The 11th Symposium on Diseases in Asian Aquaculture (DAA11) 2022

PROGRAMME BOOK

23rd - 26th AUGUST 2022

KUCHING, SARAWAK

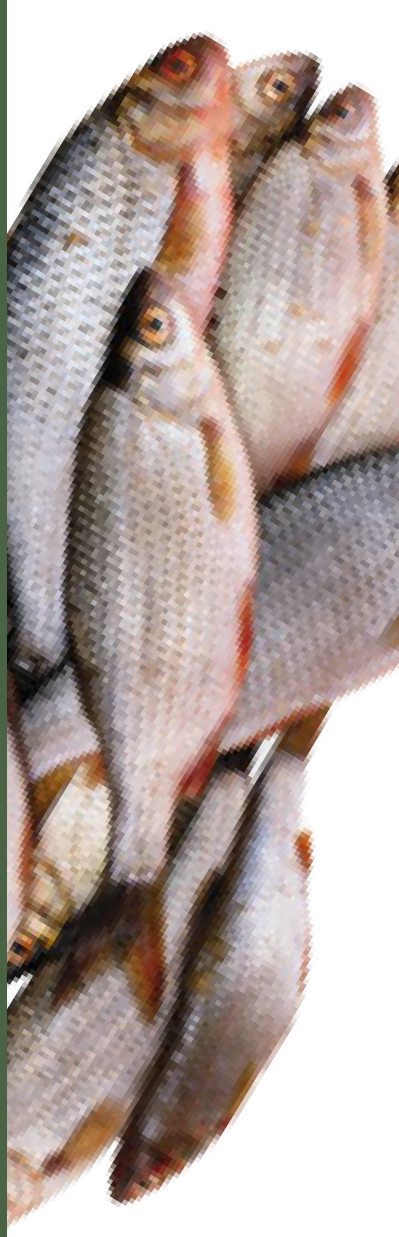
Organized by

MINISTRY OF AGRICULTURE AND FOOD INDUSTRIES

In collaboration with:

Garden of Knowledge and Virtue

Contents



GREETINGS
FROM THE FHS-AFS

On behalf of the Fish Health Section of the Asian Fisheries Society (FHS-AFS), I am pleased to welcome you to the 11th Symposium on Diseases in Asian Aquaculture (DAA11) Kuching, Sarawak. The early history of the FHS-AFS is closely linked with the Asian Fish Health Network (AFHN), which was initiated in 1985 with the support from the International Development Research Centre (IDRC), Canada. In 1989, the AFHN joined the Asian Fisheries Society (AFS) and the FHS was born as a formal section of the AFS. A year later, the FHS-AFS organized the 1st Symposium on Diseases in Asian Aquaculture (DAA1) in Bali, Indonesia.

What started in Bali in 1990 as a humble gathering has evolved as the biggest fish health event in Asia. Up until DAA10 in Bali in 2017, we managed to hold this symposium every 3 years for 27 years, which is impressive. To celebrate 30 years of the Symposium, we brought DAA11 to Malaysia, where the FHS-AFS was founded in 1989. DAA11 was initially planned to take place in 2020 but postponed to 2022 due to the Covid-19 pandemic. Due to travel restrictions associated with the pandemic, DAA 11 was organized as a virtual event.

DAA11 attracted 629 registered participants and 142 abstract submissions from 23 countries. With the theme of 'Land of Adventure: Exploring Aquatic Animal Health for Sustainable Aquaculture', DAA11 will cover wide ranges of aquatic animal health aspects including biosecurity in aquaculture, epidemiology, detection, prevention, and control of diseases in finfish, crustacean and shellfish. There are also sessions dedicated on trends in fish and shrimp health management. We hope this scientific programme will provide platforms for sharing knowledge, experience, and most importantly lessons learned of managing aquatic animal health in the region and beyond.

DAA11 is jointly organized by the FHS-AFS and the Malaysian Government. On behalf of the FHS-AFS, I would like to sincerely thank the Malaysian Government including the Sarawak Government, Ministry of Agriculture and Agro-Based Industry, and Department of Fisheries for their support and contributions to the organization of DAA11. This event will not be possible without the hard work of the DAA11 Technical Team of the National Organizing Committee. It is my duty to sincerely thank sponsors and exhibitors for their support to the event and to the Executive Committee and Senior Advisors of the FHS-AFS and the International Scientific Committee of DAA11 for their contributions to the development of a strong scientific programme. Last but not least, I would like to extend, my gratitude to the invited speakers and presenters for sharing their work at DAA11. I'm sure your talks will stimulate robust discussion and motivate the participants to further strengthen their networking in Asia and beyond. I hope all of you have a very productive symposium and look forward to seeing you in-person at DAA12 in 2025.

Best wishes,
Dr Agus Sunarto
Chairperson of the FHS-AFS

WELCOMING MESSAGE
FROM THE NATIONAL ORGANIZING

Dear Colleague and Friends,

On behalf of the Organizing Committee, I welcome all to the first ever virtual symposium on Diseases in Asian Aquaculture (DAA). While we regret that the COVID pandemic prevented us from holding the symposium in Kuching, we are excited about the opportunities of holding an innovative virtual symposium. The 11th DAA symposium marked the starts of new approaches and strategies, where the current pandemics have reminded us of our interconnectedness, that our health, animal health, and the environment are intrinsically linked - highlighting the urgent need to increase collaboration at the national, regional, and global levels to address the issue of disease transmission in aquatic ecosystems, zoonotic diseases, antimicrobials resistance as well as aquatic animal welfare, promoting integrated and system based approach to One Health concept.

The DAA11 virtual will includes 4 days of information sharing, intellectual discussions and networking with strategic virtual exhibitions and trade displays covering wide range of topics on aquatic animal health management, development, and innovations presented by internationally recognized experts and researchers from all over Asia Pacific region and around the world. The symposium also provides an excellent platform for international partners to establish and enhance research collaborations, as well as market opportunities for aquatic products and aquaculture technologies. There will be ample time for virtual networking during the Symposium.

The promotion of aquatic animal health management is not just for specialists and scientists but for everyone in the community including farmers with lived experience, aquatic resources managers, veterinarians, aquatic animal health professional, academics, educators, students, all related fisheries industry players, and the general public. Reaching new frontiers requires fresh vision and novel strategies. Producing the symposium online fits perfectly with these aims as it will allow is to keep registration fees to a minimum and reach a wider audience than a traditional conference can possibly include.

I truly appreciate and thank our co-organizing partners, the Fish Health Section of the Asian Fisheries Society (FHS-AFS) and the Ministry of Modernization of Agriculture, Native Land and Regional Development (MANRED); our collaborators especially the Marine Fishery Resources Development and Management Department of the Southeast Asian Fisheries Development Center (SEAFDEC MFRDMD), Universiti Putra Malaysia (UPM), Universiti Malaysia Terengganu (UMT), Universiti Malaysia Sarawak (UNIMAS), International Islamic University Malaysia (IIUM), WorldFish, Malaysia Fisheries Society (MFS) dan Aquaculture Asia Pacific (AAP); and our sponsors; for their technical and financial supports, that has contributed towards the success of DAA11. My sincere appreciation also goes out to all the experts and researchers (who will be participating in the DAA11 Symposium), for their roles in sharing vital and beneficial scientific information as well as valuable experiences on aquatic animal diseases and prevention strategies, contributing and enriching the scientific, public, and private communities. I hope everyone will use these opportunities to enhance and build their capacity towards sustainable, stable, and competitive aquaculture industries for food security and aquatic ecosystem sustainability.

The virtual symposium represents an opportunity for DAA11 to inspire the world with a perspective of hope on research, diagnostics, and services of aquatic animal health in Asian aquaculture. We are certain all of you find this symposium stimulating, rewarding and meaningful.

We are looking forward to warmly welcoming you to DAA11 Virtual

Haji Mohd Sufian Bin Sulaiman
Director General of Fisheries Malaysia
Chairman of the National Organizing Committee for DAA11

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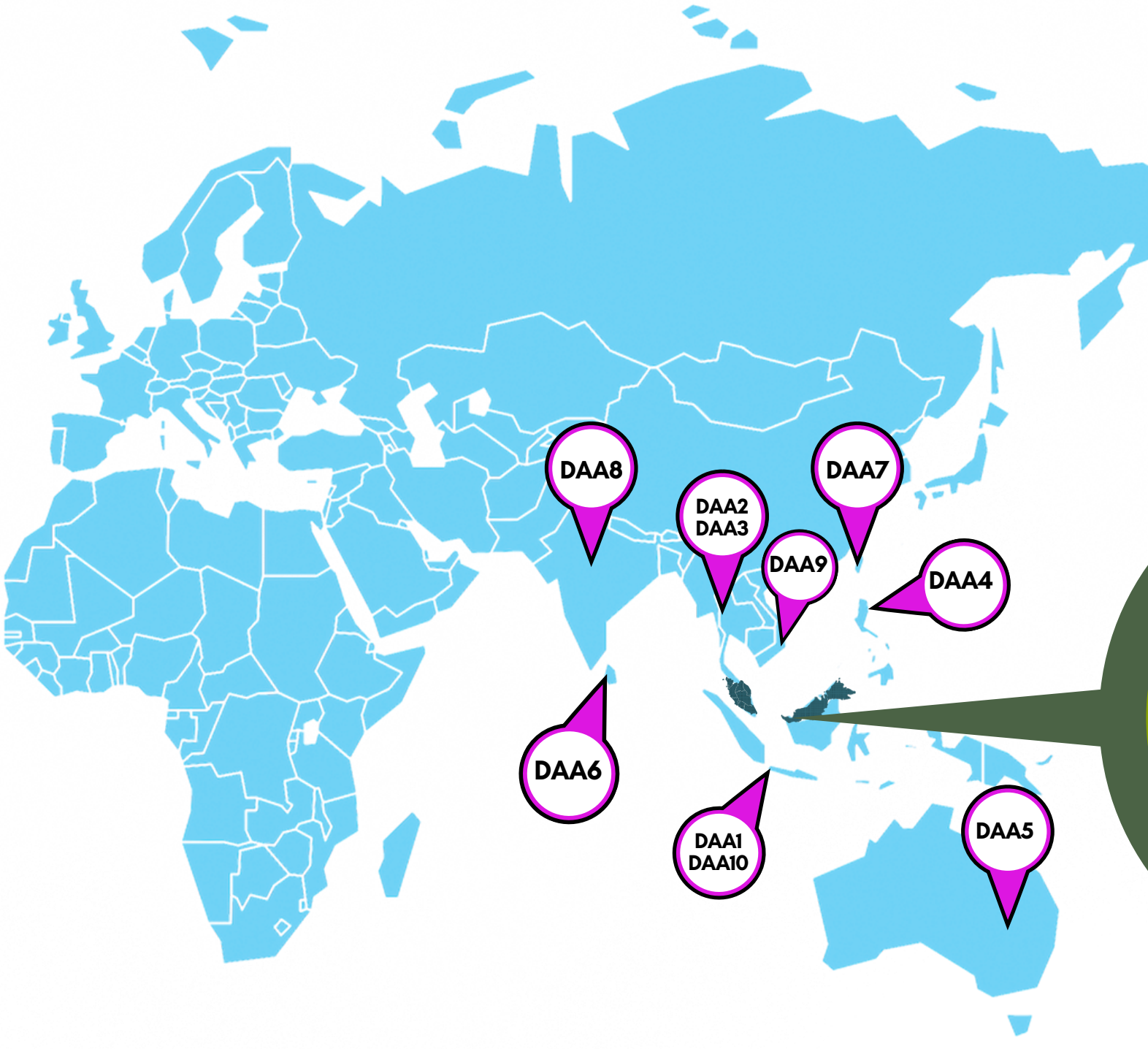

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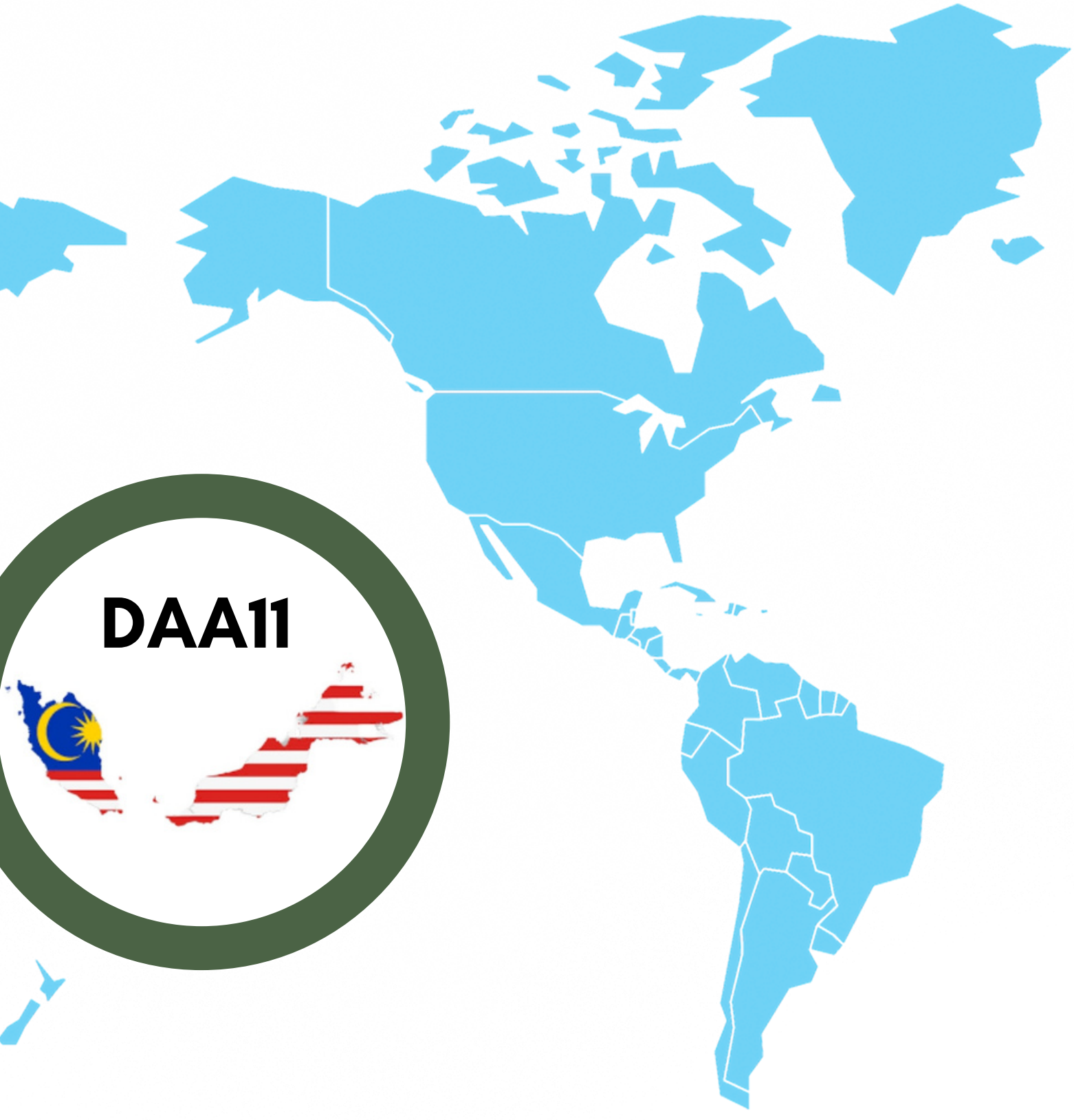

DAA11 PAR

TICIPANTS

DAA11
SCHEDULE

23rd AUGUST 2022

PLENARY I
SESSION 1:
BIOSECURITY IN AQUACULTURE

SESSION 2:
EPIDEMIOLOGY
(PARASITIC, BACTERIAL & VIRAL DISEASES)

24th AUGUST 2022

PLENARY II
SESSION 3:
DETECTION METHOD/DIAGNOSTIC
(PARASITIC, BACTERIAL & VIRAL DISEASES)

SESSION 4:
PREVENTION & CONTROL MEASURE
(PARASITIC, BACTERIAL & VIRAL DISEASES)

25th AUGUST 2022

SESSION 5:
TRENDS IN FISH HEALTH MANAGEMENT

26th AUGUST 2022

SESSION 6:
TRENDS IN SHRIMP HEALTH MANAGEMENT

PROGRAMME AT A GLANCE

DATE	MALAYSIA TIME (MYT), UTC +8	PROGRAM	Mode
DAY 1: 23rd August (Tuesday)	08:00 - 09:45	Registration	Hybrid
	09:50 - 10:30	Opening Ceremony	Hybrid
	10:40 -11:10	Plenary I – Dr. Melba B. Reantaso	Hybrid
	11:30 -17:00	Farmers Day for Malaysian Farmer	Physical
		Session 1: Biosecurity in Aquaculture	Virtual
	11:10 - 11:40	Keynote 1 – Dr. Edgar Brun	
	11:40 - 12:40	Oral Presentation	Virtual
	12:40 - 13:10	3-Minutes Presentation	Virtual
		Session 2: Epidemiology (Parasitic, Bacterial and Viral Diseases)	Virtual
	14:00 - 14:30	Keynote 2 – Prof. Dr. Kenton LI. Morgan	
	14:30 - 15:45	Oral Presentation	Virtual
	15:45 - 16:30	3-Minutes Presentation	Virtual
DAY 2: 24th August (Wednesday)	08:30 - 09:00	Plenary II – Dr. Rohana Subasinghe	Virtual
		Session 3: Detection Method/Diagnostic (Parasitic, Bacterial and Viral Diseases)	Virtual
	09:00 - 09:30	Keynote 3 – Prof. Karin Pittman	
	09:30 - 11:45	Oral Presentation	Virtual
	11:45 - 12:30	3-Minutes Presentation	Virtual
		Session 4: Prevention and Control Measures (Parasitic, Bacterial and Viral Diseases)	Virtual
	14:00 - 14:30	Keynote 4 – Dr. Huang Jie	
	14:30 - 16:00	Oral Presentation	Virtual
	16:00 - 16:45	3-Minutes Presentation	Virtual
	16:45 – 17:00	Presentation of EoI to Host DAA12 in 2025	Virtual
DAY 3: 25th August (Thursday)		Session 5: Trends in Fish Health Management	Virtual
	09:30 - 10:10	Keynote 5 – Dr. Kua Beng Chu	
	10:10 - 15:00	Oral Presentation	Virtual
	15:30 - 16:00	3-Minutes Presentation	Virtual
	16:00 – 19:00	The 12th Triennial General Meeting of FHS-AFS (TGM12)	Virtual
DAY 4: 26th August (Friday)		Session 6: Trends in Shrimp Health Management	Virtual
	09:30 - 10:10	Keynote 6 – Prof. Chu-Fang Lo	
	10:10 - 14:45	Oral Presentation	Virtual
	14:45 - 15:15	3-Minutes Presentation	Virtual
	15:45 - 16:15	Presentation of upcoming DAA12	Virtual
	16:15 – 17:00	Awards & Closing Ceremony	Virtual

PROGRAMME ITINERARY

KEMENTERIAN PERTANIAN DAN INDUSTRI MAKANAN

Opening Ceremony of the 11th Symposium on Diseases in Asian Aquaculture (DAA11)
23 August 2022
Borneo Convention Centre Kuching (BCCK), Kuching, Sarawak

9.00 am	**Registration** **Arrival of Guests & VIPs**
9.45 am	**The Arrival of the Honourable Datuk Seri Dr. Ronald Kiandee** **Minister of Agriculture and Food Industries (MAFI)**
9.50 am	**The Arrival of the Right Honourable Datuk Patinggi Tan Sri (Dr.) Abang Haji Abdul Rahman Zohari bin Tun Datuk Abang Haji Openg** **Premier of Sarawak**
	National Anthem 'Negaraku'
	State Anthem 'Ibu Pertiwiku'
	Prayer Recital
	Introductory Remarks by Dr. Agus Sunarto **Chairperson of the Fish Health Section of the Asian Fisheries Society (FHS-AFS)**
	Welcome Remarks by the Honorable Datuk Seri Dr. Ronald Kiandee **Minister of Agriculture and Food Industries (MAFI)**
	Opening Address and Official Launching by the Right Honorable Datuk Patinggi Tan Sri (Dr.) Abang Haji Abdul Rahman Zohari bin Tun Datuk Abang Haji Openg **Premier of Sarawak**
	Keynote address: Drivers and Pathways of Disease Emergence in Aquaculture, by Dr. Melba B. Reantaso, Team Leader of Food Safety, Nutrition and Health, Fisheries and Aquaculture Division, the Food and Agriculture Organization of the United Nations
	Press Conference (Tea Break for Farmers Day Participants)
	Tour of the Exhibition
12.00 pm	**Refreshments & Lunch**

***********END OF PROGRAM************

DAA 11 2022 KUCHING, SARAWAK MALAYSIA

Jabatan Perikanan Malaysia

'Sarawak, Land of Adventure: Exploring Aquatic Animal Health for Sustainable Aquaculture'

DAA11 SPEAKERS

DAA11 PLENARY SPEAKER

Dr. Melba G. Bondad-Reantaso

Leader, Food Safety, Nutrition and Health Team (NFIMF)
Fisheries and Aquaculture Division
Food and Agriculture Organization of the United Nations (FAO)
Viale delle Terme di Caracalla, Rome 00126 ITALY

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Biography

Dr Melba B. Reantaso, Ph.D. (Ms), has close to 30 years combined experience in research, training, diagnostics, extension and international aid and development work on aquaculture, management of health of aquatic organisms and biosecurity. She retired early as Senior Aquaculturist in 2002 after 18 years of government service at the Fish Health Section of the Philippine Bureau of Fisheries and Aquatic Resources. Dr Reantaso worked for the Network of Aquaculture Centre in Asia and the Pacific (NACA, Bangkok, Thailand) from 1999-2002 as Regional Aquatic Animal Health (AAH) Specialist and Coordinator of an FAO project with 21 countries participating that resulted to the establishment of aquatic animal health programme of NACA; and led the investigation of koi herpesvirus, at that time, in Indonesia. She migrated to the USA and worked (2002-2004) at the Cooperative Oxford Laboratory, a fish health laboratory shared by MD/DNR and NOAA, responsible for the histopathological analyses from an active surveillance for oysters diseases. She joined FAO in 2004, led international disease investigation task forces on epizootic ulcerative syndrome in southern Africa and the Democratic Republic of Congo, white spot syndrome virus of shrimp in Mozambique and Madagascar and acute hepatopancreatic necrosis disease in Viet Nam. She has M.Sc., Ph.D. and post-doc credentials all on diseases of aquatic animals: post-doc fellow (Nippon Veterinary and Life Science University, adviser: Prof Kishio Hatai) of the Japan Society for the Promotion of Science; Ph.D. (University of Tokyo; adviser: Prof Kazuo Ogawa) as a Monbusho scholar and an M.Sc in Biology (De La Salle University, adviser: Dr James Richard Arthur) as a recipient of a project scholarship grant from International Development Research Center of Canada. She earned her B.Sc. in Zoology from the University of the Philippines in Los Banos. She serves as referee to various peer-reviewed journals and co-editor of Diseases in Asian Aquaculture series (DAA V, VI and VII). She was founding member and served as Chairperson (2002-2005) and Secretary/Treasurer (1999-2002) of the Fish Health Section, Asian Fisheries Society and currently Senior Adviser. She travels extensively (at least 68 countries to-date) in pursuit of scholarly and career goals in aquaculture development and biosecurity. She maintains a global network of experts, and served as Chief Editor of the FAO Aquaculture Newsletter from 2006 to 2016. She spearheaded the development of a new initiative called Progressive Management Pathway for Improving Aquaculture Biosecurity, a paradigm shift in managing health of aquatic species through a risk-based, collaborative and progressive approach. She is Team Leader of Food Safety, Nutrition and Health team at the Fisheries and Aquaculture Division of FAO since 2021; aside from supervisory tasks, she leads FAO work on biosecurity, disease risk assessment, surveillance, national/regional aquatic organisms health strategies, AMR in aquaculture; develops and implements capacity development activities, projects, training courses, seminars/conferences; conducts investigations of disease outbreaks and mass mortality events in aquatic populations; and represents FAO in relevant bodies, committees, advisory board, erc..

DAA11 PLENARY SPEAKER

Drivers and pathways to disease emergence in aquaculture and possible solutions

Globally, the trend in aquaculture is that a serious transboundary infectious disease of aquatic organism emerges, spreads rapidly, and causes major production losses approximately every three to five years. The many factors contributing to disease emergence in aquaculture can be categorized into four major pathways, including: (i) trade in live animals and products; (ii) knowledge of pathogens and hosts; (iii) health management and disease control; and (iv) ecosystem changes. Emerging diseases in aquaculture may occur due to the introduction of new diseases through various exposure pathways, or due to an increased impact of diseases already present. The consequences of an emerging disease are dependent on the time of detection and effectiveness of response to the disease, which rely on good capacities in surveillance, diagnostics, institutional coordination, research infrastructure, biosecurity, and disease control measures. National strategic planning on aquatic health management and biosecurity is vital to reduce the vulnerability of the aquatic sector to new and emerging diseases and the often ad-hoc and reactive solutions to disease outbreaks and mass mortality events in aquatic populations.

The Progressive Management Pathway for Improving Aquaculture Biosecurity (PMP/AB) developed by FAO and partners, is a 'paradigm shift' that follows the principles of being risk-based, progressive and collaborative, and focuses on diseases faced by aquaculture at the commodity and enterprise levels. The four stages of PMP-AB involve strong stakeholder input to promote the application of risk management as part of a national approach. Countries decide the appropriate entry-point, how far and how fast to progress to the next stage. Due to the wide variation of farmed aquatic species, aquaculture sectors may advance independently, at different speeds or with different goals but a common requisite is strong cooperation between government, industry and academic sectors, under the public-private sector partnership (PPP). This is necessary to ensure clarity on roles and responsibilities, identify key gaps requiring improved capacity and infrastructure, and increase awareness of the cost/benefits of biosecurity systems. Emergency preparedness and risk analysis are key aspects of all stages of the PMP/AB. Risk hotspots (critical control points) along the value chain are identified for biosecurity investment (training, diagnostic capacity, etc.). All these feed into development of national strategy on aquatic organism health or aquaculture biosecurity, which sets the foundation for ongoing review and updating as the industry develops.

As countries and aquaculture enterprises advance along the pathway, the PMP/AB is expected to: reduce the burden of diseases, improve aquatic (organism and environmental) health at the farm and national levels, minimize international spread of diseases, improve socio-economic benefits from aquaculture, increase investment in aquaculture, and achieve One Health goals; all of which provide benefits at the enterprise, national, regional, and global levels.

DAA11 PLENARY SPEAKER

Dr. Rohana Subasinghe

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Biography

Dr Rohana Subasinghe is a specialist in aquaculture development and aquatic animal health management. After 22 years of service, he retired from FAO in October 2015. He was responsible for the implementation of many programmes and projects on aquaculture and aquatic animal health at national, regional, and international levels, worldwide. For fifteen years, he served as the Technical Secretary to the Sub-Committee on Aquaculture of the Committee on Fisheries of the FAO. A former teacher at the University of Colombo and the Universiti Putra Malaysia, Dr R.Subasinghe earned his PhD from Stirling University, Scotland. He is a former Chairperson of the Fish Health Section of the Asian Fisheries Society; 2018-2019 President of the Asia Pacific Chapter of the World Aquaculture Society (WAS-APC); and an honorary life member of the World Aquaculture Society and Asian Fisheries Society. He is a strong advocate for the need for more inclusive growth of global aquaculture. Dr. R.Subasinghe is currently working with World Fish, Bill & Melinda Gates Foundation and the United States Agency for International Development, towards improving fish supplies in Africa through aquaculture.

State of global aquaculture

According to FAO, in 2020, global fisheries and aquaculture production reached a record 214 million tonnes, comprising 178 million tonnes of aquatic animals and 36 million tonnes of algae (seaweed), largely due to the growth of aquaculture in Asia. The global aquaculture production in 2020 was also a record 122.6 million tonnes, with a total value of USD 281.5 billion. Aquatic animals accounted for 87.5 million tonnes and seaweed comprised 35.1 million tonnes. However, aquaculture growth in Africa records a reduction due to a decrease in the production in two major producing countries, Egypt, and Nigeria. In terms of consumption, current annual per capita consumption of fish in Africa is less than 10kg (global average is 20.2 kg) and is alarmingly forecasted to reduce in the coming years. However, rising incomes and urbanization, improvements in post-harvest practices and changes in dietary trends are projected to drive a 15 percent increase in aquatic food consumption, globally to supply on average 21.4 kg per capita in 2030. Weather this increase will have any impact on Africa is questionable. This presentation explains multiple facets of the state of aquaculture, their prospects, bottlenecks, strategies and solutions at global, regional and national levels.

KEYNOTE SPEAKER

Dr. Edgar Brun

Director Aquatic Animal Health and Welfare,
Norwegian Veterinary Institute

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Biography

Dr. Edgar Brun is currently working as Director for Aquatic Animal Health and Welfare at the Norwegian Veterinary Institute. He has a Doctor Science degree from the Norwegian School of Veterinary Science, and a master in epidemiology from London School of Hygiene and Tropical Medicine/Royal Veterinary College. He worked as a private fish health veterinarian in the growing salmonid industry in Norway before he started his early research carrier in epidemiology at the Norwegian Veterinary Institute where he later became leader for the epidemiology section for 12 years. His interests are various aspects of aquatic animal epidemiology and health management.

Biosecurity and sustainability

During the last decades, the global aquaculture industry has grown rapidly, and today provides more aquatic animal products for consumption than traditional fisheries. The development in aquaculture is associated with new technology, high number of species for farming, global demand for food and live animals and genetic products; a trade that connects farmers all over the world. However, the downside of this "success" is a global spread of a variety of infectious diseases with devastating impacts on single farmers, industry, local communities and indeed environment and the national economics. Knowledge of and a proper understanding of possible impacts of infectious diseases in aquatic animals have been lacking.

This understanding is slowly emerging by an increasing international attention from OIE and FAO as both organisations have adopted biosecurity as a strategic approach to reduce risk and sustain the industry. Biosecurity including prevention of the spreading of infectious agents and an adequate control of disease occurrence is increasingly seen as essential components of any talk about sustainable aquaculture production. Coastlines or inland rivers and lakes connects farms whether they are own by a multinational company or a small local farmer. A possible interaction between farms therefore exists and the infection status and implementation of biosecurity measures on a farm, a region and a nation, is consequently not a private issue. Rather it is a concern at national and community level, as well as for the industry as such. This puts responsibilities on both the industry as well as the relevant authorities to collaborate, support, guide, report, and regulate the industry. The talk will highlight some of the essential components to succeed in this collaboration aiming to develop a more sustainable industry with respect to infectious diseases.

KEYNOTE SPEAKER

Prof. Dr. Kenton LI. Morgan

Institute of Veterinary Science,
University of Liverpool

kentonlm@hotmail.com

Biography

Kenton Morgan was the first Professor of Epidemiology at a British Veterinary School. He is a veterinarian with a postgraduate degree in mucosal immunity. A graduate of the University of Cambridge, he developed his interest and skills in epidemiology and practical preventive medicine at the University of Bristol. He was introduced to Aquaculture after a Scotland v Wales rugby game, by Professor James Turnbull of the University of Stirling. Together with Drs CV Mohan and Nguyen Van Hao, they pioneered the application of quantitative epidemiology to aquaculture, in India and Vietnam. He has held epidemiology courses in the USA, Europe, India, and Japan, where he was visiting professor at Nagasaki University. His novel and hands on teaching techniques have attracted international acclaim.

Investment, training, resources, rigor and speed a paradigm for aquatic epidemiology

"Epidemiology, pandemic, R number;" words and concepts that were once the trademark of epidemiologists became part of everyday language as a result of global infection with an RNA virus. The last 2-3 years has taught us those longstanding methods of infectious disease control i.e. the identification of infected individuals or populations and their isolation from non-infected individuals or populations remain the basis of infectious disease control. It has been tough, and it remains tough at personal, national and international levels. It stands as a testimony to the power of infectious diseases and the role of epidemiology in their control. In aquaculture, two major pandemics have occurred over the last 50 years. White Spot Disease Syndrome and Epizootic Ulcerative Syndrome or Mycotic Granulomatosis. There was neither the epidemiological knowledge, infrastructure, finances or political will to prevent the spread of these diseases. The use of the now obsolete word epizootic is testimony to this. Arguably too much investment was made in trying to identify the "causes" of both and too little investment in their control. Investment is key to infectious disease control. You cannot simply switch on a manufacturing line to produce the expertise and infrastructure needed to combat a pandemic. The people, structures, equipment and importantly networks need to be in place. These networks are about people, who understand each other and get along with one another. Training in epidemiology often focuses on the theoretical and it can be daunting to even the most experienced laboratory scientist involved in infectious diseases. Like all sciences it has its jargon and definitions. It is important that these are understood and used correctly. Confounder for example is a word thrown around in conversation very often with little reference to its actual meaning.

KEYNOTE SPEAKER

Epidemiology however is a practical subject, whether observational, experimental, or theoretical, it is firmly rooted in practical disease control. There is a tendency for it to become top heavy, with theoretical epidemiologists outnumbering "welly boot" epidemiologists. Both are vital for effective disease control. Training should be practical and useful; it should not be a showcase for the complexity of epidemiology and the prowess of epidemiologists. Epidemiologists are often viewed as "bucket scientists" by those based in the laboratory. They use large numbers. These large numbers extend to the resources needed but unlike laboratory science it is often human resource rather than reagents that are needed. People - trained people - on the ground, collecting data, controlling movement, testing vaccines. These are key individuals. Epidemiology is about disease in populations, but it recognises that even single individual and consignments of animals can introduce disease into a previously non- infected waterbody or island country. Where rivers cross national boundaries, disease control should based on catchments not countries and the political structures which enable this should be in place. It is not rocket science! It just involves key people and groups talking to each in a task driven, tolerant way. Where procedures, such as risk-based certification or more draconian exclusion measures are in place, they have to be rigorously observed and maintained. When that "weekend" moment of disease introduction, outbreak or spread occurs, speed is of the essence. Better to put in movement controls and then relax them because of false alarms rather than inform everyone that borders will be closed on Monday. The effects of hours at this early stage can be massive as are the political and economic pressures on the decision makers! Whilst the control of infectious disease can involve generic and specific preventive measures, the control of non-infectious diseases presents greater challenges to the epidemiologist. One often missed part of the armoury in the control of non-infectious diseases is precedent and analogy. Animal kept in relatively controlled environments and fed manufactured diets grow faster. The demands of more rapid growth on nutrient and micronutrient requirements have resulted historically in diseases of deficiency and imbalance in pigs and poultry. The knowledge that these have occurred in other intensified species should serve as a resource and early warning system to the aquatic epidemiologist. Throughout the world, the provision of epidemiological expertise in aquaculture is woefully inadequate. Purse holders and political decision makers, in countries where aquaculture makes a significant contribution to human health and or GDP fail to invest, often large sums of money, in Epidemiology at their peril!

KEYNOTE SPEAKER

Prof. Karin Pittman

University of Bergen, 5006,
Bergen, Norway

karin.pittman@uib.no

Biography

Pittman is a tenured professor in the Fisheries Ecology and Aquaculture Research Group, Department of Biology, at the University of Bergen, Norway. She is a Canadian educator, inventor, entrepreneur and scientific consultant with an international background. Working in Norway since the 1980s, Prof. Karin Pittman is a socially engaged researcher who has contributed within fisheries research in developing countries, aquaculture research, business development, teaching and diplomacy, as Honorary Consul for Canada 1999-2015. As a researcher, she has studied egg and larva development in farmed marine species, nutrient uptake and food webs, marine ecology and fish health aspects. Her studies of the importance of the slime layer for health led to the establishment of Quantidoc AS in 2013, as well as an Inventor Award from Hordaland County Council in 2013 and the Global Aquaculture Alliance Prize for Aquaculture Innovation and Leadership in 2016 based on Mucosal Mapping now trademarked as Veribarr™. Karin Pittman is also a committed and creative educator who has received several awards for her teaching, including Olav Thon's Award for Outstanding Teaching in 2016, the Lecturer Prize at the Department of Biology 2012, the Owl Prize (UiB) and the NOKUT Award for Best Course in Higher Education in 2009. She has served with various international Research Council boards and programmes. She is a member of the Consular Corps Norway. She is also a grateful alumnus of the 2012 Senior Workshop at the "Alan Alda Center for Communicating Science" at Storybrook University of New York.

Fish wear their immune system on the outside – what this means for aquaculture and ecology

After 40 years of intensive aquaculture, we know the fish as an animal better than we ever did from millenia of fishing. The fundamental differences between aquaculture and agriculture animals include the time spent in a controlled stable environment for organogenesis (upto 70% of total lifespan for terrestrials vs 0-5% in aquatics), the number of evolutionary whole genome duplication events contributing to the current genome (2R for terrestrials and 3R or 4R for aquatics) and the body location of the mucosal immune system (inside for terrestrials and both inside and outside for aquatics). The external immune system of the slimy layers (mucosa of skin, gills and intestines) contains antiviral, antifungal, antiparasitic and antibacterial substances in constant dialogue with the environment. The mucous cells exhibit an organ-wide repeatable response to stimuli such as therapeutics, stress, diet and environment. The application of an unbiased standard method, mucosal mapping or Veribarr™, over 12 years and over 100 trials in ecology and aquaculture has given unprecedented understanding of how teleost mucosa function. Gills, which comprise about 50% of the surface area of fish, have proven to be the most sensitive early warning of systemic dysregulation. Some results from commercial-scale productions, from “detective work” and from controlled lab studies will be highlighted in the talk along with a plea for development of standards for fish health. The scope for growth in aquaculture resides in maintaining good stock health.

KEYNOTE SPEAKER

Dr. Huang Jie

Network of Aquaculture Centres in Asia-Pacific (NACA)

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Biography

Dr. Jie Huang, a Chinese national, obtained his BSc on virology in Wuhan University in 1987, an MSc in the Wuhan Virology Institute, Chinese Academy of Science (CAS) in 1990, and his PhD on marine biology in the Ocean Institute, CAS, in 2010. He is the Director General of the Network of Aquaculture Centres in Asia-Pacific (NACA). He devotes himself to strengthening the network and its contribution to sustainable aquaculture development in the region. As an expert on aquaculture epidemiology and biosecurity, Dr. Huang previously served as a Principal Investigator in Yellow Sea Fisheries Research Institute (YSFRI), Chinese Academy of Fishery Sciences (CAFS); the Chief Scientist of CAFS on disease control; the Designated Expert of the OIE Reference Laboratories for WSD and IHHN. Dr. Huang has conducted projects on diagnostics, epidemiology, and control technology for aquatic animal diseases since 1990, reported emerging pathogens and diseases, established new diagnostic methods, developed disease prevention techniques, and actively promoted the biosecurity concept for aquaculture. He had 178 corresponding author papers, was awarded 14 patents as the first inventor, and obtained other achievements. More than a hundred doctoral and master-level students and postdoctoral scientists have completed their studies under his tutelage.

Emerging aquatic animal diseases and response actions to their emergencies in Asia and the Pacific Region

The presentation briefed the causative agents, affected species, and presence in the region of 14 emerging diseases and other more than 300 newly found viruses reported in finfish, crustaceans, molluscs, and amphibians in the recent decade. Strategies to facilitate the solution for emerging diseases were proposed. Challenges in the identification of causative agents for emerging diseases were discussed. A technology roadmap and approaches were proposed for the confirmation of causative agents of emerging or multiple infections. For finding emerging diseases, governments shall encourage reports from the private sector, establish a communication platform for remote diagnosis, encourage active media for the aquaculture stakeholders, and develop an aquaculture insurance policy based on reporting of aquaculture diseases. To identify emerging diseases, governance-research-services-industry cooperation is encouraged, the aquatic animal health research shall be supported, passive surveillance or rapid response to emerging diseases needs to be implemented, and it is encouraged to apply metatranscriptomic and metagenomic based technologies broadly. For emerging disease notification, publications on case studies need to be encouraged, the international mechanism trusting tradability based on transparency needs to be established, the contribution of transparency from all member sources can be accounted for, and the contribution of finding emerging diseases shall be encouraged. To better respond to emerging diseases, relevant authorities and enterprises shall establish and implement a contingency plan at different levels. Governments shall implement the original domestic site quarantine inspection policy, establish the national zoning system, and support the development and application of innovative treatment measures. More international, regional, national, and local training courses for emerging disease response need to be organized.

KEYNOTE SPEAKER

Dr. Kua Beng Chu

Fisheries Research Institute Headquarters,
FRI Batu Maung, 11960, Batu Maung,
Penang, Malaysia

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Biography

Dr. Kua Beng Chu is a senior researcher and currently working as a Deputy Senior Director of research at the Fisheries Research Institute, Department of Fisheries Malaysia. She received her Doctoral degree in Fish Parasitology at the age of 32 years old from the University of Science, Malaysia. Since 1996, she has been in charge of research and development in fish health with a focus on aspects of fish parasites, pathology, disease management. She has written more than 100 technical papers in journal writing, book, and successfully patented four findings.

Malaysian experiences: environment-friendly alternatives to chemicals in aquatic animal health management

Aquaculture expansion is typically correlated with culture intensification, resulting in overcrowding and poor water quality, which promotes pathogen propagation and increase in disease outbreaks as well as mortality. Veterinary chemicals are used as prophylaxis and therapeutic of diseases in order to avoid economic losses. However, most chemotherapy causes antimicrobial resistance (AMR), and could affect the efficacy of treatment of diseases in aquatic animals health. In Malaysia, R&D on alternative medicine particularly plant extracts and commercial oils has been conducted and evaluated since the year 2010. Exploratory studies on the potentially environment-friendly alternatives to chemicals include manipulation of science-based know how in fish disease development, pathogen life cycle, and development of fish diets. Based on these concepts, Break & Protect (BP) which is a device for trapping and removing marine leeches from infested farmed fish by disrupting its life cycle was developed. Later, an improvised version (BP2) was introduced for additional 14 species of farmed fish. Another product was developed in 2017 known as KRIPeK which is a portable kit for treating fish swim bladder disorder on site. Besides that, there were also development of several plant based antimicrobial solutions such as SirehMAXTM, GARLEX, and SitroPro for preventing and treating bacterial diseases in fish beside stimulating and promoting weight gain when administered to cultured fish. Application of commercial essential oils such as cinnamon oil was also demonstrated to be beneficial in preventing and treating marine ectoparasites. The environment-friendly alternatives presented in this paper have good potential to be applied in aquaculture for alternatives treatment and intervention of disease outbreaks.

KEYNOTE SPEAKER

Prof. Chu-Fang Lo

Department of Biotechnology and Bioindustry Sciences,
National Cheng Kung University, Tainan, Taiwan

International Center for Scientific Development of Shrimp Aquaculture
National Cheng Kung University, Tainan, Taiwan

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Biography

Dr. Lo is the Emeritus Chair Professor of National Cheng Kung University, Taiwan. Dr. Lo's research work not only focuses on shrimp white spot disease (WSD) but also a shrimp bacterial disease acute hepatopancreatic necrosis disease (AHPND), caused by a pathogenic strain of the opportunistic marine bacterium *Vibrio parahaemolyticus*. Dr. Lo's team has constructed the mutants of *V. parahaemolyticus* ^{AHPND}, and successfully demonstrated the pathogenic mechanisms of AHPND from many aspects. These new insights into the pathogenic mechanisms of AHPND provide important information for developing effective AHPND control measures.

The quorum sensing (QS) system modulates virulence of *Vibrio parahaemolyticus* AHPND by regulating the expression of the *pirA*^{vp} /*pirB*^{vp} genes through AphB^{vp}

The AHPND-causing *Vibrio parahaemolyticus* strain, the *pirA*^{vp} and *pirB*^{vp} genes are highly expressed in the early log phase of the growth curve, and that expression of the PirA^{vp} and PirB^{vp} proteins continues throughout the log phase. In this study, when we compared mutant strains with a deletion or substitution in two of the quorum sensing (QS) master regulators, *luxO* and/or *opaR* (*luxO*^{D47E}, Δ*opaR*, Δ*luxO* and Δ*opaR*Δ*luxO*), our results suggested that expression of the *pirA*^{vp} and *pirB*^{vp} genes was related to the QS system, with *luxO* acting as a negative regulator of *pirA*^{vp} and *pirB*^{vp} without any mediation by *opaR*. We also identified a putative consensus AphB binding site in the promoter region of *pirAB*, and used an electrophoretic mobility shift assay (EMSA) to show that AphB^{vp}, but not AphA^{vp}, could bind to this predicted region. Real-time PCR further showed that *aphB*^{vp} was negatively controlled by LuxO^{vp}, and that its expression was parallel to the expression patterns of *pirA*^{vp} and *pirB*^{vp}. Taken together, these findings suggest that the QS system may regulate *pirA*^{vp} / *pirB*^{vp} expression through AphB^{vp}. This new insight into the pathogenic mechanisms of AHPND points toward the QS system as a possible target for therapeutics that might one day be able to control the virulence of AHPND-causing bacteria and prevent AHPND

FARMERS DAY

9:00-11:10 AM

OPENING CEREMONY

11:30-12:15 PM

SPEAKER 1:
YBHG. DATO' ADNAN BIN HUSSAIN

12:15-13:00 PM

SPEAKER 2:
DR. WAN NORHANA BINTI MD NORDIN

13.00-14:15 PM

LUNCH

14:30-15:15

SPEAKER 3:
DR. LOC HUU TRAN

15:15-15:55 PM

SPEAKER 4:
PROF. DR. HA. THANH DONG

16:20-17:00 PM

TEA BREAK & EXHIBITION TOUR

17:00 PM

PROGRAMME END

FARMERS DAY SPEAKERS

FARMERS DAY SPEAKER

YBhg. Dato' Adnan bin Hussain

Senior Director of Fisheries Biosecurity,
Department of Fisheries Malaysia (DOF)

email: adnan@dof.gov.my

Biography

YBhg. Dato' Adnan bin Hussain telah dilantik sebagai Pengarah Kanan Bahagian Biosekuriti Perikanan bermula 23 Ogos 2017. Beliau bertanggung jawab untuk mengawasi aktiviti biosekuriti perikanan yang melibatkan kawalan rasmi, analisis rasmi dan persijilan rasmi. Sebelum menjawat jawatan Pengarah Kanan Bahagian Biosekuriti Perikanan, beliau pernah bertugas selaku Pengarah Perikanan Negeri Pahang dari tahun 2011 hingga 2017 dan Ketua Cawangan Komuniti Nelayan dari tahun 2008 hingga 2011. Beliau mula berkhidmat dengan Jabatan Perikanan pada 1 Julai 1994 dengan bermula di Pejabat Perikanan Negeri Selangor dan pernah berkhidmat di Ibu Pejabat Perikanan di Cawangan Pengurusan Sumber, Cawangan Perlindungan Sumber dan Cawangan Perancang.

Program kawalan dan pemantauan kesihatan ikan di Malaysia

Jabatan Perikanan Malaysia memainkan peranan utama dalam memastikan, menjamin dan memperakukan bahawa ikan dan hasilan ikan Negara adalah berkualiti dan selamat untuk pasaran Negara dan Antarabangsa (mengikut keperluan standard antarabangsa dan Negara pengimport) melalui penyelarasan aktiviti kawalan rasmi (official control), analisis rasmi (official analysis) dan jaminan rasmi (official guarantee) di dalam sektor perikanan tangkapan dan akuakultur. Salah satu aktiviti UTAMA Jabatan Perikanan adalah melaksanakan Kawalan Rasmi Biosekuriti yang merupakan salah satu objektif utama di bawah Strategi Kesihatan Ikan Kebangsaan Malaysia (2018 – 2022). Kawalan rasmi biosekuriti adalah aktiviti pengurusan kesihatan ikan dan awam yang melibatkan aktiviti penilaian dan pengurusan risiko yang berkaitan dengan manusia, haiwan dan tumbuhan akuatik termasuk risiko alam sekitar; yang merangkumi keselamatan makanan di peringkat pengeluaran primer, zoonosis (dari penyakit haiwan atau tumbuhan akuatik), pencegahan, pengawalan dan pengurusan penyakit ikan dan perosak, spesies akuatik asing invasif, dan organisma hidup yang diubah suai (LMO-living modified organisms). Program Survelan dan Pemantauan Kesihatan Ikan adalah aktiviti pengawasan status kesihatan ikan dan pengesanan penyakit haiwan akuatik secara holistik berintegrasi yang dijalankan oleh Jabatan Perikanan Malaysia di premis akuakultur (termasuk ladang, hatceri dan sangkar), premis pengimport/ pengeksport (termasuk kawasan kuarantin), akuarium dan pusat pameran serta perairan umum, bagi untuk pengawalan penyakit di peringkat pengeluaran primer di dalam Negara dan rentas sempadan.

FARMERS DAY SPEAKER

Dr. Wan Norhana Md Noordin

Fisheries Research Institute, 11960,
Batu Maung, Penang, Malaysia

norhana@dof.gov.my

Biography

Dr. Wan Norhana merupakan seorang pegawai penyelidik dari Institut Penyelidikan Perikanan (FRI), Jabatan Perikanan Malaysia. Telah berkhidmat selama 29 tahun dengan bidang pengkhususan dalam kualiti dan keselamatan makanan. Beliau aktif mewakili Jabatan Perikanan dalam pelaksanaan aktiviti-aktiviti di bawah Pelan Tindakan Kebangsaan dalam Menangani Kerintangan Antibiotik. Dr. Wan Norhana mendapat Ijazah Sarjana Muda daripada Universiti Malaya, Sarjana Sains dari Universiti Sains Malaysia dan PhD dari University of Queensland, Australia.

Penggunaan antibiotik berhemah dalam akuakultur

Akuakultur telah dikenalpasti sebagai sektor pengeluar makanan yang paling pesat berkembang di dunia. Pada tahun 2018, akuakultur menyumbang kira-kira 46% daripada pengeluaran ikan dunia. Dengan permintaan untuk ikan yang sentiasa meningkat, sektor akuakultur kini dipacu untuk menggandakan pengeluaran melalui operasi yang berteraskan biosekuriti sepenuhnya serta penggunaan antibiotik terutamanya dalam ternakan ikan bernilai tinggi. Penggunaan antibiotik yang tidak wajar mampu mencetus fenomena kerintangan dalam bakteria dan mudah disebarkan daripada ikan ke alam sekitar dan akhirnya kepada manusia. Memandangkan kebanyakan antibiotik yang digunakan dalam akuakultur adalah sama dengan antibiotik yang digunakan untuk manusia, hal ini dapat menjejaskan rawatan pada manusia. Objektif kertas kerja ini adalah untuk berkongsi maklumat mengenai jenis-jenis antibiotik yang digunakan dalam akuakultur, isu kerintangan antibiotik sejagat serta penggunaan antibiotik secara berhemah dan bertanggungjawab bagi meningkatkan kesihatan, kebajikan ikan di samping mencegah atau mengurangkan pemilihan, kemunculan dan penyebaran bakteria rintang antibiotik. Antara penekanan lain yang hendak disampaikan adalah penggunaan antibiotik secara berhemah dengan tujuan mengoptimumkan kedua-dua keberkesanan dan keselamatannya; pematuhan kepada garis panduan dan dasar kebangsaan, mencegah pemindahan bakteria rintang dalam populasi ikan, alam sekitar dan menjamin kesihatan pengguna dengan memastikan ikan bebas daripada sisa antibiotik.

FARMERS DAY SPEAKER

Dr. Loc Huu Tran

ShrimpVet Laboratory,
Minh Phu Aquamekong,
Vietnam

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Biography

Dr. Loc Huu Tran obtained his Bachelor of Science (B.S) in the field of Aquaculture from Nong lam University, Vietnem in 2006. He subsequently completed his PhD project entitled "Determination, characterization, and control measures of the agent of the early mortality syndrome (EMS) or the acute hepatopancreatic necrosis syndrome (AHPNS) in farmed penaeid shrimp" in 2013 from Environmental Sciences and Microbiology (centered on Shrimp pathology), University of Arizona, USA. He is currently employed as an Assistant Professor at the Faculty of Fisheries, Nong Lam University at Ho Chi Minh City, Vietnam. He is also acted as a Founder and Director of Minh Phu Aquamekong ShrimpVet Laboratory. Dr. Loc Huu Tran has been conducting research which focused on shrimp diseases, particularly on EMS/AHPNS affecting penaied shrimp. Up to date, most of his publication were published in high impact journal focusing on detection of shrimp disease and control method for better management of shrimp aquaculture production.

Practical measures in disease management in shrimp farming

The expasion of the shrimp farming as well as the intensification have encountered major challenges from emerging diseases. Those emerging diseases include: EMS/AHPND, EHP, White Feces Disease, Muscle Necrosis caused by Vibrio harveyi (in some areas it might be referred as Running Mortality Syndrome). There sre still many controversies with regards to causation of some emerging diseases such as White Feces Disease and Running Mortality Syndrome. The ShrimpVet laboratory in Vietnam has been putting efforts in identification and demonstration of pathogens causing those diseases. The pathogens of those mentioned diseases have been identified. Nonetheless, the Lab has also trying to implement pratical measures in disease management at different levels including hatcheries, nurseries and shrimp farms. These includes: better hatchery, nursery, and grow out protocols. With regards to hatchery protocols, several improved practices have been applied including: PCR screening for all material (brood stock, live feed, Nauplii, and post larvae before harvest), better sanitation, better bio-remediation with focus on Vibrio reduction. The same sanitation, probiotics, and bio-remediation approaches have been applied in nursery and grow out practices. Several trials using “functional diets” with feed additives added in feed ingredients before extrusion showed positive result in both disease prevention and growth performance. An overall antibiotic-free farming protocol is achievable.

FARMERS DAY SPEAKER

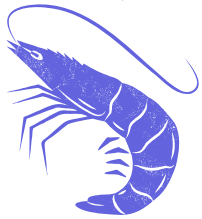
Prof. Dr. Ha Thanh Dong

Aquaculture and Aquatic Resources Management (AARM) program, School of Environment Resources and Development (SERD), Asian Institute of Technology, Pathum Thani, Thailand

htdong@ait.ac.th

Biography

Dr. Dong has been actively conducting basic and applied research in the area of aquatic animal health since 2007. He has studied a number of infectious and emerging infectious diseases in Asian aquaculture, focusing on diagnostics, host-pathogen interaction, fish immunology and vaccines. He is also interested in "alternatives to antibiotics" and nanobubble technology. Dong has authored over 80 peer-reviewed articles for international journals in this field and has served on editorial advisory boards, as a guest editor, and as a referee for international journals in this field. Dong served as an expert resource and consultant on projects led by the Food and Agriculture Organization (FAO) of the United Nations and the WorldFish center. He is currently a faculty member at the School of Environment, Resources and Development, Asian Institute of Technology.



Update on control strategies for tilapia lake virus

Tilapia lake virus (TiLV), officially called Tilapia tilapinevirus, is a major viral pathogen of farmed tilapia worldwide. The virus primarily affects tilapia fingerlings and juveniles and causes 20-90% mortality in natural disease outbreaks. Outbreaks of TiLV reportedly cause considerable economic loss for farmers. Upon the discovery of disease and causative virus in 2013-2014, significant knowledge gaps have been filled in recent years. However, no "magic bullet" is currently available to control TiLV as well as viral diseases in aquaculture. Understanding the nature of the pathogen inside and outside the host, disease transmission pathways would provide insights on disease control. Integration of different approaches, including biosecurity measures, vaccination, and selective breeding, would be useful for mitigation of TiLV. This presentation updates current knowledge of the pathogen and the disease it causes, focusing on practical biosecurity measures, autogenous vaccine development for tilapia juveniles and broodstock, and discussion of workable strategies for tilapia farmers.

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