

**REPORT OF THE MEETING
OF THE OIE FISH DISEASES COMMISSION**

Paris 24–28 June 2002

The OIE Fish Diseases Commission (FDC) met at the OIE headquarters from 24 to 28 June 2002. The meeting was chaired by Prof. Tore Håstein, President of the FDC, and Prof. Barry J. Hill, Secretary General, acted as Rapporteur. The Agenda and the List of Participants are given as Appendices I and II, respectively.

Dr James Pearson, Head of the OIE Scientific and Technical Department, welcomed the participants on behalf of Dr Bernard Vallat, Director General. He informed the Commission that he would be retiring shortly, and he introduced his successor, Dr Alejandro Schudel. Dr Pearson reviewed developments at the Central Bureau, including other staff changes and the adoption of the new OIE logo. He drew attention to the Resolution adopted during the General Session on the animal welfare mandate of the OIE; this Resolution will affect the work of the FDC. He further informed the meeting that, before the next General Session, the Central Bureau will prepare a document on the various roles of the different OIE specialist Commissions. The individual Commissions are each to provide a description of the background and skills required of their Members and a workplan for 2002 and 2003, which will give details of the Commissions' main objectives and targets.

1. Member Country comments on the report of the previous FDC meeting (January 2002)

The FDC received comments from the EU¹ and seven other OIE Member Countries on the report of its meeting in January 2002. Comments on the report that refer to topics on this (the June 2002) meeting's agenda are covered in this report under the relevant agenda items.

One Member Country queried whether comments from Member Countries on FDC reports could be made available to all Member Countries. The FDC was advised by the Central Bureau that such dissemination is not standard practice. Using the current procedure, the FDC will receive more candid comments, whereas full circulation may constrain the comments given.

One Member Country had commented that harmonisation of the *International Aquatic Animal Health Code* (AAHC) and *International Animal Health Code* (AHC) appeared to lack tangible progress. The FDC is of the opinion that harmonisation of several topics has already been achieved and that progress has, therefore, been made. For example, Prof. Håstein has adapted the chapter on Obligations and Ethics in the AHC (see Appendix III on which Member Countries are invited to send comments by **15 November 2002**). Furthermore, the FDC will proceed with developing the listing and notification processes jointly with the Code Commission (see item 4.1.).

1 European Union

One Member Country commented that the AHC chapter on Evaluation of Veterinary Services had not been considered by the FDC. It should be emphasised that the AAHC has a similar chapter entitled Evaluation of Competent Authorities (chapter 1.4.3.). Prof. Håstein will, however, compare the two chapters and amend the AAHC chapter if necessary.

2. *International Aquatic Animal Health Code*

2.1. Amendments to the *International Aquatic Animal Health Code*

2.1.1. Chapter 1.1.1. Definitions

Newly adopted definitions for the AHC were discussed. The FDC decided to include the new definition of infection in the AAHC. The Commission also added new definitions of quarantine, vertical transmission and emerging diseases (see [Appendix IV](#) on which Member Countries are invited to send comments by **15 November 2002**).

2.1.2. Chapter 1.7.1. Fallowing of sites (proposed new definition and chapter)

The proposed draft definition and chapter on fallowing are presented at [Appendix V](#) for Member Country comment by **15 November 2002**.

2.1.3. Chapter 1.5.6. Proposed amendments to the chapter on measures concerning international transfer of aquatic animal pathogens and pathological material

Prof. Hill presented the expanded chapter 1.5.6. (see [Appendix VI](#)) on measures concerning international transfer of aquatic animal pathogens and pathological material, which had been prepared with Dr Ellen Ariel from the EU Reference Laboratory for Fish Diseases as agreed at the FDC meeting of January 2002. The main changes are the addition of more detailed guidelines on the packaging and postal requirements to meet international regulations. Comments are sought from Member Countries and all OIE Reference Laboratories for aquatic animal diseases by **15 November 2002**. The new chapter, if adopted, will be published in the next edition of the AAHC.

2.1.4. Section 5.2. Destruction of pathogens

Draft amendments to the Appendices on hygienic precautions, disinfection of eggs and disinfection of fish farms had been prepared by Prof. Håstein. The Appendices are presented at [Appendix VII](#) for Member Country comment by **15 November 2002**. Amendments to the Appendices on disinfection of mollusc farms and crustacean farms will be prepared by Dr Franck Berthe and Dr Donald Lightner, respectively, for the next meeting.

2.1.5. Procedures for destruction of carcasses due to an outbreak of a fish disease?

Following comments received from OIE Delegates during the OIE General Session in May 2002 on the development of procedures for destruction of carcasses, the FDC decided to prepare a general chapter on the subject rather than including information in each disease chapter. Prof. Håstein will review EU and Australian documents on this subject and prepare a draft to be circulated among the FDC Members before the next meeting.

2.1.6. Changes to specific disease chapters (fish, molluscs or crustaceans)

In line with the decision taken at the FDC meeting in January 2002 to remove reference to the health status of the importing country in the guidelines for health assurances when importing aquatic animals and their products, the FDC agreed to delete Article X.1.X.7. from each chapter on the notifiable diseases (see [Appendix VIII](#) on which Member Countries are invited to send comments by **15 November 2002**).

2.1.7. Addition/removal of diseases to/from the Lists

Any decisions on alterations to the disease lists are deferred until the new listing criteria are adopted by the International Committee (see item 4.1.).

2.1.8. Infectious salmon anaemia (ISA) – comments on possible transmission by eggs

Member Countries had asked the FDC to give an expert opinion on the likelihood of vertical transmission of ISA virus by eggs.

Based on the scarce literature as well as the balance of experiences from Canada, Scotland and Norway, the FDC is of the opinion that there is no evidence of vertical transmission of ISA virus by eggs. A comprehensive report on the issue is currently being prepared by one Member Country. Furthermore, an international study is now being funded by the EC² to assess the disease risk posed by international trade in eggs and gametes.

2.1.9. Viral haemorrhagic septicaemia (VHS) – marine versus freshwater VHS strains

At the OIE General Session in May 2002, two Member Countries had requested that the FDC study the variation between the marine and freshwater strains of VHS virus. The Commission is of the opinion that there is not yet sufficient scientific clarity about the relationship between strains of the virus, but will monitor scientific developments on this issue.

2.1.10. Mollusc diseases, new categories – risk based approach

Discrepancies between the AAHC and *Diagnostic Manual for Aquatic Animal Diseases* (the *Manual*) relating to the list of susceptible species are often brought to the attention of the FDC by Member Countries, leading it to consider the question of categorisation of host species. The recognition of the existence of species capable of hosting pathogens without apparent disease suggests the need to differentiate these species as carriers, potential vectors, etc. Details of the reasoning are given at [Appendix IX](#).

The FDC concluded that the current definition of susceptible species in Article 1.1.1.1. covers different situations in terms of clinical signs and pathology. Modifications are proposed to Articles 3.1.X.1., 3.1.X.6., 3.1.X.8. and 3.1.X.9. of the mollusc chapters (see [Appendix X](#), which also includes the changes to disease names as explained in item 2.1.11. below and detailed in [Appendix XI](#)). Member Country comments are invited by **15 November 2002**

2.1.11. Marteilirosis – change to QX disease and Aber disease

After transferring *Haplosporidium costale* to the list of other significant diseases and in order to resolve the ambiguity of using the term ‘haplosporidiosis’ for two different diseases in the AAHC and *Manual*, the International Committee adopted the FDC proposal to use historical denominations of these diseases: ‘MSX disease’ instead of haplosporidiosis caused by *Haplosporidium nelsoni*, and ‘SSO disease’ instead of haplosporidiosis caused by *H. costale*.

Similarly, comments were received from Member Countries that the inclusion of *Mikrocytos roughleyi* in the chapter on bonamiosis may cause confusion. Moreover, it is scientifically justified to have a separate chapter for *Mikrocytos roughleyi* and to name this disease Winter mortality.

The FDC decided to apply this approach to all mollusc diseases listed by the OIE. These modifications are given at [Appendix XI](#). Member Countries are invited to comment by **15 November 2002**.

2.1.12. Yellowhead disease chapter

Following the adoption by the International Committee in May 2002 of the proposal to include GAV in the yellowhead disease chapter, the revised version of the chapter is presented at [Appendix XII](#).

3. *Diagnostic Manual for Aquatic Animal diseases*

3.1. Schedule for the preparation of the fourth edition of the *Manual*

The preparation for the fourth edition of the *Manual* is on schedule.

3.1.1. Reviewer/Member Country comments on mailing 1

The FDC considered the Reviewer/Member Countries comments on the first batch of chapters for the *Manual* and made some amendments as appropriate.

3.2. Amendments to the *Diagnostic Manual for Aquatic Animal Diseases*

3.2.1. Sampling schedules and numbers – Fish (General Information chapter)

As agreed at the January 2002 meeting, Drs Hill and Bernoth had prepared a draft revisions to Section B: Requirements to Declare a Country/Zone Free From Infection, and Section C: Sampling Procedures of chapter I.1. General Information. An expert in animal disease epidemiology had provided valuable comments on the draft revised chapter.

The FDC discussed both the draft revisions and the comments and agreed that the matter was of such a highly technical nature that it should be referred to the Ad hoc Group on Risk Analysis for their consideration (see agenda item 7.5). The Ad hoc Group will be requested to provide a new draft chapter for inclusion in the fourth edition of the *Manual*.

3.2.2. Sampling schedules and numbers – Molluscs and Crustaceans (General Information chapter)

Chapters I.2. and I.3. (General Information on diseases of molluscs and diseases of crustaceans, respectively, together with the draft prepared for fish (see item 3.2.1. above) should be incorporated by the Ad hoc Group into one general chapter. Details on diagnostic methods will still be covered separately for fish, molluscs and crustaceans, respectively.

3.2.3. Guidelines for a basic health monitoring programme

The Commission considered a request to develop a set of guidelines for a basic health monitoring programme for aquatic animals and concluded that this is not within the purview of the FDC.

4. Joint meeting with the International Animal Health Code Commission

The FDC was joined by Dr Alejandro Thiermann (representing the Code Commission) and Dr Hiroyuki Kamakawa, chargé de mission at the OIE Central Bureau.

4.1. Disease notification

The meeting carefully compared the provisional disease listing criteria developed by the FDC following a questionnaire sent to Member Countries in mid-2001, criteria for terrestrial animal diseases proposed to the Code Commission, and a set of criteria developed for identifying fish diseases to be covered by EU legislation. A set of criteria suitable for listing aquatic animal diseases into a single list was agreed. Rather than deciding which of those diseases would require immediate notification, it was agreed that the decision on whether immediate notification is required should be determined by assessing whether a set of circumstances is fulfilled, and that this should apply to all listed diseases. Thus, there will be no further categorisation of listed diseases. It was also decided that new and emerging diseases require immediate notification and a pertinent definition was drafted (see

item 2.1.1. above). The 'proposed criteria for listing an aquatic animal disease by the OIE' and the 'proposed criteria for urgent notification of aquatic animal diseases' are attached at [Appendix XIII](#). Comments are sought from OIE Member Countries by **15 November 2002** in time for consideration at the next FDC meeting in January 2003. The finalised set of criteria and definition will be presented to the OIE International Committee for adoption in May 2003.

The new criteria, once adopted, will be used to assess additional diseases for listing. Diseases currently in the fifth edition of the AAHC will remain listed, but as one list, with the distinction of 'notifiable to the OIE' and 'other significant' to be abolished. Pertinent changes to the AAHC and *Manual* will be drafted and submitted to the OIE International Committee for adoption in May 2003. A re-assessment of the diseases currently listed will be undertaken by the FDC in due course.

4.2. Development of mechanisms for OIE official recognition of 'free country' or 'free zone'

Dr Thiermann briefly presented the current thinking of the Code Commission on this issue, which is that more flexibility should be applied to determine a country's or zone's status, taking into account, for example, the quality and extent of passive surveillance rather than attempting to design a 'one-size fit-all' approach, with rigorous sampling and listing requirements. The two Commissions will continue to cooperate on these issues.

5. The role and activities of the OIE in the field of aquatic animals

5.1. Publications

The FDC recommended that Dr Andrew Cunningham (see item 7.4.) be asked to prepare a review chapter on those diseases of amphibians that are of current concern to, or a consequence of, international trade in amphibians. This chapter may be prepared for publication in the OIE *Scientific and Technical Review*.

6. OIE Reference Laboratories – role and functions

6.1. Guidelines for applicants for Reference Laboratory status

The FDC prepared guidelines for applications for OIE Reference Laboratory status (see [Appendix XIV](#)).

6.2. New applications for Reference Laboratory status/Reference Expert changes

The OIE has been notified of the following change to named experts at OIE Reference Laboratories. The Commission recommends their acceptance:

Piscirickettsiosis (*Piscirickettsia salmonis*)

Dr M. Kent to replace Prof. J. Fryer at Oregon State University, United States of America.

7. Any other business

7.1. Cooperation and partnership with other international and regional organisations

The FDC discussed several forthcoming events where it will be represented. Principal among these is the 'FAO/DFO³ Canada/OIE Expert Consultation on Surveillance and Zonation for Responsible Movement of Live Aquatic Animals: A Framework for Reducing the Risk of Transboundary Spread of Aquatic Animal Diseases', which is to be held in Rome, Italy, from 14 to 18 October 2002. Prof. Hill is representing the OIE in the organisation of this activity and he is serving as a member of the Technical Secretariat in planning the meeting and the relevant documents that are produced as a result of the Consultation.

3 Department of Fisheries and Oceans

The FDC discussed ways to improve the reporting of aquatic animal diseases by Member Countries. While there have been improvements in this area, the FDC continues to seek opportunities to improve the awareness of the Competent Authorities (the Chief Veterinary Officer and other authorities) in Member Countries of the need to ensure the prompt reporting of aquatic animal disease events in their countries to the OIE Central Bureau. The Commission notes that the upcoming meeting of the OIE Regional Commission for Asia, the Far East and Oceania will provide a forum at which the FDC may increase the awareness of the Delegates of the countries in attendance of the AHCC and *Manual* by making a presentation on the topic.

7.2. Status of FDC Internet activities – FDC Web page

The FDC agreed further developments to the FDC Web page, including the addition of the aquatic animal disease cards, which will be available in the three official OIE languages, updating the lists of diseases as approved at the General Session in May 2002, updating the list of Reference Laboratories and improving various links.

7.3. Collaborating Centre – status of new version of disease database

Prof. Hill gave an update on the latest developments with the database, which will soon include a mapping facility to display the geographical distribution of OIE aquatic animal diseases.

7.4. Amphibian disease issues

Dr Cunningham was invited as an expert in wildlife epidemiology, to provide updated information on the diseases believed to be responsible for declines in amphibian populations. An account of his presentation is given at [Appendix XV](#). In recent years, the world of amphibian disease has rapidly changed; there is currently a pandemic of chytridiomycosis with devastating effects on amphibian populations world-wide and multiple, recurring epidemics of ranaviral disease on a global scale. Both of these new diseases pose definite threats to amphibians and ecosystems. There is some evidence to show that amphibian ranavirus diseases may also threaten the health of wild and captive fish stocks, but much more work needs to be done in this respect. In both the scientific and popular press, international trade is repeatedly cited as one of the likeliest causes underlying the recent emergence and spread of these novel amphibian diseases. Similarly, the lack of readily available information on amphibian trade makes it very difficult to evaluate the likelihood that trade could be implicated in amphibian disease transmission, or the possible sources of disease introduction. Again, more studies are required to elucidate possible mechanisms and likely sources of transmission. Strong relationships, however, have been established by molecular studies between ranavirus isolates from both North America and the United Kingdom, supporting the view that European isolates were introduced with amphibian shipments. Clearly, a lack of regulation on either amphibian trade or on the introduction or control of amphibian diseases leaves an open door for pathogens to enter new and naïve host populations and to threaten aquaculture and ecosystems.

To enable it to address the issue, the FDC has produced a questionnaire which will be sent to Member Countries, in order to get more information on amphibian trade and amphibian health in different parts of the world.

7.5. Ad hoc Group on Risk Analysis

The FDC has recommended to the Director General several experts as possible members of an Ad hoc Group on Risk Analysis. The Group will be asked to advise the FDC on means to implement the recommendations of the OIE International Conference on Risk Analysis in Aquatic Animal Health, February 2000. They will also be asked to advise on surveillance and sampling procedures (see item 3.2.1).

7.6. Report of the meeting of the Presidents of the OIE Specialist Commissions

Dr Pearson referred to the minutes of the meeting of the Presidents of the Specialist Commissions, which took place during the General Session. Special emphasis was made on the role of the Commissions and the skills of Members, and the Commissions were asked to prepare a workplan for

the FDC for 2002 and 2003. The Commission discussed the proposed terms of reference for the FDC and suggested changes. A workplan for 2002 and 2003 was also prepared (Appendix XVI)

7.7. Animal Welfare Mandate of the OIE (Resolution No. XIV)

The FDC was of the opinion that animal welfare issues are of importance and will nominate an aquatic animal expert as a Member for the Working Group on Animal Welfare

7.8. Date of next meeting

The proposed date for the next FDC meeting: 6–14 January 2003.

.../Appendices

MEETING OF THE OIE FISH DISEASES COMMISSION

Paris, 24–28 June 2002

Agenda

1. **Member Country comments on the report of the previous FDC meeting (January 2002)**
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 3. ***Diagnostic Manual for Aquatic Animal diseases***
 - 3.1. Schedule for the preparation of the fourth edition of the *Manual*
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 - 4.1. Disease notification
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 - 7.6. Report of the meeting of the Presidents of the OIE Specialist Commissions
 - 7.7. Animal Welfare Mandate of the OIE (Resolution No. XIV)
 - 7.8. Date of next meeting: 6–14 January 2003
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Paris, 24–28 June 2002

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SECTION 1.3.

[VETERINARY] OBLIGATIONS AND ETHICS
 [AND CERTIFICATION FOR]
IN INTERNATIONAL TRADE

CHAPTER 1.3.1

GENERAL [REQUIREMENTS] OBLIGATIONS

Article 1.3.1.1.

International trade in aquatic animals and aquatic animal products depends on a combination of health factors that should be taken into account to ensure unimpeded trade, without incurring unacceptable risks to human and aquatic animal health.

Because of the likely variations in [sanitary] aquatic animal health situations, various options are offered by the *Code* [to importing countries and only by considering]. The [sanitary] aquatic animal health situation in the *exporting* [and] country, in the transit country or countries [can the importing country precisely state the requirements that are to be met for imports] and in the importing country should be considered before determining the requirements that have to be met for trade. To maximise harmonisation of the sanitary aspects of international trade, Competent Authorities of Member Countries should base their import requirements on the OIE standards, guidelines and recommendations.

These requirements [are mentioned] should be included in the model international aquatic animal health certificates approved by the OIE, which form Part 6 of this *Code*.

Certification requirements should be exact and concise, and should clearly convey the wishes of the *importing country*. For this purpose, prior consultation between *Competent Authorities* of *importing* and *exporting countries* is useful and may be necessary. [This makes it possible to set] It enables the setting out of the exact requirements so that the signing veterinarian or other *certifying official* can, if necessary, be given a note of guidance explaining the understanding between the *Competent Authorities* involved.

When Members of [the] a Competent Authority [of a country] wish to visit another country for matters of professional interest to the *Competent Authority* of the other country, the latter should be informed.

Article 1.3.1.2.**Responsibilities of the importing country**

- The import requirements included in the international aquatic animal health certificate should assure that commodities introduced into the importing country comply with the national level of protection that it

has chosen for aquatic animal health. Importing countries should restrict their requirements to those justified for such level of protection.

2. The international aquatic animal health certificate should not include requirements for the exclusion of pathogens or aquatic animal diseases that are present within the territory of the importing country and are not subject to any official control programme. The requirements applying to pathogens or diseases subject to official control programmes in a country or zone should not provide a higher level of protection on imports than that provided for the same pathogens or diseases by the measures applied within that country or zone.
3. [If the Competent Authority transmits] The transmission by the Competent Authority or Veterinary Administration of certificates or [communicates] the communication of import [permit] requirements to persons other than the Competent Authority or Veterinary Administration of another country[, then] necessitates that copies of these documents [must] be also sent to the Competent Authority or Veterinary Administration [of that country].

This [essential requirement] important procedure avoids delays and difficulties that may arise between traders and Competent Authorities/Veterinary Administrations when the authenticity of the certificates or permits is not established.

This information is usually the responsibility of Veterinary Administrations or other Competent Authorities [i.e. those having authority at a national level]. However, it can be the responsibility of [a local competent body directly responsible for the application of aquatic animal health measures] Veterinary Authorities or other Competent Authorities at the place of origin of the *aquatic animals* when it is agreed that the issue of certificates does not require the approval of the Veterinary Administration or other Competent Authorities.

Article 1.3.1.3.

Responsibilities of the exporting country

1. An *exporting country* should be prepared to supply the following information to *importing countries* on request:
 - a) information on the aquatic animal health [status] situation and national aquatic animal health information systems to determine whether that country is free or has *zones* that are free from *diseases notifiable to the OIE or other significant diseases*, including the regulations and procedures in force to maintain its free status;
 - b) regular and prompt information on the occurrence of transmissible *diseases*;
 - c) details of the country's ability to apply measures to control and prevent *diseases notifiable to the OIE* and, where appropriate, *other significant diseases*;
 - d) information on the structure of the *Competent Authority* and the authority that they exercise;
 - e) technical information, particularly on biological tests and vaccines applied in all or part of the national *territory*.
 - f) details of the country or location of harvest or production of the product being exported.
2. *Competent Authorities* of *exporting countries* should:
 - a) have official procedures for the authorisation of *certifying officials*, defining their functions and duties as well as conditions covering possible suspension and termination of their appointment;

- b) ensure that the relevant instructions and training are provided to *certifying officials*;
- c) monitor the activities of the *certifying officials* to verify their integrity and impartiality.

The Head of the *Competent Authority* of the *exporting country* is ultimately accountable for the *certifying official* used in *international trade*.

Article 1.3.1.4.

Responsibilities in case of an incident occurring after importation

[Additional responsibilities of exporting and importing countries]

International trade involves a continuing ethical responsibility. Therefore, if within the [normal] recognised infective periods of the various *diseases* subsequent to an export taking place, the *Competent Authority* becomes aware of the appearance or reappearance of a *disease* [in an aquatic animal population] that has been specifically included in the *international aquatic animal health certificate*, [or in bilateral agreements,] there is an obligation for the *Authority* to notify [this fact to] the *importing country*, so that the imported *aquatic animals* may be inspected or tested and appropriate action be taken to limit the spread of the *disease* should it have been inadvertently introduced.

Equally, if a disease condition appears in imported [stocks of] *aquatic animals* within a time period after importation consistent with the recognised incubation period of the disease, the *Competent Authority* of the *exporting country* should be informed so as to enable an investigation to be made, because this may be the first available information on the occurrence of the *disease* in a previously free aquatic animal population. The *Competent Authority* of the *importing country* [is entitled to] should be informed of the result of the investigation because the source of infection may not be in the *exporting country*.

[] deleted

CHAPTER 1.3.2.

[PRINCIPLES OF] CERTIFICATION PROCEDURES

Article 1.3.2.1.

Protection of the professional integrity of the certifying veterinarian or other certifying officials

Certification should be based on the highest possible ethical standards, the most important of which is that the professional integrity of the *certifying official* or other certifying veterinarian must be respected and safeguarded.

It is essential not to include in the requirements additional specific matters that cannot be accurately and honestly signed by a *certifying official* or other veterinarian. For example, these requirements should not include certification of an area as being free from [non-notifiable] *diseases* that are not notifiable in that country, the occurrence of which the signing *certifying official* or other veterinarian is not necessarily informed about. Equally, to [require] ask for certification for events that will take place after the document is signed is unacceptable when these events are not under the direct control and supervision of the signing certifying official or other veterinarian.

Certification of freedom from *diseases* based on purely clinical freedom and aquatic animal population history [may be] is of limited value. This is also true of *diseases* for which there is no specific diagnostic test, or the value of the test as a diagnostic aid is limited.

The purpose of the note of guidance referred to in [paragraph 2 above] Article 1.3.1.1. is not only to inform the signing *certifying official* or other veterinarian but also to safeguard [his/her] professional integrity.

Article 1.3.2.2.

Procedures for the preparation of international aquatic animal health certificates

[Certification procedures]

Certificates should be drawn up in accordance with the following principles:

1. Paper certificates should be pre-printed, if possible on one sheet of paper, serially numbered, and issued by the *Competent Authority* on officially headed notepaper and, if possible, printed using techniques that prevent forgery. Electronic certification procedures should include equivalent safeguards.
2. They should be written in terms that are as simple, unambiguous and easy to understand as possible, without losing their legal meaning.
3. If so required, they should be written in the language of the *importing country*. In such circumstances, they should also be written in a language understood by the *certifying official*.
4. They should require appropriate identification of [shipments of] *aquatic animals* and *aquatic animal products* except where this is impractical (e.g. *eyed eggs*).
5. They should not require a *certifying official* to certify matters that are outside his/her knowledge or that he/she cannot ascertain and verify.

6. Where appropriate, they should be accompanied, when presented to the *certifying official*, by notes of guidance indicating the extent of enquiries, tests or examinations expected to be carried out before the certificate is signed.
7. Their text should not be amended except by deletions that must be signed and stamped by the *certifying official*. The signature and stamp must be in a colour different to that of the printing of the certificate.
8. Only original certificates are acceptable.

Article 1.3.2.3.

Certifying officials

Certifying officials should:

1. be authorised by the *Competent Authority* of the *exporting country* to sign *international aquatic animal health certificates*;
2. [sign certificates only at the appropriate time; in particular, they should not sign blank or incomplete certificates, or certificates relating to *aquatic animals* or *aquatic animal products* that they have not inspected or that have passed out of their control] only certify matters that are within their own knowledge at the time of signing the certificate, or that have been separately attested by another competent party;
3. sign only at the appropriate time [ensure before signing that] certificates that have been completed fully and correctly; where a certificate is signed on the basis of [another support certificate or attestation] supporting documentation, the *certifying official* should be in possession of that documentation before signing;
4. have no [financial] conflict of interest in the commercial aspects of the aquatic animals or aquatic animal products being certified and [not be in the direct employment of the owner of the *aquatic animals* or *aquatic animal products*] be independent from the commercial parties.

Article 1.3.2.4.

Electronic certification

1. [International aquatic animal health certificates] Certification may be provided by electronic documentation sent directly from the *Competent Authority* of the *exporting country* to the *Competent Authority* of the *importing country*. Normally such systems also provide an interface with the commercial organisation marketing the *commodity* for provision of information to the certifying authority. The *certifying official* must have access to all information such as laboratory results and aquatic animal identification data.
2. Electronic certificates should carry the same information as conventional certificates.
3. [Electronic certificates must be secure] The Competent Authority must have in place systems for the security of electronic certificates against access by unauthorised persons or organisations.
4. The *certifying official* must be officially responsible for the [security] secure use of his/her electronic signature. This may be by a personal identification number or a similar secure mechanism.

[Article 1.3.2.4.

Harmonisation of methods

In as much as the OIE has approved or agreed standards concerning:

- a) tests for the diagnosis of *diseases of aquatic animals*;
- b) the preparation, production and control of *biological products* for use in the *diagnosis* or prevention of *diseases*;
- c) *disinfection*;
- d) treatments intended to destroy viruses, bacteria or spores in *aquatic animal products* coming from countries considered to be infected with certain *diseases*;

these standards (included in the *Manual* or in this *Code* as Appendices) should be adopted by *Competent Authorities* with respect to *international trade in aquatic animals and aquatic animal products*.]

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CHAPTER 1.1.1.

GENERAL DEFINITIONS

Article 1.1.1.1.

For the purposes of this *Code*:

...

Emerging disease

means a newly recognised significant *disease*, the cause of which may or may not yet be established, that has the potential to be spread by trade in *aquatic animals* and/or *aquatic animal products*.

Infection

means the presence of the infectious agent in the host.

Quarantine

means maintaining a group of *aquatic animals* in isolation with no direct or indirect contact with other *aquatic animals*, in order to undergo observation for a specified length of time and, if appropriate, testing and treatment.

Vertical transmission

means the transovarian transmission of a pathogen from a parent *aquatic animal* to its progeny.

...

SECTION 1.1.

GENERAL DEFINITIONS

CHAPTER 1.1.1.

DEFINITIONS

Article 1.1.1.1.

For the purpose of this *Code*:

...

Fallowing

means for disease management purposes, an operation where an *aquaculture establishment* is emptied of *aquatic animals* susceptible to a *disease of concern*. For these *aquatic animals* likely to be capable of acting as carriers of a *disease of concern*, decisions on *fallowing* should be based on a *risk assessment*.

[means a period during which aquatic animal premises are left empty (for *disease agents* or parasites to die or be killed by *disinfection*)]

...

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CHAPTER X.X.X.

GUIDELINES FOR FALLOWING IN AQUACULTURE

Article X.X.X.1.

Introduction

Gaps in aquaculture production at the same location are commonly recognised to be value in resting or restoring the local environment. As part of this strategy, fallowing can break re-infection cycles by removing loci of a disease from a farm. Consequently, fallowing is often carried out as a regular disease management measure in aquaculture, especially prior to the introduction of new populations of aquatic animals into a previously used site. In order to promote improved health in aquaculture, the Competent Authority responsible for aquatic animal health in a country may encourage the use of fallowing as a routine management strategy for many diseases. Account should be taken of the likely beneficial effects of fallowing in proportion to the economic costs involved. The Competent Authority should also consider such factors as the level of risk to the local and national aquaculture operations, previous knowledge of the severity of a disease(s), the infective period and distribution of the disease agent(s), the socioeconomic conditions, and benefits pertaining to the general aquatic resources.

However, where an official stamping-out policy is being carried out for a disease of concern, the Competent Authority should require that an infected aquaculture establishment, and all other aquaculture establishments in an officially established infected zone, be subjected to a required period of fallowing.

Article X.X.X.2.

Legal powers

In cases where fallowing may be a compulsory measure, for instance in the establishment or restoration of a disease free zone, countries should establish a legal framework for the implementation of fallowing procedures in aquaculture establishments. Legal provisions could include:

- a) Defining the disease circumstances when fallowing is required.
- b) Defining mechanisms based on risk assessment where individual disease-specific measures may be determined, including disinfection and the length of the fallowing period prior to the re-introduction of susceptible species.
- c) Following permission by the Competent Authority to restock with susceptible species, defining a period of surveillance and diagnosis to verify freedom from the specified disease.

Article X.X.X.3.

Technical parameters for the implementation of a statutory fallowing plan

Fallowing of a farm should start immediately after:

- a) removal of all susceptible species of aquatic animals for the disease of concern and
- b) removal of all species capable of acting as carriers of the disease of concern and

- c) equipment and other materials capable of harbouring infection have either been removed or subjected to *disinfection* to standards approved by the *Competent Authority*.

The length of the statutory *fallowing* period should be based on scientific evidence of the likelihood of a *disease agent* remaining infective outside its aquaculture host(s) in the local environment, at a level likely to cause an unacceptable risk of re-infection of the *aquaculture establishment*. Account should be taken of the extent of the *disease outbreak*, local availability of alternative hosts, the survival and infectivity characteristics of the *disease agent* and the local climatological, geographical and hydrographical factors. In addition, the level of risk to the local aquaculture industry and wider aquatic resources may be included. A *risk assessment* approach should be used to determine the length of the *fallowing* period, using qualitative methods when available data are limited, and quantitative analysis to obtain deeper insight when possible.

Article X.X.X.4.

Instructions

Countries establishing *fallowing* procedures should develop a detailed set of instructions for *disinfection* of *aquaculture establishments* prior to *fallowing*. For this purpose, the instructions set out in Section 5.2, Appendices 5.2.2., 5.2.3. and 5.2.4. in this *Code* should be used as guidelines, taking into account current scientific knowledge on the efficacy of the treatments for the *disease agent* of concern.

Article X.X.X.5.

Restocking

All *aquaculture establishments* that have been under compulsory *fallowing* should not be restocked until the *fallowing* period has been completed and permission from the *Competent Authority* has been received. When restocking, care should be taken not to use stocks of *aquatic animals* that would compromise the objectives of the *fallowing* procedure.

To increase confidence in the effectiveness of the *fallowing* procedures, all farms subjected to compulsory *fallowing* should have a period of high level official *surveillance* after *susceptible species* have been restocked. The duration and intensity of the *surveillance* should be appropriate for the *disease* of concern and local conditions.

CHAPTER 1.5.6.

**MEASURES CONCERNING INTERNATIONAL
TRANSFER OF AQUATIC ANIMAL PATHOGENS AND
PATHOLOGICAL MATERIAL [AND BIOLOGICAL
PRODUCTS]**

Article 1.5.6.1.**Objective**

To prevent the introduction and spread of aquatic animal diseases caused by pathogens.

Article 1.5.6.2.**Introduction**

The consequences of the introduction into a country of an infectious disease or an aquatic animal pathogen or new strain of pathogen from which it is currently free, are potentially very serious. This is because aquatic animal health and trade may all be adversely affected to a greater or a lesser degree. Countries will already have in place a range of measures, such as requirements for pre-import testing and quarantine, to prevent such introductions through the importation of live aquatic animals or aquatic animal products.

However, there is also the risk that disease may occur as a result of the accidental release of aquatic animal pathogens during international transfer of packaged materials. Such pathogens may already occur in the country or they may have been imported deliberately or inadvertently. It is therefore necessary to have in place measures to prevent their accidental release. These measures may be applied at national borders by prohibiting or controlling the importation of specified pathogens or pathological material, which may contain them.

Article 1.5.6.3.**Importation of aquatic animal pathogens**

The importation of any aquatic animal pathogen, pathological material [and biological products that may contain infectious agents causing the diseases listed in this Code should require specific authorisation by the Competent Authority of the importing country, with the conditions of importation described] or organisms carrying the pathogen should be permitted only under an import licence issued by the relevant authority. The import licence should contain conditions appropriate to the risk posed by the pathogen and, in relation to air transport, the appropriate standards of the International Air Transport Association concerning the packaging and transport of dangerous goods as outlined in Article 1.5.6.4.

When considering applications to import pathological material from other countries, the authorities should have regard to the nature of the material, the animal from which it is derived, the susceptibility of that animal to various diseases and the animal health situation of the country of origin. It may be advisable to require that material be pretreated before import to minimise the risk of inadvertent introduction of a pathogen.

Any material that does not satisfy [these] the applied conditions should be returned or sterilised together

Appendix VI cont.

with its packing.

Article 1.5.6.4.

Packaging and documentation for transport

The safe transfer of an aquatic animal pathogen, with respect to the pathogen, the handlers and the environment, is primarily dependent on proper packaging.

Basic triple packaging system

The system consists of three layers as follows:

1. Primary receptacle: a labelled primary watertight, leak-proof receptacle containing the specimen. The receptacle is wrapped in enough absorbent material to absorb all fluid in case of breakage.
2. Secondary receptacle: a second durable, watertight, leak-proof receptacle to enclose and protect the primary receptacle(s). Several wrapped primary receptacles may be placed in one secondary receptacle. Sufficient additional absorbent material must be used to cushion multiple primary receptacles.
3. Outer shipping package: the secondary receptacle is placed in an outer shipping package, which protects it and its contents from outside influences such as physical damage, temperature fluctuations and water while in transit.

Ice or dry ice when used in a shipment must be placed outside the secondary receptacle. If wet ice is used it should be in a leak-proof container and the outer package must also be leak-proof. The secondary receptacle must be secured within the outer package to prevent damage after the refrigerant has melted or dissipated.

Dry ice must NOT be placed inside the primary or secondary receptacle because of the risk of explosions. The outer package must permit the release of carbon dioxide gas if dry ice is used. UN (IATA?) Packing Instruction 904 must be observed for packages containing dry ice.

Documentation

Specimen data forms, letters and other types of information that identify or describe the specimen and also identify the shipper and receiver should be taped to the outside of the secondary receptacle, together with a copy of the recipient's import permit.

Article 1.5.6.5.

Any sender of aquatic animal pathogen(s) or *pathological material* must ensure that the proposed receiver has obtained the necessary import licence referred to in Article 1.5.6.3.

Article 1.5.6.6.

1. Every consignment of aquatic animal pathogens or *pathological material* [or biological products] should be notified [by the consigner to the consignee,] in advance by the sender to the intended recipient, giving the following information:
 - a) exact nature of the [product] sample and its packaging;
 - b) the number of packages sent and the marks and numbers enabling their identification;

- c) date of despatch;
 - d) method of *transport* used for consignment of products (ship, aircraft, railway wagon or road vehicle).
2. The [consignee] recipient should notify the [consigner] sender of the receipt of each consignment of aquatic animal pathogen or pathological material [or *biological products*] on its arrival.
 3. When a consignment that has been notified by the [consigner] sender fails to arrive by the anticipated date, the [consignee] intended recipient should notify the *Competent Authority* of the receiving country and, at the same time, the [consigner] sender in the country of origin, so that any necessary action can be taken for investigation to be made without delay.

[Article 1.5.6.3.

For the purposes of this *Code*, the sending of *pathological material* and *biological products* should be subject to the special rules concerning packaging stipulated for perishable biological material by the Universal Postal Convention established by the Universal Postal Union.

Article 1.5.6.4.

For the purposes of this *Code*, vaccines containing live attenuated microorganisms, or live attenuated (modified) viruses packaged or in bulk and sent in large quantities that render the conditions described in Article 1.5.6.3 inapplicable in practice, should be packed in such a way that no outside contamination is possible (solid, well-sealed internal containers, solid and securely fastened protective boxes or cases, a sufficient amount of absorbent material, and labels marked: Perishable biological products – Dangerous – Not to be opened during transportation).

Article 1.5.6.5.

1. Each receiving country should only accept vaccines for veterinary use for which a certificate is provided stating that the vaccines were officially controlled in the *exporting country*.
2. Vaccines for which the authorisation described in Article 1.5.6.1 has been made and whose identity and conformity with the certificates of origin have been verified, should be permitted entry.
3. However, if inspection of the consignment shows any change in the vaccines for veterinary use that could endanger the health of humans or *aquatic animals*, the *Competent Authority* of the receiving country should cause these vaccines to be seized and destroyed.]

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SECTION 5.1.

BLOOD SAMPLING AND VACCINATION

APPENDIX 5.1.1.

HYGIENIC PRECAUTIONS

Article 5.1.1.1.

The use of needles and syringes in routine [veterinary] aquatic animal health work in *aquaculture establishments* for procedures such as blood sampling and vaccination should be carried out in a highly professional manner, ensuring that appropriate hygienic precautions are observed.

The intraperitoneal use of unsterilised needles or syringes in *aquatic animals* should be professionally unacceptable.

The use of unsterilised or contaminated equipment (needles, syringes, etc.) or products is especially unacceptable between different *aquaculture establishments* and for live *aquatic animals* that are to be exported. It is a requirement, particularly applicable to *aquatic animals* that are to be exported live, that necessary care be taken to ensure the sterility of all the equipment and products [used] associated with the conditions of certification.

These precautions have particular importance for teams of veterinarians and other aquatic animal health specialists, including vaccination service providers.

The range of organisms capable of being transmitted includes viruses, bacteria and protozoa. The list of infectious agents transmissible in the context of this Appendix continues to expand for all species of *aquatic animals*.

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SECTION 5.2.

DESTRUCTION OF PATHOGENS

APPENDIX 5.2.1.

DISINFECTATION OF FISH EGGS [WITH IODINE]

Article 5.2.1.1.

Introduction

Although generally effective for decontamination of egg surfaces, the use of [iodophor] *disinfectants*, such as iodophors, cannot be relied upon to prevent vertical transmission of some bacterial (e.g. *Renibacterium salmoninarum*) and viral pathogens (e.g. infectious pancreatic necrosis virus) that may be present within the egg.

Article 5.2.1.2.

Conditions of use

The pH of the solutions of the iodophor products must be between 6 and 8. At a pH of 6 or less, the toxicity for *eggs* increases, and at 8 or more, the antiseptic efficacy decreases. It is therefore essential to control the pH, and 100 mg/litre of NaHCO₃ must be added to water with a low alkalinity value. It is recommended that the *eggs* be rinsed in fresh water before and after *disinfection*, or that the iodine be neutralised with sodium thiosulfate, and that water free from organic matter be used to prepare the iodophor solution. Generous amounts of this solution should be used and the solution should be replaced when it turns pale yellow and before the colour disappears. One litre of solution at a concentration of 100 mg/litre *disinfectant* will disinfect 2000 salmonid *eggs*. The contact time at this concentration should be no more than 30 minutes.

Finally, in the case of *eggs* that have been transported, the packaging should also be disinfected or, better still, destroyed in a manner that will not pose a contamination or health risk to water and/or other *fish* at the end destination.

Certain precautions must be taken prior to the use of iodophors as products on the market contain a variable quantity of detergents that can give rise to toxic effects. It is therefore recommended that preliminary tests be carried out among the products on the market. It is advisable to build up stocks of the most satisfactory product, but expiry dates must be considered.

Disinfection of *eggs* with iodine can be carried out for the various *fish* species but it is most commonly used for *fish* of the Salmonidae family. For the other species, preliminary tests should be conducted to determine at what egg stage and iodophore concentration [when and at what] *disinfection* can be carried out safely.

Disinfection of *eggs* of marine species, such as plaice, cod, Atlantic halibut, for which adverse effects have been documented, may be obtained with 400–600 mg/litre glutaraldehyde with a contact time of 5–

10 minutes. However, this is not effective against nodaviruses, for which the use of ozone at 1 mg O₃/litre for 30 seconds is recommended. A concentration of ozone of 0.1–0.2 mg O₃/litre for 3 minutes inactivates most pathogenic fish bacteria as well.

Article 5.2.1.3.

Efficacy limits

Disinfection of eggs with iodine is ineffective when trying to avoid vertical transmission of infectious pancreatic necrosis, renibacteriosis and even infectious haematopoietic necrosis, for which this method was recommended initially. The ineffectiveness of iodine has been proved by epidemiological surveys and laboratory tests.

Article 5.2.1.4.

Neutralisation of halogens

See Appendix 5.2.2.

[] deleted

APPENDIX 5.2.2.

DISINFECTION OF FISH FARMS

Article 5.2.2.1.

General principles

The choice of *disinfection* procedures depends on the size, type and nature of the materials and sites to be disinfected. With the exception of the skin of personnel and *eggs*, which must be disinfected with non-corrosive products, the surfaces to be disinfected consist of fabric or woven material (clothes, nets), hard surfaces (plastic, cement) or permeable materials (earth, gravel). *Disinfection* is more difficult for permeable surfaces and requires more time. Table 1 indicates the most common ingredients and the methods to be used on the basis of these criteria.

The use of chemical [methods] products entails the implementation of measures to protect personnel. It is first necessary to protect the skin and eyes from contact with dangerous substances by using impermeable clothing, boots, glasses and a hat. The respiratory tract must be protected by a mask and the operator must not touch any food without having thoroughly washed his/her hands. Finally, the products must be stored in such a way as not to present direct or indirect danger to animal/*fish* or human life.

The material must be thoroughly cleaned before being disinfected.

Ideally, an approval scheme for *disinfection* of products for use in aquaculture should be established. An approval scheme should consider disinfection effect against target pathogens, toxicological and ecotoxicological properties of the products.

Article 5.2.2.2.

Disinfection

See Table 1.

Table 1. Disinfection and method of use

Processes	Indications	Method of use *	Comments
Physical			
Desiccation, light	Fish pathogens on earthen bottoms	Dry for 3 months at an average temperature of 18°C	Drying period can be reduced by the use of a chemical disinfectant
Dry heat	Fish pathogens on concrete, stone, iron, ceramic surfaces	Flame-blower, blow-lamp	
Damp heat	Fish pathogens in transportation vehicle tanks	Steam at 100°C or more for 5 minutes	

Table 1 (continued). Disinfection and method of use

Processes	Indications	Method of use *	Comments
Physical			
Ultra-violet rays	Viruses and bacteria	10 mJ/cm ²	Minimum lethal dose
Ultra-violet rays	[<i>Myxosporidian</i> spores in water] <i>Myxobolus cerebralis</i>	35 mJ/cm ²	<u>In order to inactivate all sporoplasm cells in the triactinomyxon stage a dose of 1300 mJ/cm² must be used</u>
Ultra-violet rays	Infectious pancreatic necrosis (IPN) and nodavirus (VNN/VER ⁴) in water	125–200 mJ/cm ²	
Chemical			
Quaternary ammonia	Virus, bacteria, hands	1 mg/litre for 1 minute	IPN virus resistant
Quaternary ammonia	Gill bacteria, plastic surfaces	2 mg/litre for 15 minutes	
Calcium ^a oxide	Fish pathogens on dried earth-base	0.5 kg/m ² for 4 weeks	Replace in water and empty disinfected pools keeping the effluents at pH <8.5
Calcium ^a (hypochlorite)	Bacteria and viruses on all clean surfaces and in water	30 mg available chlorine/litre left to inactivate for several days	Can be neutralised with sodium thiosulfate. See special recommendations
Calcium ^a cyanamide	Spores on earthen bottoms	3000 kg/ha on dry surfaces; leave in contact for 1 month	
Formalin	Fish pathogens in sealed premises	Released from formogenic substances, generally trioxymethylene. Comply with instructions	<u>Nodavirus resistant</u>
Iodine (iodophors)	Bacteria, viruses		See special recommendations
Iodine (iodophors)	Hands, smooth surfaces	>200 mg iodine/litre a few seconds	
Iodine (iodophors)	Eyed eggs	[100 mg iodine/litre for 10 minutes] <u>100 mg iodine/litre for not more than 30 minutes</u>	
Iodine (iodophors)	Gametes during fertilisation	25 mg iodine/litre for several hours	
Iodine (iodophors)	Nets, boots and clothing	200 mg iodine/litre	

4 Viral nervous necrosis/Viral encephalopathy and retinopathy

Table 1 (continued). *Disinfection and method of use*

Processes	Indications	Method of use *	Comments
Chemical			
Ozone	Sterilisation of water, fish pathogens,	0.2–1 mg/litre for 3 minutes	Costly
<u>Ozone in seawater</u>	<u>Egg disinfection</u>	<u>0.2–1 mg/litre TRO⁵ for 0.5–3 minutes</u>	
<u>Ozone in seawater</u>	<u>Surfaces, equipment</u>	<u>0.5–1 mg/litre TRO for 30–60 minutes</u>	
Sodium ^a (hydroxide)	Fish pathogens on resistant surfaces with cracks	<u>Mixture:</u> Sodium hydroxide, 100 g Teepol®, 10 g Calcium hydroxide, 500 g Water, 10 litres Spray, 1 litre/10 m ² Leave for 48 hours	The most active disinfectant Ca(OH) ₂ stains the surfaces treated; Teepol® is a tensio-active agent. Turn water on, checking pH
Sodium ^a (hypochlorite)	Bacteria and viruses on all clean surfaces and in water	30 mg available chlorine/litre. Leave to inactivate for a few days or neutralise with Na thiosulfate after 3 hours	
Sodium ^a (hypochlorite)	Nets, boots and clothing	200 mg available chlorine/litre for several minutes	
Sodium ^a (hypochlorite)	Hands	Rinse with clean water or neutralise with thiosulfate	

a Dangerous – See precautions indicated in general recommendations

* The concentrations indicated are those for the active substance. NB: The chemicals must be approved for the prescribed use and used according to the manufacturer's specifications.

Article 5.2.2.3.

Neutralisation of halogens

Chlorine and iodine are highly toxic for *aquatic animals* and, in order to prevent serious accidents that could result from a manipulation error, it is recommended to neutralise these products with sodium thiosulfate – five moles of thiosulfate neutralise four moles of chlorine. The molecular proportions are the same for iodine.

5 Total residual oxidant

Accordingly, in order to inactivate chlorine, the amount of thiosulfate should be 2.85 times the amount of chlorine (in grams):

Number of grams of thiosulfate = $2.85 \times$ number of grams of chlorine.

For iodine, the amount of thiosulfate should be 0.78 times the amount of iodine in grams:

Number of grams of thiosulfate = $0.78 \times$ number of grams of iodine.

It is also possible to prepare a thiosulfate solution at 1% by weight, in which case the neutralising volumes will be as follows (in ml):

1. for chlorine:

$$28.5 \times [\text{number of litres of the disinfecting solution} \times \text{concentration mg/litre}] / 100$$

2. for iodine:

it is necessary to multiply by 7.8 instead of by 28.5.

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SECTION 2.1.

**DISEASES NOTIFIABLE TO THE OIE
(OF FISH)**

CHAPTER 2.1.X.

DISEASE NAME

...

Article 2.1.X.7.

[*Importing countries* that are officially declared DISEASE NAME free should only accept for importation live *fish* or *sexual products of fish* from *exporting countries* declared DISEASE NAME free, or from clearly defined DISEASE NAME free zones in countries not declared DISEASE NAME free.

Importing countries not regarded as DISEASE NAME free, but that have officially recognised DISEASE NAME free zones, should only import live *fish* and *sexual products of fish* into such zones from other countries or zones that are officially declared DISEASE NAME free.

For *aquaculture establishments* officially declared DISEASE NAME free that exist in infected zones, the *Competent Authority* of the country concerned should allow importation of live *fish* or *sexual products of fish* only from officially declared DISEASE NAME free countries, zones or *aquaculture establishments*.]

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SECTION 3.1.

**DISEASES NOTIFIABLE TO THE OIE
(OF MOLLUSCS)**

CHAPTER 3.1.X.

DISEASE NAME

...

Article 3.1.X.7.

[*Importing countries* that are officially declared DISEASE NAME free should only accept for importation live *molluscs* from *exporting countries* declared DISEASE NAME free, or from clearly defined DISEASE NAME free zones in countries not declared DISEASE NAME free.

Importing countries not regarded as DISEASE NAME free, but that have officially recognised DISEASE NAME free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared DISEASE NAME free.

For *aquaculture establishments* officially declared DISEASE NAME free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared DISEASE NAME free countries, zones or *aquaculture establishments*.]

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SECTION 4.1.

**DISEASES NOTIFIABLE TO THE OIE
(OF CRUSTACEANS)**

CHAPTER 4.1.X.

DISEASE NAME

...

Article 4.1.X.7.

[*Importing countries* that are officially declared DISEASE NAME free should only accept for importation live *crustaceans* belonging to the susceptible host species listed in Article 4.1.1.1 from *exporting countries* declared DISEASE NAME free, or from clearly defined DISEASE NAME free zones in countries not declared DISEASE NAME free.

Importing countries not regarded as DISEASE NAME free, but that have officially recognised DISEASE NAME free zones, should only import live *crustaceans* belonging to the susceptible host species listed in Article 4.1.1.1 into such zones from other countries or zones that are officially declared DISEASE NAME free.

For *aquaculture establishments* officially declared DISEASE NAME free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of live *crustaceans* belonging to the susceptible host species listed in Article 4.1.1.1 or fertilised eggs/nauplii from officially declared DISEASE NAME free countries, zones or *aquaculture establishments*.]

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Mollusc diseases: new categories of host species

In the *Aquatic Animal Health Code* (AAHC) and the *Diagnostic Manual for Aquatic Animal Diseases* (the *Manual*) susceptible species for *Perkinsus olseni/atlanticus* are: *Haliotis ruber*, *H. cyclobates*, *H. scalaris*, *H. laevigata*, *Ruditapes philippinarum* and *R. decussatus*, although current evidence suggests that *P. olseni/atlanticus* can cause mortality in species other than those listed. While Ray's fluid thioglycollate medium (RFTM) culture technique is more reliable than histology for detecting infection, it gives no information on whether the host is simply a carrier of the infection, or whether it is diseased. Using histology instead of RFTM, *P. olseni* was found to cause disease in other species including pearl oysters (2, 3). Currently, it appears that many families and species of molluscs may carry schizonts of the parasite that, in some individuals and for unknown reasons, become activated, culminating in systemic disease. Most hosts are probably susceptible to infection under certain circumstances. Therefore to name, in the AAHC, only a few species as being susceptible to disease may be misleading and the following change of the wording to Article 3.1.5.1. is proposed:

“... susceptible host species for *Perkinsus olseni/atlanticus* are abalones and clam species, among which clinical signs and disease are observed only in *Haliotis ruber*, *H. cyclobates*, *H. scalaris* and *H. laevigata*, *Ruditapes philippinarum* and *R. decussatus*. Many other species may become diseased under certain circumstances.”

However, in the case of *Perkinsus olseni/atlanticus* more than 50 mollusc species would have to be listed as carriers, which is neither practicable nor fully exhaustive. Changing Articles 3.1.5.6. and 3.1.5.8. by deleting the reference to “perkinsosis susceptible host species” could resolve the situation. This would emphasise the potential role of molluscs species as vectors and carriers.

From a more general point of view, it is proposed to modify Articles 3.1.X.6. and 3.1.X.8. in a similar way for the same reasons in all the mollusc disease chapters in the AAHC.

It has also been established that *Haplosporidium nelsoni* infects, but does not cause disease in, *Crassostrea gigas* (1, 4), whereas it causes serious disease in *C. virginica*. The FDC discussed two consequences of this situation, which are 1: the difference in risks associated with movements and transfers of the two susceptible host species, and 2: the difference in surveillance programmes that may be implemented when clinical disease may be absent and prevalence of infection is extremely low. Taking into account this situation, the Commission proposes the following change of wording to Article 3.1.2.1.:

“... susceptible host species for *Haplosporidium nelsoni* are: *Crassostrea virginica* and *C. gigas*, among which clinical signs and disease are observed only in *Crassostrea virginica*”.

1. FRIEDMAN C.S., CLONEY D.F., MANZER D. & HEDRICK R.P. (1991). Haplosporidiosis of the Pacific oyster, *Crassostrea gigas*. *J. Invertebr. Pathol.*, **58**, 367–372.
2. HINE P.M. & THORNE T. (2000). A survey of some parasites and diseases of several species of bivalve mollusc in northern Western Australia. *Dis. Aquat. Org.*, **40**, 67–78.
3. NORTON J.H., SHEPHERD M.A., PERKINS F.P. & PRIOR H.C. (1993). Perkinsus-like infection in farmed golden-lipped pearl oyster *Pinctada maxima* from the Torres Strait, Australia. *J. Invertebr. Pathol.*, **62**, 105–106.
4. RENAULT T., STOKES N.A., CHOLLET B., COCHENNEC N., BERTHE F., GERARD A. & BURRESON E.M. (2000). Haplosporidiosis in the Pacific oyster *Crassostrea gigas* from the French Atlantic coast. *Dis. Aquat. Org.*, **42**, 207–214.

SECTION 3.1.

DISEASES NOTIFIABLE TO THE OIE

CHAPTER 3.1.1.

[BONAMIOSIS] HAEMOCYTOSIS OF FLAT OYSTERS
 (*Bonamia ostreae* [*B. exitiosus*, *Mikrocytos roughleyi*])

Article 3.1.1.1.

The present chapter refers only to [bonamiosis] haemocytosis of flat oysters when caused by [the *disease agents* listed below as the susceptible host species indicated for each pathogen] *Bonamia ostreae*.

For the purposes of this *Code*, susceptible host species for *Bonamia ostreae* are probably all *Ostrea* species including: *Ostrea edulis*, *O. angasi*, *O. denselammellosa*, *O. puelchana*, *Ostreola conchaphila* (= *O. lurida*) and *O. [Tiostre] chilensis* (= *Tiostre lutaria*), in which clinical signs and disease have been reported [susceptible host species for *Bonamia exitiosus* are: *Tiostre chilensis* and *Ostrea angasi*, and the susceptible host species for *Mikrocytos roughleyi* is: *Saccostrea commercialis*].

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.1.2.

[Bonamiosis] Haemocytosis of flat oysters free country

A country may be considered free from [bonamiosis] haemocytosis of flat oysters when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.1.1] *Bonamia ostreae* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.1.1] *Bonamia ostreae* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.1.3.

[Bonamiosis] Haemocytosis of flat oysters free zone

A zone may be considered free from [bonamiosis] haemocytosis of flat oysters when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.1.1] *Bonamia ostreae* has occurred within its *territory* for at least the previous two years;

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2. no [*disease agent* listed in Article 3.1.1.1] *Bonamia ostreae* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national disease *surveillance* programmes).

Article 3.1.1.4.

[Bonamiosis] Haemocytosis of flat oysters aquaculture establishment

A [bonamiosis] haemocytosis of flat oysters free *aquaculture establishment* may be located within a [bonamiosis] haemocytosis of flat oysters free country or zone or within a [bonamiosis] haemocytosis of flat oysters infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.1.1] *Bonamia ostreae*, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.1.1] *Bonamia ostreae* that may be present.

Article 3.1.1.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [bonamiosis] haemocytosis of flat oysters free status if no [*disease agent* listed in Article 3.1.1.1] *Bonamia ostreae* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.1.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [bonamiosis] haemocytosis of flat oysters free.

If the place of harvest of the consignment is not a country officially declared [bonamiosis] haemocytosis of flat oysters free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [bonamiosis] haemocytosis of flat oysters free, or
2. an *aquaculture establishment* officially declared [bonamiosis] haemocytosis of flat oysters free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.1.7.

Importing countries that are officially declared bonamiosis free should only accept for importation live *molluscs* from *exporting countries* declared bonamiosis free, or from clearly defined bonamiosis free zones in countries not declared bonamiosis free.

Importing countries not regarded as bonamiosis free, but that have officially recognised bonamiosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared bonamiosis free.

For *aquaculture establishments* officially declared bonamiosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared bonamiosis free countries, zones or *aquaculture establishments*.]

Article 3.1.1.7.

Competent Authorities of importing countries should require:

for *molluscs* of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as bonamiosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [bonamiosis] haemocytosis of flat oysters.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.1.8.

[Certificates are optional for *molluscs* not listed as natural or experimental bonamiosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Bonamia ostrea*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.2.

[BONAMIOSIS] HAEMOCYTOSIS OF DREDGE OYSTERS
(*Bonamia exitiosus* [*B. ostreae*, *Mikrocytos roughleyi*])

Article 3.1.2.1.

The present chapter refers only to [bonamiosis] haemocytosis of dredge oysters when caused by [the *disease agents* listed below as the susceptible host species indicated for each pathogen] *Bonamia exitiosus*.

For the purposes of this *Code*, susceptible host species for *Bonamia exitiosus* are probably all *Ostrea* species including: *Ostrea* [*Tiostrea*] *chilensis* (= *Tiostrea lutaria*) and *Ostrea angasi*, in which clinical signs and disease have been reported [susceptible host species for *Bonamia ostrea* are: *Ostrea edulis*, *O. angasi*, *O. denselammellosa*, *O. puelchana*, *Ostreola conchaphila* (= *O. lurida*) and *Tiostrea chilensis* (= *T. lutaria*) and the susceptible host species for *Mikrocytos roughleyi* is: *Saccostrea commercialis*].

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.2.2.

[Bonamiosis] Haemocytosis of dredge oysters free country

A country may be considered free from [bonamiosis] haemocytosis of dredge oysters when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.2.1] *Bonamia exitiosus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.2.1] *Bonamia exitiosus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.2.3.

[Bonamiosis] Haemocytosis of dredge oysters free zone

A zone may be considered free from [bonamiosis] haemocytosis of dredge oysters when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.2.1] *Bonamia exitiosus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.2.1] *Bonamia exitiosus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national *disease surveillance* programmes).

Article 3.1.2.4.

[Bonamiosis] Haemocytosis of dredge oysters aquaculture establishment

A [bonamiosis] haemocytosis of dredge oysters free *aquaculture establishment* may be located within a [bonamiosis] haemocytosis of dredge oysters free country or zone or within a [bonamiosis] haemocytosis of dredge oysters infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.2.1] *Bonamia exitiosus*, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.2.1] *Bonamia exitiosus* that may be present.

Article 3.1.2.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [bonamiosis] haemocytosis of dredge oysters free status if no [*disease agent* listed in Article 3.1.2.1] *Bonamia exitiosus* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.2.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [bonamiosis] haemocytosis of dredge oysters free.

If the place of harvest of the consignment is not a country officially declared [bonamiosis] haemocytosis of dredge oysters free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [bonamiosis] haemocytosis of dredge oysters free, or
2. an *aquaculture establishment* officially declared [bonamiosis] haemocytosis of dredge oysters free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.2.7.]

Importing countries that are officially declared bonamiosis free should only accept for importation live *molluscs* from *exporting countries* declared bonamiosis free, or from clearly defined bonamiosis free zones in countries not declared bonamiosis free.

Importing countries not regarded as bonamiosis free, but that have officially recognised bonamiosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared bonamiosis free.

For *aquaculture establishments* officially declared bonamiosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared bonamiosis free countries, zones or *aquaculture establishments*.]

Article 3.1.2.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as bonamiosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [bonamiosis] haemocytosis of dredge oysters.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.2.8.

[Certificates are optional for *molluscs* not listed as natural or experimental bonamiosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Bonamia exitiosus*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.3.

[BONAMIOSIS] WINTER MORTALITY
 (*Mikrocytos roughleyi* [*Bonamia ostreae*, *B. exitiosus*])

Article 3.1.3.1.

The present chapter refers only to [bonamiosis] winter mortality when caused by [the *disease agents* listed below as the susceptible host species indicated for each pathogen] *Mikrocytos roughleyi*.

For the purposes of this *Code*, susceptible host species for *Mikrocytos roughleyi* is: *Saccostrea commercialis* (≡ *S. glomerata*) [susceptible host species for *Bonamia exitiosus* are: *Tiostrea chilensis* and *Ostrea angasi*, susceptible host species for *Bonamia ostreae* are *Ostrea edulis*, *O. angasi*, *O. denselammellosa*, *O. puelchana*, *Ostreola conchaphila* (= *O. lurida*) and *Tiostrea chilensis* (= *T. lutaria*)].

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.3.2.

[Bonamiosis] Winter mortality free country

A country may be considered free from [bonamiosis] winter mortality when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.3.1] *Mikrocytos roughleyi* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.3.1] *Mikrocytos roughleyi* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.3.3.

[Bonamiosis] Winter mortality free zone

A zone may be considered free from [bonamiosis] winter mortality when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.3.1] *Mikrocytos roughleyi* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.3.1] *Mikrocytos roughleyi* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national *disease surveillance* programmes).

Article 3.1.3.4.

[Bonamiosis] Winter mortality aquaculture establishment

A [bonamiosis] winter mortality free *aquaculture establishment* may be located within a [bonamiosis] winter mortality free country or zone or within a [bonamiosis] winter mortality infected zone provided that:

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1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.3.1] *Mikrocytos roughleyi*, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.3.1] *Mikrocytos roughleyi* that may be present.

Article 3.1.3.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [bonamiosis] winter mortality free status if no [*disease agent* listed in Article 3.1.3.1] *Mikrocytos roughleyi* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.3.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [bonamiosis] winter mortality free.

If the place of harvest of the consignment is not a country officially declared [bonamiosis] winter mortality free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [bonamiosis] winter mortality free, or
2. an *aquaculture establishment* officially declared [bonamiosis] winter mortality free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.3.7.]

Importing countries that are officially declared bonamiosis free should only accept for importation live *molluscs* from *exporting countries* declared bonamiosis free, or from clearly defined bonamiosis free zones in countries not declared bonamiosis free.

Importing countries not regarded as bonamiosis free, but that have officially recognised bonamiosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared bonamiosis free.

For *aquaculture establishments* officially declared bonamiosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared bonamiosis free countries, zones or *aquaculture establishments*.]

Article 3.1.3.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as bonamiosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [bonamiosis] winter mortality.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.3.8.

[Certificates are optional for *molluscs* not listed as natural or experimental bonamiosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Mikrocytos roughleyi*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.4.

MSX DISEASE

(*Haplosporidium nelsoni*)

Article 3.1.4.1.

The present chapter refers only to MSX disease when caused by *Haplosporidium nelsoni*.

For the purposes of this *Code*, susceptible host species for *Haplosporidium nelsoni* are: *Crassostrea virginica* and *C. gigas*, among which clinical signs and disease are observed only in *C. virginica*.

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.4.2.

MSX disease free country

A country may be considered free from MSX disease when:

1. no *outbreak* caused by *Haplosporidium nelsoni* has occurred within its *territory* for at least the previous two years;
2. no *Haplosporidium nelsoni* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.4.3.

MSX disease free zone

A zone may be considered free from MSX disease when:

1. no *outbreak* caused by *Haplosporidium nelsoni* has occurred within its *territory* for at least the previous two years;
2. no *Haplosporidium nelsoni* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national disease *surveillance* programmes).

Article 3.1.4.4.

MSX disease free aquaculture establishment

an MSX disease free *aquaculture establishment* may be located within an MSX disease free country or zone or within an MSX disease infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of *Haplosporidium nelsoni*, and
2. it is supplied with water by a means that ensures removal or destruction of any *Haplosporidium nelsoni* that may be present.

Article 3.1.4.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to MSX disease free status if no *Haplosporidium nelsoni* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.4.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared MSX disease free.

If the place of harvest of the consignment is not a country officially declared MSX disease free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared MSX disease free, or
2. an *aquaculture establishment* officially declared MSX disease free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.2.7.]

Importing countries that are officially declared MSX disease free should only accept for importation live *molluscs* from *exporting countries* declared MSX disease free, or from clearly defined MSX disease free zones in countries not declared MSX disease free.

Importing countries not regarded as MSX disease free, but that have officially recognised MSX disease free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared MSX disease free.

For *aquaculture establishments* officially declared MSX disease free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared MSX disease free countries, zones or *aquaculture establishments*.]

Article 3.1.4.7.

Competent Authorities of *importing countries* should require:

for *molluscs* of commercial size destined for human consumption

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the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as MSX disease susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from MSX disease.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.4.8.

[Certificates are optional for *molluscs* not listed as natural or experimental MSX disease susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Haplosporidium nelsoni*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.5.

[MARTEILIOSIS] ABER DISEASE
 (*Marteilia refringens* [*M. sydneyi*])

Article 3.1.5.1.

The present chapter refers only to [marteiliosis] Aber disease when caused by [the *disease agents* listed below in the susceptible host species indicated for each pathogen] *Marteilia refringens*.

For the purposes of this *Code*, susceptible host species for *Marteilia refringens* are: *Ostrea edulis*, *O. angasi* and *Ostrea* [*Tiostrea*] *chilensis* [and susceptible host species for *Marteilia sydneyi* is: *Saccostrea* (= *Crassostrea*) *commercialis*.]

However, the role of other bivalve species as potential vectors is still unclear. The taxonomy of the genus is uncertain and the identification of other *Marteilia* species is difficult.

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.5.2.

[Marteiliosis] Aber disease free country

A country may be considered free from [marteiliosis] Aber disease when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.5.1] *Marteilia refringens* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.5.1] *Marteilia refringens* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.5.3.

[Marteiliosis] Aber disease free zone

A zone may be considered free from [marteiliosis] Aber disease when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.5.1] *Marteilia refringens* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.5.1] *Marteilia refringens* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national disease *surveillance* programmes).

Article 3.1.5.4.

[Marteiliosis] Aber disease free aquaculture establishment

An [marteiliosis] Aber disease free *aquaculture establishment* may be located within an [marteiliosis] Aber disease free country or zone or within an [marteiliosis] Aber disease infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.5.1] *Marteilia refringens*, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.5.1] *Marteilia refringens* that may be present.

Article 3.1.5.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [marteiliosis] Aber disease free status if no [*disease agent* listed in Article 3.1.5.1] *Marteilia refringens* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.5.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [marteiliosis] Aber disease free.

If the place of harvest of the consignment is not a country officially declared [marteiliosis] Aber disease free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [marteiliosis] Aber disease free, or
2. an *aquaculture establishment* officially declared [marteiliosis] Aber disease free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.3.7.

Importing countries that are officially declared marteiliosis free should only accept for importation live *molluscs* from *exporting countries* declared marteiliosis free, or from clearly defined marteiliosis free zones in countries not declared marteiliosis free.

Importing countries not regarded as marteiliosis free, but that have officially recognised marteiliosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared marteiliosis free.

For *aquaculture establishments* officially declared marteiliosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared marteiliosis free countries, zones or *aquaculture establishments*.]

Article 3.1.5.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as *marteiliosis* susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [marteiliosis] Aber disease.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.5.8.

[Certificates are optional for *molluscs* not listed as natural or experimental *marteiliosis* susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Marteilia refringens*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.6.

QX DISEASE [MARTEILIOSIS]
(*Marteilia sydneyi* [*M. refringens*])

Article 3.1.6.1.

The present chapter refers only to [marteiliosis] QX disease when caused by [the *disease agents* listed below in the susceptible host species indicated for each pathogen] *Marteilia sydneyi*.

For the purposes of this *Code*, susceptible host species *Marteilia sydneyi* is: *Saccostrea* [= *Crassostrea*] *commercialis* (= *glomerata*) [and for susceptible host species for *Marteilia refringens* are: *Ostrea edulis*, *O. angasi* and *Tiostrea chilensis*].

[However, the role of other bivalve species as potential vectors is still unclear.] The taxonomy of the genus is uncertain and the identification of other *Marteilia* species is difficult.

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.6.2.

[Marteiliosis] QX disease free country

A country may be considered free from [marteiliosis] QX disease when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.6.1] *Marteilia sydneyi* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.6.1] *Marteilia sydneyi* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.6.3.

[Marteiliosis] QX disease free zone

A zone may be considered free from [marteiliosis] QX disease when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.6.1] *Marteilia sydneyi* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.6.1] *Marteilia sydneyi* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national *disease surveillance* programmes).

Article 3.1.6.4.

[Marteiliosis] QX disease free aquaculture establishment

A [marteiliosis] QX disease free *aquaculture establishment* may be located within a [marteiliosis] QX disease free country or zone or within a [marteiliosis] QX disease infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.6.1] *Marteilia sydneyi*, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.6.1] *Marteilia sydneyi* that may be present.

Article 3.1.6.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [marteiliosis] QX disease free status if no [*disease agent* listed in Article 3.1.6.1] *Marteilia sydneyi* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.6.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [marteiliosis] QX disease free.

If the place of harvest of the consignment is not a country officially declared [marteiliosis] QX disease free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [marteiliosis] QX disease free, or
2. an *aquaculture establishment* officially declared [marteiliosis] QX disease free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.3.7.

Importing countries that are officially declared marteiliosis free should only accept for importation live *molluscs* from *exporting countries* declared marteiliosis free, or from clearly defined marteiliosis free zones in countries not declared marteiliosis free.

Importing countries not regarded as marteiliosis free, but that have officially recognised marteiliosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared marteiliosis free.

For *aquaculture establishments* officially declared marteiliosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared marteiliosis free countries, zones or *aquaculture establishments*.]

Appendix X cont.

Article 3.1.6.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as *marteiliosis* susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [marteiliosis] QX disease.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.6.8.

[Certificates are optional for *molluscs* not listed as natural or experimental *marteiliosis* susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Marteilia sydneyi*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.7.

DENMAN ISLAND DISEASE [MIKROCYTOSIS]
 (*Mikrocytos mackini*)

Article 3.1.7.1.

The present chapter refers only to [mikrocytosis] Denman Island disease when caused by *Mikrocytos mackini*.

For the purposes of this *Code*, susceptible host species for *Mikrocytos mackini* are: *Crassostrea gigas*, *C. virginica*, *Ostrea edulis* and *O. conchaphila*. *Crassostrea gigas* seems to be more resistant to the disease than the other species.

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.7.2.

[Mikrocytosis] Denman Island disease free country

A country may be considered free from [mikrocytosis] Denman Island disease when:

1. no *outbreak* caused by *Mikrocytos mackini* has occurred within its *territory* for at least the previous two years;
2. no *Mikrocytos mackini* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.7.3.

[Mikrocytosis] Denman Island disease free zone

A zone may be considered free from [mikrocytosis] Denman Island disease when:

1. no *Mikrocytos mackini* has occurred within its *territory* for at least the previous two years;
2. no *Mikrocytos mackini* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national disease *surveillance* programmes).

Article 3.1.7.4.

[Mikrocytosis] Denman Island disease free aquaculture establishment

A [mikrocytosis] Denman Island disease free *aquaculture establishment* may be located within a [mikrocytosis] Denman Island disease free country or zone or within a [mikrocytosis] Denman Island disease infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of *Mikrocytos mackini*, and

Appendix X cont.

2. it is supplied with water by a means that ensures removal or destruction of any *Mikrocytos mackini* that may be present.

Article 3.1.7.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [mikrocytosis] Denman Island disease free status if no *Mikrocytos mackini* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.7.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [mikrocytosis] Denman Island disease free.

If the place of harvest of the consignment is not a country officially declared [mikrocytosis] Denman Island disease free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [mikrocytosis] Denman Island disease free, or
2. an *aquaculture establishment* officially declared [mikrocytosis] Denman Island disease free.

The certificate shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.4.7.

Importing countries that are officially declared mikrocytosis free should only accept for importation live *molluscs* from *exporting countries* declared mikrocytosis free, or from clearly defined mikrocytosis free zones in countries not declared mikrocytosis free.

Importing countries not regarded as mikrocytosis free, but that have officially recognised mikrocytosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared mikrocytosis free.

For *aquaculture establishments* officially declared mikrocytosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared mikrocytosis free countries, zones or *aquaculture establishments*.]

Article 3.1.7.7.

Competent Authorities of *importing countries* should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as mikrocytosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [mikrocytosis] Denman Island disease.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.7.8.

[Certificates are optional for *molluscs* not listed as natural or experimental mikrocytosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Mikrocytos mackini*, even if the *molluscs* originate from an infected country, zone or aquaculture establishment.

CHAPTER 3.1.8.

DERMO INFECTION [PERKINSOSIS]
(*Perkinsus marinus*)

Article 3.1.8.1.

The present chapter refers only to [perkinsosis] Dermo infection when caused by [the *disease agents* listed below in the susceptible host species indicated for each pathogen] *Perkinsus marinus*.

For the purposes of this *Code*, susceptible host species for *Perkinsus marinus* are: *Crassostrea virginica* and *C. gigas*, among which clinical signs and disease are mainly observed in *C. virginica*. [and susceptible host species for *Perkinsus olseni/atlanticus* are: *Haliotis ruber*, *H. cyclobates*, *H. scalaris*, *H. laevigata*, *Ruditapes philippinarum* and *R. decussatus*.]

[Some 50 other species of *molluscs* may harbour *Perkinsus* species that are apparently non-pathogenic.]

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.8.2.

[Perkinsosis] Dermo infection free country

A country may be considered free from [perkinsosis] Dermo infection when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.8.1] *Perkinsus marinus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.8.1] *Perkinsus marinus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.8.3.

[Perkinsosis] Dermo infection free zone

A zone may be considered free from [perkinsosis] Dermo infection when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.8.1] *Perkinsus marinus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.8.1] *Perkinsus marinus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national *disease surveillance* programmes).

Article 3.1.8.4.

[Perkinsosis] Dermo infection free aquaculture establishment

A [perkinsosis] Dermo infection free *aquaculture establishment* may be located within a [perkinsosis] Dermo infection free country or zone or within a [perkinsosis] Dermo infection infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.8.1 *Perkinsus marinus*], and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.8.1] *Perkinsus marinus* that may be present.

Article 3.1.8.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [perkinsosis] Dermo infection free status if no [*disease agent* listed in Article 3.1.8.1] *Perkinsus marinus* has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.8.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [perkinsosis] Dermo infection free.

If the place of harvest of the consignment is not a country officially declared [perkinsosis] Dermo infection free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [perkinsosis] Dermo infection free, or
2. an *aquaculture establishment* officially declared [perkinsosis] Dermo infection free.

The *certificate* shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.5.7.]

Importing countries that are officially declared perkinsosis free should only accept for importation live *molluscs* from *exporting countries* declared perkinsosis free, or from clearly defined perkinsosis free zones in countries not declared perkinsosis free.

Importing countries not regarded as perkinsosis free, but that have officially recognised perkinsosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared perkinsosis free.

For *aquaculture establishments* officially declared perkinsosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared perkinsosis free countries, zones or *aquaculture establishments*.]

Article 3.1.8.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as perkinsosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [perkinsosis] Dermo infection.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.8.9.

[Certificates are optional for *molluscs* not listed as natural or experimental perkinsosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Perkinsus marinus*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

CHAPTER 3.1.9.

PERKINSUS OLSENI/ATLANTICUS INFECTION
[PERKINSOSIS]

([*Perkinsus marinus*,] *Perkinsus*
olseni/atlanticus)

Article 3.1.9.1.

The present chapter refers only to [perkinsosis] *Perkinsus olseni/atlanticus* infection when caused by [the *disease agents* listed below in the susceptible host species indicated for each pathogen] *Perkinsus olseni/atlanticus*.

For the purposes of this *Code*, susceptible host species for [*Perkinsus marinus* are: *Crassostrea virginica* and *C. gigas*, and susceptible host species for] *Perkinsus olseni/atlanticus* are: abalones and clam species, among which clinical signs and disease are mainly observed in: *Haliotis ruber*, *H. cyclobates*, *H. scalaris*, *H. laevigata*, *Ruditapes philippinarum* and *R. decussatus*. Many other species may become diseased under certain circumstances.

[Some 50 other species of *molluscs* may harbour *Perkinsus* species that are apparently non-pathogenic.]

Standards for diagnostic tests are described in the *Manual*.

Article 3.1.9.2.

[Perkinsosis] *Perkinsus olseni/atlanticus* infection free country

A country may be considered free from [perkinsosis] *Perkinsus olseni/atlanticus* infection when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.9.1] *Perkinsus olseni/atlanticus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.9.1] *Perkinsus olseni/atlanticus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*.

Article 3.1.9.3.

[Perkinsosis] *Perkinsus olseni/atlanticus* infection free zone

A zone may be considered free from [perkinsosis] *Perkinsus olseni/atlanticus* infection when:

1. no *outbreak* caused by [the *disease agents* listed in Article 3.1.9.1] *Perkinsus olseni/atlanticus* has occurred within its *territory* for at least the previous two years;
2. no [*disease agent* listed in Article 3.1.9.1] *Perkinsus olseni/atlanticus* has been detected in any *mollusc* tested during operation of an official mollusc health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual* (where a zone common to several countries is involved, these countries should implement harmonised and co-ordinated national *disease surveillance* programmes).

Article 3.1.9.4.

[Perkinsosis] Perkinsus olseni/atlanticus infection free aquaculture establishment

A [perkinsosis] Perkinsus olseni/atlanticus infection free *aquaculture establishment* may be located within a [perkinsosis] Perkinsus olseni/atlanticus infection free country or zone or within a [perkinsosis] Perkinsus olseni/atlanticus infection infected zone provided that:

1. it has been tested in an official mollusc health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of [any of the *disease agents* listed in Article 3.1.9.1] Perkinsus olseni/atlanticus, and
2. it is supplied with water by a means that ensures removal or destruction of any [of the *disease agents* listed in Article 3.1.9.1] Perkinsus olseni/atlanticus that may be present.

Article 3.1.9.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to [perkinsosis] Perkinsus olseni/atlanticus infection free status if no [*disease agent* listed in Article 3.1.9.1] Perkinsus olseni/atlanticus has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

Article 3.1.9.6.

When importing live *molluscs* of all age groups [of any susceptible host species] for re-immersion, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official mollusc health *surveillance* scheme comprising inspection and laboratory tests on susceptible host species conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared [perkinsosis] Perkinsus olseni/atlanticus infection free.

If the place of harvest of the consignment is not a country officially declared [perkinsosis] Perkinsus olseni/atlanticus infection free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared [perkinsosis] Perkinsus olseni/atlanticus infection free, or
2. an *aquaculture establishment* officially declared [perkinsosis] Perkinsus olseni/atlanticus infection free.

The *certificate* shall be in accordance with Model Certificate No. 3 given in Part 6 of this *Code*.

[Article 3.1.5.7.]

Importing countries that are officially declared perkinsosis free should only accept for importation live *molluscs* from *exporting countries* declared perkinsosis free, or from clearly defined perkinsosis free zones in countries not declared perkinsosis free.

Importing countries not regarded as perkinsosis free, but that have officially recognised perkinsosis free zones, should only import *molluscs* into such zones from other countries or zones that are officially declared perkinsosis free.

For *aquaculture establishments* officially declared perkinsosis free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of *molluscs* from officially declared perkinsosis free countries, zones or *aquaculture establishments*.]

Article 3.1.9.7.

Competent Authorities of importing countries should require:

for molluscs of commercial size destined for human consumption

the presentation of an *international aquatic animal health certificate* attesting that the *molluscs* [listed as perkinsosis susceptible host species] have as their place of harvest a country, a zone or an *aquaculture establishment* free from [perkinsosis] *Perkinsus olseni/atlanticus* infection.

The certificate shall be in accordance with Model Certificate No. 3.

This certificate may not be required for *molluscs* [listed as susceptible host species] originating from an infected zone if they are destined:

1. directly for human consumption without any re-immersion, or
2. for storage, during a short period before consumption, in a tank located in an infected zone. The tank should be isolated from the local environment (e.g. in quarantine) to avoid the potential introduction of different strains of the pathogen.

Article 3.1.9.9.

[Certificates are optional for *molluscs* not listed as natural or experimental perkinsosis susceptible host species] This certificate may not be required for mollusc species that have been demonstrated not to be vectors of *Perkinsus olseni/atlanticus*, even if the *molluscs* originate from an infected country, zone or *aquaculture establishment*.

LIST OF DISEASES NOTIFIABLE TO THE OIE AND
OTHER SIGNIFICANT DISEASES

Article 1.1.2.1.

Diseases notifiable to the OIE

...

2. Diseases of molluscs

[Bonamiosis] Haemocytosis of flat oysters (*Bonamia ostreae* [, *Bonamia exitiosus*, *Mikrocytos roughleyi*])

[Bonamiosis] Haemocytosis of dredge oysters ([*Bonamia ostreae*,] *Bonamia exitiosus* [, *Mikrocytos roughleyi*])

[Bonamiosis] Winter mortality ([*Bonamia ostreae*, *Bonamia exitiosus*,] *Mikrocytos roughleyi*)

[Mikrocytosis] Denman Island disease (*Mikrocytos mackini*)

MSX disease (*Haplosporidium nelsoni*)

[Marteiliosis] Aber disease (*Marteilia refringens* [, *M. sydneyi*])

[Marteiliosis] QX disease ([*Marteilia refringens*,] *Marteilia sydneyi*)

[Perkinsosis] Dermo disease (*Perkinsus marinus* [, *P. olseni/atlanticus*])

[Perkinsosis] *Perkinsus olseni/atlanticus* infection ([*Perkinsus marinus*,] (*Perkinsus_olseni/atlanticus*))

...

Article 1.1.2.2.

Other significant diseases

...

2. Diseases of molluscs

SSO disease (*Haplosporidium costale*)

Withering syndrome of abalones (*Candidatus Xenohalictis californiensis*)

...

[] deleted

CHAPTER 4.1.3.

YELLOWHEAD DISEASE

Article 4.1.3.1.

For the purposes of this *Code*, susceptible host species for yellowhead disease are: Black tiger shrimp (*Penaeus monodon*), Pacific white shrimp (*P. vannamei*), Pacific blue shrimp (*P. stylirostris*), Gulf white shrimp (*P. setiferus*), Gulf brown shrimp (*P. aztecus*), Gulf pink shrimp (*P. duorarum*), and Kuruma prawn (*P. japonicus*).

For the purpose of this *Code*, the causative agents (*disease agents*) of yellowhead disease are yellowhead virus and related strains of the virus (e.g. gill-associated virus).

Standards for diagnostic tests are described in the *Manual*.

Article 4.1.3.2.

Yellowhead disease free country

A country may be considered free from yellowhead disease when:

1. no recorded *outbreak* of yellowhead disease has occurred within its *territory* for at least the previous two years;
2. no *disease agent* listed in Article 4.1.3.1 has been detected in any *crustacean* belonging to the susceptible host species listed in Article 4.1.3.1 tested during operation of an official crustacean health *surveillance* scheme for a period of at least two years using the procedures described in the *Manual*;
3. it is observing the conditions referred to in Articles 4.1.3.6, 4.1.3.7 and 4.1.3.8.

Article 4.1.3.3.

Yellowhead disease free zone

A yellowhead disease free zone may be established within the *territory* of one or more countries if within the zone:

1. *aquaculture establishments* and wild populations containing *crustaceans* belonging to the susceptible host species listed in Article 4.1.3.1 have been tested in an official crustacean health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*;
2. no *disease agent* listed in Article 4.1.3.1 has been detected during this two-year period.

Such yellowhead disease free zones must comprise the entire water supply in an area complying with the definition of *zone/zoning* laid down in Chapter 1.1.1 Definitions in this *Code*.

Such zones must be clearly delineated on a map of the *territory* of the country concerned by the *Competent Authority* and the conditions referred to in Articles 4.1.3.6, 4.1.3.7 and 4.1.3.8 must be observed.

Article 4.1.3.4.

Yellowhead disease free aquaculture establishment

A yellowhead disease free *aquaculture establishment* may be located not only within a yellowhead disease free country or zone but also within a yellowhead disease infected zone provided that:

1. it has been tested in an official crustacean health *surveillance* scheme for at least the previous two years using the procedures described in the *Manual*, without detection of the disease agents listed in Article 4.1.3.1);
2. it is supplied by water disinfected with approved technical devices proven to inactivate the disease agents listed in Article 4.1.3.1);
3. there is a natural or artificial barrier that prevents contamination of the *aquaculture establishment* or its water supply;
4. it is observing the conditions referred to in Articles 4.1.3.6, 4.1.3.7 and 4.1.3.8.

Article 4.1.3.5.

Restoration of free status

A country, a zone or an *aquaculture establishment* may be restored to yellowhead disease free status if it has been subjected to a *stamping-out policy* or effective disease eradication measures and if no disease agent listed in Article 4.1.3.1 has been detected for the last two years of a *surveillance* scheme using the procedures described in the *Manual*.

A newly constructed *aquaculture establishment*, or one that has undergone a thorough *stamping-out policy* under supervision of the *Competent Authority*, may achieve yellowhead disease free status in under two years if it otherwise meets all the requirements for a yellowhead disease free *aquaculture establishment*.

Article 4.1.3.6.

When importing live *crustaceans* (fertilised eggs/nauplii, postlarvae, juveniles and/or broodstock) of any *susceptible species*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This certificate must certify, on the basis of an official crustacean health *surveillance* scheme comprising inspection and laboratory tests conducted according to the procedures described in the *Manual*, whether or not the place of harvest of the consignment is a country officially declared yellowhead disease free.

If the place of harvest of the consignment is not a country officially declared yellowhead disease free, the certificate must state whether the place of harvest of the consignment is:

1. a zone officially declared yellowhead disease free, or
2. an *aquaculture establishment* officially declared yellowhead disease free.

The certificate shall be in accordance with Model Certificate No. 4 given in Part 6 of this *Code*.

[Article 4.1.3.7.

Importing countries that are officially declared yellowhead disease free should only accept for importation live *crustaceans* belonging to the susceptible host species listed in Article 4.1.3.1 from *exporting countries* declared yellowhead disease free, or from clearly defined yellowhead disease free zones in countries not declared yellowhead disease free.

Importing countries not regarded as yellowhead disease free, but that have officially recognised yellowhead disease free zones, should only import live *crustaceans* belonging to the susceptible host species listed in Article 4.1.3.1 into such zones from other countries or zones that are officially declared yellowhead disease free.

For *aquaculture establishments* officially declared yellowhead disease free that exist in infected zones, the *Competent Authority* of the country concerned should only allow importation of live *crustaceans* belonging to the susceptible host species listed in Article 4.1.3.1 or fertilised eggs/nauplii from officially declared yellowhead disease free countries, zones, or *aquaculture establishments*.]

Article 4.1.3.8.

The *Competent Authority* of a country importing dead *crustaceans* belonging to the susceptible host species listed in Article 4.1.3.1 should require that the consignment be accompanied by an *international aquatic animal health certificate*, conforming to the Model Certificate No. 5, issued by the *Competent Authority* in the exporting country.

This certificate should declare the health status of the place of harvest of the consignment in respect of yellowhead disease and the other crustacean diseases listed in this *Code*.

[] deleted

I. Proposed criteria for listing an aquatic animal disease (June 2002)

No.	Criteria (A–C)	Parameters that support a listing	Explanatory notes
A. Consequences			
1.		Where it occurs, the disease has been shown to cause significant production losses due to morbidity ⁶ or mortality at a national or multinational (zonal or regional) level.	There is a general pattern that the disease will always lead to losses in susceptible ⁷ species, and that morbidity or mortality are related primarily to the agent and not management or environmental factors.
2.	Or	The disease has been shown to, or is strongly suspected to, negatively affect wild aquatic animal populations that are shown to be an asset worth protecting.	See above
3.	Or	The agent is of public health concern.	
B. Spread			
4.		Infectious aetiology of the disease is proven.	
5.	Or	An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	Infectious diseases of unknown aetiology can have equally high-risk implications as those diseases where the infectious aetiology is proven. Whilst disease occurrence data are gathered, research should be conducted to elucidate the aetiology of the disease and the results be made available within a reasonable period of time.
6.	And	Potential for international spread, including via live animals, their products and inanimate objects.	Under international trading practices, the entry and establishment of the disease is a likely risk.
7.	And	Several countries/zones are free of the disease based on the recommendations of the <i>International Aquatic Animal Health Code</i> and <i>Diagnostic Manual for Aquatic Animal Diseases</i> .	Free countries/zones could still be protected. Listing of diseases that are ubiquitous or extremely widespread would render notification unfeasible, however, individual countries that run a control programme on such a disease can demand its listing provided they have undertaken a scientific evaluation to support their request. Examples may be the protection of broodstock from widespread diseases, or the protection of the last remaining free zones from a widespread disease.
C. Diagnosis			
8.		A repeatable, robust means of detection/diagnosis exists.	A diagnostic test should be widely available, or has undergone a formal standardisation and validation process using routine field samples (see <i>OIE Diagnostic Manual for Aquatic Animal Diseases</i>).

6 'morbidity' includes, for example, loss of production due to spawning failure

7 'susceptible' is not restricted to 'susceptible to clinical disease' but includes 'susceptible to covert infections'

II. Proposed criteria for urgent notification of aquatic animal diseases (June 2002)

A. Listed diseases	
1.	First occurrence or re-occurrence of a disease in a country or zone of a country, if the country or zone of the country was previously considered to be free of that particular disease
2.	Occurrence in a new host species
3.	New pathogen strain or new disease manifestation
4.	Potential for international spread of the disease
5.	Zoonotic potential
B. Non-listed diseases	
1.	Emerging disease/pathogenic agent if there are findings that are of epidemiological significance to other countries

**GUIDELINES FOR APPLICANTS FOR DESIGNATION
AS OIE REFERENCE LABORATORY**

1. Name of expert (a brief and informal curriculum vitae should be included).
2. Name and address of laboratory (telephone and fax numbers, e-mail address, etc.).
3. Name of Director.
4. Number of staff available to carry out the specific OIE Reference Laboratory duties.
5. Experience in diagnostic testing for the disease using validated and calibrated techniques with capacity to process significant number of analyses (provide approximate number of tests performed annually for each technique).
6. Data and administration system to enable traceability of results.
7. Additional expertise, e.g. in disease agent characterisation techniques, molecular techniques, monoclonal antibody techniques.
8. Experience in standardisation of diagnostic tests.
9. Reagent production capability (provide details of current stock of reagents for the disease).
10. Capability for timely international shipment in accordance with the requirements for postage and packaging of biological materials described in chapter 1.5.6. of the OIE *International Aquatic Animal Health Code*.
11. Current and completed research and methods development projects on the disease, including a list of relevant publications.
12. Training and consultation experience for the disease in the past two years (courses provided, number of people trained, examples of international consultation).
13. Contribute to the preparation or reviewing of reference documents (chapters for the *Diagnostic Manual for Aquatic Animal Diseases*, fish disease cards, etc.).
14. Production of an annual report of activities to be sent the OIE Central Bureau.

AMPHIBIAN TRADE: DISEASE THREATS TO AMPHIBIANS AND FISH?

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Introduction

Over recent years, the numbers of reports of infectious diseases of amphibians have increased markedly, as, in general, have the scales of morbidity and mortality caused by these diseases. Of the many amphibian diseases known, two in particular (ranavirus disease and the fungal disease, chytridiomycosis) stand out in importance, because of their global distribution, their high mortality rates and, hence, their impact on amphibians. International concerns have been relatively slow to register the importance of these phenomena, but public concerns have generally been very high and increasingly louder warning bells are being rung in the scientific press.

Ranavirus diseases

One of these warning bells has concerned an epizootic of ranavirus disease, which probably kills tens of thousands of frogs in Great Britain annually. This disease was first noticed in the early 1990s, following increasingly large numbers of unsolicited reports from members of the public of mass mortality incidents of frogs. A combination of field work, post-mortem investigations, transmission experiments and laboratory analyses led to the detection of a ranavirus as the cause of a previously unreported, fatal, epizootic of common frogs (*Rana temporaria*) in Great Britain. Follow-up questionnaires and field investigations indicate a negative effect on, including local extinction of, frog populations at affected breeding ponds, which can endure for several years subsequent to the initial disease outbreak. Other species, namely the common toad (*Bufo bufo*) and pet tortoises (*Testudo* sp.), are also killed by this ranavirus.

Although ranaviruses have been isolated from amphibians for many decades, in recent years there has been a dramatic increase in the number and size of epizootics, with very high mortality rates in wild amphibian populations. Apart from the situation in Great Britain, perhaps the most notable of these have been repeated fatal epizootics in tiger salamanders (*Ambystoma tigrinum*) in Canada (1997) and in the United States of America (USA) (Arizona, 1995; North Dakota, 1998; Maine, 1998; and Utah, 1998). The outbreak in Arizona in 1995 decimated a large population of the Sonoran tiger salamander (*A. tigrinum stebbinsi*), an endangered subspecies.

Chytridiomycosis

The phenomenon of a global decline in amphibian populations has been recognised since the late 1980s. In Australia, for example, marked declines (with local extinctions) in amphibian populations have been monitored as spreading in a wave-like manner, from an initial focus in the southern New South Wales area, travelling northwards at approximately 100 km per year. By 1993, the wave of declines had spread throughout Eastern Australia. At the same time, a similar wave of amphibian declines and local extinctions travelled southwards through Central America, from northern Costa Rica in 1988 to western Panama by 1996. In 2000, this wave had reached Ecuador, and in 2001 declines started to be reported from Colombia. Concurrent with these waves of decline and local extinctions, were the global extinctions of the golden toad (*Bufo periglenes*) in Costa Rica and of up to seven species of rain forest frog (including the only two known species of gastric-brooding frog) in Australia.

In 1998, a paper was published in which a novel chytrid fungus was reported as causing the declines in amphibians in the rain forests of Australia and Central America. It was by combining the efforts of researchers in these two continents, through the auspices of the Pathology Working Group of the International Union for Conservation of Nature and Natural Resources (IUCN)'s Declining Amphibian Populations Task Force, that the chytrid discovery was made. Morphological and, latterly, genetic analyses of the causative agent has shown the cause to be the same organism, a new genus of chytrid – and the only chytrid known to infect vertebrates – which has since been named *Batrachochytrium dendrobatidis*. Retrospective studies have now shown that this disease caused marked amphibian declines, and local extinctions, in the mid-western and western USA, which

occurred in the 1970s. More recently, chytridiomycosis has been found as the cause of current marked declines of *Bufo boreas* in Colorado, USA, *Rana* spp. in Arizona, USA, the endemic Archey's frog in New Zealand and the midwife toad in Spain. The last adds a fourth continent to the list of infected regions of the world. It is difficult to predict the effect of the loss of multi-species assemblages, in often otherwise pristine habitat, on the ecosystems concerned and this is an area that is in urgent need of study.

Amphibian trade

There is a global trade in amphibians and their products for the purpose of: the pet industry, the food industry, the supply of biological materials and for other commodities, such as scientific or educational materials.

Knowing that this trade occurs is one thing, establishing the size of this trade is quite another. In the United Kingdom (UK), for example, Her Majesty's Customs & Excise code and record the import and export of both live and dead amphibians (including products). These are, however, coded along with other commodities. For example, live amphibians are coded along with "Live Animals NES: Other Live Animals NES", while dead amphibians are coded along with "Animal PDT and dead animals unfit for human consumption NES". This makes it impossible to extract information on amphibian imports/exports alone. In addition, it is very likely that many amphibian consignments are not declared to, or recorded by, customs officials. This is particularly likely as there is no regulation of amphibian movements, unless the species involved are protected, such as being listed under CITES⁸ (see below).

Of the approximately 5500 species of amphibians only 111 (approx. 2%) are CITES-listed. Although international trade figures are available from many countries, including the UK, for CITES-listed species, the numbers are extremely small compared with the figures for trade in non-CITES listed amphibians. Figures from the UK Government's Department for the Environment Food and Rural Affairs (DEFRA) indicate a negligible export market and a small, but growing, import market. According to these figures, over the past five years, an average of approximately 500 CITES-listed amphibians has been imported into the UK annually. The trend is upwards.

Another aspect of the amphibian trade the UK authorities keep records for, is the trade in frogs' legs for human consumption. Figures for recent years available from HM Customs & Excise are as follows:

YEAR	IMPORTS		EXPORTS	
	Quantity	Value (GBP)	Quantity	Value (GBP)
1999	28,583	102,659	697	4751
2000	127,293	196,876	4559	13,871
2001	50,483	147,919	2103	5612

Approximately 90% of these were recorded as being imported from the European Union (EU), with 10% coming from "Asia and Oceania". In fact, it is likely that most of the former were re-exports, having originated from a third country – most probably from Asia. In some Asian countries, such as Thailand and Indonesia, frog farming for the food market is a large and growing industry, with the EU as a major importer of these products. One newspaper reported the importation of seven tons of frogs' legs into France from Indonesia alone for a single 2-day festival in a single town in France.

It might be assumed that a general lack of figures is because international trade in amphibians is small and irrelevant. Figures from the USA, however, tend to dispute this. In the five-year period, 1996-2001, 26.5 million live amphibians were imported into the USA and 1.9 million live amphibians were exported from the USA. This is five times greater than the import trade in reptiles. Of the imported amphibians, 74% had been wild-caught, 23% captive-bred and 3% came from an unknown source. Of the exported animals, 72% were wild-caught or from an unknown source, while 28% were recorded as having been captive-bred. Most were re-exports, having been imported into the USA from a third country. Over 6 million amphibians imported into the USA were *Rana*

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catasbeiana, an endemic US species that is now farmed intensively in many South American countries to supply the US restaurant trade. Approximately 0.1% of the imported amphibians were of CITES-listed species.

The situation regarding world trade in amphibians is summed up by TRAFFIC, the wildlife trade monitoring programmes of the World Wildlife Fund (WWF) and the IUCN, which states on its Web site that: “The worldwide trade in live reptiles and amphibians is huge.” It also, quite correctly states: “Unlike the trade in live birds and mammals, the live reptile and amphibian trade is largely unregulated, with comparatively few species listed on CITES.”

Is trade a factor in the recent epizootics in wild amphibian populations?

Work on the ranavirus epizootic in Great Britain, including molecular and other laboratory, comparisons, indicates that all the British isolates fall within a clade of amphibian ranaviruses from North America and are more distantly related to ranaviruses from South America, Australia and continental Europe. The epidemiological and virological findings, therefore, suggest that the frog epizootic in Great Britain is caused by a virus that has been recently introduced from North America. There has been speculation that the importation of bullfrogs and goldfish from North America for the UK pet trade is a possible route of introduction of a North American ranavirus into Great Britain. The trans-Atlantic trade in these species increased markedly in the 1980s, and often in the UK, pet bullfrogs and goldfish are housed in outdoor garden ponds, which also are the primary breeding habitat for the common frog in the UK.

Similarly, molecular and DNA sequencing work on *Batrachochytrium dendrobatidis* by several independent groups has shown the causative agents in North America, South America and Australia to be indistinguishable from each other. This suggests a point source with global incursions and some authors believe the likeliest route of introduction was via the anthropogenic movement of infected materials, possibly amphibians or fomites (inanimate objects), but possibly also fish (it is currently not known if fish are capable of acting as vectors). Studies in New Zealand are more demonstrative, with an apparent close spatial and temporal association between outbreaks of chytridiomycosis in wild amphibians with the release of Australian frogs from the pet trade.

Are fish at risk?

Although goldfish have been implicated as possible vectors for the introduction of ranaviruses into Great Britain, it is possible that, conversely, ranavirus diseases of amphibians pose a threat to fish health. In addition to the common frog, the UK ranavirus has caused natural mortality in common toads and *Testudo* sp. **Tortoises, thereby crossing into a second animal Class.** The Australian amphibian ranavirus, BIV, has been used to infect fish (barramundi *Lates calcarifer*) experimentally, with a high degree of mortality. In the USA, an amphibian ranavirus (RCV) has been found naturally to infect and kill both red-legged frogs (*Rana aurora*) and fish (threespine stickleback *Gasterostelus aculeatus*). The extent to which amphibian ranaviruses will naturally cross Class barriers is very poorly understood. In Great Britain, however, there was a very highly significant association between the occurrence of an outbreak of ranaviral disease of frogs in a pond and the concurrent deaths of fish.

FDC Workplan for 2002 - 2003

Update *International Aquatic Animal Health Code*

- Re-draft *Code* chapter on Evaluation of Competent Authorities on the basis of the new chapter in the *International Animal Health Code (AHC)* on Evaluation of Veterinary Services
- Re-draft *Code* chapter 5.2.3 on disinfection of mollusc farms and circulate to FDC Members before next meeting
- Re-draft *Code* chapter 5.2.4. on disinfection of crustacean farms and circulate to FDC Members before next meeting
- Draft new *Code* chapter on destruction of carcasses in disease outbreaks and circulate to FDC Members before next meeting
- Draft new *Code* chapter on aquatic animal disease listing and notification

Update *Diagnostic Manual for Aquatic Animal Diseases*

- Finalise disease chapters at the January 2003 meeting for the fourth edition of the *Manual*
- Develop a new surveillance and sampling for surveillance chapter for the fourth edition *Diagnostic Manual*
- Develop a new template for disease chapters for future editions of the *Diagnostic Manual*

Meetings

- Representation at the APEC (Asia Pacific Economic Cooperation) Second Training/Workshop entitled Capacity and Awareness Building on Import Risk Analysis (IRA) for Aquatic Animals, to be held in Sinaloa, Mexico, 12–17 August 2002
- Representation at the Fourth International Symposium on Aquatic Animal Health to be held in New Orleans, USA, 2–5 September 2002
- Representation at FAO/DFO Canada/OIE Expert Consultation on Surveillance and Zonation for Responsible Movement for Live Aquatic Animals: A Framework for Reducing the Risk of Transboundary Spread of Aquatic Animal Diseases, Rome, 14–18 October 2002
- Representation at the Fifth Symposium on Diseases in Asian Aquaculture, to be held on the Gold Coast, Australia, 24–28 November 2002
- Provision of training at Phase 2 of the Training Programme on Mollusc Disease Diagnosis for Asian Countries, to be held on the Gold Coast, Australia, 2–6 December 2002
- Fish Diseases Commission meeting to be held in Paris, OIE headquarters, 6–14 January 2003

Other issues

- Evaluate the responses to the questionnaire sent to all OIE Delegates on the responsible body, legislation, policy, import statistics, etc., regarding amphibians
- Propose an expert on aquatic animal welfare issues to be nominated to the OIE Working Group on Animal Welfare
- Consider the advice from the Ad hoc Group on Risk Analysis for Aquatic Animal Health and agree tasks for the Commission for action to fulfil the recommendations of the OIE International Conference on Risk Analysis in Aquatic Animal Health, which was held in February 2000
- Propose to the President of the Regional Commission for Asia, the Far East and Oceania to include an aquatic animal health topic at the Regional Commission Conference to be held in New Caledonia in 2003

