

OIE Initiatives on Acute Hepatopancreatic Necrosis Disease (AHPND) and Other Aquatic Animal Diseases in Asia

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Abstract

The World Organization for Animal Health (OIE) is an intergovernmental organization established in 1924 responsible for improving animal health and welfare worldwide to facilitate safe international trade of animals and animal products while avoiding unnecessary impediments to trade. OIE, as a reference organization of the World Trade Organization (WTO), works to set and update its international standards (OIE Codes and Manuals) regularly through transparent and democratic procedures. The Aquatic Code defines an OIE list of notifiable aquatic animal diseases according to the criteria for listing, which comprise consequences, spread and diagnosis. To be listed, a disease should meet the criteria of each characteristic defined in the Aquatic Code. The acute hepatopancreatic necrosis disease (AHPND) has been officially included in the OIE-listed diseases since May 2015 and officially enforced since 1 January 2016. To fulfill its overall vision which can be summarized by its slogan *Protect animals and Preserve our Future*, the OIE Regional Representation in Tokyo, Japan and Sub-Regional Representation in Bangkok, Thailand, are working in concert to provide regionally adapted services to OIE Members so that surveillance and control of animal diseases in the region may be strengthened.

Introduction

The World Organization for Animal Health (formerly the Office International des Epizooties or OIE) is an intergovernmental organization established in 1924 responsible for improving animal health and welfare worldwide (OIE, 2016a). In the current trend of globalization, animal health measures have increasing importance to facilitate a safe international trade of animals and animal products while avoiding unnecessary impediments to trade. In light of this, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) encourages the members of the World Trade Organization (WTO) to base their sanitary measures on international standards, guidelines and recommendations, where they exist (OIE, 2016g). The objective of listing is to support Member Countries' efforts to prevent the transboundary spread of important diseases

of aquatic animals through transparent and consistent reporting. The corresponding disease-specific chapters in the Aquatic Code provide standards for safe international trade in aquatic animals and their products (OIE, 2016b).

The OIE Aquatic Animal Health Code (the Aquatic Code) sets out standards for the improvement of aquatic animal health and welfare of farmed fish worldwide, and for safe international trade in aquatic animals (amphibians, crustaceans, fish and molluscs) and their products. The health measures in the Aquatic Code should be used by the Competent Authorities of importing and exporting countries for early detection, reporting and control of agents pathogenic to aquatic animals and to prevent their transfer via international trade in aquatic animals and their products, while avoiding unjustified sanitary barriers to trade (OIE, 2016b).

OIE code and manual

The OIE is recognized by the WTO as a reference organization for standards relating to animal health and zoonoses including aquatic animal diseases (OIE, 2016e). The OIE publishes 2 codes (Terrestrial and Aquatic) and 2 manuals (Terrestrial and Aquatic) as the principal references for WTO members.

The Terrestrial Animal Health Code (Terrestrial Code) and the Aquatic Animal Health Code (Aquatic Code) respectively aim to assure the sanitary safety of international trade in terrestrial animals and aquatic animals, and their products (OIE, 2016g).

The Terrestrial Code was first published in 1968 and the Aquatic Code was introduced to the public in 1995. The codes traditionally addressed animal health and zoonoses, however, in recent years, they have expanded to cover animal welfare, animal production, food safety, consistent with the expanded mandate of the OIE which is to improve animal health worldwide (OIE, 2016j). The same adoption applies more or less to the Aquatic Code as well.

The Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (Terrestrial Manual) and the Manual of Diagnostic Tests for Aquatic Animals (Aquatic Manual) provide a harmonized approach to disease diagnosis by describing internationally agreed laboratory diagnostic techniques. These manuals were published in 1989 and in 1995, respectively (OIE, 2016g).

The OIE regularly updates its international standards as new scientific information comes to light, following its established transparent and democratic procedures. The development of these standards and recommendations is the result of the ongoing work by the OIE Aquatic Animal Health Standards Commission (Aquatic Animals Commission) (OIE, 2016g). This Commission, founded in 1960 and comprises six elected members, meets twice yearly to address its work programme (OIE, 2016c). The Commission is elected by the International Committee for a three-year term. The current

President of the Commission is Dr. Ingo Ernst from Australia (Department of Agriculture and Water Resources) with Professor Mohamed Shariff Bin Mohamed Din from Malaysia (University of Putra Malaysia) as its member (OIE, 2016d).

This Commission compiles information on diseases of fish, molluscs and crustaceans and on methods used to control these diseases and draws upon the expertise of internationally renowned specialists to prepare draft texts for new articles of the Aquatic Code and the Aquatic Manual and to revise existing articles. The Commission also organizes scientific meetings on diverse topics of importance to aquaculture (OIE, 2016c).

The only pathway for adoption of a standard is via approval of the World Assembly of Delegates meeting in May each year at the OIE General Assembly (OIE, 2016g). The views of OIE national delegates are routinely sought through the twice yearly circulation of new or revised texts. Member countries are strongly encouraged to get involved more actively in the OIE standard setting process.

OIE listed diseases

The Aquatic Code defines the OIE list of notifiable aquatic animal diseases according to the criteria for listing, which comprise consequences, spread and diagnosis. To be listed, a disease should meet the criteria of each characteristic defined in the Aquatic Code. The list is reviewed on a regular basis and in case of modifications adopted by the World Assembly of Delegates at its annual General Session, the new list comes into force on 1 January of the following year. For year 2016, the list includes 28 aquatic animal diseases, out of which, 9 diseases are specifically for shrimps and/or prawn (Table 1) (OIE, 2016h).

Diseases proposed for listing should meet the relevant criteria as set out in (a) consequences, (b) spread, and (c) diagnosis. Such proposals should be accompanied by a case definition for the disease under consideration (OIE, 2016b).

Table 1. OIE listed diseases of crustaceans

No.	Disease	Susceptible Species ¹
1	Acute hepatopancreatic necrosis disease ²	<ul style="list-style-type: none"> • Giant tiger prawn (<i>Penaeus monodon</i>) • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>)
2	Crayfish plague (<i>Aphanomyces astaci</i>)	<ul style="list-style-type: none"> • All species of crayfish in all three crayfish families (<i>Cambaridae</i>, <i>Astacidae</i> and <i>Parastacidae</i>)
3	Infection with yellow head virus	<ul style="list-style-type: none"> • Giant tiger prawn (<i>P. monodon</i>) • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>) • Blue shrimp (<i>P. stylirostris</i>) • Dagger blade grass shrimp (<i>Palaemonetes pugio</i>) • Jinga shrimp (<i>Metapenaeus affinis</i>)
4	Infectious hypodermal and haematopoietic necrosis	<ul style="list-style-type: none"> • Giant tiger prawn (<i>P. monodon</i>) • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>) • Blue shrimp (<i>P. stylirostris</i>)
5	Infectious myonecrosis	<ul style="list-style-type: none"> • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>)
6	Necrotising hepatopancreatitis	<ul style="list-style-type: none"> • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>) • Blue shrimp (<i>P. stylirostris</i>) • Northern white shrimp (<i>P. setiferus</i>) • Northern brown shrimp (<i>P. aztecus</i>)
7	Taura syndrome	<ul style="list-style-type: none"> • Whiteleg shrimp/Pacific white shrimp (<i>P. vannamei</i>) • Blue shrimp (<i>P. stylirostris</i>) • Northern white shrimp (<i>P. setiferus</i>) • Southern white shrimp (<i>P. schmitti</i>) • Greasyback prawn (<i>M. ensis</i>) • Giant tiger prawn (<i>P. monodon</i>)
8	White spot disease	<ul style="list-style-type: none"> • All decapod (order <i>Decapoda</i>) crustaceans from marine, brackish and freshwater sources.
9	White tail disease	<ul style="list-style-type: none"> • Giant freshwater prawn (<i>Macrobrachium rosenbergii</i>)

¹For the purposes on the Aquatic Code chapter, the terms shrimp and prawn are used interchangeably (OIE, 2016b)

² From the Chapter Acute hepatopancreatic necrosis disease (AHPND); still on drafting process (COMMISSION, 2016)

Given the inclusion of acute hepatopancreatic necrosis disease (AHPND) in Chapter 1.3. Diseases listed by the OIE, at the May 2015 OIE General Session, the Aquatic Animals Commission developed a new draft chapter on AHPND for inclusion in the Aquatic Code in October 2015 (COMMISSION, 2015). In February 2016, revised text for the Aquatic Code and the Aquatic Manual including new draft chapter for AHPND have been circulated to Member countries for their comments (COMMISSION, 2016). All the comments will be considered by the Commission at its September 2016 meeting (OIE, 2016f).

The revised text included several technical information for AHPND. Based on the new draft chapter for AHPND (COMMISSION, 2016) or the purposes of the Aquatic Code, AHPND means infection with strains of the bacteria *Vibrio parahaemolyticus* (VP_{AHPND}) and *V. harveyi* that contain a ~70-kbp plasmid with genes that encode homologues of the *Photothabdus* insect-related (Pir) toxins, PirA and PirB. The susceptible species are whiteleg shrimp (*P. vannamei*) and giant tiger prawn (*P. monodon*). Competent Authorities should not require any conditions related to AHPND, regardless of the AHPND status of the exporting country,

zone or compartment, when authorizing the importation or transit of the following aquatic animal products from whiteleg (*P. vannamei*) and giant tiger prawn (*P. monodon*):

- heat sterilized hermetically sealed crustacean products (i.e., heat treatment at 121°C for at least 3.6 minutes or any time/temperature equivalent);
- cooked crustacean products that have been subjected to heat treatment at 100°C for at least 3 minutes (or any time/temperature equivalent which has been demonstrated to inactivate VP_{AHPND};
- pasteurized crustacean products that have been subjected to heat treatment at 63°C for at least 30 minutes (or any time/temperature equivalent which has been demonstrated to inactivate VP_{AHPND};
- crustacean oil; and
- crustacean meal

The comprehensive technical report on AHPND presented at the *Meeting of the OIE Aquatic Animal Health Standards Commission* in Paris last 15-19 February 2016 will be thoroughly described in the new draft chapter for AHPND.

Disease Reporting System

Each OIE Member Country undertakes to report the animal diseases that it detects on its territory. The OIE then disseminates the information to other countries, which can take the necessary preventive action. The OIE created and manages the World Animal Health Information System (WAHIS) which is coupled with WAHIS interface, providing information on 118 diseases listed for 2016. WAHIS Interface provides public access to all data regarding OIE-Listed diseases, which improves the transparency, efficiency and speed with which animal health information is disseminated throughout the world (OIE, 2016k).

The OIE Regional Representation for Asia and the Pacific (RRAP) is collaborating with the Network of Aquaculture Centres in Asia-Pacific (NACA) on the Quarterly Aquatic Animal Disease (QAAD) Report since 1998, which covers not only OIE-listed diseases but also non-OIE listed diseases of regional importance.

AHPND was first included in the QAAD as a non-OIE listed disease, while OIE later agreed to add AHPND to the OIE listed diseases in May 2015, coming into force from 2016.

This example demonstrates the importance, validity and usefulness of reporting and sharing the disease information particularly that of regional concerns through OIE-NACA QAAD Report. On the other hand, past experience shows that there had been certain inconsistencies in provided data between WAHIS and QAAD, including delayed or failed reporting by member countries. It is crucial to advocate improving immediate and accurate disease reporting from all member countries with the cooperation of all stakeholders.

Activities of OIE RRAP to support member countries

The *Second Regional Work Plan Framework 2016-2020* of the OIE Regional Commission for Asia and the Pacific, adopted by the OIE Regional Commission in September 2015, highlights the increasing importance of Aquatic Animal Health in this region and encourages members as well as OIE to strengthen the activities on promoting Aquatic Animal Health (OIE Regional Commission for Asia, 2015). The RRAP is conducting regional capacity building activities, such as the *Seminar for the OIE National Focal Points*, latest one held in January 2015 in Ho Chi Minh City, Viet Nam, the *Regional Workshop on Safe International Trade in Aquatic Animals and Aquatic Animal Products* held in July 2015, in Nagaoka City, Japan.

Regardless of whether veterinarians are involved in the Aquatic Animal Health Services (AAHS), it is clear that the general principles for quality would be similar to those that apply to Veterinary Services. For example, appropriate legislation and good governance are required to support AAHS in complying with OIE requirements, including for disease detection, reporting and control. The application of the Performance of Veterinary Services (PVS) Tool to the evaluation of AAHS commenced in 2009 when the OIE undertook a pilot mission in Viet Nam.

The OIE RRAP continues to support member countries through these activities to facilitate networking between OIE Delegates and OIE National Focal Points and eventually strengthen the disease surveillance, early detection and rapid response at a national level (OIE, 2016i).

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