EPIDEMIOLOGICAL STUDY OF VIRAL DISEASES OF FISH AND SHELLFISH AT HATCHERY ANDGROW-OUT PHASES

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Introduction

Aquaculture has become an important and prioritised activity in fishery industry. With the increase activity, fish health has turned into an important research area to control disease outbreaks, e.g. due to live fish movement (for seed, broodstock, recreation) and culture environment degradation. The objectives of the programme are: (a) To identify and determine the pathogenicity of fish and shellfish viruses in commonly cultured fish and shellfishes (carps, catfish, tilapia, sea perch, tiger prawn and freshwater giant prawn); and (b) to develop a diagnostic test kit for the disease.

Materials and Methods

Fish and shellfish samples were collected during farms visit and from clinical cases ssubmitted by contacts (DOF, DVS and fish/shellfish culturist). Water samples and *in situ* parameters were also taken. Biological samples were processed examined for presence of infectious agents by cell cultures, microbiological cultures, histopathology and TEM. The infectious agents were then subcultured/purified and identified through biochemical and biophysical characterisation. They were kept for further used. Monoclonal antibody and PCR primer for the isolated agent were developed. The shrimp project is also aimed to evaluate the correlation between the incidence of White Spot Syndrome virus with its culture and environmental parameters.

Results and Discussion

A new variant of cyprinid herpesvirus (MCHV) was isolated from locally bred Japanese Koi carp (*Cyprinus carpio).* The disease, grossly, induced soft, whitish papilloma on the body. Purified virus has a diameter of 250 nm, with a capsid size of 100 nm. The virion contains approximately 28 viral proteins. The virus could be grown in fish cells not of cyprinid origin, which is a unique property. Cross-species infection of the virus was also successfully made i.e. it could be infected to other non-carps cyprinids. The optimum culture temperature was 25°C which is comparatively higher than its Japanese CHV-1 (reference strain). The virus grew well in BB cells (ictalurid cells) and can attained a maximum titer of 10^5 $TCID_{50}$/ml. Unique immunogenic sites are currently being explored. Mab against MCHV, recognising two specific viral proteins, showed positive reaction against CHV-1 but not against CCV (a channel catfish herpesvirus) and SHV-2 (salmonid herpesvirus). *In situ* hybridisation using a specific CHV-1 gene probes was also found to react with MCHV papilloma tissues. Comparison of nucleotide sequences for sequence homology was also carried out on specific CHV genomes and homologous genes after amplification with PCR (Soon et al. 1996; Hassan et al. 1997). In the shrimp virus study, eight viruses were found present in the cultured tiger shrimp. They were Systemic ectodermal and mesodermal baculovirus (SEMBV), Yellow head virus (YHV), Infectious hypodermal and hematopoietic necrosis virus (IHHNV), Baculoviral mid-gut gland necrosis (BMN), Hepatopancreatic parvo-like virus (HPV), *Penaeus monodon* singly enveloped nuclear polyhedrosis virus (Pm-SNPV), *Penaeus monodon* digestive organ necrosis flavi-like virus (PmDONFV) and *Penaeus monodon* entomopox-like (PmEPV). Some of these agent are of first record of incidence and/or a new variant. These viruses were associated with the recent and also previous serious disease outbreaks in hatchery and grow-out farms. Preliminary study on SEMBV infectivity revealed that oral and cohabitation could transmit the virus. The virus could also be found in mudskipper, tilapia and feral white shrimps (Hassan and Wang, 1997; Wang et al. 1998).

Conclusions

The research programme has successfully identified some new and imoprtant fish and shrimp viruses. Further studies on the shrimp viruses are undergoing i.e. determining the infectivity or pathogenicity by *in vivo* and *in vitro* (using insect cell) experimental infection and cytopathological studies. The cyprinid fish herpes virus which causes tumor-like growth in aquarium fish has been identified.

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