

Current Status of Transboundary Fish Diseases in Vietnam: Occurrence, Surveillance, Research and Training

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I. Current Status of Koi Herpesvirus Disease (KHVD) in the Production of Common Carp and Koi

I-1. Production of Common Carp and Koi

a. Production of Common Carp

Common carp is a fish species which can be found in natural water bodies like rivers (Red, Gam, Day, Duong rivers) and lakes (Thac Ba, Hoa Binh, Nui Coc lakes). The production of common carp harvested in wild habitats is declining due to over harvesting and use of destructive methods like electric shock. However, data of wild common carp harvest are unavailable.

Common carp is usually cultured in polyculture system with other carps such as grass carp, Indian carp (Rohu and Mrigal), silver carp and black carp in ponds, rice fields, or reservoirs using extensive or semi-intensive methods. By these culture methods, common carp can grow to 800-1500 grams in the first year. We have no information about annual production of common carp.

Most broodstocks belong to government hatcheries and some of them belong to private hatcheries, but common carp fingerling production is usually done by private farms. Recently, cultured common carp is classified as a hybrid between Hungary cross Indonesia with Vietnamese common carp. Presently, Vietnam hybrid common carp is exported to Lao PDR, Thailand, India and Bangladesh.

b. Production of Koi

Information about koi culture in Vietnam is not available.

I-2. Koi Herpesvirus Disease (KHVD) of Common Carp and Koi

There is no information about KHVD of common carp and koi in Vietnam.

II. Current Status of Viral Diseases and in the Production of Shrimps and Prawn

II-1. Production of Shrimps

a. Production of Tiger Shrimp (*Penaeus monodon*)

Tiger shrimp is cultured in brackishwater farms all over country using 3 methods: extensive, semi-intensive, and intensive systems. Depending on the culture method, production ranges from 200 kg in extensive system to 6000 kg (sometimes up to 12 tons/ha/cycle) in intensive system per cycle. Different areas have different cycles. In northern Vietnam (from Hue up to Quang Ninh) there is often only one cycle that starts culture in April and harvests in August. In central and southern Vietnam, there can be more than one cycle. In 2001, the whole country had 230,000 ha for *P. monodon* culture with total production of 155,000 metric tons (MT). In 2003, the shrimp culture area increased to 575,137 ha (with 476,528 ha in southern provinces; 16,499 ha in central provinces; and 39,142 ha in northern provinces) producing more than 200,000 MT. Of this, 15,534 ha was for intensive culture (2.84%), 20,116 ha for semi-intensive culture (3.67%), and the remaining area for extensive and improved extensive culture.

Spawners and broodstocks are caught by fishing vessels from coastal areas in Vietnam, but some of them are imported from Thailand, Indonesia, Taiwan, China and Singapore. Postlarvae are produced mainly by private hatcheries located in central and southern Vietnam. In 2002, Vietnam produced 18 billion postlarvae from more than 4,000 hatcheries. In 2003, the number of hatcheries increased to 5,017 of which 1,282 are in Khanh Hoa, 1,200 in Ninh Thuan, 850 in Ca Mau, and 253 in Ba Ria Vung Tau and other places. These hatcheries produced 25.17 billion postlarvae.

There is no information on importation record of various stages of *P. monodon*. Most live export records are of marketable shrimp and some live stock records are stocked to Cambodia. In 2003, Vietnam exported 500,000 MT of shrimps to the United States, an increase of 17.5% compared with 2002 record.

b. Production of Pacific White Shrimp (*Litopenaeus vannamei*)

Vietnam started importing this species in 2002 through Asia Hawaii Ventures Ltd. This company has cultured Pacific white shrimp at very high density and produced 17 tons/ha/cycle that runs only for 3 months. At present, this species is cultured in both freshwater and brackishwater ponds.

Initially, postlarvae were imported from China and Taiwan. Afterwards, broodstocks and spawners were brought into Vietnam. Presently, broodstock is cultured and matures in ponds in Vietnam.

c. Production of Freshwater Prawn (*Macrobrachium rosenbergii*)

In 1997, the Ministry of Fisheries imported *M. rosenbergii* from China for prawn culture in northern Vietnam. In that region, prawn is stocked in April and harvested in November. For monoculture system, production is 1-1.2 tons/ha/cycle in semi-intensive system, and 1.7-3.0 tons/ha/cycle in intensive system. In polyculture system with carp and tilapia, the production is 0.6-0.8 tons of prawn/ha/cycle. Prawn is cultured in both ponds and rice fields. The stocking density is 15 individuals/m² with one cycle lasting for 5 months.

In 2000, there were only 4 hatcheries in northern Vietnam that produced 22 million postlarvae. In 2003, the whole country had 70 hatcheries producing 92 million postlarvae. Of these postlarvae, 40 million came from Can Tho, 14 million from An Giang, 15 million from Hai Phong, and 7 million from Ninh Binh. Some postlarvae of *M. rosenbergii* were imported from China.

II-2. White Spot Syndrome Virus (WSSV)

- a. In the last five years, outbreaks of WSSV often occurred in many places affecting all stages of shrimp. Species of shrimp that were infected were *Penaeus monodon*, *P. indicus*, *P. japonicus*, *P. merguensis* and *L. vannamei*. Shrimps usually got infected at 40 days of culture after attaining 2.5 g/individual. Mortality rates in affected stocks reached up to 100% within 3-10 days.
- b. Clinical signs of WSSV-affected shrimp include swimming on the water surface and staying near the dike. Feeding is reduced and shrimp show empty intestine. White spots appear in the carapace with sizes ranging from 0.5-2 mm. Some affected shrimp have pink to reddish discoloration.
- c. Most often, diagnosis is based on clinical signs, but histopathology and PCR are also used.
- d. Economic losses due to WSSV: In some cases, losses of up to 100% were recorded, but there are no estimates on their monetary equivalent.
- e. Importation record and country of origin is mentioned in section II-1b.

II-3. Taura Syndrome Virus (TSV)

Little information about dates and locations of outbreaks of TSV is available in Vietnam. In May 2004, the laboratory of the Research Institute for Aquaculture No. 1 inspected three positive samples of postlarvae of *L. vannamei*. Diagnosis was based on clinical signs, histopathology and PCR analysis.

II-4. Significant and Emerging Viral Diseases of *Macrobrachium rosenbergii*

There is no information on viral diseases affecting *M. rosenbergii*.

III. Surveillance, Monitoring and Diagnosis of Diseases of Aquatic Animals

III-1. Responsible Facility and Personnel

a. The Responsible Facilities and Their Locations

1. Research Institute for Aquaculture No. 1 (RIA1)
Dinh Bang–Tu Son–Bac Ninh, Vietnam
Tel: 0084 8780102, Fax: 00 84 8785748
email: ria1@hn.vnn.vn
2. Research Institute for Aquaculture No. 2 (RIA2)
116 Nguyen Dinh Chieu District 1–Ho Chi Minh City, Vietnam
Tel: 00 84 8 8299592, Fax: 00 84 8 8226807
3. Research Institute for Aquaculture No. 3 (RIA 3)
33 Dang Tat–Nha Trang–Khanh Hoa, Vietnam
Tel: 00 84 58 831138, Fax: 00 84 58 831846
email: ttncs3@dng.vnn.vn
4. Nha Trang Fisheries University
2 Nguyen Dinh Chieu–Nha Trang–Khanh Hoa, Vietnam
5. College of Aquaculture and Fisheries
Can Tho University, Campus 2, 3/2 Street, Can Tho City, Vietnam
Tel: 00 84 71 830961, Fax: 00 84 71 830247
6. National Fisheries Quality Assurance and Veterinary Directorate (NAAFIQAVED) 10 Nguyen Cong Hoan–Ba Dinh, Ha Noi, Vietnam
Tel: 00 84 4 8354966, Fax: 00 84 4 8317221
email: nafiqacen@hn.vnn.vn

b. The Contact Persons in These Laboratories

1. Mrs. Phan Thi Van (RIA1)
2. Mrs. Ly Thi Thanh Loan (RIA2)
3. Mr. Vo Van Nha (RIA3)
4. Dr. Do Thi Hoa, Nha Trang Fisheries University
5. Nguyen Tu Cuong NAAFIQAVED

c. Surveillance and Monitoring

These activities are done by RIA 1, 2 and 3.

III-2. Diagnostic Capabilities and Major Diseases of Aquatic Animals

Based on the agreed-upon levels of diagnosis, the capability of the laboratories is upper Level II, but under Level III because Level II plus PCR method are employed. Virology work and cell line culture is just starting.

a. Definition of Levels of Diagnosis

Level I: Diagnostic activity limited to observation of animal and the environment, and clinical examination (On Site or Field Diagnosis).

Level II: Diagnostic activity includes Parasitology, Bacteriology, Mycology, and Histopathology (Laboratory Diagnosis).

Level III: Diagnostic activity includes Virology, Electron microscopy, Molecular biology and Immunology (Laboratory Diagnosis).

b. List of Fish Health Laboratories

No.	Name of Laboratory	Diagnostic Level	Addresses
1	RIA 1 Health Laboratory	Upper II and under III	Dinh Bang–Tu Son–Bac Ninh, Vietnam phanvan@hn.vnn.vn Tel: 00 84 4 8785748
2	RIA 2 Health Laboratory	Upper II and under III	116 Nguyen Dinh Chieu District 1 Ho Chi Minh City, Vietnam Tel: 00 84 8 8299592 Fax: 00 84 8 8226807, disaqua@hcm.vnn.vn
3	RIA 3 Health Laboratory	Upper II and under III	33 Dang Tat–Nha Trang–Khanh Hoa; Tel: 00 84 58831298, Fax: 00 84 58 831846 nharia3@yahoo.com
4	Can Tho University Health Laboratory	Level II	Campus 2, 3/2 Street, Can Tho City, Vietnam ntphuong@ctu.edu.vn; Tel: 00 84 71 830961 Fax: 00 84 71 830247
5	Nha Trang Fisheries University	Level II	Aquaculture Department, 2 Nguyen Dinh Chieu–Nha Trang – Khanh Hoa
6	Provincial Health Laboratories	Levels I and II	

c. List of Economically-Important Diseases of Aquatic Animals

No.	Name of Disease	Affected Animals	Level of Diagnosis
1	Grass carp diseases	<i>Ctephanogodon idella</i>	II and III
2	VNN	Grouper	II and III
3	WSSV	<i>Penaeus monodon</i> and other shrimps	III
4	YHD	<i>P. monodon</i> and other shrimps	III
5	TSV	<i>Litopenaeus vannamei</i>	III
6	MBV	<i>P. monodon</i> and other shrimps	II

IV. Quarantine Services to Prevent Entry of Diseases of Aquatic Animals

IV-1. Responsible Facility Agency and Personnel

a. Responsible Facility

The National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) is responsible for quarantine of aquatic animals. When live aquatic animals arrive in the country, RIA1, 2 and 3 are conduct quarantine and inspection service.

b. Responsible Persons

Nguyen Tu Cuong
General Director,
NAFIQAVED
10B Nguyen Cong Hoan - Ba Dinh district - Hanoi City

Nguyen Nhu Tiep
Head of Aquatic Veterinary Department
NAFIQAVED
10B Nguyen Cong Hoan - Ba Dinh district - Hanoi City

Levels I, II and III are used for diagnosis at quarantine stations.

IV-2. Procedures and Requirements for Importation of Live Aquatic Animals**a. Importers : Procedures and Requirement for Importers**

- For species that are normally-traded for aquaculture, application form and quarantine certification should be submitted.
- For high risk species, photos or drawing to describe the species to be imported should be given together with information about biological characteristics and economic effect of the species.

b. Quarantine Officers or Inspectors

When live aquatic animals arrive in the country, inspectors will look for the accompanying application form, check the quantity of aquatic animals being shipped, and observe their behavior. Sample will be collected for analysis and the aquatic animals will be maintained in a separate place for observation for 2-3 weeks, or up to the time when the species can be classified as of high or low risk.

c. Laws and Regulations

At the moment, a decree of the government created in 1993 is in force. In the future, a new decree will be carried formulated.

IV-3. List of Quarantinable Diseases of Aquatic Animals

- a. Viral diseases: MBV, TSV, WSSV, YHD and VNN
- b. Bacterial diseases: None
- c. Fungal diseases: None
- d. Parasitic diseases: *Myxobolus*, *Ichthyophthirius*, larvae of fluke worm: *Clonorchis*, *Opisthorchis*

V. Research and Training of Fish Health Staff for Quarantine, Diagnosis, and Surveillance of Diseases of Aquatic Animals

a. Research

- a. Current research activities
Research on shrimp diseases, mudcrab diseases, grouper diseases, and grass carp diseases are being conducted.
- b. Agencies, department or universities that conduct fish disease research
RIA 1, 2 and 3, Nha Trang Fisheries University and Can Tho University are the agencies that conduct fish disease research.

Most reports are written in local language:

- a. Nguyen TP, Ng. M. Hau & D.T.H. Oanh, 2003 “WSSV & MBV infected rate in *P. monodon* cultured in Cuu long Delta”. In: National conference on Aquaculture, Nov 24-25, 2003.
- b. Nguyen V. H., L. H. Phuoc, L. T. Loan, D. Q. T. Vuong, Ng. V. Dung, C. t. Trung, T. H. Viet & L. H. Tai, 2003. “Normal diseases on *P. monodon* cultured in Cuu Long Delta”. In: National conference on Aquaculture, Nov 24-25, 2003.
- c. Phan T. V, P. M. Yen, K. V. Van, Ng. T. Ha, T. T. K. Chi & P. V. Khang, 2003. “Research infected causative pathogens on grass carp” In: National conference on Aquaculture, Nov 24-25, 2003.

b. Training

The agencies that conduct training are:

1. RIA 1
Dinh Bang–Tu Son–Bac Ninh, Vietnam
Tel & Fax: 00 84 4 8785748
ria1@hn.vnn.vn, phanvan@hn.vnn.vn
2. College of Aquaculture and Fisheries
Can Tho University, Campus 2, 3/2 Street, Can Tho City
Tel: 00 84 71 830961; Fax: 00 84 71 830247
3. Nha Trang Fisheries University, 2 Nguyen Dinh Chieu–Nha Trang–Khanh Hoa

c. Staff Training

Fish Health staff have gone through various academic and practical training to do quarantine, diagnosis and surveillance of aquatic animals. MSc. Aquatic Veterinary Courses, Aquatic Animal Health Management Course in AIT, Australia, Diagnostic Aquatic Animal Diseases in AAHRI, SEAFDEC training AquaHealth Online, aquatic animal diseases in fisheries universities, the CARD project of Australian for surveillance of aquatic animals.

d. Training Requirement

At the moment, Vietnam still lacks human resources to conduct diagnosis at Level III in research institutes. There is also lack of staff in aquatic animal health management.