Control of Aquatic Animal Diseases in Japan

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Diagnosis and Training Center for Fish Diseases (n=6)
- Development and dissemination of diagnosis techniques for aquatic animals. OIE reference laboratories for KHV and RSIV.

Research Center for Fish Diseases (n=11)
- Research and development for pathogens, pathology, treatment, prevention and immunology of aquatic animals.
Regulatory authority for the disease control of aquatic animals

Fish and Fishery Products Safety Office
Animal Products Safety Division,
Food Safety and Consumer Affairs Bureau,
Ministry of Agriculture, Forestry and Fisheries (MAFF)

Legal foundations for the control of aquatic animal diseases

- Fisheries Resources Protection Act
  (import quarantine)

- Fish Farming Production Maintaining Act
  (disease control within Japan)
Guideline for Disease Control of Aquatic Animals specifies roles of different sectors:

- Fish farmers
- Prefectural governments (local research labs)
- NRIA
- Quarantine office
- MAFF

- Control of specified diseases
  24 diseases (including 11 OIE listed diseases)
- Control of emerging diseases
- Control of existing diseases
Fish health management

Workflow among relevant sectors

Animal Products Safety Division (MAFF)
- Funding
- Disease reports
- Expert advice

National Research Institute of Aquaculture
- Diagnosis
- Reagents
- Hands on training
- Proficiency tests
- Disease reports

Prefectural governments (fisheries laboratories)
- Diagnosis
- Advice
- Supervising
  - drug usage
  - health management
- Disease reports

Fish farms / Public waters
- Maintaining culture records
- Basic hygiene
Prefectural governments and local fisheries research laboratories in Japan

Forty seven local prefectures.

Each prefectural government has its own fisheries research laboratory.
Fish health personnel (n = 2–4)
Roles of prefectural governments and local fisheries research labs

- To visit fish farms periodically
- To gather information (species and numbers of animals cultured, location, movement of animals etc.) about the fish farmers in the prefecture as much as possible
- To gather information about occurrences of diseases
- To educate fish farmers and supervise hygiene management
- To diagnose diseases
- To report occurrences of specified, or emerging diseases to the MAFF and to ask for confirmatory diagnoses to the NRIA
- To take necessary measures to prevent diseases from spreading
- Observation of imported live animals from foreign countries for a specified period in fish farms.
### Education of fish health in universities

<table>
<thead>
<tr>
<th>Fisheries sciences</th>
<th>Veterinary medicine</th>
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</thead>
</table>
| • Students can learn fish health as a part of the fisheries sciences, but the curriculum is not thorough.  
  • There are laboratories of some specific subjects of fish health, such as virology or bacteriology depending on the expertise of the P. I. |  
  • Students study mostly about terrestrial animals.  
  • Fish health is included in the curriculum but it is not thorough.  
  • Only a limited number of laboratories are dealing with fish health.  
  • Graduates may obtain the veterinary license if they pass the national exam. |
Japan Fisheries Resource Conservation Association provides a comprehensive education course for aquatic animal health.

<table>
<thead>
<tr>
<th>Basic course</th>
<th>hrs.</th>
<th>Hands on training</th>
<th>hrs.</th>
<th>Expert course</th>
<th>hrs.</th>
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<tr>
<td>Fish farming production maintaining act</td>
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<td>Bacteriology</td>
<td>12</td>
<td>Immunology</td>
<td>6</td>
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<tr>
<td>The law on pharmaceuticals and medical devices</td>
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<td>Virology</td>
<td>12</td>
<td>Pathology</td>
<td>6</td>
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<td>Food sanitation Act</td>
<td>2</td>
<td>Mycology</td>
<td>10</td>
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<td>Environment of farming</td>
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<td>Parasitology</td>
<td>10</td>
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<tr>
<td>Aquatic animal diseases in general</td>
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<td>Special lecture I</td>
<td>2</td>
<td>Pharmacology</td>
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<tr>
<td>Phycology</td>
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<td><strong>Total</strong></td>
<td>56</td>
<td><strong>48</strong></td>
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<td><strong>40</strong></td>
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</tbody>
</table>

Examination for “Fish Health Expert”
Ten Local conferences for fish health
The NRIA (Diagnosis and Training Center for Fish Diseases) provides:

- Proficiency tests (KHV, soft tunic syndrome)
- Hands on training on specific subjects
- Diagnostic reagents (positive controls)
- Diagnostic service for “unknown diseases”

to prefectural fisheries research labs.
Diagnostic service for “unknown diseases” for mortalities that cannot be diagnosed in local fisheries research labs

The animals that have been submitted to the NRIA for diagnosis of “unknown” diseases:

Vertebrates (fin fishes)
Tunicates (ascidians)
Crustaceans (shrimps, crabs, krill)
Mollusks (abalones, oysters, clams, squid)
Echinodermata (sea urchin, sea cucumber, starfish)
Polychetes
Thank you for your attention
Specified diseases by the Japanese government

For fin fishes

1. Viral haemorrhagic septicaemia (except for IVa, OIE listed)
2. Koi herpesvirus disease (OIE listed)
3. Spring viraemia of carp (OIE listed)
4. Piscirickettsiosis
5. Enteric redmouth disease
6. Epizootic haematopoietic necrosis (OIE listed)
7. Salmonid alphavirus disease (OIE listed)
8. Glugeosis of red sea bream
9. Whirling disease
Specified diseases by the Japanese government

For crustaceans

1. Yellowhead disease (OIE listed)
2. Monodon baculovirus disease
3. Tetrahedral baculovirosis
4. Taura syndrome (OIE listed)
5. Infectious hypodermal haematopoietic necrosis
6. Infectious myonecrosis (OIE listed)
7. Infection with gill associated virus
8. Acute hepatopancreatic necrosis disease (OIE listed)
9. Necrotising hepatopancreatitis (OIE listed)
10. Covert mortality syndrome
Specified diseases by the Japanese government

For molluscs and other invertebrates

1. Infection with abalone herpes virus (OIE listed)
2. Pustule disease of abalone
3. Infection with ostreid herpesvirus I (μVar only)
4. Infection with *Perkinsus qugwadi* in scallop
5. Soft tunic syndrome of tunicate
Health Agreements with Exporting Countries

1. Definition of terms

2. Health requirements for aquatic animals including;
   - Health management system of the exporting country
   - Presence of the diseases
   - Methods of inspection (observation, sampling, tests, etc.)

3. Handling of animals during shipment

4. Inspection certificate
   (stating factors 1. and 2. and other general information)
Importer

Quarantine Offices (at major sea or airports)

Document review

Import permission

Inspection of the animal

Disease suspected

Import permission denied

Quarantine facility

Detailed tests

Disease confirmed

Animals are destroyed

Fish farms

Consuming public

Observation for 6 months

Import quarantine for aquatic animals in Japan
Difficulties in import quarantine of aquatic animals

1. Different animals are cultured in different countries.
2. Harmless parasitic organisms for original hosts sometimes cause devastating damage in related but different species in different countries.
3. It is impossible to quarantine animals for unknown diseases.
4. Import quarantine is allowed only when the pathogen is scientifically confirmed and diagnosis is established (in scientific papers).
Acquiring new hosts and emergence of disease

Co-evolution of host and parasite

Disease in related species

Home

Different country/region
These pathogens had not been noticed as problems in their (presumed) home countries

- **Xenohaliotothis californiensis** *(Withering syndrome)*
  Devastated some abalone species in the U. S. ← No harm to Japanese abalones

- **Neoheterobothrium hirame**
  A benign parasite of the Southern flounder (Atlantic ocean) → Decimated a population of the related species in Japanese waters.

- **Myxobolus cerebralis** *(Whirling disease)*
  Weakly pathogenic to brown trout in Europe → Heavy damage to rainbow and cutthroat trout in the mid-western U. S.

- **Perkinsus qugwadi**
  Natural host unknown → Caused severe disease problems in imported scallop in Canada