NACA Newsletter

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Vale Professor Sena De Silva

Prof. Sena De Silva presenting at the Global Conference on Aquaculture 2010.

It was with great sadness that we learned that our dear friend Professor Sena De Silva passed away on 6 May, 2020. On behalf of the Governing Council, the Chair Dr Yingjie Liu, and the NACA Secretariat, would like to express our sincere condolences to his family. The aquaculture community, and the region, has lost one of its true champions.

Prof. De Silva was a brilliant scientist working across multiple disciplines including nutrition, limnology, inland fisheries, fish breeding, biodiversity and environmental issues. He was a renowned teacher and mentor; he loved teaching and had a genuine interest in capacity building. His students may be found in nearly every country throughout the region. Many now occupy high-level roles in government, industry, academia, and international organisations. Many may also be found in rural villages, working their farms.

Prof. De Silva's association with NACA dates back to the beginnings of the organisation itself. He represented the International Development Research Centre at a meeting in 1989, where the Provisional Governing Council adopted the NACA Agreement and decided to make it an inter-governmental organisation. From that time on, Prof. De Silva frequently worked in conjunction with NACA, developing and deploying projects in collaboration with scientists across the region. These included regional initiatives on aquaculture education, managing conflicts between capture fisheries and aquaculture in reservoirs, limnology and fisheries studies, broodstock management of mahseer, tsunami relief work and many others. He also worked with NACA staff in the development of projects on biodiversity and conservation, the use of GIS as a tool in inland fisheries management, the fisheries and conservation of Philippine lakes, provided input into NACA's Governing Council and later served as a member of the Technical Advisory Committee.

He was a member of the Advisory Committee of the FAO/ NACA Conference on Aquaculture in the Third Millennium, held in Bangkok in 2000, where he prepared the Global Synthesis, which was one of the main working papers. He was later appointed a member of the NACA Task Force 2000,

whose recommendations were instrumental in the development of the 3rd Five Year Work Programme; he would again serve as a NACA Task Force member in 2015.

In 2006 Prof. De Silva was elected as Director General of NACA and served for five highly successful years, playing a key role in project development in areas including culture-based fisheries, the development of better management practices for Vietnamese catfish, management of reservoir fisheries, the use of remote sensing for inland fisheries management, reducing the dependence on trash fish in feeds for marine fish, and climate change. His term culminated in the highly successful FAO/NACA Global Conference in Aquaculture 2010, held in Phuket, Thailand, where he presented the regional synthesis paper on Aquaculture Development in the Asia-Pacific.

During his term NACA was selected to win the 2010-2011 Margarita Lizárraga Medal, conferred by FAO, with recognition of its significant contribution to sustainable aquaculture development in the Asia and Pacific Region, serving as a cohesive intergovernmental forum for the formulation of regional policies as well as cooperation and coordination in aquaculture research, development and training.

Prof. De Silva took a personal interest in improving the lot of the region's small-scale farmers and was at his happiest working on field projects, seeing the positive changes in the communities. He was also a powerful advocate for the interests of small-scale farmers at international meetings and fora; if he felt that the interests of small-scale farmers were being trampled, look out! He was never afraid to be the lone voice of dissent or to criticise injustices in the status quo.

After completing his term as Director General, Prof. De Silva returned to Deakin University, Australia, where he continued his research and collaboration on aquaculture development projects with NACA until this day. His most recent project with the network was to write the Asia-Pacific regional synthesis paper for the now postponed FAO/NACA Global Conference on Aquaculture 2020, which he was to present in Shanghai, China.

We, the staff of the NACA Secretariat, will miss Sena. He was not just a colleague, teacher and mentor, he was also our friend.

The State of World Fisheries and Aquaculture 2020

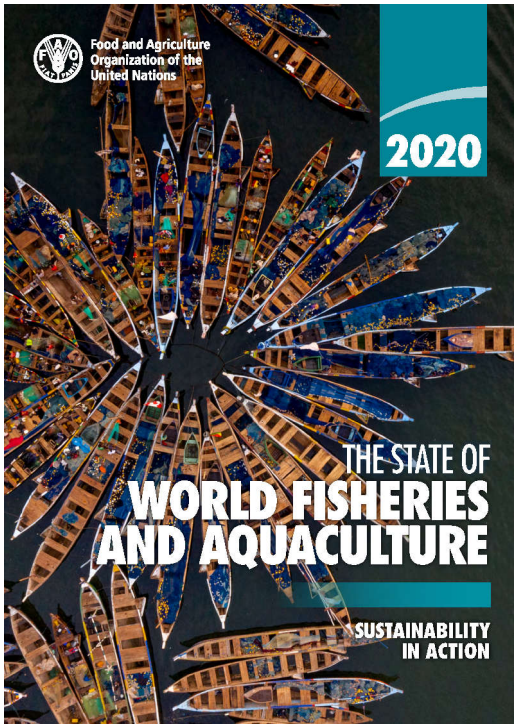
FAO has released the 2020 edition of The State of World Fisheries and Aquaculture, which has a particular focus on sustainability. This reflects a number of specific considerations. First, 2020 marks the twenty-fifth anniversary of the Code of Conduct for Responsible Fisheries (the Code). Second, several Sustainable Development Goal indicators mature in 2020. Third, FAO hosted the International Symposium on Fisheries Sustainability in late 2019, and fourth, 2020 sees the finalisation of specific FAO guidelines on sustainable aquaculture growth, and on social sustainability along value chains.

While Part 1 retains the format of previous editions, the structure of the rest of the publication has been revised. Part 2 opens with a special section marking the twenty fifth anniversary of the Code. It also focuses on issues coming to the fore, in particular, those related to Sustainable Development Goal 14 and its indicators for which FAO is the "custodian" agency. In addition, Part 2 covers various aspects of fisheries and aquaculture sustainability. The topics discussed range widely, from data and information systems to ocean pollution, product legality, user rights and climate change adaptation. Part 3 now forms the final part of the publication, covering projections and emerging issues such as new technologies and aquaculture biosecurity.

It concludes by outlining steps towards a new vision for capture fisheries. The State of World Fisheries and Aquaculture aims to provide objective, reliable and up-to-date information to a wide audience – policymakers, managers, scientists, stakeholders and indeed everyone interested in the fisheries and aquaculture sector.

Several resources are available from the FAO website. These are:

- The full report: http://www.fao.org/documents/card/en/c/ca9229en
- Brief version of the report: http://www.fao.org/documents/card/en/c/ca9231en
- Summary of the impacts of the COVID-19 pandemic on the fisheries and aquaculture sector: http://www.fao.org/documents/card/en/c/ca9349en



Viral covert mortality disease (VCMD): Disease card

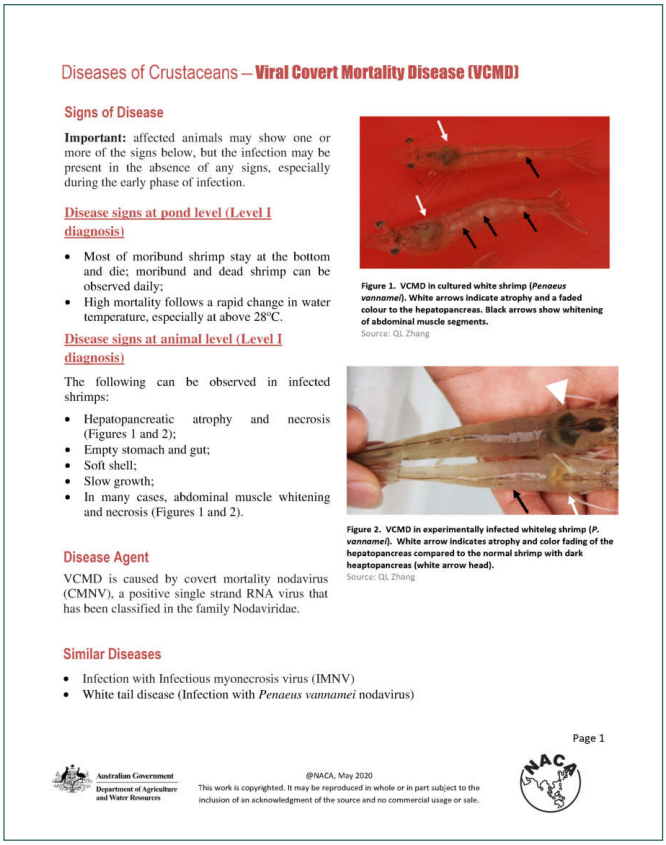
This disease advisory describes the history, known host range, clinical signs and PCR detection methods for viral covert mortality disease (VCMD). Crustaceans currently known to be susceptible to VCMD include *Penaeus vannamei*, *P. chinensis*, *P. japonicus*, *P. monodon*, *Macrobrachium rosenbergii*, *Procambarus clarkii*, *Exopalaemon carinicauda*, *Ocypode cordimanus*, *Diogenes edwardsii*, *Corophium sinense*, *Parathemisto gaudichaud* and *Tubuca arcuate*. Fish species including *Mugilogobius abei*, *Carassius auratus*, and *Paralichthys olivaceus* may also be susceptible to the virus.

At the pond level, most moribund shrimp stay at the bottom and die, and dead shrimp can be observed daily; high mortality follows a rapid change in water temperature, especially at above 28°C. At the animal level, clinical signs of infected shrimp include hepatopancreatic atrophy and necrosis; empty stomach and gut; soft shell; slow growth; and in many cases abdominal muscle whitening and necrosis.

Importantly, affected animals may show one or more of these signs but the infection may be present in the absence of any signs, especially during the early phase of infection.

The disease card is available for free download from:

https://enaca.org/?id=1108



Diseases of Crustaceans – **Viral Covert Mortality Disease (VCMD)**

Signs of Disease

Important: affected animals may show one or more of the signs below, but the infection may be present in the absence of any signs, especially during the early phase of infection.

Disease signs at pond level (Level I diagnosis)

- Most of moribund shrimp stay at the bottom and die; moribund and dead shrimp can be observed daily;
- High mortality follows a rapid change in water temperature, especially at above 28ºC.

Disease signs at animal level (Level I diagnosis)

The following can be observed in infected shrimps:

- Hepatopancreatic atrophy and necrosis (Figures 1 and 2);
- Empty stomach and gut;
- Soft shell;
- Slow growth;
- In many cases, abdominal muscle whitening and necrosis (Figures 1 and 2).

Figure 1. VCMD in cultured white shrimp (*Penaeus vannamei*). White arrows indicate atrophy and a faded colour to the hepatopancreas. Black arrows show whitening of abdominal muscle segments.
Source: QL Zhang

Figure 2. VCMD in experimentally infected whiteleg shrimp (*P. vannamei*). White arrow indicates atrophy and color fading of the hepatopancreas compared to the normal shrimp with dark heaptopancreas (white arrow head).
Source: QL Zhang

Disease Agent

VCMD is caused by covert mortality nodavirus (CMNV), a positive single strand RNA virus that has been classified in the family Nodaviridae.

Similar Diseases

- Infection with Infectious myonecrosis virus (IMNV)
- White tail disease (Infection with *Penaeus vannamei* nodavirus)

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Australian Government Department of Agriculture and Water Resources

@NACA, May 2020
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Disease advisory: Decapod iridescent virus 1 (DIV1): An emerging threat to the shrimp industry

This disease advisory describes the history, known host range, clinical signs and PCR detection methods for decapod iridescent virus 1 (DIV1). Preventative strategies are suggested. Currently known susceptible species of DIV1 include *Penaeus vannamei*, *Macrobrachium rosenbergii*, *Exopalaemon carinicauda*, *M. nipponense*, *Procambarus clarkii*, and *Cherax quadricarinatus*. Clinical signs of infected *P. vannamei* are not typical, including slightly reddish body, hepatopancreatic atrophy with colour fading, and empty stomach and guts. The full advisory may be downloaded from:

https://enaca.org/?id=1098

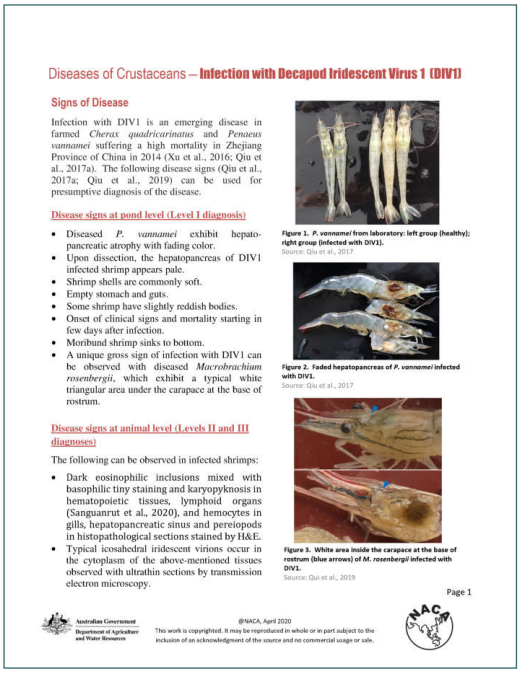
Infection with decapod iridescent virus 1 (DIV1): Disease card

Infection with DIV1 is an emerging disease in farmed *Cherax quadricarinatus* and *Penaeus vannamei* suffering a high mortality. This disease card provides information on:

- Signs of disease at pond land animal level (levels I - III diagnoses).
- The disease agent, known host range and distribution in the Asia-Pacific region.
- Molecular diagnostic methods and key expert contact points for further information.

The disease card is available for download from:

https://enaca.org/?id=1104



Diseases of Crustaceans – **Infection with Decapod Iridescent Virus 1 (DIV1)**

Signs of Disease

Infection with DIV1 is an emerging disease in farmed *Cherax quadricarinatus* and *Penaeus vannamei* suffering a high mortality in Zhejiang Province of China in 2014 (Xu et al., 2016; Qiu et al., 2017a). The following disease signs (Qiu et al., 2017a; Qiu et al., 2019) can be used for presumptive diagnosis of the disease.

Disease signs at pond level (Level I diagnosis)

- Diseased *P. vannamei* exhibit hepatopancreatic atrophy with fading color.
- Upon dissection, the hepatopancreas of DIV1 infected shrimp appears pale.
- Shrimp shells are commonly soft.
- Empty stomach and guts.
- Some shrimp have slightly reddish bodies.
- Onset of clinical signs and mortality starting in few days after infection.
- Moribund shrimp sinks to bottom.
- A unique gross sign of infection with DIV1 can be observed with diseased *Macrobrachium rosenbergii*, which exhibit a typical white triangular area under the carapace at the base of rostrum.

Figure 1. *P. vannamei* from laboratory: left group (healthy); right group (infected with DIV1).
Source: Qiu et al., 2017

Figure 2. Faded hepatopancreas of *P. vannamei* infected with DIV1.
Source: Qiu et al., 2017

Disease signs at animal level (Levels II and III diagnoses)

The following can be observed in infected shrimps:

- Dark eosinophilic inclusions mixed with basophilic tiny staining and karyopyknosis in hematopoietic tissues, lymphoid organs (Sanguanrut et al., 2020), and hemocytes in gills, hepatopancreatic sinus and pereiopods in histopathological sections stained by H&E.
- Typical icosahedral iridescent virions occur in the cytoplasm of the above-mentioned tissues observed with ultrathin sections by transmission electron microscopy.

Figure 3. White area inside the carapace at the base of rostrum (blue arrows) of *M. rosenbergii* infected with DIV1.
Source: Qui et al., 2019

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@NACA, April 2020
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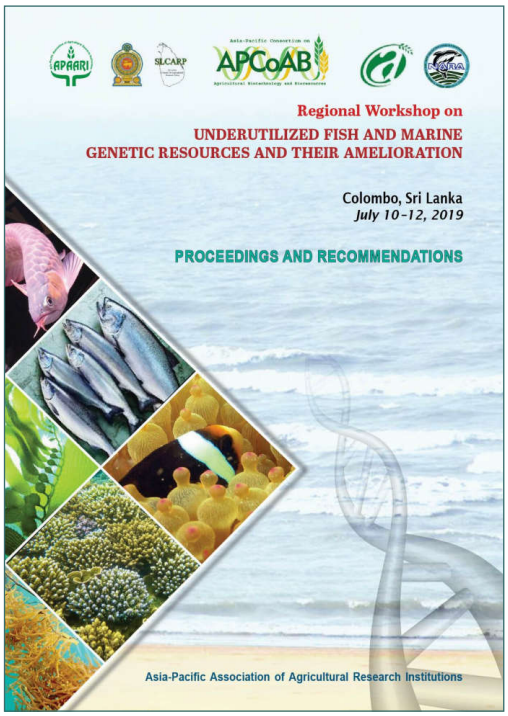
Regional Workshop on Underutilized Fish and Marine Genetic Resources and their Amelioration – Proceedings and Recommendations

The Regional Workshop on Underutilized Fish and Marine Genetic Resources (FMGR) and their Amelioration was held from 10-12 July 2019, at the National Aquatic Resources Research and Development Agency, Colombo, Sri Lanka. The workshop was organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI) under its programme on Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources, the Sri Lanka Council for Agricultural Research Policy and the National Aquatic Resources Research and Development Agency (NARA).



The key objectives of the workshop were to:

- Assess the status of underutilised FMGR at the regional level and to assess R&D status of priority species with potential for use in food and agriculture.
- Discuss knowledge gaps and the way forward in defining regional priorities concerning underutilised FMGR and create awareness on their role and potential for diversification of food supplies and livelihood generation.
- Formulate strategies for strengthening the institutional framework for FMGR management, and legal and policy framework to promote their conservation and sustainable use at the regional level.

These proceedings contain a summary of the thematic presentations, discussions, and recommendations of the workshop. They are redistributed here courtesy of APAARI. The proceedings are available for free download from:

https://enaca.org/?id=1111

Latest special issue of Gender, Technology & Development examines new learnings on women and fisheries

The latest Special Issue of Gender, Technology and Development (Vol. 24, 2020) contains seven papers and a guest editorial exploring gender issues in fisheries and aquaculture.

The papers address issues around technology, innovation and organisation, and the positive changes that occur when the contributions of women are made visible, they are empowered, and have a voice in decision making.

The special issue is drawn from papers presented at the 7th Global conference on gender in Aquaculture and Fisheries "*Expanding the Horizons of Women in Fisheries and Aquaculture*" in 2018.

The conference was co-organised by the Gender in Aquaculture and Fisheries (GAF) Section of the Asian fisheries Society, the Asian Institute of Technology and NACA.

For more information please visit the GAF Section website at:

https://www.genderaquafish.org/2020/05/26/latest-special-issue-of-gender-technology-development-examines-new-learnings-on-women-and-fisheries/

www.enaca.org

Development of a global information system for farmed types of aquatic genetic resources

FAO's recent report on The State of the World's Aquatic Genetic Resources for Food and Agriculture identified a number of important needs and challenges in the conservation, sustainable use and development of aquatic genetic resources. One of the key priorities identified was to "Establish and strengthen national and global characterisation, monitoring and information systems for AqGR", including through:

- Promotion of a globally standardised use of terminology, nomenclature and descriptions of AqGR.
- Improved and harmonised reporting procedures and expanded existing species-based information systems to cover unreported resources, including aquatic plants, ornamental species and microorganisms.
- The development, promotion and commercialisation/institutionalisation of national, regional and global standardised information systems for the collection, validation, monitoring and reporting on genetic resources below the level of species (i.e. farmed types and stocks).

FAO convened a virtual workshop from 8-12 June to discuss the development of an information system under a project Registry of Farmed Types of Aquatic Genetic Resources, funded by the German Government. The main goals of the project are to develop prototype registry system that documents the main 'farmed types' used in aquaculture, and to validate it through a series of regional workshops.

A farmed type is a genetic resource *below* the species level. Primary farmed types describe the status of a cultured organisms domestication and improvement, for example wild sourced seed from a distinct stock, captive bred animals from a given hatchery population, and strains selectively bred for improved production characteristics provide the basis for assigning a primary farmed type.

Cultured organisms may also be assigned a secondary farmed type, which denotes the application of value-adding genetic technologies and manipulations such as hybridisation, monosex technologies, polyploidy or genetic engineering.

The purpose of the information system is to document existing farmed types, focusing on those that exceed 10% of national production of a given species. This will facilitate policy development and decision making regarding aquatic genetic resources, including monitoring and reporting to support conservation objectives and sustainable development goals.

The consultation was also used to gather feedback on a proposed 'Global Plan of Action for Aquatic Genetic Resources', which is being developed in response to a request made by the Commission on Genetic Resources for Food and Agriculture at its 17th regular Session in February 2019.

The plan is at a very early stage of development and more details will be made available as it begins to take shape.

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NACA is a network composed of 19 member governments in the Asia-Pacific Region.

Quarterly Aquatic Animal Disease Report, October-December 2019

The 84th edition of the Quarterly Aquatic Animal Disease Report contains information from eleven governments.

The foreword discusses meetings of the ad hoc Steering Committee of the Regional Collaboration Framework on Aquatic Animal Health in Asia and the Pacific.

The report is available for free download from:

https://enaca.org/?id=1106