2018/3

QUARTERLY
AQUATIC ANIMAL DISEASE REPORT
(Asia and Pacific Region)

July – September 2018

Published by

Network of Aquaculture Centres in Asia-Pacific

Suraswadi Building, Department of Fisheries Kasetsart University Campus, Ladyao, Jatujak, Bangkok 10900, Thailand

The OIE Regional Representation for Asia and The Pacific

Food Science Building 5F, The University Of Tokyo, 1-1-1 Yayoi, Bunkyo-Ku Tokyo 113-8657, Japan

Food and Agriculture Organization of the United Nations

Viale delle Terme di Caracalla Rome 00100 Italy

January 2019

Network of Aquaculture Centres in Asia-Pacific, World Organisation for Animal Health (OIE) Regional Representation for Asia and the Pacific, and Food and Agriculture Organization of the United Nations. January, 2019. *Quarterly Aquatic Animal Disease Report (Asia and Pacific Region)*, 2018/3, July – September 2018. NACA, Bangkok, Thailand and OIE-RRAP, Tokyo, Japan.

Contents

Foreword

17th Meeting of the Asia Regional Advisory Group on Aquatic Animal Health (AGM-17)

The 17th Meeting of the Asia Regional Advisory Group on Aquatic Animal Health (AGM 17) was held in Bangkok, Thailand on 13-14 November 2018, back-to-back with the OIE Regional Expert Consultation on Aquatic Animal Disease Diagnosis (held on 15-16 November 2018). The AGM 17 was attended by invited experts from the region, representatives of NACA partner organizations including World Organization for Animal Health (OIE), Food and Agriculture Organization of the United Nations (FAO), and Southeast Asian Fisheries Development Center (SEAFDEC), and the private sectors. They are as follows:

AG Members:

- Dr. Ingo Ernst (OIE Aquatic Animal Health Standard Commission; and the Australian Department of Agriculture and Water Resources);
- Dr. Jing Wang (OIE-RRAP, Tokyo, Japan)
- Dr. James Richard Arthur (represented Dr. Melba Reantaso, FAO HQ, Rome, Italy)
- Dr. Eleonor Tendencia (SEAFDEC AQD, Philippines)
- Dr. Supranee Chinabut (DOF-Thailand)
- Prof. Timothy Flegel (Centex Shrimp-Thailand)
- Dr. Qing Li (Ministry of Agriculture, PR China)

- Dr. Janejit Kongkumnerd (DOF-Thailand)
- Dr. Kjetil Fyrand (PHARMAQ AS-Private Sector)
- Dr. Eduardo Leaño (NACA; AG Technical Secretary)

Co-opted Members:

- Dr. Gillian Elizabeth Mylrea (OIE HQ, Paris, France)
- Mr. Weimin Miao (FAO-RAP, Bangkok)
- Dr. Hon Pong Ho (OIE-RRAP, Tokyo)
- Dr. Siow-Foong Chang (AVA, Singapore)
- Dr. Andy Shinn (Fish Vet Group Asia, Thailand)
- Dr. Hong Liu (AQSIQ, PR China)
- Dr. Yan Liang (YSFRI, PR China)

Observer/Other Participants:

- Dr. Chien Tu (AHRI, Taiwan)
- Mr. Simon Wilkinson (NACA)
- Dr. Cherdsak Virapat (NACA)
- Dr. Derun Yuan (NACA)

Updates on aquatic animal health management in the region were discussed during the 2-day meeting. These include progress reports from NACA, OIE, FAO and SEAFDEC on their activities in the Asia-Pacific region, and aquatic animal health programs and activities of Australia, China and Thailand. Updates on important diseases of finfishes, crustaceans, molluscs and amphibians were also presented and discussed.

Among the current and important issues on aquatic animal health, the new emerging diseases like Tilapia lake virus (TiLV) and Shrimp hematocyte iridescent virus (SHIV) were highlighted. Other issues including antimicrobial use (AMU) and antimicrobial resistance (AMR) in aquaculture, and updating of diseases in QAAD for 2019 disease reporting were discussed and endorsed by the group. The Final Report of the meeting is under preparation and will be published at NACA website within the first quarter of 2019.

Reports Received by the NACA and OIE-RRAP

(Officially prepared by OIE National Focal Points for Aquatic Animals/NACA National Coordinator, and submitted by OIE Delegate)

Country: AUSTRALIA* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	-(2012)	-(2012)	-(2012)		1
2. Infectious haematopoietic necrosis	0000	0000	0000		
3. Spring viraemia of carp (SVC)	0000	0000	0000		
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000		
5. Infection with *Aphanomyces invadans* (EUS)	-(2017)	-(2017)	-(2017)		2
6. Red seabream iridoviral disease (RSID)	0000	0000	0000		
7. Koi herpesvirus disease (KHV)	0000	0000	0000		
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000		
9. Viral encephalopathy and retinopathy	-(2018)	+	-(2018)	III	3
10.Enteric septicaemia of catfish	-(2014)	-(2014)	-(2014)		4
11. Carp edema virus disease	***	***	***		
12. Tilapia lake virus (TiLV)	***	***	***		
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	+?	-(2018)	-(2018)	III	5
2. Infection with *Perkinsus olseni*	+(west zone SA)	-(2018)	-(2018)	I	6
3. Infection with abalone herpesvirus	-(2011)	-(2011)	-(2011)		7
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000		
5. Infection with *Bonamia ostreae*	0000	0000	0000		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000		
7. Acute viral necrosis (in scallops)	***	***	***		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000		
2. Infection with white spot syndrome virus	-(2018)	-(2018)	-(2018)		8
3. Infection with yellow head virus genotype 1	0000	0000	0000		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	-(2018)	-(2018)	+		9
5. Infection with infectious myonecrosis virus	0000	0000	0000		
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-(2008)	-(2008)	-(2008)		10
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000		
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000		
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	0000	0000	0000		
11. Viral covert mortality disease (VCMD) of shrimps	***	***	***		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	-(2008)	-(2008)	-(2008)		11
2. Infection with *Batrachochytrium dendrobatidis*	-(2018)	-(2018)	-(2018)		12
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Epizootic haematopoietic necrosis** was not reported this period despite passive surveillance in Victoria (last reported 2012), the Australian Capital Territory (last reported 2011), New South Wales (last reported 2009) and South Australia (last reported 1992). Passive surveillance and never reported in the Northern Territory, Queensland, Tasmania and Western Australia.
2	**Infection with *Aphanomyces invadans* (EUS)** was not reported this period despite passive surveillance in New South Wales (last reported July 2017) and the Northern Territory (last reported May 2017), Queensland (last reported 2014), Western Australia (last reported 2013), Victoria (last reported 2012), and South Australia (last reported 2008). Passive surveillance and never reported in Tasmania. No information available this period in the Australian Capital Territory.

3	**Viral encephalopathy and retinopathy (VER)** 1. **Reported in** Queensland in August 2018, passive surveillance; 2. **Species affected** – juvenile Queensland grouper (*Epinephelus lanceolatus*); 3. **Clinical signs** – lethargy, anorexia, remaining on tank floor; 4. **Pathogen** – Betanodavirus; 5. **Mortality rate** – up to 50% of stock; 6. **Economic loss** – N/A; 7. **Geographic extent** – one farm South East Queensland; 8. **Containment measures** – none; 9. **Laboratory confirmation** – qPCR (brain tissue); 10. **Publications** – nil. VER is known to occur previously in the Northern Territory (last reported 2013), Western Australia (last reported 2013), South Australia (last reported 2010) and Tasmania (last reported 2000). Targeted surveillance and not reported this period in New South Wales (last reported 2016). Passive surveillance and never reported in Victoria. No information available this period in the Australian Capital Territory.
4	**Enteric septicaemia of catfish (*E. ictaluri*)** was not reported this period despite passive surveillance and never reported in New South Wales, South Australia, Victoria and Western Australia. No information available this period in the Australian Capital Territory. It was reported from clinically normal fish from a single river in Queensland (last reported 2014), the only occurence of E. ictaluri in wild fish populations in Australia. Active surveillance throughout Northern Australia has found no evidence of E. ictaluri in any other wild fish populations. E. ictaluri has been detected previously in association with imported ornamental fish including; the Northern Territory in a closed aquarium (last reported in 2011), and in PC2 containment facilities in Tasmania (last reported in 2001) and Queensland (last reported 2008).
5	**Infection with *Bonamia exitiosa*** 1. **Reported in** South Australia in July 2018, passive and active surveillance; 2. **Species affected** – flat oyster (*Ostrea angasi*); 3. **Clinical signs** – none; 4. **Pathogen** – *Bonamia exitiosa*; 5. **Mortality rate** – N/A; 6. **Economic loss** – N/A; 7. **Geographic extent** – Coffin Bay and Streaky Bay farming regions; 8. **Containment measures** – none; 9. **Laboratory confirmation** – qPCR, tissue smears, histology; 10. **Publications** – nil. *Bonamia exitiosa* is known to have occurred previously in Western Australia (last reported February 2017) and Victoria (last reported 2016). Passive surveillance and never reported in Queensland, New South Wales, Tasmania and Northern Territory. No information available for the Australian Capital Territory (no marine water responsibility).

6	**Infection with *Perkinsus olseni*** 1. **Reported in** South Australia in July 2018; 2. **Species affected** –blacklip abalone (*Haliotis rubra*); 3. **Clinical signs** – clinical; 4. **Pathogen** – *Perkinsus olseni*; 5. **Mortality rate** – none; 6. **Economic loss** – N/A; 7. **Geographic extent** –western fishery zone in SA; 8. **Containment measures** – voluntary fishing closure around affected areas; 9. **Laboratory confirmation** – RFTM; 10. **Publications** – nil. *Perkinsus olseni* is known to occur previously in Victoria (last reported 2015), Queensland (last reported 2014), and New South Wales (last reported 2005). Passive surveillance and never reported in the Northern Territory and Tasmania. No information available for the Australian Capital Territory (no marine water responsibility).
7	**Infection with abalone herpesvirus (abalone viral ganglioneuritis)** was not reported this period despite passive surveillance in Tasmania (last reported 2011), New South Wales (last reported 2011 and eradicated following detection in contained commercial live-holding facilities) and Victoria (last reported 2010). Passive surveillance and never reported in the Northern Territory, Queensland, South Australia and Western Australia. No information available this period in the Australian Capital Territory (no marine water responsibility).
8	**Infection with white spot syndrome virus (white spot disease)** is known to occur previously in Queensland (last reported March 2018). As a result of detection of WSSV in wild crustaceans, movement and fishing restrictions in the Moreton Bay region have been in place to contain white spot disease and prevent new outbreaks. The latest round of surveillance testing of wild crustaceans outside the movement restriction area, along the east coast of Queensland (Cairns, Bundaberg, Fraser Coast and Moreton Bay) continued through April and May. All tests have been negative for WSSV. White spot disease has never been reported despite active and passive surveillance in New South Wales, South Australia, Western Australia, Victoria and Northern Territory. Never reported in Tasmania despite passive surveillance. No information available for the Australian Capital Territory (no marine water responsibility).
9	**Infection with infectious hypodermal and haematopoietic necrosis virus** 1. **Reported in** Queensland in September 2018, passive surveillance; 2. **Species affected** –Giant tiger prawn (*Penaeus monodon*); 3. **Clinical signs** – weakness, mortality; 4. **Pathogen** – Infectious hypodermal and haemotopoietic necrosis virus; 5. **Mortality rate** – unknown; 6. **Economic loss** – N/A; 7. **Geographic extent** –unknown; 8. **Containment measures** – none; 9. **Laboratory confirmation** – real-time PCR; 10. **Publications** – nil. Infectious hypodermal and haematopoietic necrosis virus is known to occur previously in Queensland (last reported March 2018) and the Northern Territory (last reported 2003). Passive surveillance and never reported in New South Wales, South Australia, Victoria and Western Australia. No information available this period in the Australian Capital Territory (no marine water responsibility) and Tasmania (susceptible species not present).

10	**Infection with *Macrobrachium rosenbergii* nodavirus (White tail disease)** was not reported this period despite passive surveillance in Queensland (last reported 2008). Passive surveillance and never reported from the Australian Capital Territory, New South Wales, the Northern Territory, South Australia, Victoria and Western Australia. No information available this period in Tasmania (susceptible species not present).
11	**Infection with *Ranavirus*** was not reported this period despite passive surveillance in the Northern Territory (last reported 2008, prior to official reporting for ranavirus). Suspected but not confirmed through passive surveillance in Queensland. Passive surveillance and never reported in Tasmania and New South Wales. No information available this period in the Australian Capital Territory, South Australia, Victoria and Western Australia.
12	**Infection with *Batrachochytrium dendrobatidis*** is know to occur previously in Queensland (last reported in April 2018, was not reported this period despite passive surveillance), Victoria (last reported 2016), Tasmania (last reported 2013), New South Wales (last reported 2012), and Western Australia (last reported 2008). Passive surveillance and never reported from the Northern Territory. No information available this period in the Australian Capital Territory and South Australia.
13	**Hepatopancreatitis** in prawns was not reported this period despite passive surveillance in Queensland (last reported 2017). Passive surveillance and never reported in New South Wales. No information available in the Australian Capital Territory, Victoria, Norther Territory, South Australia, Western Australia and Tasmania.

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

Nil

Country: CHINESE TAIPEI **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	***	***	***		
2. Infectious haematopoietic necrosis	***	***	***		
3. Spring viraemia of carp (SVC)	***	***	***		
4. Viral haemorrhagic septicaemia (VHS)	***	***	***		
5. Infection with *Aphanomyces invadans* (EUS)	-	-	-		
6. Red seabream iridoviral disease (RSID)	+	+	+	LDCCs	1
7. Koi herpesvirus disease (KHV)	-	-	-		
Non OIE-listed diseases					
8. Grouper iridoviral disease	+	+	+	LDCCs	2
9. Viral encephalopathy and retinopathy	+	-	+	LDCCs	3
10.Enteric septicaemia of catfish	***	***	***		
11. Carp edema virus disease	-	-	-		
12. Tilapia lake virus (TiLV)	-	-	-		
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	***	***	***		
2. Infection with *Perkinsus olseni*	***	***	***		
3. Infection with abalone herpesvirus	-	-	-		
4. Infection with *Xenohaliotis californiensis*	***	***	***		
5. Infection with *Bonamia ostreae*	***	***	***		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	***	***	***		
7. Acute viral necrosis (in scallops)	***	***	***		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	-	-	-		
2. Infection with white spot syndrome virus	+	+	+	LDCCs	4
3. Infection with yellow head virus genotype 1	-	-	-		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	-	-	-		
5. Infection with infectious myonecrosis virus	***	***	***		
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-	-	-		
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	***	***	***		
8. Acute hepatopancreatic necrosis disease (AHPND)	***	***	***		
9. Infection with *Aphanomyces astaci* (Crayfish plague)	-	-	-		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	***	+	+	LDCCs	5

11. Viral covert mortality disease (VCMD) of shrimps	***	***	***		
12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	-	-	-		
2. Infection with *Batrachochytrium dendrobatidis*	***	***	***		
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	1. Pingtung county, New Taipei city. 14 outbreak reports from 10 farms. 2. Date: (1) Jul 23; (2) Aug 14; (3), (4), (5) Aug 15; (6) Aug 22, (7), (8), (9) Sep 3; (10) Sep 12; (11) Sep 13; (12) Sep 14; (13), (14) Sep 18. 3. Species: (1), (2), (11) Micropterus salmoides; (3), (4), (5), (6), (7), (8), (9), (10), (12), (13), (14) Lates calcarifer. 4. Mortality rate: low to high. 5. Total number of death: (1) 5000/60000; (2) 200/2000; (3) 1000/40000; (4) 600/40000; (5) 240/40000; (6) 50000/150000; (7) 0/80000; (8) 100000/200000; (9) 700/22000; (10) 375/8000; (11) 0/50000; (12) 200/20000; (13) 1000/12000; (14) 100/30000.

2	1. Kaohsiung city. 38 outbreak reports from 29 farms. 2. Date: (1), (2) Jul 2; (3) Jul 12; (4) Jul 14; (5) Jul 25; (6), (7) Jul 31; (8), (9) Aug 7; (10) Aug 8; (11), (12) Aug 14; (13), (14) Aug 16; (15), (16), (17), (18) Aug 21; (19), (20), (21) Sep 1; (22) Sep 5; (23) Sep 8; (24) Sep 10; (25), (26), (27) Sep 18; (28) Sep 25; (29), (30), (31), (32), (33) Sep 26; (34), (35), (36) Sep 27; (37), (38) Sep 29. 3. Species: (1), (2), (3), (4), (5), (6), (7), (8), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34), (37), (38) Lates calcarifer; (9) Trachinotus blochii; (35) Epinephelus fuscoguttatus x Epinephelus lanceolatus; (36) Epinephelus malabaricus. 4. Mortality rate: low. 5. Total number of death: (1), (2), (8), (11), (12), (15), (16), (22), (24), (38) 0/40000; (3), (5), (29), (34) 0/10000; (4), (13), (14), (30), (35), (36) 0/20000; (6) 0/45000; (7), (17), (21), (31), (32), (33) 0/30000; (9) 0/24000; (10), (37) 0/23000; (18), (25), (26) 0/32000; (19) 0/35000; (20) 0/48000; (23) 0/26000; (27) 0/21000; (28) 0/25000.
3	1. Kaohsiung city. 14 outbreak reports from 11 farms. 2. Date: (1) Jul 12; (2), (3) Jul 14; (4) Sep 1; (5) Sep 18; (6), (7), (8), (9), (10), (11), (12) Sep 26; (13), (14) Sep 29. 3. Species: (1), (6), (10) Epinephelus malabaricus; (2), (8), (9) Epinephelus lanceolatus; (3), (4), (5), (7), (11), (13), (14) Epinephelus fuscoguttatus x Epinephelus lanceolatus; (12) Lates calcarifer. 4. Mortality rate: low. 5. Total number of death: (1), (12) 0/40000; (2) 0/1300; (3), (5) 0/5000; (4) 0/1000; (6), (10) 0/30000; (7), (8) 0/20000; (9), (11), (13) 0/10000; (14) 0/48000.
4	1. Yilan county, Taichung city, Chiayi county, Taitung county, Changhua county, Tainan city. 12 outbreak reports from 12 farm. 2. Date: (1) Jul 5; (2) Jul 16; (3) Jul 19; (4) Aug 15; (5) Aug 22; (6) Aug 28; (7) Aug 30; (8) Sep 3; (9) Sep 5; (10) Sep 10; (11), (12) Sep 25. 3. Species: (1), (3), (4), (5), (6), (9), (10), (11), (12) Litopenaeus vannamei; (2) Caridina serrata var.; (7) Penaeus monodon; (8) Ornamental shrimps. 4. Mortality rate: low to high. 5. Total number of death: (1) 480000/500000; (2)0/40 ; (3) 0/800000; (4) 0/600000; (5) 0/1500000; (6) 0/50000; (7) 500/120000; (8) 0/100000; (9) 0/700000; (10) 0/300000; (11) 0/400000; (12) 0/200000.
5	1. Pingtung county, New Taipei city, Taitung county, Changhua county. 7 outbreak reports from 6 farms. 2. Date: (1), (2) Aug 22; (3) Aug 23; (4) Aug 27; (5) Aug 30; (6) Sep 4; (7) Sep 20. 3. Species: (1), (2), (3), (4), (5), (6), (7) Litopenaeus vannamei. 4. Mortality rate: low. 5. Total number of death: (1) 1400/25900; (2), (3) 300/26000; (4) 2000/50000; (5) 0/600000; (6) 0/250000; (7) 200/75000.

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

Country: HONG KONG SAR, CHINA* Period: July - September 2018

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000	II	
2. Infectious haematopoietic necrosis	0000	0000	0000	III	
3. Spring viraemia of carp (SVC)	0000	0000	0000	III	
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000	III	
5. Infection with *Aphanomyces invadans* (EUS)	0000	0000	0000	III	
6. Red seabream iridoviral disease (RSID)	-	-	+	III	1
7. Koi herpesvirus disease (KHV)	-	-	-	III	
Non OIE-listed diseases					
8. Grouper iridoviral disease	-	-	-	III	
9. Viral encephalopathy and retinopathy	-	-	-	III	
10.Enteric septicaemia of catfish	0000	0000	0000	II	
11. Carp edema virus disease	***	***	***		
12. Tilapia lake virus (TiLV)	***	***	***		
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000	II	
2. Infection with *Perkinsus olseni*	0000	0000	0000	II	
3. Infection with abalone herpesvirus	0000	0000	0000	II	
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000	II	
5. Infection with *Bonamia ostreae*	***	***	***		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000	II	
7. Acute viral necrosis (in scallops)	0000	0000	0000	II	
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000	III	
2. Infection with white spot syndrome virus	-	-	-	III	
3. Infection with yellow head virus genotype 1	0000	0000	0000	III	
4. Infection with infectious hypodermal and haematopoietic necrosis virus	0000	0000	0000	II	
5. Infection with infectious myonecrosis virus	0000	0000	0000	II	
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	0000	0000	0000	II	
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	***	***	***	II	
8. Acute hepatopancreatic necrosis disease (AHPND)	***	***	***	II	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000	II	
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	***	***	***		
11. Viral covert mortality disease (VCMD) of shrimps	***	***	***		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	(1 Apr 2017)	(1 Apr 2017)	(1 Apr 2017)	III	
2. Infection with *Batrachochytrium dendrobatidis*	0000	0000	0000	III	
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	RSID caused by ISKNV was identified in hybrid grouper fry during pathogen screening. The size of affected raft was approximately 404 m^2. Clinical signs were observed but no massive disease outbreak and low mortality was reported. The farmer and fry importer were recommended to adopt good aquaculture practices, and obtain health certificate/conduct tests on imported fry.
2	
3	

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

Country: INDIA* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000		
2. Infectious haematopoietic necrosis	0000	0000	0000		
3. Spring viraemia of carp (SVC)	0000	0000	0000		
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000		
5. Infection with *Aphanomyces invadans* (EUS)	-	+( )	+( )	II, III	1
6. Red seabream iridoviral disease (RSID)	0000	0000	0000		
7. Koi herpesvirus disease (KHV)	0000	0000	0000		
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000		
9. Viral encephalopathy and retinopathy	-	-	-		
10.Enteric septicaemia of catfish	0000	0000	0000		
11. Carp edema virus disease	-	-	-		
12. Tilapia lake virus (TiLV)	+( )	-	+( )	III	2
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000		
2. Infection with *Perkinsus olseni*	-	-	+( )	II, III	3
3. Infection with abalone herpesvirus	0000	0000	0000		
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000		
5. Infection with *Bonamia ostreae*	0000	0000	0000		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000		
7. Acute viral necrosis (in scallops)	0000	0000	0000		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000		
2. Infection with white spot syndrome virus	+( )	+( )	+( )	III	4
3. Infection with yellow head virus genotype 1	0000	0000	0000		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	-	+( )	+( )	III	5
5. Infection with infectious myonecrosis virus	+( )	-	-	III	6
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-	-	-		
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000		
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000		
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	+( )	+( )	+( )	III	7
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	0000	0000	0000		
13. Iridovirus in crayfish	0000	0000	0000		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	0000	0000	0000		
2. Infection with *Batrachochytrium dendrobatidis*	0000	0000	0000		
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Infection with *Aphanomyces invadans*** was reported in *Liza parsia*, *Mugil cephalus* in Ernakulam district; *Etroplus suratensis* from Alapuzzha and Kollam districts of Kerala and *Channa* sp. from Thanjuvar district, Tamil Nadu.
2	**Tilapia lake virus** disease was reported from very limited areas of Thoothukudi district of Tamil Nadu and Ernakulam district of Kerala.
3	**Infection with *P. olseni*** was reported in wild samples of *Perna viridis* from Kozhikode, Kerala.

4	**Infection with white spot syndrome virus (WSSV)** was reported in *Litopenaeus vannamei* from very limited areas of Nagapattinam district of Tamil Nadu; Thane district of Maharashtra; Surat and Bharuch districts of Gujarat; Srikakulam, East Godavari, West Godavari, Viziyanagram and Nellore districts of Andhra Pradesh; and Udupi and Uttar Kannada districts of Karnataka. Infection with WSSV was also reported in *Penaeus monodon* in South 24 Parganas district of West Bengal and Ernakulam district of Kerala.
5	**Infection with infectious hypodermal and haematopoietic necrosis virus** was reported in *Litopenaeus vannamei* from very limited areas of West Godavari district, Andhra Pradesh in August; Nagapattinam in Tamil Nadu during September, 2018.
6	**Infection with infectious myonecrosis virus** was reported in *Litopenaeus vannamei* from very limited areas of Krishna and West Godavari districts, Andhra Pradesh in July, 2018.
7	**Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei***, was reported in *Litopenaeus vannamei* from very limited areas of Bhadrak district of Odisha; Uttar Kannada and Udupi districts of Karnataka; Surat and Bharuch districts of Gujarat; North 24 Parganas district of West Bengal; Nagapattinam, Cuddalore, Thiruvallur, Kanchipuram, Thanjavur, Pudukkottai, Thoothukudi, Ramanathapuram districts of Tamil Nadu; Nellore and West Godavari districts of Andhra Pradesh; Fazilka and Mansa districts of Punjab; Fatehabad, Hisar, Sirsa, Rohtak, Bhiwani, Charkhi Dadri and Jhajjar districts of Haryana.

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

Country: JAPAN* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000	I	
2. Infectious haematopoietic necrosis	+	+	+	I,III	1
3. Spring viraemia of carp (SVC)	0000	0000	0000	I	
4. Viral haemorrhagic septicaemia (VHS)	-(2018)	-(2018)	-(2018)	I	
5. Infection with *Aphanomyces invadans* (EUS)	-(2015)	-(2015)	-(2015)	I	
6. Red seabream iridoviral disease (RSID)	+	+	+	II,III	2
7. Koi herpesvirus disease (KHV)	+	+	+	III	3
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000	I	
9. Viral encephalopathy and retinopathy	+	+	+	III	4
10.Enteric septicaemia of catfish	-(2010)	-(2010)	-(2010)	I	
11. Carp edema virus disease	+	-	-	III	5
12. Tilapia lake virus (TiLV)	0000	0000	0000	I	
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000	I	
2. Infection with *Perkinsus olseni*	-(2007)	-(2007)	-(2007)	I	
3. Infection with abalone herpesvirus	0000	0000	0000	I	
4. Infection with *Xenohaliotis californiensis*	-(2015)	-(2015)	-(2015)	I	
5. Infection with *Bonamia ostreae*	0000	0000	0000	I	
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	-(2014)	-(2014)	-(2014)	I	
7. Acute viral necrosis (in scallops)	0000	0000	0000	I	
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000	I	
2. Infection with white spot syndrome virus	+	+	-	III	6
3. Infection with yellow head virus genotype 1	0000	0000	0000	I	
4. Infection with infectious hypodermal and haematopoietic necrosis virus	0000	0000	0000	I	
5. Infection with infectious myonecrosis virus	0000	0000	0000	I	
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	0000	0000	0000	I	
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000	I	
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000	I	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000	I	
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	0000	0000	0000	I	
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000	I	

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	0000	0000	0000	I	
13. Iridovirus in crayfish	0000	0000	0000	I	
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	-(2012)	-(2012)	-(2012)	I	
2. Infection with *Batrachochytrium dendrobatidis*	-(2009)	-(2009)	-(2009)	I	
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Infectious haematopoietic necrosis (IHN)** 1) **Reported in** 9 prefectures 2) **Species affected:** Amago (*Onchorynchus masou ishikawae*), Yamame (*O. masou*), Rainbow trout (*O.mykiss*), Whitespotted charr (*Salvelinus leucomaenis*); 3) **Disease characteristics:** Mortality, anemia, haemorrahges, exophthalmos, discoloration, blackening of the body, unusual swimming; 4) **Pathogen:** Infectious haematopoietic necrosis virus 5) **Mortality rate:** 2-100% 6) **Economic loss:** ー 7) **Names of infected areas:** Honshu, Shikoku, Hokkaido; 8) **Preventive/control measures taken:** Feed restriction, disinfection of facilities and tools, movement control, removal of dead fish, notification to concerned authorities. 9) **Laboratories for confirmation:** Clinical examination, cell culture, PCR, isolation of the virus, and observation of CPE by prefectural research laboratories 10) **Publications:** None

2	**Red seabream iridiviral disease (RSID)** 1) **Reported in** 8 prefectures 2) **Species affected:** Red seabream (*Pagrus major*), Japanese amberjack (*Seriola quinqueradiata*), Pacific Bluefin funa (*Thunnus orientalis*), Spotted knifejaw (*Oplegnathus punctatus*), Greater amberjack (*S. dumerili*) White trevally (*Pseudocaranx dentex*) Yellowtail amberjack (*S. lalandi*); 3) **Disease characteristics:** Mortality, black spots on gills, thinness; 4) **Pathogen:** Red seabream iridovirus 5) **Mortality rate:** 1-20% 6) **Economic loss:** － 7) **Names of infected areas:** Honsyu, Shikoku, Kyushu; 8) **Preventive/control measures taken:** Removal of dead fish, movement control, feed restriction. 9) **Laboratory confirmation:** Histopathological observation, PCR, inspection of IFAT by prefectural research laboratories. 10) **Publications:** None
3	**Koi herpesvirus disease (KHV)** 1) **Reported in** 1 prefecture 2) **Species affected:** Koi carp (*Cyrpinus carpio*); 3) **Disease characteristics:** Mortality; 4) **Pathogen:** Koi herpesvirus; 5) **Mortality rate:** 13-100% 6) **Economic loss:** － 7) **Names of infected areas:** Honshu; 8) **Preventive/control measures taken:** Movement control, removal of dead fish, culling of infected fish, disinfection of ponds, facilities and tools, notification to concerned authorities; 9) **Laboratory confirmation:** PCR by National Research Institute of Aquaculture and prefectural research laboratories. 10) **Publications:** Website of Ministry of Agriculture, Forestry and Fisheries (MAFF), website of Prefectures, notification to press.
4	**Viral encephalopathy and retinopathy (VER)** 1) **Reported in** 2 prefectures 2) **Species affected:** Convict grouper (*Epinephelus septemfasciatus*), Longtooth grouper (*E. bruneus*)xGiant grouper (*E. lanceolatus*); 3) **Disease characteristics:** Unusual swimming; 4) **Pathogen:** Betanodavirus; 5) **Mortality rate:** 1-3% 6) **Economic loss:** － 7) **Names of infected areas:** Honsyu, Kyushu; 8) **Preventive/control measures taken:** Removal of dead fish. 9) **Laboratory confirmation:** PCR prefectural research laboratory. 10) **Publications:** none.

5	**Carp edema virus disease (CEV)** 1) **Reported in** 1 prefecture 2) **Species affected:** Koi carp (*Cyprinus carpio*); 3) **Disease characteristics:** Reddening of body surface and fins; 4) **Pathogen:** Carp edema virus; 5) **Mortality rate:** 52% 6) **Economic loss:** － 7) **Names of infected areas:** Kyushu; 8) **Preventive/control measures taken:** Culling of infected fish. 9) **Laboratory confirmation:** PCR prefectural research laboratory. 10) **Publications:** none.
6	**Whote spot disease (WSD)** 1) **Reported in** 2 prefectures; 2) **Species affected:** Kuruma prawn (*Marsupenaeus japonicus*); 3) **Disease characteristics:** Mortality, white spot; 4) **Pathogen:** White spot syndrome virus; 5) **Mortality rate:** 29-75% 6) **Economic loss:** － 7) **Names of infected areas:** Kyushu, Shikoku; 8) **Preventive/control measures taken:** Disinfection of ponds, removal of dead shrimps; 9) **Laboratory confirmation:** PCR, LAMP prefectural research laboratories. 10) **Publications:** none.

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

Country: MALAYSIA* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000		
2. Infectious haematopoietic necrosis	0000	0000	0000		
3. Spring viraemia of carp (SVC)	0000	0000	0000	I,II,III	1
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000		
5. Infection with *Aphanomyces invadans* (EUS)	(1986)	(1986)	(1986)	I	2
6. Red seabream iridoviral disease (RSID)	-	-	-	I,III	3
7. Koi herpesvirus disease (KHV)	(2017)	(2017)	(2017)	I,III	4
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000		
9. Viral encephalopathy and retinopathy	(2015)	(2015)	(2015)	III	5
10.Enteric septicaemia of catfish	0000	0000	0000		
11. Carp edema virus disease	0000	0000	0000		
12. Tilapia lake virus (TiLV)	+	(2018)	(2018)	III	6
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000		
2. Infection with *Perkinsus olseni*	?(2016)	?(2016)	?(2016)		7
3. Infection with abalone herpesvirus	0000	0000	0000		
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000		
5. Infection with *Bonamia ostreae*	0000	0000	0000		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000		
7. Acute viral necrosis (in scallops)	0000	0000	0000		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	-	-	-	I,III	8
2. Infection with white spot syndrome virus	?(2016)	?(2016)	?(2016)	I,III	9
3. Infection with yellow head virus genotype 1	0000	0000	0000	I,III	10
4. Infection with infectious hypodermal and haematopoietic necrosis virus	(2016)	(2016)	(2016)	III	11
5. Infection with infectious myonecrosis virus	(2018)	(2018)	(2018)	III	12
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-	-	-		
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000		
8. Acute hepatopancreatic necrosis disease (AHPND)	(2014)	(2014)	(2014)		13
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	(2016)	(2016)	(2016)		14
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	0000	0000	0000		
13. Iridovirus in crayfish	0000	0000	0000		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	0000	0000	0000		
2. Infection with *Batrachochytrium dendrobatidis*	0000	0000	0000		
ANY OTHER DISEASES OF IMPORTANCE					
1. Megalocytivirus (Requirement for export to Australia)	(2016)	(2016)	(2016)	III	15
2. Enteric red mouth disease (Requirement for export to Japan)	0000	0000	0000	III	16

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Spring viraemia of carp (SVC)** No positive case was detected (PCR) during DoF active surveillance programme.
2	**Infection with *Aphanomyces invadans* (EUS)** No positive case was detected (gross observation) during DoF active surveillance programme.
3	**Red seabream iridoviral disease (RSID)** No positive case was detected (PCR) during DoF active surveillance programme.
4	**Koi herpesvirus disease (KHV)** No positive case was detected (PCR) during DoF active surveillance programme. Infection with KHV is known to occurin the state of Selangor (2017)

5	**Viral encephalopathy and retinopathy (VER)/ (VNN)** No positive case was detected (PCR) during DoF active surveillance programme. Infection with VER is known to occur in the state of Perak (2015) and Kelantan (May 2015).
6	**Tilapia lake virus (TiLV)** **1) Origin of the disease or pathogen (history of the disease):** 2) **Species affected:** *Oreochromis* spp.; 3) **Disease characteristics (unusual clinical signs or lesions):** High mortality; 4) **Pathogen (isolated/sero-typed):** Tilapia lake virus; 5) **Mortality rate (high/low; decreasing/increasing):** High; increasing; 6) **Death toll (economic loss, etc):** RM3,000.00 (estimated) 7) **Size of infected areas or names of infected areas:** Sg. Como, Kenyir Lake, Terengganu and Banding Lake, Perak; 8) **Preventive/control measures taken:** Restrict movement, contingency measures, culling; 9) **Samples sent to national or international laboratories for confirmation (indicate the names of laboratories):** Fisheries Biosecurity Centre, Tunjang, Kedah, and Fisheries Biosecurity Centre, KLIA, Selangor; 10) **Published paper (articles in journal/website, etc.):** None TiLV disease is known to have occurred previously in Kedah (June 2017), Perlis (July 2017), Sarawak (July 2017), Negeri Sembilan (October 2017), and Kedah and Sarawak (March 2018).
7	**Infection with *Perkinsus olseni*** No positive case was detected (PCR) during DoF active surveillance programme. Infection with *Perkinsus olseni* was suspected to occur in 2016, but not confirmed in a zone.
8	**Infection with Taura syndrome virus (TSV)** *Penaeus monodon* and *P. vannamei* No positive case was detected (PCR) during DoF active surveillance programme.
9	**Infection with White spot syndrome virus (WSD)** No positive case was detected (PCR) during DoF active surveillance programme. WSD was suspected to occur in 2016 but not confirmed in a zone.
10	**Infection with Yellow head virus genotype 1 (YHD)** *Penaeus monodon* and *P. vannamei* No positive case was detected (PCR) during DoF active surveillance programme.
11	**Infection with Infectious hypodermal and haematopoietic virus (IHHNV)** No positive case was detected (PCR) during DoF active surveillance programme. IHHNV is known to occur in Terengganu (last reported June 2016).
12	**Infection with Infectious myonecrosis virus (IMNV)** No positive case was detected (PCR) during DoF active surveillance programme. IMNV is known to occur previously in the state of Sabah (2014) and Malacca (June 2018).

13	**Acute hepatopancreatic necrosis disease (AHPND)** No positive case was detected (PCR) during DoF active surveillance programme. AHPND is kown to occur previously in several states in Malaysia (2014)
14	**Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)** No positive case was detected (PCR) during DoF active surveillance programme. HPM-EHP is known to occur previously in several states in Malaysia (2016)
15	**Megalocytivirus** **1) Origin of the disease or pathogen (history of the disease):** 2) **Species affected:** Freshwater ornamental fish (tropical fish); 3) **Disease characteristics (unusual clinical signs or lesions):** ; 4) **Pathogen (isolated/sero-typed):** Megalocytivirus; 5) **Mortality rate (high/low; decreasing/increasing):** Low; decreasing; 6) **Death toll (economic loss, etc):** None 7) **Size of infected areas or names of infected areas:** Ornamental fish farm at Senai, Johor; 8) **Preventive/control measures taken:** Restrict movement, contingency measures, culling; 9) **Samples sent to national or international laboratories for confirmation (indicate the names of laboratories):** Fisheries Biosecurity Centre, Johor; 10) **Published paper (articles in journal/website, etc.):** None The disease is known to have occurred previously in 2013 and 2014 in several states in Malaysia.
16	**Enteric redmouth disease (ERD)** No positive case was detected (biochemical test and PCR) during DoF active surveillance programme.

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

Country: MYANMAR* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	***	***	***		
2. Infectious haematopoietic necrosis	***	***	***		
3. Spring viraemia of carp (SVC)	***	***	***		
4. Viral haemorrhagic septicaemia (VHS)	***	***	***		
5. Infection with *Aphanomyces invadans* (EUS)	***	***	***		
6. Red seabream iridoviral disease (RSID)	***	***	***		
7. Koi herpesvirus disease (KHV)					
Non OIE-listed diseases					
8. Grouper iridoviral disease	***	***	***		
9. Viral encephalopathy and retinopathy	***	***	***		
10.Enteric septicaemia of catfish	***	***	***		
11. Carp edema virus disease					
12. Tilapia lake virus (TiLV)					
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*					
2. Infection with *Perkinsus olseni*					
3. Infection with abalone herpesvirus					
4. Infection with *Xenohaliotis californiensis*					
5. Infection with *Bonamia ostreae*					
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*					
7. Acute viral necrosis (in scallops)					
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	-	-	-	III	1
2. Infection with white spot syndrome virus	-	-	-	III	
3. Infection with yellow head virus genotype 1	-	-	-		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	***	***	***	III	
5. Infection with infectious myonecrosis virus	-	-	-	III	
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-	-	-	III	
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	***	***	***		
8. Acute hepatopancreatic necrosis disease (AHPND)	-	-	-	III	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	***	***	***		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	***	***	***		
11. Viral covert mortality disease (VCMD) of shrimps	***	***	***		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus					
2. Infection with *Batrachochytrium dendrobatidis*					
ANY OTHER DISEASES OF IMPORTANCE					
1. Parasitic disease					2
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	During this period, we have received 37 samples of crustaceans (6 frozen shrimp and 7 soft shell crab for export), live PL samples of *P. vannamei* (6 samples) and *Macrobrachium rosenbergii* (1 sample), and broodstock/adult *P. vannamei* (2 samples) and *M. rosenbergii* (2 samples) for import and local use) for testing, and found that all samples were negative for WSSV, MrNV, YHV, IMN, AHPND and TSV.
2	Visited some fish farms in Yangon, Mandalay and Ayeyarwaddy regions during this period. Parasitic infestations (*Dactylogyrus* spp., *Trichodina* spp.) were found in some farms due to poor water quality.
3	

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

Country: NEW CALEDONIA **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	***	***	***		
2. Infectious haematopoietic necrosis	***	***	***		
3. Spring viraemia of carp (SVC)	***	***	***		
4. Viral haemorrhagic septicaemia (VHS)	***	***	***		
5. Infection with *Aphanomyces invadans* (EUS)	***	***	***		
6. Red seabream iridoviral disease (RSID)	***	***	***		
7. Koi herpesvirus disease (KHV)	***	***	***		
Non OIE-listed diseases					
8. Grouper iridoviral disease	***	***	***		
9. Viral encephalopathy and retinopathy	+	+	+		1
10.Enteric septicaemia of catfish	***	***	***		
11. Carp edema virus disease	***	***	***		
12. Tilapia lake virus (TiLV)	***	***	***		
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000	II	
2. Infection with *Perkinsus olseni*	0000	0000	0000	II	
3. Infection with abalone herpesvirus	0000	0000	0000	II	
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000	II	
5. Infection with *Bonamia ostreae*	0000	0000	0000	II	
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000	II	
7. Acute viral necrosis (in scallops)	***	***	***		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000	III	
2. Infection with white spot syndrome virus	0000	0000	0000	III	
3. Infection with yellow head virus genotype 1	0000	0000	0000	III	
4. Infection with infectious hypodermal and haematopoietic necrosis virus	2013	2013	2013	III	
5. Infection with infectious myonecrosis virus	0000	0000	0000	III	
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	0000	0000	0000	III	
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000	III	
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000	III	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000	III	
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	0000	0000	0000	III	
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000	III	

12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	***	***	***		
2. Infection with *Batrachochytrium dendrobatidis*	***	***	***		
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	

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

Country: NEW ZEALAND **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000	III	
2. Infectious haematopoietic necrosis	0000	0000	0000	III	
3. Spring viraemia of carp (SVC)	0000	0000	0000	III	
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000	III	
5. Infection with *Aphanomyces invadans* (EUS)	0000	0000	0000	III	
6. Red seabream iridoviral disease (RSID)	0000	0000	0000	III	
7. Koi herpesvirus disease (KHV)	0000	0000	0000	III	
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000	III	
9. Viral encephalopathy and retinopathy	0000	0000	0000	III	
10.Enteric septicaemia of catfish	0000	0000	0000	III	
11. Carp edema virus disease	0000	0000	0000	III	
12. Tilapia lake virus (TiLV)	0000	0000	0000	III	
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	- (2018)	- (2018)	- (2018)	III	1
2. Infection with *Perkinsus olseni*	- (2018)	+	- (2018)	III	2
3. Infection with abalone herpesvirus	0000	0000	0000	III	
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000	III	
5. Infection with *Bonamia ostreae*	- (2017)	- (2017)	- (2017)	III	3
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000	III	
7. Acute viral necrosis (in scallops)	0000	0000	0000	III	
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000	III	
2. Infection with white spot syndrome virus	0000	0000	0000	III	
3. Infection with yellow head virus genotype 1	0000	0000	0000	III	
4. Infection with infectious hypodermal and haematopoietic	0000	0000	0000	III	
5. Infection with infectious myonecrosis virus	0000	0000	0000	III	
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	0000	0000	0000	III	
7. Infection with *Hepatobacter penaei* (Necrotising	0000	0000	0000	III	
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000	III	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000	III	
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	0000	0000	0000	III	
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000	III	

12. *Spiroplasma eriocheiris* infection	0000	0000	0000	III	
13. Iridovirus in crayfish	0000	0000	0000	III	
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	0000	0000	0000	III	
2. Infection with *Batrachochytrium dendrobatidis*	-(2010)	-(2010)	-(2010)	III	4
ANY OTHER DISEASES OF IMPORTANCE					
1.					
2.					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Infection with *Bonamia exitiosa*** occurs in commercial oyster beds in Foveaux Strait, Southland where it is highly prevalent and associated with mortalities in mid to late summer. It occurs intermittently around the South Island and in Wellington Harbour (southern end of the North Island), and has been previously reported in *Ostrea chilensis* from Hauraki Gulf (Auckland region), Tauranga (Bay of Plenty region), the Marlborough Sounds and Wellington Harbour. Annual monitoring of the presence of *B. exitiosa* infection is undertaken in the flat oyster (*O. chilensis*) population in the Foveaux Strait.

2	**Infection with *Perkinsus olseni*** was first detected in New Zealand in 1999, in wild wedge shells (*Macomona liliana*). It was then found in wild populations of New Zealand cockles (*Austrovenus stutchburyi*), ark shells (*Barbatia novaezelandiae*) and pipi (*Paphies australis*) in 2000-2001. In July 2013, *P. olseni* was detected for the first time in farmed black foot pāua (*Haliotis iris*), a type of abalone native to New Zealand. Further detections were made in wild *H. iris* populations in 2014. These mollusc species occur widely around the coast of New Zealand, but to date *P. olseni* has only been detected in these species from the Auckland region northwards. *Perkinsus olseni* was found for the first time on the South Island in New Zealand green lipped mussels (*Perna canaliculus*) in a land based aquaculture facility in September 2014, and then in wild New Zealand scallops (*Pecten novaezelandiae*) in November 2014. Both of these findings were in the Marlborough region, and were incidental and not associated with mortality events. In November 2017, passive surveillance detected *P. olseni* from New Zealand scallops in two sites within Kaipara harbour, Auckland region, and again was thought to be incidental and not associated with significant pathology in scallops.
3	**Infection with *Bonamia ostreae*** was detected for the first time in New Zealand flat oysters (*Ostrea chilensis*) in January 2015. It was found on one land-based aquaculture facility in the Nelson region, and on two marine farms in the Marlborough region, both regions being in northern part of the South Island. Since that time, movement controls have been in place to regulate the movement of susceptible shellfish from the northern regions of the South Island and active surveillance has been conducted for the purposes of early detection of spread. In 2016, *B. ostreae* was detected in both farmed and wild flat oysters within the Marlborough region (the same region as initially reported), and was associated with pathology and mortality in the farmed population. In May 2017 surveillance detected *B. ostreae* in marine flat oyster farms in Big Glory Bay, Stewart Island (situated in the Southland region, at the southern end of the South Island). No clinical signs or elevated mortality was observed in association with *B. ostreae* in farmed flat oysters in Big Glory Bay. Following this detection, movement controls to manage risk movements from Stewart Island were issued, and depopulation of all flat oyster farms within areas where *B. ostreae* had been detected commenced. Depopulation of farms in Big Glory Bay commenced on the 19 June 2017 and was completed September 2017. Depopulation of farms in Marlborough Sounds commenced on the 11 July and was completed in December 2017. Active surveillance continues for the purposes of early detection of spread.
4	The first isolation of ***Batrachochytrium dendrobatidis*** was made in 1999 in New Zealand. Since then the fungus has been detected both on the North and South Islands in both native and introduced frog species. It is not certain what level of population decline if any, is associated with the presence of the fungus in native frogs.

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

Country: SINGAPORE* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000		
2. Infectious haematopoietic necrosis	0000	0000	0000		
3. Spring viraemia of carp (SVC)	0000	0000	0000		
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000		
5. Infection with *Aphanomyces invadans* (EUS)	0000	0000	0000		
6. Red seabream iridoviral disease (RSID)	(2017)	(2017)	+	III	1
7. Koi herpesvirus disease (KHV)	(2018)	(2018)	(2018)		
Non OIE-listed diseases					
8. Grouper iridoviral disease	(2014)	(2014)	(2014)		
9. Viral encephalopathy and retinopathy	+	+	+	III	1
10.Enteric septicaemia of catfish	***	***	***		
11. Carp edema virus disease	***	***	***		
12. Tilapia lake virus (TiLV)	0000	0000	0000		
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	***	***	***		
2. Infection with *Perkinsus olseni*	***	***	***		
3. Infection with abalone herpesvirus	***	***	***		
4. Infection with *Xenohaliotis californiensis*	***	***	***		
5. Infection with *Bonamia ostreae*	***	***	***		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	***	***	***		
7. Acute viral necrosis (in scallops)	***	***	***		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000		
2. Infection with white spot syndrome virus	(2018)	(2018)	(2018)		
3. Infection with yellow head virus genotype 1	0000	0000	0000		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	0000	0000	0000		
5. Infection with infectious myonecrosis virus	0000	0000	0000		
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	***	***	***		
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000		
8. Acute hepatopancreatic necrosis disease (AHPND)	0000	0000	0000		
9. Infection with *Aphanomyces astaci* (Crayfish plague)	***	***	***		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	***	***	***		
11. Viral covert mortality disease (VCMD) of shrimps	***	***	***		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	***	***	***		
13. Iridovirus in crayfish	***	***	***		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	***	***	***		
2. Infection with *Batrachochytrium dendrobatidis*	(2018)	(2018)	(2018)		
ANY OTHER DISEASES OF IMPORTANCE					
1 Infection with Scale Drop Disease Virus	+	(2018)	+	III	2
2 Infection with Lates Calcarifer Herpes Virus	+	(2018)	+	III	2
3 Mycobacteriosis	+	(2018)	+	II	3

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	In September, a mixed infection with **Red Seabream Iridovirus Disease (RSIVD)** and **Viral Nervous Necrosis Virus (VNNV)** were detected by PCR and histopathology analysis from a batch of diseased grouper fish submitted by a land-based commercial facility. The farm had reported abnormal swimming behaviour, lethargy and inappetance in this batch of fish. VNNV was concurrently detected by PCR from separate batches of clinically healthy grouper fish from the same land-based facility in July and August. An on-site investigation was carried out on the moribund population and identified the fish as having been recently imported and still kept under quarantine at the time of the investigation. The farm was advised to assess their overseas supply sources and adopt further biosecurity measures to prevent pathogen spread to the unaffected tanks. The affected population was prohibited from being sold to other farms.

2	**Scale Drop Disease Virus (SDDV) and *Lates calcarifer* Herpesvirus (LCHV)** were detected in two separate batches of diseased asian seabass submitted from the same commercial fish farm by PCR, in July and September respectively. The affected population had experienced low grade mortalities. The premises' attending veterinarian was promptly made aware of the findings.
3	Bacterial entities compatible with ***Mycobacterium* sp.** were detected by histopathology and special-staining within granulomatous visceral lesions in a batch of diseased coral trout and grouper, submitted by a land-based commercial aquaculture facility in July and September respectively. The affected population had experienced low grade mortalities. The farm was advised to remove both moribund and in-contact fish, rectify possible transmission routes of Mycobacteriosis and inform their customers to take precautions in view of the potential zoonotic risk.

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

Country: VIETNAM* **Period: July - September 2018**

Item	Disease status [a/]			Level of diagnosis	Epidemiological comment numbers
DISEASES PREVALENT IN THE REGION	Month				
FINFISH DISEASES	July	August	September		
OIE-listed diseases					
1. Epizootic haematopoietic necrosis	0000	0000	0000		
2. Infectious haematopoietic necrosis	0000	0000	0000		
3. Spring viraemia of carp (SVC)	0000	0000	0000		
4. Viral haemorrhagic septicaemia (VHS)	0000	0000	0000		
5. Infection with *Aphanomyces invadans* (EUS)	-	-	-		
6. Red seabream iridoviral disease (RSID)	0000	0000	0000		
7. Koi herpesvirus disease (KHV)	0000	0000	0000		
Non OIE-listed diseases					
8. Grouper iridoviral disease	0000	0000	0000		
9. Viral encephalopathy and retinopathy	0000	0000	0000		
10.Enteric septicaemia of catfish	+()	+()	+()	I, III	1
11. Carp edema virus disease	0000	0000	0000		
12. Tilapia lake virus (TiLV)					
MOLLUSC DISEASES					
OIE-listed diseases					
1. Infection with *Bonamia exitiosa*	0000	0000	0000		
2. Infection with *Perkinsus olseni*	-	-	-		
3. Infection with abalone herpesvirus	0000	0000	0000		
4. Infection with *Xenohaliotis californiensis*	0000	0000	0000		
5. Infection with *Bonamia ostreae*	0000	0000	0000		
Non OIE-listed diseases					
6. Infection with *Marteilioides chungmuensis*	0000	0000	0000		
7. Acute viral necrosis (in scallops)	0000	0000	0000		
CRUSTACEAN DISEASES					
OIE-listed diseases					
1. Infection with Taura syndrome virus	0000	0000	0000		
2. Infection with white spot syndrome virus	+()	+()	+()	I, III	2
3. Infection with yellow head virus genotype 1	-	-	-		
4. Infection with infectious hypodermal and haematopoietic necrosis virus	0000	0000	0000		
5. Infection with infectious myonecrosis virus	0000	0000	0000		
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	-	-	-		
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	0000	0000	0000		
8. Acute hepatopancreatic necrosis disease (AHPND)	+()	+()	+()	I, III	3
9. Infection with *Aphanomyces astaci* (Crayfish plague)	0000	0000	0000		
Non OIE-listed diseases					
10. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)	0000	0000	0000		
11. Viral covert mortality disease (VCMD) of shrimps	0000	0000	0000		

*Member of NACA's Asia Regional Aquatic Animal Health Programme

12. *Spiroplasma eriocheiris* infection	0000	0000	0000		
13. Iridovirus in crayfish	0000	0000	0000		
AMPHIBIAN DISEASES					
OIE-listed diseases					
1. Infection with Ranavirus	0000	0000	0000		
2. Infection with *Batrachochytrium dendrobatidis*	0000	0000	0000		
ANY OTHER DISEASES OF IMPORTANCE					

DISEASES PRESUMED EXOTIC TO THE REGION[b]
LISTED BY THE OIE
Finfish: Infection with HPR-deleted of HPR0 salmon anemia virus, Infection with salmon pancreas disease virus; Infection with *Gyrodactylus salaris*.
Molluscs: Infection with *Bonamia ostreae*; *Marteilia refringens*; *Perkinsus marinus*.
Crustaceans: Crayfish plague (*Aphanomyces astaci*).
NOT LISTED BY THE OIE
Finfish: Channel catfish virus disease

a/ Please use the following symbols:

+	Disease reported or known to be present	?( )	Presence of the disease suspected but not confirmed in a zone
+?	Serological evidence and/or isolation of causative agent but no clinical diseases	***	No information available
?	Suspected by reporting officer but presence not confirmed	0000	Never reported
+( )	Occurrence limited to certain zones	-	Not reported (but disease is known to occur)
+?( )	Confirmed infection/infestation limited to one or more zones of the country, but no clinical disease	(year)	Year of last occurrence

b/ 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	**Enteric Septicaemia of Catfish (*Edwardsiella ictaluri*)** Infection found in some small scale catfish (*Pangasius micronema*, *P. hypophthalmus*) farms.

2	**Infection with white spot syndrome virus (White Spot Disease; WSD)** **Pathogen**: White spot syndrome virus (WSSV) **Species affected:** *Penaeus monodon* and *Litopenaeus vannamei;* **Name of affected area:** reported and limited in some small scale farms with low biosecurity control. Shrimps were affected at 10-100 days after stocking; **Mortality rate:** average to high; **Clinical signs:** lethargic or moribund shrimps aggregated at pond surface and edges, slow to erratic swimming behavior, overall body color often reddish, minute to large (0.5-2.0 mm diameter) white inclusions embedded in the cuticle; **Control measures:** early harvest, strict isolation of infected ponds from movement, strengthened control of transportation, cleaning and disinfection of infected ponds and farming tools using Calcium hypochlorite (chlorine).
3	**Acute Hepatopancreatic Necrosis Disease (AHPND)** **Pathogen**: *Vibrio parahaemolyticus* with Phage A3 **Species affected:** *Penaeus monodon* and *Litopenaeus vannamei* (10-45 DOC) **Name of affected area:** reported and limited to some small-scale farms with low biosecurity control. **Mortality rate:** could reach 95% in intensive and semi-intensive farms; **Clinical signs:** shrimps become lethargic with soft, darkened shells, mottling of the carapace. Pathology is limited to hepatopancreas. **Control measures:** early harvest, strict isolation of infected ponds from movement and transport controls, cleaning and disinfection of infected ponds and farming tools using Calcium hypochlorite (chlorine).

2. New aquatic animal health regulations introduced within past six months (with effective date): None

List of Diseases in the Asia-Pacific
Quarterly Aquatic Animal Disease Report (Beginning 2018)

1. DISEASES PREVALENT IN THE REGION	
1.1 FINFISH DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Epizootic haematopoietic necrosis	1.Grouper iridoviral disease
2. Infectious haematopoietic necrosis	2.Viral encephalopathy and retinopathy
3. Spring viraemia of carp (SVC)	3.Enteric septicaemia of catfish
4. Viral haemorrhagic septicaemia (VHS)	4. Carp edema virus disease
5. Infection with *Aphanomyces invadans* (EUS)	5. Tilapia lake virus disease
6. Red seabream iridoviral disease (RSID)	
7. Koi herpesvirus disease (KHV)	
1.2 MOLLUSC DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with *Bonamia exitiosa*	1. Infection with *Marteilioides chungmuensis*
2. Infection with *Perkinsus olseni*	2. Acute viral necrosis (in scallops)
3. Infection with abalone herpesvirus	
4. Infection with *Xenohaliotis californiensis*	
5. Infection with *Bonamia ostreae*	
1.3 CRUSTACEAN DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with Taura syndrome virus	1. Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (HPM-EHP)
2. Infection with white spot syndrome virus	
3. Infection with yellow head virus genotype 1	2. Viral covert mortality disease (VCMD) of shrimps
4. Infection with infectious hypodermal and haematopoietic necrosis	3. *Spiroplasma eriocheiris* infection
5. Infection with infectious myonecrosis virus	4. Iridovirus in crayfish
6. Infection with *Macrobrachium rosenbergii* nodavirus (White Tail disease)	
7. Infection with *Hepatobacter penaei* (Necrotising hepatopancreatitis)	
8. Acute hepatopancreatic necrosis disease (AHPND)	
9. Infection with *Aphanomyces astaci* (Crayfish plague)	
1.4 AMPHIBIAN DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with *Ranavirus*	
2. Infection with *Bachtracochytrium dendrobatidis*	
2. DISEASES PRESUMED EXOTIC TO THE REGION	
2.1 Finfish	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with HPRdeleted or HPR0 salmon anaemia virus	1. Channel catfish virus disease
2. Infection with salmon pancreas disease virus	
3. Infection with *Gyrodactylus salaris*	
2.2 Molluscs	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with *Marteilia refringens*	
2. Infection with *Perkinsus marinus*	

Recent Aquatic Animal Health Related Publications

OIE Aquatic Animal Health Code, 21st Edition, 2018. The OIE Aquatic Animal Health Code (the Aquatic Code) provides standards for the improvement of aquatic animal health worldwide. It also includes standards for the welfare of farmed fish and use of antimicrobial agents in aquatic animals. The sanitary measures in the Aquatic Code should be used by the Competent Authorities of importing and exporting countries for early detection, reporting and control of pathogenic agents in aquatic animals (amphibians, crustaceans, fish and molluscs) and to prevent their spread via international trade in aquatic animals and their products, while avoiding unjustified sanitary barriers to trade. The standards in the Aquatic Code have been formally adopted by the World Assembly of OIE Delegates, which constitutes the organisation's highest decision-making body. This 21st edition incorporates modifications to the Aquatic Code agreed at the 86th General Session in May 2018. This edition includes the following updates: Chapter 1.3. 'Diseases listed by the OIE'; Chapter 5.3. 'OIE procedures relevant to the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization'; Chapter 5.4. 'Criteria to assess the safety of aquatic animal commodities';Article X.X.2. of Chapters 10.1. 'Epizootic haematopoietic necrosis', 10.3. 'Infection with Gyrodactylus salaris' and 10.4. 'Infection with infectious salmon anaemia virus'; Articles X.X.8., X.X.9., X.X.10. and X.X.11. of all disease-specific chapters in Sections 8, 9 and 10. This edition also includes the following new chapter: Chapter 8.2. 'Infection with *Batrachochytrium salamandrivorans*'.The Aquatic Animal Health Code is available for free download http://www.oie.int/en/standard-setting/aquatic-code/access-online/

OIE Manual of Diagnostic Tests for Aquatic Animals, 2017. The purpose of the Manual of Diagnostic Tests for Aquatic Animals (the Aquatic Manual) is to provide a standardised approach to the diagnosis of the diseases listed in the Aquatic Code, to facilitate health certification for trade in aquatic animals and aquatic animal products. Although there are many publications on the diagnosis and control of aquatic animal diseases, the Aquatic Manual is a key reference document describing the methods relevant to the OIE-listed diseases and other important diseases for use by aquatic animal health laboratories around the world. Adoption of the specified methods will help to increase efficiency of laboratories and to promote improvements in aquatic animal health world-wide.The manual is available for free download at http://www.oie.int/en/standard-setting/aquatic-manual/access-online/

NACA, NFTEC, China-ASEAN CJRPMAT and SYS, 2018. **Emergency Regional Consultation for Prevention and Management of Tilapa Lake Virus (TiLV) in the Asia-Pacific**. EM leano and Y Liang (Editors). Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand. 67 pp.

Jansen, MD, Dong, HT and Mohan CV, 2018. **Tilapia lake virus: a threat to the global tilapia industry? Reviews in Aquaculture**, doi: 10.1111/raq.12254.

NACA, 2017. **Disease Advisory: Tilapia Lake Virus – an Emerging Threat to Farmed Tilapia in the Asia-Pacific Region**. Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand.

Jansen, M.D. and Mohan, C.V., 2017. **Tilapia Lake Vrus (TiLV): Literature Review.** Penang, Malaysia: CGIAR Research Program on Fish Agri-Food Systems. Working Paper: FISH-2017-04.

OIE, 2017. **Tilapia Lake Virus (TiLV) – a Novel Orthomyxo-like Virus**. World Organization for Animal Health, Paris, France.

FAO, 2017. **Outbreaks of Tilapia lake virus (TiLV) Threaten the Livelihoods and Food Securityof Millions of People Dependent on Tilapia Farming**. GIEWS Special Alert No: 338 – Global. Food and Agriculture Organization of the United Nations, Rome, Italy.

Surachetpong, W., Janetanakit, T., Nonthabenjawan, N., Tattiyapong, P., Sirikanchana, K. and Amonsin, A., 2017. **Outbreaks of tilapia lake virus infection, Thailand, 2015-2016**. Emerging Infectious Diseases, https://dx.doi.org/10.3201/eid2306.161278

Dong HT, Siriroob, S., Meemetta, W., Santimanawong, W., Gangnonngiw, W., Pirarat, N., Khunrae, P., Rattanarojpong, T., Vanichviriyakit, R. and Senapin, S., 2017a. **Emergence of tilapia lake virus in Thailand and an alternative semi-nested RT-PCR for detection**. Aquaculture, doi: 10.1016/j.aquaculture.2017.04.019

Dong HT, Siriroob, S., Meemetta, W., Santimanawong, W., Gangnonngiw, W., Pirarat, N., Khunrae, P., Rattanarojpong, T., Vanichviriyakit, R. and Senapin, S., 2017b. **A warning and an improved PCR detection method for tilapia lake virus (TiLV) disease in Thai tilapia farms.** http://www.enaca.org/modules/news/article.php?article_id=2077&title=tilapia-lake-virus-in-thailand-improved-pcr-detection-method

Kramer, L., 2017. **Sizing up TiLV and its potential impact on tilapia production**. Global Aquaculture Advocate, May 2017.

Pakingking, R.V. Jr., de Jesus-Ayson, E.G.T. and Acosta, B.O. (Eds.), 2016. **Addressing Acute Hepatopancreatic Necrosis Disease (AHPND) and Other Transboundary DSiseases for Improved Aquatic Animal Health in Southeast Asia**. SEAFDEC AQD, Tigbauan, Iloilo, Philippines. 109 pp.

Lio-Po, G.D. and E.M. Leaño, 2016. **Chapter 13: Important diseases of penaeid shrimps**. In: IC Liao, NH Chao and EM Leaño (editors), Progress of Shrimp and Prawn Aquaculture in the World. National Taiwan Ocean University, Keelung, Taiwan, The Fisheries Society of Taiwan, Keelung, Taiwan, Asian Fisheries Society, Selangor, Malaysia and World Aquaculture Society, Loisiana, USA. p. 269-315.

Liu, Z., Zhang, Q.-L., Wan, X.-Y., Huang, J., 2016. **Development of real-time PCR assay for detection of microsporidian *Enterocytozoon hepatopenaei* and detection in shrimp samples under different growth rates.** Progress in Fishery Sciences. In press (in Chinese. Abstract in English).

Dabu, I.M., Lim, J.J., Arabit, P.M.T., Orense, S.J.A.B., Tabardillo Jr., J.A., Corre, V.L. and Maningas, M.B.B., 2015. **The first record of acute hepatopancreatic necrosis disease in the Philippines.** Aquacul. Res. doi: 10.1111/are.12923

de la Peña,L.D., N.A.R. Cabillon, D.D. Catedral, E.C. Amar, R.C. Usero, W.D. Monotilla, A.T. Calpe, D.D.G. Fernandez and C.P. Saloma, 2015. **Acute hepatopancreatic necrosis disease (AHPND) outbreaks in *Penaeus vannamei* and *P. monodon* cultured in the Philippines.** Diseases of Aquatic Organisms, 116:251-254.

Kondo, H., Van, P.T., Dang, L.T. and Hirono, I., 2015. **Draft genome sequence of non-*Vibrio parahaemolyticus* acute hepatopancreatic necrosis disease strain KC13.17.5, isolated from diseased shrimp in Vietnam**. Genome Announc 3(5):e00978-15. doi:10.1128/genomeA.00978-15.

Liu, L., Xiao, J., Xia, X., Pan, Y., Yan, S. and Wang, Y., 2015. **Draft genome sequence of *Vibrio owensii* strain SH-14, which causes shrimp acute hepatopancreatic necrosis disease.** Genome Announc 3(6):e01395-15. doi:10.1128/genomeA.01395-15.

Soto-Rodriguez, S.A., Gomez-Gil, B., Lozano-Olvera, R., Betancourt-Lozano, M. and Morales-Covarrubias, M.S., 2015. **Field and experimental evidence of *Vibrio parahaemolyticus* as the causative agent of acute hepatopancreatic necrosis disease of cultured shrimp (*Litopenaeus vannamei*) in Northwestern Mexico.** Applied and Environmental Microbiology, 81: 1-11.

Han, J.E., Tang, K.F.J., Tran, L.H. and Lightner, D.V. , 2015. **Photorhabdus insect-related (Pir) toxin-like genes in a plasmid of *Vibrio parahaemolyticus*, the causative agent of acute hepatopancreatic necrosis disease (AHPND) of shrimp**. Dis. Aquat. Org., 113:33-40

Sirikharin, R., Taengchaiyaphum, S., Sanguanrut, P., Chi, T.D., Mavichak, R., Proespraiwong, P., et al., 2015. **Characterization and PCR Detection Of Binary, Pir-Like Toxins from *Vibrio parahaemolyticus* Isolates that Cause Acute Hepatopancreatic Necrosis Disease (AHPND) in Shrimp**. PLoS ONE 10(5): e0126987. doi:10.1371/journal.pone.0126987

Zhang, Q., Liu, Q., Liu, S., Yang, H., Liu, S., Zhu, L., Yang, B., Jin, J., Ding, L., Wang, X., Liang, Y., Wang, Q. and Huang, J., 2014. **A new nodavirus associated with covert mortality disease of shrimp**. J. Gen. Virol., 95:2700-2709.

Tran, L.H., Fitzsimmons, K., Lightner, D.V., 2014. **AHPND/EMS: From the academic science perspective to the production point of view.** Aquaculture Asia-Pacific, March/April 2014: 14-18.

Tran, L.H., Fitzsimmons, K., Lightner, D.V., 2014. **Tilapia could enhance water conditions, help control EMS in shrimp ponds.** Global Aquaculture Advocate, Jan/Feb 2014: 26-28

Mohan, C.V. and Leaño, E., 2014. **Shrimp early mortality syndrome (EMS)/Acute hepatopancreatic necrosis syndrome (AHPNS): an emerging aquatic animal disease in the Asia Pacific.** In: Aquaculture New Possibilities and Concerns (VRP Sinha and P Jayashankar, editors). p. 133-140.

FAO, 2013. **Report of the FAO/MARD Technical Workshop on Early Mortality Syndrome (EMS) or Acute Hepatopancreatic Necrosis Syndrome (AHPNS) of Culture Shrimps (Under TCP/VIE/3304).** FAO Fisheries and Aquaculture Report No. 1053. Food and Agriculture Organization of the United Nations, Rome, Italy. 65 pp.

Tran, L., Nunan, L., Redman, R.M., Mohney, L.L., Pantoja, C.R., Fitzsimmons, K., Lightner, D.V., 2013. **Determination of the infectious nature of the agent of acute hepatopancreatic necrosis syndrome affecting penaeid shrimp**. Diseases of Aquatic Organisms, 105:45-55.

Tangprasittipap, A., Srisala, J., Chouwdee, S., Somboon, M., Chuchird, N., Limsuwan, C., Srisuvan, T., Flegel, T.W., Sritunyalucksana, K., 2013. **The microsporidian *Enterocytozoon hepatopenaei* is not the cause of white feces syndrome in whiteleg shrimp *Penaeus (Litopenaeus) vannamei***. BMC Veterinary Research, 9:139.

NACA, 2012. **Final Report. Asia Pacific Regional Consultation on the Emerging Shrimp Disease – Early Mortality Syndrome (EMS)/Acute Hepatopancreatic Necrosis Syndrome (AHPNS).** Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand. http://www.enaca.org/modules/library/publication.php?publication_id=1059

OIE, 2012. **Proceedings of OIE Global Conference on Aquatic Animal Health – Aquatic Animal Health Programmes: their Benefits for Global Food Security**. World Organisation for Animal Health, Paris, France. 205 pp.

FAO, 2012. **Improving biosecurity through prudent and responsible use of veterinary medicines in aquatic food production.** FAO Fisheries and Aquaculture Technical Paper No. 547. FAO, Rome. 207 pp.

Leaño, E. M, and C.V. Mohan. 2012. **Early mortality syndrome threatens Asia's shrimp farms.** Global Aquaculture Advocate, July/August 2012: 38-39

Flegel, T.W., 2012. **Historic emergence, impact and current status of shrimp pathogens in Asia**. J. Invertebrate Pathology, 110:166-173.

Senapin, S., Phiwsaiya, K., Gangnonngiw, W., Flegel, T., 2011. **False rumours of disease outbreaks caused by infectious myonecrosis virus (IMNV) in the whiteleg shrimp in Asia.** Journal of Negative Results in BioMedicine, 10:10.

Rodgers, C.J., Mohan, C.V., Peeler, E.J., 2011. **The spread of pathogens through trade in aquatic animals and their products.** Rev. Sci. Tech, Off. Int. Epiz., 30: 241-256.

List of NACA National Coordinators(*) and OIE National Focal Points for Aquatic Animals(**)

Country	Name and Address
Australia	Dr. Ingo Ernst* Aquatic Animal Health Unit Office of the Chief Veterinary Officer Department of Agriculture, Fisheries and Forestry GPO Box 858, Canberra ACT 2601, Fax: +61-2-6272 3150; Tel: +61-2-6272 4328 Email: ingo.ernst@agriculture.gov.au Dr. Herbert Brett* Aquatic Animal Health Unit , Office of the Chief Veterinary Officer Department of Agriculture, Fisheries and Forestry GPO Box 858, Canberra ACT 2601 Fax: +61 2 6272 3150; tel: +61 2 6272 4009 E-mail: brett.herbert@agriculture.gov.au Dr. Yuko Hood** Principal Science Officer, Aquatic Pest and Health Policy Department of Agriculture and Water Resources GPO Box 858, 7 London Circuit Canberra, ACT 2601 Phone: +61 2 6272 3024 E-mail: yuko.hood@agriculture.gov.au
Bangladesh	Dr. M. G. Hussain* Director General, Bangladesh Fisheries Research Institute (BFRI) Mymensingh 2201, Bangladesh Fax: +880-91-66559, Tel: +880-91-65874 E-mail: hussain.bfri@gmail.com; dg@fri.gov.bd; dgbfri@gmail.com Dr. Md. Forhadul Alam** Assistant Director (Animal Health) Department of Livestock Services Ministry of Fisheries and Livestock Prani Sampad Bhaban, Krishikhamar Sarak Farmgate, Dhaka 1215 Tel: 880-2911-5968 E-mail: forhadul1961@gmail.com
Bhutan	Mr. Dorji Namgay** Program Director National Aquaculture Centre Department of Livestock Ministry of Agriculture and Forests Gelephu, Sarpang Tel: 975-625-1190 Fax: 975-625-1201 E-mail: namgaydorji@moaf.gov.bt; ricochets425@gmail.com

Brunei	Mr. Haji Hallidi Salleh** Acting Director of Fisheries Department of Fisheries Ministry of Industry and Primary Resources Menteri Besar Road, Bandar Seri Begawan Tel: 673-2383067 Fax: 6732382069 E-mail: halidi.salleh@fisheries.gov.bn
Cambodia	Mr. Chheng Phen* Acting Director Inland Fisheries Research and Development Institute (IFReDI) Fisheries Administration, # 186, Norodom Blvd., PO Box 582, Phnom Penh, Cambodia Phone: +855 23 221485 E-mail: chhengp@yahoo.com Dr. Chin Da** Director of the Aquatic Division of the Fisheries Administration of Cambodia P.O.Box: 2447, Phnom Penh-3 Tel: 855 23 996 380 E-mail: chinda77@yahoo.com
P.R. China	Dr. Dongyue Feng** Engineer National Fishery Technical Extension Center Building 18, Maizidian Street Chaoyang District Center Beijing 100125 Tel: 86-138-119-564-67 E-mail: fengdy76@sina.com
Chinese Taipei	Dr Heng Yi Wu** Specialist Bureau of Animal and Plant Health Inspection and Quarantine Council of Agriculture, Executive Yuan 10F, No.100, Sec. 2, Heping W. Rd, Zhongzheng Dist, Taipei City 10070 Tel: 886-2-8978-7925 E-mail: hanker@mail.baphiq.gov.tw
Fiji	Dr. Bhaheerathan Kanagasapapathy** Acting Chief Veterinary Officer Biosecurity Authority of Fiji Level 3, Provident Plaza 1, Ellery Street Suva Tel: 679 3312512 Fax: 679 33 05 043 E-mail: bkanagasapapathy@baf.com.fj

Hong Kong China	Ms Joanne On-on Lee* Fisheries Officer (Aquaculture Environment) Agriculture, Fisheries and Conservation Department 8/F, Cheung Sha Wan Government Offices 303 Cheung Sha Wan Road Fax: +852 21520383; Tel: +852 21506808 E-mail: joanne_oo_lee@afcd.gov.hk
India	Mr. Intisar Anees Siddiqui* Fisheries Research & Investigation Officer Department of Animal Husbandry, Dairying and Fisheries Ministry of Agriculture, Krishi Bhawan, New Delhi 110114 Tel: +91-11-23389419/23097013 Fax: +91-11-23070370/23384030 E-mail: intisarsiddiqui@yahoo.co.in Mr. Joshi Aditya Kumar** Joint Secretary (Fisheries) Department of Animal Husbandry, Dairying & Fisheries Ministry of Agriculture & Farmers Welfare Krishi Bhawan, New Delhi 110001 Tel: 91-11-23381994 Fax: 91-11-23070370 E-mail: jsfy@nic.in
Indonesia	Dr. Maskur* Director of, Fish Health and Environment Directorate General of Aquaculture Ministry of Marine Affairs and Fisheries Jl. TB. Simatupang Kav.1, JakartaHarsono RM No. 3, Gedung Ps. Minggu Jakarta Selatan Fax: +62 2129 40 6800; Tel: +62 2129 40 6800 E-mail: maskurfish@gmail.com Mr. Arik Hari Wibowo** Director of Aquaculture Regional Development and Fish Health Directorate General of Aquaculture Ministry of Marine Affairs and Fisheries Minabahari IV Lantai VI Jl. Medan Merdaka Timur No. 16, Jakarta Pusat, Jakarta Fax: +62 2135 14724; Tel.: +62 2135 19070 E-mail: hariwibowoarik@gmail.com
Iran	Dr. Kazem Abdi Khazineh Jadid*/** Director General, Aquatic Animal Health Department Iran Veterinary Organization Ministry of Jihad-E-Agriculture Seyed Jamaledin Asad-Abadi St., Vali-Asr Ave. P.O.Box 14155-6349, Tehran, Iran Tel: +98-21-88966877; Fax: +98-21-88957252 E-mail: kazemabdy@yahoo.com

Japan	Ms. Hiroko Sakamoto** Director Fish and Fishery Products Safety Office Animal Products Safety Division Food Safety and Consumer Affairs Bureau Ministry of Agriculture, Foresty and Fisheries 1-2-1 Kasumigaseki, Chiyoda-ku Tokyo 100-8950 Tel: +81-3-3502-8098 Fax: +81-3-3501-2685 E-mail: suisan_boueki@maff.go.jp
DPR Korea	Mr. Chong Yong Ho* Director of Fish Farming Technical Department, Bureau of Freshwater Culture Sochangdong Central District, P.O.Box. 95 , Pyongyong, Fax: +850-2-814416; Tel: 3816001, 3816121 Dr. Yun Ki Man** Veterinary Expert Veterinary and Anti-Epizootic Department Ministry of Agriculture Jungsong-Dong, Sungri Street Central District, Pyongyang Tel: 850-21-811-138-182-78 E-mail: MOAECD@silibank.com
Republic of Korea	Dr. Myoung Ae Park*/** Director, Pathology Division National Fisheries Research and Development Institute 152-1, Haeanro, Gijang-up Gijang-gun, Busan 619-705 Tel: +82-51-7202470 E-mail: mapark@nfrdi.go.kr Dr. Sung Hang Yoon** Quarantine Officer National Fisheries Products Quality Management Services 106 Haaulmeaulro, Ilsandong-gu Goyang-si Tel: 82-31-929-4692 E-mail: ysha78@korea.kr

Lao PDR	Mrs. Thongphoun Theungphachanh* Quality Control Animal Product Department of Livestock and Fisheries DLF PO Box 811, Lao PDR Fax : +856 21 216380; Tel: +856 21 216380 or Mobile: +856 20 772 1115 Email: theungphachan@yahoo.com Dr. Bounthong Saphakdy* Director of Fisheries Division Department of Livestock and Fisheries DLF P.O. Box 811, Lao PDR E-mail: saphakdy@yahoo.com Mr. Akhane Phomsouvanh** Deputy Director Division of Fisheries Department of Livestock and Fisheries P.O. Box 6644, Vientiane 01000 Tel: 856-2121-7869" E-mail: akhane@live.com
Malaysia	Dr. Kua Beng Chu*/** Director National Fish Health Reserach Division 11960 Batu Maung Penang Palau Pinang Tel: +604 626 3922 E-mail: kbengchu@yahoo.com
Maldives	Dr. Shafiya Naeem** Senior Research Officer Marine Research Center Ministry of Fisheries and Agriculture H. White Wave, Moonlight Higun Male' - 20096 Tel: 960-332-2242 Fax: 960-332-6558 E-mail: snaeem@mrc.gov.mv; shafiyanaeem@gmail.com
Micronesia, Fed. States of	Mr Valentin Martin** Deputy Assistant Secretary Marine Resources Unit Department of Resources & Development P.O Box PS-12 Palikir, Phonpei, FM96941 Tel: 691-320-2620/5133/2646 Fax: 691-320-5854 E-mail: fsmmrd@mail.fm
Mongolia	Dr Tsengee Sugir** State Central Veterinary Laboratory Khan-uul district, Zaisan P.O. Box 53/03 Ulaanbaatar 210153 Tel: 976-341651-18 Fax: 976-11-70111050 E-mail: ssugar352000@yahoo.com

Myanmar	Mr. U Saw Lah Pah Wah* Department of Fisheries, Ministry of Livestock and Fisheries Sin Minn Road, Alone Township, Yangon, Myanmar Fax: +95 01 228-253; Tel: +95 01 283-304/705-547 E-mail: dof@mptmail.net.mm Dr Kyaw Naing Oo** Director, Livestock Zone Livestock Breeding and Veterinary Department Ministry of Agriculture, Livestock and Irrigation Office No. (36), Yaza Thingaha Road, Ottaya Thiri Township Nay Pyi Taw Fax: +95 067 408342; Tel: +95 9250066212 E-mail: kyaw87vet@gmail.com
Nepal	Mr Ram Prasad Panta*/** Senior Fisheries Development Officer Central Fisheries Laboratory Central Fisheries Building Balaju, Machhapokhari, Kathmandu Tel: 977-1-4385854 Fax: 977-1-4350833 E-mail: rppanta13@gmail.com Mr Rama Nanda MISHRA** Program Director Directorate of Fisheries Development Central Fisheries Building Machhapokharia, Balau, Kathmandu Tel: 977-98-511-32-662 E-mail: aryanmishra017@gmail.com
New Caledonia	Dr. Stéphanie Sourget** Veterinarian Veterinary, Food and Rural Affairs Department Veterinary, Food and Phytosanitary Service B.P. 256, 98845 Noumea Tel: 687-24-37-45 / 79-83-64 Fax: 687-25-11-12 E-mail: stephanie.sourget@gouv.nc; davar.sivap@gouv.nc
New Zealand	Dr. Rissa Williams** Incursion Investigator Ministry for Primary Industries PO Box 40742, Upper Hutt 5140 Wellington Tel: +64 4 894 5698 E-mail: Rissa.Williams@mpi.govt.nz

Pakistan	Mr. Anser Mahmood Chatta* Deputy Fisheries Development Commissioner Livestock Division, Ministry of Food, Agriculture and Livestock 10th Floor, Shaheed-e-Millat Secretariat (Livestock Wing) I Islamabad, Pakistan Fax: +9251 9212630; Tel: +9251 9208267, ansermchatta@yahoo.com Dr. Mansood Hussan Khan** Research Officer Ministry of National Food Security and Research E-mail: khurshid_65@hotmail.com
Papua New Guinea	Mr. Wani Jacob Aruma** Advisor Aquaculture and Inland Fisheries Unit National Fisheries Authority P.O.Box 2016 Port Moresby, National Capital District Tel: 675-3090-444 Fax: 675-320-2061 E-mail: jwani@fisheries.gov.pg; jacobaruma.wani@gmail.com
Philippines	Dr. Joselito R. Somga*/** Aquaculturist II, Fish Health Section, BFAR 860 Arcadia Building, Quezon Avenue, Quezon City 1003 Fax: +63 2 3725055/4109987; Tel: +63 2 3723878 loc206 or 4109988 to 89 E-mail: jsomga@bfar.da.gov.ph
Singapore	Mr. Hanif Loo Jang Jing* Programme Executive (Aquaculture) Aquaculture Branch Food Supply & Technology Department Agri-Food & Veterinary Authority of Singapore 5 Maxwell Road, #01-00, Tower Block, MND Complex, Singapore 069110 Fax: +65 63257677; Tel: +65 63257636; Email: loo_jang_jing@ava.gov.sg Dr. Lijun Diana Marie Chee* Aquatic Animal Health Section Animal and Plant Health Centre 6 Perahu Road, Singapore 718827 Fax: +65 63161090; Tel: +65 63165140 E-mail: Diana_Chee@AVA.gov.sg Dr. Teo Xuan Hui** Senior Veterinarian Aquatic Animal Health Section Agri-Food & Veterinary Authority 6 Perahu Road, 718827 Tel: 65-6316-5164 E-mail: Tel_Xuan_Hui@ava.gov.sg

Sri Lanka	Dr. Rajapaksa Arachilage Geetha Ramani*/** Veterinary Investigation Officer Veterinary Investigation Center Department of Animal Production and Health Welisara, Sri Lanka Tel: +94-112-9258213; +94-714-932169 E-mail: vic_welisara@yahoo.com
Thailand	Dr. Jaree Polchana*/** Aquatic Animal Health Research Institute (AAHRI) Department of Fisheries , Kasetsart University Campus Jatujak, Bangkok 10900, Thailand Fax: +66 2 5613993; Tel: +66 2 5794122, 5796977 E-mail: jpolchana@gmail.com
Timor Leste	Dr. Felisiano Da Conceição** National Directorate and Veterinary Services Ministry of Agriculture and Fisheries Rua de Presidente Nicolau Lobato No.5 Comoro, Dili Tel: 670-331-0518 Mobile: 670-772-68-637 E-mail: maularavets@yahoo.com; alvabetha@gmail.com
Vanuatu	Mr. Lency Dick** Senior Aquaculture Officer Department of Fisheries Ministry of Agriculture, Livestock, Forestry, Fisheries and Bio-Security PMB 9045 Port Vila Tel: 678 23 174 Fax: 678 23641 E-mail: lnc.dick@gmail.com; lnc.kukan@gmail.com
Vietnam	Dr. Nguyen Ngoc Tien*/** Head Aquatic Animal Health Division Department of Animal Health (DAH) 15/78 Giai Phong Street, Dong Da Hanoi, Vietnam Fax: +84 4 38685961; Tel: +84 4 38693605 E-mail: tien.epi.dah@gmail.com

Instructions on how to fill in the
QUARTERLY AQUATIC ANIMAL DISEASE REPORT
(Revised during the Provisional Meeting of the AG[1], Bangkok, Thailand, November 7-9, 2001)

Symbols used in the report are similar to those used by FAO, OIE and WHO for the *Animal Health Yearbook*. Please read these instructions carefully before you fill in the forms.

Under the heading 'Country', please enter your country.

Under the heading 'Period', please enter the reporting quarter (months) and year, e.g. January to March 2002.

Under the heading "Month", please enter months of a quarter in question, e.g. January, February, March.

In "Level of Diagnosis", please enter the Level of Diagnosis used, e.g., I, II, or III. See Section C below.

In "Epidemiological Comment Numbers", please enter the serial numbers, and write your corresponding epidemiological comments on page 2. See Section D below for guidance on the subjects to be covered under Epidemiological Comments.

If an unknown disease of serious nature appears, please fill in the last line of the form, with additional information on "Level of Diagnosis" and "Epidemiological Comment Numbers" as above.

Please do not fail to enter "*******" or "**-**" as appropriate against each disease, which is essential to incorporate your information on the *Quarterly Aquatic Animal Disease Report (Asia and Pacific Region.)*

If you have new aquatic animal health regulations introduced within the past six months, please describe them under Section 2 on page 2.

Please use the following symbols to fill in the forms.

A. Symbols used for negative occurrence are as follows:

*** This symbol means that no information on a disease in question is available due to reasons such as lack of surveillance systems or expertise.

- This symbol is used when a disease is not reported during a reporting period. However the disease is known to be present in the country (date of last outbreak is not always known).

0000 This symbol is used when disease surveillance is in place and a disease has never been reported.

(year) Year of last occurrence (a disease has been absent since then).

B. Symbols used for positive occurrence are shown below.

+ This symbol means that the disease in question is reported or known to be present.

+? This symbol is used when the presence of a disease is suspected but there is no recognised occurrence of clinical signs of the disease in the country. Serological evidence and isolation of the causal agent may indicate the presence of the disease, but no confirmed report is available. **It is important that the species of animals to which it applies is indicated in the "Comments" on page 2 of the form if you use this symbol**.

+( ) These symbols mean that a disease is present in a very limited zone or zones as exceptional cases. It may also include the occurrence of a disease in a quarantine area.

? This symbol is used only when a disease is suspected by the reporting officer, but the presence of the disease has not been confirmed.

+?( ) These symbols mean that confirmed infection/infestation is limited to one of more zones of the country, but no clinical disease.

?( ) These symbols mean the presence of the disease suspected but not confirmed in a zone.

[1] Regional Advisory Group on Aquatic Animal Health (AG)

C. Levels of Diagnosis

LEVEL	SITE	ACTIVITY
I	Field	Observation of animal and the environment Clinical examination
II	Laboratory	Parasitology Bacteriology Mycology Histopathology
III	Laboratory	Virology Electron microscopy Molecular biology Immunology

D. Subjects to be covered in the Epidemiological Comments

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

IMPORTANT

Please send the **original report** or the best photocopy thereof to the OIE and/or NACA **by fax** and **registered airmail**. Faxed reports are needed to check whether or not the reports are all right. The deadline for submission of the reports is **two and a half months (75 days)** after the end of the quarterly period.

If you require further explanation, please write to the OIE (Tokyo), NACA (Bangkok) or FAO (Rome) at the following addresses, respectively:

OIE Regional Representation for Asia and the Pacific
Food Science Building 5F
The University of Tokyo
1-1-1 Yayoi, Bunkyo-ku
Tokyo, 113-8657, Japan
Tel. +81 3 5805 1931; Fax +81 3 5805 1934
E-Mail: rr.asiapacific@oie.int

NACA
P. O. Box 1040, Kasetsart Post Office, Bangkok 10903, Thailand
Tel: 66-2-561-1728/9 (ext. 117); Fax: 66-2-561-1727
Dr. E.M. Leaño
E-mail: eduardo@enaca.org

FAO
Fishery Resources Division, Fisheries Department
FAO of the United Nations
Viale delle Terme di Caracalla, 00100 Rome
Tel. +39 06 570 56473; Fax + 39 06 570 530 20
E-mail: Rohana.Subasinghe@fao.org

Notes

Published by the Network of Aquaculture Centres in Asia-Pacific, World Organisation for Animal Health (OIE) Regional Representation for Asia and the Pacific, and the Food and Agriculture Organization of the United Nations.
For inquiries regarding editorial or technical content, please write to
NACA, P.O. Box 1040, Kasetsart P.O. , Bangkok 10903, Thailand; Tel. (662) 561- 1728 to 9; Fax: (662) 561-1727;
e-mail: **info@enaca.org** or **eduardo@enaca.org.**
Website: **http://www.enaca.org**

ISSN 1513-6558