

**REPORT OF THE SECOND MEETING
OF THE ASIA REGIONAL ADVISORY GROUP ON
AQUATIC ANIMAL HEALTH**



Network of Aquaculture Centres in Asia-Pacific

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Preparation of this document:

This report was prepared by the Asia Regional Advisory Group (AG) on Aquatic Animal Health (AGM-2) that met at the NACA Headquarters in Bangkok, Thailand, on the 10th-12th November 2003.

The Advisory Group was established by the Governing Council of the Network of Aquaculture Centres (NACA) to provide advice to NACA members in the Asia-Pacific region on aquatic animal health management, through the following activities: (a) Review and evaluation of regional aquatic animal disease reporting; (b) Review and evaluation of implementation of the *Technical Guidelines*; (c) Advise on identification and designation of regional aquatic animal health resources, including specialist advisers, Regional Reference Laboratories and Resource Centres; (e) Revision of the *Technical Guidelines*¹, *Manual of Procedures*² and *Asia Diagnostic Guide for Aquatic Animal Diseases*³ as required; and (f) Development of procedures for advising on dealing with aquatic animal health emergencies. Members of the Advisory Group include invited aquatic animal disease experts, World Animal Health Organisation (OIE), Food and Agricultural Organisation of the United Nations (FAO) and collaborating regional organizations.

The designations employed and the presentation of the material in this document do not imply that the expression of any opinion whatsoever on the part of the Network of Aquaculture Centres in Asia-Pacific (NACA) concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

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¹ Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing consensus and Implementation strategy, 2000. FAO/NACA. Fisheries Technical Paper No 402

² FAO/NACA. 2001. Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals. *FAO Fisheries Technical Paper*, No. 402, Suppl. 1. FAO, Rome. 2001. 106 p.

³ Bondad-Reantaso, MG, McGladdery SE, East, I and Subasinghe, RP. (Eds.). *Asia Diagnostic Guide to Aquatic Animal Diseases*. *FAO Fisheries Technical Paper*, No. 402, Suppl. 2. FAO, Rome. 2001. 236 p.

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INTRODUCTION

The second meeting of the Asia Regional Advisory Group on Aquatic Animal Health (AGM-2) was held at the NACA Headquarters, Bangkok, Thailand on 10th-12th November 2003.

Dr Michael Phillips of NACA formally opened the meeting. He welcomed the members and thanked them for their active involvement in the regional aquatic animal health program. Extending a special welcome to the OIE Deputy Regional Representative, Yoshiyuki Oketani, he appreciated the continued cooperation from the OIE Regional Office in Japan. Following the welcome remarks, the Advisory Group Chair Supranee Chinabut, took over as Chairperson of the Meeting, with Eva-Maria Bernoth as the Vice-Chair. The participants reviewed and adopted the AG Meeting agenda (Annex A). The list of Advisory Group (AG) members and meeting participants is provided as Annex B.

SESSION 1: PROGRESS REPORT

A report detailing recent activities and progress made since the first meeting of the Advisory Group (AG) in November 2002 was presented to the AG. The report identified issues for discussions during the meeting. Following the presentation, the session was opened for questions, comments and adoption of the progress report.

Following clarification regarding the implementation of the Technical Guidelines (TG) in certain countries, the AG members adopted the progress report. After the progress report adoption, sessions were held on various topics of relevance to the Terms of Reference (TOR) of AG and the work program of NACA.

SESSION 2: SURVEILLANCE, REPORTING AND RESPONSE TO DISEASE PROBLEMS

2.1 Emerging Diseases in the Region

The Chair requested the members to make presentations on emerging diseases in the region, initially focusing on those in the quarterly aquatic animal disease (QAAD) reporting system. Presentations and discussions focused on reports of occurrences, action taken by the countries and implications for the region. Recommendations and actions on how the region could respond in terms of management, surveillance, reporting and emergency preparedness were suggested.

2.1.1 Spring viraemia of carp (SVC). The meeting received information that SVC virus had been isolated from common carp and koi carp in China PR. Surveillance for SVC in ornamental fish has been going on from 2001 according to the procedures given in *OIE Manual of Diagnostic Tests for Aquatic Animals (OIE Aquatic Manual)*. Large numbers of samples of ornamental fish have been screened for SVC. SVC virus had been found in two farms in the Tianjian region. Based on gene sequencing analysis, this virus has 98% similarity to previous isolates of the SVC virus from Beijing held at the OIE Reference Laboratory for SVC in the UK. The results have been reported through the regional aquatic animal disease reporting system to NACA.

The SVC virus detected in China PR did not cause mortality, and there is ongoing work on surveillance, zoning and infectivity.

Recommendations

- NACA National Coordinators (NCs) should be made aware of this disease outbreak in the region.
- NCs in countries with susceptible species should take action to increase vigilance for SVC. This may include disseminating information on SVC, requesting reports on SVC, ensuring adequate diagnostic capability for SVC and increasing surveillance.

2.1.2 Koi herpes virus (KHV) and Koi mass mortality. The meeting was informed of the recent occurrence of KHV in Japan. The AG was told that KHV was confirmed in a number of prefectures in Japan and the Chief Veterinary Officer (CVO) is preparing a report for OIE. This is the first recorded occurrence in Japan and the origin of the virus is presently unknown.

The meeting also expressed concern about the continued occurrence of koi and common carp mass mortality in Indonesia and emphasized the urgent need to confirm the etiology.

The meeting noted research being done in Israel on similar disease outbreaks. These studies indicate that the pathology is more in the kidney and gills and for viral isolations kidney should be used instead of gills. The importance of confirming whether koi and common carp mortalities taking place in Japan, Indonesia and Israel are caused by the same pathogen or not was emphasized.

Recommendations

- In view of the occurrence of KHV in Japan, it was decided to add ‘infection with koi herpesvirus’ to the list of diseases prevalent in the region in the QAAD
- As there is no clear cut information on etiology of koi mass mortality taking place in Indonesia, it was recommended to retain the listing in QAAD as “Koi mass mortality” for the time being to facilitate collation of information
- In view of the new information available, it was recommended to revise and update the disease card on koi mass mortality/KHV and make it widely available to the NCs.
- It was also recommended that NCs in countries with susceptible species should take action to increase vigilance for KHV. This may include disseminating information on KHV, requesting reports on KHV, re-evaluating diagnostic capability for KHV and increasing surveillance

2.1.3 Grouper iridoviral disease. The occurrence of grouper iridoviral diseases, while generally accepted as being increasingly widespread, is not being officially reported. Since the listing of grouper iridoviral disease in the QAAD from January 2003, only Hong Kong China and Singapore have reported the occurrence of iridoviral diseases.

Recommendations

- In view of the increasing importance of marine fin fish culture in the region, the AG recommended NCs in countries with marine fin fish culture activities to further strengthen surveillance and reporting of grouper iridoviral diseases

2.1.4 Epizootic ulcerative syndrome (EUS). The report of EUS detected in a single rainbow trout (*Oncorhynchus mykiss*) in Australia was discussed as it was the first report in rainbow trout. The AG was informed that the occurrence of EUS in rainbow trout was an isolated finding in one animal, but the case had been confirmed. The occurrence and circumstances under which it was reported was explained to the AG.

2.1.5 Taura syndrome virus (TSV). TSV has been reported in the white shrimp *P.vannamei* in China PR, Indonesia and Thailand, although there is no clear epidemiological data to assess its impact. The AG noted that reporting of TSV may be constrained in some countries due to government bans or restrictions on *P.vannamei* introductions.

The AG expressed strong concern that the spread of TSV may be greater than indicated by QAAD reports and emphasized the need to improve reporting of TSV in the region, indicating the species in which it occurs.

Recommendations

- In view of the increasing spread of TSV in the region, the AG recommended that, regardless of legal status of *P.vannamei* in a country, NCs should report TSV occurrence.

2.1.6 White spot syndrome virus (WSSV). WSSV has been reported in *P.vannamei* in the region. The AG agreed that WSSV occurring in *P.vannamei* should be clearly reflected in the QAAD reports.

The importance of including affected species in all disease reports as an epidemiological comment on the QAAD form was emphasized.

2.1.7 Infectious hypodermal and haematopoietic necrosis virus (IHHNV). The AG discussed the recent report of IHHNV causing mortality in Indonesia. As this is an unusual finding (prevalence of IHHNV can be high in apparently healthy animals, but mortalities due to the virus are rare), it was recommended that further enquiries be made to confirm IHHNV as the cause of mortality.

Recommendations

- NACA should contact the NC of Indonesia and obtain further details and case study reports concerning IHHNV.
- NACA should confirm future reports by NCs on IHHNV-related mortality in consultation with the NC before publishing them in the QAAD. Case study reports should be prepared for the AG meeting. NCs should be given the opportunity to provide amendments to reports where appropriate.

2.2 Emerging Health Problems in the Region (not yet listed in the QAAD).

The AG discussed other emerging diseases, syndromes and pathogens of potential significance for the region. The AG emphasized the need for epidemiological studies, good disease outbreak investigations and clear case definitions to better understand these problems and their impacts. It noted the EUS case definition workshop (held during the Fifth Symposium on Diseases in Asian Aquaculture, Nov 2002) as a good example of a way to prepare a case definition.

2.2.1 Slow growth syndrome in *P. monodon* is emerging as a serious problem in Thailand. During 2002, slow growth of farmed *P. monodon* was reported in many shrimp growing areas of Thailand. The cause of the slow growth has not been determined but some recent (unpublished) studies indicate a viral agent may be involved. There is also concern that the condition followed the importation of Pacific white shrimp (*P. vannamei*). Hatchery operators now simultaneously produce postlarvae for both *P. vannamei* and *P. monodon*, providing an ideal opportunity for pathogen transfer between species. The syndrome has not been seen in *P. vannamei*. The AG recommended close monitoring of this syndrome and associated research developments.

2.2.2 Mourilyan virus is a Bunya-like virus found recently in *P. monodon* from Australia and Thailand and *P. japonicus* in Taipei China. The prevalence of the virus in wild *P. monodon* population is known to be high, and the virus is probably wide spread in the Asian region. Very high prevalence was recently detected in wild *P. monodon* brood stock collected from the Andaman Sea and Gulf of Thailand. The significance of this virus in causing mortality, growth reduction or its role under mixed viral infections is still not clear. The AG recommended close monitoring of associated research developments.

2.2.3 Peripheral neuropathy and retinopathy (PNR). An outbreak of PNR, a disease associated with gill associated virus (GAV) infection in farmed *P. monodon* has been reported from Australia. The AG emphasized the need for establishing the role of GAV in PNR and mid crop mortality syndrome (MCMS). This will enable a case definition to be established and facilitate reporting and collation of data on regional occurrence of this disease.

2.2.4 White tail disease/White body disease. The AG was informed of reports of white tail disease (WTD) causing mortalities in *Macrobrachium rosenbergii* hatcheries and farms in India and China PR. Two viruses, *Macrobrachium rosenbergii* nodavirus (MrNV) and extra small virus (XSV) have been recently found to be associated with WTD.

Recommendations

- A disease card for white tail disease should be prepared and made available to NCs.
- NCs should be informed of white tail/body disease. NCs in countries with *M. rosenbergii* farming should increase vigilance for this disease.

2.2.5 Abalone Die offs. Reports of recent die offs of abalone in Taipei China and China PR are a concern in the region. There is yet no confirmatory etiology, but

viruses and/or *Vibrio alginolyticus* have been implicated. Japan, Australia, Republic of Korea, Taipei China and China PR have large abalone industries, so the problem could be economically significant. In view of the importance of mollusc aquaculture to Asia, as well as movement of their spat and adults, efforts are required to better understand this problem, and generally improve reporting of mollusc diseases.

Referring to abalone die offs, the AG noted that such dramatic mortalities should be reported to OIE under the urgent notification provision for unlisted disease (article 1.2.1.3. 1. f of the *Aquatic Animal Health Code*).

The meeting was informed that abalone diseases were included in Phase II of the FAO/NACA molluscan health management training program (Queensland, November 2002) and will be included in the proposed Phase III program to continue raising awareness and diagnostic capability (see item 7.1 below).

Recommendations

- Noting the potential for the disease to spread in the region, the AG recommended to include “Abalone viral mortality” under unknown diseases of serious nature in the QAAD reporting form.
- The NACA secretariat should package available information on relevant molluscan diseases for the region and send to NCs.
- Recognising the seriousness of the problem and potential for widespread impacts, the AG suggested a task force be constituted to further investigate this problem.
- Relevant authorities in Taipei China and China PR may be contacted by OIE and NACA respectively for collaboration and to provide further information.

2.3 Implications for the Asia-Pacific of new disease outbreaks in Europe and N. America

The AG was informed of first detection and first reports of certain OIE-listed diseases in Europe and America (First detections of SVC in Switzerland, Denmark and the USA; mikrocytosis (*Mikrocytos mackini*) in the USA; MSX (*Haplosporidium nelsoni*) and SSO (*H. costale*) disease in Canada; EHN in Finland; and a new outbreak of IHN in Austria). It emphasized the advantages of such emergency reporting to trading partners. The AG noted the importance of strengthening emergency reporting mechanisms in the region, including OIE listed diseases and regional diseases of importance but not listed by the OIE (such as the new emerging diseases of koi herpes virus and abalone viral mortality).

Recommendation

- NACA should make the OIE emergency reports widely available in the region.
- The importance of emergency reporting should be emphasized to CVOs and NCs.

2.4 Review of QAAD Reports

A review paper on the QAAD reports from 1998 to 2002 was presented to the AG. The FAO/NACA/OIE regional QAAD reporting came into effect from the 3rd quarter

of 1998. Till December 2002, a total of 18 reports were published. Compliance by participating governments, quality and accuracy of disease reports and occurrence and distribution of important aquatic diseases in the region were examined in the review.

Responding to questions on the status of disease reporting in livestock, the AG was informed that accurate disease reporting – regardless whether on livestock or aquatic animal diseases – can be a generic problem in some countries. In such situations, it will be more difficult to address the specific problems existing for aquatics. However, if livestock disease reporting works well in a country, and problems exist only for aquatics, then such problems could be addressed specifically. The AG suggested collaboration between OIE and NACA to investigate whether those countries identified as having problems with accurate disease reporting in aquatic animals also have such problems with reporting livestock diseases.

Most countries in the region are aware of the regional disease reporting system. AG members were pleased with the awareness that had been raised by the regional QAAD reporting system and emphasized the importance of continuing to strengthen this collaborative program at international, regional and national levels. At national levels, the importance of strengthened cooperation between NCs and CVOs was emphasised.

The AG further suggested NCs strengthen networking among with aquatic animal health resources in the country to support effective reporting. Assistance should be provided in such networking where required. The AG recognized that long-term programs are necessary to build capacity in many countries. The AG agreed that the review paper should be “fed” back to the NCs for them to see how their reports fare compared with the others

Recommendations

- Revise the review paper and adopt a system of coding for countries (i.e. each recipient will be able to identify themselves, but not the other countries).
- Use levels instead of categories to group countries based on the quality of reports.
- Circulate the paper to AG for additional comments.
- Use the review to raise the profile of disease reporting in the region.
- Circulate the paper to NCs/CVOs, so that the NCs/CVOs and governments will realize and appreciate that the QAAD reports are useful and are analysed.
- NACA should organize technical missions to selected countries to support awareness raising and capacity building for disease reporting.

2.5 Update on the OIE Aquatic Animal Health Code and OIE Manual of Diagnostic Tests for Aquatic Animals

The President of the OIE Aquatic Animal Health Standards Commission (AAHSC) presented the most significant changes adopted by the OIE International Committee in May 2003 for the *Aquatic Code* and *Aquatic Manual* and incorporated in the latest (2003) versions of both documents. The new provisions include:

- Disease categories have been abolished, and there is now only one list of aquatic animal diseases. This list combines all those aquatic animal diseases that were previously listed as either ‘notifiable’ or ‘other significant’ by the OIE.
- New criteria for listing of diseases have been adopted. There are eight criteria under the headings ‘Consequences’, ‘Spread’ and ‘Diagnosis’. OIE members proposing to list an aquatic animal disease with OIE must demonstrate how the disease fulfils the new criteria.
- New disease reporting obligations for OIE Member Countries have been adopted. Whilst there is only one single list of aquatic animal diseases, there are two ‘categories’ of urgency for reporting. Regular reports on the status of all listed diseases must be provided to the OIE through the annual returns and – in the Asia Pacific region – through the QAAD reporting system. Under specific epidemiological circumstances, notification must be provided to the OIE within 24 hours.
- Urgent notification is also required for non-listed diseases if there is a case of an emerging disease or pathogenic agent should there be findings that are of epidemiological significance to other countries. In the *Aquatic Code*, an emerging disease means a newly recognised serious disease, the cause of which may or may not yet be established, that has the potential to be spread within and between populations, for example by way of trade in aquatic animals and/or aquatic animal products.
- New requirements have been adopted to declare a country or zone free from infection with a listed disease. These will differ depending on the previous infection status and will take into account: Absence of susceptible species; Historical freedom; Last known occurrence within the previous 25 years; and Previously unknown infection status. This is a huge step forward from the previous ‘one-size-fits-all’ approach of targeted surveillance of a fixed number of animals. Details on these new requirements are published in the *Aquatic Manual* in Chapter 1.1.4, but the format and content of the individual disease chapters in the *Aquatic Code* as well as *Aquatic Manual* will require substantial amendment to take into account these new requirements.

The President of the AAHSC stressed that in the context of disease reporting it is important to understand that the circumstances for regular as well as urgent notification do not require the presence of clinical disease or mortality. The 6th edition of the *Aquatic Code* clarifies in Article 1.2.1.2.4: “The presence of an infectious agent, even in the absence of clinical *disease*, should be reported.”

2.6 Outcomes from the June and October 2003 meetings of the OIE Aquatic Animal Health Standards Commission (AAHSC)

The President of the OIE AAHSC briefed the meeting on the key outcomes of last two AAHSC meetings. She advised that the draft meeting reports will be formally noted by the OIE International Committee at their General Session in May 2004. Like previous finalized meeting reports, they will then be available on the OIE website.

- The AAHSC suggests to remove some aquatic animal diseases from the current list as they do not fulfill the new criteria anymore. The revised (shortened) list will be submitted to the OIE International Committee for adoption.
- Based on the new requirements for declaration of freedom from disease (see above), the AAHSC has drafted new disease chapters for the *Aquatic Code* for

epizootic haematopoietic necrosis; infection with *Marteilia refringens*; and white spot disease. As a step towards harmonisation of the *Aquatic* and *Terrestrial Codes*, references to disease free aquaculture establishments were removed. The AAHSC has also substantially revised and simplified all model international aquatic animal health certificates. Based on comments received on the revised templates, the Commission will prepare the draft disease chapters for all diseases for OIE Member Country comment prior to finalisation and submission for adoption by the International Committee.

- Prof. Håstein (formerly the President of the then OIE Fish Diseases Commission) has been appointed as a Member of the OIE Working Group on Animal Welfare. The OIE Global Conference on Animal Welfare will be held at the OIE headquarters in February 2004. The presentations will include general topics such as pain, stress, starvation, etc., and aquatic animal welfare will be covered.
- The AAHSC has noted inconsistencies between data on aquatic animal diseases submitted by some OIE Member Countries for inclusion in Handistatus II and those published by the OIE Regional Representation for Asia and the Pacific in the quarterly aquatic animal disease reports. The entire OIE disease information management system will be revised to accommodate the new disease lists for aquatic and terrestrial diseases (see above) and the new reporting requirements for implementation in January 2005. The new system will also integrate weekly, monthly, and annual reporting.
- Like NACA, the AAHSC has also noted continuing problems with timeliness and accuracy of disease reporting by some OIE Member Countries; importantly, this includes the not-reporting of first occurrences of a listed disease. The OIE is addressing this problem by various means, including the better use of data held by OIE Reference Laboratories for aquatic animal diseases, and face-to-face presentations such as at the 23rd Conference of the OIE Regional Commission for Asia, the Far East and Oceania 25-28 November 2003 (see below).

It was pointed out that draft texts for the *Aquatic Code* and *Aquatic Manual* need to be carefully looked at by OIE Member Countries. However, it is the experience of the AAHSC that in many OIE Member Countries the Commission's meeting reports – which contain these draft texts – reach aquatic animal health experts either too late for meaningful comment, or not at all. This extremely low level of engagement is of concern to the OIE, because OIE Member Countries do not take up the opportunity to influence the setting of international standards that underpin international trade. Therefore, OIE has recently urged national delegates to ensure that aquatic animal health experts in their country as well as the appropriate aquatic animal health authority receive the Aquatic Animals Commission's reports.

2.7 Changes to QAAD reporting form

The meeting discussed changes required in the QAAD form. Some changes are required because of changes made to the OIE *Aquatic Code*. The AG suggested other changes because of the changing disease situation in the region. The changes are as follows:

- Addition of ‘spherical baculovirus (*Penaeus monodon*-type baculovirus or MBV) to ensure that all OIE-listed diseases appear on the QAAD form;
- Adjusting the names of OIE-listed diseases of molluscs as follows:

Old name	New name
Bonamiosis:	infection with <i>Bonamia ostreae</i>
	infection with <i>Bonamia exitiosus</i>
	infection with <i>Mikrocytos roughleyi</i>
MSX disease:	infection with <i>Haplosporidium nelsoni</i>
Marteiliosis:	infection with <i>Marteilia refringens</i>
	infection with <i>Marteilia sydneyi</i>
Mikrocytosis:	infection with <i>Mikrocytos mackini</i>
Perkinsosis:	infection with <i>Perkinsus marinus</i>
	infection with <i>Perkinsus olseni/atlanticus</i>
SSO disease:	infection with <i>Haplosporidium costale</i>
Withering syndrome of abalone:	infection with <i>Candidatus Xenohalotus californiensis</i>

- Removing reference to ‘notifiable’ (previously indicated by an asterisk behind the disease name);
- Adding ‘spring viraemia of carp’ to the list of diseases prevalent in the region and removing it from the list of diseases presumed to be exotic;
- Adding ‘infection with koi herpesvirus’ to the list of diseases prevalent in the region; and
- Adding ‘abalone viral mortality’ as an unknown disease of a serious nature.

The QAAD report form was modified accordingly. The new disease reporting form will be used for the reporting period Jan-March 2004. The form will be circulated with a brief background document and a joint OIE/NACA letter to all NCs and CVOs. The revised disease reporting form is provided in **Annex C**.

Recommendations

- The NACA secretariat with the assistance of experts develop case definitions / fact-sheets for the newly added diseases, for use by reporting officers. The fact sheet for ‘koi mass mortality’ should be revised and updated and include information on ‘koi herpesvirus’

The AG also agreed that it would be useful if more epidemiological information were provided with reported occurrences of disease, such as the species of animals affected. A typical example is the occurrence of white spot disease in *P. vannamei* (as opposed to *P. monodon*). It is an important record if WSSV is affecting *P. vannamei* in this region.

On improving the QAAD in its format and contents, the AG suggested that disease cards, diagnosis information, case study reports for new diseases and country disease status reports should be published in the QAAD.

2.8 Emergency Preparedness

The AG discussed emergency responses to serious disease outbreaks. The meeting was informed of emergency preparedness plans and programs developed and tested in Australia. Preparedness should happen during “peace time” (i.e. when there is no disease). When there is an emergency, the response should proceed according to the plans that have been developed. The members were informed of manuals developed for disinfection, destruction of animals, control center management systems and job cards, and disease-specific strategies. Simulated disease exercises are considered useful in Australia to test the preparedness plans developed. This simulation can range from table discussions to major field exercises.

Recommendation

- To prepare generic contingency plans for the region, bring together experiences from Australia and elsewhere.

The meeting was informed of the workshop in September 2004 on “emergency response to aquatic animal disease outbreaks: opportunities and challenges for developing countries” under the ongoing FAO TCP in Indonesia. FAO has invited NACA to cooperate in the workshop. Australia offered to provide the five currently available emergency plans on CD for distribution to NCs during the proposed workshop. The AG suggested the workshop consider developing an emergency preparedness model and/or manual using as examples of koi mass mortality and abalone die offs. The AG welcomed the initiative of FAO and the Government of Indonesia, and requested NACA to inform FAO of the suggestions made by the AG for inclusion in workshop planning.

2.9 Emergency Fund

The AG suggested the creation of an emergency fund to facilitate emergency response to new diseases in the region. Such funds might be used for travel of regional and international experts, with countries requesting emergency assistance being prepared to take care of the local logistics. On the proposal of setting a separate fund in NACA, suggestions were made to develop a more formal protocol and seek general agreement from member countries during the Governing Council Meeting (GCM).

The meeting was informed that countries may request emergency assistance from FAO through an emergency technical assistance program or FAO representative’s fund. The AG was noted that in the case of koi mass mortality in Indonesia, NACA played a vital role in creating awareness and bringing experts in a task force and in approaching FAO for further assistance. The AG suggested that during diseases emergencies in the region, the NACA should continue to play an active role in responding quickly.

SESSION 3: NATIONAL AQUATIC ANIMAL HEALTH STRATEGIES

3.1 Implementation of the Regional Technical Guidelines (TG)

The AG discussed a report on the status of TG implementation in participating countries.

The AG was pleased with the considerable progress in implementation of TG in some NACA member countries. It also noted with concern that progress in some countries was limited. As implementation of the Technical Guidelines is a long-term process, the AG recommended a continuous effort to motivate and support governments in initiating their health management programs. NACA assisted workshops had proved useful in the past, and should be initiated where appropriate to facilitate the process of TG implementation.

The AG was informed of the proposed workshop in 2004 on “Building capacity to combat invasive alien species and trans-boundary pathogens in aquaculture in the ASEAN region” which will give an opportunity to bring the NCs of ASEAN countries together and make further progress on the implementation of TG.

The AG noted that governments give more attention to their international obligations when trade issues start to affect them. Commitment and willingness on the part of the governments was emphasized as the primary requirement for implementation of the TG.

The meeting noted the SPS⁴ agreement had given special attention to the considerations of developing countries implementing SPS measures, and that considerable capacity building had been required. The AG was informed that WTO had organized workshops and seminars to facilitate WTO member countries to accomplish their international obligation. Members agreed that such workshops had been good starting points, but emphasized the need for continuous support to build capacity in developing countries in Asia.

3.2 Cooperation of veterinary and fisheries authorities

The president of the OIE AAHSC briefed the meeting on preparations for the forthcoming Conference of the OIE Regional Commission for Asia, the Far East and Oceania, Noumea, New Caledonia, 25–28th Nov 2003. A report on aquatic animal diseases has been prepared for this Conference. The purpose of the report will be to demonstrate a certain lack of interest of Veterinary Authorities in some OIE Member Countries, deficiencies in communications between Veterinary Authorities and other Competent Authorities involved in aquatic animal health, and inaccuracies and inconsistencies in aquatic animal disease reporting to the OIE. The report draws on experience by the OIE as well as on OIE Member Country replies to a questionnaire previously circulated. The Conference will then finalise a set of draft recommendations to improve the situation. These recommendations will be directed

⁴ World Trade Organization: Agreement on the Application of Sanitary and Phytosanitary Measures

towards OIE itself as well as towards its Member Countries and consist of discrete suggestions how to assist cooperation and improve communication between veterinary and other authorities responsible for aquatic animal health. Once finalised, the recommendations will be presented to the International Committee in May 2004.

The AG noted the update and welcomed that OIE actively seeks to improve cooperation between veterinary and fisheries authorities, which will hopefully also improve cooperation between Chief Veterinary Officers (CVOs) and NCs. The AG considered that the NCs were already functioning as focal points for aquatic animal diseases reporting, complementary to the OIE delegates. Further involvement in OIE standard setting, would strengthen NACA aquatic animal health program, disease reporting and TG implementation and improve the cooperation between veterinary and fisheries authorities in member countries.

3.3 Proposal to hold the OIE-AAHSC meeting back to back with AGM-4 in November 2005

This proposal was welcomed by the members as an excellent idea to strengthen the aquatic animal health activity of the region. The AG made the following suggestions:

- To propose to organize AAHSC meeting back-back with AGM-4 along with a national workshop on “National Strategies on Aquatic Animal Health in the Asia-Pacific Region”
- OIE Reference Laboratories for Aquatic Animal Diseases in the region should be involved in such a proposal
- The workshop should provide an opportunity to bring CVO and NCs together and help improve cooperation between veterinary and fisheries authorities in the region
- OIE, FAO and NACA should jointly undertake this activity
- The meeting was informed that such a proposal is consistent with OIE’s decentralization policy
- The AG requested the President of the OIE AAHSC to raise this proposal in the meeting of the OIE Aquatic Animal Health Standards Commission

3.4 Revision of Technical Guidelines (TG) and Supporting Documents.

The need for revision of Technical Guidelines and supporting documents was discussed in detail.

The AG was informed of the recent developments on quarantine procedures and guidelines for movement of live fish among ASEAN member countries. The Regional Seminar “ Harmonization of Quarantine Procedures for Live Fish Among ASEAN Member Countries” (February 24-26 , 2003, Penang Malaysia) succeeded in drafting “Guidelines for harmonization of quarantine procedures of live fish among ASEAN member countries”. The ASEAN Sectoral Working Group on Fisheries (ASWGF_i) in its 11th meeting held in May 2003, agreed to adopt the guidelines. To properly reflect the scope/contents articulated in the “Guidelines” and as the first step in the process, the ASWGF_i agreed that the scope of cooperation and title of draft be changed to “General Guidelines on Responsible movement of Live Food Fin Fish”.

The AG members felt that the TG are very broad and cover all the aspects required for live fish and saw no need for revision of TG at this time.

AG members discussed the testing procedures adopted for testing for aquatic pathogens in aquatic products (testing for viral pathogens in frozen shrimp/prawn). For example, polymerase chain reaction (PCR) detects only a fragment of DNA/RNA in the virus and not necessarily intact, viable virus. Thus a PCR positive result does not give a clear indication that there is presence of infectious material. The AG emphasized the fact that the use of PCR as a means of determining disease risk in aquatic animal products has not been validated. The AG agreed that the TG does not cover aquatic animal products.

3.5 Asia Diagnostic Guide (ADG) supplements

AG members discussed the process and procedures that could be used to develop ADG supplements.

Recommendations

- To contact the experts who developed the ADG chapters and request them to review the chapters and if required revise it.
- Invite new experts to contribute towards developing chapters for new diseases added to the list.
- Draft documents developed for new diseases should be provided for review by the AG.
- Prepare electronic versions of any new chapters, rather than print in hard copy.

3.6 Disease cards

The AG recognized the need for simple disease cards for important listed and non listed diseases in the region. It was suggested to approach the NCs and seek their advice on the type of information required and names of diseases for which such information is sought. Some of the AG members offered to provide technical assistance to NACA in developing the disease cards.

Recommendation

- To develop simple disease cards for important diseases in the region including listed diseases and make them widely available.

SESSION 4: WIDESPREAD ADOPTION OF BETTER AQUATIC ANIMAL HEALTH MANAGEMENT PRACTICES IN THE REGION

The AG was briefed on one element of the NACA health program that promotes and supports widespread adoption of better aquatic animal health management practices in the region. The approach adopted by NACA also addresses food safety issues as well as aquatic animal health management. In discussing this element of the NACA work program, the AG emphasized the importance of collaboration with the private sector.

SESSION 5: HARMONIZED DIAGNOSTIC PROCEDURES AND APPROACHES TO RISK ASSESSMENT IN THE REGION

5.1 Harmonization of diagnostic procedures

The AG emphasized the importance of harmonization of diagnostic techniques and the need for more inter-calibration exercise to determine capacity and deficiencies of laboratories with the aim of upgrading/improving skills. The AG felt that further harmonization of diagnostic methods for important diseases (fish/shrimp/mollusc) in the region should be carried out under through collaboration between NACA, FAO and OIE.

Recommendation

- NACA to organize ring testing and proficiency testing for regional diseases of importance, in collaboration with OIE and FAO.

5.2 Diagnostic laboratory capability survey.

The NACA secretariat had carried out a survey of diagnostic capabilities for regional list of aquatic animal diseases. Although there had been a good response in several countries, there was a need to extend the coverage of the survey. The AG made the following suggestions.

Recommendations

- To encourage laboratories to submit information by highlighting the benefits that are likely to accrue to such laboratories
- To approach individual laboratories on a personalized basis
- To promote better networking of laboratories within countries to provide effective diagnostic support.
- Encourage in-country networking through email lists, and by circulating regular news items and information.
- Promote active cooperation between the NCs and country aquatic animal health laboratory networks.

5.3 Three tier aquatic animal health regional resource base

The AG was informed of the procedures followed to collect information required for initiating the process of establishing the three-tier aquatic animal health regional resource base. The AG emphasized the importance of establishing the regional resource base and made the following recommendations.

Recommendations

- Continue to make personal contact with the list of Regional Resource Experts (RRE) and encourage their participation.
- Continue the process of formalizing cooperation with the institutions which have shown interest to become Regional Resource Centres (RRC) and Regional Reference Laboratories (RRL)
- Attempt to operationalize the resource base at three levels based on available information and interest, and see how it progresses over the next year.
- Explore incentives for participation in the resource base.

5.4 Risk assessment and introduction of *Penaeus vannamei* to the region

A comprehensive review on the “Introduction of *P.vannamei* and *P.stylirostris* into the Asia-Pacific Region is currently under preparation by FAO and NACA. Commissioning of this study was in response to the AGM-1 recommendations. A summary report presented at Yunnan Workshop in China “Use of international mechanisms for the control and responsible use of alien species in aquatic ecosystems” 27-30 August 2003 was made available to AG for review. The AG welcomed the document, and noted the following issues of concern.

- The effect of declining shrimp price, and influence of increased production of *P.vannamei* in the region
- Occurrence of TSV in Asia
- Increased disease risk as a result of continued introduction of uncertified stock of *P.vannamei*.
- Use of regional brood stock and proliferation of regional stocks of uncertain health status
- Difficulties in enforcing strict bans on movements adopted by some countries.
- Cohabitation of *P.monodon* and *P.vannamei* in hatcheries and farms, which can encourage transfer of pathogens between the species.
- Perception of farmers that TSV is not a serious problem compared to WSD
- Escape of *P.vannaemi* to the wild and possible impacts
- The need to make import decisions based on scientific import risk analyses
- The possibility of making safe introductions following proper health certification and quarantine procedures
- Creating an awareness among governments and NCs on the extent and spread of *P.vannamei* in the region as a result of both legal and illegal imports.
- The fact that SPF/SPR principles are still largely misunderstood in the region. To create increased awareness, it was suggested to circulate information on SPF/SPR concepts among NCs and other stakeholders. It was also suggested

to request the NCs to organize translation of such information into national languages and disseminate widely amongst the stakeholders.

SESSION 6: REGIONAL AND INTERNATIONAL COOPERATION

The AG discussed ongoing and planned regional and international cooperation in regional aquatic animal health. The AG was pleased to note the excellent regional and international cooperation that had contributed to the development and implementation of the regional aquatic animal health program in Asia. It was generally agreed that such cooperation should be further pursued and the AG took note of various opportunities to further strengthen cooperation between NACA, OIE, FAO, ASEAN, Australian Center for International Agricultural Research (ACIAR), European Union (EU), Asia Pacific Economic Cooperation (APEC), SEAFDEC, SPC and other regional and international bodies to support Asia in effective implementation of the regional aquatic animal health program. Several initiatives are described below.

6.1 Permanent Advisory Network for Diseases in Aquaculture (PANDA)

Information on PANDA, a European project to establish a network of experts was presented by Dr Franck Berthe. The aim of the project is to strengthen competencies through reinforcing and expanding the existing networks of the European Community and National Reference Laboratories for aquatic animal diseases and link these to other research institutes and diagnostic laboratories in Europe and elsewhere. In addition to enhancing exchange of knowledge, skills and scientific opinion in the area of aquatic animal health, a major purpose of the network is to provide the European Commission with a comprehensive source of scientific information and advice on issues related to policy and legislation in this area. A project web site will be established to disseminate information about the project, its objectives, progress and output. Experts in the different fields of aquatic animal health are being invited to submit their details to a database via the project web site on a voluntary basis. The database of experts will provide the lead participant for each work package of the project with a target group for electronic discussion forums on matters prioritised by the project steering group according to the current need for scientific information in support of European Union policy. The network activities will initially focus on (i) risk analysis of exotic emerging and re-emerging disease hazards, (ii) development of an epidemiology database and methods for disease surveillance and containment, (iii) evaluation of diagnostic methods and recommendations for standardisation and validation (iv) environmentally safe strategies for disease control, and (v) training needs and opportunities in research and diagnostics. Details of the environmentally safe strategies for disease control work package were provided as an example. Findings emerging from the network activities will be disseminated to all stakeholders and also collated into reports to the European Commission.

Recommendation

- The AG commended the PANDA project on its approach and recommended NACA seek cooperation with PANDA, recognizing its potential as a good platform for exchange of knowledge and experience between Europe and Asia in the field of aquatic animal disease control and health management.

6.2 *Perkinsus* Initiative

Dr Franck Berthe presented some issues related to infection of molluscs with *Perkinsus* species in the region. After a brief review of the current status of scientific information on taxonomy and epidemiology and impact of *Perkinsus* species on their hosts, the presentation identified areas where new developments in research are likely to improve management of this disease.

Perkinsus species are parasites infecting a large number of mollusc species and have been associated with high mortality outbreaks and economic losses. Two species, *Perkinsus marinus* and *P. olseni*, currently listed by the OIE, are reported from the region in clam and abalone. It was emphasised that the situation in the region is mirrored by serious concerns in Europe with regards to *Perkinsus olseni/atlanticus*. Following recommendations emerging from implementation of the regional mollusc training programme (Phase II, 2002), the International Council for the Exploration of the Sea Working Group on Pathology and Diseases of Marine Organisms 2003 Report and a technical workshop held during the 2003 International Conference of the European Association of Fish Pathologists, a bi-regional co-operative research initiative involving research groups in Asian and European countries is currently exploring funding opportunities.

The AG noted the FAO/NACA molluscan health program had initiated research on mollusk diseases in Asia, but that further collaborative research on molluscan pathogens should be encouraged. The proposed *Perkinsus* research was suggested as a potential important follow up activity to Phase III of the molluscan health program.

6.3 Food and Agriculture Organisation of the United Nations (FAO)

FAO expressed its support to the AG and its importance in coordinating aquatic animal health activities in the region. FAO welcomed the AG report of progress in implementation of the TG. FAO initiatives in aquatic animal health include: emergency support to Indonesia addressing the koi mass mortality, a recent review of the introduction of *P. vannamei* to the region, support to the FAO/NACA molluscan health training program, and the development of AAPQIS. In addition, the recently concluded Yunnan workshop (“Use of international mechanisms for the control and responsible use of alien species in aquatic ecosystems” 27-30 August 2003) emphasized many of the common priorities concerning the trans-boundary movement of aquatic animals.

6.4 Southeast Asian Fisheries Development Center (SEAFDEC)

SEAFDEC Aquaculture Department has a project on “Development of Fish Diseases Inspection Methodologies for Artificially-Bred Seeds” funded by Government of Japan-Trust Fund (GoJ-TF), as one of the collaborative projects of the ASEAN-SEAFDEC Fisheries Consultative Group (FCG). In pursuing the objectives of said projects, SEAFDEC and OIE organized a Seminar-Workshop on “Disease Control in Fish and Shrimp Aquaculture in Southeast Asia-Diagnosis and Husbandry

Technique” that was convened in Iloilo City, Philippines on 04-06 December 2001 with 60 participants from 12 countries. In this Seminar-Workshop, the need for a networking scheme for disease diagnosis and control in the region was further emphasized. The Seminar- Workshop recommended, among others, the conduct of an international training course on diagnosis of viral diseases. So far, two training courses on "Hands-on Training for Important Viral Diseases of Shrimp and Marine Fish" in collaboration with OIE and NACA have been held in 2002 and 2003 with participants from ASEAN and NACA member countries. SEAFDEC assured continued collaboration with NACA in advancing the regional aquatic animal health program.

6.5 Office International des Epizooties (OIE) (World Animal Health Organisation)

The OIE Regional Representation in Tokyo informed that it was important to continue and further develop cooperation in the collation and dissemination of disease status information and implementation of the regional health program. The SEAFDEC/NACA/OIE training course on "Hands-on Training for Important Viral Diseases of Shrimp and Marine Fish" had been a good example, and such cooperation should be strengthened in the future.

6.6 Association of South East Asian Nations (ASEAN)

The AG suggested further cooperation with ASEAN through development of joint projects and organizing workshops. The AG agreed that the proposed workshop “Building capacity to combat invasive alien species and trans-boundary pathogens in aquaculture in the ASEAN region” to be held in 2004, should be used as an opportunity to bring the NCs of ASEAN countries together, providing the basis of further cooperation on a long term program of action that will support implementation of the ‘Technical Guidelines’

6.6 Secretariat for the South Pacific (SPC)

The AG was informed of the proposed cooperation between NACA, FAO and the SPC in implementing risk assessments on movement of live aquatic animals in the Pacific.

SESSION 7: OTHER ISSUES

7.1 Phase III of the FAO/NACA Molluscan Health Management Program

The AG was informed of the present status in the planning of the Phase III of the molluscan health program. Phase III is planned for 2004 in Republic of Korea (to be hosted by National Fisheries Research and Development Institute in Busan). The proposed activities will include training in level III diagnostics (immunoassays, PCR, TEM) for molluscan diseases, inter-calibration exercise and presentation of survey

results for diseases of pearl oysters, edible oyster, abalone and country specific survey results

The AG welcomed this initiative, and advised NACA and FAO to consult further with the Government of Korea towards early implementation of the program.

7.2 Coordinated approaches to capacity building

Aquatic animal health management training programs are run in various institutions across the region. The AG emphasized the importance of continuing such capacity building efforts, but suggested more active coordination of training activities was necessary to provide effective and better-organized capacity building. The meeting was also informed of the SEAFDEC on-line courses, that the AG considered a promising way of delivering health management training.

7.3 Aquatic Animal Pathogen and Quarantine Information System (AAPQIS)

The new version of AAPQIS was demonstrated to the AG. AAPQIS is the FAO global aquatic animal health database available at www.aapqis.org. NACA is hosting the Asia-Pacific section of the AAPQIS database. The AG welcomed this FAO and NACA initiative and made the following suggestions for improvement of the Asia-Pacific section of AAPQIS:

- To focus on important disease for the region and provide a complete set of information, with a priority to diseases in the QAAD.
- Provide occurrence data as far as possible for important pathogens for all the 21 countries.
- The tracking facility available in the AAPQIS should be cross-linked with the OIE database to facilitate tracking of pathogens between countries in the region.
- To continue to build AAPQIS with more information about regional and national diseases important for the Asia-Pacific region.
- To ensure input from all countries, to ensure balance in the information provided.

The AG also noted that the OIE databases and AAPQIS are developed for separate purposes and are complementary.

7.4 Review of the AG Terms of Reference

The meeting reviewed the Advisory Group Terms of Reference, and suggested no revisions to the TOR.

Three new members will be appointed to the Advisory Group in 2004, and the AG members were requested to provide suggestions. NACA will submit the names to the NACA Governing Council in April 2004.

7.5 Meeting date

The meeting for AGM-3 was fixed for November 2004. The NACA Secretariat will advise the final date in good time.

SESSION 8: PRESENTATION OF MEETING REPORT AND CLOSING

The draft report was adopted and the meeting closed.

List of Appendices

Annex A. Meeting Agenda/Programme

Annex B. Meeting Participants

Annex C. Revised QAAD form

ANNEX A: ADVISORY GROUP MEETING PROGRAM

Monday, 10th November

Morning session 0900-1200h

- Welcome Remarks
- Review and adoption of agenda

Chair: Dr Supranee Chinabut

Vice-Chair: Dr Eva-Maria Bernoth

Session 1: Recent Activities and Expected Outputs from the AGM-2

- Presentation of progress report (since AGM-1) and identification of issues for discussion during the AGM-2

Session 2: Surveillance, Reporting and Response to Disease Problems

- Emerging diseases in the region
- Emerging aquatic health problems in the region (not yet listed in the QAAD)
- Implications for the Asia-Pacific of new disease outbreaks in Europe and North America
- Review of QAAD reports - report on the QAAD reporting system review paper
- Update on the OIE Aquatic Animal Health Code and OIE Manual of Diagnostic Tests for Aquatic Animals
- Outcomes from the June and October 2003 meetings of the OIE Aquatic Animal Health Standards Commission
- Changes to QAAD reporting form
- Emergency preparedness
- Emergency fund

Afternoon session 1330-1530h

Session 2: continued

Evening session 1600-1800h

Session 3: National Aquatic Animal Health Strategies

- Implementation of the Regional Technical Guidelines (TG)
- Cooperation of veterinary and fisheries Authorities
- Proposal to hold the OIE-AAHSC back to back with AGM-4 in 2005
- Revision of Technical Guidelines (TG) and supporting documents
- Asia Diagnostic Guide (ADG) supplements
- Disease cards

Tuesday, 11th November

Morning session 0900-1200h

Session 4: Widespread Adoption of Better Aquatic Animal Health Management Practices in the Region

Session 5: Harmonized Diagnostic Procedures and Approaches to Risk Assessment in the Region

- Harmonisation of diagnostic procedures
- Diagnostic laboratory capability survey
- Three tier aquatic animal health regional resource base
- Risk assessment and introduction of *Penaeus vannamei* to the region

Afternoon session 1330-1530h

Session 5: Continued

Evening session 1600h-1800h

Session 6: Regional and International Cooperation

- Permanent Advisory Network for Diseases in Aquaculture (PANDA)
- *Perkinsus* Initiative
- Food and Agricultural Organization of the United Nations (FAO)
- Southeast Asian Fisheries Development Centre (SEAFDEC)
- Office International des Epizooties (OIE) (World Animal Health Organisation)
- Association of South East Asian Nations (ASEAN)
- Secretariat for the South Pacific (SPC)

Session 7: Other Issues for Consideration

- Phase III of the FAO/NACA Molluscan health management program
- Coordinated approaches at capacity building
- Aquatic Animal Pathogen and Quarantine Information System (AAPQIS)
- Review of the AG Terms of Reference
- Date of next meeting

Wednesday 12th November

Morning session 0900-1200h

- Free/Report preparation

Afternoon session 1330-1800h

Session 8: Presentation of Meeting Report and Closing

ANNEX B: LIST OF PARTICIPANTS

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ANNEX C: QUARTERLY AQUATIC ANIMAL DISEASE REPORT

Country: _____ Period: _____

Item	Disease status ^{a/}			Level of diagnosis	Epidemiological comment numbers
	January	February	March		
DISEASES PREVALENT IN THE REGION					
FINFISH DISEASES					
OIE-listed diseases					
1. Epizootic haematopoietic necrosis					
2. Infectious haematopoietic necrosis					
3. <i>Oncorhynchus masou</i> virus disease					
4. Spring viraemia of carp					
5. Viral haemorrhagic septicaemia					
6. Viral encephalopathy and retinopathy					
7. Infectious pancreatic necrosis					
8. Epizootic ulcerative syndrome (EUS)					
9. Bacterial kidney disease					
10. Red seabream iridoviral disease					
11. Enteric septicaemia of catfish					
Non OIE-listed diseases relevant to the region					
12. Epitheliocystis					
13. Grouper iridoviral disease					
14. Infection with koi herpesvirus					
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with <i>Bonamia exitiosa</i>					
2. Infection with <i>Mikrocytos roughleyi</i>					
3. Infection with <i>Haplosporidium nelsoni</i>					
4. Infection with <i>Marteilia sydneyi</i>					
5. Infection with <i>Perkinsus olseni/atlanticus</i> ^{b/}					
Non OIE-listed diseases relevant to the region					
6. Infection with <i>Marteilioides chungmuensis</i>					
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Taura syndrome					
2. White spot disease					
3. Yellowhead disease (YH virus, gill-associated virus)					
4. Spherical baculovirus (<i>Penaeus monodon</i> -type baculovirus)					
5. Infectious hypodermal and haematopoietic necrosis					
6. Spawner-isolated mortality virus disease					
7. Tetrahedral baculovirus (<i>Baculovirus penaei</i>)					
8. Necrotising hepatopancreatitis					
Non OIE-listed diseases relevant to the region					
9. Baculoviral midgut gland necrosis					
UNKNOWN DISEASES OF A SERIOUS NATURE					
1. Koi mass mortality					
2. Akoya oyster disease					
3. Abalone viral mortality					
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

Prepared by:
 Name: _____
 Position: _____
 Signature: _____
 Date: _____

Endorsed by (OIE Delegate):
 Name: _____
 Position: _____
 Signature: _____
 Date: _____

DISEASES PRESUMED EXOTIC TO THE REGION, BUT LISTED BY THE OIE^(c)

Finfish: Channel catfish virus disease; Infectious salmon anaemia; Piscirickettsiosis; Gyrodactylosis (*Gyrodactylus salaris*); White sturgeon iridoviral disease

Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Mikrocytos mackini*; *Perkinsus marinus*; *Candidatus Xenohaliotis californiensis*; *Haplosporidium costale*

Crustaceans: Crayfish plague (*Aphanomyces astaci*)

a/ Please use the following symbols:

<p>+ Disease reported or known to be present</p> <p>+? Serological evidence and/or isolation of causative agent</p> <p>but no clinical diseases</p> <p>? Suspected by reporting officer but presence not</p>	<p>+() Occurrence limited to certain zones</p> <p>*** No information available</p> <p>0000 Never reported</p> <p>- Not reported (but disease is known to occur)</p> <p>(year) Year of last occurrence</p>
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b/ *Perkinsus olseni* and *P.atlanticus* are now considered conspecific. They may have different host species in different regions, and countries are encouraged to provide epidemiological comments where either of these agents occur.

c/ If there is suspicion or confirmation of any of these diseases, they must be reported immediately, because the region is considered free of these diseases.

1. Epidemiological comments:

(Comments should include: 1) Origin of the disease or pathogen (history of the disease); 2) Species affected; 3) Disease characteristics (unusual clinical signs or lesions); 4) Pathogen (isolated/sero-typed); 5) Mortality rate (high/low; decreasing/increasing); 6) Death toll (economic loss, etc); 7) Size of infected areas or names of infected areas; 8) Preventive/control measures taken; 9) Samples sent to national or international laboratories for confirmation (indicate the names of laboratories); 10) Published paper (articles in journals/website, etc). and 11) Unknown diseases: describe details as much as possible.)

Comment No.	
1	
2	
3	
4	
5	

2. New aquatic animal health regulations introduced within past six months (with effective date):