NACA Newsletter

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Urgent warning: Positive PCR detection results for infectious myonecrosis virus (IMNV) and decapod iridescent virus 1 (DIV1) in captured *Penaeus monodon* from the Indian Ocean

By Jiraporn Srisala, Piyachat Sanguanrut, Dararat Thaiue, Saensook Laiphrom, Jittima Siriwattano, Juthatip Khudet, Sorawit Powtongsook, Timothy W. Flegel and Kallaya Sritunyalucksana

From a survey of wild, adult *Penaeus monodon* of potential broodstock size from the Indian Ocean in April 2018, we obtained positive nested RT-PCR test results for infectious myonecrosis virus (IMNV) (2/26 shrimp in one specimen lot) and positive nested PCR test results for DIV1 (5/26 shrimp in a different lot). The test results were obtained using nucleic acid extracted from pleopods (swimming legs) and the PCR protocols used were those previously published for SHIV (Qiu, et al., 2017) and IMNV (Poulos Lightner, 2006; Poulos, et al., 2006); (Senapin, et al., 2007). The amplicon sequences from these tests were 99-100% identical to the matching regions published for the two viruses. As a confirmatory step, a second round of nested PCR tests was carried out using new, in-house primers designed from regions of the respective viral genomes distant from the target regions used in the first round of tests. These new tests had never been used previously in our laboratory and the positive and negative results for both viruses corresponded with those for the same individual specimens from the first round of testing for the partner target gene. Again, the amplicon sequences were 99-100% identical to the matching regions published for the two viruses.

These results suggested the possibility that the grossly normal, PCR-positive captured *P. monodon* specimens might be infected with the respective viruses at the carrier level. If so, they might serve as potential vehicles for introduction of IMNV and/or DIV1 into crustacean culture systems, especially if they were used in hatcheries for production of PL for distribution to shrimp farmers without proper precautions in place.

We recommend that wild, captured *P. monodon* from the Indian Ocean intended for use as broodstock be subjected to PCR testing before use in a hatchery and that they be discarded, if they are found to be positive. If not positive, their larvae and post-larvae (PL) should be monitored for presence of these 2 viruses periodically during production and again before they are sold to users. We also strongly recommend that industry practitioners using wild, captured *P. monodon* be discouraged from handling it together with broodstock of other crustaceans listed above in common maturation or hatchery facilities. We also recommend that shrimp farmers be discouraged from cultivating those species together with *P. monodon* in the same pond or on the same farm, especially if the latter originated from wild, captured broodstock that have not been tested for freedom from IMNV and/or DIV1 as applicable based on susceptibility of the specific species. Indeed, since domesticated stocks of *P. monodon* SPF for IMNV and DIV1 are available, we do not recommend the use of captured wild *P. monodon* broodstock for PL production at all.

To download the full document please visit:

https://enaca.org/?id=1093

COVID-19 news

Global Conference on Aquaculture 2020 postponed

The conference has been postponed due to the devastating impacts of the COVID-19 pandemic. New dates have not been fixed, but it is anticipated that the conference will be held in 2021 when circumstances allow. In the meantime, work on the programme will continue, and updates will be posted in due course. The location will remain Shanghai, China.

NACA Secretariat office closed

The NACA Secretariat office is closed and the staff are working remotely until further notice. Regrettably, our workshops and other in-person activities have also been disrupted. However, we are working on some online offerings that we hope will fill the gap.

For all enquiries please email info@enaca.org, or see our Staff Directory webpage for contact information for individual staff members:

https://enaca.org/?id=37

Got some spare computing power to fight COVID-19?

If you have an underutilised computer you can donate some of its spare processing capacity to support research on how COVID-19 viral proteins work, which is aimed at aiding the design of drugs to stop them. You can do this by participating in the Folding@Home project.

Folding@Home is a distributed computing project for simulating protein dynamics, including the process of protein folding and the movements of proteins implicated in a variety of diseases.

It brings together citizen scientists who volunteer to run simulations of protein dynamics on their personal computers.

Insights from this data are helping scientists to better understand biology and providing new opportunities for developing therapeutics.

The way it works is that you install a software client on your computer. Folding@Home will then send pieces of a protein folding simulation task to your computer, which will be processed in the background when you aren't using it. Folding@Home collates the work units processed by the community to assemble full simulations. You can choose to donate CPU time while you work or while your computer is idle, at different levels.

Over 100,000 people are currently contributing. The combined processing power is huge, currently around 1.5 x86 exoflops, making it the world's first exoflop computing system. This has allowed researchers to run computationally costly atomic-level simulations of protein folding thousands of times longer than formerly possible.

To participate, please visit the Folding@Home COVID-19 page. You will need to install their free software client and set the category to 'any'. For more information, please visit:

https://foldingathome.org/covid19/

Urgent announcement on usefulness of the lymphoid organ (LO) as an additional prime target for diagnosis of decapod iridescent virus 1 (DIV1) in diseased *P. vannamei*

By Piyachat Sanguanrut, Dararat Thaiue, Jumroensri Thawonsuwan, Timothy W. Flegel and Kallaya Sritunyalucksana

We carried out laboratory injection challenges that employed extracts prepared from shrimp naturally-infected with decapod iridovirus 1 (DIV1). We found that diseased shrimp from the injection trials showed pathognomonic lesions for DIV1 in the hematopoietic tissue that matched those reported for DIV1 in *P. vannamei* from China (Qiu et al. 2017. Scientific Reports. 7). In addition, we also found distinctive lesions in the lymphoid organ that could be used as an additional indicator in confirming diagnosis of DIV1 disease. Also, the lesions from shrimp challenged with the 10x dilution were more severe than those from 100x dilution, and for some shrimp in the 100x dilution, the lesions were very clear in the LO but absent in the HPT.

Altogether, the results suggested that histology of the HPT and LO could be used together to help in the diagnosis of DIV1 in conjunction with RT-PCR, amplicon sequencing and in situ hybridisation (ISH) analysis. This is particularly important in confirming the presence of virulent isolates of DIV1 in new geographical locations.

To download the full announcement, please visit: https://enaca.org/?id=1092

Fresh or frozen seafood?

Australia's Fisheries Research and Development Corporation (FRD) has released a free cookbook, "Fish fresh + frozen" showcasing a variety of seafood recipes.

The book is the product of an FRDC research project which proved that fresh fish is always better than frozen – expert panellists could not tell the difference!

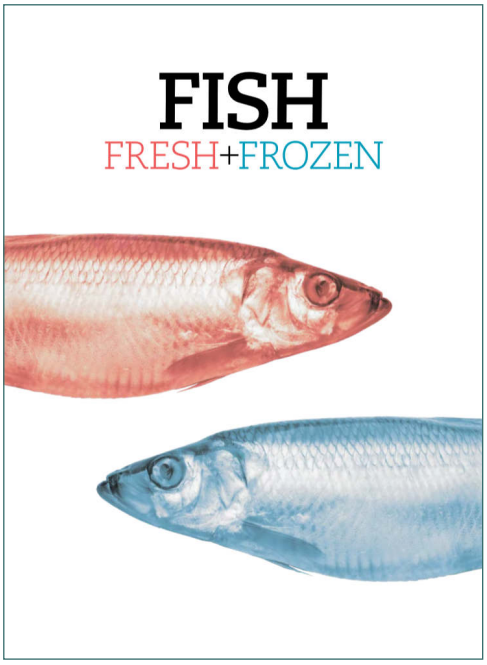
To download the book, please visit:

https://www.fishfiles.com.au/media/cook-books

To read about the research visit:

http://www.frdc.com.au/media-publications/fish/FISH-Vol-27-1/Seafood-quality-frozen-in-time

Source: FRDC.



Report of the Eighteenth Meeting of the Asia Regional Advisory Group on Aquatic Animal Health

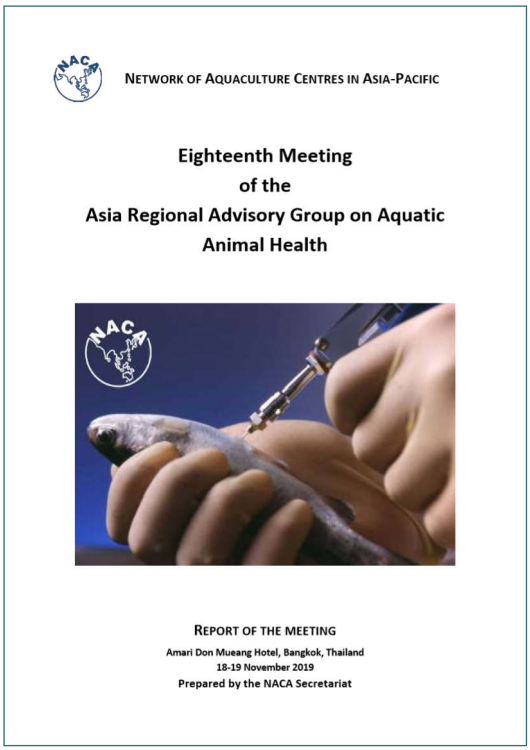
This report was prepared by the 18th Asia Regional Advisory Group on Aquatic Animal Health (AG) that met at Bangkok, Thailand on 18-19 November 2019. The group discussed:

- OIE standards and global issues, including progressive management pathways for aquaculture biosecurity.
- Review of regional disease status.
- Reports on the aquatic animal health programmes of partner agencies.
- Disease reporting.

Members of the Advisory Group include invited aquatic animal disease experts in the region, representatives of the World Animal Health Organisation (OIE) and the Food and Agricultural Organization of the United Nations (FAO), collaborating regional organisations such as SEAFDEC Aquaculture Department (SEAFDEC AQD) and OIE-Regional Representation in Asia and the Pacific (OIE-RRAP), and the private sector.

To download the report, please visit:

https://enaca.org/?id=1094



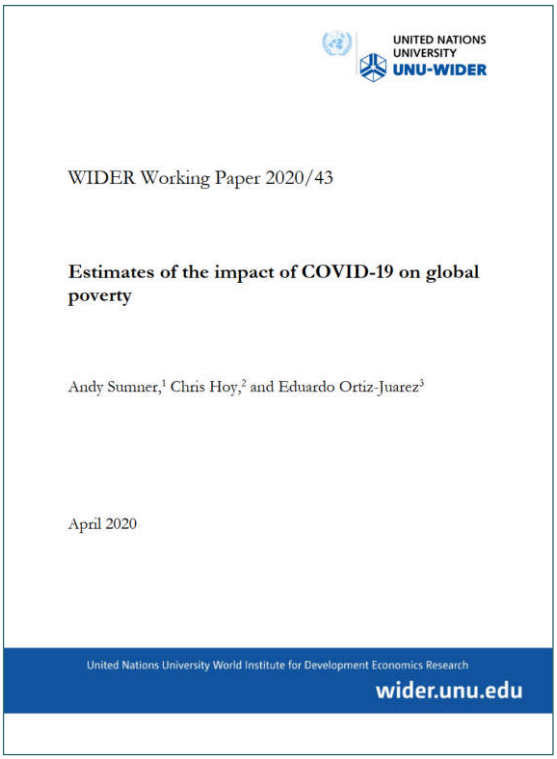
COVID-19 fallout could push half a billion people into poverty in developing countries

New research published by UNU-WIDER today warns that the economic fallout from the global pandemic could increase global poverty by as much as half a billion people, or 8% of the total human population. This would be the first time that poverty has increased globally in thirty years, since 1990.

The authors of the UNU-WIDER study - Andy Sumner and Eduardo Ortiz-Juarez of King's College London and Chris Hoy from Australian National University - find that a setback of this size would reverse a decade of global progress on poverty reduction.

"This study shows that the achievement of the 2030 Agenda, and in particular, the SDGs on no poverty and zero hunger, is under considerable threat. The need of the hour is to bring together development agencies, national governments, civil society and the private sector in a global effort to protect the livelihoods and lives of the poorest of the poor in the Global South." – Kunal Sen, Director of UNU-WIDER.

The results of the study have galvanised concern for vulnerable communities around the world. They are being cited by Oxfam International, today, in its call to world leaders to implement "an Economic Rescue Plan for All, to keep



poor countries and poor communities afloat," ahead of key meetings of the World Bank and International Monetary Fund (IMF) and G20 Finance Ministers' next week.

Oxfam is calling on world leaders to agree on an Emergency Rescue Package of 2.5 trillion USD paid for through the immediate cancellation or postponement of 1 trillion in debt repayments, a 1 trillion increase in IMF Special Drawing Rights (international financial reserves), and an additional 500 billion in aid.

The WIDER Working Paper estimates an outcome of a 400-600 million persons increase in global poverty given a scenario in which per capita consumption contracts by 20%. The study also estimates poverty increases for mitigated contractions of 10% and 5% and shows the impacts on poverty by region, as well as globally.

Andy Sumner, Professor of International Development at King's College London and a Senior Non-Resident Research Fellow at UNU-WIDER, said of the research:

"We were surprised at the sheer scale of the potential poverty tsunami that could follow COVID-19 in developing countries. Our findings point towards the importance of a dramatic expansion of social safety nets in developing countries as soon as possible and - more broadly - much greater attention to the impact of COVID in developing countries and what the international community can do to help".

To download the research report, please visit:

https://www.wider.unu.edu/publication/estimates-impact-covid-19-global-poverty

Source: UNU-Wider.

Simple techniques double crablet production

By Joesyl Marie de la Cruz

Crab farmers will be happier, and the environment hopefully better, with recent improvements at the mangrove crab hatchery of the Southeast Asian Fisheries Development Center Aquaculture Department (SEAFDEC/AQD) in Iloilo, Philippines.

Crablets used in the farming of the prized mangrove crabs, *Scylla serrata*, are usually collected from the wild and increasing demand has threatened their natural population with crablets becoming more difficult to find.

"Overfishing has pushed the local government of areas heavily exploited for crablets such as Catanduanes, Surigao, and Samar. They have implemented strict prohibitions in the collection of wild crablets," said Joana Joy Huervana, associate researcher at SEAFDEC/AQD and leader of the mangrove crab team.

Restrictions on wild collections in the Philippines led to the rise in demand for hatchery-bred crablets. Unfortunately, crab hatcheries suffer from very low survival rates caused by disease and cannibalism.

Crablets produced in the SEAFDEC/AQD mangrove crab hatchery in Iloilo, Philippines. Photo: Devcom Section.

However, Huervana recently revealed that simple tweaks in protocols at the SEAFDEC/AQD hatchery have led to a significant boost in their crablet production, with survival increasing twofold.

By feeding the crabs more frequently and providing cleaner water in the tanks, Huervana reported that they were able to increase the average survival rate from zoea (newly-hatched larvae) stage to crablet, from an average of one percent in 2017 to two percent in 2019.

Two percent might seem low to those unfamiliar with the hatchery business, but Huervana says crabs produce an average of 3 million larvae which translates to 60,000 crablets per spawner. She further disclosed that SEAFDEC sells crablets, as a byproduct of research, at US$ 0.10 per piece but wild crablets sold by traders in the Philippines reach as much as US$0.24 to US$0.30 per piece.

The simple tweaks helped them achieve the higher survival rate from zoea to crablet, reaching as much as 10 percent sometime last year, which contributed to the hatchery's production of over 650,000 pieces of crablets for 2019.

Increased feeding frequency, cleaner water

"Feeding frequency was increased from four to six times a day with an interval of four hours," Huervana shared, which is "based on the crabs' biomass at 100 percent feeding rate."

She said the intervention worked because cannibalism among the crabs is more prominent starting in the megalopa stage (intermediate larval phase), therefore increasing the available feeds, together with providing additional shelters in the larval tanks, increased the survival.

"As for the water replacement, the interval was shortened from five to four days. Siphoning of tank bottom to remove dead larvae, microalgae, and feeds is done every three days to further improve water quality. Also, monitoring of water parameters was consistently conducted," Huervana added.

"These techniques were tested throughout the years and were proven effective. It could also be easily adapted by hatchery owners and other stakeholders," Huervana shared.

She added that further improvements are still being done in the SEAFDEC/AQD hatchery, not only to cope with the industry's demand for crablets, but also to improve the science behind the technology of mangrove crab hatchery.

"We do our share in alleviating the pressure caused by overfishing in the wild by continuously improving production techniques of our mangrove crab hatchery to share with our stakeholders."

Above left, right: Staff of the SEAFDEC AQD mangrove crab hatchery in Iloilo, Philippines counts crablets prior to shipping out. Photo: J.D. Huervana.

Network of Aquaculture Centres in Asia-Pacific

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

Quarterly Aquatic Animal Disease Report, July-September 2019

The 83rd edition of the Quarterly Aquatic Animal Disease report contains information from twelve governments.

To download the report, please visit:

https://enaca.org/?id=1086