<i>Picornaviridae</i> -Taura syndrome virus	<b><i>Penaeus vannamei</i>, <i>P. stylirostris</i>, <i>P. setiferus</i>, <i>P. schmitti</i>, <i>P. aztecus</i>, <i>P. duorarum</i>, <i>P. chinensis</i>, <i>P. monodon</i>, <i>P.</i></b>	Latin America, Belize, Brazil, Colombia, Costa Rica, Ecuador, El Salvador,	✘	✓	Yes	Yes	Yes

<sup>8</sup> *Pacifastacus leniusculus*, the signal crayfish, has been widely stocked throughout temperate Europe. Histopathological surveys for pathogens carried by *P. leniusculus* in Europe have never been published – and probably have never been conducted. Essentially, this should be considered as “no data” (B. Edgerton, pers. com.).

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>japonicus</i> and <i>Metapenaeus ensis</i> and <i>Penaeus aztecus</i> ,	Guatemala, Honduras, Indonesia, Korea R., Malaysia, Mexico, Myanmar, Nicaragua, Panama, Peru, Taiwan, Thailand, Venezuela and USA (Florida, South Carolina and Texas)					
<b>Crustaceans-bacterial</b>							
<i>Aerococcus viridans</i> (Gaffkaemia)	<b><i>Homarus spp.</i></b>	Canada, Europe (UK) and ?USA	✘	✘	No	Yes	Yes
<i>Aeromonas hydrophila</i>	<b><i>Penaeus monodon</i>, <i>Cherax quadricarinatus</i></b>	Australia, Indonesia	✘	✘	Yes	No	No
? <i>Bacillus subtilis</i> but no causal relationship (Bacterial White Spot Syndrome)	<b><i>Penaeus monodon</i></b>	Malaysia	✘	✘	Yes	?No	No
<i>Coxiella cheraxi</i> (crayfish systemic rickettsiosis)	<b><i>Cherax quadricarinatus</i></b>	Australia, Ecuador	✘	✘	Yes	Yes <sup>9</sup>	Yes
Crayfish hepatopancreatic rickettsia- like organism	<b><i>Cherax quadricarinatus</i></b>	Australia	✘	✘	Yes	No	No
<i>Lactococcus</i> spp. ( <i>Lactococcus garviae</i> )	<b><i>Macrobrachium rosenbergii</i></b>	Taiwan	✘	✘	No	Yes Associated with <i>Oncorhynchus mykiss</i> in Europe and not penaeid shrimps	No
?alpha Proteobacteria (Necrotising hepatopancreatitis)	<b><i>Penaeus vannamei</i>, <i>P. stylirostris</i>, <i>P. aztecus</i>, <i>P. californiensis</i> and <i>P. setiferus</i></b>	USA (Texas), Latin America, Brazil, Costa Rica, Ecuador, Mexico, Panama, Peru and	✘	✘	Yes	Unknown	No

<sup>9</sup> There is probably a case to be made that this agent satisfies the OIE criteria – certainly, it is as warranted as spawner-isolated mortality virus (SMV). Several acute cases resulting in losses in redclaw aquaculture in Australia and Ecuador have been documented, and it is suspected that the chronic affects are at least as serious to redclaw as SMV is to shrimp (B. Edgerton, pers. com.).

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
	<i>setiferus</i>	Mexico, Panama, Peru and Venezuela					
Vibriosis: Luminous <i>Vibrio</i> spp. ( <i>V. harveyi</i> )	<b><i>Penaeus</i> spp.</b>	Asia	✘	✘	Yes	Yes	Yes
<b>Crustaceans-parasitic</b>							
Apostome ciliates ( <i>Hyalophys lwoffi</i> )	<b>North American crayfish and freshwater shrimp</b>	USA	✘	✘	Yes	No	No
<i>Microsporidium</i> spp.	<b><i>Fenneropenaeus indicus</i>, <i>Penaeus monodon</i> and <i>P. semisulcatus</i></b>	Madagascar	✘	✘	Yes	No Reported in wild coast coastal species	No
<i>Psorospermium</i> sp. <i>Psorospermium haeckeli</i> <sup>10</sup>	<b><i>Cherax quadricarinatus</i>, <i>Cherax tenuimanus</i></b> <i>Astacus astacus</i> , <i>Astacus leptodactylus</i> , <i>Pacifastacus leniusculus</i> , <i>Procambarus clarkii</i> , <i>Orconectes limosus</i> ,	Australia Europe, USA	✘ ✘	✘ ✘	Yes No	No No	No No
<i>Tetrahymena pyriformis</i>	<b><i>Cherax quadricarinatus</i></b>	Australia	✘	✘	Yes	No	No
<i>Thelohania contejeani</i>	<b><i>Astacus astacus</i>, <i>Astacus leptodactylus</i>, <i>Austropotamobius pallipes</i></b>	Europe	✘	✘	No	No	No
<i>Vavraia parastacida</i>	<b><i>Cherax destructor albidus</i>, <i>Cherax tenuimanus</i>, <i>Cherax quadricarinatus</i>, <i>Cherax quinquecarinatus</i></b>	Australia	✘	✘	Yes	No	No
Other crayfish microsporidians <sup>11</sup>	<b>Virtually all freshwater crayfish species</b>	Ubiquitous	✘	✘	Yes	No	No

<sup>10</sup> This is a very poorly understood group (even though it was first discovered 150 years ago). Several morphotypes – which with further study may be considered separate species – are exotic to Europe but they often are referred to in the literature as *P. haeckeli*. The Australian morphotype(s)/species has not been reported from Europe, and for clarity it is referred to as *Psorospermium* sp. (B. Edgerton, pers.com.).

<sup>11</sup> Microsporidians are also a very poorly understood group. Microsporidiosis has been reported from European crayfish on many occasions – most commonly the causative agent is referred to as *Thelohania contejeani* even though few studies properly identify the microsporidian, or even show that the condition (whitened muscle) was indeed due to a microsporidian. *T. contejeani* has been reported outside of Europe, but those studies did not include methodologies to accurately identify the species. There are other microsporidians known to infect European freshwater crayfish. This classification is meant to denote the poorly known microsporidians which are exotic to Europe (including

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
<b>Crustaceans-fungal</b>							
<i>Aphanomyces astaci</i> (Crayfish plague)	<b><i>Astacus astacus</i>, <i>Austropotamobius pallipes</i>, <i>Austropotamobius torrentium</i>, <i>Astacus leptodactylus</i>, <i>Pacifastacus leniusculus</i>, <i>Procambarus clarkii</i></b> and <i>Eriocheir sinensis</i>	Europe (Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and Yugoslavia) and North America	✓ (III)	✓	No	Yes	Yes
<i>Fusarium</i> spp.	<i>Astacus leptodactylus</i> , <i>Austropotamobius pallipes</i> , <i>Pacifastacus leniusculus</i>	Europe	✗	✗	No	No	No
<i>Saprolegnia parasitica</i>	<i>Astacus astacus</i> , <i>Astacus leptodactylus</i> , <i>Procambarus clarkii</i>	Europe	✗	✗	No	No	No
<b>Amphibians-viral</b>							
<i>Iridoviridae</i> -Amphibian ranavirus	<b>Amphibians</b> and ? <i>Carassius auratus</i>	?Canada, UK and USA	✗	✗	No	Yes Unproven link with ornamental fish and cyprinids	Yes
<b>Amphibians-bacterial</b>							
<i>Streptococcus iniae</i>	<i>Rana castesbeiana</i>	USA	✗	✗	No	Yes Associated with <i>Oncorhynchus mykiss</i> in Europe and not	Yes

those that were reported as *T. contejeani*). One microsporidian, *Vavraia parastacida* from Australia, is considered separately because it has been fully described, and it has biological characteristics which make it a greater risk than the other exotic microsporidians (B. Edgerton, pers. com.).

Causal agent (or disease)	Host range (natural host in bold)	Geographical distribution	91/67-listed (category)	OIE- listed	Exotic to the EU	OIE disease criteria (A and B)	For hazard scoring
						amphibians	
<b>Amphibians-parasitic</b>							
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Amphibians-fungal</b>							
<i>Batrachochytrium dendrobatidis</i> (amphibian chytridiomycosis)	<b>Amphibians</b>	Africa, Australia, Central America, Asia, Europe (unknown distribution), Japan, New Zealand, South America and USA	✘	✘	No	Yes	Yes

## 1.2 Disease agents exotic to the EU

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<b>Fish-viral</b>			
Common carp coronavirus	<i>Cyprinus carpio</i>	Host species present	Insufficient data of presence in EU
Eel rhabdovirus - EVA	<i>Anguilla rostrata</i>		Same as eel rhabdovirus European
Golden shiner virus	<i>Notemigonus crysoleucas</i>	Host species not present	Insufficient data
Goldfish haematopoietic necrosis virus	<i>Carassius auratus</i>	Host species present	Insufficient data
Grass carp reovirus	<i>Ctenopharyngodon idella</i> , <i>Mylopharyngodon piceus</i> , <i>Pseudorasbora parva</i> and <i>Gobiocypris rarus</i>	Host species present	May be highly virulent? Or not? See literature from China
<i>Herpesviridae</i> -Channel catfish virus (Ictaluridae herpes virus type 1)	<i>Ictalurus punctatus</i> , <i>Ictalurus furcatus</i> and <i>I. catus</i>	Host species not present but reported presence in Russia Federation	Small -scale aquaculture of <i>I. punctatus</i> in Italy, but not tested for the virus.
<i>Herpesviridae</i> -Herpes virus salmonis type 1	<i>Oncorhynchus mykiss</i> and <i>O. tshawytscha</i>	One host species present: <i>Oncorhynchus mykiss</i>	Insufficient data, but was removed from the OIE list. Virus only present in Japan and trout are not exported from Japan. No trade as yet but would be a risk in the future if trade started.
<i>Herpesviridae</i> - <i>Oncorhynchus masou</i> virus (salmonid herpesvirus type 2)	<i>Oncorhynchus nerka</i> , <i>O. masou</i> , <i>O. keta</i> , <i>O. kisutch</i> and <i>O. mykiss</i>	<i>Oncorhynchus mykiss</i> (widespread) and ?1998 (possibly erroneous) report of presence in UK	Virus only present in Japan and trout are not exported from Japan. No trade as yet but would be a risk in the future if trade started.
<i>Herpesviridae</i> -Pilchard herpes virus	<i>Sardinops sagax</i>	Host species not present but other pilchard species are (e.g. <i>Sardina pilchardus</i> )	Tend to be very host specific, more data needed on whether the EU has a susceptible host or not. High mortality rate and can travel along the coast at up to 25 km/day. Route of transmission is possibly

Disease Agent	Host species	Comment regarding the EU	Task Force comment
			commercial feed.
<i>Herpesviridae</i> -white sturgeon herpesvirus-1	<i>Acipenser transmontanus</i>	Host species may be present in small numbers	Probably a worry if white sturgeon starts to be farmed in EU, which is already happening on a very small scale in Italy. Future trade would require further assessment.
<i>Herpesviridae</i> - white sturgeon herpesvirus-2	<i>Acipenser transmontanus</i>	Host species may be present in small numbers	Probably a worry if white sturgeon starts to be farmed in EU, which is already happening on a very small scale in Italy. Future trade would require further assessment.
Infectious salmon anaemia virus	<i>Oncorhynchus kisutch</i> , <i>Salmo salar</i> , <i>Salmo trutta</i> , <i>Oncorhynchus mykiss</i> , <i>Clupea harengus</i> and <i>Lepeophtheirus salmonis</i>	Host species present and has been previously recorded in the EU	Faeroe Islands, ?Ireland and Norway. ?Eradicated from UK (Scotland and the Shetland Islands). Wildlife reservoir, but with different strain virulence
<i>Iridoviridae</i> -Epizootic haematopoietic necrosis virus	<i>Perca fluviatilis</i> , <i>Oncorhynchus mykiss</i>	Some host species present: <i>Perca fluviatilis</i> (Europe but not Spain, Greece); <i>Oncorhynchus mykiss</i> (widespread)	Exotic to Europe, EHN affects rainbow trout and European perch only. According to the OIE, EHNV is one of the three iridovirus types considered as agents of epizootic haematopoietic necrosis (EHN)
<i>Iridoviridae</i> - Santee Cooper ranavirus (SCRV): Largemouth bass iridovirus	<i>Morone salmoides</i> , <i>Morone saxatilis</i> , <i>Poecilia reticulata</i> (guppies)	Host species not present but the hybrid is imported from USA and Israel and reared	Insufficient data on similar species susceptibility from a EU perspective.
<i>Iridoviridae</i> -Mandarin fish iridovirus	<i>Siniperca chuatsi</i>	Host species not present	Insufficient data on similar species susceptibility from a EU perspective. Evidence that it is very virulent in other countries. The causal agent is the same as Red Sea Bream Iridovirus.
<i>Iridoviridae</i> -Red sea bream iridovirus	<i>Pagrus major</i> , <i>Seriola quinqueradiata</i> , <i>Seriola spp.</i> , <i>Lateolabrax sp.</i> , <i>Oplegnathus fasciatus</i> , <i>Epinephelus malabaricus</i>	Some host species present: <i>Pagrus spp.</i> , <i>Seriola spp.</i> , <i>Epinephelus spp.</i> , <i>Thunnus thynnus</i>	Reported to be highly virulent and potential aquaculture species are susceptible hosts.

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<i>Iridoviridae</i> -White sturgeon iridovirus	<i>Epinephelus malabaricus</i> , <i>Epinephelus</i> spp., <i>Lates calcarifer</i> , <i>Thunnus thynnus</i> , ?Perciformes, ?Pleuronectiformes and ?Tetraodontiformes <i>Acipenser transmontanus</i> , <i>A. gueldenstaedtii</i> , <i>A. baeri</i> and <i>A. fluvescens</i>	Host species possibly present in some areas: Possible occurrence of similar virus in Northern Europe (Russia)	Italy has small scale farming
New Japan virus	<i>Oncorhynchus kisutch</i> , <i>O. mykiss</i> , <i>Salvelinus</i> sp. and <i>Plecoglossus altivelis</i>	Some host species present	Insufficient data. See IRA from AQIS on salmonids and marine fish for background. Virus only present in Japan and trout are not exported from Japan. No trade as yet but would be a risk in the future if trade started
Salmon leukaemia virus	<i>Oncorhynchus tshawytscha</i> , <i>O. masou</i> and <i>Salmo salar</i>	One host species present: <i>Salmo salar</i>	Insufficient data, the local host species is not a natural host species
Snakehead rhabdovirus	<i>Channa striata</i>	Host species not present	Not been shown to be virulent, no snakehead in the EU.
Tilapia larvae encephalitis virus	<i>Oreochromis aureus</i> and <i>O. niloticus niloticus</i>	Host species not present but reported in Israel	Insufficient data, although there are reports of some tilapia farming in the EU
Viral oedema of carp	<i>Cyprinus carpio</i>	Host species present	Insufficient data.
Walleye sarcoma retrovirus	<i>Stizostedion vitreum</i>	Host species not present	Not a threat.
<b>Fish-bacterial</b>			
<i>Streptococcus agalactiae</i>	<i>Sparus aurata</i> , <i>Liza klunzingeri</i>	Host species present in aquaculture and the wild	Zoonotic: associated with endocarditis, as well as septicaemia and meningitis in neonates
<b>Fish-parasitic</b>			
<b>Cestodes</b>			

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<i>Atractolytocestus sagittatus</i>	<i>Cyprinus carpio</i>	Host species present and another <i>Atractolytocestus</i> sp. Found in USSR	
<b>Crustacea</b>			
<i>Caligus teres</i>	<i>Oncorhynchus mykiss</i> and <i>O. kisutch</i>	Host species present and another <i>Caligus</i> sp. Found in Europe	
<i>Caligus rogercresseyi</i>	<i>Salmo salar</i>	Host species present and another <i>Caligus</i> sp. Found in Europe	
<b>Myxozoa<sup>12</sup></b>			
<i>Ceratomyxa shasta</i>	<b>Salmonidae</b>	Host species present	
<i>Henneguya salminicola</i> and <i>Henneguya</i> spp.	<i>Oncorhynchus</i> spp., <i>Sciaenops ocellata</i> , <i>Sparus aurata</i> , <i>Ictalurus punctatus</i> , <i>Lagodon rhomboids</i> , <i>Lates calcarifer</i> , <i>Acanthopagrus australis</i> and other marine fish	Host species present ( <i>Sparus aurata</i> and ? <i>Oncorhynchus mykiss</i> ) but reported from Italy and Tunisia in sea bream	
<i>Kudoa thyrsites</i> and <i>Kudoa</i> spp.	<b>Salmonidae, Clupeidae, Merluccius productus, Morone saxatilis, Seriola quinqueradiata, Lates calcarifer, Seriola grandis, Seriola lalandi, Thunnus maccoyii</b> and other marine fish	Some host species present	
<i>Parvicapsula</i> spp.	<i>Oncorhynchus</i> spp., <i>O. mykiss</i> , <i>O. clarki</i> , <i>Salmo</i>	Some host species present: <i>Oncorhynchus mykiss</i> and	

<sup>12</sup> All Myxosporeans most likely have a two host lifecycle (fish is the intermediate host and an invertebrate -mostly Oligochaetes- is the final host based on where sexual reproduction occurs). This makes risk assessment difficult since only the fish host species is considered (e.g. for the hazard scores). For example, potential fish hosts for the North-American Myxosporean *Ceratomyxa shasta* are present within the EU, but if the other needed host(s) in the life cycle is not present, the risk for establishment will be very low (however, a host switch for this parasite could occur) (Tor Atle Mo, pers comm.)

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<i>Parvicapsula pseudobranchicola</i>	<i>salar</i> , <i>Sciaenops ocellatus</i> , <i>Liza macrolepis</i> and reservoir marine fish species  <i>Salmo salar</i>	<i>Salmo salar</i> but host specificity of some <i>Parvicapsula</i> spp. is low  Likely that the final host occurs within the EU where salmon is produced, but at present there is no idea about the invertebrate final host for this parasite	
<b>Protozoa</b>			
<i>Enterocytozoon salmonis</i>	<i>Oncorhynchus tshawytscha</i> , <i>O. mykiss</i> and <i>Salmo salar</i>	Some host species present: <i>Oncorhynchus mykiss</i> and <i>Salmo salar</i>	
<i>Heterosporis anguillarum</i>	<i>Anguilla japonica</i>	Host species not present but <i>Anguilla anguilla</i> is present	
<i>Loma salmonae</i>	<i>Oncorhynchus</i> spp., <i>O.</i> <i>mykiss</i> and <i>Salvelinus</i> <i>fontinalis</i>	Some host species present: <i>Oncorhynchus mykiss</i> and <i>Salvelinus fontinalis</i>	
<i>Microsporidium takedai</i> and <i>Microsporidium</i> spp.	<i>Oncorhynchus</i> spp., <i>O.</i> <i>mykiss</i> , <i>Salmo trutta</i> , <i>Taurulus bubalis</i> , <i>Seriola</i> <i>quinqueradiata</i> , <i>Pagrus</i> <i>major</i> and ?flounder	Some host species present: <i>Oncorhynchus mykiss</i> and <i>Salmo trutta</i>	
<i>Neoparamoeba pemaquidensis</i> (amoebic gill disease)	<i>Salmo salar</i>	Host species (marine phase) present but need to check environmental conditions (wild fish are not reservoirs)	
<i>Spironucleus barkhanus</i>	<b>Salmonidae</b>		
<i>Trypanoplasma bullocki</i>	<b>Many marine finfish, flatfish</b>	?Some host species present	
<i>Trypanoplasma (Cryptobia) samositica</i>	<b>Salmonids</b> and other freshwater fish	Some host species present	

Disease Agent	Host species	Comment regarding the EU	Task Force comment
	freshwater fish		
<b>Nematodes</b>			
<i>Philometroides fulvidraconi</i> and <i>Philometroides</i> spp.	<b><i>Pelteobagrus fulvidraco</i>, <i>Macquaria ambigua</i></b>	Host species not present	
<b>Fish-fungal</b>			
<i>Aphanomyces invadans</i> (Epizootic ulcerative syndrome)	<b><i>Anguillidae</i> spp., <i>Caranx</i> spp., <i>Plecoglossus altivelis</i>, <i>Clarius</i> spp., <i>Channa striatus</i>, <i>Cichlidae</i>, <i>Cyprinidae</i>, <i>Lates calcarifer</i>, <i>Mugil cephalus</i>, <i>Siluridae</i> and many other different species</b> (incl. ? <i>Brevoortia tyrannus</i> )	Some host species present: <i>Anguillidae</i> spp., <i>Cyprinidae</i> , <i>Mugil cephalus</i> .	Has potential to cause severe problems but the environmental conditions are probably unfavourable
<b>Molluscs-viral</b>			
Agemaki birnavirus	<b><i>Sinonovacula constricta</i></b>	Host species not present	Insufficient data
Akoya oyster disease	<b><i>Pinctada fucata martensii</i> and ?<i>Pinctada maxima</i>, <i>Chlamys nobilis</i>, <i>Crassostrea gigas</i> and <i>Pinctada margaritifera</i></b>	One possible host species present: <i>Crassostrea gigas</i>	Insufficient data.
Arenavirus – <i>Hyriopsis cumingii</i> plague	<b><i>Hyriopsis cumingii</i></b>	Host species not present	Possibly one host species present but insufficient data. May need revising.
Digestive epithelial virosis (small RNA viruses)	<b><i>Perna canaliculus</i>, <i>Pecten novaezelandiae</i>, <i>Saccostrea glomerata</i> and <i>Paphies ventricosa</i></b>	Host species not present	Never reported in the EU.
<i>Iridoviridae</i> (Iridovirosis – Oyster velar virus disease)	<b><i>Crassostrea gigas</i></b>	Host species present	Withdrawn from the EU listing, although possibly observed in Europe. Future trade may require further consideration.
Papova-like virus – viral gametocytic hypertrophy	<b><i>Crassostrea virginica</i>, <i>Crassostrea gigas</i>, <i>Saccostrea glomerata</i></b>	Some host species present: <i>Crassostrea gigas</i>	Insufficient data.

Disease Agent	Host species	Comment regarding the EU	Task Force comment
	<i>Saccostrea glomerata</i> , <i>Crassostrea rhizophorae</i> , <i>Ostrea conchaphila</i> and <i>?Pinctada maxima</i> and <i>Mya arenaria</i>		
<b>Molluscs-bacterial</b>			
Bacterial abscess disease	<i>Placopecten magellanicus</i>	Host species not present	Insufficient data
Giant clam rickettsiosis – Rickettsia-like organism	<i>Hippopus hippopus</i>	Host species not present	Insufficient data
Juvenile oyster disease – Rosebacter-group disease	<i>Crassostrea virginica</i>	Host species not present	Host species not present but <i>C. gigas</i> is present Decreasing in USA
Mycoplasmiasis of scallops – Mycoplasma-like organism	<i>Patinopecten yessoensis</i> and <i>Pecten novaezelandiae</i>	Host species not present but some <i>Pecten</i> spp. are present	Never reported from species in EU, although possible imports of exotic scallops into the EU for aquaculture purposes
Nuclear inclusion X – large rickettsial-like organism	<i>Siliqua patula</i>	Host species not present	Insufficient data
<b>Molluscs-parasitic</b>			
Apicomplexan parasite X	<i>Ostrea chilensis</i> and <i>Perna canaliculus</i>	Host species not present but some <i>Ostrea</i> spp. are present	
<i>Bonamia exitiosus</i>	<i>Ostrea chilensis</i> , <i>O. angasi</i> , <i>O. denselammellosa</i> , <i>Ostrea</i> spp. <i>Tiostrea</i> spp. and <i>Crassostrea rivularis</i>	Host species not present	
<i>Haplosporidium costale</i> <i>Haplosporidium tumefacientis</i> (Haplosporidiosis of mussels)	<i>Crassostrea virginica</i> <i>Mytilus californianus</i>	Host species not present Host species not present but other <i>Mytilus</i> spp. are present	
<i>Marteilia lengehi</i>	<i>Saccostrea cucullata</i>	Host species not present	

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<i>Marteilia sydneyi</i>	<i>Saccostrea glomerata</i> and <i>Saccostrea echinata</i>	Host species not present	
<i>Marteilioides branchialis</i> (Marteilioidosis) <i>Marteilioides chungmuenis</i> (Marteilioidosis)	<i>Saccostrea commercialis</i> <i>Crassostrea gigas</i>	Host species not present Host species present: <i>Crassostrea gigas</i>	
<i>Microsporidium rapuae</i> (Microsporidiosis of dredge oysters)	<i>Ostrea chilensis</i>	Host species not present but other <i>Ostrea</i> spp. are present	
<i>Mikrocytos mackini</i>  <i>Mikrocytos roughleyi</i>	<i>Crassostrea gigas</i> , <i>Ostrea edulis</i> , <i>O. conchaphila</i> , and <i>Crassostrea virginica</i> <i>Saccostrea glomerata</i> ( <i>S. commercialis</i> )	Host species present: <i>Crassostrea gigas</i> and <i>Ostrea edulis</i> Host species not present	
<i>Pectenophilus ornatus</i>	<i>Pectinopecten yessoensis</i> and <i>Chlamys farreri</i> .	Host species not present	
<i>Perkinsus marinus</i>  <i>Perkinsus qugwadi</i> (Perkinsosis of scallops)	<i>Crassostrea virginica</i> , <i>C. gigas</i> and <i>C. ariakensis</i> <i>Patinopecten yessoensis</i>	Host species present: <i>Crassostrea gigas</i> Host species not present but <i>Pecten</i> spp. are present	
<i>Pseudoperkinsus karlsoni</i>	<i>Argopecten irradians</i>	Host species not present but <i>Pecten</i> spp. are present	
Quahuag parasite unknown	<i>Mercenaria mercenaria</i>	Host species not present	
<b>Molluscs-fungal</b>			
<i>Sirolopidium zoophthorum</i> – Larval mycosis	<i>Crassostrea virginica</i> , <i>Argopecten irradians</i> , <i>Mercenaria mercenaria</i> and <i>Ruditapes decussatus</i>	Host species present: <i>Crassostrea</i> spp. and <i>Ruditapes</i> spp.	
<b>Molluscs-miscellaneous</b>			
Malpeque disease	<i>Crassostrea virginica</i>	Host species not present but <i>Crassostrea</i> spp. are present	

Disease Agent	Host species	Comment regarding the EU	Task Force comment
Shellboring sponges – <i>Cliona</i> spp.	<i>Pinctada</i> spp., <i>Crassostrea</i> spp., <i>Saccostrea</i> spp., <i>Ostrea</i> spp. and <i>Mytilus edulis</i>	Host species present: <i>Crassostrea</i> spp., <i>Ostrea</i> spp. and <i>Mytilus</i> spp.	
<b>Crustaceans-viral</b>			Some countries, such as Turkey, Italy, Greece, Portugal, Spain, etc, have potential for aquaculture of these predominantly tropical species.
<i>Baculoviridae</i> - Baculoviral midgut gland necrosis virus	<i>Penaeus japonicus</i> , <i>P. monodon</i> , <i>P. plebejus</i> , <i>P. chinensis</i> and <i>P. semisulcatus</i>	Host species not present	
<i>Baculoviridae</i> - Spherical baculovirosis ( <i>Penaeus monodon</i> -type baculovirus)	<b>Penaeus monodon, as well as other penaeid shrimps and prawns</b>	?Host species not present, although possibly reported in the Mediterranean and West Africa	
<i>Baculoviridae</i> - Tetrahedral baculovirosis ( <i>Baculovirus penaei</i> )	<i>Penaeus duorarum</i> , <i>P. aztecus</i> , <i>P. setiferus</i> , <i>P. vannamei</i> , <i>P. stylirostris</i> , <i>P. marginatus</i> , <i>P. monodon</i> , <i>P. penicillatus</i> , <i>P. schmitti</i> , <i>P. paulensis</i> and <i>P. subtilis</i>	Host species not present	
CdBV (Cherax destructor bacilliform virus)	<i>Cherax destructor</i>		
CdSPV (Cherax destructor systemic parvo-like virus)	<i>Cherax destructor</i>		
Cherax destructor picorna-like virus	<i>Cherax destructor</i>		
CGV (Cherax Giardivirus-like virus)	<i>Cherax quadricarinatus</i>		
CqBV (Cherax quadricarinatus bacilliform virus)	<i>Cherax quadricarinatus</i>		
CqPV (Cherax quadricarinatus parvo-like virus)	<i>Cherax quadricarinatus</i>		
CqRV (Cherax quadricarinatus reo-like virus)	<i>Cherax quadricarinatus</i>		
<i>Coronaviridae</i> - Gill associated virus disease	<i>Penaeus monodon</i> , <i>P. esculentus</i> , <i>P. merguensis</i> and <i>P. japonicus</i>	Host species not present	

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<i>Coronaviridae</i> - Yellowhead virus	<i>Penaeus monodon</i> , <i>P. japonicus</i> , <i>P. vannamei</i> , <i>P. setiferus</i> , <i>P. aztecus</i> , <i>P. duorarum</i> , <i>P. stylirostris</i> , <i>Palaemon styliferus</i> , <i>Fenneropenaeus merguensis</i> , <i>Metapenaeus ensis</i> , <i>Euphausia</i> spp. and <i>Acetes</i> spp.	Host species not present	
MrNV and XSV (White tail disease)	<i>Macrobrachium rosenbergii</i>		Frozen imports
<i>Nimaviridae</i> -White spot virus	<i>Penaeus japonicus</i> , <i>P. chinensis</i> , <i>P. indicus</i> , <i>P. merguensis</i> , <i>P. monodon</i> , <i>P. setiferus</i> , <i>P. stylirostris</i> , <i>P. vannamei</i> , <i>P. aztecus</i> , <i>P. duodarum</i> and many more penaeid species	Host species not present	Huge potential to spread. Reported from crabs
PIBV (Pacifastacus leniusculus bacilliform virus)	<i>Pacifastacus leniusculus</i>		
<i>Parvoviridae</i> - Infectious hypodermal and haematopoietic necrosis virus	<i>Penaeus vannamei</i> , <i>P. stylirostris</i> , <i>P. occidentalis</i> , <i>P. monodon</i> , <i>P. semisulcatus</i> , <i>P. californiensis</i> , <i>P. japonicus</i> , <i>P. setiferus</i> , <i>P. aztecus</i> and <i>P. duorarum</i>	Host species not present	
? <i>Parvoviridae</i> -Spawner-isolated mortality virus disease	<i>Penaeus monodon</i> , <i>Cherax quadricarinatus</i> , <i>Penaeus esculentus</i> , <i>P. japonicus</i> , <i>P. merguensis</i> and <i>Metapenaeus ensis</i>	Host species not present	
<i>Picornaviridae</i> - Taura syndrome virus	<i>Penaeus vannamei</i> , <i>P. stylirostris</i> , <i>P. setiferus</i> , <i>P. schmitti</i> , <i>P. aztecus</i> , <i>P. duorarum</i> , <i>P. chinensis</i> , <i>P. monodon</i> and <i>P. japonicus</i>	Host species not present	

Disease Agent	Host species	Comment regarding the EU	Task Force comment
<b>Crustaceans-bacterial</b>			Some countries have potential for aquaculture, such as Turkey, Italy, Greece, Portugal, Spain, etc.
<i>Aeromonas hydrophila</i>	<i>Penaeus monodon</i>	Host species not present	<i>A. hydrophila</i> is of public health concern, although not usually directly associated with crustaceans.
? <i>Bacillus subtilis</i> but no causal relationship (Bacterial White Spot Syndrome)	<i>Penaeus monodon</i>	Host species not present	
<i>Coxiella cheraxi</i> (crayfish systemic rickettsiosis)	<i>Cherax quadricarinatus</i>		
Crayfish hepatopancreatic rickettsia-like organism	<i>Cherax quadricarinatus</i>		
<i>Lactococcus</i> spp. ( <i>Lactococcus garviae</i> )	<i>Macrobrachium rosenbergii</i>	Host species not present	In Europe associated with rainbow trout. Not known as a pathogen of crustaceans but associated with septicemia in immunosuppressed individuals.
?alpha Proteobacteria (Necrotising hepatopancreatitis)	<i>Penaeus vannamei</i> , <i>P. stylirostris</i> , <i>P. aztecus</i> , <i>P. californiensis</i> and <i>P. setiferus</i>	Host species not present	
Vibriosis: Luminous <i>Vibrio</i> spp. ( <i>V. harveyi</i> )	<i>Penaeus</i> spp.	Host species not present	
<b>Crustaceans-parasitic</b>			
Apostome ciliates ( <i>Hyalophys lwoffii</i> )	North American crayfish and freshwater shrimp		
<i>Microsporidium</i> spp.	<i>Fenneropenaeus indicus</i> , <i>Penaeus monodon</i> and <i>P. semisulcatus</i>	?Host species not present	
<i>Psorospermium</i> sp.	<i>Cherax quadricarinatus</i> , <i>Cherax tenuimanus</i>		
<i>Tetrahymena pyriformis</i>	<i>Cherax quadricarinatus</i>		
<i>Vavraia parastacida</i>	<i>Cherax destructor albidus</i> , <i>Cherax tenuimanus</i> , <i>Cherax</i>		

Disease Agent	Host species	Comment regarding the EU	Task Force comment
	<i>quadricarinatus, Cherax quinquecarinatus</i>		
Other crayfish microspridians	Virtually all freshwater crayfish species		
<b>Crustaceans-fungal</b>			
None	N/A	N/A	
<b>Amphibians-fungal</b>			
<i>Batrachochytrium dendrobatidis</i> (amphibian chytridiomycosis)	Amphibian species		

### 1.3 Disease agents present in the EU but with limited distribution

Disease Agent	EU Distribution	Task Force comment
<b>Fish-viral</b>		
Birnavirus (non-EVE) infection	Netherlands	Insufficient data
Bream rhabdovirus	Northern Ireland	One reported outbreak, but insufficient data
Eel rhabdovirus-EVEX	Not exotic but unknown distribution (?Italy and France)	See Annex 1.1
Erythrocytic necrosis virus (Viral erythrocytic necrosis)	Limited marine areas	Reported from the wild, no importance to aquaculture
Esox lymphosarcoma retrovirus	Finland, Ireland and Sweden	Insufficient data
Esox sarcoma retrovirus	Sweden	Insufficient data
<i>Herpesviridae</i> -Herpes virus anguillae <i>Herpesviridae</i> - Herpes virus of black catfish  <i>Herpesviridae</i> - Koi herpes virus	?France, ?Hungary and Netherlands  Italy  Austria, Belgium, Denmark, France, Germany, Israel, the Netherlands, Switzerland and the UK	Probably indigenous to wild eels  The virus has not been fully characterised and it is different from the <i>I. punctatus</i> herpesvirus  Probably more widespread than officially reported. Huge potential to severely affect the carp industry, although clinical disease seems to be temperature dependent.
Infectious haematopoietic necrosis virus	Austria, Belgium, Czech Republic, France, Germany, Italy, Netherlands, Poland, Russia, Slovenia, ?Spain and Switzerland	Some of the EU countries are possibly IHN-free and the disease could possibly still be considered as having a limited distribution
<i>Iridoviridae</i> -European catfish iridovirus	France, Italy	Host species present in small numbers. Disease widespread in some areas of Italy where a different virus, which came from New Zealand, may have been isolated. According to the OIE, ECV is one of the three iridovirus types considered as agents

Disease Agent	EU Distribution	Task Force comment
<p><i>Iridoviridae</i>-European sheatfish virus</p> <p><i>Iridoviridae</i>-Japanese eel iridovirus</p>	<p>?Belgium, Finland, Germany and Slovenia.</p> <p>?Reported from France, Italy and Germany</p>	<p>of epizootic haematopoietic necrosis (EHN)</p> <p>The sheat fish virus is indigenous and according to the OIE, ESV is one of the three iridovirus types considered as agents of epizootic haematopoietic necrosis (EHN)</p>
Pacific salmon anaemia virus/erythrocytic inclusion body syndrome	?Norway and Ireland	May not be important
Perch/Pike-perch fry rhabdovirus	France	Bound to be widespread
<i>Togaviridae</i> -Pancreas disease	France, Ireland, Norway, Spain, UK (Scotland)	<p>Sleeping disease apparently is the same virus</p> <p>Definitely emergent in rainbow trout</p>
Viral encephalopathy and retinopathy	The Mediterranean region (France, Greece, Italy, Malta and Spain), as well as Norway, Portugal and UK (Scotland)	Possibly more widespread
<b>Fish-bacterial</b>		
<i>Citrobacter freundii</i>	Scotland and Spain	Possibly more widespread. Relatively minor fish pathogen with poorly defined distribution. May be of public health concern, although probably not associated with fish.
<i>Clostridium botulinum</i>	Denmark and UK	A minor fish pathogen with no known association to equivalent human botulinism.
<p><i>Edwardsiella ictaluri</i> (enteric septicaemia of catfish)</p> <p><i>Edwardsiella tarda</i></p>	<p>Reported from Italy</p> <p>Belgium, Czechoslovakia, Germany, Israel, Italy, Norway and Spain</p>	<p>Some minor host species present: Salmonidae (<i>Oncorhynchus mykiss</i>) and some small scale <i>I. punctata</i> farming in Italy. Uncommon opportunistic pathogen of lower respiratory tract infections, with unclear association to fish.</p> <p>Certain host species present: <i>Anguilla</i> spp. and Salmonidae. Uncommonly reported from gastrointestinal disorders in</p>

Disease Agent	EU Distribution	Task Force comment
		immunocompromised human hosts and possibly associated with pet reptiles and the ingestion of raw fish.
<i>Lactococcus</i> spp. ( <i>Lactococcus garviae</i> )	Italy, Spain, Turkey and Israel	Increasing in importance and geographic range as a fish disease. Zoonotic: associated with bovine mastitis and very occasionally with bacterial endocarditis or septicemia in immunosuppressed individuals
<i>Photobacterium piscicida</i>	The Mediterranean region	Spreading
<i>Piscirickettsia salmonis</i> (Piscirickettsiosis)	Ireland and Norway (not diagnosed since 1997 but OIE reported in 2000)	Potential never demonstrated. Strong evidence for vertical transmission in Chile, trade of potentially infected eggs between the hemispheres
<i>Pseudomonas anguilliseptica</i>	Denmark, France, Portugal, Spain and UK (Scotland)	
<i>Streptococcus</i> spp. <i>Streptococcus iniae</i>	Italy, Spain and Israel	Zoonotic: identified as an emerging human pathogen producing fulminant soft tissue infection.
<b>Fish-parasitic</b>		
<b>Cestodes</b>		
<i>Atractolytocestus huronensis</i>	Czech Republic and Hungary	
<b>Crustaceans</b>		
<i>Caligus elongatus</i> and <i>Lepeophtheirus salmonis</i>	Ireland, Norway and UK (Scotland)	
<b>Nematodes</b>		
<i>Anguillicola crassus</i>	Netherlands, Spain and UK	
<b>Myxozoa</b>		
<i>Ceratomyxa sparusaurati</i>	Adriatic	
<i>Henneguya salminicola</i> and <i>Henneguya</i> spp.	Italy and Tunisia	Host species present ( <i>Sparus aurata</i> and <i>?Oncorhynchus mykiss</i> ) but reported from

Disease Agent	EU Distribution	Task Force comment
		Italy and Tunisia in sea bream
<i>Myxobolus</i> sp.	Adriatic	
<b>Protozoa</b>		
<i>Pleistophora</i> spp.	North Sea and Mediterranean	The pathogenicity in fish depends on intensity and species. Some <i>Pleistophora</i> species are potentially opportunistic pathogens of humans, but not knowingly related to fish, although certain <i>Pleistophora</i> -like microsporidians may be acquired from raw or lightly cooked fish or crustaceans.
<i>Spironucleus (Hexamita) salmonis</i>	?Germany	
<b>Monogeneans</b>		
<i>Gyrodactylus salaris</i> (Gyrodactylosis)	Bosnia, Denmark, Finland, France, Germany, Norway, Portugal, Russian Federation, Spain and Sweden, as well as ?Czech Republic, ?Georgia and ?Ukraine	Reports in some countries (e.g. France, Portugal, Spain) are probably erroneous and refer to other <i>Gyrodactylus</i> spp.  Has probably been spread widely within Europe with the movement of live rainbow trout and is therefore likely to be present in more countries than currently known.
<i>Zeuxapta seriolae</i>	Spain (Balearic Islands) and Italy	
<b>Fish-fungal</b>		
None	N/A	
<b>Molluscs-viral</b>		
Gill necrosis virus disease	France, Portugal, Spain and the UK	
Haemocytic infection virus disease	France and Spain	
<i>Herpesviridae</i> (Herpesvirosis – Oyster herpes-like virus disease)	?	
<i>Herpesviridae</i> (Herpes virus infection of larval <i>Crassostrea gigas</i> )	France, ?Spain and UK	

Disease Agent	EU Distribution	Task Force comment
Icosahedral virus-like disease of carpet-shell clams	Spain (Galicia)	
Picornavirus-like virus – Granulomycetosis	Denmark and ?UK	
<b>Molluscs-bacterial</b>		
<i>Candidatus Xenohalictis californiensis</i> (withering syndrome)	Ireland, Spain	Host species currently susceptible not present although European abalone are present. Israel has possibly reported positive after infected imported stocks
Extracellular giant “rickettsiae”	Spain (Atlantic coast)	
Pacific oyster nocardiosis – <i>Nocardia crassostreae</i>	Netherlands	Host species present but poor data
Rickettsiales of scallops – Rickettsia-like and Chlamydia-like organisms	France, Scotland and Sweden	
<i>Vibrio lentus</i>  <i>Vibrio tapetis</i> (Brown Ring Disease)	Spain (Galicia- <i>Octopus vulgaris</i> ; Valencia- <i>Ostrea edulis</i> ) France, ?Ireland, Italy, Portugal, Spain and UK. Restricted to <i>Tapes philippinarum</i>	Many other <i>Vibrio</i> spp. should possibly be considered
<b>Molluscs-parasitic</b>		Generally insufficient data on geographic distribution
<i>Bonamia ostreae</i>	Denmark, France, Ireland, Italy, Kuwait, Netherlands, Spain and UK (excl. Scotland)	
<i>Haplosporidium americanum</i> (European oyster minchiniasis)  <i>Haplosporidium nelsoni</i>  <i>Haplosporidium tapetis</i> (Carpet clam haplosporidiosis)	France and Netherlands France and Netherlands France, Spain and Portugal	
<i>Marteilia</i> spp. (Marteiliosis)  <i>Marteilia christensenii</i>  <i>Marteilia maurini</i>  <i>Marteilia refringens</i>	Unknown distribution but recent report in northern Greece France France, Italy and Spain France, Greece, Italy, Morocco, Netherlands, Portugal, Spain and ?UK	

Disease Agent	EU Distribution	Task Force comment
	(Southern England)	
<i>Microsporidium</i> sp. (Microsporidiosis of queen scallops)	UK	
<i>Mytilicola intestinalis</i>	Denmark, Ireland, Italy and UK	Is it a problem?
<i>Perkinsus olseni/atlanticus</i>	France, Italy, Portugal and Spain	
Scallop protozoan G	?Ireland	
<i>Steinhausia</i> sp. (microsporidian)	France	Not well characterised
<b>Molluscs-fungal</b>		
<i>Ostracoblabe implexa</i> – Shell disease	Ireland and UK	
<b>Crustaceans-viral</b>		
None	N/A	
<b>Crustaceans-bacterial</b>		
<i>Aerococcus viridans</i> (Gaffkaemia)	UK and ?	Infrequently encountered as a human pathogen causing bacteremia, endocarditis and urinary tract infections.
<b>Crustaceans-parasitic</b>		
None	N/A	
<b>Crustaceans-fungal</b>		
None	N/A	
<b>Amphibians-viral</b>		
<i>Iridoviridae</i> -Frog (rana)virus	?UK.	Possible involvement with and transfer between ornamental fish. Mortalities of wild populations of amphibians and possibly fish with no restriction on the amphibians trade

#### 1.4 Disease agents present in the EU but with widespread or unknown distribution

Disease Agent	Comment regarding EU	Task Force comment
<b>Fish-viral</b>		
Aquabirnaviridae Marbled goby aquabirnavirus	Host species not present, although report of possible similar virus from <i>Cyprinus carpio</i> in Asia	Ubiquitous This particular aquabirnavirus is not present in the EU
Eel virus European	Not exotic but unknown distribution	Some host species present: <i>Anguilla anguilla</i> and is the same agent as eel rhabdovirus. See Annex 1.1
Gill lamellar pillar cell necrosis virus	Reported widespread in Europe	
<i>Herpesviridae</i> - Cyprinid herpesvirus	Reported widespread in Europe	
Infectious pancreatic necrosis virus	Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, Turkey, UK and Yugoslavia	
<i>Iridoviridae</i> -Lymphocystis Disease virus (Lymphocystis)	Widespread in Europe	
Pike fry rhabdovirus	Reported widespread in Europe	
Spring viraemia of carp virus	Austria, Belarus, Bosnia, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Italy, Kuwait, Lithuania, Macedonia, Moldavia, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, UK, Ukraine and Yugoslavia	
Viral haemorrhagic septicaemia virus	Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia,	

Disease Agent	Comment regarding EU	Task Force comment
	Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, USSR and UK	
<b>Fish-bacterial</b>		
<i>Aeromonas hydrophila</i>	Widespread, secondary and ubiquitous in Europe	<i>A. hydrophila</i> is of public health concern. Although not usually directly associated with fish, topical zoonotic infections can occur.
<i>Aeromonas salmonicida</i> (furunculosis)	Widespread in Europe	
<i>Epitheliocystis</i> (?Clamydia)	Unknown distribution	
<i>Flavobacterium (Flexibacter) spp.</i> , <i>Flavobacterium psychrophilum</i> , <i>Tenacibaculum maritimum (Flexibacter maritimus)</i>	Widespread in Europe	Concentrate on <i>Flavobacterium psychrophilum</i>
<i>Micrococcus luteum</i>	Unknown	
<i>Mycobacterium spp. (marinum, fortuitum, chelonae).</i>	Unknown distribution but possibly widespread in certain countries of Europe	Certain species zoonotic. Nontuberculous atypical mycobacterial granuloma disease is caused by <i>M. marinum</i> (e.g. from handling marine aquaria fish).
<i>Nocardia spp.</i>	Unknown distribution. Some host species present: Salmonidae and ornamental species	Insufficient data. Nocardia infection caused by some strains can be a rare human disorder.
<i>Photobacterium (Vibrio) damsela</i>	Probably widespread in many different species	Rarely associated with fatal necrotizing fasciitis (e.g. in Japanese and USA fishermen).
<i>Piscirickettsia</i> -like spp.	Unknown distribution but reported in <i>Dicentrarchus</i> sp. in France	
<i>Pseudomonas fluorescens</i>	Unknown distribution but probably ubiquitous	
<i>Renibacterium salmoninarum</i> (bacterial kidney disease)	Denmark, Finland, France, Germany, Iceland, Italy, Norway, Poland, Portugal, Spain, Sweden, ?Turkey, UK and Yugoslavia	

Disease Agent	Comment regarding EU	Task Force comment
<i>Vibrio</i> spp. ( <i>V. anguillarum</i> , <i>V. cholerae</i> , <i>V. ordalii</i> , <i>V. pelagius</i> , <i>V. salmonicida</i> , <i>V. splendidus</i> , <i>V. vulnificus</i> biotype 2)	Denmark, Faeroe Islands, Greece, Iceland, Italy, Norway, Spain and UK.	<i>V. splendidus</i> fish and shellfish ( <i>C. gigas</i> and shrimp). Vibrios are ubiquitous and some isolates are zoonotic. Examples include <i>V. cholerae</i> associated with contaminated food fish and <i>V. vulnificus</i> biotype 1 contracted from eating raw oysters, as well as <i>V. alginolyticus</i> , <i>V. damsela</i> , <i>V. parahaemolyticus</i> , etc. <i>V. vulnificus</i> biotype II is an eel pathogen.
<i>Yersinia ruckeri</i> (Enteric redmouth disease)	Widespread in Europe	
<b>Fish-parasitic</b>		
<b>Cestodes</b>		
<i>Bothriocephalus achellognathi</i>	Unknown distribution	
<i>Caryophyllaeus fimbriceps</i> and <i>C. laticeps</i>	Unknown distribution	
<i>Eubothrium</i> spp.	Unknown distribution	
<i>Khawia sinensis</i>	Unknown distribution	
<i>Triaenophorus</i> spp.	Unknown distribution	
<b>Crustaceans</b>		
<i>Argulus</i> spp.	Unknown distribution but possibly widespread	
<i>Ceratothoa</i> spp., <i>Mothocya</i> spp. and <i>Nerocila</i> spp.	Unknown distribution ( <i>Ceratothoa</i> spp. from <i>Dicentrarchus labrax</i> in Turkey) but probably ubiquitous and non-specific	
<i>Ergasilus sieboldi</i> and <i>Ergasilus</i> spp.	Unknown distribution	
<i>Lernaea elegans</i> , <i>L. cyprinacea</i> and <i>Lernaea</i> spp.	Unknown distribution	
<i>Lernaeocera branchalis</i>	Unknown distribution	
<b>Digeneans</b>		
<i>Clinostomum marginatum</i>	Unknown distribution	
<i>Cryptocotyle lingua</i>	Western Atlantic	

Disease Agent	Comment regarding EU	Task Force comment
Sanguinicolidae ( <i>Sanguinicola</i> spp.)	Unknown distribution but probably Mediterranean regions	
<b>Monogeneans</b>		
<i>Benedenia</i> spp.	Unknown distribution	
<i>Dactylogyrus</i> spp.	Unknown distribution	
<i>Diplectasnum</i> spp.	Unknown distribution	
<i>Gyrodactylus</i> spp.	Unknown distribution	
<i>Sparicotyle chrysophrii</i> and other Microcotylidae	Unknown distribution but probably Mediterranean regions	
<b>Myxozoa</b>		
<i>Ceratomyxa</i> spp.	Unknown distribution	
<i>Hoferellus</i> spp.	Unknown distribution	
<i>Enteromyxum (Myxidium) leei</i>	Unknown distribution but reported from the Mediterranean	
<i>Enteromyxum scopthalmi</i>	Unknown distribution but reported from the Atlantic	
<i>Myxobolus cerebralis</i>	Unknown distribution but possibly widespread	
<i>Sphaerospora</i> spp.	Adriatic, Mediterranean and Israel	
<i>Sphaerospora renicola</i>	Adriatic, Bulgaria, Hungary, Israel and Russia	
<i>Tetracapsuloides bryosalmonae</i> (Proliferative kidney disease)	Many European countries	
<b>Nematodes</b>		
<i>Anisakis</i> spp.	Unknown distribution but probably widespread and ubiquitous	<i>Anisakis simplex</i> causes intestinal anisakiasis in humans from consumption of raw or improperly prepared fish.
<i>Camallanus</i> spp.	Unknown distribution	

Disease Agent	Comment regarding EU	Task Force comment
<i>Capillaria</i> spp.	Unknown distribution	Some fish-borne species can cause intestinal capillariasis in humans following consumption of raw fish.
<i>Philometroides cyprini</i> ( <i>Philometra lusiana</i> )	Unknown distribution but imported in USSR with wild amur carp	
<b>Protozoa</b>		
<i>Acanthamoeba</i> spp.	Unknown distribution	Widely distributed in fish and fresh water and can cause meningoencephalitis or keratoconjunctivitis in humans.
<i>Brooklynella hostilis</i>	Unknown distribution	
<i>Chilodonella</i> spp.	Unknown distribution	
<i>Cryptobia</i> spp.	Unknown distribution	
<i>Cryptocaryon irritans</i>	Unknown distribution	
<i>Dermocystidium</i> spp. <i>Dermocystidium cyprini</i>	Unknown distribution Reported throughout Europe	
<i>Eimeria sardinae</i>	Unknown distribution	
<i>Eimeria</i> spp.	Unknown distribution but probably Mediterranean regions	
<i>Glugea stephani</i> and <i>Glugea</i> spp.	Unknown distribution	
<i>Goussia gadi</i> , <i>G. subepithelialis</i> and <i>Goussia</i> spp. <i>Goussia sparis</i>	Unknown distribution Unknown distribution but probably Mediterranean regions	
<i>Ichthyophonus hoferi</i> and <i>Ichthyophonus</i> sp.	Unknown distribution	
<i>Ichthyophthirius multifiliis</i>	Unknown distribution but probably widespread	
<i>Neoparamoeba</i> spp.	Unknown distribution but probably Atlantic and Mediterranean regions	
<i>Tetrahymena</i> spp.	Unknown distribution	

Disease Agent	Comment regarding EU	Task Force comment
<i>Scyphidia</i> spp.	Unknown distribution	
<i>Trichodina</i> spp.	Unknown distribution	
<i>Tetramicra brevifillum</i>	Unknown distribution	
<i>Trichodinella</i> spp.	Unknown distribution	
<i>Trichophrya</i> spp.	Unknown distribution	
<i>Tripartiella</i> spp.	Unknown distribution	
<i>Trypanoplasma borreli</i>	Reported throughout Europe	
<i>Trypanosoma carasii</i> (= <i>T. danilewskyi</i> )	Reported throughout Europe	
<i>Trypanosoma</i> spp.	Unknown distribution	
<b>Fish-fungal</b>		
<i>Branchiomyces</i> spp. ( <i>sanguinus</i> and <i>demigrans</i> )	Unknown distribution	
<i>Exophiala</i> spp.	Unknown distribution but recorded from the Northern Hemisphere and possibly Europe	
<i>Saprolegnia</i> spp.	Ubiquitous and secondary	
<b>Molluscs-viral</b>		
None	N/A	
<b>Molluscs-bacterial</b>		
Hinge ligament disease – Cytophaga-like bacteria	?Ubiquitous and affects many species	
<b>Molluscs-parasitic</b>		
None	N/A	
<b>Molluscs-fungal</b>		
None	N/A	
<b>Molluscs-miscellaneous</b>		
Annelida – Mud worm disease – <i>Polydora</i> spp., <i>Pegeandia</i> spp. Sabellid worms	Unknown distribution but possibly global, although some species may have limited	

Disease Agent	Comment regarding EU	Task Force comment
<i>Boccardia</i> spp., Sabellid worms	although some species may have limited geographical range or be host species specific	
<b>Crustaceans-viral</b>		
AaBV ( <i>Astacus astacus</i> bacilliform virus)	Finland, Norway <sup>13</sup> , Germany <sup>14</sup> – otherwise unknown distribution and importance in <i>Astacus astacus</i>	
ApBV ( <i>Austropotamobius pallipes</i> bacilliform virus)	France - otherwise unknown distribution and importance in <i>Austropotamobius pallipes</i>	
<i>CpSBV</i> (bunya-like virus)	Unknown distribution and importance in the edible crab <i>Cancer pagurus</i>	
<b>Crustaceans-bacterial</b>		
None	N/A	
<b>Crustaceans-parasitic</b>		
<i>Psorospermium haeckeli</i>	Finland, Germany	
<i>Thelohania contejeani</i>	UK, France, Germany, Russia, Yugoslavia, Finland, Norway, Poland	
<b>Crustaceans-fungal</b>		
<i>Aphanomyces astaci</i> (Crayfish plague)	Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden and UK; as well as neighbouring countries Bulgaria, Norway, Romania, Russia, Switzerland, Turkey and Yugoslavia	
<i>Fusarium</i> spp.		

<sup>13</sup> Pathology observed but virions not visualised under the electron microscope (Hastein, Lightner and Edgerton, unpublished)

<sup>14</sup> Pathology observed and virions visualised under electron microscope, but unclear whether same virus as in Finland (Edgerton and Webb, in preparation)

Disease Agent	Comment regarding EU	Task Force comment
<i>Saprolegnia parasitica</i>		
<b>Amphibians-bacterial</b>		
<i>Streptococcus iniae</i>	Unknown distribution	Associated with <i>Oncorhynchus mykiss</i> and not reported from amphibians

## Main references for data sources

- AFFA. 2002a. Import risk analysis (IRA) of Non-viable Bivalve Molluscs. 65 pp. [http://www.affa.gov.au/corporate\\_docs/publications/pdf/market\\_access/biosecurity/animal/2002/2002-44a.pdf](http://www.affa.gov.au/corporate_docs/publications/pdf/market_access/biosecurity/animal/2002/2002-44a.pdf).
- AFFA. 2002b. Generic import risk analysis (IRA) of non-viable non-salmonid freshwater finfish Technical Issues Paper. 67 pp. [http://www.affa.gov.au/corporate\\_docs/publications/pdf/market\\_access/biosecurity/animal/2002/2002-19a.pdf](http://www.affa.gov.au/corporate_docs/publications/pdf/market_access/biosecurity/animal/2002/2002-19a.pdf).
- Anon. 2006. Council Directive 2006/88/EC of 24 October 2006 on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals. *Official Journal of the European Union*, L328/14, 43 pp.
- AQIS. 1999a. Import Risk Analysis on Non-Viable Salmonids and Non-salmonid Marine Finfish. Australian Quarantine and Inspection Service, Canberra, 409 p.
- AQIS. 1999b. Import Risk Analysis on Live Ornamental Fish. Australian Quarantine and Inspection Service, Canberra, 172 p.
- Aquatic Animal Diseases Significant to Australia. 2004. Identification field guide. Second edition, 2004. Commonwealth of Australia; <http://www.disease-watch.com/documents/CD/index/body.htm>
- Bondad-Reantaso, M.G., McGladdery, S.E., East, I. and Subasinghe, R.P. (eds.). 2001. Asia Diagnostic Guide to Aquatic Animal Diseases. FAO Fisheries Technical Paper No. 402, Supplement 2. Rome, FAO. 240 pp.
- Bulletin of the EAFP. 2002. Volume 22 (1-6).
- Bulletin of the EAFP. 2003. Volume 23 (1-6).
- Bulletin of the EAFP. 2004. Volume 24 (1-6).
- Fisheries and Oceans, Canada: Synopsis of Infectious Diseases and Parasites of Commercially Exploited Shellfish; <http://www.pac.dfo-mpo.gc.ca/sci/shelldis/>
- OIE. 2006. International Aquatic Animal Health Manual of Diagnostic Tests. 5th edn. Office International des Épizooties, Paris. ([http://www.oie.int/eng/normes/fmanual/A\\_summry.htm](http://www.oie.int/eng/normes/fmanual/A_summry.htm)).
- OIE International Database on Aquatic Animal Diseases. (<http://www.collabcen.net/toWeb/aq2.asp>)
- Speare, R. and Berger. L. Global distribution of chytridiomycosis in amphibians. <http://www.jcu.edu.au/school/phtm/PHTM/frogs/chyglob.htm>
- Stone, M.A.B., MacDiarmid, S.C. and Pharo, H.J. 1997. Import health risk analysis: salmonids for human consumption. Ministry of Agriculture Regulatory Authority, New Zealand. 269 pp.