Review of OIE Regional Workshop on Emergency Aquatic Animal Disease Response in collaboration with NACA

Bali, Indonesia, 6-8 November 2013
35 participants including 11 country representatives
OIE Regional Workshop on Emergency Aquatic Animal Disease Response in collaboration with NACA
Bali, Indonesia, 6-8 November 2013

Summary Report

OIE Regional Representation for Asia and the Pacific

Summary Report
PPT for presentations available from OIE Asia Pacific website
Programme

- Organizational Presentations
- Country Presentations
- National Aquatic Animal Health Programmes
- Regional Aquatic Animal Health Programmes
- Case Studies on Emergency Animal Disease Response (molluscan, crustacean, finfish) followed by small group discussion
- Recommendations/ The way forward
Organizational Presentations

- OIE Aquatic Animal Health Code and Manual of Diagnostic Tests for Aquatic Animals
  - Dr. Hnin Thidar Myint (OIE Asia Pacific)

- FAO-NACA technical Guidelines on Responsible Movement of Live Aquatic Animals
  - Dr. Eduardo Leano (NACA)

- Quarterly Aquatic Animal Disease Reporting
  - Ms Nanae Takagishi (OIE Asia Pacific)

- Current Disease Trends in Aquaculture (global/regional)
  - Dr. Eduardo Leano (NACA)
Aquatic Animals Commission meeting in October 2013 proposed Article 1.2.3. ‘Criteria for listing an emerging aquatic animal disease’ be deleted.

Criteria for listing an emerging aquatic animal disease

- Infectious aetiology of the disease is proven.
- OR
- An infectious agent is strongly associated with the disease, but the aetiology is not yet known
- AND
- The agent is of public health concern.
- OR
- Significant spread in wild populations of wild or cultured aquatic animals
In Aquatic Animal Health Code 2014

- Article 1.2.3. defining criteria for a listing emerging disease is deleted.

- Infection with ostertoid herpes virus -1 microvariant was deleted (an emerging disease in the code 2013)
- AHPNS was not listed due to the deletion of the criteria.

- Article 1.4.4. requests member countries immediate notification and subsequent periodical reports in response to emerging diseases.
AHPNS

- The Aquatic Animal Health Commission considered and agreed
  - AHPNS cannot be included in the OIE list by due to the uncertainty on pathogen identity.
  - AHPNS cannot be listed as an emerging disease.
  - AHPNS meets the criteria of emerging diseases.
  - Occurrences of AHPNS should be notified to OIE in accordance with Article 1.1.3.

- ‘Disease Information card:
  Acute Hematopancreatic Necrosis Syndrome’ became available on OIE web site from Dec. 2013.
Progress made by 21 member governments (Asia Regional AAH Programme) on the major components listed in the Asia Regional Technical Guidelines.

<table>
<thead>
<tr>
<th>Seven Elements listed in the guidelines</th>
<th>Progress Made in Asia-Pacific Region (number of countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Disease diagnosis</td>
<td>10</td>
</tr>
<tr>
<td>Health certification and quarantine measures</td>
<td>10</td>
</tr>
<tr>
<td>Disease zoning</td>
<td>3</td>
</tr>
<tr>
<td>Disease surveillance and reporting</td>
<td>8</td>
</tr>
<tr>
<td>Contingency planning</td>
<td>3</td>
</tr>
<tr>
<td>Import risk analysis</td>
<td>4</td>
</tr>
<tr>
<td>National strategies and policy frameworks</td>
<td>11</td>
</tr>
</tbody>
</table>
Quarterly Aquatic Animal Disease (QAAD) Reporting
- Ms Nanae Takagishi (OIE Asia Pacific)

・QAAD reporting system is a joint activity between NACA and OIE Asia Pacific
・The Asia Regional Advisory Group reviews and evaluates QAAD reports and lists diseases of regional concerns.

List of diseases of regional concerns

<table>
<thead>
<tr>
<th></th>
<th>Finfish</th>
<th>Mollusc</th>
<th>Crustacean</th>
<th>Amphibian</th>
</tr>
</thead>
<tbody>
<tr>
<td>OIE-listed diseases</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Non OIE-listed</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

15-17 countries among 26 member countries submit all reports.
Current Disease Trends in Aquaculture (global/regional)  
-Dr. Eduardo Leano (NACA)

- Aquaculture Trends
- Important diseases in Asia Pacific

Fin fish:
  - Epizootic ulcerative syndrome (EUS)
  - Koi herpesvirus (KHV) disease
  - Viral nervous necrosis (VNN)
  - Grouper iridoviral disease (GIV)

Crustacean:
  - White spot disease (WSD)
  - White tail disease (WTD)
  - Acute hepatopancreatic necrosis syndrome (AHPNS)
Country presentations

Prior template for presentation included:

• Aquatic Animal Health (AAH) situation
• Policies and regulation on AAH management
• Emergency preparedness and contingency planning
• The Way forward

Bangladesh - Dr Malay Sanker Dey
India - Dr. I. A. Siddiqui
Indonesia - Mr. Maskur Maskur
Myanmar - Dr. Zaw Win
Sri Lanka - Dr. G. R. Arachcige
Vietnam - Dr. Le Van Khoa

Diversities among countries
Cultured aquatic animal species
Major diseases of concerns
National AAH Programmes

• China- Dr. Dongyue Feng
  Aquatic animal disease contingency plans (2005)

• Japan- Dr. Keiko Okamoto
  Amendment of the Fisheries Resources Protection Law (2007) in response to Koi herpes virus disease & Nishikigoi Export Program

• The Republic of Korea- Dr. Mi Young Cho
  Aquatic Animal Disease Control Act (2008)
Regional AAH Programs

- Southeast Asian Fisheries Development Center-Aquaculture Department (SEAFDEC-AQD)- Dr. Joselito Somga
  - Surveillance of Tilapia and mudcrab pathogens
  - On-site training on freshwater fish health management in Myanmar and Cambodia

- South Asian Association for Regional Cooperation (SAARC)
  - Mr. P. K. Kolaventre
Case studies on Emergency Aquatic Animal Disease Response

- Mollusc and Ascidian
  Akoya oyster disease and the Soft tunic diseases
  - Prof. Tomoyoshi Yoshinaga (Japan)

- Fin fish
  Koi herpes virus (KHV) disease
  - Dr. Kei Yuasa (Japan)

- Crustacean
  Acute haepatopancreas syndrome (AHPNS/EMS)
  - Ms. Jaree Polchana (Thailand)

- Small group discussion after the presentations
Akoya (pearl) oyster disease in Japan
suddenly appeared in most pearl producing areas in 1996

“The Sea of Pearls Becomes a Graveyard”
Akoya (pearl) oyster disease in Japan

- The first outbreaks in most pearl producing areas in Japan all at once in autumn 1996
- Infectious nature of the disease proven in May, 1998, (1.5 years after the first outbreak)
- Pathogen unrevealed yet (probably viral disease) (19 years after the first occurrences)
- Diagnosis based on histology only
- Epidemiology
  - China ⇒ Ehime Prefecture
  - Rapid spread with transportation of mother akoya oysters
- Containment and eradication failed
- Counter measure
  - Pearl production using cross-bred Akoya oysters between Japanese oysters and Chinese oysters
The disease triggered the depletion of pearl industry.
Soft tunic disease of sea squirt

- First outbreak occurred in Miyagi prefecture 2007
- Clinical sign: Destruction of the tunic
- Pathogen: the flagellate, *Azminobodo hoyamushi*
- Susceptible hosts:
  - Sea squirts
    - *Halocynthia roretzi (cultured)*
    - *Styela clava*
    - possibly some other sea squirts
The disease first occurred in Korea in 1995 and much affected sea squirt culture in Korea.

Pathogen was not revealed in Korea.
Actions of the local government in Miyagi Prefecture before the first outbreak of the disease

In May 2004
The first recognition of the presence of the disease in Korea by Japanese sea squirt farmers and a local government

From Sep 2005 - Jan 2007
Local government issued warning on the disease three times, requesting farmers voluntary restraint of importing sea squirt seeds, though they did not know the infectivity and pathogen of the disease.

Even after the warnings, some farmers introduced sea squirt seeds from Korea, due to the absence of legislation to ban the importation and due to lack of knowledge on the disease.

In Jan. 2007, the first outbreak of the disease was confirmed by the local government.
Spread of the disease in Miyagi Prefecture


Aug. 2008  Infectious nature of the disease was proven
Apr. 2010  Pathogen was specified.

Mar. 2011  A tsunami hit Miyagi Prefecture and destroyed aquaculture facilities and industry there.

Summer 2011  Infected wild sea squirts were found in some areas.
Recommendations based on discussion

Recognizing low capacity of diagnosis of molluscan diseases in this region and the difficulties of containment and eradication of molluscan diseases in open-water culture systems;

- International supports are necessary in order to develop capacity on field level diagnosis and laboratory tests.
- Proper and strict quarantine and preventive measures should be applied for movement of live animals.
Koi herpes virus disease in Japan

**Occurrence**

- 1996 UK
- 1997 USA, Israel, Germany
- 1998 Korea
- 1999 Belgium
- 2001 China, Netherland
- 2002 Taiwan, Indonesia, Denmark
- 2003 **Japan**, South Africa, Switzerland
  - Austria, France

**June 2003**
Listed as an object of import and domestic quarantine and inspection by the Japanese government

**2006** Listing by OIE
June 2003: Listing by the government

Nationwide transfer of live carp from the lake to aquaculture farms, restaurants and game fishing facilities even during the outbreak

Nov. 2\textsuperscript{nd}: Confirmation of KHV by a national laboratory

Ban of transfer of carp from Lake Kasumigaura by the government.
Nishikigoi Export Program

- Registration of Nishikigoi farms
  - Surveillance of specified diseases (twice/year, for 2 years)
  - Biosecurity planning
- Issue of health certificates by local governments
  - Examination of animals and documents by laboratories of local governments or authorized laboratories

Registered farms are exporting Nishikigoi.
Discussion on KHVD focusing on

- Diagnostic methods
- Prevention from spreading
- Prevention from importing pathogens
- Host susceptibility
Occurrence of AHPNS

- China 2009
- Vietnam 2010
- Malaysia 2011
- Thailand 2012
- Mexico 2013

Identification of pathogen 2012
NACA regional response to AHPNS

- Recognizing the problem
  Alerting NACA regional advisory group (AG), OIE and FAO May 2011
  Discussion in AG Nov. 2011

- Alerting competent authorities (CA) and dissemination of knowledge
  Formal Circular to CA and Disease advisory May 2012

- Convening of Asia Pacific emergency regional consultation on AHPNS Aug. 2012
  Technical report and Disease card

  prior to the identification of the causative agent

- Follow-up disease advisory March 2013
Early Mortality Syndrome (EMS)/Acute Hepatopancreatic Necrosis Syndrome (AHPNPS): An emerging threat in the Asian shrimp industry

Edward M. Leafe and C.H. Milton
NACA, Bangkok, Thailand

The Asia-Pacific region, being the top producer of aquaculture products in the world, is continuously beset by emerging aquatic animal disease problems causing high mortalities and economic losses among small farmers as well as commercial producers. Over the last couple of decades, several diseases (e.g. infectious haematopoietic necrosis, white spot syndrome, yellows disease, Taura syndrome) have caused significant devastation in the shrimp aquaculture of the region, causing the collapse of some industries (e.g. Penaeus vannamei). Recently, a new emerging disease known as early mortality syndrome (EMS) or shrimp acute hepatopancreatic necrosis syndrome or AHPNPS has been reported to cause significant losses among shrimp farmers in China (2008), Vietnam (2010) and Malaysia (2011). It was also reported to affect shrimp in the eastern Gulf of Thailand (Pepal, 2012).

The disease affects both P. monodon and P. vannamei and is characterized by mass mortalities (ranging up to 100% in some cases) during the first 20-30 days of culture (post-cocoon to grow-out ponds). Clinical signs include slow growth, darkening of the tissue, nose swelling, albumen, and sudden death. The primary pathogens (considering the disease is infectious) have not been identified, while the presence of some microorganisms including Vibrio, psychrophilic anaerobic and nematode has been observed in some samples. Lightner et al. (2012) described the pathological and etiological details of this disease. Histological examination showed that the effects of EMS in both P. monodon and P. vannamei appear to be limited to the hepatopancreas (HP) and show the following characteristics:

1. Lack of histic activity in generative cells of the HP.
2. Dysfunction of central hepatopancreatic cells and accessory cells.
3. Proximal hepatocytes and necrotic masses of central HP tubule epithelial cells.
4. Terminal stages including massive interstitial hemorrhagic aggregation followed by secondary bacterial infections.

Histopathological results were obtained by Pauwels et al. (2012) on shrimp samples collected from Chantaburi and Rayong provinces in early 2013 (Figure 1). The progressive destruction of the HP results from lesions that result in degeneration and dysfunction of the tubule epithelial cells that progress to post-cocoon to grow-out HP tubules. This degeneration of the HP is highly suggestive of a toxin disease, but additional information suggests that disease spread patterns may be consistent with an infectious agent.

In China, the occurrence of EMS in 2009 was initially ignored by most farmers. But in 2011, outbreaks became more serious especially in farms with culture history of more than 5 years and those closer to the sea using early winter water of 15-18°C (Pepal, 2012). Shrimp farming in Hainan, Guangdong, Fujian and Guangxi suffered during the first half of 2011 with almost 80% losses.

Network of Aquaculture Centres in Asia-Pacific
Bangkok, Thailand
9-10 August 2012

Unconfirmed Outbreaks
NACA has also received several reports on early mortality in shrimps from other countries in the region. Though, so far, unconfirmed reports (as confirmatory diagnosis by histopathology) were not performed. In response to this, the Asia Regional Advisory Group on Aquatic Animal Health (AAG) has decided to include AHPNPS in the list of reportable diseases for GARD (Quarterly Aquatic Animal Disease) Reporting in Asia Pacific starting in the first quarter of 2013. This is for the sole purpose of gaining more information about the disease within the region (NACA, 2012. AAG 11: Report of the Meeting: http://www.naca.org/ftp/aag/documentation/2013/11会议报告-AAG11-2013-2季度会议报告-澜沧-181002-GARD报告.pdf).

Acute Hepatopancreatic Necrosis Syndrome (AHPNPS): Status Update

Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand
Action plans for mitigating the impact of AHPN (Thailand)

- Setting of local and central war rooms
- Surveillance and monitoring program
- Mitigation and management measures to lessen the EMS/AHPNS Risk (from early 2013)
  - Improvement of hatchery sanitation
  - Improvement of nursery sanitation management
  - Improvement of shrimp farm management
- Measures for management and control of EMS/AHPNS outbreak in shrimp farm
- Importation of Pacific white shrimp broodstock
- Ongoing research
- Communication and public awareness

Outcomes “Occurrence of AHPNS is likely to decrease”
Discussion on AHPNS

Major elements for response to an emerging disease

- Awareness programs
- National surveillance and mandatory reporting
- Task force or Emergency team
- Legislation for control of AHPNS
- Training program at national level for different stakeholders
- Application of standard guidelines for movement of live shrimps (e.g. IRA) and culture management practices (e.g. BMPs, GAPs)
## Major foreign epidemics in Japan

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Year</th>
<th>Origin</th>
<th>Host change</th>
<th>Impact on wild populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPN in salmonids</td>
<td>1964</td>
<td>USA?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IHN in salmonids</td>
<td>1970</td>
<td>USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKD in salmonids</td>
<td>1973</td>
<td>USA</td>
<td></td>
<td></td>
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<tr>
<td><em>Pseudomonas</em> in eel</td>
<td>1970</td>
<td>Europe</td>
<td></td>
<td></td>
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<tr>
<td>Cold water disease of salmonid and Ayu</td>
<td>1985</td>
<td>USA</td>
<td></td>
<td>Ayu</td>
</tr>
<tr>
<td>EIBS in coho salmon</td>
<td>1986</td>
<td>USA</td>
<td></td>
<td></td>
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<tr>
<td>Iridovirus in red seabream</td>
<td>1990</td>
<td>HongKong?</td>
<td></td>
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<tr>
<td><em>Neobenedenia</em> in marine fishes</td>
<td>1991</td>
<td>China</td>
<td></td>
<td></td>
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<tr>
<td>WSSV</td>
<td>1993</td>
<td>China</td>
<td></td>
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<tr>
<td><em>Neoheterobothrium</em> in olive flounder</td>
<td>1993</td>
<td>USA</td>
<td></td>
<td></td>
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<tr>
<td>Akoya oyster disease</td>
<td>1994</td>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KHV</td>
<td>2003</td>
<td>Indonesia?</td>
<td></td>
<td></td>
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<tr>
<td><em>Edwardsiella ictaluri</em> in Ayu</td>
<td>2007</td>
<td>USA?</td>
<td></td>
<td></td>
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<tr>
<td>Soft tunic disease of sea squirt</td>
<td>2007</td>
<td>Korea</td>
<td></td>
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<tr>
<td><em>Xenohaliotis</em> in abalone</td>
<td>Before 2011</td>
<td>?</td>
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<td>?</td>
</tr>
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Red: emerging diseases with no or little knowledge prior to invasion