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Date: 17 February 2022

Dr. Aimimuliani Adam
Kulliyyah of Science,
IIUM

Dear Dr.,

LETTER OF ACCEPTANCE - [VIRTUAL] INTERNATIONAL CONFERENCE ON MARINE SCIENCE & AQUACULTURE (vICOMSA), 8 – 10 MARCH 2022

We are pleased to inform you that the abstract of your paper entitled **"Abundance and size composition of billfish by-catch in Pahang coastal waters, Malaysia."** has been accepted for **POSTER** presentation at the vICOMSA 2022 with the theme **'The Ocean We Want Towards Sustainable Development**.

Please complete the conference payment form https://forms.gle/s3UNLYr9x8mtGUyQ8 and fees accordingly on or before **20 February 2022.**

Fees: RM 200

Rate: Non-Student (Malaysia)

Registration Number: vICOMSA2021_P_34

Fees are payable via FPX, credit card, cheque, cash deposit, internet banking, and telegraphic to:

For payment via FPX and Credit card, please visit this website:
https://jurcon.ums.edu.my/ocums/index.php/ICOMSA/ICOMSA22

Bendahari Universiti Malaysia Sabah, Jabatan Bendahari, Universiti Malaysia Sabah, Aras 3, Blok Selatan, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia.

Account No: 510013024241 (Universiti Malaysia Sabah)
Bank Name & Address : Maybank, Jalan Pantai, Kota Kinabalu, Sabah, Malaysia
Swift Code : MBBEMYKLXXX

Presenter is required to submit one (1) poster in **PDF Format**, **1 Page**; **Portrait Orientation**; and the file size is **not more than 10 MB**. Please use your name as the filename.

Please submit the file to vICOMSA 2020 committee (icomsa@ums.edu.my) before or no later than **28 February 2022**.

Kindly visit our conference website (https://vicomsa2022.wixsite.com/icomsa) and Facebook page **International Conference on Marine Science & Aquaculture** for more information and latest updates.

We look forward to your participation in vICOMSA 2022. Please do not hesitate to contact the Secretariat through e-mail: icomsa@ums.edu.my if you require additional information about the conference.

Thank you.

Yours sincerely,

ASSOC. PROF. DR. JUANITA JOSEPH
Chairman
International Conference on Marine Science and Aquaculture (vICOMSA 2022) Borneo Marine Research Institute

c.c - vICOMSA 2022 Secretariat

PROGRAM BOOK

UMS
UNIVERSITI MALAYSIA SABAH

vICOMSA 2022

08 - 10 MARCH 2022

[Virtual]
International Conference on Marine Science & Aquaculture

"The Ocean We Want Towards Sustainable Development"

Co-organizers

UPM Universiti Putra Malaysia Berilmu Berbakti
UNIMAS Universiti Malaysia Sarawak
IOI International Ocean Institute
Institut Teknologi Bandung 1920
Graduate School of Integrated Sciences for Life Hiroshima University
MSMS Malaysian Society of Marine Sciences Persatuan Sains Lautan Malaysia
KINDAI UNIVERSITY
汕頭大學 SHANTOU UNIVERSITY
國立臺灣海洋大學 National Taiwan Ocean University
MABIK National Marine Biodiversity Institute of Korea

CONFERENCE PROGRAMME AT A GLANCE

<table>
<tr><th colspan="4">DAY 1: 8 MAC 2022 (TUESDAY)</th></tr>
<tr><td>0830-0900</td><td colspan="3">Entrance of the Participant</td></tr>
<tr><td>0900-0930</td><td colspan="3">OPENING CEREMONY</td></tr>
<tr><td>0930-1015</td><td colspan="3">KEYNOTE 1: Research Progress on Sex Determination and Differentiation of The Mud Crab (Scylla paramamosain)

Speaker: Prof. Dr. Hongyu Ma (Shantou University)</td></tr>
<tr><td rowspan="3">1015-1230</td><td colspan="3">Session Break (Preparation)</td></tr>
<tr><td>Oral Session 1</td><td>Oral Session 2</td><td>Oral Session 3</td></tr>
<tr><td>Marine Biodiversity and Conservation</td><td>Nutrition and Feed Technology</td><td>Marine Pollution and Ocean Health</td></tr>
<tr><td>1230-1330</td><td colspan="3">LUNCH BREAK</td></tr>
<tr><td rowspan="2">1330-1430</td><td colspan="3">(Announcement/Others)</td></tr>
<tr><td colspan="2">PLENARY 1: Marine Microorganisms and Their Bioremediation Potential

Speaker: Dr. Pooja Shivanand (Universiti Brunei Darussalam)</td><td>PLENARY 2: Seagrass Monitoring and Transplanting for Assisted Recovery

Speaker: Prof. Dr. Muta Harah Zakaria (Universiti Putra Malaysia)</td></tr>
<tr><td rowspan="3">1430-1625</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Oral Session 4</td><td>Oral Session 5</td><td>Oral Session 6</td></tr>
<tr><td>MSMS Special Session</td><td>PBAF Special Session</td><td>IOI Special Session</td></tr>
<tr><td rowspan="3">1625-1730</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Poster Session 1</td><td>Poster Session 2</td><td>Poster Session 3</td></tr>
<tr><td>Marine Biodiversity and Conservation</td><td>Nutrition and Feed Technology & Seafood Safety and Security</td><td>Marine Biodiversity and Conservation, Marine Pollution and Ocean Health, Climate Change: Mitigation and Adaptation, Remote Sensing and Coastal Oceanography</td></tr>
<tr><td colspan="4">FINAL ANNOUNCEMENT AND END OF DAY 1</td></tr>
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<tr><td>0830-0915</td><td colspan="3">KEYNOTE 2: How to Manage Coastal and Marine Resources After Pandemic

Speaker: Dr. Yudi Nurul Ihsan (Universitas Padjadjaran)</td></tr>
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<tr><td>Oral Session 7</td><td>Oral Session 8</td><td>Oral Session 9</td></tr>
<tr><td>Marine Biodiversity and Conservation</td><td>Aquaculture & Fisheries</td><td>Climate Change: Mitigation and Adaptation, Citizen Science, Awareness and Education, Blue Economy of Coastal Community</td></tr>
<tr><td rowspan="3">1110-1240</td><td colspan="3">Session Break (Announcement/10 Min break)</td></tr>
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<tr><td>Marine Biodiversity and Conservation</td><td>Aquaculture & Fisheries</td><td>Aquaculture & Fisheries</td></tr>
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Speaker: Dr. Aazani Mujahid (Universiti Malaysia Sarawak)</td></tr>
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<tr><td>Oral Session 13</td><td>Oral Session 14</td><td>Oral Session 15</td></tr>
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<tr><td>Poster Session 4</td><td>Poster Session 5</td><td>Poster Session 6</td></tr>
<tr><td>Marine Biodiversity and Conservation</td><td>Aquaculture Diseases and Health Management</td><td>Aquaculture & Fisheries</td></tr>
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<tr><td>0815-0830</td><td colspan="3">(Preparation/Announcement/Others)</td></tr>
<tr><td>0830-0915</td><td colspan="3">KEYNOTE 3: Global Spread of Aquatic Parasites Via Aquaculture, Aquarium and Game Fishing

Speaker: Prof. Dr. Susumu Ohtsuka (Hiroshima University)</td></tr>
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<tr><td>Oral Session 16</td><td>Oral Session 17</td><td>Oral Session 18</td></tr>
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<tr><td>Oral Session 19</td><td>Oral Session 20</td><td>Oral Session 21</td></tr>
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<tr><td>Oral Session 22</td><td>Oral Session 23</td><td>Oral Session 24</td></tr>
<tr><td>Remote Sensing and Coastal Oceanography</td><td>Aquaculture Diseases and Health Management</td><td>Aquaculture & Fisheries, Seafood Safety and Security</td></tr>
<tr><td>1625-1700</td><td colspan="3">AWARD AND CLOSING CEREMONY</td></tr>
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vICOMSA 2022 SCIENTIFIC SESSION

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1015-1230	**Oral Session 1** Chairperson: **Dr. John Madin** OMBC-1 OMBC-2 OMBC-3 OMBC-4 OMBC-5 OMBC-6	**Oral Session 2** Chairperson: **Prof. Dr. Rossita Shapawi** ONFT-1 ONFT-2 ONFT-3 ONFT-4 ONFT-5 ONFT-6	**Oral Session 3** Chairperson: **Assoc. Prof. Dr. Abentin Estim** OMPOH-1 OMPOH-2 OMPOH-3 OMPOH-4 OMPOH-5 OMPOH-6
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1430-1625	**Oral Session 4** Chairperson: **Dr. Aazani Mujahid** MSMS-1 MSMS-2 MSMS-3 MSMS-4 MSMS-5	**Oral Session 5** Chairperson: **Dr. Mohammad Tamrin bin Mohamad Lal** PBAF-1 PBAF-2 PBAF-3 PBAF-4 PBAF-5	**Oral Session 6** Chairperson: **Ms. Antonella Vassallo** IOI-1 IOI-2 IOI-3 IOI-4 IOI-5
1625-1730	**Poster Session 1** Chairperson: **Dr. John Madin** PMBC-1 PMBC-2 PMBC-3 PMBC-4 PMBC-5 PMBC-6 PMBC-7 PMBC-8 PMBC-9 PMBC-10	**Poster Session 2** Chairperson: **Dr. Audrey Daning Tuzan** PNFT-1 PNFT-2 PNFT-3 PNFT-4 PNFT-5 PNFT-6 PSSS-1 PSSS-2 PSSS-3	**Poster Session 3** Chairperson: **Dr. Zarinah Waheed** PCCMA-1 PMPOH-1 PMPOH-2 PMPOH-3 PRSCO-1 PRSCO-2 PRSCO-3 PRSCO-4 PRSCO-5
FINAL ANNOUNCEMENT AND END OF DAY 1			

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	Chairperson: **Dr. Zarinah Waheed** OMBC-7 OMBC-8 OMBC-9 OMBC-10 OMBC-11	Chairperson: **Dr. Nazia Abdul Kadar** OAF-1 OAF-2 OAF-3 OAF-4 OAF-5	Chairperson: **Assoc. Prof. Dr. Teruaki Yoshida** OBECC-1 OCSAE-1 OCCMA-1 OCCMA-2 OCCMA-3
1110-1240	**Oral Session 10**	**Oral Session 11**	**Oral Session 12**
	Chairperson: **Mr. Muhammad Ali Syed Hussein** OMBC-12 OMBC-13 OMBC-14 OMBC-15	Chairperson: **Dr. Fikri Akmal Khodzori** OAF-6 OAF-7 OAF-8 OAF-9	Chairperson: **Dr. Norfazreena Mohd Faudzi** OAF-10 OAF-11 OAF-12 OAF-13
1240-1330	**LUNCH BREAK**		
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	Chairperson: **Dr. Pushpa M. Palaniappan** OMBC-16 OMBC-17 OMBC-18 OMBC-19 OMBC-20	Chairperson: **Dr. Lim Leong Seng** CTC-1 CTC-2 CTC-3 CTC-4 CTC-5	Chairperson: **Assoc. Prof. Dr. Annita Yong Seok Kian** OAF-14 OAF-15 OAF-16 OAF-17 OAF-18
1625-1730	**Poster Session 4**	**Poster Session 5**	**Poster Session 6**
	Chairperson: **Mr. Muhammad Ali Syed Hussein** PMBC-11 PMBC-12 PMBC-13 PMBC-14 PMBC-15 PMBC-16 PMBC-17 PMBC-18 PMBC-19 PMBC-20	Chairperson: **Dr. Muhammad Dawood Shah** PADHM-1 PADHM-2 PADHM-3 PADHM-4 PADHM-5 PADHM-6 PADHM-7	Chairperson: **Dr. Chong Wei Sheng** PAF-1 PAF-2 PAF-3 PAF-4 PAF-5 PAF-6 PAF-7 PAF-8 PAF-9 PAF-10 PAF-11
FINAL ANNOUNCEMENT AND END OF DAY 2			

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1110-1240	**Oral Session 19** Chairperson: **Dr. Chong Wei Sheng** OMPOH-12 OMPOH-13 OMPOH-14 OMPOH-15	**Oral Session 20** Chairperson: **Dr. Muhammad Dawood Shah** OADHM-6 OADHM-7 OADHM-8 OADHM-9	**Oral Session 21** Chairperson: **Dr. Nur Fatihah Binti Abdul Halid** OAF-24 OAF-25 OAF-26 OAF-27
1240-1330	**LUNCH BREAK**		
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1430-1625	**Oral Session 22** Chairperson: **Dr. Madihah Jafar Sidik** ORSCO-1 ORSCO-2 ORSCO-3 ORSCO-4 ORSCO-5	**Oral Session 23** Chairperson: **Assoc. Prof. Dr. Balu Alagar Venmathi Maran** OADHM-10 OADHM-11 OADHM-12 OADHM-13 OADHM-14	**Oral Session 24** Chairperson: **Wahidatul Husna Zuldin** OAF-28 OSSS-1 OSSS-2 OSSS-3 OSSS-4
1625-1700	**AWARD AND CLOSING CEREMONY**		

vICOMSA 2022

PROGRAMME

ORAL PRESENTATION
(SESSION 1-6)

08TH MARCH 2022

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 1: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
1030-1045	OMBC-1	Hoang Dinh Chieu	The Remarkable Results of Marine Biodiversity and Conservation in Vietnam from 2010 – 2020
1045-1100	OMBC-2	Jinwook Back	Introduction Of Taxonomic Research Trends in Korea: Focus on Harpacticoids
1100-1115	OMBC-3	Saleem Mustafa	Marine Biodiversity And Climate Change – Perils Of Managing In Silos, And Imperatives For Blending Multidimensional Approaches For 'The Ocean We Want ' By 2030
1115-1130	OMBC-4	Syazana Jeffry	A Small Mangrove Island of Port Dickson, Negeri Sembilan
1130-1145	OMBC-5	Mohd Fikri Akmal Mohd Khodzori	Coral Community Structure in Tioman Island Marine Park, Malaysia
1145-1200	OMBC-6	B Mabel Manjaji Matsumoto	Whale Sharks in Malaysia: What We Know
1200-1230	DISCUSSION (Question and Answer)		

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 2: NUTRITION AND FEED TECHNOLOGY			
Time	**Code**	**Presenter**	**Title**
1030-1045	ONFT-1	Christian Larbi Ayisi	Effects Of Dietary Probiotic Supplementation (*Bacillus subtilis* 200 And *Saccharomyces cerevisiae*) on Growth, Feed Utilization and Proximate Composition of African Bony Tongue (*Heterotis niloticus*)
1045-1100	ONFT-2	Muhammad Abduh Bin Yazed	Effects Of Dietary Lipid Levels on Gonad Development and Maturation of Female Malaysian Mahseer (*Tor tambroides)* in Captive Condition
1100-1115	ONFT-3	Ahmad Shahroom	The Effects of Egg-And Sea-Shells Powder as Natural Calcium Supplements in The Diets on Growth Performance, Molting Frequency, Survival Rate, and Body Composition of Juvenile Crayfish, *Cherax quadricarinatus*
1115-1130	ONFT-4	Hasniyati Binti Muin	Supplementation of Red Seaweed (*Gracilaria changii*) in Black Soldier Fly Larvae Based Feed Improved Growth and Feed Efficiency of Red Hybrid Tilapia
1130-1145	ONFT-5	Muhammad Shukri Bin Mohd Yusof	Potential of Fly Larva and Anchovy Process Waste Powder as Protein Source in Tilapia Fish Pellet.
1145-1200	ONFT-6	Dayang Nur Jazlyn Binti Abang Zamhari	Dietary Butyric Acid Supplementation in High Plant Protein Diets on Giant Grouper (*Epinephelus lanceolatus*) Juveniles
1200-1230	DISCUSSION (Question and Answer)		

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 3: MARINE POLLUTION AND OCEAN HEALTH			
Time	**Code**	**Presenter**	**Title**
1030-1045	OMPOH-1	Adiana Ghazali	The Geochemistry Exploration of Metals in Brunei Bay
1045-1100	OMPOH-2	Shellyn Prastisia Mberato	Study of Water Quality Level Using Diversity and Saprobic Indexes of Phytoplankton in Manado Bay, North Sulawesi
1100-1115	OMPOH-3	Jeszy Novianti Andakke	Characteristics of Macro and Meso Debris Along the Cost of Manado Bay, North Sulawesi, Indonesia
1115-1130	OMPOH-4	Dede Falahudin	Persistent Organic Pollutants in Mangrove Sediments From Bintan Island, Indonesia: Characteristics, Potential Sources, And Ecological Risk Assessment
1130-1145	OMPOH-5	Ong Meng Chuan	Heavy Metals Level in Oyster (*Crassostrea* spp.) of the South China Sea Region
1145-1200	OMPOH-6	Lavannia Ravikumar	Determination of Heavy Metals Concentration in Green-Lipped Mussels, *Perna viridis* (Linnaeus), From Straits of Johor
1200-1230	DISCUSSION (Question and Answer)		

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 4: SPECIAL SESSION – BEACONS OF HOPE: SECURING OUR MARINE ECOSYSTEMS FOR A BRIGHTER FUTURE			
Time	**Code**	**Presenter**	**Title**
1445-1500	MSMS-1	Zarinah Waheed	Coral Reefs of Malaysia: Status and Trends
1500-1515	MSMS-2	Muhammad Ali Syed Hussein	Mangrove Forest Utilisation in Sabah
1515-1530	MSMS-3	Jillian Ooi	Splendor in the Seagrasslands of Mersing
1530-1545	MSMS-4	Irwan Isnain	Sipadan Island, Malaysia: An Important Sea Turtle Nesting and Foraging Grounds in The Celebes Sea
1545-1600	MSMS-5	Affendi Yang Amri	Knowing Malaysia's Important Marine Areas
1600-1625	DISCUSSION (Question and Answer)		

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 5: SPECIAL SESSION – PHYSIOLOGY AND BEHAVIOUR IN AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1445-1500	PBAF-1	Lim Leong Seng	Sugars Are Potential Chemoattractant to Mud Crab, *Scylla tranquebarica* as Determined Behaviourally
1500-1515	PBAF-2	Karsoon Tan	Impacts of Severe Winter on Bivalve Aquaculture
1515-1530	PBAF-3	Tan Kian Ann	The Sex Reversal of Male *Macrobrachium rosenbergii* via siRNA Knockdown
1530-1545	PBAF-4	Liew Hon Jung	Climate Warming Induces Air-Breathing Fish Remodel Their Physiological Response and Social Courtship Differently
1545-1600	PBAF-5	ZhenHua Ma	Acute Acidification Stress Weakens The Head Kidney Immune Function of Juvenile *Lates calcarifer*
1600-1625	DISCUSSION (Question and Answer)		

DAY 1 (8TH MARCH 2022)			
ORAL SESSION 6: SPECIAL SESSION – CHALLENGES OF SUSTAINABLE BLUE ECONOMY IN MARINE TRADE, SCIENCE AND AQUACULTURE			
Time	**Code**	**Presenter**	**Title**
1500-1505	Welcome and Introduction Awni Behnam, Honorary President, International Ocean Institute; Malta		
1505-1516	IOI-1	Alan Deidun	The Extraction of Bams (Biologically Active Molecules) From Aquaculture and Fishing Discards
1516-1527	IOI-2	Sirikan Prasertying	Perspective on Blue Economy Development Framework: Approaching Sustainable Economic Growth in Southeast Asia.
1527-1538	IOI-3	Elif Ozgur	The EU Project Results of the "*Climate Change Adaptation for the Sea and Coasts of Antalya*" with Special Emphasis on the Ocean Literacy for the Development of Blue Economy
1538-1549	IOI-4	Lamiaa Mohamedien	Impact of Marine pollution on Fisheries and Aquaculture, Another Challenge to Achieving a Sustainable Blue Economy
1549-1600	IOI-5	Cherdsak Virapat	Current Challenges of Sustainable Blue Economy in Aquaculture
1600-1610	DISCUSSION (Question and Answer)		

vICOMSA 2022

PROGRAMME

ORAL PRESENTATION
(SESSION 7-15)

09TH MARCH 2022

DAY 2 (9TH MARCH 2022)			
SESSION 7: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
0930-0945	OMBC-7	Roswati Md Amin	Bioluminescent Plankton, *Noctiluca scintillans* in Perak Coastal Water
0945-1000	OMBC-8	Sujjat Al Azad	Distribution Pattern of Dissolved Inorganic Nutrients and Phytoplankton Diversity in River Estuary, Kota Kinabalu, Sabah, Malaysia
1000-1015	OMBC-9	Yuki Hayami	Characterization of Microbial Community Associated With Marine Sponges in Karah Island, Peninsular Malaysia
1015-1030	OMBC-10	Nur Airie Bin Zainudin	Preliminary Observation on The Diatom Diversity Associated With The Decomposition of Partially Submerged Buried Cadaver
1030-1045	OMBC-11	Nurul Nur Farahin Binti Syed	Seagrass Vegetative Morphological Variability Related to Habitat Type and Water Depth
1045-1110	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 8: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
0930-0945	OAF-1	Muhamad Naimullah	Unbaited Light-Emitting Diode Traps Performance for Catching Orange Mud Crabs
0945-1000	OAF-2	Kenneth Francis Rodrigues	Genetic Diversity of *Tor douronensis* Populations in Sabah: Implications for Aquaculture And Conservation
1000-1015	OAF-3	Teoh Chui Fen	Effects of Crystalline Amino Acids on Antennular Grooming Behavior in Slipper Lobster *Thenus orientalis*
1015-1030	OAF-4	Jia Ju Lee	Effects of Temperatures, Salinities and Diets on The Asexual Reproduction of Moon Jellyfish *Aurelia Aurita*
1030-1045	OAF-5	Nur Syafiqah Binti Mohamad Zul	Isolation and Characterization of Ten Microsatellite Markers in The Tri-Spine Horseshoe Crab (*Tachypleus Tridentatus*)
1045-1110	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 9: CLIMATE CHANGE: MITIGATION AND ADAPTATION; CITIZEN SCIENCE, AWARENESS AND EDUCATION; BLUE ECONOMY OF COASTAL COMMUNITY			
Time	**Code**	**Presenter**	**Title**
0930-0945	OBECC-1	Covaci Brindusa	Mountain Lakes, as Support for Blue Economy and Agritourism. Evidence From the European Area
0945-1000	OCSAE-1	Sanen Marshall	Mengarang: The Bajau Laut Approach to Livelihood
1000-1015	OCCMA-1	Po-Yuan Hsiao	Impacts of Climate Change-Induced Environmental Fluctuations on The Structure of Summer Marine Ecosystems Around The Southwest Water of Taiwan
1015-1030	OCCMA-2	Nor Shairah Azura Binti Nazrrol	The Exploitation of Remote Sensing Data for Potential Fishing Zone in East Coast of Peninsular Malaysia During Southwest Monsoon
1030-1045	OCCMA-3	Fazliana binti Mustajap	Bathymetry Derivative Study of Coral Area (Karang Sela), Bidong Island, Terengganu From Sonar Technology
1045-1110	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 10: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
1120-1135	OMBC-12	Juanita Joseph	Identification Of Foraging Grounds for Marine Turtles in Malaysia
1135-1150	OMBC-13	Jeethvendra Kirishnamoorthie	Photo Identification and Laser Photogrammetry to Determine Population Demographics Of Green Turtles (*Chelonia mydas*) in Eastern Sabah
1150-1205	OMBC-14	Tuan Emilia binti Tuan Mohd Noor	Metabolic Heating Event During Incubation Phase and Nest Escaping of Green Sea Turtle Hatchlings
1205-1220	OMBC-15	Mohammad Azuwan Bin Hassan	Density Of Saltwater Crocodile (*Crocodylus porosus*) Wild Population in Samarahan River Basin, Sarawak
1200-1230	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 11: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1120-1135	OAF-6	Raymie Bin Nurhasan	The Status of Selected Reef Fishes (Carangidae, Lutjanidae, Serranidae) Stocks in Tun Mustapha Park Analysed Using Swept Area Method
1135-1150	OAF-7	Effarina Bt Mohd Faizal Abdullah	Biological Characteristics of Kawakawa (*Euthynnus affinis*) in Perak Waters
1150-1205	OAF-8	Nur Hidayah Asgnari	Length - Weight Relationship and Condition Factor of a Dominant Species of Anchovies, *Encrasicholina heteroloba* in West Coast of Peninsular Malaysia
1205-1220	OAF-9	Muhammad Ikhlas Zabidi	Long-Term Patterns of Fish Landing in Response with ENSO Phenomena in Kota Kinabalu, Sabah, Malaysia
1200-1230	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 12: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1120-1135	OAF-10	Wei Qing Chloe Lung	Delayed Signs of UV-C Damage to *Chlorella* sp. Observed Through Fluorescent Staining
1135-1150	OAF-11	Wan Nurizzati Binti W Idris	Development of Sperm Cryopreservation Protocol for *Pangasius nasutus*
1150-1205	OAF-12	Nazirah Binti Mingu	Comparative Study of Drying Methods on Selected Seaweeds (*Kappaphycus* sp. and *Padina* sp.) Based on Their Phytochemical and Carrageenan Located in Sabah
1205-1220	OAF-13	Donald Torsabo	Effects of Smoking and Sun Drying on The Carcass Quality of *Oreochromis niloticus* (LINNAEUS, 1758)
1200-1230	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 13: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
1445-1500	OMBC-16	Moongeun, Yoon	Genetic diversity of *Sesarmops intermedius* (Crustacea, Brachyura, Sesarmidae) in Korea inferred From Molecular Sequence Variation
1500-1515	OMBC-17	Aiman Amanina binti Amran	Nereididae (Annelida: Phyllodocida) of Intertidal of Buntal Beach.
1515-1530	OMBC-18	Md Yeakub Ali	Identification Keys of Marine Larval Fish of Straits of Malacca
1530-1545	OMBC-19	Hana Kim	Application of eDNA Metabarcoding for Identification of Polychaetes Species in Marine Benthic Community
1545-1600	OMBC-20	Dexter Miller Robben	Construction Of a Recombinant Plasmid pCAMBIA1303 Containing The SARS-COV-2 Nucleocapsid (N) Gene for The Transformation of *Chlorella* and Spirulina
1600-1625	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 14: SPECIAL SESSION – CORE-TO-CORE PROGRAM: BUILDING UP RESEARCH NETWORK FOR SUCCESSFUL SEED PRODUCTION TECHNOLOGY LEADING SOUTH-EAST ASIAN REGION			
Time	**Code**	**Presenter**	**Title**
1445-1450	CTC-1	Motohiko Sano	Japan Society for the Promotion of Science (JSPS) Core-to-Core Program: Building Up Research Network for Successful Seed Production Technology Leading South-East Asian Region
1450-1505	CTC-2	Mohammad Tamrin Bin Mohamad Lal	First Report of Plant Fungal Pathogen Zasmidium Musae Associated With Moribund Eggs of Ornate Spiny Lobster (*Panulirus Ornatus*) in Sabah
1505-1520	CTC-3	Thao Duc Mai	Cultivation and Biochemical Composition of The Diatom *Chaetoceros muelleri* as a Live-Feed Stock for Shrimp Larval Culture in Vietnam
1520-1535	CTC-4	Leobert D. de la Peña	"OPLAN BALIK SUGPO" (Operation Plan for Black Tiger Prawn Revival) in The Philippines: Shrimp Health and Biosecurity Management in Hatchery and Grow-Out Operations
1535-1550	CTC-5	Desrina	Health assessment of Wild and Farmed Blood Cockles *Tegilarca granosa* in the North Coast of Central Java
1550-1625	DISCUSSION (Question and Answer)		

DAY 2 (9TH MARCH 2022)			
SESSION 15: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1445-1500	OAF-14	Yucheng Lu	ATP Synthase Subunit E is a Shrimp Growth-Associated Breeding Marker
1500-1515	OAF-15	Asra Nor Izaty Binti Aswadi	Banana Leaf *Musa acuminata* x *balbisiana* Extract Improved Siamese Fighting Fish *Betta splendens* Hatching Rate
1515-1530	OAF-16	Amirah Syafiqah Binti Mohd Zamri	Molecular Cloning and Characterization of Gonadotorpin-Releasing Hormone (GnRH) Gene in *Pangasius nasutus*
1530-1545	OAF-17	Amin Safwan Bin Adnan	Histological and Biochemical Changes in The Orange Mud Crab (*Scylla olivacea*) at Different Ovarian Maturation Stages
1545-1600	OAF-18	Noordiyana Mat Noordin	Development of Broodstock Maturation Diets for Female Orange Mud Crab, *Scylla olivacea* (HERBST, 1796)
1600-1625	DISCUSSION (Question and Answer)		

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PROGRAMME

ORAL PRESENTATION
(SESSION 16-24)

10TH MARCH 2022

DAY 3 (10TH MARCH 2022)			
SESSION 16: MARINE POLLUTION AND OCEAN HEALTH			
Time	**Code**	**Presenter**	**Title**
0930-0945	OMPOH-7	Yusuke Kondo	Seasonal Occurrence of Ctenophores and Their Parasites in The Seto Inland Sea, Japan
0945-1000	OMPOH-8	Sarini Binti Ahmad Wakid	Preliminary Studies on The Expression of Glutathione S-Transferase in Geloina Expansa.
1000-1015	OMPOH-9	Mariche Bandibas Natividad	Toxin-producing phytoplankton in Las Pinas-Paranaque Wetland Park and its surrounding waters (LPPWP)
1015-1030	OMPOH-10	Soo Chen Lin	Phycoremediation of Aquaculture Wastewater Using Alginate-Immbolized Microalgae
1030-1045	OMPOH-11	Fazsa Islamiati Machmud	Utilization of Diatom Silica Modified by Phenylacetic Acid For Polycyclic Aromatic Hydrocarbon (Pahs) Pollutants Adsorption
1045-1110	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 17: AQUACULTURE DISEASES AND HEALTH MANAGEMENT			
Time	**Code**	**Presenter**	**Title**
0930-0945	OADHM-1	Nguyen Tan Phat	TLR23, a Fish-Specific TLR, Recruits MyD88 and TRIF to Activate Expression of a Range of Effectors in Melanomacrophages in Nile Tilapia (*Oreochromis niloticus*)
0945-1000	OADHM-2	Lau Lik Ming	An Evaluation of Fixation Methods: Application of Anti-Cd4 Antibodies Against Ginbuna Crucian Carp *Carassius auratus Langsdorfii*
1000-1015	OADHM-3	Fatin Khairah Haron	*In Vitro* Antiparasitic Efficacy of *Sargassum polycystum* and *Kappaphycus striatum* v*ar*. Green Flower Seaweed Extracts Against Marine Parasitic Leech *Zeylanicobdella arugamensis* With LC-QTOF Analysis
1015-1030	OADHM-4	Rosidah	Potential of Aloe Vera for Treatment of Infection With *Aeromonas hydrophila* Bacteria on Koi Fry
1030-1045	OADHM-5	Fajar Nurul Arifah	Antibacterial Activity Red Algae (*Gracilaria* Sp.) Extract to Against Pathogenic Bacteria in Aquaculture
1045-1110	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 18: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
0930-0945	OAF-19	Sen Chan	Assessments of Color-Associated Traits in *Pseudodiaptomus annandalei* (Calanoida, Copepoda)
0945-1000	OAF-20	Nor Syahira Idayu binti Ismail	Feeding Dependency on Food Colour in Seahorse, *Hippocampus barbouri*
1000-1015	OAF-21	Hazeeqah Filzah Binti Kassim	Culturing of a Free-Living Marine Nematodes in a Laboratory Scale
1015-1030	OAF-22	Dian Yuni Pratiwi	Immunostimulant Activity of Macroalgae on Immune System of *Litopenaeus vannamei*
1030-1045	OAF-23	Danial Iman Haris B Nor Azman	Growth Performance of Post Larvae White Shrimp (*Litopenaeus vannamei*) Fed with Micro Feed Incorporated with Probiotic
1045-1110	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 19: MARINE POLLUTION AND OCEAN HEALTH			
Time	**Code**	**Presenter**	**Title**
1120-1135	OMPOH-12	Wan Siti Mardhiah Binti W Johari	Microplastics in Rocky Oyster (*Saccostrea cucullata*) Along Shoreline of Pahang, Malaysia
1135-1150	OMPOH-13	Tang Chung Ngo	Bioavailability of Microplastics and Ingestion Incidence in Zooplankton in Sabah Coastal Waters
1150-1205	OMPOH-14	Nurzafirah Mazlan	Evaluation of Microplastics Isolated From Sea Cucumber *Acaudina molpadioides* in Pulau Langkawi, Malaysia
1205-1220	OMPOH-15	Alfinna Yebelanti	Patterns, Types, And Distributions of Macroplastic Debris Based on Oceanographic Conditions and Community Perspectives: Case Studies in Muara Gembong Downstream of Citarum
1200-1230	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 20: AQUACULTURE DISEASES AND HEALTH MANAGEMENT			
Time	**Code**	**Presenter**	**Title**
1120-1135	OADHM-6	Yusuke Nishida	Parasitism of The Non-Indigenous Sea Louse *Caligus sclerotinosus* Among Wild and Farmed Red Sea Bream *Pagrus major* in The Seto Inland Sea, Japan
1135-1150	OADHM-7	Nanami Yumura	What Could Have Happened to The Evolution of The Highly Modified Fish Parasite Pennellidae: Implication of Evolutionary Trends Based On Molecular Analysis
1150-1205	OADHM-8	Panakkool Thamban Aneesh	Tropical Fish Parasitic Crustaceans: Parasitic Adaptations and Emerging Paradigms in Research
1205-1220	OADHM-9	Helna A K	A Taxonomic Review of the Copepod Family Chondracanthidae Milne Edwards, 1840(Copepoda: Poecilostomatoida) Parasitizing the Marine Fishes From Indian Waters
1200-1230	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 21: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1120-1135	OAF-24	Siti Amalia Aisyah Abdul Halim	Revisiting the Taxonomic Relationship Between *Pangasius nasutus* and *P. conchophilus* based on Cytochrome C Oxidase Subunit I (COI) GENE
1135-1150	OAF-25	Noorul Azliana Jamaludin	Mitochondrial Markers Revealed Highly Differentiated Lineages of Spotted Sardinella, *Amblygaster sirm* (Walbaum, 1792) in South China Sea and Andaman Sea
1150-1205	OAF-26	Nuralif Fakhrullah Bin Mohd Nur	High Connectivity of a Stable Population of *Carangoides malabaricus* in Malaysian Waters
1205-1220	OAF-27	Muhammad Hanif Bin Fadzli	Reproductive Aspects of The Coastal Trevally *Carangoides coeruleopinnatus* From Terengganu Waters, Malaysia
1200-1230	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022) SESSION 22: MARINE POLLUTION AND OCEAN HEALTH; REMOTE SENSING AND COASTAL OCEANOGRAPHY			
Time	**Code**	**Presenter**	**Title**
1445-1500	ORSCO-1	Soufiane Hasni	Environmental impact on the Spatio-temporal abundance and distribution of the European Sardine (*Sardina pilchardus*, Walbaum 1792) in the Southern Alboran Sea.
1500-1515	ORSCO-2	Muhammad Faqih Ahkam	Influence Carbon Dioxide Flux on Primary Productivity in The Java Sea Estimated From Satellite Measurements
1515-1530	ORSCO-3	Sheila Zallesa	Analysis of the Effect of Currents on the Distribution of Bottom Sediment in the Waters of Gili Terawangan Island, Lombok, West Nusa Tenggara
1530-1545	ORSCO-4	Chong Wei Sheng	Optimising The Screening Strategy in UAV Data Prior to Sun Glint Correction for Coral Classification Mapping
1545-1600	ORSCO-5	Ochtoryano Fadhylla	Marine Tourism Suitability Based on Oceanographic Parameters and Hazards Risk Assessment in Pelabuhan Ratu Bay, West Java, Indonesia
1600-1625	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 23: AQUACULTURE DISEASES AND HEALTH MANAGEMENT			
Time	**Code**	**Presenter**	**Title**
1445-1500	OADHM-11	Low Chen Fei	In-Silico Modeling of Anti-Quorum Sensing DNA Aptamers
1500-1515	OADHM-12	Chin Yong Kit	Isolation and Screening of *Lactobacillus* sp. Against *Vibrio parahaemolyticus* as Causative Agent af Acute Hepatopancreatic Necrosis Disease (AHPND)
1515-1530	OADHM-13	Shafiq Johar	Screening and Evaluation of Potential Bacteria From *Pangasius nasutus* as Probiotics Against Pathogenic *Aeromonas hydrophila* and *Streptococcus agalactiae*
1530-1545	OADHM-14	Fittrie Meyllianawaty Pratiwy	Isolation and Selection Endophyte Bacteria Genus *Pseudomonas* Associated with *Sargassum* Sp. from Pantai Karapyak, Pangandaran District, Indonesia
1545-1600	OADHM-15	Eka Royani	The Potentiality of Bioactive Compounds and Endophytic Bacteria From Brown Algae as Antimicrobial in Aquaculture
1600-1625	DISCUSSION (Question and Answer)		

DAY 3 (10TH MARCH 2022)			
SESSION 24: AQUACULTURE AND FISHERIES; SEAFOOD SAFETY AND SECURITY			
Time	**Code**	**Presenter**	**Title**
1445-1500	OAF-28	Mohd Kamel Wan Ibrahim	Underwater LED Illuminance in A Floating Buoyant for Marine Aquaculture Application
1500-1515	OSSS-1	Chong In Lio	Predictive Model for The Quality of White Shrimp Using Traditional Method Combined With Multispectral Image Technology Under Different Storage Temperatures
1515-1530	OSSS-2	Olumide Odeyemi	Microbiological Safety of Seafood Imported to The European Union From Southeast Asia
1530-1545	OSSS-3	Muhammad Dawood Shah	Therapeutical Potential and Nutraceutical Profiling of North Bornean Seaweeds
1545-1600	OSSS-4	Cheng-Quan Chen	The Effect of Thyme and Oregano Essential Oil for Preserving The Shelf Life of White Shrimp Under Low-Temperature Storage
1600-1625	DISCUSSION (Question and Answer)		

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PROGRAMME

POSTER PRESENTATION
(SESSION 1-3)

08TH MARCH 2022

DAY 1 (8TH MARCH 2022)			
POSTER SESSION 1: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
1640-1645	PMBC-1	Kyeong Mi Kim	Complete Mitochondrial Genomes of Two *Sargassum* Species, *S. nigrifolium* and *S. yezoense* (Fucales, Phaeophyceae)
1645-1650	PMBC-2	Ihsan Hani binti Radzi	Morphology and Genetic Identification of *Thenus indicus* (Flathead Lobster) in Kota Kinabalu, Sabah
1650-1655	PMBC-3	Byung-Jin Lim	A New Species of The Genus *Thompsonopia* (Copepoda : Calanoida : Pseudocylopiidae) From Malaysia
1655-1700	PMBC-4	Melissa Versteeg	*Heteractis magnifica* Population Assessments at Coral Reefs of Pulau Perhentian, Terengganu, Malaysia.
1700-1705	PMBC-5	Hye-Won Moon	Shallow-Water Black Corals (Anthozoa: Antipatharia) from Korea With Notes on *Myriopathes n.* sp.
1705-1710	PMBC-6	Amir Asyraf Bin Zainudin	Population Genetics of Wild *Pangasius nasutus* (Bleeker, 1863) Based on COI Marker Along Pahang River, Malaysia
1710-1715	PMBC-7	Parivaseni Ravichandran	Hermit Crabs in Southeast Asia: A Review on The Status and Trends of Hermit Crab Studies in Southeast Asian Countries
1715-1720	PMBC-8	Cheng-Ann Chen	Meiobenthos in the Hydrothermal Vent of Guishan Island, Taiwan
1720-1725	PMBC-9	Kee Dang Syaryn Kee Mohamad Yasin	Seagrass General Knowledge on Restoration Activities in Sabah
1725-1730	PMBC-10	Arvie Joy Manejar	The Impact of Urbanization on Fishing Communities in the Philippines

DAY 1 (8TH MARCH 2022) POSTER SESSION 2: NUTRITION AND FEED TECHNOLOGY; SEAFOOD SAFETY AND SECURITY			
Time	**Code**	**Presenter**	**Title**
1640-1645	PNFT-1	Nurul Nadiah Binti MAsrialah	Effects of Different Microalgal Diet on The Growth Population of Marine Harpacticoid Copepod *Amphiascoides neglectus*
1645-1650	PNFT-2	Chua Sing Ying	The Effect of Different Concentration of Probiotics (Lacto-sacc) Mixtures on Growth Performance and Feed Utilization of Empurau (Tor tambroides) Fingerlings
1650-1655	PNFT-3	Rossita Shapawi	Evaluation of Different Levels of Mineral in Anchovy By-Product-Based Diets on Growth Performance of Redclaw Crayfish, *Cherax quadricarinatus*
1655-1700	PNFT-4	Sitti Raehanah Muhamad Shaleh	Ingestion and Digestion of Diatom Flocs by Juvenile Sea Cucumber *Holothuria scabra* in Captivity
1700-1705	PNFT-5	Norfazreena Mohd Faudzi	Supplementation of Phytase in Defatted Soybean Meal Feeds in Hybrid Grouper, Tiger Grouper *Epinephelus Fuscoguttatus* X Giant Grouper *E. Lanceolatus* Juvenile
1705-1710	PNFT-6	Annita Seok Kian Yong	Utilization of Processed Fish Waste as Feed Alternative in Red Tilapia (*Oreochromis* sp.) diets
1710-1715	PSSS-1	Siti Nor Fatihah Zakaria	Crude B-Glucan Binding Protein Profiling of Hooded Oyster (*Saccostrea cucullata*)
1715-1720	PSSS-2	Choirul Anwar	Development and Quantitative Assessment of a High-Performance Liquid Chromatography Method for Determination Potential of Polyphenol in *Agardhiella subulate*
1720-1725	PSSS-3	Shigeharu Senoo	Amur Catfish (*Silurus asotus*): Aquaculture Potential and Challenges

DAY 1 (8TH MARCH 2022)			
POSTER SESSION 3: MARINE BIODIVERSITY AND CONSERVATION; MARINE POLLUTION AND OCEAN HEALTH; CLIMATE CHANGE: MITIGATION AND ADAPTATION; REMOTE SENSING AND COASTAL OCEANOGRAPHY			
Time	**Code**	**Presenter**	**Title**
1640-1645	PCCMA-1	Elisa Rumpang	Ecosystem Carbon and Nitrogen on Tropical Peatlands
1645-1650	PMPOH-1	Héctor del Castillo	The Abandonment of End-Of-Life Tires (ELTS) on the Spanish Coast: Analysis of the Phenomenon and Identification of High Incidence Areas
1650-1655	PMPOH-2	Thivialosini Siva	Preliminary Data of Physicochemical Changes Associated with Decomposition of Partially Submerged Cadaver Buried at Different Depth in Mangrove Soil
1655-1700	PMPOH-3	Madihah Jafar-Sidik	The variation of environmental profiles during harmful algal bloom in Sepanggar Bay, Sabah, Malaysia
1700-1705	PRSCO-1	Muhammad Mazmirul Bin Abd. Rahman	Reliability of Shoreline Delineation Between Sentinel-2 and Landsat 8 Imagery in Determining Shoreline Evolution for DSAS Method: A Case Study in Pahang Coastline
1705-1710	PRSCO-2	Ashadi Arifin Nur	Numerical Model Around Small Island: Study Case of Kei Island, Indonesia
1710-1715	PRSCO-3	Indrawan Fadhil Pratyaksa	Calculating The Shifting of Mangrove Area Utilizing Satellite Data in Mundu, Cirebon
1715-1720	PRSCO-4	Rima Rachmayani	Indian Ocean's Sea Surface Temperature in The Simulated Freshwater Perturbation
1720-1725	PRSCO-5	Mochamad Riam Badriana	Vertical Distribution of Ocean Parameter in Nusa Dua, Bali, Coastal Area
1725-1730	PRSCO-6	Ashadi Arifin Nur	Biochemistry Parameter on Surface Seawater Around Small Island at Southeast Maluku, Indonesia

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PROGRAMME

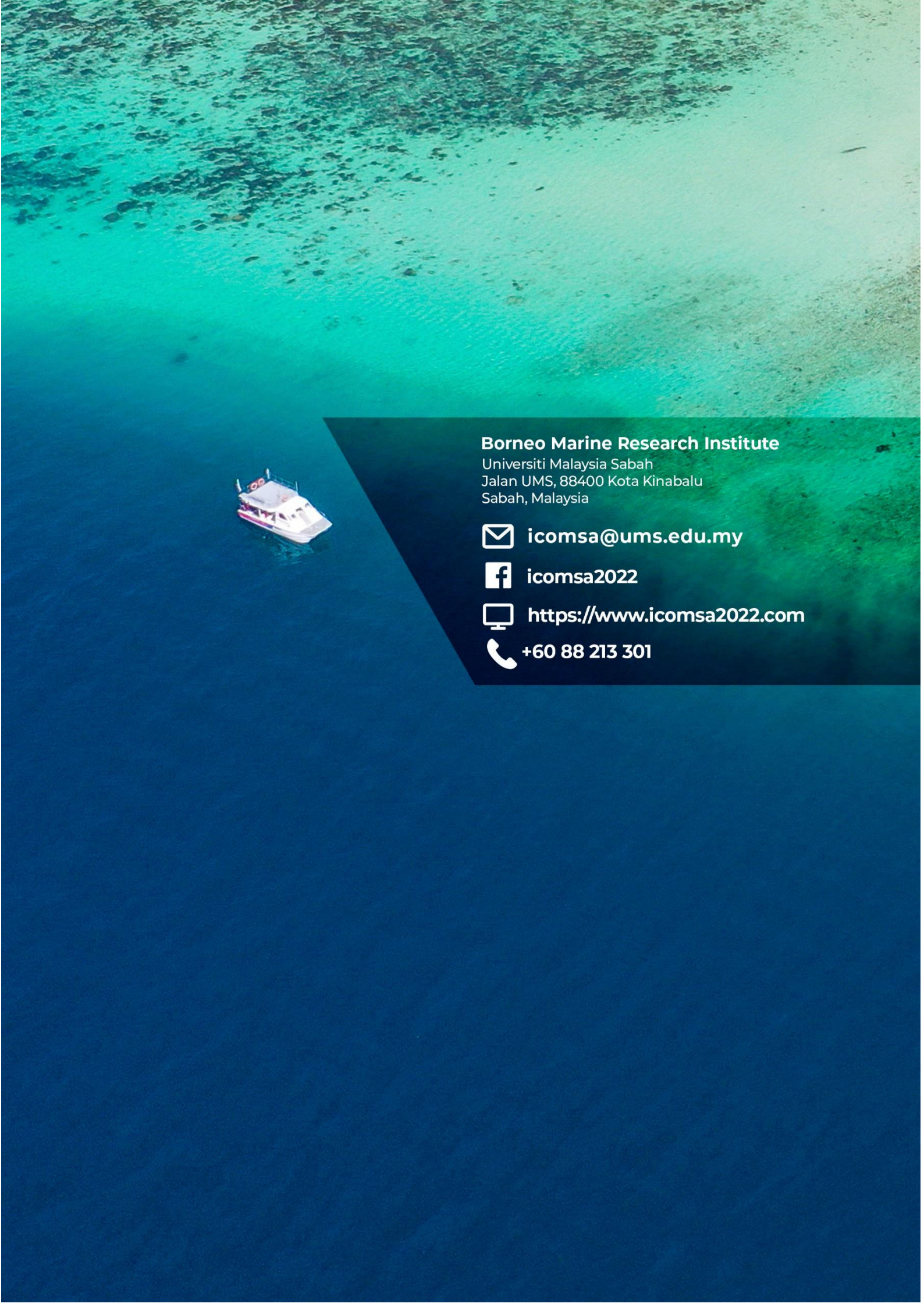
POSTER PRESENTATION
(SESSION 4-6)

09TH MARCH 2022

DAY 2 (9TH MARCH 2022)			
POSTER SESSION 4: MARINE BIODIVERSITY AND CONSERVATIONS			
Time	**Code**	**Presenter**	**Title**
1640-1645	PMBC-11	Hairul Masrini Muhamad	First Description of Biphonal Calls of Irrawaddy Dolphins (*Orcaella brevirostris*)
1645-1650	PMBC-12	Pushpa Palaniappan	Evidence of Boat Strike Injuries on Green Turtles *Chelonia mydas* at Mabul Island, Sabah, Malaysia
1650-1655	PMBC-13	Masaki Nawata	Hosts and Seasonal Occurrence of the Planktonic Sea-Louse *Caligus undulatus* in Japanese Waters
1655-1700	PMBC-14	Ami Shaumi	Fungal Communities Associated with Carapace and Gut of the Marine Crabs *Charybdis natator* and *Monomia haani* in Northern Taiwan
1700-1705	PMBC-15	Nur Shahira Bt Idrus	*Caulerpa* Species From Intertidal and Subtidal Areas
1705-1710	PMBC-16	Ejria Saleh	Occurrence and Distribution of Seagrasses at Northwest of Kudat, Sabah
1710-1715	PMBC-17	John Madin	Multi Type Marine Ecosystem and Biotic Community of a Small Bay in Tropical Waters
1715-1720	PMBC-18	Nazia Abdul Kadar	Sea Cucumber Species Distribution at West Coast of Sabah: A Preliminary Study
1720-1725	PMBC-19	Aimimuliani Adam	Abundance and Size Composition of Billfish By-Catch in Pahang Coastal Waters, Malaysia.
1725-1730	PMBC-20	Louise Matha George	The Diversity of Marine Mangrove of Taiwan

DAY 2 (9TH MARCH 2022)			
POSTER SESSION 5: AQUACULTURE DISEASES AND HEALTH MANAGEMENT			
Time	**Code**	**Presenter**	**Title**
1640-1645	PADHM-1	Lein En Yao	*In-vitro* Isolation and Characterization of Potential Probiotic from Gastrointestinal Tract of Tropical Spiny Lobster *Panulirus ornatus* Suitable for Spiny Lobster Farming
1645-1650	PADHM-2	Sow Cyn Shieng	Evaluation of Biofilm Formation on Different Probiotics Bacteria for Giant Freshwater Prawn *Macrobranchium rosenbergii* Culture
1650-1655	PADHM-3	Muhammad Syafiq Aizat Bin Hamid	Assessment of Microalgae-Based Feed, *Chlorella vulgaris* as Immunostimulant for Red Hybrid Tilapia (Oreochromis sp.) on Growth, Histopathological Change and Disease Resistant
1655-1700	PADHM-4	Clara Edah Norman	Antiparasitic Potential of a Seaweed Against the Parasitic Leech *Zeylanicobdella arugamensis* (Hirudinea) in Marine Aquaculture
1700-1705	PADHM-5	Balu Alagar Venmathi Maran	A New Species of Parasitic Copepod *Nemesis* Risso, 1826 (Siphonostomatoida: Eudactylinidae) From the Gills of Coralcat Shark *Atelomycterus marmoratus* (Anonymous [Bennett], 1830) From Malaysia
1705-1710	PADHM-6	Rafidah Binti Othman	Effect of oral treatment of methyltestosterone (MT) on sex differentiation and growth in juvenile yellow perch (Perca flavescens)
1710-1715	PADHM-7	Md.Safiul Alam Bhuiyan	Optimization Assay for Detection of Avian Infectious Bronchitis Virus (IBV) Using an Electrochemical DNA Biosensor

DAY 2 (9TH MARCH 2022)			
POSTER SESSION 6: AQUACULTURE AND FISHERIES			
Time	**Code**	**Presenter**	**Title**
1640-1645	PAF-1	Esraa E. Abouelmaaty	Induce Spawning and Larval Development of *Tripneustus gratilla*, Red Sea, Egypt
1645-1650	PAF-2	Fatin Nabilah Bt Mohamad Sahadan	Molecular Characterization and Phylogenetic Classification of GNRH Hormones in River Catfish *Hemibagrus nemurus*
1650-1655	PAF-3	Mohd Akmal Bin Sobari	Preliminary Investigation of Length-Weight, Length-Length Relationships, and Condition Factor of Four *Scombridae* Species in Kuala Perlis
1655-1700	PAF-4	Muhammad Amir Danial Bin Zahaludin	Field efficacy of an Inactivated *Vibrio harveyi* against Vibriosis in Cage-Cultured Asian Seabass, *Lates calcarifer*
1700-1705	PAF-5	Jamil Bin Musel	Length Frequency Distribution and Length-Weight Relationship of *Rastrelliger kanagurta* in Sarawak, Malaysia
1705-1710	PAF-6	Zaidnuddin Bin Ilias	Recent Observation on *Holothuria Scabra* Population And Maturity From Johor Straits
1710-1715	PAF-7	Teruaki Yoshida	Ingestion Rate of The Soft Coral *Palythoa* sp., Fed With *Artemia* Nauplii
1715-1720	PAF-8	Nur Fatihah Abd Halid	Grading Based on The Body Colouration of *Betta splendens* Variety Super Red Plakat
1720-1725	PAF-9	Ching Fui Fui	Recovery under Different Stocking Density of Stunted Growth Asian Seabass, Lates calcarifer Juvenile
1725-1730	PAF-10	Julian Ransangan	Effect of Feeding Regime on Growth and Survival of Asiatic Hard Clam, *Meretrix meretrix*, Larvae in Hatchery Condition
1730-1735	PAF-11	Audrey Daning Tuzan	Biodiversity and Biological Aspects of Spiny Lobster Species at Kota Kinabalu, Sabah, Malaysia: A Preliminary Study



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ABSTRACT BOOK

UMS
UNIVERSITI MALAYSIA SABAH

vICOMSA 2022

08 - 10 MARCH 2022

[Virtual] International Conference on Marine Science & Aquaculture

"The Ocean We Want Towards Sustainable Development"

Co-organizers

UPM Universiti Putra Malaysia Berilmu Berbakti

UNIMAS Universiti Malaysia Sarawak

International Ocean Institute

Institut Teknologi Bandung

Graduate School of Integrated Sciences for Life Hiroshima University

MSMS Malaysian Society of Marine Sciences Persatuan Sains Lautan Malaysia

KINDAI UNIVERSITY

汕頭大學 SHANTOU UNIVERSITY

國立臺灣海洋大學 National Taiwan Ocean University

MABIK National Marine Biodiversity Institute of Korea

DISCLAIMER

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MESSAGE FROM

Vice Chancellor
Universiti Malaysia Sabah

بسم الله الرحمن الرحيم

Assalamualaikum WBT, Salam Sejahtera and very good morning,

YBrs. Associate Prof. Ts. Dr. Sitti Raehanah Mohamad Shaleh
Director of Borneo Marine Research Institute, UMS
YBrs. Associate Prof. Dr. Juanita Joseph
Organising Chairperson
Distinguish Guests, fellow participants
Ladies and Gentlemen

I would like to express my sincere gratitude to the organisers for giving me the honour to deliver the welcoming remarks.

Ladies and gentlemen,

It is my pleasure to welcome and thank the plenary speakers, keynote speakers and all participants, for joining us in this important scientific discourse on "**The Ocean We Want Towards Sustainable Development**", the theme of vICOMSA 2022.
Organising this scale of international scientific conference is certainly no easy task, so I congratulate the Director of BMRI, the Organising Chair and the hardworking organising committee for your perseverance and commitment, all of which has helped bring us together to this occasion.
I am thus emboldened to state that this platform has an important role in helping create the perfect conditions for ensuring that the oceans – the marine environment – especially in Sabah, continue to receive the necessary attention of researchers, and importantly, inspire young people into ocean science and R&D for ocean sustainable development.

Sustainability at a crossroads

Ladies and gentlemen,

When we look back at the start of the pandemic, as countries around the world implemented lockdowns [Malaysia included, where this was termed as MCO (Movement Control Order)], we are vividly reminded of how much nature was ailing. By December 2021, science news about *sustainability* were, unsurprisingly grim. A big part of this grim news can be attributed to the covid-19 pandemic.

The future is further painted as bleak, as we read that progress on the United Nations's 17 Sustainable Development Goals (UN SDGs) – a holistic framework for guiding priorities for sustainable development, and adopted by Malaysia – which has a 2030 deadline target, and which was already at a slow rate, was further derailed by the pandemic. With new vaccines quite rapidly developed and delivered in that same year 2021, hopes were really high, but that the virus has again caught up on us, with no one had really envisioned the prolonging of the pandemic to beyond 2021, as a result of emerging new covid variants. In fact, 2021 has been described as a year of multiple crises (Nature 2021, 600: 569-570), compounded further by the impacts of natural disasters due to climate change.

Ladies and gentlemen,

On a very positive note, it also seems that just a short respite from the pressures of human's presence can enable nature to recover. Although such recovery is not by leaps and bounds, the brief, but much needed "rest" was all that is required for nature to return to its fundamental functions, to a point that even the wildlife felt that nature was inviting enough for their return.

One such research was documented in our own backyard, by one of BMRI's then PhD research candidate (Nasrulhakim Bin Maidin). In his study investigating the "*possible long-term negative impacts (of ecotourism) on the ecology and sustainability of the Tunku Abdul Rahman Park (TARP)*" – a Marine Protected Area (MPA) and a popular tourist destination in Sabah – one of the exciting findings was the "(slight) increase of coral cover at the TARP after the implementation of the MCO".

The study was able to attribute such improvement to the four-month (from Mar-Jun 2020) absence of tourists during the time the MCO was in effect. The research findings are published in the Malaysian Journal of Sustainable Environment (Dec 2021 edition; a MyCite journal). [Note: Nasrulhakim was halfway through PhD his research when the pandemic struck. He has now progressively advanced, has submitted his revised and bound thesis in December 2021, and is now waiting for his graduation date to be announced].

Blue Foods and Sustainable Recovery in the context of the SDGs

Ladies and gentlemen,

Sabah is blessed with many unique features of the marine ecosystem. When the Borneo Marine Research Institute (BMRI) was established in 1995, it was for the conduct of research, and to make available scientific information to the State and country for the

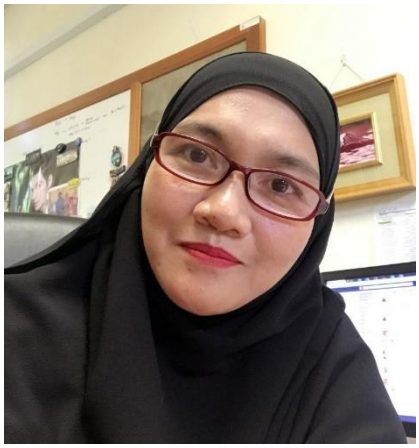
management of marine resources. At the BMRI, researchers under the Institute's Aquaculture Program, have been carrying out lab trials from developing sustainable fish feed to studying feeding behaviours and the diseases affecting aquaculture fish.
Whilst those under the Marine Science Program, they have been carrying out field observations and monitoring, employing rigorous ecological approaches to study the marine ecosystems – the fishes, turtles and marine mammals and microscopic planktons – their productivity and habitats particularly the coral reefs, the sea grasses and tidal flats.
Furthermore, they ensure that their research stay relevant to society by getting involved in conservation efforts and engaging with the (local) community. These on-going efforts is what helped create BMRI today, as a centre of excellence for research in aquaculture and marine sciences in the country and abroad.

Ladies and gentlemen,

The importance of blue foods – a collective term for aquatic foods, such as fish, shellfish and seaweed – has been catapulted into focus following the prioritisation for sustainable recovery in the context of the SDGs (Sustainable Development Goals), and economic uncertainties in the wake of the covid 19 pandemic.
The many new challenges and risks posed by climate change and the covid pandemic in the foreseeable future, are the drivers for researchers to explore, adapt and scale up to available technologies to stay relevant.
As a centre of excellence, we have seen BMRI and its researchers involved firsthand in researching for ways to make "sustainable blue foods", while also researching in marine biodiversity protection.
Therefore, I have confidence that BMRI will rise to the expectations once again and continue to make significant contributions in these areas of research.
It may be necessary however, to revisit and evaluate existing fruitful collaborations with research institutions and non-governmental organisations that the university entered into since its existence, and to explore new partners for strategic cooperation for ocean sustainability.
Taking these steps and actions now, and the assurance of resilience demonstrated by nature itself, may well be the catalyst we need in determining "**The Oceans We Want Towards Sustainable Development**".

Thank You.

Professor Datuk ChM. Ts. Dr. Taufiq Yap Yun Hin
Vice Chancellor Universiti Malaysia Sabah



MESSAGE FROM

Director

Borneo Marine Research Institute
Universiti Malaysia Sabah

Assalamualaikum wbt. & Salam Sejahtera

We warmly welcome you to attend the **2022 virtual International Conference on Marine Science and Aquaculture** with a theme: ***The Ocean We Want Towards Sustainable Development.***

We hoped to host you in our gorgeous state of Sabah, the Land Below the Wind, so that you could witness our unique ecosystem, notably its marine biodiversity, personally. Regrettably, the Covid-19 outbreak derailed these plans, as it was uncertain when foreign visitors would be permitted to enter Malaysia.

This year represents the second time we have organized ICOMSA virtually. We were obliged to adjust promptly and host a virtual conference in 2020. It was our first attempt at a completely digital event, and I was impressed with the level of content we could offer with ICOMSA members. That experience has taught us innumerable lessons. We can reach a broader audience digitally, particularly those who live in remote areas who experience difficulties to get to Sabah. A virtual meeting is convenient, eco-friendly, economically viable, and time efficient.

So, here we are again, offering you with a scientific conference focused on the theme The Ocean We Want: Towards Sustainable Development. Humans have always had a close bond to the ocean, whether it is for food, recreation, or other purposes. Growing population creates a greater demand for products and services. While plans for ocean-based economies (blue economies) and circular economies have gained traction, they face an array of constraints due to the oceans' deteriorating condition. Without concerted effort, we will gradually lose control of the environment. Without a sustainable ocean, it is hard to envision a sustainable future for humanity. Scientific understanding of ecosystems, particularly biodiversity, and human-ecosystem interactions is critical for assisting us in managing our natural resources.

We intend to share ideas and information through ICOMSA to better steer research directions toward a sustainable blue economy. The conference's output will showcase the

societal relevance of the research contributions of marine science and aquaculture researchers, as well as those from other related disciplines to sustainable development.

Congratulations to all members of the ICOMSA 2022 Organizing Committee, Co-organizers and the many other departments involved for their dedication and hard work in ensuring the success of this virtual event.

Thank you very much.

Assoc. Prof. Ts. Dr. Sitti Raehanah Muhamad Shaleh
Director of Borneo Marine Research Institute
Universiti Malaysia Sabah

MESSAGE FROM

Chairman

Virtual International Conference on Marine Science and Aquacultrue (vICOMSA) 2022

Salam sejahtera
Kopivosian
Greetings from the Land Below The Wind

On behalf of the organizing committee of the virtual **International Conference on Marine Science & Aquaculture (ICOMSA 2022)**, I am honoured and delighted to welcome you to this event. This year, the theme is: '***The Ocean We Want Towards Sustainable Development'***.

Organized by the Borneo Marine Research Institute (BMRI) of Universiti Malaysia Sabah (UMS), this symposium delves into current issues and challenges related to marine science and aquaculture. It is also supporting the blueprint for the United Nations' Decade of Ocean Science for Sustainable Development (2021–2030), which is intended to intensify scientific investigations that can help in sustainable ocean ecosystem management. With this conference's structured programmes, we hope to be able to identify science-informed responses to pressures on the marine ecosystem, and formulate mitigation measures and adaptation strategies that are needed for a sustainable future.

ICOMSA 2022 provides delegates with a unique platform to discuss ideas and best practices on a wide range of topics in the areas related to marine science and aquaculture. The conference is divided into ten sub-themes, especially tackling current issues such as marine pollution and ocean health, climate change, seafood safety and security, conservation of marine biodiversity, and the blue economy of coastal communities. The technical programme of ICOMSA 2022 is rich and varied with three keynote speakers, four plenary speakers, four special sessions, and numerous concurrent sessions for oral and poster presentations. We hope to be able to generate new knowledge that will be worthwhile in developing policies and plans to address the current issues. The complex nature of the issues requires experts from different backgrounds to work together to come up with new concepts, ideas and techniques that could help us to achieve tangible outcomes.

This is the second time BMRI is organizing the event virtually, as we are still battling with COVID-19. Even so, I am happy to announce that the response has been overwhelming, with 200 participants from 20 countries in attendance.

I am also excited to announce that ICOMSA 2022 has 11 co-organizers. From Malaysia, we have Universiti Malaysia Sarawak, Universiti Putra Malaysia, and the Malaysian Society of Marine Sciences. From Indonesia, we have Universiti Padjajaran Bandung, and the Bandung Institute of Technology. From Japan, we have Kindai University and Hiroshima University. Then we have National Taiwan Ocean University, Shantou University (China), Marine Biodiversity Institute of Korea (MABIK), and finally the International Ocean Institute (IOI).

We strive for quality by collaborating not only with local and international universities or institutes, but also with a quality international journal to ensure impactful studies are included in the conference. This year, for the first time, we are partnering with Diversity, an open access journal from MDPI.

This conference is the result of hard work, support and dedication of many parties. We have been able to hold this event today because of the utmost commitment shown by the various conference committees and departments in UMS.

Firstly, I would like to convey my sincere thanks and deepest gratitude to the BMRI ICOMSA 2022 committee members.

I am also thankful to all of the various departments in UMS.

I also would like to express my sincere thanks to BMRI postgraduate students who have helped.

I am grateful to the participants, presenters and sponsors for their valuable contributions to this conference. It is a pleasure to have you all with us.

I thank the Director of BMRI, Associate Professor Ts. Dr. Sitti Raehanah Muhamad Shaleh, for her inspiring leadership and support.

I am very thankful to the Vice-Chancellor of UMS, Professor Datuk ChM. Ts. Dr. Taufiq Yap Yun Hin for his encouragement and for delivering the opening address.

Thank you all for participating in the **International Conference on Marine Science & Aquaculture 2022.**

Have a great conference!

Associate Professor Dr. Juanita Joseph

ABOUT vICOMSA 2022

The "Annual Seminar on Marine Science and Aquaculture" commenced in 2003 in Universiti Malaysia Sabah. It provided a platform to exchange knowledge about the marine ecosystems and development of aquatic food resources through sustainable fisheries and aquaculture. From 2014, this annual event was rebranded and is now known as the "International Conference on Marine Science and Aquaculture (ICOMSA)".

The theme for ICOMSA 2022 is "The Ocean We Want Towards Sustainable Development". This topic is of global relevance and is particularly important, where marine ecosystem services play a significant role in socio-economic development, aquaculture industry and seafood security. Our goal is to demonstrate how science and new ideas can provide the best possible solutions to our ever-changing marine environment, and addressing existing and evolving challenges which are critical for ocean ecosystem balance and sustainability of benefits we derive from ocean-based economies such as fisheries, aquaculture, and ecotourism.

vICOMSA 2022: No. of Presenters			
Keynote Speaker	**: 3**	**Oral Presenter**	**: 117**
Plenary Speaker	**: 4**	**Poster Presenter**	**: 56**

vICOMSA 2022 Sub Themes	
01. Marine Biodiversity and Conservation	06. Aquaculture Diseases and Health Management
02. Marine Pollution and Ocean Health	07. Nutrition and Feed Technology
03. Climate Change: Mitigation and Adaptation	08. Citizen Science, Awareness and Education
04. Aquaculture and Fisheries	09. Remote Sensing and Coastal Oceanography
05. Seafood Safety and Security	10. Blue Economy of Coastal Community

vICOMSA 2022
ORGANISING COMMITTEE

PATRON	**: Prof. Datuk Chm. Dr. Taufiq Yap Yun Hin,** Vice-Chancellor, Universiti Malaysia Sabah
ADVISORS	: **Assoc. Prof. Ts. Dr. Ramzah Dambul,** Deputy Vice-Chancellor (Research & Innovation) **Assoc. Prof. Ts. Dr. Sitti Raehanah Muhamad Shaleh,** Director, Borneo Marine Research Institute, Ums
CHAIRMAN	: **Assoc. Prof. Dr. Juanita Joseph**
CO-CHAIRMAN	: **Dr. Zarinah Waheed**

TECHNICAL COMMITTEE	**PUBLICITY COMMITTEE**
Dr. Chen Cheng Ann **Dr. Nur Fatihah Abd Halid** **Dr. Irfan Chong Wei Sheng** **Dr. Hairul Masrini Muhamad** **Ms. Flora Anne Asalin** **Mr. Muhamad Amirrul Ariff bin Ariffin** **Ms. Nor Syahira Idayu binti Ismail** **Ihsan Hani binti Radzi** **Parivaseni A/P Ravichandran** **Ng Wei-Ling**	**Assoc. Prof. Dr. Julian Ransangan** **Dr. Madihah Jafar Sidik** **Mr. Muhammad Ali Syed Hussein** **Mr. Najamuddin Abdul Basri** **Ms. Flora Anne Asalin** **Mr. Che Hasruddin Che Hassan** **Mr. Yusdi Ismail** **Mdm. Amalia Shaiful Kahar** **Ms. Wong Zy Chee** **Ms. Anis Hammani Juraini** **Mr. Muhamad Idlan**
SECRETARIAT COMMITTEE	**SCIENTIFIC COMMITTEE**
Dr. Audrey Daning Tuzan **Dr. Wahidatul Husna Zuldin** **Dr. Norfazreena Mohd Faudzi** **Mdm. Linda Jallis** **Mr. Amizam Salleh** **Ms. Teoh Chui Fen** **Mr. Lein En Yao**	**Dr. Mohammad Tamrin Mohamad Lal** **Dr. Lim Leong Seng** **Assoc. Prof. Dr Balu Alagar Venmathi Maran** **Assoc Prof. Dr. Annita Yong Seok Kian** **Dr. Sujjat Al-Azad**
TREASURER	**SPONSORSHIP COMMITTEE**
Puan Wendy Binti Induk **Puan Shirley E. Ading**	**Dr. Nazia Abdul Kadar** **Assoc. Prof. Dr Faihana Ching Fui Fui** **Dr. Rafidah Othman** **Mdm. Samsidar Muhd Nurung**
SPECIAL TASK	
Assoc. Prof. Dr. Bernardette Mabel Manjaji Matsumoto **Dr. Nurzafirah Mazlan** **Dr. Mohd Fikri Akmal bin Mohd Khodzori**	

OPENING CEREMONY

VIRTUAL INTERNATIONAL CONFERENCE ON MARINE SCIENCE AND AQUACULTURE (vICOMSA) 2022

Date : 08 March 2022 (Tuesday)
Time : 9.00 am
Venue : Zoom Webinar

0845 : Entrance of Participants to Zoom Webinar

0855 : Entrance of **Y. Bhg. Prof. Datuk ChM. Ts. Dr. Taufiq Yap Yun Hin**
Vice-Chancellor, Universiti Malaysia Sabah

0900 : National Anthem (Negaraku) and Sabah Anthem (Sabah Tanah Airku)

Do'a Recital

Welcoming Remarks by
Y.Brs. Assoc. Prof Dr. Juanita Joseph
Organising Chairman

Speech and Official Launching by
Y.Bhg. Prof. Datuk ChM. Ts. Dr. Taufiq Yap Yun Hin
Vice-Chancellor of Universiti Malaysia Sabah

0930 : Keynote Speech by **Prof. Dr. Hongyu Ma**
Professor at Marine Biology Institute, Shantou University of China

1015 : End of Opening Ceremony

AWARD AND CLOSING CEREMONY

VIRTUAL INTERNATIONAL CONFERENCE ON MARINE SCIENCE AND AQUACULTURE (ICOMSA) 2022

Date **: 10 March 2022 (Thursday)**
Time **: 4.25 pm**
Venue **: Zoom Webinar**

1620	:	Entrance of Participants to Zoom Webinar
1625	:	Closing Speech by **Y.Brs. Dr. Zarinah Waheed** *Co-Organising Chairman*
1640	:	Winner Announcement for Best Poster and Oral Presentation Awards
1700	:	Closing Ceremony Ends

CONFERENCE PROGRAMME AT A GLANCE

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<tr><td>0900-0930</td><td colspan="3">OPENING CEREMONY</td></tr>
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Speaker: Prof. Dr. Hongyu Ma (Shantou University)</td></tr>
<tr><td rowspan="3">1015-1230</td><td colspan="3">Session Break (Preparation)</td></tr>
<tr><td>Oral Session 1</td><td>Oral Session 2</td><td>Oral Session 3</td></tr>
<tr><td>Marine Biodiversity and Conservation</td><td>Nutrition and Feed Technology</td><td>Marine Pollution and Ocean Health</td></tr>
<tr><td>1230-1330</td><td colspan="3">LUNCH BREAK</td></tr>
<tr><td rowspan="2">1330-1430</td><td colspan="3">(Announcement/Others)</td></tr>
<tr><td colspan="2">PLENARY 1: Marine Microorganisms and Their Bioremediation Potential

Speaker: Dr. Pooja Shivanand (Universiti Brunei Darussalam)</td><td>PLENARY 2: Seagrass Monitoring and Transplanting for Assisted Recovery

Speaker: Prof. Dr. Muta Harah Zakaria (Universiti Putra Malaysia)</td></tr>
<tr><td rowspan="3">1430-1625</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Oral Session 4</td><td>Oral Session 5</td><td>Oral Session 6</td></tr>
<tr><td>MSMS Special Session</td><td>PBAF Special Session</td><td>IOI Special Session</td></tr>
<tr><td rowspan="3">1625-1730</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Poster Session 1</td><td>Poster Session 2</td><td>Poster Session 3</td></tr>
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<tr><td colspan="4">FINAL ANNOUNCEMENT AND END OF DAY 1</td></tr>
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DAY 2: 9 MAC 2022 (WEDNESDAY)			
0815-0830	**(Preparation/Announcement/Others)**		
0830-0915	**KEYNOTE 2: How to Manage Coastal and Marine Resources After Pandemic** Speaker: **Dr. Yudi Nurul Ihsan (Universitas Padjadjaran)**		
0915-1110	**Session Break (Preparation/Announcement/Others)**		
	Oral Session 7	**Oral Session 8**	**Oral Session 9**
	Marine Biodiversity and Conservation	**Aquaculture & Fisheries**	**Climate Change: Mitigation and Adaptation, Citizen Science, Awareness and Education, Blue Economy of Coastal Community**
1110-1240	**Session Break (Announcement/10 Min break)**		
	Oral Session 10	**Oral Session 11**	**Oral Session 12**
	Marine Biodiversity and Conservation	**Aquaculture & Fisheries**	**Aquaculture & Fisheries**
1240-1330	**LUNCH BREAK**		
1330-1345	**(Preparation/Announcement/Others)**		
1345-1430	**PLENARY 3: Love: Driving Partnerships for The Ocean We Want** Speaker: **Dr. Aazani Mujahid (Universiti Malaysia Sarawak)**		
1430-1625	**Session Break (Preparation/Announcement/Others)**		
	Oral Session 13	**Oral Session 14**	**Oral Session 15**
	Marine Biodiversity and Conservation	**CTC Special Session**	**Aquaculture & Fisheries**
1625-1730	**Session Break (Preparation/Announcement/Others)**		
	Poster Session 4	**Poster Session 5**	**Poster Session 6**
	Marine Biodiversity and Conservation	**Aquaculture Diseases and Health Management**	**Aquaculture & Fisheries**
FINAL ANNOUNCEMENT AND END OF DAY 2			

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<tr><th colspan="4">DAY 3: 10 MAC 2022 (THURSDAY)</th></tr>
<tr><td>0815-0830</td><td colspan="3">(Preparation/Announcement/Others)</td></tr>
<tr><td>0830-0915</td><td colspan="3">KEYNOTE 3: Global Spread of Aquatic Parasites Via Aquaculture, Aquarium and Game Fishing

Speaker: Prof. Dr. Susumu Ohtsuka (Hiroshima University)</td></tr>
<tr><td rowspan="3">0915-1110</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Oral Session 16</td><td>Oral Session 17</td><td>Oral Session 18</td></tr>
<tr><td>Marine Pollution and Ocean Health</td><td>Aquaculture Diseases and Health Management</td><td>Aquaculture & Fisheries</td></tr>
<tr><td rowspan="3">1110-1240</td><td colspan="3">Session Break (Announcement/10 Min break)</td></tr>
<tr><td>Oral Session 19</td><td>Oral Session 20</td><td>Oral Session 21</td></tr>
<tr><td>Marine Pollution and Ocean Health</td><td>Aquaculture Diseases and Health Management</td><td>Aquaculture & Fisheries</td></tr>
<tr><td>1240-1330</td><td colspan="3">LUNCH BREAK</td></tr>
<tr><td>1330-1345</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>1345-1430</td><td colspan="3">PLENARY 4: Blue Revolution in Tuna Aquaculture – Full Cycle Culture Technology of Pacific Bluefin Tuna – Activities so Far, at Present, in the Future

Speaker: Prof. Dr. Yoshifumi Sawada (Kindai University)</td></tr>
<tr><td rowspan="3">1430-1625</td><td colspan="3">Session Break (Preparation/Announcement/Others)</td></tr>
<tr><td>Oral Session 22</td><td>Oral Session 23</td><td>Oral Session 24</td></tr>
<tr><td>Remote Sensing and Coastal Oceanography</td><td>Aquaculture Diseases and Health Management</td><td>Aquaculture & Fisheries, Seafood Safety and Security</td></tr>
<tr><td>1625-1700</td><td colspan="3">AWARD AND CLOSING CEREMONY</td></tr>
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vICOMSA 2022 SCIENTIFIC SESSION

DAY 1: 8 MAC 2022 (TUESDAY)			
0930-1015	**KEYNOTE 1: Research Progress on Sex Determination and Differentiation of The Mud Crab (*Scylla paramamosain*)** Speaker: **Prof. Dr. Hongyu Ma (Shantou University)** Chairperson: **Assoc. Prof. Ts. Dr. Sitti Raehanah Muhamad Shaleh**		
1015-1230	**Oral Session 1**	**Oral Session 2**	**Oral Session 3**
	Chairperson: **Dr. John Madin** OMBC-1 OMBC-2 OMBC-3 OMBC-4 OMBC-5 OMBC-6	Chairperson: **Prof. Dr. Rossita Shapawi** ONFT-1 ONFT-2 ONFT-3 ONFT-4 ONFT-5 ONFT-6	Chairperson: **Assoc. Prof. Dr. Abentin Estim** OMPOH-1 OMPOH-2 OMPOH-3 OMPOH-4 OMPOH-5 OMPOH-6
1230-1330	**LUNCH BREAK**		
1330-1430	**PLENARY 1: Marine Microorganisms and Their Bioremediation Potential** Speaker: **Dr. Pooja Shivanand (Universiti Brunei Darussalam)** Chairperson: **Assoc. Prof. Dr. Julian Ransangan**	**PLENARY 2: Seagrass Monitoring and Transplanting for Assisted Recovery** Speaker: **Prof. Dr. Muta Harah Zakaria (Universiti Putra Malaysia)** Chairperson: **Assoc. Prof. Dr. B Mabel Manjaji Matsumoto**	
1430-1625	**Oral Session 4**	**Oral Session 5**	**Oral Session 6**
	Chairperson: **Dr. Aazani Mujahid** MSMS-1 MSMS-2 MSMS-3 MSMS-4 MSMS-5	Chairperson: **Dr. Mohammad Tamrin bin Mohamad Lal** PBAF-1 PBAF-2 PBAF-3 PBAF-4 PBAF-5	Chairperson: **Ms. Antonella Vassallo** IOI-1 IOI-2 IOI-3 IOI-4 IOI-5
1625-1730	**Poster Session 1**	**Poster Session 2**	**Poster Session 3**
	Chairperson: **Dr. John Madin** PMBC-1 PMBC-2 PMBC-3 PMBC-4 PMBC-5 PMBC-6 PMBC-7 PMBC-8 PMBC-9 PMBC-10	Chairperson: **Dr. Audrey Daning Tuzan** PNFT-1 PNFT-2 PNFT-3 PNFT-4 PNFT-5 PNFT-6 PSSS-1 PSSS-2 PSSS-3	Chairperson: **Dr. Zarinah Waheed** PCCMA-1 PMPOH-1 PMPOH-2 PMPOH-3 PRSCO-1 PRSCO-2 PRSCO-3 PRSCO-4 PRSCO-5
FINAL ANNOUNCEMENT AND END OF DAY 1			

DAY 2: 9 MAC 2022 (WEDNESDAY)			
0830-0915	**KEYNOTE 2: How to Manage Coastal and Marine Resources After Pandemic** Speaker: **Dr. Yudi Nurul Ihsan (Universitas Padjadjaran)** Chairperson: **Assoc. Prof. Dr. Ejria Saleh**		
0915-1110	**Oral Session 7**	**Oral Session 8**	**Oral Session 9**
	Chairperson: **Dr. Zarinah Waheed** OMBC-7 OMBC-8 OMBC-9 OMBC-10 OMBC-11	Chairperson: **Dr. Nazia Abdul Kadar** OAF-1 OAF-2 OAF-3 OAF-4 OAF-5	Chairperson: **Assoc. Prof. Dr. Teruaki Yoshida** OBECC-1 OCSAE-1 OCCMA-1 OCCMA-2 OCCMA-3
1110-1240	**Oral Session 10**	**Oral Session 11**	**Oral Session 12**
	Chairperson: **Mr. Muhammad Ali Syed Hussein** OMBC-12 OMBC-13 OMBC-14 OMBC-15	Chairperson: **Dr. Fikri Akmal Khodzori** OAF-6 OAF-7 OAF-8 OAF-9	Chairperson: **Dr. Norfazreena Mohd Faudzi** OAF-10 OAF-11 OAF-12 OAF-13
1240-1330	**LUNCH BREAK**		
1345-1430	**PLENARY 3: Love: Driving Partnerships For The Ocean We Want** Speaker: **Dr. Aazani Mujahid (Universiti Malaysia Sarawak)** Chairperson: **Assoc. Prof. Dr. Teruaki Yoshida**		
1430-1625	**Oral Session 13**	**Oral Session 14**	**Oral Session 15**
	Chairperson: **Dr. Pushpa M. Palaniappan** OMBC-16 OMBC-17 OMBC-18 OMBC-19 OMBC-20	Chairperson: **Dr. Lim Leong Seng** CTC-1 CTC-2 CTC-3 CTC-4 CTC-5	Chairperson: **Assoc. Prof. Dr. Annita Yong Seok Kian** OAF-14 OAF-15 OAF-16 OAF-17 OAF-18
1625-1730	**Poster Session 4**	**Poster Session 5**	**Poster Session 6**
	Chairperson: **Mr. Muhammad Ali Syed Hussein** PMBC-11 PMBC-12 PMBC-13 PMBC-14 PMBC-15 PMBC-16 PMBC-17 PMBC-18 PMBC-19 PMBC-20	Chairperson: **Dr. Muhammad Dawood Shah** PADHM-1 PADHM-2 PADHM-3 PADHM-4 PADHM-5 PADHM-6 PADHM-7	Chairperson: **Dr. Chong Wei Sheng** PAF-1 PAF-2 PAF-3 PAF-4 PAF-5 PAF-6 PAF-7 PAF-8 PAF-9 PAF-10 PAF-11
FINAL ANNOUNCEMENT AND END OF DAY 2			

DAY 3: 10 MAC 2022 (THURSDAY)			
0830-0915	**KEYNOTE 3: Global Spread of Aquatic Parasites Via Aquaculture, Aquarium and Game Fishing** Speaker: **Prof. Dr. Susumu Ohtsuka (Hiroshima University)** Chairperson: **Assoc. Prof. Dr. Balu Alagar Venmathi Maran**		
0915-1110	**Oral Session 16**	**Oral Session 17**	**Oral Session 18**
	Chairperson: **Dr. Nurzafirah Binti Mazlan** OMPOH-7 OMPOH-8 OMPOH-9 OMPOH-10 OMPOH-11	Chairperson: **Dr. Rafidah Binti Othman** OADHM-1 OADHM-2 OADHM-3 OADHM-4 OADHM-5	Chairperson: **Dr. Sujjat Al-Azad** OAF-19 OAF-20 OAF-21 OAF-22 OAF-23
1110-1240	**Oral Session 19**	**Oral Session 20**	**Oral Session 21**
	Chairperson: **Dr. Chong Wei Sheng** OMPOH-12 OMPOH-13 OMPOH-14 OMPOH-15	Chairperson: **Dr. Muhammad Dawood Shah** OADHM-6 OADHM-7 OADHM-8 OADHM-9	Chairperson: **Dr. Nur Fatihah Binti Abdul Halid** OAF-24 OAF-25 OAF-26 OAF-27
1240-1330	**LUNCH BREAK**		
1345-1430	**PLENARY 4: Blue Revolution in Tuna Aquaculture – Full Cycle Culture Technology of Pacific Bluefin Tuna – Activities so Far, at Present, in the Future** Speaker: **Prof. Dr. Yoshifumi Sawada (Kindai University)** Chairperson: **Assoc. Prof. Dr. Faihana Ching Abdullah**		
1430-1625	**Oral Session 22**	**Oral Session 23**	**Oral Session 24**
	Chairperson: **Dr. Madihah Jafar Sidik** ORSCO-1 ORSCO-2 ORSCO-3 ORSCO-4 ORSCO-5	Chairperson: **Assoc. Prof. Dr. Balu Alagar Venmathi Maran** OADHM-10 OADHM-11 OADHM-12 OADHM-13 OADHM-14	Chairperson: **Wahidatul Husna Zuldin** OAF-28 OSSS-1 OSSS-2 OSSS-3 OSSS-4
1625-1700	**AWARD AND CLOSING CEREMONY**		

KEYNOTE SPEAKERS

KEYNOTE SPEAKER 1

Prof. Dr. Hongyu Ma
Shantou University

Hongyu Ma, Ph. D., Professor; Director of Marine Biology Institute of Shantou University; Executive Deputy Director of Guangdong Key Laboratory of Marine Biotechnology; Co-Founder of STU-UMT Joint Shellfish Research Laboratory; Visiting Professor of Universiti Malaysia Terengganu (2019.11-2021.10). Selected into the National Program for Support of Top-Notch Young Professionals; Selected into the Leading Talent Project of Special Support Plan of Guangdong Province; Selected into the "Sail Plan" Program for the Introduction of Outstanding Talents of Guangdong Province. A member of the Professional Committee of Aquatic Biotechnology of the 10th Council of China Fisheries Society, a member of the 6th Council of the Chinese Association of Young Scientists and Technologists, Vice Chairman of Technological Innovation Platform of Chinese Mud Crab Industry, Standing Director of Guangdong Young Scientists Association, Director of Agricultural Science and Technology Professional Committee of Guangdong Young Scientists Association, a member of the First Expert Committee of Guangdong Aquatic Seed Industry Innovation Alliance, a member of the 10th Council of Guangdong Genetic Society, Vice President of the 8th Shantou Young Scientists and Technicians Association, and Standing Member of Shantou Youth Federation. A member of Editorial Board of Molecular Biology Reports; a Review Editor of Frontiers in Physiology ; a Review Editor of Frontiers in Marine Science.

He mainly engaged in marine biotechnology and genetic breeding, and he has made outstanding achievements in marine crab seedling breeding, variety breeding, sex determination and differentiation, hybridization mechanism and sex reversal. He has presided over 21 scientific research projects, with 5 at the national level and 6 at the provincial and ministerial level. He published more than 160 SCI papers, of which 83 SCI papers were published as the first author or corresponding author. He obtained 13 national invention patents, 12 utility models and 1 software copyright. He won more than 10 scientific and technological awards such as the second prize of Shanghai Scientific and Technological Progress Award, and the China Industry University Research Cooperation Innovation Award. He won the honorary titles of Scientific Chinese Person of the Year 2018, and Shanghai Youth Post Expert, and so on.

RESEARCH PROGRESS ON SEX DETERMINATION AND DIFFERENTIATION OF THE MUD CRAB (*SCYLLA PARAMAMOSAIN*)

Hongyu Ma

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ABSTRACT

The mud crab (Scylla paramamosain) is a traditional marine fishery resource and mariculture crab species in China. It plays an important role in China's marine economic industry. There are significant differences between female and male crab, not only in morphological characteristics, nutritional value and market price, but also in genome and transcriptome. Our research group carried out a systematic study on the sex determination and differentiation of the mud crab, in order to reveal the differences between genders and the genetic mechanism of sex determination and differentiation. The phenotypic differences between male and female in the early stage were clarified by microscopic observation, which laid a foundation for the study of gender differentiation. The whole genome of mud crab was sequenced, and the chromosome level genome map was drawn. Thirteen female-specific SNP markers (female heterozygous and male homozygous) were screened, and a molecular technique for rapid identification of genetic sex was established. A high-density genetic map was constructed with the first-generation family of S. paramamosain as the mapping population, which located the sex determining region and sex-specific SNP markers. At the same time, another genetic map was constructed with the hybrid F1 generation of Scylla serrata ♀ × Scylla paramamosain ♂, which also located the sex determining region. With the aid of whole genome data, a novel sex-related gene Sp-pol was identified around the sex-specific SNP marker. The expression characteristics of the gene during different development of testis and ovary were analyzed, and its localization characteristics in gonads were clarified. This result could be helpful for better understanding the sex determination and differentiation of crabs.

KEYWORDS: N/A

KEYNOTE SPEAKER 2

Dr. Yudi Nurul ihsan
Universitas Padjadjaran

Yudi N. Ihsan is a Dean of Faculty of Fisheries and Marine Science, Universitas Padjadjaran, Indonesia. He received his degrees in Fisheries (BSc) in 1999 and Management of Coastal and Marine Resources (MSc) in 2002 from Institut Pertanian Bogor, Indonesia. In 2012 he received his PhD in Marine Biogeochemistry at Christian Albrechts Universitaet zu Kiel and Max Planck Institute for Marine Microbiology, Bremen Germany. He joined Department of Marine Sciences, Faculty of Fisheries and Marine Sciences, UNPAD in 2006 as teaching staff, then became a Deputy Dean for Academic, Student Affairs, Innovation and Cooperation (2016-2018) before holding his current post as a Dean of the faculty. He has research and experience in the areas of fisheries and marine science, marine biology, marine bioremediation, and marine ecology. In addition to his university teaching and research, he also active in scientific activities both at national and international level. He is also a member in Indonesian Biodiversity Community, Asian Fisheries Society and as a Leader for the Expert Group of Marine and Fisheries in Indonesia.

HOW TO MANAGE COASTAL AND MARINE RESOURCES AFTER PANDEMIC

Yudi Nurul Ihsan

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ABSTRACT

One of the world's megatrends in 2045 is the struggle for natural resources. Indonesia as a tropical country has the advantage of abundant natural resources, especially in the marine sector. How efforts can be made to manage marine resources in a sustainable manner. Currently, apart from marine pollution and destructive fishing, the Covid pandemic is also an issue in the management of coastal and marine resources. This paper represents how marine and coastal conditions in Indonesia after the Covid 19 pandemic. The aim was to describe and analyze the effect of this pandemic to marine and coastal resources. The method used online seminar, discussion with experts and stakeholders, and forum group discussion. The result showed that the coastal ecosystem services had an effect and probably will grow and recovery within a few months. With a restriction on the ocean to shipping company, sound in the ocean a little bit reduce and it has a wide impact to marine biota. The decrease in exploitation in Indonesia's coastal and marine areas during the pandemic has resulted in abundant of marine biodiversity in the future. However, marine pollution such as marine debris and oil spills, as well as industrial waste are still the main problems that will disrupt the sustainable management of marine and coastal resources. To sum up, government has to construct a new regulation about human and environment to gain a new perspective about environment management.

KEYWORDS: Coastal management, marine pollution, ocean health, pandemic covid 19, ocean conservation,

KEYNOTE SPEAKER 3

Prof. Dr. Susumu Ohtsuka
Hiroshima University

Dr. Susumu OHTSUKA, currently serving as a Professor of Hiroshima University at the Graduate School of Integrated Sciences for Life. Prof. Ohtsuka graduated from Kyoto University and then got a doctoral degree from the University of Tokyo in 1991 and major in Marine Planktology, in addition to that, he works in Marine Symbiotic Biology, Jellyfish Ecology, Conservation Ecology of Horseshoe Crab, etc. Prof. Ohtsuka has published more than 225 publications, 6 books, and about 20 book chapters. Prof. Ohtsuka has made a signficiant contribution in the field of taxonomy of copepods/Planktology, created about 4 families, 22 new genera/subgenera and about 126 new species. Fifteen Ph.D. students are graduated under his supervision. Currently, Prof. Ohtsuka is serving as the President of the Japanese Society of Systematic Zoology, the Vice President of the Plankton Society of Japan, and the Councilor of World Association of Copepodologists.

GLOBAL SPREAD OF AQUATIC PARASITES VIA AQUACULTURE, AQUARIUM AND GAME FISHING

Susumu Ohtsuka

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ABSTRACT

Some non-indigenous aquatic parasites have been globally spreading by way of anthropogenic activities and causing serious economic losses on fishing industries in receiver areas. The following three issues are briefly reviewed mainly based on our own studies. (1) What kinds of parasites such as copepods and monogeneans have been introduced from donor areas to receiver areas? (2) How have non-indigenous parasites been introduced? (3) What happens to the native ecosystems after their introduction? And how much are the economic losses caused by introduction and subsequent prevalence of non-indigenous parasites? Parasites are introduced to new receiver waters either intentionally or unintentionally: via international trading of commercially important hosts (aquaculture, aquarium, game fishing) or potentially by vessels (ballast water, attachment to ship bottom). It depends on the life cycle of parasites. Survival of newly introduced parasites in receiver areas likely depends on the presence or absence of suitable hosts in the nearly or equally same climate zones in donor areas. Some non-indigenous species belonging to the copepod families Caligidae and Ergasilidae have been globally spreading to become pests. These parasites have been spreading by way of international trading of edible and ornamental fish. The endoparasitc copepod Mytilicola orientalis Mori, 1935 was newly described from the intestines of Pacific oyster mussel in Japan and has been spreading over North American and European countries by way of international trading of Pacific oyster. During their distributional expansion, spillover effects are distinct. Generally, parasitic copepods showing low host-specificities exhibit spillover effects. The diclidophorid monogenean Neoheterobothrium hirame has been introduced from North America to Japan, causing mass mortality of juveniles of Japanese flounder on the coast of the Japan Sea in 1997. On the other hand, native parasites have been known to infest non-indigenous host fish. The best-known example is that Caligus rogercresseyi infests farmed Atlantic salmon introduced from northern hemisphere to Chile. The economic losses have been heavily caused by the sea lice. Once an invasive and/or pathogenic parasite is newly introduced to a receiver area, it is difficult to eliminate it from there. Since not only fish but also aquatic invertebrates usually harbor one or more symbionts, strict screening for target organisms before international trades is highly recommended.

KEYWORDS: Aquaculture, Aquarium, Ballast water, Copepod, Economic loss, Game fishing, Host-specificity, Intentional introduction, non-indigenous, Parasite, Spillover effect

PLENARY SPEAKERS

PLENARY SPEAKER 1

Dr. Pooja Shivanand
Universiti Brunei Darussalam

Dr. Pooja Shivanand completed her PhD in Chemical Engineering and specifically in Industrial Biotechnology at the National Institute of Technology Karnataka, India and completed her scholar PhD training from Institut für Mikrobiologie & Biotechnology, University of Bonn, Germany.

Dr. Pooja Shivanand is best known for her research interests including applied microbiology, bioprocesses and microbial technology, bioremediation, fermentation and enzyme technology, green technology, environmental design and Environmental Management.

She has received several awards including the National Award for Best Technical Paper entitled 'Learning challenges and business models for biotechnology - an Indian perspective', awarded by the Indian Society for Technical Education. She is now teaching at Universiti Brunei Darulsalam.

MARINE MICROORGANISMS AND THEIR BIOREMEDIATION POTENTIAL

Pooja Shivanand

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ABSTRACT

Marine environments consisting of coastal and deep-sea regions are a great reservoir of microorganisms including bacteria and fungi, which have evolved unique features and metabolites like enzymes and osmolytes, to adapt to varying conditions of salinity and temperature. Such marine microbes and their biomolecules are potential sources of bioactive compounds and bioremediation agents. Recent studies on the microbial diversity of marine habitats in Brunei Darussalam has found a diversity of culturable fungi and bacteria of potential biotechnological value. Efficient waste management is imperative for ensuring sustainable communities. The use of plastics and chemicals such as synthetic pesticides and fertilizers has increased rapidly over the years. Moreover, pollutants and their accumulation in the water bodies pose a threat due to their resistance to natural biodegradation. Marine microorganisms play a pivotal role to ameliorate effects of naturally occurring and man-made disturbances in coastal environments. As Louis Pasteur noted, the role of the infinitely small in nature is infinitely great. In this paper the diversity and applications of marine microorganisms, newly isolated from Brunei Darussalam will be discussed, with a focus on their application in bioremediation which include enzymes and bioflocculants for treating wastewater, bacterial degradation of plastics and biosurfactant production for crude oil degradation. Finding new strains, optimizing the conditions for better performance and scale-up studies offer challenges and scope for further investigations.

KEYWORDS: Marine microorganisms, bioremediation, wastewater, bioflocculant, biosurfactant

PLENARY SPEAKER 2

Prof. Dr. Muta Harah Zakaria
Universiti Putra Malaysia

Muta Harah Zakaria is a professor at the Department of Aquaculture, Faculty of Agriculture, Universiti Putra Malaysia (UPM). She received her Doctoral degree or PhD in Seagrass Biology and Ecology from the same university. Over the past 20 years, her team has conducted studies on taxonomy and biology, ecology and distribution, utilization, molecular genetics, and bioprospecting of marine macrophytes and freshwater plants. She was also involved in Projects on Seagrass Ecology, sub-section Marine Ecology of Aquatic Resources and Environmental Studies of the Straits of Malacca and Third Country Training Programs on seagrass and mangrove ecology under the Japan International Co-operation Agency (JICA). From 2011 until the 2020 she is participating and representing as a group leader for Macrophytes Group (G2M) Malaysia with countries, Japan, Indonesia, Thailand and Vietnam under a Project JSPS Core-to Core Program: Research and Education Network on Coastal Ecosystem in Southeast Asia. Currently she has been leading seagrass biodiversity conservation research collaborating with the industry to monitor, transplant, and rehabilitate the seagrass ecosystem for biodiversity conservation and sustainability for marine organisms and traditional local fisheries. Prof. Dr. Muta Harah Zakaria has contribution as main author and co-authors more than 200 publications in various journals, proceedings, and books. She is also a reviewer of the various journal and serves as a member of the World Seagrass Association (WSA) and International Society for Southeast Asian Agriculture Science (ISSAAS).

SEAGRASS MONITORING AND TRANSPLANTING FOR ASSISTED RECOVERY

Muta Harah Zakaria*[1, 2] and Japar Sidik Bujang[3]

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ABSTRACT

Seagrasses in Malaysia are submerged flowering plants distributed in various shallow inter-and sub-tidal areas of estuarine and marine habitats. Seagrasses are the food and habitats for the vulnerable dugongs, seahorses, endangered green turtles, other fishes, crabs, and feeding grounds for seasonal migratory birds. In Malaysia, seagrasses in many places are facing human threats. The lack of awareness regarding the area and importance of seagrasses in the coastal environment has caused seagrasses' losses. Our case study monitors a degraded 26.3 ha of Merambong seagrass meadow from impacts of coastal development. Coastal development has caused local losses of seagrasses and mass propagation of green seaweed, Ulva reticulata. The combined impacts of reclamation and mass propagation of green seaweed resulted in further loss, causing bare areas. A series of assisted seagrass recovery programs was performed to rehabilitate the degraded meadow. The bare areas of Merambong were planted with germinated juvenile seedlings of Enhalus acoroides, obtained from a donor site, Tanjung Adang Laut, and plugs of Halophila species, the native cover species in Merambong. A combination of ground-truthing and aerial drone mapping assess the seagrass and seaweed's overall distribution and their status. Monitoring information and assisted recovery program performance derived can be used to advise decision-makers on how to maintain or reduce damage to seagrass meadows, habitats, or ecosystems.

KEYWORDS: Seagrass meadows, monitoring, culture, transplanting, threats

PLENARY SPEAKER 3

Dr. Aazani Mujahid
Universiti Malaysia Sarawak

Dr. Aazani Mujahid is a senior lecturer at Malaysia's Universiti Malaysia Sarawak. She started her career as a tutor at UNIMAS and graduated from the University of Southampton with a PhD in Oceanography in 2011. She got various accolades from the Universiti, including the Most Cited Article in a High-Impact Journal in 2020 and the Anugerah Perkhidmatan Cemerlang 2014. She had been an active member in a variety of international scientific partnerships and had an extensive worldwide network. She has contributed to over 30 journal papers and received a total of RM 2.7 million in awards, both national and international. Her research interests include marine biodiversity and conservation, physical oceanography, coastal erosion, estuaries and coastlines, coastal community education and awareness, and tertiary education.

LOVE: DRIVING PARTNERSHIPS FOR THE OCEAN WE WANT

Aazani Mujahid*[1], Moritz Mueller[2], Fitri Suraya Mohamad[1] and Jacey-Lynn Minoi[1]

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ABSTRACT

Among the United Nations Sustainable Development Goals (SDG), the ultimate encompassing final Goal 17 regarding 'partnerships for the goals' remains arguably the most altruistic. Revitalizing relevant stakeholders in finance, technology, capacity building, trade, especially systemic issues including policy and institutional coherence, multi-stakeholder partnerships and essential data, monitoring and accountability are crucial to realizing all SDGs. Moreover, any strategy would need to build upon solid and equitable partnerships at all levels - from local communities to the key policymakers. Nevertheless, it remains clear that development agendas still lack cooperation and communication with dimensions to ensure co-creation, especially from the bottom-up approaches. There is no 'One' formula to creating a lasting partnership for resilient programs or networks. However, we share our recent observations from the ongoing £1.37M UKRI-ESRC GCRF Project "A Community-Centred Educational Model for developing Social Resilience (ACES)". Here we propose some critical components to positive partnerships with the focus of co-creation: Local actors, Ownership, Values shared, and Engagement. We have embedded these components within key actions at all stages of programs, from the initial stages to the impact translation. Enhanced partnerships, in turn, lead to adaptable, inclusive and more substantial program outcomes.

KEYWORDS: Co-creation, Collaborative, Networking, Humanistic values

PLENARY SPEAKER 4

Dr. Yoshifumi Sawada
Kindai University

Prof. Sawada has been involved in improving the technology of fish fingerlings for various important aquaculture species, especially in Japan, including tuna, red bream, seriola species, etc. He is known for his expertise in the use of DNA applications for various purposes, including aquaculture, fisheries management, and propagation (strengthening fisheries resources by releasing artificially hatched and reared juveniles into the open sea). Prof. Sawada has also worked extensively on the biology of early fish development and bioinformation.

Due to his impressive work on improving aquaculture of farmed fish, Prof. Sawada and his team have been awarded the 3rd Japan Prize by the Japanese government in 2010 and the 3rd Japan Prize by the Minister of Agriculture and Forestry in 2004.

He will speak on the 'Full-cycle aquaculture of the Pacific bluefin tuna - Activities so far, at present, in the future'

BLUE REVOLUTION IN TUNA AQUACULTURE – FULL CYCLE CULTURE TECHNOLOGY OF PACIFIC BLUEFIN TUNA – ACTIVITIES SO FAR, AT PRESENT, IN THE FUTURE

Yoshifumi Sawada*

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ABSTRACT

Kiindai University completed the Pacific bluefin tuna (PBF), Thunnus orientalis, life cycle in 2002, which was the world first success for large tuna species. In 2004, artificially hatched and raised PBF were shipped to the market from Kindai University, which means the industrialization of PBF hatchery technology. However, there needed the further research in that technology to improve the efficiency of mass production and to develop a better bread for sustainable aquaculture. In the presentation, problems which had been solved, halfway to be solved, and still practically untouched will be described. Firstly, there are three period of high mortality in the larval and juvenile rearing, e.g. (1) during the first 10 days, (2) from 10 to 30 days days post hatch (dph) and (3) from 30 to 120 dph. Unsuitable environmental conditions, mismatch of the live feed size, and insufficient nutritional content of the feed are possible factors leading to high mortality during the first period. Survival during nursery culture, which was only 0.07% in 1994, increased to 5-10% in 2020. This progress is associated with improved techniques in larval and juvenile rearing. For example, the use of a surface oil film depresses early mortality due to the adhesion of larvae to the surface of the water. On the other hand, Cannibalism of larvae and juveniles causes high mortality during the second period. The piscivory occurs from a very early developmental stage in PBF as in other Scombridae. We succeeded in suppressing PBT cannibalism by supplying plenty of live fish larvae of other species and by the improved size grading. Trauma due to collision of juveniles with the tank or net wall is the cause of the third high mortality period. Their sensitivity to changes in light intensity or loud noises causes them to swim in panic, and collisions during high-speed swimming even in the juvenile stage are often fatal. Better survival at the beginning of grow-out culture is due to the use of an enlarged net cage size when fish are transferred from tanks in the hatchery. The third problem is the disease caused by red sea bream iridovirus (RSIV) which is a member of a recently-recognized group of very pathogenic viruses affecting marine species in the Asian region. Young PBF are often infected with this viral disease, however symptoms of this disease appear for older bluefin tuna than one-yr-old. There is no available treatment except for the reduction of stocking density. Breeding program is now in progress to establish an excellent growth family line by the DNA analysis t to identify an individual. In addition, DNA analytical method to distinguish the sex is needed for stable reproduction under the aquaculture condition.

KEYWORDS: Pacific bluefin tuna, full-cycle aquaculture, hatchery technology

ORAL PRESENTATION SESSION

DAY 1 (8TH MARCH 2022)
SESSION 1: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
Dr. John Madin	1030-1045	OMBC-1	Hoang Dinh Chieu	The Remarkable Results of Marine Biodiversity and Conservation in Vietnam from 2010 – 2020
	1045-1100	OMBC-2	Jinwook Back	Introduction Of Taxonomic Research Trends in Korea: Focus on Harpacticoids
	1100-1115	OMBC-3	Saleem Mustafa	Marine Biodiversity And Climate Change – Perils Of Managing In Silos, And Imperatives For Blending Multidimensional Approaches For 'The Ocean We Want ' By 2030
	1115-1130	OMBC-4	Syazana Jeffry	A Small Mangrove Island of Port Dickson, Negeri Sembilan
	1130-1145	OMBC-5	Mohd Fikri Akmal Mohd Khodzori	Coral Community Structure in Tioman Island Marine Park, Malaysia
	1145-1200	OMBC-6	B Mabel Manjaji Matsumoto	Whale Sharks in Malaysia: What We Know
	1200-1230		DISCUSSION (Question and Answer)	

OMBC-1 THE REMARKABLE RESULTS OF MARINE BIODIVERSITY AND CONSERVATION IN VIETNAM FROM 2010 – 2020

Hoang Dinh Chieu*[1], Nguyen Van Hieu[1], Do Anh Duy[1], Nguyen Khac Bat[1], Nguyen Van Nguyen[1]

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ABSTRACT

The investigation and assessment of marine biodiversity and conservation have been significantly implemented and considered in Vietnam in recent years. The remarkable results of marine biodiversity and conservation in Vietnam from 2010 – 2020 were presented in three fields, including: (1) species diversity in the typical marine ecosystems; (2) high techologies applied in marine conservation; (3) establishment and management of the Marine Protected Areas (MPA). Recently, these research results have been applied in MPA management, marine resource enhancement and marine habitat restoration in Vietnam.

KEYWORDS: Marine conservation, marine biodiversity, Viet Nam, 2010 - 2020.

OMBC-2 INTRODUCTION OF TAXONOMIC RESEARCH TRENDS IN KOREA: FOCUS ON HARPACTICOIDS

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ABSTRACT

Korea is a peninsula country with three main marine characteristics. First, East Sea is deep with seasonal cold and warm currents. Second, the South Sea, has complex coastline with many small islands, is directly affected by the Kuroshio warm current. Third, the West Sea (Yellow Sea) has wide tidal flats. These marine characteristics are environmental characteristics in which Korea can have high biodiversity, especially harpacticoids. Taxonomic research on Korean harpacticoids was first initiated by ecologists in the 1980s. After that, researches were conducted by a few professors. However, when the National Institute of Biological Resources (NIBR) opened in 2007, state-led taxonomic research began in earnest. In addition, since the opening of the National Marine Biodiversity Institute of Korea (MABIK) specialized in marine organisms in 2015, state-led investments has been made in taxonomy for marine organism. By 2021, 198 species of Korean marine and brackish-water harpacticoids were recorded in 32 families. The recently published number of new species was six in 2019, nine in 2020, and eight in 2021. In the past, many surveys of harpacticoids diversity were conducted mainly on coastal or intertidal zone that were directly accessible, but recently, studies using grab or diving surveys have been conducted on the subtidal zone. To write a paper about new species, several methods are being used. Morphological description is the most basic for classification of new species. The high-power microscopy (X1,000 magnification) and electron microscope (SEM) have been used for description of morphological characters. Digital drawing has also been used. In some cases, cryptic species are separated using quantitative shape analysis such as the location of the sensilla. Next, the particle DNA sequence information such as COI and 18rRNA is being used to supplement morphological information. It is widely used not only in the classification of species but also in the study of lineage. Next, there is a method of using the component analysis of organisms using MALDI-TOF MS. Research using a combination of these methods will continue to increase the diversity of harpacticoids in Korea. In addition, data obtained through studies will be released online and can be used for research in other fields.

KEYWORDS: Marine conservation, marine biodiversity, Viet Nam, 2010 - 2020.

OMBC-3 MARINE BIODIVERSITY AND CLIMATE CHANGE – PERILS OF MANAGING IN SILOS, AND IMPERATIVES FOR BLENDING MULTIDIMENSIONAL APPROACHES FOR 'THE OCEAN WE WANT ' BY 2030

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ABSTRACT

Climate change is impacting the marine biodiversity which is a major factor in combating the effects of climate change. Increase in the rate of climate change will accelerate the loss of marine biodiversity. Implementing measures that mitigate climate change will also lessen the stress on biodiversity. Protecting 30% of marine area by 2030 will significantly contribute to conserving and restoring the marine natural capital and mitigating the effects of climate change. A synthesis of published data and conceptual analysis have revealed the merits of the '30x30 metrics' which is being discussed as a blueprint for action focusing on marine ecosystem and climate change. The projected benefits of this metrics include safeguarding > 80% of the range of distribution of endangered marine species, ensuring 35% of marine biodiversity benefits, supporting > 8 million tons of extra seafood, sequestering about 30% of carbon, and preventing 90% of the risk of carbon disturbance due to bottom trawling in EEZ that requires protection of only 3.6% of the ocean. Bringing 30% of the marine area under protection will also create enabling conditions for the scientists to establish baselines for measuring the efficiency of conservation interventions, especially monitoring the effectiveness of the application of digital (IR4.0) technologies. These observations can generate accurate data for simulation modelling and address the knowledge gaps about the ocean, >80% of which remains unexplored. Findings of the multiple benefits from marine protected areas and analysis of outcomes from successful case studies support the 30 x 30 blueprint. Such data will be the basis for a long-term management of marine biodiversity and climate-related impacts such as ocean acidification which is evident from decline in pH from 8.2 to 8.1 over last 100 years. Issues of concern are: 38% decrease in marine fish abundance (compared to 1970 level), 50% loss of coral reef cover from the 1950 coverage, degradation of other critical habitats, especially mangroves and seagrasses amounting to 66%, and reduction in global fish stocks that are within biologically sustainable level from 90% in 1970 to 65.8% at present. At stakes are commercial fisheries and seafood security, and other marine ecosystem services. Solutions to these problems require big ideas, data analytics in all the dimensions of sustainability, bold actions, and effective implementation of measures intended for improving the ocean health by 2030.

KEYWORDS: Ocean ecosystem, climate change, impact mitigation, management interventions, sustainability

OMBC-4 A SMALL MANGROVE ISLAND OF PORT DICKSON, NEGERI SEMBILAN

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ABSTRACT

Mangrove Island is applied broadly to include any low island with a substantive portion of mangrove vegetation. Pulau Burong, located 2° 32' 47.8032" N, 101° 47' 10.9674" E, Negeri Sembilan, a 1.72 ha, is an example of a mangrove island with mangroves that are adaptable, clinging to a rocky hard substrate is periodically exposed locations. We employed an aerial drone mapping of the island and ground-truthing walk-over survey to record location, mangrove and associate plant species with GPS, morphology and structural modifications, and phenology status. The drone ortho-image map was loaded in Google Earth, and plants' location and species GPS coordinates were indicated on the map. The drone orthoimage map showed the location distribution of mangroves on rocky outcrops. Walk over survey showed a mangrove assemblage of 7 species that varied in abundance. Sonneratia alba is distributed in the western part of the island. Behind the Sonneratia alba is a thicket of mixed Rhizophora mucronata-R. stylosa. Scattered in the center of the island are the Avicennia marina and a single tree of Avicennia alba, and Lumnitzera littorea and Scyphiphora hydrophyllacea. Except for Sonneratia, all mangrove species are dwarf. They grow sparsely on rocks with their roots in the rock and sediment in cracks rather than on the rocky surface. During the survey, all mangrove species are in flowering and fruiting phases. We want to investigate further if Sonneratia alba and Avicennia species or Rhizophora species are pioneers in developing the mangrove island. This will be discussed in the coming presentation.

KEYWORDS: Drone mapping, Mangroves, Mangrove ecology, Distribution, Pulau Burong

OMBC-5 CORAL COMMUNITY STRUCTURE IN TIOMAN ISLAND MARINE PARK, MALAYSIA

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ABSTRACT

Tioman Island has a remarkably high coral distribution. Hence, evaluating the coral health status in this Marine Park is important for sustainable reef ecosystem management. This study aims to determine the coral condition and distribution using Coral Video Transect (CVT) method at twenty reef sites around the east coast, west coast and the isolated zones of Tioman Island Marine Park. Coral Point Count with Excel extension (CPCe) software was used for coral coverage measurement. The present results indicated that Tioman reefs were in 'fair' average condition with the live corals cover 48.0% ± 0.7. Besides, 254 species from 61 genera and 15 families of the scleractinian hard corals were identified at all reef sites. Following the scleractinian taxonomic classification, coral surveys and past studies revealed 355 species from 67 genera and 15 families with an additional 30 new species records for TIMP and 15 species for the east coast of Peninsular Malaysia. Current data at this island also presented 29 rare, 86 vulnerable, 3 endangered scleractinian species. Moreover, visual photographic analysis using the CPCe software was recorded 77 genera from 24 families of hard and soft corals with Acropora, Montipora and Porites predominantly found in reef assemblages. Overall, it can be concluded that the extensive coastal development and widespread of tourism activities may have influenced on the variations of coral condition and distribution in the study area.

KEYWORDS: Hard coral, Soft coral, Diversity, Abundance, Marine Park, Peninsular Malaysia

OMBC-6 WHALE SHARKS IN MALAYSIA: WHAT WE KNOW

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ABSTRACT

The whale shark Rhincodon typus is the world's largest fish inhabiting tropical and warm temperate waters. The species is epipelagic and forms predictable, coastal aggregations globally, at sites normally associated with feeding opportunities. In Asia, the species was targeted by fisheries into the 2000s leading to declines in regional abundance and, consequently, the species was assessed as Endangered in the IUCN Red List in 2016. There are some signs of recovery however, with the Philippines hosting one of the largest known aggregations globally, and Indonesia hosting over five known aggregation sites. In contrast, little is known about whale sharks in Malaysia. Here, we used citizen science, survey effort and data mining to understand the species in Malaysia. We recorded 162 whale shark encounters from news outlets, social media posts and contributions to the global database 'Wildbook for Whale Sharks' between 1996 and 2021. Of these, 80 whale sharks were individually identified using their unique spot patterns ranging from 3.5 to 6.0 m in total length (mean 4.5 m), most of which we could not determine the sex for (83%). This juvenile dominated population demographic is consistent with data from neighbouring countries. Using photographic-identification (photo-ID) one individual was matched between Pulau Redang (Terengganu) and the Chumphon archipelago in Thailand. Similarly, a whale shark from central Philippines was identified in Pulau Sipadan, Sabah. Both Sipadan and Redang have the highest incidences of whale sharks in Malaysia, albeit these sharks appear to be navigating through these sites like that observed elsewhere (e.g. Galapagos Islands, Ecuador or Koh Tao, Thailand). In contrast, whale sharks encountered along the west coast of Sabah (e.g. Kota Belud, Pulau Gaya) appear to be capitalising on zooplankton prey availability. Through citizen science and online reports, we reported at least four dead whale sharks in Malaysia from anthropogenic causes including plastic ingestion and direct harvest. Further work is needed to elucidate whale shark movements within and away from Malaysia, as well as understanding their feeding ecology and persistent threats.

KEYWORDS: *Rhincodon typus*, photo-ID, citizen science, endangered, migratory

DAY 1 (8TH MARCH 2022)
SESSION 2: NUTRITION AND FEED TECHNOLOGY

Chairperson	Time	Code	Presenter	Title
Prof. Dr. Rossita Shapawi	1030-1045	ONFT-1	Christian Larbi Ayisi	Effects Of Dietary Probiotic Supplementation (*Bacillus subtilis* 200 And *Saccharomyces cerevisiae*) on Growth, Feed Utilization and Proximate Composition of African Bony Tongue (*Heterotis niloticus*)
	1045-1100	ONFT-2	Muhammad Abduh Bin Yazed	Effects Of Dietary Lipid Levels on Gonad Development and Maturation of Female Malaysian Mahseer (*Tor tambroides)* in Captive Condition
	1100-1115	ONFT-3	Ahmad Shahroom	The Effects of Egg-And Sea-Shells Powder as Natural Calcium Supplements in The Diets on Growth Performance, Molting Frequency, Survival Rate, and Body Composition of Juvenile Crayfish, *Cherax quadricarinatus*
	1115-1130	ONFT-4	Hasniyati Binti Muin	Supplementation of Red Seaweed (*Gracilaria changii*) in Black Soldier Fly Larvae Based Feed Improved Growth and Feed Efficiency of Red Hybrid Tilapia
	1130-1145	ONFT-5	Muhammad Shukri Bin Mohd Yusof	Potential of Fly Larva and Anchovy Process Waste Powder as Protein Source in Tilapia Fish Pellet.
	1145-1200	ONFT-6	Dayang Nur Jazlyn Binti Abang Zamhari	Dietary Butyric Acid Supplementation in High Plant Protein Diets on Giant Grouper (*Epinephelus lanceolatus*) Juveniles
	1200-1230		DISCUSSION (Question and Answer)	

ONFT-1 EFFECTS OF DIETARY PROBIOTIC SUPPLEMENTATION (*Bacillus subtilis* 200 AND *Saccharomyces* cerevisiae) ON GROWTH, FEED UTILIZATION AND PROXIMATE COMPOSITION OF AFRICAN BONY TONGUE (*Heterotis niloticus*)

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ABSTRACT

KEYWORDS: *Heterotis niloticus*, Bacillus subtilis 200, *Saccaromyeces cerevisae*, growth performance, feed utilization

ONFT-2 EFFECTS OF DIETARY LIPID LEVELS ON GONAD DEVELOPMENT AND MATURATION OF FEMALE MALAYSIAN MAHSEER (*Tor tambroides*) IN CAPTIVE CONDITION

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ABSTRACT

The present research was conducted to investigate the effects of different lipid levels on the gonad development of female Tor tambroides broodstocks, a high value freshwater fish. Four isonitrogenous (450 g kg^{-1} crude protein) diets containing 60, 82, 105 and 128 g kg^{-1} of lipid (0, 2.5, 5.0 and 7.5% lipid inclusion respectively) were formulated to contain fish oil to corn oil ratio of 1:1, and fed to female fish (n = 5 fish × 2 replicate × 4 treatments; average weight = 1850 ± 130g) for five months. Based on the gonadosomatic index (GSI), there was a significant difference ($p<0.05$) between fish fed with a diet containing 82 g kg^{-1} of lipid (1.47 ± 0.57) and fish fed with a diet containing 128 g kg^{-1} (0.15 ± 0.06). For histological observations on the gonad cell, fish fed with a diet containing 82 g kg^{-1} has a higher percentage of Stage 4 (13.3 ± 4.18%),5 (17.7 ± 7.84%), and 6 (1.3 ± 0.88%) oocytes at the gonad posterior where none of these stages were found in the gonad of 128 g kg^{-1} treated fish. The higher GSI for fish fed with a diet containing 82 g kg^{-1} of lipid also contributed to significantly higher ($p<0.05$) 17β-oestradiol levels (0.75 ng ml^{-1}) at 12-hour post-Ovaprim injection compared to fish fed with diets containing 60 (0.36 ng ml^{-1}), 105 (0.29 ng ml^{-1}) and 128 g kg-1 (0.28 ng ml^{-1}) of lipid. Results obtained in the present study highlight the importance of optimal level of lipid to promote gonad development of T. tambroides.

KEYWORDS: Kelah, oestradiol, oocytes, vitellogenesis.

ONFT-3 THE EFFECTS OF EGG-AND SEA-SHELLS POWDER AS NATURAL CALCIUM SUPPLEMENTS IN THE DIETS ON GROWTH PERFORMANCE, MOLTING FREQUENCY, SURVIVAL RATE, AND BODY COMPOSITION OF JUVENILE RED CLAW CRAYFISH *Cherax quadricarinatus*

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ABSTRACT

The effects of egg-and sea-shells powder as natural calcium supplements in the diets on growth performance, molting frequency, survival rate, and body composition of juvenile crayfish, Cherax quadricarinatus were studied. Formulated diets containing 30% protein and 8% lipid were prepared using supplementation of 0 (control), 3%, 6%, 9% eggshell, and 6% seashell. Mixe frozen vegetable containing 26% protein and 5% lipid was also used to compare the performance between formulated feed and commonly used diets in commercial practice. Cherax quadricarinatus juvenile with an average total weight of 0.21 ± 0.01 g and length of 25.0 ± 0.10 mm (TL) were obtained from 10 ovigerous females bred in captivity, and stocked in 0.6 m² aquarium at a rate of 8 crayfish per replicate for individual performance and 12 crayfish per replicate for group performance. The addition of egg and sea-shells powder exerted positive effects on the growth performance, molting frequency, survival of red claw crayfish. Crayfish fed with a 6% eggshell supplemented diet exhibited the highest weight gain (average group and individual: 349.47 – 370.85 g), specific growth rate (average SGR group and individual: 2.50 – 2.60 % / day), survival rate (average group and individual:70 - 80 %), highest molting frequency (average group and individual: 3.19 – 3.21) and lowest feed conversion ratio (average FCR group and individual: 1.51 – 1.68). The final growth of grouped crayfish was significantly higher compared to individual crayfish. There was no significant difference (P>0.05) in calcium percentage of exoskeleton for both group and individual experiments. Similarly, the performance of diets based on eggshell and seashell was not significantly different (P>0.05). Considering the low cost and abundance of egg-shell, the addition of 6% eggshell into the diet is recommended for the best growth of juvenile Cherax quadricarinatus.

KEYWORDS: Juvenile red claw crayfish, calcium supplements, eggshell, seashell, diet treatment. *Cherax quadricarinatus*

ONFT-4 SUPPLEMENTATION OF RED SEAWEED (*Gracilaria Changii*) IN BLACK SOLDIER LARVAE BASED FEED IMPROVED GROWTH AND FEED EFFICIENCY OF RED HYBRID TILAPIA

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ABSTRACT

A previous study reported that black soldier fly larvae (BSFL) could only replace FM at 50% in the tilapia diet. Hence, this study aimed to improve the formulation by supplementation of red seaweed, Glacilaria changii (GC) at a different percentage to reduce the FM utilization in red hybrid tilapia (O. niloticus x O. mosambicus). All diets were based on 30% protein (isonitrogenous), 10% lipid (isolipidic) and 19 kJ/g energy (isoenergetic) contents. This study used two types of control feeds, namely C1, which contains 30% FM, and C2 contains FM and BSFL at a ratio of 1:1 (15%:15%). Another four formulated feeds were provided with 15% BSFL + 15% FM, and each diet were supplemented with GC at 4.5% (GC4.5), 7.5% (GC7.5), 10.5% (GC10.5), and 15% (GC15). Each feed was randomly assigned to triplicate treatments with 20 fish per tank. The fish was fed twice daily at 3% of their body weight ratio for 12 weeks, and the growth parameters were monitored. The supplementation of GC did not significantly affect the hepatosomatic indices of the fish in all treatments. However, the condition factor of fish fed with GC7.5 and GC10.5 improved compared to other treatments. Fish supplemented with GC7.5 shows better feed intake and growth performance than other groups. In addition, the inclusion of GC in all treatments resulted in good protein and lipid content than the control diets. This finding demonstrated that supplementation of GC at 7.5% could enhance the performance of red hybrid tilapia.

KEYWORDS: *Gracilaria changii,* Black soldier fly larvae, growth performance, Red hybrid tilapia, feed efficiency

ONFT-5 POTENTIAL OF FLY LARVA AND ANCHOVY PROCESS WASTE POWDER AS PROTEIN SOURCE IN TILAPIA FISH PELLET

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ABSTRACT

Feeding is one of the most crucial aspects of fish culture activities. The rise of pellet prices due to the lack of raw material has led the farmers to shift to alternative protein sources. This research aims to study the potential of fly larva flour and anchovy process waste as a cheap alternative protein source for tilapia farming. Tilapia fishes with average length were divided into four different treatments. T1 is a control treatment (fish pellet) while T2, T3 and T4 contain a mixture of fly larva powder and anchovy process waste powder (45%, 50% and 55% mixture of fly larva flour and anchovy head flour). Fish growth rate, survival rate and water quality were recorded weekly throughout the study period. Data analysis shows that there are no significant differences amongst each treatment. This study result indicates that fish supplied with a mixture of fly larva powder and anchovy process waste powder shared the same growth rate as the fish supplied with commercial pellets.

KEYWORDS: Alternative protein, Anchovy, Feed, Pellet

ONFT-6 DIETARY BUTYRIC ACID SUPPLEMENTATION IN HIGH PLANT PROTEIN DIETS ON GIANT GROUPER (*Epinephelus* lanceolatus) JUVENILES

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ABSTRACT

This study was conducted to investigate the effects of organic acid supplementation on 50% soybean meal replacement on the growth performance, hepatic condition and intestinal histology of giant grouper Epinephelus lanceolatus. Fish were fed two experimental diets, one with organic acid (SBM50 + 1%) and one without organic acid (SBM50) with one control diet which is an all-fishmeal diet (FM). Formulated diets were isoproteic (48%) and isolipidic (12%). Experiment fish were cultured in a recirculating seawater system and fed twice daily until apparent satiation. Growth performance, hepatic condition and histological changes were observed in this study. Highest growth was seen in fish fed FM ($p < 0.05$) followed by SBM50 and SBM50 + 1% with SBM50 + 1% being significantly lowest. Feed conversion ratio and protein efficiency ratio was also seen better in fish fed FM ($p < 0.05$) and it follows similar trend with growth performance. For the hepatic condition, superoxide dismutase activity was high in fish fed FM, followed by SBM50 + 1% and SBM50 but not significant meanwhile, thiobarbituric acid reactive substances (TBARS) was found significantly lower in fish fed FM ($p < 0.05$) followed by SBM50 + 1% and SBM50. Hepatocytes were also seen significantly bigger in fish fed FM ($p < 0.05$) thus having higher glycogen content ($p < 0.05$) compared to SBM50 and SBM50 + 1%. The inclusion of 1% butyric acid in 50% soybean meal replacement did not gave positive effects on the fish growth however it showed mitigating effects on inflamed intestines although not significant. Overall, 1% butyric acid did not help optimize the high plant protein replacement for giant grouper juveniles.

KEYWORDS: *Giant grouper (Epinephelus lanceolatus), high plant protein replacement, growth performance, hepatic condition, histological changes*

DAY 1 (8TH MARCH 2022)
SESSION 3: MARINE POLLUTION AND OCEAN HEALTH

Chairperson	Time	Code	Presenter	Title
Assoc. Prof. Dr. Abentin Estim	1030-1045	OMPOH-1	Adiana Ghazali	The Geochemistry Exploration of Metals in Brunei Bay
	1045-1100	OMPOH -2	Shellyn Prastisia Mberato	Study of Water Quality Level Using Diversity and Saprobic Indexes of Phytoplankton in Manado Bay, North Sulawesi
	1100-1115	OMPOH -3	Jeszy Novianti Andakke	Characteristics of Macro and Meso Debris Along the Cost of Manado Bay, North Sulawesi, Indonesia
	1115-1130	OMPOH -4	Dede Falahudin	Persistent Organic Pollutants in Mangrove Sediments From Bintan Island, Indonesia: Characteristics, Potential Sources, And Ecological Risk Assessment
	1130-1145	OMPOH -5	Ong Meng Chuan	Heavy Metals Level in Oyster (*Crassostrea* spp.) of the South China Sea Region
	1145-1200	OMPOH -6	Lavannia Ravikumar	Determination of Heavy Metals Concentration in Green-Lipped Mussels, *Perna viridis* (Linnaeus), From Straits of Johor
	1200-1230		DISCUSSION (Question and Answer)	

OMPOH-1 THE GEOCHEMISTRY EXPLORATION OF METALS IN BRUNEI BAY

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ABSTRACT

The geochemistry of metals was investigated in the Brunei Bay sediment cores of the Malaysian waters. Four sediment cores were sampled with the purpose of assessing any possible pollution causes by aluminium (Al), cadmium (Cd), copper (Cu), chromium (Cr), iron (Fe) and lead (Pb). Metals total concentration, geochemical interpretation on metals, sediment physico-chemical characteristic as well as the metals fractionation were carried as per discussed in the methodology. In general, the selected metals have different enrichment or depletion pattern in each sediment core. The LB sediment core has the highest average of metals compared to other sediment cores. Brunei Bay sediment was dominant by silt with low total organic content. However, both parameters were not affecting the concentration of metals in the bay sediment. Largely, all metals in all sediment cores are classified as uncontaminated to moderately contaminate except for Pb. During the period of 1980's, Pb was moderately to strongly contaminated LB sediment core. It was most probably caused by the high usage of local boat and Labuan Port activities. The risk assessment code analysis has exhibited that only Cu has low risk on the benthic health in Brunei Bay sediment especially for B5 and B7 sediment core. In overall, Brunei Bay sediment shows no significant pollution caused by the metals, however the metals enrichment behavior may lead to a serious metals pollution concern on Brunei Bay ecosystem in the future.

KEYWORDS: Metals, sediment cores, Brunei Bay, risk assessment

OMPOH-2 STUDY OF WATER QUALITY LEVEL USING DIVERSITY AND SAPROBIC INDEXES OF PHYTOPLANKTON IN MANADO BAY, NORTH SULAWESI

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ABSTRACT

The purpose of this study was to determine the level of water pollution by using phytoplankton as bioindicators in Manado Bay, North Sulawesi. Sampling was carried out during September 2021 (transitional season II) by doing 3 repetitions with an interval of 2 weeks. The research method used a purposive random horizontally sampling. This sampling was collected from 4 locations. Some of the parameters studied were the saprobic index and the phytoplankton diversity index. The results showed that the saprobic index and diversity index of plankton ranged from 1.33 to 1.47 and 1.72 to 1.98, respectively. The result showed that 3 of 4 locations were susceptible to organic pollution from household waste residues, marine transportation activities, settlements, and the presence of rivers, the other location was reduced because it was long far from anthropogenic activities. Based on saprobic index, Manado bay's water quality were β- Mesosaprobic or categorizes as lightly to moderately polluted. Meanwhile, diversity index of phytoplankton was 1.72-1.98 or categorized as moderately polluted. Based on these criterions, it is concluded that the biological quality of the waters in Manado Bay, North Sulawesi is moderately polluted.

KEYWORDS: Water Pollution, Phytoplankton, Saprobic Index, Diversity Index, Manado Bay

OMPOH-3 CHARACTERISTICS OF MACRO AND MESO DEBRIS ALONG THE COST OF MANADO BAY, NORTH SULAWESI, INDONESIA

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ABSTRACT

The abundance of garbage in Manado City reaches 126,770 kg consisting of 76.84% organic waste and 18.51% plastic waste (World Banks, 2018). Manado City's garbage heaps increase every year because it has no debris nets on its river estuaries. The garbage from settlements was carried through the river, causing heaps of waste in the waters around Manado Bay. This waste can threaten the ecosystem and Manado City tourism area, so research on marine debris that washed up on the beach around Manado Bay needs to be done. This study was conducted in August 2021 (Summer Monsoon). Meso debris (0.5-2.5 cm) and macro debris (>2.5 cm) were collected from 5 beaches in Manado Bay during flood and ebb tide. Assessment of marine debris about abundance and composition was assessed by beach litter. Data collection was carried out using the Guidelines Beach Litter Monitoring by the Ministry of Environment and Forestry Republic of Indonesia 2020. The study showed that meso and macro debris in 5 locations has various types, sizes, densities, and colors. In general, macro debris was dominant more than meso debris.

KEYWORDS: Macro debris, meso debris, beach litter, abundance, composition, Manado

OMPOH-4 PERSISTENT ORGANIC POLLUTANTS IN MANGROVE SEDIMENTS FROM BINTAN ISLAND, INDONESIA: CHARACTERISTICS, POTENTIAL SOURCES, AND ECOLOGICAL RISK ASSESSMENT

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ABSTRACT

The first comprehensive analysis of persistent organic pollutants (POPs), including 209 congeners of polychlorinated biphenyls (PCBs), 38 polybrominated diphenyl ethers (PBDEs) congeners, and four alternative PBDEs—decabromodiphenyl ethane (DBDPE); 1,2-bis(2,4,6-tribromophenoxy)ethane (BTBPE); pentabromoethylbenzene (PBEB), and 2,2′ ,4,4′ ,5,5′ -hexabromobiphenyl (BB-153), were determined in the ten mangrove sediments from Bintan Island, Riau Islands Province, Indonesia. Concentrations of ∑92PCBs, ∑10PBDEs, BDE209, and PBEB in mangrove sediments ranged from 1.4 to 5.0, 0.068–0.85, not detected–11, and not detected–0.013 ng g-1 dry weight, respectively. Proportion of low chlorinated PCBs (2-Cl, 3-Cl, 4-Cl and 5-Cl) to total PCBs was between 66% and 84% (mean 75%) with tetra-CB was the most abundant homolog. As for PBDEs, BDE-77 was predominant congeners with a proportion of 38%, but BDE-47 was the most frequency detected congener at all sampling sites. Unintentionally produced PCB might be a predominant potential source of PCBs with proportion to total PCBs between 17% and 53%, with PCB 11 as predominant congener. Risk assessments of total PCBs, dioxin-like PCBs, and PBDEs showed that ecological risk of PCBs and PBDEs to sediment dwelling organisms might be negligible. However, further investigation is needed because of potential bioaccumulation of PCBs, PBDEs, and other POPs in mangrove organisms or seafood aquaculture and potential transfer to the higher levels on mangrove food web and risk for human. The present study contributes to the very rare data on the function of mangrove ecosystem as accumulation zone of POPs and their further remediation potential for contaminated sediment.

KEYWORDS: PCBs, PBDEs, PBEB, mangrove sediment, Bintan Island, Indonesia

OMPOH-5 HEAVY METALS LEVEL IN OYSTER (*Crassostrea* spp.) OF THE SOUTH CHINA SEA REGION

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ABSTRACT

Heavy metals pollution has been happening for many years due to increasing anthropogenic activities and natural occurrences such as weathering and volcanic eruptions. Coastal areas are the most vulnerable areas to all the pollution from the uplands. This study aimed to collect the data and determine the pollution status using oysters from Crassostrea spp. as a biomarker from the compiled data from South China Sea research articles. Only articles from the year 2010 until 2021 were selected in this study. In order to determine and calculate the pollution status of heavy metals in Crassostrea spp., data have been collected by extracting findings in research papers from South China Sea regions and making comparisons between the species and types of metals. Data extraction was done to further identify the pollution status by calculating the metal pollution index (MPI) value of each metal to evaluate the safety level for shellfish consumption. In general, heavy metal concentrations between the six main metals observed in this study were found to decrease in the sequence of Cu > Zn > Cd > Pb > Hg > As in soft tissue, gill and stomach. Highly toxic metals found in studied oysters are concerning as both Zn and Cu show a value exceeding the maximum fixed value and directly proportional to their MPI value. The high mean concentration of Zn is proven by the number of anthropogenic activities in the study area such as agriculture that widely use pesticides and fertilisers. Effective legislation such as Food Regulations 1985 in Malaysia or Food and Drug Administration's are needed to reduce and control environmental pollution and food contamination by heavy metals.

KEYWORDS: heavy metal, oyster, *Crassostrea* spp., South China Sea, metal pollution index

OMPOH-6 DETERMINATION OF HEAVY METALS CONCENTRATION IN GREEN-LIPPED MUSSELS, *Perna viridis* (LINNAEUS), FROM STRAITS OF JOHOR

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ABSTRACT

Green-lipped mussel, P. viridis collected from the Straits of Johor were analysed to determine the level of selected metal concentrations and their potential ecological risks. A total of 100 adults cultured P. viridis were sampled from Kupang Fresh Market and 36 adults wild P. viridis were collected from Sg. Kong Kong, Straits of Johor to indicate their level of contamination using the pollution load index (PLI). The concentrations of selected heavy metals (As, Cd, Cu, Pb, T-Hg and Zn) were determined using an Inductively Coupled Plasma Mass Spectrometer (ICP-MS) after closed digestion with Suprapur Nitric acid (HNO_3). The average concentration of cultured P. viridis for As, Cd, Cu, Pb, T-Hg and Zn were 6.58±0.96 µg/g dw, 0.18±0.06 µg/g dw, 10.4±3.10 µg/g dw., 0.44±0.17 µg/g dw, 0.043±0.014 µg/g dw and 43.2±12.4 µg/g dry weights, respectively. On the other hand, the concentrations of wild P. viridis for As, Cd, Cu, Pb, T-Hg and Zn were 9.06±1.27 µg/g dw, 0.22±0.04 µg/g dw, 14.4±2.14 µg/g dw, 0.92±0.23 µg/g dw, 0.069±0.039 µg/g dw and 54.5±15.0 µg/g dw, respectively. The concentrations were significantly higher in the wild compared to cultured mussels. The overall PLI value was 0.73 and 1.06 for cultured and wild P. viridis, respectively, establishing that both the P. viridis are considered as unpolluted. Furthermore, Cd, Pb and Zn in cultured samples whilst all metals except Pb for wild samples were well correlated with the P. viridis sizes indicating that metals concentrations increased with the size. This study revealed that concentrations of heavy metals in both P. viridis samples were within the prescribed guideline values established by the regulatory bodies except for Zn. Generally, the P. viridis from the Straits of Johor are still safe to be consumed. Consistent monitoring of pollution status in the study area is encouraged to minimise the health risk of the surrounding community and deterioration of the aquatic ecosystem.

KEYWORDS: *heavy metal, Perna Viridis, green-lipped mussel, pollution, Straits of Johor*

vICOMSA 2022 MSMS Special Session

BEACONS OF HOPE: SECURING OUR MARINE ECOSYSTEMS FOR A BRIGHTER FUTURE

Marine ecosystems such as mangrove forests, coral reefs and seagrass meadows contain high biodiversity, which may include unique marine flora and fauna. They provide goods and services to people worldwide, directly or indirectly, in the form of food, coastline protection, tourism, pharmaceuticals, and other sources of income. They also usually hold great recreational and cultural importance for local communities.

Areas which contain these marine ecosystems often have higher biodiversity than other areas or provide essential ecosystem services and therefore are potentially important for the food security and economy of a country like Malaysia. It is imperative to identify these areas in order to protect, preserve and manage them effectively.

The ninth meeting of the Conference of the Parties (COP 9) to the Convention on Biological Diversity (CBD) adopted specific scientific criteria for identifying ecologically or biologically significant marine areas (EBSAs) to be suggested for protection.

The invited speakers in this session will focus on EBSAs in Malaysia, particularly on coral reefs, seagrass and mangrove ecosystems.

DAY 1 (8TH MARCH 2022)
SESSION 4: SPECIAL SESSION - BEACONS OF HOPE: SECURING OUR MARINE ECOSYSTEMS FOR A BRIGHTER FUTURE

Chairperson	Time	Code	Presenter	Title
Dr. Aazani Mujahid	1445-1500	MSMS-1	Zarinah Waheed	Coral Reefs of Malaysia: Status and Trends
	1500-1515	MSMS-2	Muhammad Ali Syed Hussein	Mangrove Forest Utilisation in Sabah
	1515-1530	MSMS-3	Jillian Ooi	Splendor in the Seagrasslands of Mersing
	1530-1545	MSMS-4	Irwan Isnain	Sipadan Island, Malaysia: An Important Sea Turtle Nesting and Foraging Grounds in The Celebes Sea
	1545-1600	MSMS-5	Affendi Yang Amri	Knowing Malaysia's Important Marine Areas
	1600-1625		DISCUSSION (Question and Answer)	

MSMS-1 CORAL REEFS OF MALAYSIA: STATUS AND TRENDS

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ABSTRACT

The coral reefs of Malaysia are primarily fringing and patch reefs. Large concentrations of reefs are found in East Malaysia, particularly on the northern and eastern coast of Sabah. The east coast of Sabah is within the scientific boundary of the Coral Triangle, the area with the highest marine biodiversity in the world. In Peninsular Malaysia, most of the clear water reefs are fringing the offshore islands in the South China Sea, while the reefs of the Strait of Malacca are few and far between and are mostly in turbid waters. In a recent report, the status and trends of the coral reefs of Malaysia was analysed based on coral cover data collected from over 200 reefs across the country from 2010 to 2018. This presentation will highlight the results of the report including the drivers and pressures to the coral reefs of Malaysia.

KEYWORDS: Coral cover, threats to coral reefs, Peninsular Malaysia, Sabah, Sarawak

MSMS-2 MANGROVE FOREST UTILISATION IN SABAH

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ABSTRACT

The total mangrove area is Sabah has been estimated to be approximately 380,000 hectares, or about 60% of the mangroves in Malaysia. Home of unique and iconic wildlife such as the fireflies, archerfish, mudskippers, otters, proboscis monkeys, saltwater crocodiles, even dolphins; mangroves could be promoted as popular tourist attraction. Most of the mangrove areas in Sabah are classified as mangrove forest reserves under the Sabah Forestry Department. Mangrove timber used for construction pile and charcoal production are extracted from the Class V mangrove forest reserves. The surrounding shallow coastal areas are fertile fishing grounds for prawn, anchovy, and other fisheries resources. Throughout the state, local communities conduct artisanal fishing and gleaning activities for economic benefits and self-sustenance. Local communities can be found living along the mangrove river channels. Closer to larger cities and towns, mangroves are lost or fragmented due to development and human habitation.

KEYWORDS: Ecosystem connectivity, forest reserve, Ramsar site, fisheries resource, mangrove products

MSMS-3 SPLENDOR IN THE SEAGRASSLANDS OF MERSING

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ABSTRACT

The district of Mersing, located on the northeast coast of Johor, is a Malaysian hotspot for seagrasses. Extensive seagrass meadows occur along the shore of Mersing town, as well as around the offshore marine park islands. In this talk, the iconic meadows of Pulau Sibu, Pulau Tinggi, Pulau Babi Besar, and Pulau Setindan will be described. Evidence for their function as fish habitats and dugong feeding areas will be presented. These meadows have been mapped and monitored, albeit patchily, since 2009, and insights into the baseline health status of these meadows will be provided. With this, it is hoped that the splendor of Mersing's seagrasslands will be recognized, leading to conservation measures that grant direct protection to this critically important ecosystem.

KEYWORDS: Johor, ecosystem functions and services, seagrass-coral connectivity, plant abundance

MSMS-4 SIPADAN ISLAND, MALAYSIA: AN IMPORTANT SEA TURTLE NESTING AND FORAGING GROUNDS IN THE CELEBES SEA

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ABSTRACT

Sipadan Island Park provides nesting and foraging grounds for sea turtles in the Celebes Sea (Malaysia). Sea turtle conservation on the island had been initiated since the 1980s or much earlier, however, monitoring and data recording was inconsistent, not until 2005. In this paper, we analyzed nesting data collected from 2005 – 2020, and morphometric data of sea turtles from foraging ground (2010 & 2011). Analysis of the 16-years nesting data recorded a total of 9, 975 green turtles (Chelonia mydas) and 63 hawksbills (Eretmochelys imbricata) turtle nests. Nesting occurred throughout the year for the green ranging from 298 to 1,037 nesting (mean ± std. dev. = 623.44 ± 227.19), and hawksbill turtles ranging from 1 to 11 nesting (mean± std. dev. = 4 ± 3.70) with peak nesting from June to September, and August recorded as the peak nesting season. A decreasing nesting trend at 12% in annual abundance was estimated. Mean hatching success was 40.53% ranging from 23.0% and 71.6%. Two species of sea turtles were found foraging around Sipadan waters, the green (93.6%) and hawksbill turtles (6.4%). Foraging sea turtles were mixtures of different size classes (range: 38.20 – 100.00 cm) with large aggregations dominated by juveniles (58%). External observation classified the sex of foraging turtles as female (11%), male (7%) and unknown sex (82%). Information on the nesting and foraging sea turtles is very important especially as critical baseline for sea turtle conservation and future management effort in Sipadan Island.

KEYWORDS: Green turtle, hawksbill turtle, reproductive output, foraging aggregations, Celebes Sea, Coral Triangle Area

MSMS-5 KNOWING MALAYSIA'S IMPORTANT MARINE AREAS

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ABSTRACT

Malaysia is one of the high biodiversity nations of the world. This is due not only to the flora and fauna of our terrestrial but also our marine areas. The important terrestrial areas have mostly been identified such as The Belum Rainforest and The Danum Valley. However, our important marine areas have not been fully identified due to its vastness and its relative inaccessibility. This presentation will highlight a few of the important marine areas of Malaysia which has coral reefs, mangroves and the least known ecosystem which is the seagrass beds. It is hoped that this will inspire and improve the conservation priorities and management of Malaysian marine areas.

KEYWORDS: green turtle, hawksbill turtle, reproductive output, foraging aggregations, Celebes Sea, Coral Triangle Area

DAY 1 (8TH MARCH 2022)
SESSION 5: SPECIAL SESSION - PHYSIOLOGY AND BEHAVIOUR IN AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
Dr. Mohammad Tamrin bin Mohamad Lal	1445-1500	PBAF-1	Lim Leong Seng	Sugars Are Potential Chemoattractant to Mud Crab, *Scylla tranquebarica* as Determined Behaviourally
	1500-1515	PBAF-2	Karsoon Tan	Impacts of Severe Winter on Bivalve Aquaculture
	1515-1530	PBAF-3	Tan Kian Ann	The Sex Reversal of Male *Macrobrachium rosenbergii* via siRNA Knockdown
	1530-1545	PBAF-4	Liew Hon Jung	Climate Warming Induces Air-Breathing Fish Remodel Their Physiological Response and Social Courtship Differently
	1545-1600	PBAF-5	ZhenHua Ma	Acute Acidification Stress Weakens The Head Kidney Immune Function of Juvenile *Lates calcarifer*
	1600-1625	DISCUSSION (Question and Answer)		

PBAF-1 SUGARS ARE POTENTIAL CHEMOATTRACTANT TO MUD CRAB, *Scylla tranquebarica* AS DETERMINED BEHAVIOURALLY

Leong-Seng Lim*[1], Kit-Shing Liew[1], Hon Jung Liew[2] and Gunzo Kawamura[1]

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ABSTRACT

The Scylla mud crabs are high-value commercial portunid crabs in Southeast Asia. In aquaculture, mud crabs are commonly fed with the low value fish and bivalves. However, mud crabs are slow eaters hence feed spoilage and deterioration of water quality often happened in the rearing tanks, causing disease outbreak and mass mortality to the cultured mud crabs. To solve this problem, identifying the suitable chemoattractant for mud crabs is necessary to aid them in food searching, and reduce their time spent in food detection. Sugars are common chemoattractant to decapod crustaceans but its attractiveness to mud crabs is still unknown. The present study was conducted to identify the potential chemoattractants from sugars for the mud crab, Scylla tranquebarica. In the experiment, feeding response of the S. tranquebarica (10 individuals, CW: 8.5 - 9.5 cm; BW: 110 - 160 g) to 6 sugars (glucose, galactose, sucrose, fructose, maltose, and mannose) at 0.01, 0.1, 1.0 M were examined, with the clam extract and seawater as the positive and negative controls, respectively. These substances were delivered to the mud crabs through the pipetting method and the mud crab response was evaluated using the scoring methods (from 0 - 3): (0) no response; (1) increase in antennular flicking; (2) increase in mouthparts movement; and (3) probing movement made by chelipeds and walking legs. The 95% confidence intervals of the mean scores (MS) were used to detect the significant difference among the treatments. At 0.01 M, the MS from all sugars were low, ranging from 0.1 to 1. At 0.1 M, the MS from all sugars were improved, ranging from 0.8 - 1.8. Although these results were significantly higher ($P<0.05$) than that of seawater, there were generally lower than the clam extract with significant ($P<0.05$). At 1.0 M, sucrose and galactose attained the highest MS (2.0), although these results were not significantly higher than those from glucose (1.9) and maltose (1.6). In conclusion, sucrose, galactose, glucose, and maltose were the potent chemoattractants to the S. tranquebarica. Further test with the higher concentration levels (>1.0 M) of these sugars is recommended, to determine their optimum levels for being an efficient chemoattractant to the S. tranquebarica.

KEYWORDS: Crustaceans, glucose, galactose, sucrose, fructose, feeding behaviour

PBAF-2 IMPACTS OF SEVERE WINTER ON BIVALVE AQUACULTURE

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ABSTRACT

Multiple lines of evidences, ranging from time series field observations to climate change simulation experiments, have shown that the driving factors of climate change have a negative impact on bivalves. The impacts of some climate change drivers, especially global warming and ocean acidification, on bivalves have been reviewed comprehensively. However, the impact of severe winter, a relatively less popular climate change driver but yet an important factor affecting bivalves, has received little attention. Therefore, this article reviews relevant data published on specific research questions to improve the understanding of diverse evidences. In general, many studies have shown that mid-latitudes, especially North America, Europe and Asia, experience severe winters more and more frequently. This is due to the fact that the north pole regions are warming much faster than the equator, and the jet stream in polar regions weakens, prompting the flow of cold air from Arctic to mid-latitudes. The increasingly severe winter events can have various effects on the survival, reproduction, recruitment and physiology of bivalves. This review is helpful to clarify the current state of research and determine the direction of research on the impacts of severe winter on bivalves in the future.

KEYWORDS: climate change; sever winter; bivalves; mass mortality; aquaculture; future studies

PBAF-3 THE SEX REVERSAL OF MALE *Macrobrachium rosenbergii* VIA siRNA KNOCKDOWN

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ABSTRACT

The giant freshwater prawn (Macrobrachium rosenbergii) is the largest paleamonid prawn, which originated in the Indo-Pacific and was distributed to countries in Southeast Asia. In aquaculture industry, male M. rosenbergii generally exhibit faster growth than female, and the size variation in a population unfavors commercial production. Consequently, the practice of culturing monosex (all-male) was developed and it is able to increase both the production yield and income. Manually selecting males for culture during the grow-out period has been practiced in commercial prawn farming, however, it is labour-intensive and generally unsuccessful in producing a male monoculture. Previous study revealed that the androgenic gland is essential for sexual differentiation, development, and maintaining the sexual morphotype features in male M. rosenbergii. Hence, the androgenic gland ablation, and the knockdown of MrIAG and MrIR via dsRNA and siRNA method may induce sex reversal, turning male to neo-female. The mating of neo-female with normal male will produce all male progeny which favors the monosex culture. In this study, siRNA knockdown method was implemented to silence the MrIAG and MrIR in M. rosenbergii. The findings revealed that 0.5 ug/g is the optimum dosage to silence the MrIAG and MrIR. RT-qPCR results indicated that 0.5 ug/g can efficiently reduce the expression of MrIAG and MrIR in testis and androgenic gland. Through histological observations, it is inferred that the 0.5 ug/g can effectively retarded spermatogenesis in testis, it is found that the seminiferous lobules were loosely arranged, and only spermatocytes could be observed. Morphologically, neo-females developed as female prawns that have brood chamber, setal buds, ovipositing setae, and ovigerous setae.

KEYWORDS: *Macrobrachium rosenbergii*; sex reversal; siRNA knockdown; *MrIAG*; *MrIR*.

PBAF-4 CLIMATE WARMING INDUCES AIR-BREATHING FISH REMODEL THEIR PHYSIOLOGICAL RESPONSE AND SOCIAL COURTSHIP DIFFERENTLY

Hon Jung Liew*[,1,5], Sharifah Rahmah[1,2], Leong-Seng Lim[6] and Mazlan Abd Ghaffar[1,3,4]

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ABSTRACT

Knowledge about the resilience of aquatic ectothermic life under climate warming has been researching intensively. Not only ocean but freshwater environment also highly vulnerable to climate warming due to narrow buffer capability that threatening many freshwater species. Especially pelagic communities that living at their upper limit of physiological tolerance such as labyrinth fish. Gourami, a member of labyrinth is a native species to Southeast Asia with important roles contributed to both economically and ecologically. Traditionally, gourami was cultured integrated with paddy to control unwanted insects and harvested for local authentic delicacies as protein source, as well as for ornamental purposes. Nevertheless, not much research being focus to research this species under current climate changing scenario. Therefore with these knowledge as background, this study was planned to investigate the impact of warming environment temperature (28 vs. 34°C) on feeding, physiological and reproductive performances of gourami. Physiological responses was assessed by using respirometry assay, while spawning performance was investigated via selective pairing natural spawning method. Fishes were gradually adapted from 28°C to 34°C within two weeks prior to respirometry assay and spawning performance were monitored for six months. As expected, high metabolic oxygen intake was recorded under high environment temperature. Moreover, our results also showed that 34°C depressed feeding, mating and spawning performances. Nest bubbles were small in size and scattered that resulted in low hatching and survival rates. Evidently, gourami lost their courtship interactive interest prior-during-past spawning. With all of these information obtained highlighted that climate warming highly impair overall feeding, reproduction performance and basal metabolism responses of gourami.

KEYWORDS: Air-breathing fish, climate warming, spawning, physiology, behaviour

PBAF-5 ACUTE ACIDIFICATION STRESS WEAKENS THE HEAD KIDNEY IMMUNE FUNCTION OF JUVENILE *Lates calcarifer*

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ABSTRACT

Acidized water environment can impact many physiological processes of aquatic animals. The response of the head kidney to acidification, especially the immune response, is of great significance to health. This study analyzed the histological and transcriptional changes under different acidification levels (C group, pH 8.1; P group, pH 7.4; E group, pH 3.5) in the short term (12 h, 36 h and 60 h) in the head kidney of juvenile L. calcarifer. The results showed that the acidification of the water environment caused tissue damage to the head kidney of L. calcarifer, and the damage appeared earlier and was stronger in the extreme pH group. The transcriptional response of L. calcarifer head kidney increased with the increase of acidification level. The two treatments transcriptional responses showed different trends in terms of time. After KEGG function enrichment, with the increase of stimulation time, the proportion of down-regulated pathways was increasing, and the types of pathway enrichment at different acidification levels were quite different at the initial stage. At 12 h, the first category in the P group with the most significant number of pathways was 'Metabolism', and the first category in the E group with the largest number of pathways was 'Human Diseases'. At 60 h, the enrichment pathways of the two groups were highly overlapping in immune-related pathways, which contained 26 common DEGs. They had a dominant expression pattern. In the P group, the expression level decreased with time. In the E group, the down-regulation degree of expression level at 12 h reached the level of the P group at 60 h, and the expression level remained low until 60 h. Through the correlation network, interferon regulatory factor 7 (IRF7), Tripartite motif containing-21 (TRIM21), Signal transducer and activator of transcription 1 (STAT1) and Signal transducer and activator of transcription 3 (STAT3) were found to have the most correlation with other genes. In this study, juvenile L. calcarifer showed different coping strategies to different levels of acute acidification stress, but all of them resulted in the extensive weakening of head kidney immune function.

KEYWORDS: N/A

DAY 1 (8TH MARCH 2022)
SESSION 6: SPECIAL SESSION – CHALLENGES OF SUSTAINABLE BLUE ECONOMY IN MARINE TRADE, SCIENCE AND AQUACULTURE

Chairperson	Time	Code	Presenter	Title
Ms. Antonella Vassallo	1500-1505		Welcome and Introduction Awni Behnam Honorary President, International Ocean Institute; Malta	
	1505-1516	IOI-1	Alan Deidun	Turning Discards into a Resource: The Circular Economy in Practice Through The Extraction of Biologically Active Molecules (BAMs) From Discarded Fish and Invertebrate Biomass
	1516-1527	IOI-2	Sirikan Prasertying	Perspective on Blue Economy Development Framework: Approaching Sustainable Economic Growth in Southeast Asia.
	1527-1538	IOI-3	Elif Ozgur	The EU Project Results of the "*Climate Change Adaptation for the Sea and Coasts of Antalya*" with Special Emphasis on the Ocean Literacy for the Development of Blue Economy
	1538-1549	IOI-4	Lamiaa Mohamedien	Impact of Marine pollution on Fisheries and Aquaculture, Another Challenge to Achieving a Sustainable Blue Economy
	1549-1600	IOI-5	Cherdsak Virapat	Current Challenges of Sustainable Blue Economy in Aquaculture
	1600-1610		DISCUSSION (Question and Answer)	

IOI-1 TURNING DISCARDS INTO A RESOURCE: THE CIRCULAR ECONOMY IN PRACTICE THROUGH THE EXTRACTION OF BIOLOGICALLY ACTIVE MOLECULES (BAMS) FROM DISCARDED FISH AND INVERTEBRATE BIOMASS

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ABSTRACT

A health-conscious society has become increasingly interested in food supplements such as nutraceuticals and other Biologically Active Molecules (BAMs). Supply of these BAMs from discarded biomass of terrestrial origin is constrained by a number of factors, including those related to security of supply as well as to those related to personal lifestyle and to religious and cultural mores. The extraction of BAMs from discarded of a marine origin has thus gained increasing traction in recent years, with the portfolio of emerging BAMs of interest constantly broadening. For instance, good-quality collagen as well as fish oil (PUFA – polyunsaturated fatty acids) have been extracted from a variety or marine discards, including non-commercialised biomass of Atlantic bluefin tuna (Thunnus thynnus) as well as from jellyfish. The latter plastic group has yielded a kaleidoscope of other BAMs of interest, including those with an anti-tumoral and anti-inflammation activity. Chitosan, marketed as an active ingredient useful in weight loss pharmaceuticals, is increasingly being extracted from crustacean carapaces. Poriferans (sponges) and sea cucumbers (holothurians) are increasingly yielding a diverse array of BAMs, including those being applied as modulators of the immune system or those being studied as scaffolds for both development in humans. The patenting of marine-originating active ingredients is well underway, although concerns over the equitability of the process involved exist.

KEYWORDS: Biologically Active Molecules (BAMs), circular economy, discards, fish and invertebrate biomass, fish oils, collagen, chitosan, jellyfish.

IOI-2 PERSPECTIVE ON BLUE ECONOMY DEVELOPMENT FRAMEWORK: APPROACHING SUSTAINABLE ECONOMIC GROWTH IN SOUTHEAST ASIA

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ABSTRACT

In Southeast Asia, maritime trade and transport have been one of the pillars in strengthening the economic growth in the region, and where one of the highest volumes of goods in international trade is conducted. In light of this, the greater volume of maritime trade is connected to the greater amount of pollution and damages to the environment, organisms, and natural resources of the sea. Accordingly, the well-being of these resources can create consequences to the quality of life within human beings as the resources on seas are considered as a source of supplies to the people. Therefore, ITD sees an importance of the Blue Economy Development Framework that has the capabilities in achieving sustainable development of maritime related issues such as commerce and trade in and around the oceans, ocean health challenges, aligning with the principle of the Sustainable Development Goal (SDG)14: Life Below Water, whilst maximizing the growth of the marine economy. Thus, the implementation of Blue Economy Development and international policies will be the foundation and an essential factor in exploiting sustainable economic growth to the developing countries and countries that are highly reliable on seaborne trade in Southeast Asia, which is well perceived as the process of recovery, build resilience, and bring prosperity inclusively in the region.

KEYWORDS: Sustainable Economic Development, Maritime Trade, Blue Economy Development, Sustainable Development Goal (SDG) 14.

IOI-3 THE EU PROJECT RESULTS OF THE "CLIMATE CHANGE ADAPTATION FOR THE SEA AND COASTS OF ANTALYA" WITH SPECIAL EMPHASIS ON THE OCEAN LITERACY FOR THE DEVELOPMENT OF BLUE ECONOMY

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ABSTRACT

Climate crisis is showing alarming impacts in the Mediterranean region and has already led to oceanographic aspects like increasing sea temperatures, ocean acidification, rising sea levels, increasing ocean stratification, decreasing sea-ice extent, altered patterns of ocean circulation, and modified oxygen content at the surface. These identified impacts show the necessity of becoming "ocean and climate literate" of course in addition to political action. Increasing knowledge and awareness concerning ocean environments are at the heart of marine and coastal management and implementing the marine related Sustainable Development Goal 14 "Conserve and sustainably use the oceans, seas and marine resources for sustainable development".

Turkish Marine Research Foundation (TUDAV)'s education efforts support increasing community resilience and also developing citizen science through multiple programs. The goal of these programs is to support the education of the public so they are knowledgeable of the ways in which their community can become more resilient to the effects of climate change and environmental hazards. The main aim of the Antalya Marine Biology Museum is also raising ocean literacy to protect marine environment. The Museum displays our natural heritage of marine species and give information about them especially endangered and protected species and cultivate peoples' love and interest for the sea, which accomplishes the educative mission of the Museum.

The project entitled "Climate Change Adaptation for the Sea and Coasts of Antalya" is the first marine adaptation project to the climate change in Turkey conducted by the Antalya Metropolitan Municipality and TUDAV. Project activities focused on the effects of climate change on the marine and coastal environments, thus on the economy, cultural heritage and biodiversity and increasing awareness on marine environment and climate change.

This study presents the results of the EU Project on public awareness of marine environmental and climate change issues that will eventually develop the Blue Economy in a more holistic way. Currently, Turkey mostly benefits from the traditional sectors such maritime transportation, ports, ship-building, fisheries, aquaculture and tourism. However, these sectors are not developed with the

consideration of the oceans environmental sustainability and the protection of marine biodiversity. It was found that public interest in these issues is significant, but that gaps exist in terms of issue-specific awareness and that the availability of independent information on marine issues is limited. It is concluded that there are significant opportunities to develop the Antalya Marine Biology Museum's role in raising public awareness of marine environmental issues that build on its current activities and with scientific collaboration.

KEYWORDS: Climate change, marine environment, public awareness, ocean literacy, blue, economy, Antalya, Turkey, Mediterranean Sea.

IOI-4 IMPACT OF MARINE POLLUTION ON FISHERIES AND AQUACULTURE; ANOTHER CHALLENGE TO ACHIEVE A SUSTAINABLE BLUE ECONOMY

Lamiaa Ismail Mohamedein

ABSTRACT

The marine environment receives different types of pollution which affect marine life in different ways. Heavy metals, nutrients, pesticides, hydrocarbon compounds, microorganisms, marine litters and chemical hazards impacted the marine life including fisheries and aquaculture which are the main source of seafood for humans in the world. Contaminated environments produce contaminated seafood as some contaminants accumulate and biomagnify in tissues, or cause infections or infestations with negative impacts observed on human health due to exposure to chemical or biological components. Seafood quantity and quality depend on the water quality of the surrounding environment and the food types specially in the aquaculture sector. The global market for seafood products continues to increase year by year and current global focus on the connection between diet and health drives growth in the industry and offers commercial opportunities on a number of fronts. Increasing the seafood trade in the new millennium required safety and quality assurance for seafood and required enhanced levels of international co-operation in setting up standards and regulations for it. Achieving the critical balance between sustainability, ecosystem management and economic returns is crucial to attaining a sustainable blue economy and preserving these resources for future generations, and to achieving Agenda 2030 and the SDGs.

KEYWORDS: N/A

IOI-5 CURRENT CHALLENGES OF SUSTAINABLE BLUE ECONOMY IN AQUACULTURE

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ABSTRACT

Five key selected challenges affected current aquaculture were identified. This includes pathogen, Antimicrobial Resistance (AMR), impacts of climate change, food safety and certification, and limited knowledge & technology transfer for small-scale fish farmers. The impacts will be varied depending on different countries. Fish pathogen is considered the biggest issue affected aquaculture production. Asia contributes over 90 percent of the world aquaculture production, with intensification as a major contributor to the fast growth of aquaculture industry. Aquaculture intensification, however, has resulted in increased disease problems of cultured animals. Increasing transboundary movement of aquatic animals related to seed supply and trade has further intensified the problem. Antimicrobials are most commonly used drug to prevent and control common aquatic animal diseases in aquaculture. Although the control over the use of antimicrobial has been strengthened over the past decade mainly for trade related purpose, they are still commonly used in aquaculture in region. The global climate is changing and its impacts associated with the accumulation of greenhouse gases in the atmosphere from human activities, change in mean temperature, shifts in seasons and an increasing intensity of extreme weather events are already occurring and is predicted to worsen in the future. Millions of people, particularly those in developing countries, are facing shortages of water and food and greater risks to health. Therefore, it is critically important to address these climate change challenges especially in many Asia-Pacific countries, which are highly vulnerable. Food safety is a key concern for international trade in fish products. The constantly changing regulatory environment and safety requirements of importing countries pose a special challenge to small-scale aquaculture producers. NACA is working to help address food safety through the entire market chain from hatchery to consumer. Education and training can improve knowledge and technology transfer which will eventually mitigate all other challenges. The Sustainable Blue Economy of aquaculture can be promoted and operated through mitigation on impacts of aquatic animal diseases; management of chemical and antibiotic usage in aquaculture; adaptation and mitigation of climate change; address of food safety through the entire market chain from hatchery to consumer and identification of capacity building needs and organization of training courses and technology transfer to small-scale fish farmers. In addition, regional cooperation and collaboration among members will significantly improve the sustainable aquaculture for food security and food safety in the coming years.

KEYWORDS: Challenges, Aquaculture, Impacts of Climate Change, Antimicrobial Resistance, Coastline, Network of Aquaculture Centres in Asia-Pacific (NACA), Food Shortages, Food Safety

DAY 2 (9TH MARCH 2022)
SESSION 7: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
Dr. Zarinah Waheed	0930-0945	OMBC-7	Roswati Md Amin	Bioluminescent Plankton, *Noctiluca scintillans* in Perak Coastal Water
	0945-1000	OMBC-8	Sujjat Al Azad	Distribution Pattern of Dissolved Inorganic Nutrients and Phytoplankton Diversity in River Estuary, Kota Kinabalu, Sabah, Malaysia
	1000-1015	OMBC-9	Yuki Hayami	Characterization of Microbial Community Associated With Marine Sponges in Karah Island, Peninsular Malaysia
	1015-1030	OMBC-10	Nur Airie Bin Zainudin	Preliminary Observation on The Diatom Diversity Associated With The Decomposition of Partially Submerged Buried Cadaver
	1030-1045	OMBC-11	Nurul Nur Farahin Binti Syed	Seagrass Vegetative Morphological Variability Related to Habitat Type and Water Depth
	1045-1110		DISCUSSION (Question and Answer)	

OMBC-7 BIOLUMINESCENT PLANKTON, *Noctiluca scintillans* IN PERAK COASTAL WATER, MALAYSIA

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ABSTRACT

A bioluminescent dinoflagellate, Noctiluca scintillans, that may form bloom and patches at the sea surface, can feed on a wide range of prey over a broad spectrum of both sizes and trophic status. In some regions, Noctiluca can be a coastal or offshore indicator of eutrophication, as an increase in nutrients results in an increase in phytoplankton. In Malaysia, there is only one historical record of Noctiluca scintillans bloom from Penang harbour in 1918. Based on the local news, bioluminescent events produced by this species can often be seen from Perak coastal water down to Kuala Selangor, Straits of Malacca. However, until nowadays, there is no recent record available on the bioluminescent plankton of Noctiluca scintillans, particularly in this area. Thus, our study aims to determine the occurrence of Noctiluca scintillans in Bagan Datuk coastal water, Perak. Sampling was conducted in September 2020 at five stations using a plankton net, 60 µm mesh size. Our result indicated a high occurrence of this species dominated in the study area up to 12.7 x 10^3 cells L^{-1}. Further study is required to understand the trophic interaction via carbon transfer and its role in the marine food web.

KEYWORDS: Blue tears, bioluminescent, dinoflagellate, Malaysia, Noctiluca scintillans

OMBC-8 DISTRIBUTION PATTERN OF DISSOLVED INORGANIC NUTRIENTS AND PHYTOPLANKTON DIVERSITY IN RIVER ESTUARY, KOTA KINABALU, SABAH, MALAYSIA

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ABSTRACT

The river estuary had been encountered with high anthropogenic activities from time to time such as, deforestation, landscape changes and urban growth resulted alteration of nutrients with the changes of phytoplankton diversity. This study was conducted to determine the spatial distribution of dissolved inorganic nutrients and phytoplankton abundances in river estuary, Kota Kinabalu, Sabah, Malaysia. Water and phytoplankton samples were collected from six stations along the Darau River estuary for the period of six months (May 2019 to October 2019). Twenty-six (26) genera with three (3) major groups phytoplankton were found within the river estuary areas. The diatoms (86%) were accounted the highest abundances among the total phytoplankton, followed by dinoflagellates (13%) and Cyanobacteria (1%). The most dominance species of Skeletonema costatum, with density of 1186.69 $X10^3$ cells/L and Thalassiosira sp. (938.01 $X10^3$ cells/L) were recorded from Station 1 (upstream) and Station 5 (mangrove area) respectively. The Chaetoceros sp. (84.25 $X10^3$ cells/L) was the dominated in Station 6 (control site). Station 4 (residential area) accounted the highest diversity of species such as Skeletonema costatum, Thalassiosira sp., Peridinium sp., Gonyaulax sp., and Cylindrotheca sp. with total cell density of 142.98 × 10^3cells/L. The diversity index of phytoplankton in the study area was observed in the range of 5.2 to 7.09 and the evenness index determined in the range of 1.81 to 2.87. There was a weak but positive correlation observed with the cell density and concentration of nutrients, with phosphate R^2=0.2437, ammonium (R^2=0.301) and nitrate (R^2=0.406). The influences of nutrients in the diversity of phytoplankton and poor relationship of nutrients with the cell density in this river estuary might be associated with other environmental factors, tidal fluctuations and rate of discharge of inputs from surrounding areas, which are essential and vital to address in this type of research.

KEYWORDS: River estuary, Nutrients, Phytoplankton abundance, diversity and evenness

OMBC-9 CHARACTERIZATION OF MICROBIAL COMMUNITY ASSOCIATED WITH MARINE SPONGES IN KARAH ISLAND, PENINSULAR MALAYSIA

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ABSTRACT

Marine sponges are important members of marine ecosystems due to their roles in filtering great volume of seawater, stabilizing of substrates, and providing habitats and food for other organisms. It has been known that marine sponge symbiotic microbes play key roles for the host's metabolic functions such as carbon cycles, nitrogen cycles, and sulfur cycles. Also, it has been considered that their composition is influenced by host species, spatial/temporal condition and environmental factors. Symbiotic microbial composition has been studied in recent decades especially the Caribbean and the Mediterranean Sea, whereas there is still paucity of research in Asian areas, particularly in Malaysia. Thus, the aim of this study is to investigate microbial composition and its potential microbial functions associated with three different marine sponge species (Aaptos suberitoides, Theonella swinhoei, and Xestospongia testudinaria) and ambient seawater collected from Karah Island, Terengganu, Malaysia. Microbial composition was analyzed by 16S rRNA gene amplicon sequencing of the V3-V4 region and potential microbial functions were annotated based on Functional Annotation of Prokaryotic Taxa (FAPROTAX). PCoA results showed that microbial community structures were clearly different between sponges and seawater. Chloroflexi was the predominant phylum in all sponge species. Proteobacteria and Actinobacteriota were compose core microbial community in T. swinhoei and X. testudinaria, while Cyanobacteria and Proteobacteria were dominant in A. suberitoides. Comparatively, seawater was predominated by Cyanobacteria, followed by Proteobacteria and Actinobacteriota. Microbial potential functions by FAPROTAX showed that the abundance of aerobic ammonia oxidation, nitrification, and predatory or exoparasitic were detected in all sponge samples much higher than seawater. Meanwhile, several functions such as nitrogen fixation, aerobic chemoheterotrophy, and intracellular.

KEYWORDS: Marine Sponge, Microbial community, Next Generation Sequencing (NGS), Functional Annotation of Prokaryotic Taxa (FAPROTAX)

OMBC-10 PRELIMINARY OBSERVATION ON THE DIATOM DIVERSITY ASSOCIATED WITH THE DECOMPOSITION OF PARTIALLY SUBMERGED BURIED CADAVER

Siti Sofo Ismail[1], Wong Qing Yang[2], Yong Mang Teng[3], Huwaida Mohd Hanifah[4], Liu Jia Chee[5], Ku Mohd Kalkausar Ku Yusof[6], Nurul Shahida Redzuan[7], Nur Airie Zainudin[8*]

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ABSTRACT

A partially submerged buried cadaver simulation was performed to elucidate the potential of diatom diversity to locate partially submerged clandestine graves, subsequently, to determine the post mortem interval (PMI) of the cadavers. This study was conducted by burying fatty flesh of domestic pig (Sus scrofa) at 10 cm and 15 cm depths in the mangrove soil ecosystem. This mangrove burial site exposed to tidal with a maximum and minimum daily mean reading of 21.26 ppt and 15.05 ppt, respectively. The fatty flesh was allowed to decompose at eight designated sampling points, corresponding to each decomposition stage. The post-experimental pH and decomposition rate were measured. The associated topsoil was collected with a value of 12.57 cm^3 for diatom extraction to characterise the diatoms composition and diversity at each burial interval using a high power light microscope. The cadaveric derived lipids were extracted using modified Bligh Dyer extraction method and analyzed with Gas Chromatography-Flame Ionization Detection (GC-FID). A similar trend in the decomposition rate and post-experimental soil pH for both 10 cm and 15 cm burial depths was observed. A total of 44 diatoms were found and differentiated, together with a total of 22 diatoms were identified for certain decomposition stages and depth. The number of individuals of diatoms for 10cm burial depth was remarkably higher than that of 15 cm burial depth. However, the diversity for the burial depth of 10 cm was lower than that of 15 cm depth. Furthermore, this study demonstrated a significant difference in diatom diversity between control soils with 10 cm burial depth ($p = 0.0447$) and diversity between 10 cm and 15 cm depth ($p = 0.0021$). These preliminary findings indicated the potential of diatoms diversity to be used as an alternative approach to locate the partially submerged clandestine grave and/or estimate the PMI of the bodies.

KEYWORDS: Decomposition rate, diatom diversity, different burial depths, mangrove ecosystem, partially submerged clandestine grave

OMBC-11 SEAGRASS VEGETATIVE MORPHOLOGICAL VARIABILITY RELATED TO HABITAT TYPE AND WATER DEPTH

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ABSTRACT

Seagrass is a marine angiosperm extensively dispersed along the shore in various habitats. Shallow coastal water at Port Dickson, Negeri Sembilan, comprises different habitat characteristics; sandy intertidal mud; Teluk Pelanduk (TP), Tanjung Gemok (TG), and Jetty Port Dickson (JPD); rocky intertidal shore, Teluk Kemang (TK), subtidal rocky shore, Pulau Bagan Pinang (PUBP); sandy, muddy beach, Pantai Bagan Pinang (PBP); rocky and coral reef flats, Pulau Arang (PA) and Pulau Burong (PB). A total of eight species; Enhalus acoroides, Thalassia hemprichii, Halophila ovalis, Halophila decipiens, Cymodocea serrulata, Halodule uninervis, Halodule pinifolia, and Syringodium isoetifolium were collected, recorded during the ground-truthing. Seagrass plants collected were subjected to leaf lengths and widths analyses to determine their association with habitats and water depths. Enhalus acoroides and T. hemprichii have diverse habitats, from sandy intertidal mud rocky to coral reef flats. Morphometric analyses indicated grass-like seagrass, e.g., T. hemprichii and E. acoroides from sandy mud substrate, possess longer leaf lengths of 21-17.84 cm and 34.51-80.22 cm, respectively. The same species from the rocky and coral reef flats have shorter leaf lengths of 2.89-8.85 cm and 15.94-48.12 cm, respectively. For spoon-grass, leaf sizes are related to depths. Shallow water H. ovalis at a depth of 0.4-0.6 m have shorter leaf length and width of 6.26-10.45 and 2.84-5.87 mm, respectively. Halophila ovalis from deeper water, 1.3-1.5 m, possess longer and broader leaves of 9.70-21.02 and 7.24-11.85 mm, respectively. Narrow-leaved H. uninervis (leaf width of 0.46-1.55 mm wide) was discovered on a sandy substratum, while wide-leaved (leaf width of 1.55-3.75 mm wide) was from a muddy area. No comparison can be made for Syringodium isoetifolium as it only occurred in Teluk Kemang. The findings highlight that morphological variability of seagrass leaves is related to habitat types and the depth at which they grew.

KEYWORDS: Seagrass, Port Dickson, Morphological variation, Habitat

DAY 2 (9TH MARCH 2022)
SESSION 8: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
	0930-0945	OAF-1	Muhamad Naimullah	Unbaited Light-Emitting Diode Traps Performance for Catching Orange Mud Crabs
	0945-1000	OAF-2	Kenneth Francis Rodrigues	Genetic Diversity of *Tor douronensis* Populations in Sabah: Implications for Aquaculture and Conservation
Dr. Nazia Abdul Kadar	1000-1015	OAF-3	Teoh Chui Fen	Effects of Crystalline Amino Acids on Antennular Grooming Behavior in Slipper Lobster *Thenus orientalis*
	1015-1030	OAF-4	Jia Ju Lee	Effects of Temperatures, Salinities and Diets on The Asexual Reproduction of Moon Jellyfish *Aurelia Aurita*
	1030-1045	OAF-5	Nur Syafiqah Binti Mohamad Zul	Isolation and Characterization of Ten Microsatellite Markers in The Tri-Spine Horseshoe Crab (*Tachypleus Tridentatus*)
	1045-1110		DISCUSSION (Question and Answer)	

OAF-1 UNBAITED LIGHT-EMITTING DIODE TRAPS PERFORMANCE FOR CATCHING ORANGE MUD CRABS

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ABSTRACT

Mud crabs (Scylla spp.) are a vital fishery resource and targeted for a valuable source of income for coastal communities throughout the Indo-Pacific region. Baited traps are a considerable expense in crustacean fishing. Hence, the present study was performed to investigate the catchability of Scylla olivacea in response to light-emitting diodes (LEDs) in captivity and field conditions. We used a new experimental setup in the captivity condition that revealed most S. olivacea were attracted to green, blue, and white LED lights and no attractive effect by red LED lights similar to the controls. Field studies have shown that the catch per unit of effort (CPUE) of S. olivacea and other organisms, including bycatch species, is significantly higher when conventional mackerel and chicken head baits are used. However, unbaited traps equipped with green LED lights produced low CPUE of S. olivacea. Moreover, baited trap with chicken head, mackerel and green LED caught 4.52 %, 7.28 % and 2.18% more CPUE of S. olivacea compare to empty trap, respectively. Besides, both the mackerel and chicken head treatments resulted in the higher average CPUE of S. olivacea than did the green LED treatments; 0.66, 0.38 and 0.13 per trap. No significant differences were detected in the average carapace width of S. olivacea across all treatments. Our findings demonstrated that mud crabs can be captured using artificial lights, like other aquatic species but further in-depth studies and specific modifications to improve the performance of LED lights are warranted.

KEYWORDS: Light Preference, Crab Vision, Mangrove, LED light

OAF-2 GENETIC DIVERSITY OF *Tor douronensis* POPULATIONS IN SABAH: IMPLICATIONS FOR AQUACULTURE AND CONSERVATION

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ABSTRACT

Tor douronensis, a cyprinid riverine fish species which also locally known as Pelian, has an aquaculture potential and of conservational value. Understanding the genetic diversity and population structure is fundamental for implementation of appropriate conservation measures and a sustainable management program. Eighteen wild Pelian populations were analyzed based on microsatellite markers and mtDNA D-loop. Pelian possesses microsatellite gene diversity ranging from 0.270 to 0.527 and mtDNA D-loop haplotype diversities ranging from 0.000 to 0.833. Pairwise Fst values for microsatellite and Φst values for mtDNA D-loop were significant (P<0.05) between many population pairs. Microsatellites analyses of molecular variance, AMOVA analyses revealed that most of the variances were found within populations (60.85% and 50.74% for grouping by watershed and Crocker Trusmadi Range, CTR, respectively) whereas mtDNA D-loop region revealed most variances were among groups (95.63% and 73.77% for grouping by watershed and CTR, respectively) with significantly high Φst and Fst values. Mantel tests supported patterns of differentiation as a result of isolation by distance. Analyses on genetic distance-based relationships (NJ, MP, UPGMA, Bayesian, haplotype network) and model-based clustering (BAPS, STRUCTURE) were consistent with partitioning the overall populations into two well differentiated cluster and further sub-structured according to watershed. Isolation by distance, river fragmentation and historical isolation by CTR significantly explain the genetic population structure. The genetic diversity of T. douronensis presents an opportunity for the establishment of a breeding program for the species based on selection and management of broodstock from diverse populations on the basis of mitochondrial and nuclear molecular markers.

KEYWORDS: *Tor douronensis*, mitogenome, microsatellites, population diversity

OAF-3 EFFECTS OF CRYSTALLINE AMINO ACIDS ON ANTENNULAR GROOMING BEHAVIOR IN SLIPPER LOBSTER *Thenus orientalis*

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ABSTRACT

Antennular grooming behavior (AGB) is a typical behavior observed in crustaceans by repeatedly grasping and wiping through their olfactory organs, the antennule, with the third maxillipeds. L-glutamate has been reported as one of the chemicals that effectively elicited antennular grooming behavior, especially in Panulirus species. In this present study, behavioral assays were carried out by presenting 18 amino acids (AA) at three concentrations between 10^{-1} and 10^{-3}M via a handheld pipette to determine whether chemical stimuli could activate AGB in 14 Thenus orientalis (each lobster represented as a replicate). The magnitudes of the AGB responses in T. orientalis at three concentrations were determined from recorded videotapes. Post-stimulus mean wipe rates were determined by averaging the number of wipes counted over the two minutes observation period. The AGB ratio was calculated and expressed as the representative data by dividing the total number of positive AGB responded by the T. orientalis to each AA with total replicates. Significant AGB responses of T. orientalis was effectively evoked by L-glutamic acid. As an ionic form of glutamate, L-glutamic acid was the sole chemical found to mediate antennular grooming behavior in 78.6% of T. orientalis at 10^{-3}M concentration. The ABG responses increased with the concentration of L-glutamic acid, in which the wipe rate and AGB ratio were significantly higher ($P < 0.05$) at 10^{-1}M (33.643 and 0.79) than those elicited by 10^{-3}M concentration (0.857 and 0.14). At the highest concentration, 14% of lobsters responded to L-valine, 7% to L-glycine, L-glutamine and L-threonine, respectively. At 10^{-2}M concentration, only L-glutamic acid and L-valine stimulated the lobster's AGB responses. By comparing the AGB mediated at 10^{-1}M concentration AA, L-glutamic acid elicited the highest wipe rate and AGB ratio. Four other AA also significantly ($P < 0.05$) elicited high wipe rate and AGB ratio; glycine (0.214 and 0.07), L-glutamine (0.071 and 0.07), L-threonine (0.429 and 0.07) and L-valine (0.286 and 0.14). AGB occurred due to the electrostatic or "sticky" nature of glutamic acid and is easily detectable with chemoreceptors of lobster. Therefore, L-glutamic acid can be suggested to indicate appetitive feeding in T. orientalis.

KEYWORDS: Antennular grooming, Stereotype behavior, Amino acids, Concentrations, *Thenus orientalis*

OAF-4 EFFECTS OF TEMPERATURES, SALINITIES AND DIETS ON THE ASEXUAL REPRODUCTION OF MOON JELLYFISH *Aurelia aurita*

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ABSTRACT

Jellyfish is an important secondary consumer in marine food chain. In aquaculture applications, jellyfish can not only be produced for the demands of food consumption and ornamental aquarium, but also be used as live feed for marine larviculture of several species. This study aims to investigate the effects of different culture conditions on the asexual reproduction of Aurelia aurita. The experimental animals were originally collected from the Love River in Kaohsiung, Taiwan, and have been domesticated in the laboratory environment for more than one year before the study was carried out. Experiment 1 was designated to evaluate the interactive effects of temperatures (15, 20, 25, 30, 35 °C) and salinities (15, 20, 25, 30, 35 psu) on the asexual reproduction (budding and strobilation) of the moon jellyfish polyp. During the period of 59 days, the polyp showed the highest total bud production (44 buds/polyp) under the medium temperature (25°C) and salinity (20 psu) condition, whereas the medium temperature and high salinity treatment (25°C; 35 psu) had the highest strobilation rate (23 ephyra/polyp) among all treatments. Experiment 2 assessed the effects of different types of diets (newly-hatched Artemia nauplii, enriched Artemia nauplii, and calanoid copepod Acartia southwelli) on the asexual reproduction of the polyp. The results indicated that the total bud production of the group fed with enriched Artemia nauplii and copepods (96 and 74 buds/polyp, respectively) were significantly higher than the group fed with newly-hatched Artemia nauplii (42 buds/polyp). The findings suggest that the nutritional value of the diet is one of the key factors affecting the asexual reproduction of moon jellyfish.

KEYWORDS: moon jellyfish, asexual reproduction, temperature, salinity, diet

OAF-5 ISOLATION AND CHARACTERIZATION OF TEN MICROSATELLITE MARKERS IN THE TRI-SPINE HORSESHOE CRAB (*Tachypleus tridentatus)*

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ABSTRACT

The tri-spine horseshoe crab, Tachypleus tridentatus, is a species under conservation pressure and can be found in Sabah. Anecdotal reports show a decrease in number of horseshoe crab populations. This phenomenon may impact to the loss of genetic diversity of the species. Based on this, we hypothesized that there is a reduced level of genetic diversity in the horseshoe crab populations in Sabah. If proven correct, there is an urgent need to identify the levels of genetic diversity that is present in the populations. We have collected a total of thirty samples from three locations from Sabah representing the east and west coast of Sabah. A shotgun sequencing approach using PacBio's circular consensus sequencing (CCS) long reads was then used to rapidly identify microsatellite loci. Primers were subsequently designed to develop novel microsatellite markers which were then used to determine the level of genetic diversity of an initial preliminary collection of 30 samples of T. tridentatus from Sandakan, Kota Belud and Kudat. Here, we report on the characterization of ten polymorphic microsatellite loci. All loci were observed to be polymorphic with the number of alleles ranged from 2 to 8 per locus. The overall observed heterozygosity for the ten analyzed loci ranged from 0.03 to 0.4667 while the expected heterozygosity ranged from 0.2466 to 0.7706. The results indicate that there is a low amount of genetic variability in the population. Efforts are still ongoing to test the ten loci on more samples from different locations in Sabah. These markers have a potential application in population management where it will be used to determine if there is a loss of genetic diversity of the Asian horseshoe crab species that are present in Sabah. This project was funded by the Fundamental Research Grant Scheme (FRG0483-2018) by the Ministry of Education, Malaysia.

KEYWORDS: Microsatellite, horseshoe crab, simple sequence repeat, molecular markers, Sabah

DAY 2 (9TH MARCH 2022)
SESSION 9: Climate Change: Mitigation and Adaptation; Citizen Science, Awareness and Education; Blue Economy of Coastal Community

Chairperson	Time	Code	Presenter	Title
Assoc. Prof. Dr. Teruaki Yoshida	0930-0945	OBECC-1	Covaci Brindusa	Mountain Lakes, as Support for Blue Economy and Agritourism. Evidence From the European Area
	0945-1000	OCSAE-1	Sanen Marshall	Mengarang: The Bajau Laut Approach to Livelihood
	1000-1015	OCCMA-1	Po-Yuan Hsiao	Impacts of Climate Change-Induced Environmental Fluctuations on the Structure of Summer Marine Ecosystems Around the Southwest Water of Taiwan
	1015-1030	OCCMA-2	Nor Shairah Azura Binti Nazrrol	The Exploitation of Remote Sensing Data for Potential Fishing Zone in East Coast of Peninsular Malaysia During Southwest Monsoon
	1030-1045	OCCMA-3	Fazliana binti Mustajap	Bathymetry Derivative Study of Coral Area (Karang Sela), Bidong Island, Terengganu From Sonar Technology
	1045-1110	DISCUSSION (Question and Answer)		

OBECC-1 MOUNTAIN LAKES, AS SUPORT FOR BLUE ECONOMY AND AGRITOURISM. EVIDENCE FROM THE EUROPEAN AREA

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ABSTRACT

Mountain lakes - parts of the blue deal, and support for the blue economy - represent an agritourism segment insufficiently used. The potential of these areas is huge and should be one of the major keys of the European mountain area. Throughout Europe are important mountain chains, as Scandinavian (1762 km), Carpathian (1500 km), Alps (1200km), Caucasus (1100 km), and Apennine (1000 km). The European mountain lakes present a high diversity, from natural likes to artificial and from glacial lakes to current ones. Mountain lakes agritourism is well-developed in the Alps and some Scandinavian and Apennine areas, but in the rest of the European area investments and entrepreneurship represent an imperative. The infrastructure of the European mountain area does not favor the development of mountain lakes agritourism. However, more and more tourists, visitors of the European mountain area, prefer mountain lakes agritourism than any other form of tourism. In this context, the European Commission proposes plans and investments for the blue deal and blue economy. The research methods have been qualitative through exploration of the existent scientific literature and official website regarding agritourism and mountain entrepreneurship throughout Europe. The public and private governance from all over Europe must concentrate the efforts for project proposals and attract funds in order to sustain the European mountain area, especially lakes agritourism. The paper presents some successful agritourism models of the mountain lakes to be followed by the other regions.

KEYWORDS: Agritourism, Blue economy, Mountain lakes, the European mountains

OCSAE-1 MENGARANG: THE BAJAU LAUT APPROACH TO LIVELIHOOD

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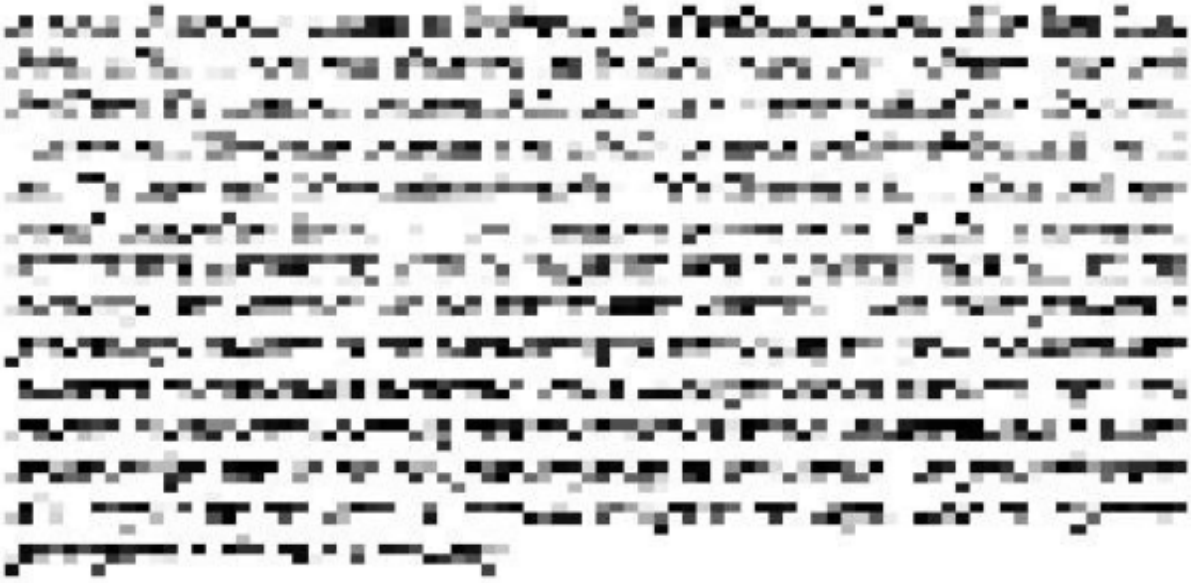
ABSTRACT



KEYWORDS: Bajau Laut, *Mangarang*, Corals, Pumpboats, Statelessness

OCCMA-1 IMPACTS OF CLIMATE CHANGE-INDUCED ENVIRONMENTAL FLUCTUATIONS ON THE STRUCTURE OF SUMMER MARINE ECOSYSTEMS AROUND THE SOUTHWEST WATER OF TAIWAN

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ABSTRACT

Taiwan Bank (TB) is located in the southern Taiwan Strait, where the marine environment is influenced by South China Sea Warm Current and Kuroshio Branch Current during summer. The uplifted continental slope and bottom currents bring upwelling areas and create an important fishing ground. Climate-induced fluctuations in marine fish populations have been demonstrated in the Taiwan Strait region. Through predation and competition, interspecific relationships were unclarified, which affected layer by layer in the ecosystem. Fishery data and environment data was collected to construct an ecosystem models by using Ecopath with Ecosim (EWE). The relationship between environmental changes and species variation was analyzed using the generalized additive model (GAM). The ecosystem model shows that the energy transfer efficiency is 0.35%, with a pyramidal structure, and low trophic level species have a positive effect on high trophic level species, which is a bottom-up control system. For environmental factors, all species were influenced by NPP, which was also the main factor affecting benthic species and may have delayed effects. Pelagic species were affected by high NPP, as well as low SST and negative values of the multivariate El Niño–Southern Oscillation (ENSO) index.

KEYWORDS: Taiwan Bank, primary production; primary production required, mass balance ecosystem model, ecosystem structure.

OCCMA-2 THE EXPLOITATION OF REMOTE SENSING DATA FOR POTENTIAL FISHING ZONE IN EAST COAST OF PENINSULAR MALAYSIA DURING SOUTHWEST MONSOON

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ABSTRACT

Satellite-derived products of sea surface temperature and Chl-a concentration are important parameters in fisheries resource application as it provided continuous temporal and spatial resolution. The previous studies had shown that fishing ground is controlled by a few factors such as the availability of light, nutrients, and depth. Understanding the processes that cause changes in productivity water is an important step on the way to improve the interpretation of satellite remote sensing and to understand the ocean ecology. Yet, the using net primary productivity (NPP) dataset in East Coast of Peninsular Malaysia (ECPM) waters had not been exploited. This study demonstrates the utilization and correlation of primary productivity SST and Chl-a concentration which is derived from remote sensing data were applied in order to forecast fishing ground in the ECPM waters. The scope of this study only covers the temporal-spatial distribution of primary productivity parameters during the southwest monsoon especially during the full moon and new moon where during these moon phases, tidal force and current circulation are maximum. The fish zoning was done by analysis on 18 years of MODIS NPP parameters from 2002 to 2020. In this study, the globally MODIS SST-derived product was tuned and was substituted in NPP algorithms to be used regionally in ECPM waters. Then the map of zoning SST, Chl-a concentration and NPP were combined to produce the potential of fishing zone map. This study indicated that high potential fishing grounds were within high biological production zones and optimum physical environment due to favorable conditions for fish aggregation. This map will help in the management of marine resources and fishermen catchment efficiency in the large areas at the low coast within a short period.

KEYWORDS: Primary productivity, sea surface temperature, chlorophyll-a concentration, fishing ground

OCCMA-3 BATHYMETRY DERIVATIVE STUDY OF CORAL AREA (KARANG SELA), BIDONG ISLAND, TERENGGANU FROM SONAR TECHNOLOGY

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ABSTRACT

Bathymetry is the measurement of the water depth, which is height from water bed to water surface. It is also a description of variations of seabed topography. In this study, bathymetry analysis was used to describe the seabed morphology at Karang Sela, Bidong Island. Bathymetry data is importance to estimate the complexity of the seabed environment. This is because the variation of seabed environment is influencing the marine life settlement, sheltered area, food supply, forces and many more. Thus, the aims of this study are to obtain bathymetry data by using multibeam echo sounder, to map the bathymetry, to know the morphology of the study area and to analyse the benefit of MBES in mapping the seabed. This study was conducted by using multibeam echosounder Reson T20 on 15th August 2020. Qinsy QPS software was used for data acquisition and Qimera QPS was for processing multibeam data. Then, bathymetry data was analysed in ArcGIS. The results of this study were presenting the depth of the study area, bathymetry map, bathymetry derivatives which were slope, rugosity, curvature, aspect and Bathymetric Position Index (BPI). As conclusion, bathymetry data is important in order to develop any conservation planning at study area and sensitive marine habitat area can be protected.

KEYWORDS: Bathymetry, multibeam echosounder, bathymetry derivatives, Bathymetric Position Index (BPI).

DAY 2 (9TH MARCH 2022)
SESSION 10: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
Mr. Muhammad Ali Syed Hussein	1120-1135	OMBC-12	Juanita Joseph	Identification Of Foraging Grounds for Marine Turtles in Malaysia
	1135-1150	OMBC-13	Jeethvendra Kirishnamoorthie	Photo Identification and Laser Photogrammetry to Determine Population Demographics Of Green Turtles (*Chelonia mydas*) in Eastern Sabah
	1150-1205	OMBC-14	Tuan Emilia binti Tuan Mohd Noor	Metabolic Heating Event During Incubation Phase and Nest Escaping of Green Sea Turtle Hatchlings
	1205-1220	OMBC-15	Mohammad Azuwan Bin Hassan	Density Of Saltwater Crocodile (*Crocodylus porosus*) Wild Population in Samarahan River Basin, Sarawak
	1200-1230		DISCUSSION (Question and Answer)	

OMBC-12 IDENTIFICATION OF FORAGING GROUNDS FOR MARINE TURTLES IN MALAYSIA

Juanita Joseph[1*], Gavin Jolis[1,2], Siti Nabilla Jalimin[1], Kirishnamoorthie Jeethvendra[1,3], Irwan Isnain[4], James Bali[5], Mohd Ridhwan Mahali[1], Hideaki Nishizawa[6], Rafidah Othman[1], Saifullah Arifin Jaaman[7], Xuelei Zhang[8] and Ejria Saleh[1]

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ABSTRACT

Marine turtles use few habitats during their life stages. In Malaysia, most research and conservation were conducted at nesting beaches due to the difficulty in conducting in-water studies. Since marine turtles spent the majority of their lives at sea, within their foraging habitats, it is crucial to protect and conserve these areas. In this study, we compiled new and published data obtained from foraging grounds for marine turtles throughout Malaysian waters. A total of 24 foraging grounds had been identified within the South China Sea (8), Sulu Sea (5), Celebes Sea (10) and Malacca Strait (1). Five species were identified, with the green turtle as the dominant species (93%), followed by the hawksbill turtles (7%). Olive ridley and loggerhead turtles were very rare, either found dead or entangled in fishing nets. One leatherback turtle was reported in Lankayan, but it was not sure whether it was foraging or just on its migrating route. Few foraging grounds had been studied intensively namely the Brunei Bay, Mantanani Island, Tun Mustapha Park and islands around Semporna. Mixed-stock analysis for green turtles in Malaysia had also been conducted, and had identified the natal origin of the turtles. These studies had confirmed that Malaysia is very important for the survival of marine turtles, not only providing important rookeries but also foraging habitats, especially within the Southeast Asia - Pacific region.

KEYWORDS: Sea turtles, foraging aggregations, South China Sea, Celebes Sea, Sulu Sea, Malacca Strait

OMBC-13 PHOTO IDENTIFICATION AND LASER PHOTOGRAMMETRY TO DETERMINE POPULATION DEMOGRAPHICS OF GREEN TURTLES (*Chelonia mydas*) IN EASTERN SABAH

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ABSTRACT

Endangered green turtle (Chelonia mydas) populations are under anthropogenic threat, exacerbated by their long-distance migrations. Our understanding of the species is primarily based on nesting grounds with a general lack of understanding of their ecology and behavior at foraging grounds, as well as population demographics. Non-invasive techniques, such as photo identification (photo-ID) and laser photogrammetry, can be used to answer important questions relating to the species habitat use, demographics and threats. Here, we used photoID and paired-laser photogrammetry to characterize aggregations of green turtles in Eastern Sabah from November 2018 to September 2020. Results from 90 field surveys yielded 689 encounters with green turtles, of which we identified 400 individual turtles from their unique facial scales. Dominant size classes of juveniles (48%) and sub-adults (36%) were present at the reef (1 – 20 m). Resights displayed high spatial site fidelity that indicates the importance of protecting these neritic areas. Retrospective data from citizen science revealed temporal site fidelity with the longest residency recorded at 2,884 days for a 70 cm SCL individual turtle. Our findings highlight the applicability of photo-ID and laser photogrammetry as feasible methods to determine green turtle population demographics through non-invasive methods.

KEYWORDS: Coral Triangle, endangered species, citizen science, site fidelity, foraging ground

OMBC-14 METABOLIC HEATING EVENT DURING INCUBATION AND NEST ESCAPING OF GREEN SEA TURTLE HATCHLINGS

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ABSTRACT

Green turtle (Chelonia mydas) is an endangered marine reptile globally. Soaring global warming issues have resulted in the shortening of incubation eggs duration. This condition affects hatchlings' fitness, leading to the production of smaller and weaker individuals. It is crucially important in determining their performances during the nest escaping phase. Apart from ambient temperature within the nest that plays its role in influencing the incubation temperature, the heat produced by the development of embryos and emerging hatchlings is also a big concern, which affects their performance during nest escaping activity. This study aimed to assess the duration of metabolic heating throughout the eggs incubation period and determine their influences on the active digging performance of the hatchlings during the nest escaping phase. The study was conducted at Marine Turtle Field Station of Universiti Malaysia Terengganu, Pantai Chagar Hutang, Pulau Redang, where four temperature loggers were deposited into 15 relocated nests. Within each 70cm in depth nest, temperature readings were logged at four positions (bottom, middle, side and top) to observe the metabolic heating event during the incubation phase. Whereas to monitor the digging activity by the emerging hatchlings, another four temperature loggers were then placed along with different other 15 relocated nests' columns with a distance of 10 cm apart from each logger. Results showed the presence of metabolic heating in all incubated nests started to rise from day 25th to 40th (out of 60 days incubation). The study also revealed a positive correlation between clutch size and metabolic heating, where the number of clutch sizes influences the rate of metabolic heating of a nest. It is also presumed that the higher the metabolic heating rate of a nest, the lower the fitness of the hatchlings. These conditions will reduce the performance of the digging hatchlings during nest escaping activity. Moreover, the rate of metabolic heating is directly proportional to the performances of active nest digging. In conclusion, clutch size is proven to be one of the main factors that explain a large proportion of the variation in the metabolic heating event during the incubation period and nest escaping activity. The findings can aid in establishing mitigation methods, particularly in the production of well fitness hatchlings of the sea turtles in the sanctuary.

KEYWORDS: Climate change, Conservation Biology, Animal Physiology, Chelonia mydas, Hatchery Practice.

OMBC-15 DENSITY OF SALTWATER CROCODILE (*Crocodylus porosus*) WILD POPULATION IN SAMARAHAN RIVER BASIN, SARAWAK

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ABSTRACT

Saltwater crocodile (Crocodylus porosus) is widely distributed in coastal areas in Sarawak. They could be found in almost all water bodies that connected to rivers including small or large river systems, inland freshwater swamps and mangrove estuaries. The cases related to human-crocodile conflict show an increasing trend for the last twenty years and the assumption is now more crocodiles living in the rivers with less food is available for them to survive. There is limited study being carried out in Samarahan area, thus the density of crocodile is still unknown. Therefore, this study is designed to determine the density of crocodiles in Samarahan River Basin (SRB). Three rivers were selected for the study, namely Tuang River, Sabang River and Belat River. This study used standard night spotting technique and the survey covered 15 km linear distance upstream from the river mouth. There is an increasing trend in wild crocodile populations density in SRB, from year 2019 to 2021 with 0.98, 1.11 and 1.22 non-hatchlings per km, respectively. All class cohorts can be seen inhabiting the three rivers with high number of hatchlings and yearlings observed, suggesting that the rivers support healthy wild crocodile populations. This finding could support relevant agencies to formulate sustainable utilization of this valuable resource for the benefit of local people.

KEYWORDS: Crocodile, biodiversity, density, wild population trend

DAY 2 (9TH MARCH 2022)
SESSION 11: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
Dr. Fikri Akmal Khodzori	1120-1135	OAF-6	Raymie Bin Nurhasan	The Status of Selected Reef Fishes (Carangidae, Lutjanidae, Serranidae) Stocks in Tun Mustapha Park Analysed Using Swept Area Method
	1135-1150	OAF-7	Effarina Bt Mohd Faizal Abdullah	Biological Characteristics of Kawakawa (*Euthynnus affinis*) in Perak Waters
	1150-1205	OAF-8	Nur Hidayah Asgnari	Length - Weight Relationship and Relative Condition Factor of a Dominant Species of Anchovies, *Encrasicholina heteroloba* in West Coast of Peninsular Malaysia
	1205-1220	OAF-9	Muhammad Ikhlas Zabidi	Long-Term Patterns of Fish Landing in Response with ENSO Phenomena in Kota Kinabalu, Sabah, Malaysia
	1200-1230		DISCUSSION (Question and Answer)	

OAF-6 THE STATUS OF SELECTED REEF FISHES (CARANGIDAE, LUTJANIDAE, SERRANIDAE) STOCKS IN TUN MUSTAPHA PARK ANALYSED USING SWEPT AREA METHOD

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ABSTRACT

Marine capture fisheries is one of the important industries in the Tun Mustapha Park (TMP), a multi-use marine protected area in Sabah. In fact, approximately 12.3 % of fish landings in Sabah is recorded from the TMP area alone. On the other hand, data on the fisheries stock status such as fish biomass, catch rate, species density and/or abundance and catch per unit effort remain scarce, mainly due to the lack of such studies for this area. In this on-going study, we conducted a fisheries stock assessment on a few commercially important species of reef fishes. The selected species are from three families which are groupers (Serranidae), snappers (Lutjanidae) and jacks/ trevallies (Carangidae). Data were collected using three approaches, but in this study we only present data collected using the SWEPT area method. Samplings were conducted in four sites, which are Marudu Bay, Balambangan waters, Inderason waters and Sibogoh-Malawali waters, for a period of 4 days between 18 March 2021 and 27 March 2021. For each site, three hauls were made, with each haul set to a one-hour bottom trawl effort. The landed catch were sorted, measured and identified to species level or at least to genus level. The selected reef fish composition represented 0.41 % of the overall trawl-caught fishes in this study with 12 of the selected reef fish species recorded out of 54 fish families and 105 fish species. Our preliminary analyses of the fisheries stock status indicate that the biomass of TMP fisheries stock is approximately 3,320.08 metric tonnes (mt). The biomass for Serranidae is 3.99 mt, Lutjanidae 0.24 mt and Carangidae 9.54 mt. Efforts are on-going in this fisheries stock assessment. Data collected will form the baseline marine capture fisheries data which is important for fisheries management for the recently gazetted TMP, and will contribute towards the sustainable development goals as adopted by the country.

KEYWORDS: Fish Stock Assessment, Reef Fishes, Fisheries, SWEPT area method, Tun Mustapha Park, Sabah

OAF-7 BIOLOGICAL CHARACTERISTICS OF KAWAKAWA (*Euthynnus affinis*) IN PERAK WATERS

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ABSTRACT

Neritic tuna species are among the important pelagic fish caught by commercial and traditional fishing gears. The main neritic tuna found in Malaysian waters are longtail (Thunnus tonggol), kawakawa (Euthynnus affinis) and frigate tuna (Auxis thazard). The study was conducted from January to December 2021 in Perak waters. The purpose of this study was to analyse the biological characteristics including length frequency, length-weight relationship, sex ratio and length at first maturity. From length frequency were obtained mode size at 320 - 350 mm for male and 380 - 420 mm for female. The growth pattern of kawakawa was isometric as shown by the equation of as $W = 0.00001TL^{3.0569}$ *(*$R^2 = 0.9593$*). The gonad fish were dominated of immature gonads by 82%, and the mature gonads by 18%, with level V was almost found every month. The results of chi square test showed that there were significant differences number of males and females fish with the ratio male to female, 1 : 0.97. The length at first maturity was at 433.39 mm.*

KEYWORDS: Neritic tuna, length frequency, length-weight relationship, length at first maturity

OAF-8 LENGTH - WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR OF A DOMINANT SPECIES OF ANCHOVIES, *Encrasicholina heteroloba* IN WEST COAST OF PENINSULAR MALAYSIA

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ABSTRACT

This study was conducted to determine the length - weight relationship and condition factor of a dominant species of anchovies, Encrasicholina heteroloba in West Coast of Peninsular Malaysia. This study was carried out from January to December 2021 in Pulau Pangkor, Perak and Tanjung Dawai, Kedah. A sample of 2 to 4 kg of fresh anchovy was taken from each haul of anchovy purse seines and were identified for species, measured the total length and weight. The result from this study shows that the relationship between total length and body weight of E. heteroloba for both male and females were $W=0.00519L^{3.20}$ in Pulau Pangkor and $W=6.0.00689L^{3.04}$ in Tanjung Dawai which exhibit positive allometry growth. Meanwhile, the mean relative condition factor (Kn) for the anchovies were 1.02±0.003 SE in Pulau Pangkor and 1.01±0.002 SE in Tanjung Dawai which indicates that the fish is in good growth condition. This species is an important component of the marine ecosystem and commercially significant marine food resource in Malaysia. Thus, understanding the length - weight relationship and condition factor of this species is crucial in estimating the biological information and population health condition which can be used for fishery resources management to ensure the sustainability of fisheries resources.

KEYWORDS: Length-weight relationship, relative condition factor, anchovies and *Encrasicholina hetreoloba*

OAF-9 LONG-TERM PATTERNS OF FISH LANDING IN RESPONSE WITH ENSO PHENOMENA IN KOTA KINABALU, SABAH, MALAYSIA

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ABSTRACT

El-Nino Southern Oscillation (ENSO) phenomena is one of the factors influencing the long-term pattern of fish landing. This phenomenon relates to climate variations such as rainfall, temperatures, and other climate parameters across the equatorial Pacific Ocean. El Nino refers to the ENSO cycle's warm phase, while La Niña implies the cold phase. The aims of this study are to investigate the long-term pattern (20-years) of fish landing as well as ENSO phenomena occurrences in Kota Kinabalu. Fish landings data for 20-years (2000-2019) obtained from the Fisheries Department of Sabah. The ENSO phenomenon is determined by using the Oceanic Niño Index (ONI) obtained from NOAA websites. Events are defined as overlapping 3-month periods at or above the +0.5 anomaly for warm (El Niño) events and at or below the -0.5 anomaly for cold (La Niña) events. The threshold is further broken down into Weak (with a 0.5 to 0.9 SST anomaly), Moderate (1.0 to 1.4), Strong (1.5 to 1.9) and Very Strong (≥ 2.0) events. For the purpose of this report for an event to be categorized as weak, moderate, strong or very strong it must have equaled or exceeded the threshold for at least 3 consecutive overlapping 3-month periods. There is seven El-Nino year recorded from year 2000 to 2019. Weak El-Nino recorded in year 2004, 2006, 2014 and 2018; moderate El-Nino recorded in year 2002 and 2009; very strong El-Nino recorded in year 2015. There were eight La Nina occurrence throughout 20-years. Weak la-Nina recorded in year 2000, 2005, 2008, 2016,2017; moderate La-Nina recorded in year 2011; strong La-Nina recorded in year 2007 and 2010. Abundance of fish landing during weak El-Nino year are 42,138 tonnes (2004), 44,861 tonnes (2006), 68,588 tonnes (2014), 57,827 tonnes (2018); moderate El-Nino are 43,757 tonnes (2002), 48,757 tonnes (2009); and very strong El-Nino are 61,771 tonnes (2015). Abundance of fish landing during La-Nina year are 48,914 tonnes (2000), 48,218 tonnes (2005), 45,429 tonnes (2008), 57,253 tonnes (2016), 55,850 tonnes (2017); moderate La-Nina are 48,542 tonnes (2011); strong La-Nina are 51,152 tonnes (2007), 50,742 (2010). Diversity of fish landing during weak El-Nino year are 67 species (2004, 2006), 93 species (2014), 98 species (2018); moderate El-Nino are 67 species (2002), 86 species (2009); and very strong El-Nino are 93 species (2015). Diversity of fish landing during La-Nina year are 67 species (2000, 2005, 2008), 93 species (2016), 98 species (2017); moderate La-Nina are 85 species (2011); strong La-Nina are 67 species (2007), 86 species (2010). There was more La-Nina occurrence than El-Nino from year 2000 to 2019. The abundance of the fish landing was mostly higher during the El-Nino year. There was no relationship between the diversity and the fish landing as the diversity only increase over the year. However, further study may prove as atmospheric temperature also directly affecting the oceanic water column through SST. The productivity of fisheries resources is also mostly related to the development of phytoplankton and ecology. Extreme weather events (pre and post) in response to fish landing also can be done.

KEYWORDS: N/A

DAY 2 (9TH MARCH 2022)
SESSION 12: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
Dr. Norfazreena Mohd Faudzi	1120-1135	OAF-10	Wei Qing Chloe Lung	Delayed Signs of UV-C Damage to *Chlorella* sp. Observed Through Fluorescent Staining
	1135-1150	OAF-11	Wan Nurizzati Binti W Idris	Development of Sperm Cryopreservation Protocol for *Pangasius nasutus*
	1150-1205	OAF-12	Nazirah Binti Mingu	Comparative Study of Drying Methods on Selected Seaweeds (*Kappaphycus* sp. and *Padina* sp.) Based on Their Phytochemical and Carrageenan Located in Sabah
	1205-1220	OAF-13	Donald Torsabo	Effects of Smoking and Sun Drying on The Carcass Quality of *Oreochromis niloticus* (LINNAEUS, 1758)
	1200-1230		DISCUSSION (Question and Answer)	

OAF-10 DELAYED SIGNS OF UV-C DAMAGE TO *Chlorella* SP. OBSERVED THROUGH FLUORESCENT STAINING

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ABSTRACT

Ultraviolet (UV-C) irradiation is the most important part of water filtration, which has no side effects on the environment and has been used in water purification systems in the aquaculture and transistor industries. In this research, the effect of UV-C on Chlorella sp. was investigated. Chlorella sp. was irradiated 0, 1, 2 and 3 times at a fixed flow rate of 6.5 L min^{-1} and the effects of UV-C LED on the apoptosis rate and death rate of Chlorella sp. were analyzed by flow cytometry after staining cells with the nucleic acid dye SYTOX Green and the membrane-associated protein stain Annexin V-PE Reagent. As a result of UV-C irradiation, the cells Chlorella sp. underwent phosphatidylserine (PS) ectropion and plasma membrane damage which resulted in death. The effect of UV-C is proportional to the number of times of irradiation. Three times of UV-C LED irradiation resulted in 91.76 ± 3.33 % death rate, as observed through SYTOX Green staining, with no rebound within 72 hours. This research was the first report that observed the delayed cellular apoptosis occurred in Chlorella sp., we expect that our study can be used as a standard reference for future industrial applications.

KEYWORDS: Cell death, *Chlorella* sp., flow cytometry, phosphatidylserine, UV-C

OAF-11 DEVELOPMENT OF SPERM CRYOPRESERVATION PROTOCOL FOR *Pangasius nasutus*

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ABSTRACT

Pangasius nasutus (Bleeker, 1863) or locally known as 'patin buah' is a promising aquaculture species with high market value and constantly increasing in market demand. In order to serve the growing demand of this species through artificial fertilization and the preservation of valuable strains of male broodstocks, the development of sperm cryopreservation for this species is required. In this study, the basic protocol of sperm cryopreservation for P.nasutus was established by identifying the key factors including cryoprotectants, cooling rates and toxicity. Various cryoprotectants [10%; Dimethyl Sulphoxide (DMSO), Dimethyl Acetamide (DMA), Methanol (MeOH), Ethylene Glycol (EG)] with 0.9% Sodium Chloride (NaCl) as an extender at a dilution ratio 1:9 were investigated. Cooling rates were manipulated by adjusting various height of straws (10-15 cm) above liquid nitrogen (LN) vapor and immersed in liquid nitrogen (LN) at -40°C for different concentrations of DMSO and MeOH. Toxicity was determined by observing samples at set intervals (till 50 minutes) after dilution in 5-15% DMSO, MeOH and DMA. The most successful cryodiluent with a comparative post-thaw motility of 27.93±17.2% was 10% MeOH with 90% 0.9 NaCl when cooled at height of 14cm from LN surface for 5 minutes. However, other cryoprotectants were also effective as there were no significant differences in comparative post-thaw motility. The effect of cooling rates showed no significant differences between different heights of straw above the surface of liquid nitrogen on comparative post-thaw motility. All cryoprotectants at the tested concentrations (5-15%) were not toxic at 10 minutes. These results obtained here will be important for further studies on the standardization of cryopreservation procedures and application of artificial fertilization for P.nasutus species.

KEYWORDS: Cryopreservation, cryoprotectant, toxicity, cooling rate

OAF-12 COMPARATIVE STUDY OF DRYING METHODS ON SELECTED SEAWEEDS (*Kappaphycus sp. and Padina sp.*) BASED ON THEIR PHYTOCHEMICAL AND CARRAGEENAN LOCATED IN SABAH

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ABSTRACT

Seaweed, one of the marine resources is known with their precious active compound. Dehydration process often requires before utilizing the seaweed. It helps on increases the shelf life and play a major role in the extraction of specific chemical components. This study conducted to evaluate the effects of different drying treatments of two different seaweeds on its phytochemical contents and carrageenan properties of the dry seaweed product. Seaweed used include edible seaweed which are Kappaphycus sp., and locally abundant seaweed Padina sp. Four (4) different drying methods used; namely sun-drying for five (5) days, air-drying for 14 days, freeze-drying for five (5) days, and oven drying with three different temperatures at 60°C, 80°C and 100°C for six (6) h, respectively. The weight of each seaweed was taken before and after drying treatment. Methanol, MeOH was used as extraction solvent in the determination of phytochemicals content for total phenolic content (TPC) and total flavonoid content (TFC). Sodium hydroxide, NaOH used to extract carrageenan from seaweeds and evaluated on their percentage yield, respectively. Results obtained shows that Kappaphycus sp. yield 40.30% compared to Padina sp., 16.24%. Oven dried at 100°C extracts possessed lowest retention of phytochemicals content and carrageenan yield among all drying methods.

KEYWORDS: *Kappaphycus sp., Padina sp.,* drying, phytochemical, carrageenan

OAF-13 EFFECTS OF SMOKING AND SUN DRYING ON THE CARCASS QUALITY OF *Oreochromis niloticus* (LINNAEUS, 1758)

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ABSTRACT

The effects of smoking and sun drying process on the carcass quality of Oreochromis niloticus from the Federal University of Agriculture Makurdi Fisheries Research Farm was studied to determine their proximate composition and organoleptic qualities. Forty Oreochromis niloticus fish samples were collected, 20 of which were smoked dried in a smoking kiln and the remaining 20 were sun-dried. Results obtained showed that crude protein was significantly higher (52.57 ± 0.03) in sundried carcass than in smoked carcass (47.88 ± 0.02), lipid in sun dried (8.90 ± 0.01) was significantly higher than smoked carcass (8.31 ±0.01) the moisture content of smoked carcass (8.08±0.014) was significantly higher than sun dried carcass (5.51 ± 0.29). From the organoleptic assessment, the smoked O. niloticus however exhibited significantly higher organoleptic quality with a higher acceptability ratio of 4.80 ± 0.12 compared to the sundried samples (3.00 ± 0.29). This study concluded that sun-drying as a method of fish processing preserved fish and preserved its high nutrient content, whereas smoked dried fish samples in this study were preferred in terms of texture, appearance, and general acceptability.

KEYWORDS: *Oreochromis niloticus,* smoking, sun-drying, smoking kiln, fisheries product processing

DAY 2 (9TH MARCH 2022)
SESSION 13: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
	1445-1500	OMBC-16	Moongeun, Yoon	Genetic diversity of *Sesarmops intermedius* (Crustacea, Brachyura, Sesarmidae) in Korea inferred From Molecular Sequence Variation
	1500-1515	OMBC-17	Aiman Amanina binti Amran	Nereididae (Annelida: Phyllodocida) of Intertidal of Buntal Beach.
Dr. Pushpa M. Palaniappan	1515-1530	OMBC-18	Md Yeakub Ali	Identification Keys of Marine Larval Fish of Straits of Malacca
	1530-1545	OMBC-19	Hana Kim	Application of eDNA Metabarcoding for Identification of Polychaetes Species in Marine Benthic Community
	1545-1600	OMBC-20	Dexter Miller Robben	Construction Of a Recombinant Plasmid pCAMBIA1303 Containing The SARS-COV-2 Nucleocapsid (N) Gene for The Transformation of *Chlorella* and Spirulina
	1600-1625		DISCUSSION (Question and Answer)	

OMBC-16 GENETIC DIVERSITY OF *Sesarmops intermedius* (CRUSTACEA, BRACHYURA, SESARMIDAE) IN KOREA INFERRED FROM MOLECULAR SEQUENCE VARIATION

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ABSTRACT

The land crab, Sesarmops intermedius, is widely distributed in the western Pacific region, including in Korean, Japanese, Taiwan, Hong Kong coastal area, and as far as Surabaya and Java in Indonesia. The species is inhabitant in the upper intertidal zones of on rocky beaches in the lower reaches of estuaries. The Korean population is designated as an endangered species, which has been an extremely decreased number of individuals results from the compounding effects of habitat destruction and pollution. The primarily focus of conservation genetics and evolution in an endangered species is to determine evolutionary significant units (ESUs) and the conservation unit using molecular marker. Also, these genetic data can be used to make a strategy management of sustain current levels of genetic diversity. The genetic diversity and population history of S. intermedius were investigated with a nucleotide sequence analysis of 611 base pairs (bp) of the mitochondrial cytochrome c oxidase subunit I gene (COI) in 78 individuals collected from 11 populations in Korea, which defined a total of 14 haplotypes. The observed haplotypes had a shallow genealogy and no geographical associations. Greater haplotype diversities (0.448- 1.000), low nucleotide diversity (0.001-0.007), and significant negative values for Fu's FS in the most of populations suggest rapid population growth and a recent, sudden population expansion from an ancestral population in the Late Pleistocene. The low pairwise comparison values of F_{ST} estimates for COI gene indicated substantial gene flew occurs among these populations as a result of sea currents, but significant genetic differentiation of Gangjin population from all other populations, might have been influenced by a restriction in gene flow caused by hydrographic conditions such as ocean boundaries. Population genetic data based on molecular marker will be useful to conserve for marine organisms under protection crab species.

KEYWORDS: *Sesarmops intermedius*, Conservation genetics, Genetic diversity, Genetic population structure

OMBC-17 NEREIDIDAE (ANNELIDA: PHYLLODOCIDA) OF INTERTIDAL OF BUNTAL BEACH

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ABSTRACT

Polychaetes are one of the important macrobenthos that maintains the dynamics of the ecosystem. They are primary food source for higher order organism in food web and also important in the recycling of organic matter. Polychaete studies on their availability have been conducted widely in Malaysia, especially Peninsular Malaysia. These studies have contributed in the species discoveries and the compilation of polychaete checklist in Malaysia. However, the records of polychaete found in the Sarawak waters were incomplete and limited. This study aims to contribute in data collection of polychaete species in Sarawak waters by focusing on Nereidid family in the intertidal zone of sandy area of Buntal beach. Sampling was conducted by establishing two parallel transect line from high to low tide. Sediment samples were taken along the transect line at each station. Samples were dug out with a depth of 15 cm in 0.5 m x 0.5 m area using spade and preserved with 10% formalin. The collected samples were later observed under stereo and compound microscope for further identification. Four species from family Nereididae were identified; Dendronereis sp., Neanthes willeyi, Nematonereis unicornis and Platynereis dumerilii. Dendronereis sp. have the highest number of individuals collected (38 individuals). The long distance between the high tide to low tide zone in Buntal beach (<1km) allows more stations for polychaete collection and presence of different sediment sizes. The variation of sediment sizes along Buntal beach provides suitable habitat for Nereidid polychaete species.

KEYWORDS: Polychaete, Nereidid family, intertidal zone of Buntal beach, sediment.

OMBC-18 IDENTIFICATION KEYS OF MARINE LARVAL FISH OF THE STRAITS OF MALACCA

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ABSTRACT

Precise larval identification is critical for fishery management and habitat protection in ecological and early life history research of larval fishes. For this purpose, body shape, myomeres count, gut shape, gas bladder, head spination, eyes shape, fin formation, pigment and fin ray counts were dichotomously used to identify marine larval fish sampled from the Straits of Malacca off Port Dickson, Malaysia. Because of the diverse forms of the ontogenic stages, identification of the fish larvae was divided into three main notochord developmental stages i.e. preflexion, flexion and post-flexion. The sampling program that was carried out in the month of March and April 2021 during two contrasting lunar cycles of full moon and new moon, and diurnal variation of day and night recovered 892 individual larvae identified to the lowest possible taxa of 15 families. The highest number of fish larvae were Gobiidae, followed by Engraulidae, Leiognathidae, Ambassidae, Blennidae, Carangidae, Nemipteridae, Sciaenidae, Tetraodontidae, Clupeidae, Syngnathidae, Mullidae, Apogonidae, Sillaginidae, Uranoscopidae and Ophidiidae. Each character used in this study to identify the larvae was of great taxonomic utility.

KEYWORDS: Dichotomous Keys, Larval fish, Ontogeny, Diurnal, New Moon, Full Moon, Straits of Malacca

OMBC-19 APPLICATION OF eDNA METABARCODING FOR IDENTIFICATION OF POLYCHAETES SPECIES IN MARINE BENTHIC COMMUNITY

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ABSTRACT

Polychaetes are an important indicator of benthic communities because of their highly species richness and frequency in mostly benthic environment. It is important to understand species diversity of polychaetes due to their ecological importance. Here, eDNA metabarcoding method was employed as an alternative to a conventional survey of species diversity for polychaetes. First, a new specific primer set targeting a short 16S region was developed for eDNA metabarcoding analysis of polychaetes, and its applicability was then evaluated by comparing its performance with that of the COI universal primer set based on mock community test and environmental DNA metabarcoding analysis. This new specific primer set was amplified more target taxa than the COI universal primer from mixed DNA and eDNA, it was capable of performing accurate identification for polychaetes species with a high taxonomic resolution, which makes it suitable for monitoring of polychaetes. It can also overcome the limitations of polymorphic species identification shown in existing studies using COI universal primers. In addition, to verify the possibility of identifying polychaetes species using eDNA metabarcoding technique, comparative analysis between morphological identification and eDNA metabarcoding identification was performed. Our results demonstrated that DNA metabarcoding was able to detect much more polychaeta taxa than morphological identification. Especially, DNA metabarcoding is a powerful tool for resolving taxon diversity in groups that can be easily damaged during sample collecting or difficult to distinguish morphologically due to their small sizes such as Spionidae. If eDNA metabarcoding analysis can compensate for the continuous accumulation of Korean polychaetes barcode databases and several limitations such as some taxa are improved, eDNA metabarcoding analysis can be powerful tool for diversity analysis of polychaetes.

KEYWORDS: *Annelida, Polychaeta, Diversity, DNA metabarcoding, Species-specific primer.*

OMBC-20 CONSTRUCTION OF A RECOMBINANT PLASMID pCAMBIA1303 CONTAINING THE SARS-COV-2 NUCLEOCAPSID (N) GENE FOR THE TRANSFORMATION OF CHLORELLA AND SPIRULINA

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ABSTRACT

The coronavirus disease 2019 (COVID-19) has caused more than 359 million cases and 5.62 million deaths as of January 27, 2022. Although the development of SARS-CoV-2 vaccines and their implementation showed a decreasing trend in the hospitalizations of severe cases, the emergence of new variants may cause evasion from the vaccine-induced immunity. Microalgae such as Chlorella sp. and Spirulina sp. are known for their naturally existing bioactive metabolites which are pharmacologically active and exhibit antiviral properties. The use of microalgae to produce SARS-CoV-2 antigens is a sustainable approach for high scalability and lower production cost. The nucleocapsid (N) protein is a potential protein target for inducing a high immunogenic response against SARS-CoV-2. The antigens produced can then be used as a target for the development of edible vaccines against SARS-CoV-2. The present study highlights the plasmid construction of the N gene using the pCAMBIA1303 plant expression vector. Research workflow includes subcloning of the N gene into pCAMBIA1303 through double digestion of restriction enzymes i.e., BglII and NcoI, followed by a ligation reaction. Agarose gel electrophoresis results of the digested and ligated products show a successful integration of the N gene into the pCAMBIA1303 vector and Sanger sequencing has confirmed the N gene inserted is of the right sequence. This new plasmid is called pCAMBIA1303-N. Future works include the transformation of the newly constructed pCAMBIA1303-N expression vector into the protoplast cell of microalgae through electroporation. The antigens produced by the transgenic microalgae can potentially be used towards the development of a SARS-CoV-2 edible vaccine.

KEYWORDS: Microalgae, SARS-CoV-2, COVID-19, Edible vaccine

DAY 2 (9TH MARCH 2022)
SESSION 14: CORE-TO-CORE PROGRAM: BUILDING UP RESEARCH NETWORK FOR SUCCESSFUL SEED PRODUCTION TECHNOLOGY LEADING SOUTH-EAST ASIAN REGION

Chairperson	Time	Code	Presenter	Title
Dr. Lim Leong Seng	1445-1450	CTC-1	Motohiko Sano	Japan Society for the Promotion of Science (JSPS) Core-to-Core Program: Building Up Research Network for Successful Seed Production Technology Leading South-East Asian Region
	1450-1505	CTC-2	Mohammad Tamrin Bin Mohamad Lal	First Report of Plant Fungal Pathogen Zasmidium Musae Associated With Moribund Eggs of Ornate Spiny Lobster (*Panulirus Ornatus*) in Sabah
	1505-1520	CTC-3	Thao Duc Mai	Cultivation and Biochemical Composition of The Diatom *Chaetoceros muelleri* as a Live-Feed Stock for Shrimp Larval Culture in Vietnam
	1520-1535	CTC-4	Leobert D. de la Peña	"OPLAN BALIK SUGPO" (Operation Plan for Black Tiger Prawn Revival) in The Philippines: Shrimp Health and Biosecurity Management in Hatchery and Grow-Out Operations
	1535-1550	CTC-5	Desrina	Health assessment of Wild and Farmed Blood Cockles *Tegilarca granosa* in the North Coast of Central Java
	1550-1625		DISCUSSION (Question and Answer)	

CTC-1 JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS) CORE-TO-CORE PROGRAM: BUILDING UP RESEARCH NETWORK FOR SUCCESSFUL SEED PRODUCTION TECHNOLOGY LEADING SOUTH-EAST ASIAN REGION

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ABSTRACT

Declining of fishery resources has become a major issue with the population increase and economic development. Establishment of protocol of seafood production by aquaculture which does not dependent on natural resources is one of the promising solutions to this issue. It should need seeds for aquaculture which are bred from parents and reared massively under artificial conditions. Technology for seed production of the target species has been independently developed and improved in each country. In addition to the protocols for suitable broodstock maturation and for nutrition in larval culturing, control of infectious diseases is necessary in seed production. In this project, we intend to improve the technology in Southeast Asian countries with the project policy that one country concentrates on one target species, providing efficient approach for technology development. With participation of institutions in five countries, Indonesia, Malaysia, Philippines, Thailand and Vietnam in corporation with Japanese researchers of TUMSAT and cooperating universities, the target species for the respective countries are blood cockle, mangrove crab, grouper, swimming crab and slipper lobster. Japanese experts and the relevant counterpart country experts in the fields of both seed production and disease control work together through extensive face-to-face discussion, so that we can develop and improve the protocol of seed production efficiently. The developed protocols for each target species in this project will be transferred to Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD), an ASEAN research institution, and then disseminated to ASEAN member countries through AQD technical training program. This system of technology development and transfer can be a research platform. After establishing principal technology of seed production in this project (2019-2022), we will step up a future project on the platform to develop more advanced seed production technologies which could contribute to increasing productivity of aquaculture in Southeast Asia.

KEYWORDS: Research network, Seed production, Disease control

CTC-2 FIRST REPORT OF PLANT FUNGAL PATHOGEN *Zasmidium musae* ASSOCIATED WITH MORIBUND EGGS OF ORNATE SPINY LOBSTER (*Panulirus ornatus*) IN SABAH

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ABSTRACT

Fungal infections have been reported as one of the main hindrances for successful crustacean seed production. In a shrimp hatchery of Universiti Malaysia Sabah, abnormal sponge development of the ornate spiny lobster Panulirus ornatus was observed and it was suspected as fungal infection due to a change in sponge colour. Fungus was isolated from egg samples of P. ornatus and transferred to Peptone-Yeast-Glucose-Seawater (PYGS) agar to identify and to reveal its morphological characteristics. Interestingly, the isolate in PYGS broth transferred into sterilized seawater did not show any characteristic feature of any asexual reproduction of Oomycete infection on crustacean. Consequently, slide culture was performed for a more detailed examination, where the fungus isolate showed septate hyphae and vesicle-like fruiting body only upon staining via Iodine-Glycerol stain. Based on the morphological characteristic features, the present isolate was determined as a non-oomycete organism and designated as IPMB LE01 strain. According to the ITS nucleotide sequence analyses of IPMB LE01, it has matched to Zasmidium musae. This species was mainly reported in plant fungal infection and rarely observed in aquatic animals. Hence, it is considered as the first report of fungus-associated on the moribund eggs of ornate spiny lobster in Sabah.

KEYWORDS: Fungal infection, *Panulirus ornatus* Eggs, PYGS, ITS sequence, Ascomycetes

CTC-3 CULTIVATION AND BIOCHEMICAL COMPOSITION OF THE DIATOM *Chaetoceros muelleri* AS A LIVE-FEED STOCK FOR SHRIMP LARVAL CULTURE IN VIETNAM

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ABSTRACT

The shrimp seedstock in Vietnam has had a remarkable increase in the last decade, with annual production of more than 2,000 hatcheries estimated at around 130 billion postlarvae. In the process of shrimp larviculture, importance of microalgal for survival and growth has been well documented, driving a demand of microalgal biomass and high nutrition value. In this study, we investigated the growth and biochemical composition of a new diatom strains in shrimp larvicultivation in Vietnam, Chaetoceros muelleri CS-176, in various culturing conditions. Here, we report that the growth of C. muelleri was the highest under F medium with the highest exponential growth rate at 0.8±0.03 and maximum cell density at 11.4 ±1.0 ×10^{6} cells.mL^{-1} compared to other mediums of F/2 and a popular commercial medium of AGP-C. The total protein, carbohydrate and lipid were recorded at around 4.53±0.04, 2.30±0.17, and 9.84±0.39 % (dw), respectively. under the hatchery conditions. Addtionally, the PUFA was the highest at 40.5±1.8, followed by SFA at 34.86±1.23 and MUFA at 24.63±0.86 % (total fatty acid). The major fatty acids of the diatom were myristic acid (14:0), palmitic acid (16:0), palmitoleic acid (16:1ω7-cis), EPA, and DHA. The study also pointed out that the FA profile of C. muelleri was markedly affected by temperature. In which, the high temperature caused high SFA and low PUFA, and vice versa. The growth performance and biochemical profile of the C. muelleri was potentially suitable for shrimp larval cultivation.

KEYWORDS: Biochemical composition, *Chaetoceros muelleri*, diatom, fatty acids, microalgal growth, live feeds

CTC-4 "OPLAN BALIK SUGPO" (OPERATION PLAN FOR BLACK TIGER PRAWN REVIVAL) IN THE PHILIPPINES: SHRIMP HEALTH AND BIOSECURITY MANAGEMENT IN HATCHERY AND GROW-OUT OPERATIONS

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ABSTRACT

In 2017, SEAFDEC/AQD initiated the "Oplan Balik Sugpo" or Operation Plan for Black Tiger Prawn Revival. This Program generally aims to bring back the Penaeus monodon industry of the Philippines and help farmers revive their hopes and venture again into prawn culture. Moreover, this Program covers high quality prawn fry production in the hatchery and the environment-friendly schemes with enhanced biosecurity features in grow-out operations. Under the Program, the disease prevention schemes were implemented for responsible management of prawn spawners obtained from the natural environment. The Spawner/Broodstock Facility and Shrimp Hatchery Complex of SEAFDEC/AQD practice strict quarantine protocols to ensure high quality fry production. From 2018 to 2021, the consistent successful fry productions verified and validated the technologies implemented. Fry produced in 2019 until 2021 from the Shrimp Hatchery Complex were stocked in ponds at Dumangas Brackishwater Station for verification studies following the environment-friendly schemes with enhanced biosecurity features in prawn farming. These include strict proactive monitoring using bacterial and PCR analyses for both cultured prawn and rearing water. The results validated that the technology applied was successful for the three consecutive crops based on its consistent high survival and harvest. In 2022, this technology will also be field-tested in several Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) sites and private farms before it will be promoted for commercial adoption by prawn farmers.

KEYWORDS: *Penaeus monodon*, Shrimp Health Management, Biosecurity, White Spot Syndrome Virus

CTC-5 HEALTH ASSESSMENT OF WILD AND FARMED BLOOD COCKLES *Tegilarca granosa* IN THE NORTH COAST OF CENTRAL JAVA

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ABSTRACT

Blood cockles (Tegilarca granosa) is an important seafood in Indonesia. Blood cockles farming is done by stocking brackish water pond and intertidal areas with spat collected from the wild. Central Java Province has several natural habitat and farming location of the blood cockles. The objective of this research is to assess the health condition of wild and farmed blood cockles on the north coast of Central Java Province by examining parasitic infection, histopathological changes, and blood condition. Blood cockles (wild and farmed) was collected weekly from villages during June-October 2020 and brought to the laboratory alive. Parasites infection and histopathological changes were examined on fresh squash and preserved tissues of the following organs: gills, gonad, digestive gland and mantle. There is no difference in prevalence, parasite species and infected organ between farmed and wild cockles. The most common parasites found was Nematopsis spp. Blood cockle with heavy infection tend to have pale gills, blood and soft tissue, lower hematocrit percentage and longer clotting time than that with light infection. Pathological changes observed associated with the occurrence of Nematopsis cysts were enlargement on the gills lamella, necrosis on connective tissues of the gut and depressed area on the gonad adjacent to the cyst. There was no difference in prevalence of infection and health condition between wild and farmed blood cockles.

KEYWORDS: Alternative protein, Anchovy, Feed, Pellet

DAY 2 (9TH MARCH 2022)
SESSION 15: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
	1445-1500	OAF-14	Yucheng Lu	ATP Synthase Subunit E is a Shrimp Growth-Associated Breeding Marker
	1500-1515	OAF-15	Asra Nor Izaty Binti Aswadi	Banana Leaf *Musa acuminata* x *balbisiana* Extract Improved Siamese Fighting Fish *Betta splendens* Hatching Rate
Assoc. Prof. Dr. Annita Yong Seok Kian	1515-1530	OAF-16	Amirah Syafiqah Binti Mohd Zamri	Molecular Cloning and Characterization of Gonadotorpin-Releasing Hormone (GnRH) Gene in *Pangasius nasutus*
	1530-1545	OAF-17	Amin Safwan Bin Adnan	Histological and Biochemical Changes in The Orange Mud Crab (*Scylla olivacea*) at Different Ovarian Maturation Stages
	1545-1600	OAF-18	Noordiyana Mat Noordin	Development of Broodstock Maturation Diets for Female Orange Mud Crab, *Scylla olivacea* (HERBST, 1796)
	1600-1625		DISCUSSION (Question and Answer)	

OAF-14 ATP SYNTHASE SUBUNIT E IS A SHRIMP GROWTH-ASSOCIATED BREEDING MARKER

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ABSTRACT

Penaeus vannamei is one of the most popular aquaculture species in the world. This species is featured with its fast-growing and delicious taste, which drives people develop various strains. During this process identification of trait-associated markers could effectively increase breeding efficiency. Driven by this, we tried to screen fast-growing key regulators via a FACS-based high throughput method, in which 2-NBDG was applied as a fluorescent indicator for direct glucose uptake measurement. Totally six candidate genes were screened out followed by in vitro validation in 293T cells. After that, the correlation between these genes and shrimp growing was further verified in a hybrid lineage. Two genes including ATP synthase subunit e and inhibitor of apoptosis protein were confirmed that their expression level was correlated with shrimp growth speed. And then, we further test these two candidate markers in various lineage and confirmed that ATP synthase subunit e could be a shrimp fast-growing breeding marker. Our data provide a novel method to screen functional markers for shrimp breeding.

KEYWORDS: *Penaeus vannamei,* growth-associated breeding marker, ATP synthase subunit e

OAF-15 BANANA LEAF *Musa acuminata X balbisiana* EXTRACT IMPROVED SIAMESE FIGHTING FISH *Betta splendens* HATCHING RATE

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ABSTRACT

In the recent years, lots of efforts have been done to ensure ornamental industry is economically profitable. One of the efforts is application of plant extracts that is widely used including in Siamese fighting fish (Betta splendens) which involving using catappa leaf in its breeding. However, due to the difficulty in obtaining catappa leaf, breeders have been using brown banana leaf (BBL) as an alternative. Moreover, no study has been done to investigate whether BBL has the same ramifications as catappa leaf. Therefore, the objectives of this study are to investigate the toxicity of BBL (Musa acuminata x balbisiana) and the effects of its application on size of bubble nest, fecundity and hatching rate of B. splendens. A 96 hours toxicity test (LC50) was conducted on broodstocks (n=42 male, 42 female) housed individually where no mortality was observed even at the highest concentration of BBL (1.1 g/L). Then, B. splendens broodstocks (n=63 pairs, 9 replicate treatments^{-1}) were exposed to different treatments; C1 (no leaf, control), C2 (0.7 g brown catappa leaf, positive control) and T1 (0.7 g), T2 (0.8 g), T3 (0.9 g), T4 (1.0 g) and T5 (1.1 g) of BBL. Results showed there was significant differences ($P<0.05$) in hatching rates obtained in C2 (95.86%) and T5 (95.63%). However, there was no significant difference in size of bubble nest and fecundity of catappa leaf and BBL treatments. It is suggested that BBL can replace catappa leaf in B. splendens breeding.

KEYWORDS: Ornamental fish, broodstock, toxicity, hatching rate

OAF-16 MOLECULAR CLONING AND CHARACTERIZATION OF GONADOTORPIN-RELEASING HORMONE (GnRH) GENE IN *Pangasius nasutus*

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ABSTRACT

Pangasius nasutus (Bleeker, 1863), river catfish locally known as patin buah is an indigenous freshwater fish and native fish species, which usually can be found in the Asian region and the Pahang River, Malaysia. The native patin buah raised popularity and is highly consumed in Malaysia due to its sweet taste and nutritional value. However, the Department of Fisheries Maran in Malaysia, reported that the wild patin buah population was declining due to the slow growth and limited artificial breeding of this species due to its reproductive failure, inability to reach final oocyte maturation (FOM), and low survival rate when reared in captivity. Currently, recorded fisheries statistics from the Department of Fisheries (DOF) show that only 10,000 hatching fry were produced in 2018, with no further successful breeding in 2019 or 2020. Pangasius nasutus is a seasonal spawner species, so its production is limited by the lack of an appropriate 'natural' spawning environment in captivity. Thus, the study of gonadotropinreleasing hormone (GnRH), a crucial hormone in reproductive process, which stimulates the release of gonadotropins hormones for promoting sex steroid production and maturation of the gonad. This study involved the molecular characterization of complete open reading frame (ORF) GnRH-1 and GnRH-2 subunit genes of P. nasutus. Briefly, brain samples from adult P. nasutus were used to perform RNA extraction, following reverse-transcription of the total RNA into cDNA. Polymerase Chain Reaction (PCR) was performed by using degenerated primers to amplify the partial genes of GnRH-1 and GnRH-2, while Rapid Amplification of cDNA Ends (RACE) PCR was performed to obtain the unknown region of 5′ and 3′ sequences of GnRH-1 and GnRH-2 genes. All PCR products were successfully cloned into TOPO TA vector and were sent for DNA sequencing. From the result, partial PCR amplification were successfully detected at specific band of ~136 bp and ~162 bp for GnRH-1 and GnRH-2, respectively. The RACE PCR results showed PCR bands were generated at ~450 bp and ~380 bp for GnRH-1 and GnRH-2, respectively. Phylogenetic analysis showed GnRH-1 and GnRH-2 species were clustered together with similar Siluriformes order, which consist most of catfish species. The findings of this study will be the first step toward developing an artificial hormone to improve the reproductive strategy of P. nasutus and other fish species, thus to increase the production of this species in Malaysia.

KEYWORDS: Gonadotropin-releasing hormone, Pangasius nasutus, Polymerase chain reaction, cloning

OAF-17 HISTOLOGICAL AND BIOCHEMICAL CHANGES IN THE ORANGE MUD CRAB (*Scylla olivacea*) AT DIFFERENT OVARIAN MATURATION STAGES

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ABSTRACT

Twenty female adult orange mud crab, Scylla olivacea (consisting of five crabs per ovarian maturation stage) were sampled from Setiu Wetlands, Terengganu, Malaysia (5°40'47.93"N 102°42'45.04"E). Ovaries and hepatopancreas were sampled to determine their characteristics at the different ovarian maturation stages through external morphologies (colouration, gonadosomatic index, and hepatosomatic index), and histology assessment (size and structure). Meanwhile, hemolymph was sampled to identify the concentration of glucose, and vertebrate-type steroid hormones (17β-estradiol and progesterone). Morphological observations indicated there was an increase in ovarian GSI, with colour changes from translucent to reddish-orange; however, an inverse result was recorded for HSI, as the decrement with colour ranged from pale-brown to dark-brown as maturation advances. Histological analysis indicates that both diameters of oocyte and hepato-tubule increase significantly as stages advance. Hemolymph glucose showed fluctuating results, with Stage-2 recorded as the highest levels, meanwhile, the levels of 17β-estradiol and progesterone recorded a relatively consistent concentration. Overall, ovarian maturation stages affect the GSI, oocyte diameter, and hepato-tubule diameter ($p < 0.05$). However, HSI, glucose,17β-estradiol, and progesterone concentration in hemolymph were not affected ($p > 0.05$) as maturation progressed. This suggests that based on the available data, the examined glucose and vertebrate-type steroid hormones do not play the main role in the development of S. olivacea ovarian maturation. They might become precursors or stimulate other hormones or tissues, rather than directly affect the maturation of S. olivacea as further clarification is needed for better understanding. Therefore, the results obtained could serve as an important guideline focusing on reproductive physiology for prospective mud crab broodstock management for improving the mud crab aquaculture.

KEYWORDS: Aquaculture, Climate change, Glucose, Hormones, *Scylla* spp.

OAF-18 DEVELOPMENT OF BROODSTOCK MATURATION DIETS FOR FEMALE ORANGE MUD CRAB, *Scylla olivacea* (HERBST, 1796)

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ABSTRACT

Data lacking on the nutrient requirements of mud crab, Scylla olivacea has become a hindrance for commercialization of mud crab. Optimal dietary lipid is required for their growth and reproduction and this study was designed to investigate the effect of semi-moist feeds containing different lipids levels to the reproduction of female orange mud crab, Scylla olivacea. Four isonitrogenous semi moist feed (~42%) were formulated with different lipid percentages i.e. T1: 6%, T2: 8%, T3: 10%, and T4: 12% and fed to 120 matured female mud crabs for 90 days. Each crab was considered as a single replicate. Results showed a gradual increase of gonadosomatic index (GSI) level when crabs were fed with diet that contained 12% lipid during 30, 60 and 90 days feeding trial (10.44%, 11.03%, and 14.51%, respectively). However, the GSI increasing pattern was inversely proportional with the HSI (8.92%, 5.11%, and 4.76%) Meanwhile, higher concentration of both EPA and DHA was found in the ovary of mud crabs fed with T4 throughout feeding duration in comparison to other diets. Histological assessment showed that the highest oocyte diameter was dominated in mud crabs fed with T4, which was also correlated with higher level of progesterone (Pg) demonstrating that dietary lipid at 12% level enhanced the ovarian maturation of the crabs. The extrapolation of data from this study can be used as guidelines in formulating semi-moist feeds for future research development in adult decapods. Further research is needed in improving the feeds durability to minimize nutrient loss so crabs can fully reap the benefits of the nutrients present in the feeds.

KEYWORDS: *Scylla*, mud crab, lipid, oocyte, semi-moist diet,

DAY 3 (10TH MARCH 2022)
SESSION 16: MARINE POLLUTION AND OCEAN HEALTH

Chairperson	Time	Code	Presenter	Title
	0930-0945	OMPOH-7	Yusuke Kondo	Seasonal Occurrence of Ctenophores and Their Parasites in The Seto Inland Sea, Japan
	0945-1000	OMPOH-8	Sarini Binti Ahmad Wakid	Preliminary Studies on The Expression of Glutathione S-Transferase in Geloina Expansa.
Dr. Nurzafirah Binti Mazlan	1000-1015	OMPOH-9	Mariche Bandibas Natividad	Toxin-producing phytoplankton in Las Pinas-Paranaque Wetland Park and its surrounding waters (LPPWP)
	1015-1030	OMPOH-10	Soo Chen Lin	Phycoremediation of Aquaculture Wastewater Using Alginate-Immobilized Microalgae
	1030-1045	OMPOH-11	Fazsa Islamiati Machmud	Utilization of Diatom Silica Modified by Phenylacetic Acid for Polycyclic Aromatic Hydrocarbon (Pahs) Pollutants Adsorption
	1045-1110		DISCUSSION (Question and Answer)	

OMPOH-7 SEASONAL OCCURRENCE OF CTENOPHORES AND THEIR PARASITES IN THE SETO INLAND SEA, JAPAN

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ABSTRACT

Ctenophores play important roles in marine food webs as predators feeding on zooplankton such as copepods, fish eggs, and fish juveniles; and as also as prey for fish. However, the biology and ecology of ctenophores have not been extensively studied, unlike those of jellyfish, partly because of difficulties in preserving ctenophores. In particular, symbiosis in ctenophores is almost completely unknown. To understand this, we investigated the seasonal changes in the composition and abundance of ctenophores and their parasites in the Seto Inland Sea, Japan, from December 2019 to June 2021. Five ctenophore species (Beroe campana, Bolinopsis mikado, Hormiphora palmata, Ocyropsis fusca, and Pleurobrachia rhodopis) were collected during the investigation. The most abundant, B. mikado, occurred throughout the year, with the highest peak (116 individuals/100 m^3), seen in June 2020. A small number of B. campana, which have been reported to prey on B. mikado were also recorded. No association was found between ctenophores and fish, in contrast to associations seen between jellyfish and fish. This is likely due to the fact that ctenophores, unlike jellyfish, lack venomous nematocysts. Metacercariae of trematodes, Cephalolepidapedon saba, Lecithocladium excisum, and Opechona olssoni, infected both B. mikado and B. campana. Opechona olssoni occurred throughout the year and its prevalence was positively correlated with the abundance of B. mikado. Mean intensity of O. olssoni seen on B. campana (3.6) was significantly higher than that seen on B. mikado (1.2), presumably due to predation by the former on the latter. Increased occurrence of trematodes in predatory ctenophores feeding on other ctenophores has also been observed in the medusivorous Cyanea nozakii, suggesting accumulation of trematodes in predators at higher trophic levels. We revealed that ctenophores function as intermediate hosts of some trematodes with scyphozoan medusae. Other parasites such as hyperiid amphipods and turbellarians were rarely found in some ctenophores.

KEYWORDS: Accumulation, ctenophore, parasite, Seto Inland Sea, trematode

OMPOH-8 PRELIMINARY STUDIES ON THE EXPRESSION OF GLUTATHIONE S-TRANSFERASE IN *Geloina expansa*

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ABSTRACT

Glutathione S-transferases (GSTs) are the enzymes involved in the phase II detoxification metabolism, have an advantage to be used as biomarkers of aquatic pollution. Biomarkers have been used extensively in monitoring pollution and the state of the ecosystem. However, a lack of sensitivity and specificity can limit the use of biotic or abiotic stressors with specific biomarkers. Nowadays, a local researcher performs ecotoxicology studies, but less of the research focuses on proteomic studies in bivalves that can contribute to environmental monitoring data. Bivalves such as Geloina expansa are the ideal species for biomonitoring. It is filter feeders, sessile, sedentary, long-lived, widely distributed, accumulate several toxins, and adapt to naturally stressful conditions. The present study was conducted to determine the GSTs in bivalve G. expansa, or locally known as Lokan. Samples were collected from the mangrove forest in Sepang Besar River, Selangor. The flesh of G. expansa were homogenized in buffer solution and centrifuged at 17500rpm for an hour. GST activity were measured using 1-chloro-2, 4-dinitrobenzene (CDNB) as substrate. The change of absorbance at 340nm were recorded for 3 minutes using UV-Vis Spectrophotometer. Protein amounts were measured by Bradford assay using bovine serum albumin as standard. The total of GST enzyme activities was estimated about 61.63 ± 4.98 µmol/min/ml. Total protein content in these bivalves were estimated about 2.4 ± 0.15 mg/ml. The specific activity for GST was calculated as the ratio of enzyme activity to total protein for 31.81 ± 3.12 µmol/min/ml/mg. One-way ANOVA was performed to compare the mean values of protein concentration, total activity and specific enzyme activity. There was a significant difference for total activity and specific activity in G.expansa, $p<0.05$, but no significance different between four sites in total protein in G. expansa, $p>0.05$. According to this study, G. expansa exhibits GST expression and could be employed as a biomonitor for environmental pollution.

KEYWORDS: Bivalves, Glutathione S-tranferases, *Geloina expansa*, biomonitor

OMPOH-9 TOXIN-PRODUCING PHYTOPLANKTON IN LAS PINAS-PARANAQUE WETLAND PARK AND ITS SURROUNDING WATERS (LPPWP)

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ABSTRACT

Plankton populations are influenced by the physical and chemical properties of the water. They can serve as indicators of pollution in the aquatic environment as their assemblages are sensitive to changes in water quality. This study describes the assemblage of phytoplankton in selected sites within LPPWP and its relationship with water quality parameters. The sampling of plankton was done at the ten randomly selected stations within the protected area and immediate waters. Water sample collection with replicates was done by vertically towing a plankton net at each station. The collected samples were placed in plastic bottles diluted with formalin, and brought to laboratory for identication and quantification of plankton. Ecological and stability conditions were assessed using diversity indices. Water quality levels were measured using Aquaread Multi-Water quality Checker. The relationship between plankton assemblages and water quality levels was inferred using Canonical Correspondence Analysis (CCA). A total of 17 genera of marine phytoplankton belonging to two major groups, diatoms and dinoflagellates, were identified. The density of diatoms ranged from 1,800 to 2,723,733 cells/L. Chaetoceros sp. had the highest density in all sampling stations. The density of dinoflagellates, which was dominated by Prorocentrum micans, ranged from 1,367 to 8,367 cells/L. Most of the numerically dominant phytoplankton are bloom-forming species that can cause fish kills and contaminate edible marine organisms with toxins. The index range of Shannon diversity index (H') and Pielou evenness index (J) for phytoplankton were 0.56 to 1.28, and 0.146 to 0.206, respectively . Index values indicates a very low to moderate diversity, implying a moderate to a heavily polluted environment with a community under stress. Moreover, concentration levels of some water parameters were below the acceptable limits indicated in DAO 2016-08. Using the Marine Water Quality Index, water quality can be classified under the poor category. Based on the result of CCA, the density of Chaetoceros sp., Rhizosolenia sp., Pseudonitzschia sp., Trichodesmium sp., and Odontellasp may be associated with phosphate, BOD, DO, and pH levels. On the other hand, the density of Coscinodiscus sp. seemed sensitive to nitrate levels, while salinity, TDS, and temperature may have influenced the density of Steptotheca sp. The density of plankton within LPPWP and its surrounding waters were associated with specific water quality parameters. Changes in water quality may favor the occurrence of HABs since most of the identified plankton are toxin-producing species. The study recommends the enhancement or implementation of a master plan for the reduction of sediment and nutrient runoffs draining towards the Manila Bay Area.

KEYWORDS: N/A

OMPOH-10 PHYCOREMEDIATION OF AQUACULTURE WASTEWATER USING ALGINATE-IMMOBILIZED MICROALGAE

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ABSTRACT

Immobilized microalgae have primarily been proposed for secondary and tertiary wastewater treatment in industrial and urban settings. The use of immobilized microalgae for sustainable phycoremediation of aquaculture wastewater, particularly marine water, is limited. Nutrients, primarily in the form of inorganic nitrogen, are abundant in intensive aquaculture wastewater. Aquaculture wastewater should be treated before being discharged into natural aquatic ecosystem to avoid eutrophication and deleterious impacts. Therefore, this study aims to investigate the feasibility of using immobilized Nannochloropsis sp. in calcium alginate beads to remove nutrients from aquaculture wastewater. The immobilized cells were cultured for 144 hours in aquaculture wastewater containing an initial concentration of 1951.78 µM total nitrogen (TN). Immobilized Nannochloropsis sp. was capable of removing 73% of TN, with uptake ceasing when the immobilized cell reached stationary phase. Ammoniacal-nitrogen and nitrite-nitrogen were completely removed in less than 96 hours. The current study demonstrated the potential use of alginate immobilized Nannochloropsis sp. to remove nutrients from aquaculture wastewater. Nonetheless, bead stability and cell leaching continue to be the most difficult challenges in the use of alginate immobilization techniques in marine water.

KEYWORDS: Aquaculture wastewater, nutrients, alginate-immobilized microalgae, *Nannochloropsis* sp.

OMPOH-11 UTILIZATION OF DIATOM SILICA MODIFIED BY PHENYLACETIC ACID FOR POLYCYCLIC AROMATIC HYDROCARBON (PAHs) POLLUTANTS ADSORPTION

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ABSTRACT

PAHs (Polycyclic Aromatic Hydrocarbons) pollution in coastal waters has increased from year to year and damages aquatic ecosystems. Based on the U.S. Environmental Protection Agency (EPA), the maximum permissible concentration of PAHs in water is 0.2 g/L. Thus, efforts should be made to reduce PAHs levels in the waters. The adsorption method is an alternative and effective method to reduce PAHs levels because it is cheaper, simpler, and more efficient. Biomaterial from marine biota is one of the potentials that can be developed in exploring biomass from aquatic ecosystems. Biomaterials derived from microalgae diatoms contain silica which has uniform pores and nano-sized so it is estimated that it can potentially be used as an adsorbent. One of the most common types of diatoms found in Indonesia is the Cyclotella striata TBI which can produce better lipids and biomass than other types of microalgae. Modifying their silica with phenylacetic acid has the advantage of binding PAHs by adding hydrophobic sites to the silica surface through π-π and π-sp^3 lipophilic interactions. This study aims to isolate and modify the silica of the Cyclotella striata TBI using phenylacetic acid. Then characterize the properties of the biomaterial and evaluate the adsorption capacity of diatom silica Cyclotella striata TBI modified by phenylacetic acid for adsorption of PAHs (phenanthrene and anthracene). Diatom silica was isolated from diatom culture and modified by the Batch method. Then the modified silica was characterized using Fourier Transform Infra-Red (FT-IR), Scanning Electron Microscope - Energy Dispersive X-ray (SEM-EDS), High-Resolution Transmission Electron Microscopy (HR-TEM), Brunauer-Emmett-Teller (BET) analysis, and Water Contact Angle (WCA) test. The adsorption capacity was studied through adsorption isotherms and evaluated using Gas ChromatographyMass Spectrometry (GC-MS). The FT-IR results showed the presence of a C=O carbonyl group from phenylacetic acid at 1703 cm^{-1} and a shift in the wavenumber range of the –OH group due to hydrogen bonding after modification. While the results of SEM-EDS and HR-TEM showed that Cyclotella striata TBI cells had a nano-sized porous surface with a cell diameter of 9 µm, a height of 3 µm, and an increase in carbon content in the silica after modification. The BET characterization and WCA test showed a reduced surface area and more hydrophobic surface in the presence of phenylacetic acid. The adsorption isotherm model for phenanthrene and anthracene is the Freundlich model with a maximum adsorption capacity of 11,112 mg/g and 12,508 mg/g, respectively.

KEYWORDS: *Diatom silica, microalgae, Cyclotella striata TB1, PAH, Adsorption*

DAY 3 (10TH MARCH 2022)
SESSION 17: AQUACULTURE DISEASES AND HEALTH MANAGEMENT

Chairperson	Time	Code	Presenter	Title
Dr. Rafidah Binti Othman	0930-0945	OADHM-1	Nguyen Tan Phat	TLR23, a Fish-Specific TLR, Recruits MyD88 and TRIF to Activate Expression of a Range of Effectors in Melanomacrophages in Nile Tilapia (*Oreochromis niloticus*)
	0945-1000	OADHM-2	Lau Lik Ming	An Evaluation of Fixation Methods: Application of Anti-Cd4 Antibodies Against Ginbuna Crucian Carp *Carassius auratus Langsdorfii*
	1000-1015	OADHM-3	Fatin Khairah Haron	*In Vitro* Antiparasitic Efficacy of *Sargassum polycystum* and *Kappaphycus striatum* v*ar*. Green Flower Seaweed Extracts Against Marine Parasitic Leech *Zeylanicobdella arugamensis* With LC-QTOF Analysis
	1015-1030	OADHM-4	Rosidah	Potential of Aloe Vera for Treatment of Infection With *Aeromonas hydrophila* Bacteria on Koi Fry
	1030-1045	OADHM-5	Fajar Nurul Arifah	Antibacterial Activity Red Algae (*Gracilaria* Sp.) Extract to Against Pathogenic Bacteria in Aquaculture
	1045-1110		DISCUSSION (Question and Answer)	

OADHM-1 TLR23, A FISH-SPECIFIC TLR, RECRUITS MYD88 AND TRIF TO ACTIVATE EXPRESSION OF A RANGE OF EFFECTORS IN MELANOMACROPHAGES IN NILE TILAPIA (*Oreochromis niloticus*)

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ABSTRACT

Nile tilapia (Oreochromis niloticus) is an important food fish species that is mainly cultivated in tropical and subtropical countries. However, microbial diseases have created various difficulties for this industry. The fundamental prerequisite for tackling disease outbreak prevention and disease resistance is to know how hosts' immune responses against invading microbes are initiated. Toll-like receptors (TLRs) are vital pattern recognition receptors and play pivotal roles in the cellular innate immunity defense that is able to recognize pathogen-associated molecular patterns (PAMPs). In this study, Oreochromis niloticus TLR23 (OnTLR23) was cloned and bioinformatic analyses revealed that OnTLR23 is not an ortholog of mammalian TLR13 as previously suggested. The basal transcript level of OnTLR23 was found to be higher in the immune-related organs and was upregulated in the spleen and/or head kidney following Aeromonas hydrophila, Streptococcus agalactiae or poly I:C injections, and increased in the melanomacrophage-like tilapia head kidney (THK) cell line after LPS and zymosan stimulation. Furthermore, we demonstrated for the first time that OnTLR23 locates mainly in the intracellular region in fish cells and the constitutively active form of OnTLR23 promotes the expression of molecules related to antigen presentation, proinflammatory cytokines, antimicrobial peptides and type I interferon in THK cells. A co-immunoprecipitation assay revealed that OnTLR23 can interact with both OnMyD88 and OnTRIF, but not with OnTIRAP. A luciferase assay showed that the NF-κB activity was not elevated in the OnTLR23 overexpressed THK cells after treatment with known purified bacterial-derived ligands of TLRs. Taken together, OnTLR23 is likely to recruit OnMyD88 and OnTRIF as adaptors to induce the expression of various effectors in melanomacrophages, but its corresponding ligand is an issue awaiting further investigation.

KEYWORDS: N/A

OADHM-2 AN EVALUATION OF FIXATION METHODS: APPLICATION OF ANTI-CD4 ANTIBODIES AGAINST GINBUNA CRUCIAN CARP *Carassius auratus langsdorfii*

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ABSTRACT

$CD4^+$ helper T (Th) cells serve as a key mediator of the adaptive immune system for differentiation of Th 1 cell-mediated immunity and Th2 humoral immunity. In mammals, only one type of CD4 is found on the surface of Th cells. However, teleost fish possess two divergent forms of CD4: CD4-1 resembling the mammalian CD4 while CD4-2 is a unique CD4 homolog. In rainbow trout, three $CD4^+$ leukocyte populations were identified: a lymphocyte population expressing both CD4-1 and CD4-2 [CD4 Double Positive (DP)], a lymphocyte population expressing only CD4-2 [CD4-2 Single Positive (SP)] and a myeloid cell population expressing only CD4-1 [CD4-1 SP]. In the present study, we used the developed Anti-gCD4-1 polyclonal antibody (pAb) and Anti-gCD4-2 monoclonal antibody (mAb) to investigate their applications against cells and tissues of ginbuna following various fixation methods. For immunohistochemistry (IHC), paraffin-embedded (P) and frozen-embedded (Fr) spleen of ginbuna were sectioned at 3 µm and 7 µm, respectively. For immunofluorescence (IF), kidney leukocytes of ginbuna were applied to a Percoll density gradient of 1.067 g/mL and centrifuged at 400 x g for 20 minutes at 4°C. The lymphocyte-rich fraction at the interface was collected for Cytospin smears preparation, then followed by fixation with methanol (M), Davidson's solution (DS), paraformaldehyde (PFA) and acetone (A), respectively. After that, all sections (IHC-P and IHC-Fr) or smears (IF-M, IF-DS, IF-PFA and IF-A) were first incubated with either Anti-gCD4-1 pAb (1:100) or Anti-gCD4-2 mAb (1:100) at 4°C for 1 hour, and then incubated with Alexa Fluor® 555 conjugated Anti-Rabbit IgG (1:500) or Alexa Fluor® 488 conjugated Anti-Mouse IgM (1:500) at 4°C for 45 minutes as the secondary antibody. The stained slides were then nuclear counterstained with Hoechst 33342 (1:1000). Rabbit serum and Mouse IgM isotype were used as the controls against Anti-gCD4-1 Rabbit pAb or Anti-gCD4-2 Mouse mAb, respectively. The sections were washed three times with phosphate buffer saline (PBS) after incubation with antibodies at each step. The results showed that various fixation methods did not affect the binding ability of these Anti-CD4 antibodies on their respective CD4-1 and CD4-2 molecules of ginbuna leukocytes in both IHC and IF. The fluorescent labels that appeared on the cell surface of ginbuna leukocytes suggest that CD4 DP and CD4-2 SP cells had the typical morphology of lymphocytes while CD4-1 SP cells turned out to be monocyte or macrophage population. In the future study, we will use these Anti-CD4 antibodies in histopathological and immunohistochemical examination to reveal the importance of the unique teleost $CD4\text{-}2^+$ cells in the adaptive immune mechanism.

KEYWORDS: CD4-1, CD4-2, Immunohistochemistry, Immunofluorescence, Fixation

OADHM-3 *IN VITRO* ANTIPARASITIC EFFICACY OF *Sargassum polycystum* AND *Kappaphycus striatum* var. *Green Flower* SEAWEED EXTRACTS AGAINST MARINE PARASITIC LEECH *Zeylanicobdella arugamensis* WITH LC-QTOF ANALYSIS

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ABSTRACT

Zeylanicobdella arugamensis (Annelida), a marine parasitic leech is heavily infesting cultured hybrid groupers in Southeast Asian countries. They attach to the hybrid groupers by sucking and biting its surface, paving the way for secondary infection. The objective of the study is to utilize the locally available seaweeds to control the infestation of parasitic leech since seaweeds are having a variety of therapeutic properties. The methanol extracts of seaweeds (Sargassum polycystum and Kappaphycus striatum var. Green Flower) from Sabah were prepared using the available methods and investigated the anti-parasitic efficacy against Z. arugamensis through in-vitro bioassay. A total of 204 alive leeches from the host hybrid groupers was obtained from the fish hatchery. The parasitic leeches were treated with the methanol extracts of S. polycystum and K. striatum var. Green Flower for 180 minutes by preparing 5 different dosages such as 100, 50, 25, 12.5 and 6.25 mg/ml concentration. Both seaweeds were shown to have high anti-parasitic efficacy, resulting in 100% mortality of leech in a shorter time duration. Sargassum polycystum showed higher anti-parasitic efficacy in the total mortality of leeches within 0.96 ± 0.44 min, for 100 mg/ml of the extract. Kappaphycus striatum var. Green Flower showed 1.17 ± 0.30 min, for 100mg/ml dosage. LC-QTOF analysis was used to reveal the phytochemical composition of the extract to understand the nature of the main components responsible for its antiparasitic activities. The presence of aromatic, phenolic, and terpenoid bioactive compounds in S. polycystum and K. striatum var. Green Flower could have enhanced the mortality rate of parasitic leeches. Thus, this study found that both seaweeds are showing high efficacy in its anti-parasitic activities and can be applied effectively in grouper aquaculture farms for the sustainable aquaculture.

KEYWORDS: aquaculture, parasites, antiparasitic activity, *Sargassum polycystum*, *Kappaphycus striatum* var. *Green Flower*, hybrid grouper, bioactive compounds, *Zeylanicobdella arugamensis*

OADHM-4 POTENTIAL OF *Aloe vera* FOR TREATMENT OF INFECTION WITH *Aeromonas hydrophila* BACTERIA ON KOI FRY

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ABSTRACT

This research aims to study the ability of Aloe vera (Burm.f.), extract to treat Koi fry [Cyprinus carpio (Lacépède, 1803)] which is attacked by Aeromonas hydrophila (Chester, 1901). The method used was the experimental method using a completely randomized design with five treatments and three replications was applied. The treatment used was immersion with A. vera extract with a concentration of treatment A (0 mg kg–1), B (150 mg kg–1), C (300 mg kg–1), D (450 mg kg–1) and E (600 mg kg–1). The variables observed were in vitro test, LC50-24-h test, clinical symptoms which included damage to fish body, fish feeding response and fish response to shock which were analyzed descriptively comparatively. The results showed A. vera extract has the ability as an antibacterial with inhibition zone diameter reaching 20.49 mm at a concentration of 5 000 mg kg–1 and LC50 test 48 h (in vivo test) of 1 157.16 mg kg–1, so for the treatment of fish use concentrations below that concentration. The use of Aloe vera extract with a concentration of 300 mg kg–1 for 48 h was effective to treat koi fry infected with A. hydrophila by healing relatively fast body damage, response to feed and shock is normal and fast.

KEYWORDS: Alternative medicine, Clinical symptoms, *Cyprinus carpio*, Fish disease, Ornament fish

OADHM-5 ANTIBACTERIAL ACTIVITY RED ALGAE (*Gracilaria* sp.) EXTRACT TO AGAINST PATHOGENIC BACTERIA IN AQUACULTURE

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ABSTRACT

KEYWORDS: Red algae, Bacterial Endophytes, Aquaculture, Pathogen

DAY 3 (10TH MARCH 2022)
SESSION 18: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
	0930-0945	OAF-19	Sen Chan	Assessments of Color-Associated Traits in *Pseudodiaptomus annandalei* (Calanoida, Copepoda)
	0945-1000	OAF-20	Nor Syahira Idayu binti Ismail	Feeding Dependency on Food Colour in Seahorse, *Hippocampus barbouri*
Dr. Sujjat Al-Azad	1000-1015	OAF-21	Hazeeqah Filzah Binti Kassim	Culturing of a Free-Living Marine Nematodes in a Laboratory Scale
	1015-1030	OAF-22	Dian Yuni Pratiwi	Immunostimulant Activity of Macroalgae on Immune System of *Litopenaeus vannamei*
	1030-1045	OAF-23	Danial Iman Haris B Nor Azman	Growth Performance of Post Larvae White Shrimp (*Litopenaeus vannamei*) Fed with Micro Feed Incorporated with Probiotic
	1045-1110		DISCUSSION (Question and Answer)	

OAF-19 ASSESSMENTS OF COLOR-ASSOCIATED TRAITS IN *Pseudodiaptomus annandalei* (CALANOIDA, COPEPODA)

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ABSTRACT

Pseudodiaptomus annandalei is a common calanoid copepod species found in Taiwan and other southeastern countries. It is extensively used as an aquatic live feed for marine larviculture industry (e.g. grouper hatcheries). In P. annandalei population, variations in body color could be often observed among individuals, the differences in productive and biochemical characteristics between the two variants have yet been investigated. In this study, we evaluated the productivity (clutch number, clutch interval, fertilization rate and nauplii production) and nutritional profiles (total lipid content, fatty acid composition, astaxanthin concentration) of the pre-selected dark-color and light-color strains of P. annandalei. The results indicated that the productivity of the two strain are not significantly different, however, the dark-color strain has remarkably higher astaxanthin content (1.96 µg mg $^{-1}$) than the light-color strain do (1.38 µg mg $^{-1}$). Our findings implicate the great potential of astaxanthin-rich copepod as emerging functional live feed for enhancing marine larviculture production.

KEYWORDS: Copepod, *Pseudodiaptomus annandalei*, color-associated traits, productivity, astaxanthin

OAF-20 FEEDING DEPENDENCY ON FOOD COLOUR IN SEAHORSE, *Hippocampus barbouri*

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ABSTRACT

Predator colour preference enables in the recognition of prey items which can be useful in the production of potential feed. However, preferred food colour varies depending on the surrounding background colour and light intensity. The goal of this study was to determine if the food colour can increase the acceptance of inert food as seahorse is known to prefer live food. Food colour preferences of seahorses were determined in relation to different background colours by observation of first response (approach and ingestion) of sub-adult seahorse, Hippocampus barbouri (SL: 7.56±0.35 cm and WW: 0.59±0.10 g). At this size, the tested seahorses were able to ingest frozen sergestid shrimp, Acetes sibogae (TL: 10.0±0.5 mm). Frozen Acetes were dyed with blue, green, red and yellow. Natural white colour Acetes with no colour dye served as control. All the 10 possible food colour pairs presented simultaneously within the visual field of seahorse in tanks with red, green and blue backgrounds. The frequency of the first response was recorded and quantitative analysis of by χ^2 test and Thurstone's law of comparative judgment. Against all backgrounds, the first response was significantly biased to natural white colour Acetes. Besides, yellow and green-coloured Acetes also significantly preferred against green and red background, respectively. Thus, this study demonstrated that sub-adult H. barbouri have colour preferences. However, further study is required to confirm the colour vision in H. barbouri.

KEYWORDS: First response, *Hippocampus barbouri*, food color, background color

OAF-21 CULTURING OF A FREE-LIVING MARINE NEMATODES IN A LABORATORY SCALE

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ABSTRACT

This study aims to introduce diets that are more affordable and applicable, compared to nutrient media diet, which can be costly to purchase. The present study was designed for 30 days to observe the effects of different diets on population growth of free-living marine nematode, Oxystomina pulchella under laboratory condition. The samples were randomly collected at intertidal area of Pantai Pandak, Kuching. The nematodes were acclimatized for 30 days with constant value of salinity at 30 PSU, room temperature between 27°C - 30°C and continuous aeration. The diets tested were processed into juice form and are composed of single type diets. The diets were made of catappa leaf and goat dung. Nematodes which were fed with goat dung recorded significantly ($p<0.05$) higher growth of individuals and survival (90%) compared to the catappa leaf. The present study suggested that Oxystomina pulchella could be a potential nematode for being commercially cultivated by as nematode is highly demand as food item for marine fish larvae in aquaculture industry.

KEYWORDS: Nematodes, marine, cultivation, laboratory scale culture

OAF-22 IMMUNOSTIMULANT ACTIVITY OF MACROALGAE ON IMMUNE SYSTEM OF *Litopenaeus vannamei*

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ABSTRACT

Litopenaeus vannamei is one of the popular aquatic commodities in Indonesia. The shrimp contribute high foreign exchange earnings for Indonesia. Rapid growth, high tolerance in water salinity, low protein requirements made L. vannamei suitable for aquaculture. However, disease attacks can make mass mortality and decrease the production value of L. vannamei. One of the efforts in overcoming and preventing shrimp disease is through increasing the shrimp body's defense system by using immunostimulants. The use of vaccines and antibiotics has several negative effects if used in the long term to treat disease. Therefore, currently, the use of natural stimulants needs to be developed. Macroalgae is one of natural immunostimulants which has a lot of bioactive compounds such as flavonoids, alkaloids, terpenoids, phenols, polysaccharides. This review article aims to describe immunostimulant activity such as total hemocyte count and phagocytic activity of some macroalgae species on the immune system of L. vannamei. Macroalgae that can be described are Dictyota sp., Gracilaria sp., Gracillaria verrucosa, Padina sp., Padina australis, Sargassum sp., Sargassum polycystum, Caulerpa sp., Eucheuma cottoni. In conclusion, macroalgae can increase the total hemocyte and phagocytic activity of and can be used as an immunostimulant on L. vannamei.

KEYWORDS: *Litopenaeus vannamei*, Phagocytic activity, Total Haemocyte, Macroalgae, Disease

OAF-23 GROWTH PERFORMANCE OF WHITE SHRIMP, *Litopenaeus vannamei* POSTLARVAE FED WITH MICRO FEED INCORPORATED WITH PROBIOTICS

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ABSTRACT

Micro feed is one of the innovative ways to provide nutrients at the early stage of aquaculture species. Incorporation of micro feed with probiotics can potentially enhance the beneficial performance of feed in the host, since probiotics are widely known for their beneficial impacts on gut maturation, growth improvement, immune response and survival rate in most of the aquaculture species. Hence, the objective of this study was to determine the growth performance of white shrimp, Litopenaeus vannamei, fed with micro feed incorporated with probiotics. The potential probiotic used was previously identified as Bacillus amyloliquefaciens strain L9. Treatments consist of commercial feed (control)(CF), micro feed (MF), probiotic (PB) L9 (10^4, 10^6 and 10^8 CFU/ml) and L9 (10^4, 10^6 and 10^8 CFU/ml) with micro feed (MF+PB). Micro feed was prepared by solidification process, freeze dried and micronized until size 500 µm. Results demonstrated that shrimp fed with MF+PB (10^4, 10^6 and 10^8 CFU/ml) showed a significantly higher survival rate with 95.3±0.76 % (10^4), 93.6±2.0 % (10^6) and 92.5±2.0 % (10^8) respectively compared to control group (84±4.0 %). In terms of final weight and final length, MF+PB at concentration of 10^4 and 10^6 CFU/ml had a higher value with 0.0297±0.0002 g and 1.82±0.03 cm for MF+PB 10^4 CFU/ml and 0.0310±0.001 g and 1.94±0.005 cm for MF+PB 10^6 CFU/ml. Meanwhile, shrimp fed with MF+PB at concentration of 10^4 and 10^6 CFU/ml showed higher specific growth rate with 3.63±0.02% and 3.76±0.10% respectively compared to CF (3.44±0.15 %). Feed conversion ratio shows the treatment of MF+PB 10^4 CFU/ml (1.5±0) and MF+PB 10^6 CFU/ml (1.4±0.1) had a significant difference in post larvae shrimp. Thus, it can be concluded that B. amyloliquefaciens strain L9 incorporated in micro feed at the concentration of 10^4 and 10^6 CFU/ml able to improve survival and growth performances of post larvae white shrimp and have the potential to replace the usage of commercial feed in shrimp culture.

KEYWORDS: *Bacillus amyloliquefaciens*, micro feed, post larvae, *Litopenaeus vannamei*, growth

DAY 3 (10TH MARCH 2022)
SESSION 19: MARINE POLLUTION AND OCEAN HEALTH

Chairperson	Time	Code	Presenter	Title
Dr. Chong Wei Sheng	1120-1135	OMPOH-12	Wan Siti Mardhiah Binti W Johari	Microplastics in Rocky Oyster (*Saccostrea cucullata*) Along Shoreline of Pahang, Malaysia
	1135-1150	OMPOH-13	Tang Chung Ngo	Bioavailability of Microplastics and Ingestion Incidence in Zooplankton in Sabah Coastal Waters
	1150-1205	OMPOH-14	Nurzafirah Mazlan	Evaluation of Microplastics Isolated From Sea Cucumber *Acaudina molpadioides* in Pulau Langkawi, Malaysia
	1205-1220	OMPOH-15	Alfinna Yebelanti	Patterns, Types, And Distributions of Macroplastic Debris Based on Oceanographic Conditions and Community Perspectives: Case Studies in Muara Gembong Downstream of Citarum
	1200-1230		DISCUSSION (Question and Answer)	

OMPOH-12 MICROPLASTICS IN ROCKY OYSTER (*Saccostrea cucullata*) ALONG SHORELINE OF PAHANG, MALAYSIA

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ABSTRACT

Microplastics (MP) is semi-synthetic polymer of 5 mm-1µm with ubiquitous property. MP exists in the environment as the result of weathering product or large plastics or intentionally manufactured as the ingredient of substances. MP pollution has harmed the terrestrial and aquatic organisms as it could cause wide range of sublethal or lethal effect to the organisms that ingested it. The purpose of this research is to access MP concentration in rocky oyster (Saccostrea cucullata) existing in coastal area of Pahang. Five locations have been chosen from Pahang shoreline to indicate the level of MP pollution of the area. The wild oysters were collected randomly using hammer and chisel. MP was extracted from the oysters using digestion method by 10% potassium hydroxide (KOH). Prior to filtration, the solution underwent density separation using 50% potassium iodide (KI) solution. MP sample was identified using stereomicroscope and validated using ATR-FTIR (Attenuated Total Reflectance-Fourier transform infrared) spectroscopy. The result of MP abundance in Pahang shoreline accounted of 0.4-0.67 particles/ind (0.49 particles/ind) and 0.18-0.86 particles/g wet weight(w.w.). The number of MP particles/ind was high in Balok while the number of particles/g w.w. was high in Tanjung Batu. Fiber (47%) was the most abundant followed by fragment (34%) and bead (1%). Color of MP was mostly white (31.7%) followed by black (25.6%), transparent (17.1%), blue (15.9%), brown (7.3%) and red (2.4%). 80% of MP was made up of polypropylene (PP) and other 20% was polyethylene (PE). PP was mainly used in the food packaging and automotive industries while PE was used for the production of housewares, toys and trash bags. This research could be the pilot study to conduct risk assessment of MP impact in oysters to human health.

KEYWORDS: Microplastics, *Saccostrea cucullata*, Pahang.

OMPOH-13 BIOAVAILABILITY OF MICROPLASTICS AND INGESTION INCIDENCE IN ZOOPLANKTON IN SABAH COASTAL WATERS

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ABSTRACT

Microplastics (MP) ingestion is increasingly prevalent in minute marine organisms at the lower trophic levels of the marine food web. Zooplankton are particularly susceptible to MP ingestion, with 72 taxa observed to ingest MP under laboratory conditions. However, there is limited in situ observations on MP in zooplankton and their relationships with environmental MP. The present study investigated the seasonal distribution, quantity and characteristics of MP in natural zooplankton populations and seawater in Sepanggar Bay, Sabah. Zooplankton and MP samples were collected in vertical tows using 300 µm and 20 µm plankton net, respectively, at three stations with varying distance from the shore (1 km, 4 km and 7 km) from October to December 2021, corresponding to inter-monsoon and northeast (NE) monsoon seasons. Significantly higher seawater MP abundance was recorded in NE monsoon (54.9 ± 23.7 MP/m^3) compared to inter-monsoon (25.9 ± 9.4 MP/m^3). Two types of MP were identified in seawater: filaments and fragments. Filaments were dominant in both seasons, accounting for 98.3% and 96.7% of the total MP abundance during inter- and NE monsoons, respectively. The average size of MP was statistically larger during inter- than NE monsoons (784.3 ± 783.9 µm and 960.3 ± 843.3 µm, respectively). MP ingestion incidence in seven zooplankton groups varied from 0.002 ± 0.004 MP/ind. (Ostracoda) to 0.022 ± 0.019 MP/ind. (Hydrozoa). MP ingestion incidence was relatively higher during NE monsoon (0.013 ± 0.009 MP/ind.) than inter-monsoon (0.007 ± 0.004 MP/ind.). Filaments, microbeads and fragments were identified in zooplankton, accounting for 80.7%, 10.4% and 8.9% of the total ingested MP, respectively. Translucent MP were most commonly found in zooplankton, comprising 75.8% and 62.5% of the total MP ingested during inter- and NE monsoons. The average size of MP were 569.8 ± 518.7 µm, 79.5 ± 47.8 µm to 18.5 ± 4.0 µm for filaments, fragments and microbeads, respectively. No significant seasonal differences were observed in the characteristics of MP and ingestion incidence in zooplankton. No significant correlation between the abundance of MP in zooplankton and seawater was observed in either season, suggesting that MP ingestion was not dependent on the concentrations of MP available in the seawater. The results provide the first evidence of MP contamination in zooplankton in Sabah's coastal waters, indicating zooplankton as a potential repository for small-sized MP and a vector of MP entry into the marine food web.

KEYWORDS: Bioavailability, microplastics, zooplankton, seasonal variation, Sepanggar Bay

OMPOH-14 EVALUATION OF MICROPLASTICS ISOLATED FROM SEA CUCUMBER *Acaudina molpadioides* IN PULAU LANGKAWI, MALAYSIA

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ABSTRACT

Plastic pollution is an emerging environmental concern in recent years due to continuous mass production and its slow degradation. Microplastics measuring between 5 mm and 1 µm are being ingested by marine animals and eventually by human consumption in form of seafood. The aim of this research was to evaluate microplastics isolated from sea cucumber Acaudina molpadioides in Pulau Langkawi. A total of 20 animals were collected and their gastrointestinal tract were dissected and digested using NaOH. Microplastics were isolated, filtered and identified through microscopic examination based on the colour, shape and size. The chemical composition of microplastics were further analysed by FTIR to identify the functional group of polymers. A total of 1652 microplastics were found in A. molpadioides. Fibres (99.4%) and black (54.4%) were the majority of microplastics observed in terms of shapes and colors. The size range within 0.5 to 1 µm and 1 to 2 µm were the highest abundance observed. There were two identified polymer types of microplastics obtained through FTIR which were polyethylene (PE) and polymethyl methacrylate (PMMA). In conclusion, microplastics were isolated and identified from A. molpadioides. Results revealed that there was presence of microplastic pollution in the digestive tract of the animals. Further research can be done on the toxicity effects of these microplastics towards human upon consumption of these animals as seafood.

KEYWORDS: Microplastic, Seafood, Pollution, FTIR analysis

OMPOH-15 PATTERNS, TYPES, AND DISTRIBUTIONS OF MACROPLASTIC DEBRIS BASED ON OCEANOGRAPHIC CONDITIONS AND COMMUNITY PERSPECTIVES: CASE STUDIES IN MUARA GEMBONG DOWNSTREAM OF CITARUM

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ABSTRACT

Muara Gembong is downstream of Citarum river that still faces the challenge of plastic pollution problem. This research is a multidisciplinary study that combines oceanographic factors and socioeconomic perceptions of local people about macroplastic debris on the coast. The main purpose of research is to understand the local people's perceptions and oceanographic factors' connections towards plastic debris in Muara Gembong. Oceanographic parameters to be analyzed include current, tidal, and wind conditions. The location of plastic debris accumulation hotspots is obtained by GPS (Global Positioning System) marking method along downstream rivers, ecosystems, and coastal areas. To obtain public perception data, FGD (Focus Group Discussion), interviews, and 100 questionnaires by online interview representing local government, Local NGOs, and communities were conducted. The research was conducted based on debris accumulation hotspot marking, interviews, and Focus Group Discussion. Based on the hotspot marking, through the water route, 14 yellow dots were marked from the Citarum river through water route, 18 blue dots indicating debris through land route, and 19 red dots show Local Perspectives on piles of marine debris. Current, wind and tidal patterns have an appropriate data with the answer to the Muara Gembong local residents interview that plastic waste always dominates and is distributed in the West Monsoon Season (WMS) and Early of Transitional Season 1 (TS1) wind blow and current from west to east/northeast. Most local interview respondents answer the plastic garbage comes from outside the Muara Gembong area, namely the CBL and Citarum river also from jakarta bay debris transport.

KEYWORDS: Citarum, Plastic Waste, Hotspot, Perception, Oceanography, Muara Gembong

DAY 3 (10TH MARCH 2022)
SESSION 20: AQUACULTURE DISEASES AND HEALTH MANAGEMENT

Chairperson	Time	Code	Presenter	Title
Dr. Muhammad Dawwod Shah	1120-1135	OADHM-6	Yusuke Nishida	Parasitism of The Non-Indigenous Sea Louse *Caligus sclerotinosus* Among Wild and Farmed Red Sea Bream *Pagrus major* in The Seto Inland Sea, Japan
	1135-1150	OADHM-7	Nanami Yumura	What Could Have Happened to The Evolution of The Highly Modified Fish Parasite Pennellidae: Implication of Evolutionary Trends Based on Molecular Analysis
	1150-1205	OADHM-8	Panakkool Thamban Aneesh	Tropical Fish Parasitic Crustaceans: Parasitic Adaptations and Emerging Paradigms in Research
	1205-1220	OADHM-9	Helna A K	A Taxonomic Review of the Copepod Family Chondracanthidae Milne Edwards, 1840(Copepoda: Poecilostomatoida) Parasitizing the Marine Fishes From Indian Waters
	1200-1230		DISCUSSION (Question and Answer)	

ODAHM-6 PARASITISM OF THE NON-INDIGENOUS SEA LOUSE *Caligus sclerotinosus* AMONG WILD AND FARMED RED SEA BREAM *Pagrus major* IN THE SETO INLAND SEA, JAPAN

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ABSTRACT

Caligid copepods, or more commonly sea lice, are pests of some cultured fish and can cause economic losses. Caligus sclerotinosus Roubal, Armitage, and Rhode (1983) was originally described from the silver sea bream Pagrus auratus, a fish native to Australia. This caligid was first recorded in red sea bream Pagrus major cultured in Oita Prefecture, western Japan in 1999. Caligus sclerotinosus is believed to have been introduced from Australia to Japan through the international trade of P. auratus. In Japan and Korea, heavy infestations of C. sclerotinosus were seen in farmed P. major. However, the post-naupliar developmental stages of this caligid are rarely found on the host. Therefore, C. sclerotinosus was previously believed to use different fish as intermediate hosts outside the cages in which P. major is farmed. Moreover, C. sclerotinosus has never been found in wild individuals of P. major. Therefore, the life cycle of the species has remained unknown since its discovery in East Asia. We examined 284 wild individuals of P. major collected from the Seto Inland Sea (SIS) from March 2020 to May 2021 and a total of 24 cultured individuals from Wakayama Prefecture in August 2020 (N=10) and Ehime Prefecture in September 2020 (N=14). We confirmed the presence of C. sclerotinosus in wild individuals of P. major in SIS for the first time. Prevalence and mean intensity of wild P. major were 41.2% and 2.64 ± 2.3, respectively. Our results indicate that C. sclerotinosus has already spread over wild P. major across the entirety of the SIS. Furthermore, all post-naupliar stages of C. scelerotinosus were found in the farmed P. major collected from both prefectures, implying this species does not use an intermediate host.

KEYWORDS: *Caligus sclerotinosus*, intermediate host, life cycle, *Pagrus*

ODAHM-7 WHAT COULD HAVE HAPPENED TO THE EVOLUTION OF THE HIGHLY MODIFIED FISH PARASITE PENNELLIDAE: IMPLICATION OF EVOLUTIONARY TRENDS BASED ON MOLECULAR ANALYSIS

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ABSTRACT

Some species of the family Pennellidae have profound effects on fisheries due to parasite infestations. This family consists of ecto- or meso-parasitic copepods that parasitize marine fish and detract from the appearance of the fish. Since members of the family have highly modified bodies and reduced appendages, it is difficult to deduce their exact phylogenetic relationships. The present study aimed to reveal molecular phylogenetic relationships among 7 genera and 12 species of pennellids using 18S and 28S ribosomal DNA sequences. According to our analysis, three clades were generated (Clade-I, Peniculus; Clade-II, Haemobaphes-Lernaeocera-Phrixocephalus-Exopenna-Lernaeenicus radiatus; Clade-III, Pennella-Lernaeenicus spp.), which were supported by moderate bootstrap values > 57% and high posterior probabilities > 0.98. This result supports the morphology-based phylogenetic relationships previously proposed by Boxshall (1986) but did not support a sister group comprising Exopenna, Phrixocephalus, and Pennella. The first offshoot, Peniculus, is defined as a fin-ectoparasite exhibiting clear tagmosis. The second and third divergences are defined as the anterior and posterior body parts that play separate roles in nutrient absorption/attachment and reproduction, respectively. Most of the species classified within Clade-II are gill parasites that have coiled egg strings that could have evolved to adjust themselves into narrow spaces within the gill cavities of the hosts. Phrixocephalus is an eye parasite in Clade-II, which also has coiled egg strings and may have originated from ancestral gill mesoparasites. All species of Clade III are distinctly characterized by a head region that serves as the anchor, with processes that embed deeply in the tissues of the host.

KEYWORDS: N/A

ODAHM-8 TROPICAL FISH PARASITIC CRUSTACEANS: PARASITIC ADAPTATIONS AND EMERGING PARADIGMS IN RESEARCH

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ABSTRACT

Globally the information on the taxonomy of parasitic crustaceans infesting the commercial fishes is comparatively well documented. On the other hand, studies on the parasitic adaptations such as diversity in body form, physiological and biological adaptations, including, reproduction, moult, life cycle and the host-parasite interactions are still meagre. Such studies, however, could throw light on the evolution of crustacean parasites, distribution of parasites in various ocean realms and use of crustacean parasites to derive clues on host distribution and behaviour. The present study discusses tropical fish parasitic crustaceans with an overview of diversity and adaptations of parasitic isopods based on primary research and compiled from published literature. Parasitic cymothoids are protandrically hermaphroditic, an exciting case of male to female sex change through an intermediate transitional stage. The site and host-specific parasitization of parasitic isopods will also be reflected in their body form, size, shape and other structural adaptations. This paper also discusses the mechanism of bi-phasic moulting in cymothoids and its lifecycle, with the case studies of Brucethoa bharata Aneesh et al., 2020, infesting the deep-sea fish Glossanodon macrocephalus. The life cycle included three sequential stages: marsupial stage, free-living stage, and an infective stage with a series of bi-phasic moulting. The paper also discusses emerging trends in research on parasitic crustaceans, the knowledge gaps in the field and suggests that the deep-sea fish may harbour a greater diversity of parasites as a reflection of the diversity of host fish.

KEYWORDS: Fish parasites, Isopods, Copepods, moult, reproduction, lifecycle

ODAHM-9 A TAXONOMIC REVIEW OF THE COPEPOD FAMILY CHONDRACANTHIDAE MILNE EDWARDS, 1840(COPEPODA: POECILOSTOMATOIDA) PARASITIZING THE MARINE FISHES FROM INDIAN WATERS

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ABSTRACT

The parasitic copepod fauna infesting the commercial fishes are comparatively well studied from India, especially from the southwest coast. The families such as Bomolochidae, Caligidae, Ergasilidae, Lernaeopodidae, Lernanthropidae, Pandaridae, Pennellidae and Taeniacanthidae are well documented, while the family Chondracanthidae is least studied. The fish parasitic copepod family Chondracanthidae Milne Edwards, 1840, comprises more than 160 species under 51 valid genera. The genus Acanthochondria Oakley, 1930 is the highly speciose genus in this family with 52 valid species, followed by Chondracanthus Delaroche, 1811, having 41 valid species. Present study discusses the diversity of chondracanthids and the knowledge gap based on primary research and compiled from published literature. The family Chondracanthidae remains very little known from India, with only eleven species belonging to the seven genera such as Acanthochondria krishnaii Aneesh et al., 2020, Bactrochondria hoi (Pillai, 1985) (described as Ceratochondria hoi), B. papilla Ho et al., 2000, Chondracanthus kabatai Aneesh et al., 2020, Heterochondria petila Ho et al., 2000, H. pillaii Ho et al., 1970, H. similis (Yu and Wu, 1932), H. zebriae (=Acanthochondria zebriaei) (Ho et al., 2000), Medesicaste penetrans Heller, 1868, Protochondracanthus alatus (Heller, 1868), P. trilobatus (Pillai, 1964). The paper also discusses the knowledge gaps in the taxonomy and diversity research of chondracanthids infesting the deep-sea fishes, their biogeography and suggests that the deep-sea fish may harbour a greater diversity of chondracanthids as a reflection of the diversity of host fish.

KEYWORDS: Parasitic crustaceans, deep-sea fish parasite, Chondracanthids, Checklist, India

DAY 3 (10TH MARCH 2022) SESSION 21: AQUACULTURE AND FISHERIES				
Chairperson	**Time**	**Code**	**Presenter**	**Title**
Dr. Nur Fatihah Binti Abdul Halid	1120-1135	OAF-24	Siti Amalia Aisyah Abdul Halim	Revisiting the Taxonomic Relationship Between *Pangasius nasutus* and *P. conchophilus* based on Cytochrome C Oxidase Subunit I (COI) GENE
	1135-1150	OAF-25	Noorul Azliana Jamaludin	Mitochondrial Markers Revealed Highly Differentiated Lineages of Spotted Sardinella, *Amblygaster sirm* (Walbaum, 1792) in South China Sea and Andaman Sea
	1150-1205	OAF-26	Nuralif Fakhrullah Bin Mohd Nur	High Connectivity of a Stable Population of *Carangoides malabaricus* in Malaysian Waters
	1205-1220	OAF-27	Muhammad Hanif Bin Fadzli	Reproductive Aspects of The Coastal Trevally *Carangoides coeruleopinnatus* From Terengganu Waters, Malaysia
	1200-1230		DISCUSSION (Question and Answer)	

OAF-24 REVISITING THE TAXONOMIC RELATIONSHIP BETWEEN *Pangasius nasutus* AND *P. conchophilus* BASED ON CYTOCHROME C OXIDASE SUBUNIT I (COI) GENE

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ABSTRACT

Pangasius nasutus, often known as catfish or in Malay as 'Patin buah,' is a commercially important species of catfish in the genus Pangasius. This species is a native species that occurs only in Peninsular Malaysia (Pahang), Sarawak (Batang Rajang), Sumatra (Batang Hari, Indragiri, Musi), and Kalimantan (Barito, Kahayan, Kapuas). In recent years, there has been growing interest in the genetic research of 'Patin buah,' Pangasius nasutus in Pahang River and P. conchophilus, also called 'Patin buah kemboja,' an introduced species from Mekong and Chao Phraya River basins. Molecular data employed in earlier phylogenetic studies were inadequate for its phylogenetic placement. In this study, we revisited the taxonomy of the two species based on wider coverage of specimens from Pahang River and GenBank sequences utilising on approximately 654 base-pair of the mitochondrial DNA COI gene. The genetic distance was consistent with intraspecific relationship between presumed P. nasutus and P. conchophilus with genetic divergences of only 0.4%. However, a closer inspection of the sequences showed three positions where there were consistent differences between P. nasutus and P. conchophilus sampled from all sites in Pahang River and GenBank sequences. This suggest that these could be diagnostic markers for the two species. Further studies need to be conducted to confirm these postulates using a wider geographical coverage of the two species and more detailed genomic investigations.

KEYWORDS: *Pangasius nasutus*, *P. conchophilus*, phylogenetic, mitochondrial DNA COI, genomic

OAF-25 MITOCHONDRIAL MARKERS REVEALED HIGHLY DIFFERENTIATED LINEAGES OF SPOTTED SARDINELLA, *Amblygaster sirm* (WALBAUM, 1792) IN SOUTH CHINA SEA AND ANDAMAN SEA

Noorul Azliana Jamaludin*[1,2,3], Jamsari Amirul Firdaus Jamaluddin[3], Masazurah A. Rahim [4], Noor Adelyna Mohammed Akib[1,3] & Siti-Azizah Mohd Nor[5]

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ABSTRACT

The spotted sardinella, Amblygaster sirm (Walbaum, 1792) is a species of sardine that is commercially important in Malaysia. This study aims to determined the population structure of the targeted species by using mitochondrial DNA (mtDNA) Cytochrome b (Cyt b) from a total of ten populations of fish, including: the Andaman Sea (2), South China Sea (6), Sulu Sea (1) and Celebes Sea (1). The haplotype diversity (h) was high (ranged from 0.91 to 1.00) and nucleotide diversity (π) was low (ranged from 0.002 – 0.009) implying high variation of genetic diversity. The genetic structure was observed from 7.2% to 7.6% genetic divergence between populations in the South China Sea and its neighboring waters, versus those in the Andaman Sea with significant F_{ST}. In addition, morphometric analysis also done and supported this finding. As conclusion, from the molecular evidence, separate fishery management units for A. sirm of the Andaman Sea and the South China Sea were recommended which would be useful information for future fisheries management planning by authorities.

KEYWORDS: Population genetic, phylogenetic relationships, morphometric analysis, fishery management, Southeast Asia

OAF-26 HIGH CONNECTIVITY OF A STABLE POPULATION OF *Carangoides malabaricus* IN MALAYSIAN WATERS

Nuralif Fakhrullah Mohd Nur*[1], Muhammad Hanif Fadzli[1], Nur Izzati Zulaidi[1], Min Pau Tan[2], Ying Giat Seah[1], Siti Azizah Mohd Nor[2], Ahasan Habib[1] and Tun Nurul Aimi Mat Jaafar[1]

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ABSTRACT

This study examined the genetic diversity, population structure and demographic history of Malabar Trevally (Carangoides malabaricus) using non-coding control region marker of mitochondrial DNA. A sum of 480-bp of control region sequences from seven sampling sites was analysed and a total of 69 polymorphic sites were found resulting in 87 haplotypes. Molecular diversity indices revealed that overall haplotype diversity (h = 0.990) and nucleotide diversity (π = 1.831%) were higher for all sampling sites. Median joining haplotype network and maximum likelihood and Bayesian inference tree grouped all haplotypes into a single clade. Analysis of genetic population structure based on analysis of molecular variance (AMOVA) revealed that there is significant genetic differentiation (F_{CT} = 0.07028, $P < 0.05$) between seas covering the sampling sites, no significant genetic differentiation (F_{SC} = 0.00014, $P > 0.05$) between sampling sites within the seas and there is significant genetic differentiation (F_{ST} = 0.07028, $P < 0.05$) between sampling sites from all seas. Further analysis using pairwise F_{ST} after Bonferroni correction revealed no significant structure between all populations. Neutrality test values were found to be negative for Tajima's D ($P > 0.05$) and Fu's F_s ($P < 0.05$) and mismatch analysis showed a bimodal pattern indicated a stable population. We concluded that C. malabaricus populations in Malaysian waters as a single management unit thus higher authorities may take an action to implement a proper management to conserve the genetic diversity of the species.

KEYWORDS: Genetic diversity, population structure, *Carangoides*, control region

OAF-27 REPRODUCTIVE ASPECTS OF THE COASTAL TREVALLY *Carangoides coeruleopinnatus* FROM TERENGGANU WATERS, MALAYSIA

Muhammad Hanif Fadzli*[1], Tun Nurul Aimi Mat Jaafar[1], Nuralif Fakhrullah Mohd Nur[1], Mohd Sharol Ali[1], Min Pau Tan [2], Rumeaida Mat Piah[1]

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ABSTRACT

The coastal trevally (Carangoides coeruleopinnatus) (Ruppel, 1830) is a species that live inshore marine and belongs to Carangidae family. This species is one of species that are important in commercial value. However, the understanding of its biology is poorly studied. Thus, this study describes the reproductive biology of Carangoides coeruleopinnatus captured in Terengganu waters, Malaysia. Fish samples were collected monthly from Pulau Kambing fish landing port, Terengganu, Malaysia from April 2019 to March 2020. A total of 687 individuals were observed, with 362 males (52.69%) ranging in length from 6.3 cm to 26.6 cm (mean ± SD: 13.2 ± 3.84 cm) and 325 females (47.31%) ranging in length from 9.0 cm to 26.4 cm (mean ± SD: 13.9 ± 3.34 cm). The sex ratio shifted dramatically in favor of males (1 : 0.90) (x^2 = 1.99). In June (x^2 = 10.89), July (x^2 = 11.91), August (x^2 = 6.10), and September (x^2 = 4.41), however, there is a considerable variation between sexes over months. The monthly variation of the gonadosomatic index (I_G) peaked for males and females between February and April, indicating the spawning season. The relationship between the condition factor (K) and the hepatosomatic index (I_H) revealed that the mobilization of energy from the body assist in gonad maturation. The fecundity ranged from 15.7 cm to 21.4 cm, with a mass of 142.6 g to 333.0 g, yielding 20, 438 to 121, 829 eggs. Male reaching maturity earlier than female, at 15.78 cm compared to 12.45 cm for female. This research contributes to a better understanding of the reproductive characteristics of C. coeruleopinnatus, which will aid in future establishment of rules and regulations for effective fishery management in Terengganu waters in the future.

KEYWORDS: *Carangoides coeruleopinnatus*, Fecundity, Length at maturity (L_{50}), Reproduction, Sex ratio, Spawning period

DAY 3 (10TH MARCH 2022)
SESSION 22: REMOTE SENSING AND COASTAL OCEANOGRAPHY

Chairperson	Time	Code	Presenter	Title
Dr. Madihah Jafar Sidik	1445-1500	ORSCO-1	Soufiane Hasni	Environmental impact on the Spatio-temporal abundance and distribution of the European Sardine (*Sardina pilchardus*, Walbaum 1792) in the Southern Alboran Sea.
	1500-1515	ORSCO-2	Muhammad Faqih Ahkam	Influence Carbon Dioxide Flux on Primary Productivity in The Java Sea Estimated From Satellite Measurements
	1515-1530	ORSCO-3	Sheila Zallesa	Analysis of the Effect of Currents on the Distribution of Bottom Sediment in the Waters of Gili Terawangan Island, Lombok, West Nusa Tenggara
	1530-1545	ORSCO-4	Chong Wei Sheng	Optimising The Screening Strategy in UAV Data Prior to Sun Glint Correction for Coral Classification Mapping
	1545-1600	ORSCO-5	Ochtoryano Fadhylla	Marine Tourism Suitability Based on Oceanographic Parameters and Hazards Risk Assessment in Pelabuhan Ratu Bay, West Java, Indonesia
	1600-1625		DISCUSSION (Question and Answer)	

ORSCO-1 ENVIRONMENTAL IMPACT ON THE SPATIO-TEMPORAL ABUNDANCE AND DISTRIBUTION OF THE EUROPEAN SARDINE *Sardina pilchardus, Walbaum 1792* IN THE SOUTHERN ALBORAN SEA

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ABSTRACT

The European Sardine (Sardina pilchardus, Walbaum 1792) is a species of genus Sardina, a small pelagic fish that occurs in the southern Alboran sea (Moroccan coast), which have an important economic value. This work aims to identify the significant environmental factors that influence sardine catch variability, to compare the fitness of the resulting global models in the Southern Alboran Sea zones, to construct the LPUE of each zone, and to determine the correlation between the observed and the predicted LPUE of each zone of the Southern Alboran Sea. Using Ordinary Least Squares (OLS) and Generalized Linear Models (GLM) as methods, Moroccan main port' landing logbook from 2009 to 2020, and satellite environmental data of multiple parameters. We claim that the Surface concentration of Zooplankton (Zoo), Sea Surface Temperature (SST), and Sea Level Anomaly (SLA) are the main significant parameters explaining Spatio-temporal changes of the species in the SAS. In terms of model significance, biological models outperform oceanographic models. The global models' correlation between observed and predicted LPUE show promising results.

KEYWORDS: Climate change, Environmental Factors, Generalized Linear Models, *Sardina pilchardus*, Southern Alboran Sea.

ORSCO-2 INFLUENCE CARBON DIOXIDE FLUX ON PRIMARY PRODUCTIVITY IN THE JAVA SEA ESTIMATED FROM SATELLITE MEASUREMENTS

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ABSTRACT

Aquatic productivity has a vital role in the carbon cycle and food chain, as well as an essential requirement for studying the structure and function of marine ecosystems. Previous studies have shown that the Java Sea acts as a source of carbon dioxide (CO2) which can affect primary productivity in the Java Sea. Sea surface temperature, chlorophyll-a, sea surface salinity, surface wind speed, tropospheric mole fraction of CO2 and sea level pressure were analyzed to calculate CO2 gas transfer velocity, CO2 solubility, The Net Primary Productivity, and Photosynthetically Active Radiation (PAR) all significantly impact net primary productivity in a water body (SST). This study aims to determine the net primary productivity in the Java Seas using Aqua-MODIS data. The data for this study was gathered via satellite data, and the net primary production was calculated using a VGMP model (vertically Generalized Production Model). In all of the Java Sea, there was a positive association between CO2 fluxes and productivity, which might be attributed to convective mixing, which boosts both changes and productivity at the same time. Monsoonal upwelling had an increasing influence on both of the characteristics measured in the Java Sea due to river input. The effects of an El Nino tend to be amplified of association between fluxes and production, which might be due to high bacterial respiration, which leads to increased surface CO2 levels and greater productivity.

KEYWORDS: Carbon dioxide flux, Primary Productivity, Java Sea

ORSCO-3 ANALYSIS OF THE EFFECT OF CURRENTS ON THE DISTRIBUTION OF BOTTOM SEDIMENT IN THE WATERS OF GILI TERAWANGAN ISLAND, LOMBOK, WEST NUSA TENGGARA

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ABSTRACT

The Gili Trawangan waters is one of the tourist destinations located in Gili Indah Aquatic Tourism Park, North Lombok. Hydro-oceanography parameters affect of sediment as the waves, currents, and tidal. The sediment movement be expected are one of the source of sediment in Gili Trawangan waters the potential to make that territory run into sedimentation rather high. In this regard , than do research about current and seabad sediment in that waters. The purpose of this research is to find aware the direction and speed of a current, find distribution of seabed sediment and then knowing relation between current and distribution of seabad sediment in Gili Trawangan waters. This research be divided into three steps, the first is primary data collection for basic sediment samples in the waters of Gili Trawangan Beach, the second step is analysis sample of seabad sediment in the Marine Geology Laboratory at Faculty of Fisheries and Marine Sciences Padjadjaran University and the final step is processing the current and sediment transport data using software MIKE 21. Taking field data was conducted from the 30 to 31 Agustus 2019. Method used in this research is quantitative method based on scientific rules concrete / empirical, objective, measurable, rational and systematic. Based on an analysis distribution of seabed sediment during the research sediment type in Gili Trawangan waters dominated by sand. The results of hydrodynamic modeling showed the average surface current speed is 0.00173 m/s, the current speed at high tide ranges from 0.001 - 0.018 m/s and the current speed at low tide is 0.001-0.014 m/s with the direction of alternating current patterns from the southeast east.

KEYWORDS: Seabad sediment distirbution, Current, Gili Trawangan waters

ORSCO-4 OPTIMISING THE SCREENING STRATEGY IN UAV DATA PRIOR TO SUN GLINT CORRECTION FOR CORAL CLASSIFICATION MAPPING

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ABSTRACT

Much effort is being expended in developing sun glint correction algorithms for aerial and satellite imagery to build reliable coral classification maps. There is little known about how a screening method applied to UAV data collected in areas with persistent glint can be used to reduce image distortions and glint effects to build coral classification maps. The screening of distorted UAV data acquired in glint-affected areas was optimised to eliminate image distortions, artefacts, and glint effects, improving the accuracy of coral classification maps on Bidong Island (Malaysia). Four distortion correction procedures were examined, and the UAV data screening method was introduced prior to glint correction (DSGC). Machine learning algorithms [maximum likelihood (ML), Mahalanobis distance (MD), random forest (RF), support vector machine (SVM), and artificial neural network (ANN)] were used to validate the coral classification maps. The DSGC approach for accurately screening image distortions in UAV data was evaluated on comparable coral ecosystems. The improved coral classification maps are crucial for assessing present conditions, identifying prospective conservation priority areas, restoring related species from vulnerable situations, and supporting coastal and island management decision-makers.

KEYWORDS: Coral, drone, distortion, sun glint

ORSCO-5 MARINE TOURISM SUITABILITY BASED ON OCEANOGRAPHIC PARAMETERS AND HAZARDS RISK ASSESMENT IN PELABUHAN RATU BAY, WEST JAVA, INDONESIA

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ABSTRACT

Pelabuhan Ratu Bay is one of the tourism destinations located in southern part of West Java and facing to the Indian Ocean. This study aims to determine and classify appropriate types of tourism based on oceanographic biophysical parameters and hazards risk assessment in 3 selected sites in the coastal area of the bay. The method used is a combination of marine tourism suitability index and coastal hazard risk assessment. The data were obtained from field observation and secondary data from various data sources. The parameter of biophysical oceanographic data namely water depth, current velocity, beach slope, beach width, beach type, land cover, and hazardous biota. Potential hazards is identified as rip current and high waves. Selected parameters such as tidal, current velocity and ocean waves were calculated in seasonal events. This study shows that all selected sites i.e. Citepus Beach, Karang Hawu Beach, and Cimaja Beach have a high score of hazard along the year due to of high waves (maximum more than 3m). Citepus Beach and Karang Hawu Beach is not suitable for swimming, but only for recreational activities at the beach. Cimaja Beach is suitable to be used as a surfing tourism site since it has plunging type wave with dissipative beach and high wave along the year.

KEYWORDS: Recreational tourism, surfing tourism, biophysical oceanography parameter, hazard risk.

DAY 3 (10TH MARCH 2022)
SESSION 23: AQUACULTURE DISEASES AND HEALTH MANAGEMENT

Chairperson	Time	Code	Presenter	Title
Assoc. Prof. Dr. Balu Alagar Venmathi Maran	1445-1500	OADHM-11	Low Chen Fei	*In-Silico* Modeling of Anti-Quorum Sensing DNA Aptamers
	1500-1515	OADHM-12	Chin Yong Kit	Isolation and Screening of *Lactobacillus* sp. Against *Vibrio parahaemolyticus* as Causative Agent of Acute Hepatopancreatic Necrosis Disease (AHPND)
	1515-1530	OADHM-13	Shafiq Johar	Screening and Evaluation of Potential Bacteria From *Pangasius nasutus* as Probiotics Against Pathogenic *Aeromonas hydrophila* and *Streptococcus agalactiae*
	1530-1545	OADHM-14	Fittrie Meyllianawaty Pratiwy	Isolation and Selection Endophyte Bacteria Genus *Pseudomonas* Associated with *Sargassum* Sp. from Pantai Karapyak, Pangandaran District, Indonesia
	1545-1600	OADHM-15	Eka Royani	The Potentiality of Bioactive Compounds and Endophytic Bacteria From Brown Algae as Antimicrobial in Aquaculture
	1600-1625	DISCUSSION (Question and Answer)		

OADHM-11 *IN-SILICO* MODELING OF ANTI-QUORUM SENSING DNA APTAMERS

Low Chen Fei[1*], Siti Aisyah Razali[2], Nur Afiqah Md Yusof[1], Azyyati Mohd. Padzil[3], Syarul Nataqain Baharum[1], Nurul Hanun Ahmad Raston[4], Chong Chou Min[5], Natrah Fatin Mohd Ikhsan[5], Sarmila A/P Muthu Krishnan[5], Magdalena Lenny Situmorang[6]

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ABSTRACT

Aptamer has been studied extensively as a substitute of antibodies for various applications. It is rivalling antibody in the application of disease diagnosis and therapy. Small in molecular size and non-immunogenic properties of aptamers greatly contribute to its potential as therapeutic agent. While the aptamer binding affinity and specificity allow its application in disease detection and diagnosis. In this study, in-silico modeling was approached to design single-stranded DNA aptamers against bacterial quorum sensing receptor. The crystal structure of the apo form of Vibrio harveyi receptor protein (PDB ID: 1ZHH) was used as target. An initial library containing 256 short fragments of nucleotides with randomized sequences was used in molecular docking against the target protein. Aptamer candidates of eight nucleotides in length that possess significant binding affinity were selected for subsequent molecular dynamic (MD) simulation. The protein-aptamer complex was simulated for 50ns, and the complex stability was assessed. The protein-aptamer binding interaction was examined using Molecular Mechanics Poisson-Boltzmann Surface Area (MMPBSA) approach. Subsequently, selected aptamer candidates were modified by addition of complementary base to form short hairpin structured aptamers. Binding of the selected aptamers was verified by Isothermal Titration Calorimetry (ITC), which is a frequently used technique in quantitative studies of biomolecular interactions. MD simulation revealed aptamer candidates that possess significant binding affinity in the target protein binding domain, where the calculated binding energy was lower than -250 kJ/mol. Number of hydrogen bond during 50ns MD simulation recorded a range from 5-15 bonds. Verification of protein-aptamer interactions by ITC identified two short hairpin structured aptamers to possess significant K_d value. In-vitro binding assay and subsequent preliminary analysis demonstrated anti-QS activities of the designed aptamer, which suppressed the bioluminescence of Vibrio that regulated by QS cascade. Further analysis will be evaluating the suppression of virulence factor by the anti-QS DNA aptamers.

KEYWORDS: Single-stranded DNA aptamer, Anti-quorum sensing, LuxP

OADHM-12 ISOLATION AND SCREENING OF *LACTOBACILLUS* SP AGAINST *VIBRIO PARAHAEMOLYTICUS* AS CAUSATIVE AGENT OF ACUTE HEPATOPANCREATIC NECROSIS DISEASE (AHPND)

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ABSTRACT

Acute hepatopancreatic necrosis disease (AHPND) is a newly emerging marine shrimp disease that damaged severely to global shrimp aquaculture industries. robiotic, Lactobacillus sp. have potential to become alternative of antibiotic due to antibiotic restriction law for preventing disease occurrence in aquaculture. In this study, Lactobacillus sp. was chosen as probiotic candidates against Vibrio parahaemolyticus AHPND. Lactobacillus plantarum T31, L. plantarum KD2, L. sakei DJ1 and L. curvatus were isolated and identified by 16sRNA gene amplification from Flat needlefish (Ablennes hians), Blackspot Snapper (Lutjanus ehrenbergii), Streaked Spinefoot (Siganus javus) and Largescale tonguesole (Cynoglossus arel) respectively. Meanwhile, Lactobacillus plantarum P8 and P20 were previously isolated from fermented fish that made from Belanger's croaker (Johnius Belangerii), known as Pekasam. All Lactobacillus sp were streaked into blood agar with 48h incubation for safety conformation; Four of Vibrio sp. positive AHPND which V. parahaemolyticus, V. campbelii and V. rotiferanus and Vibrio sp. negative AHPND which another strain of V. parahaemolyticus were used for colony top assay and well diffusion assay. The cultured Lactobacillus sp. broth streaked on MRS agar with 24h incubation, then, overlaid with Vibrio sp. seeded soft TSB agar with 24h incubation for colony top assay; the cultured Lactobacillus sp. MRS broth and centrifuged cultured MRS broth supernatant diffuse into wells of Vibrio sp seeded MH agar with 24h incubation for well diffusion assay respectively. All Lactobacillus sp. have no hemolytic effect in blood agar test; All strain of Lactobacillus sp. significantly had inhibition area of the Vibrio sp for all test compared with uncultured MRS broth. However, L. plantarum P8, P20, KD2 and T31 have significantly larger inhibition area of all Vibrio sp. which more than 14mm, 16mm and 14mm for colony top assay, well diffusion assay of cultured MRS broth and centrifuged MRS broth supernatant respectively compared with L. sakei DJ1 and L. curvatus. In this study, V. parahaemolyticus strain with positive AHPND was chosen for co-culture assay for further confirmation of the pathogenic inhibition. All of the L. plantarum strains co-cultured with V. parahaemolyticus in double strength TSB, then, serial dilution with spread into TCBS agar and MRS agar in 0h, 12h, 24h and 48h for coculture assay respectively. In result, the L. plantarum P20, KD2 and T31 showed higher inhibition of the V. parahaemolyticus compare with Lactobacillus strains P8. the L. plantarum P20, KD2 and T31 were chosen for feeding trial. 10^8 CFU/ml of L. plantarum P20, KD2 and T31 were supplemented into basal feed with 1:1 ratio. Four tanks of treatment tank with 300 Black tiger shrimp, Penaeus monodon postlarvae (PL15) were set which for feeding trial. The 4 tank were fed different with basal feed, L. plantarum P20, KD2 and T31 supplemented feeds for 35 days with 3 times daily with 3% body weight to achieve PL50 stage. Then, 60 shrimps from each treatment's shrimps transferred three aquariums with 20 shrimp per aquarium as triplicate accordingly. All aquariums were proceeded for 5×10^5 CFU/ml V. parahaemolyticus immersion challenge test. For growth performance, P20 treatment group was significant highest in final weight, weight gain and specific growth rate (SGR) which 0.1473 ± 0.0111, 1516.646 ± 149.3861 and 6.9458 ± 0.2294 respectively while lowest in feed conversion ratio (FCR) which 1.9659 ± 0.1508 compared with other treatments. In the challenge test, P20 and T31 treatment groups show lowest mortality significantly which 18.3333 ± 4.7140 % and 21.6667 ± 9.4281 % compared with other treatments. Overall, L. plantarum P20 was effectively inhibited V. parahaemolyticus positive AHPND in vitro and effectively improve growth performance and enhanced survival of P. monodon postlarvae against the V. parahaemolyticus in vivo. Therefore, L. plantarum P20 is chosen as probiotic that against pathogenic Vibrio sp caused shrimp diseases included AHPND and vibriosis. Hence, it potentially prevents the penaeid shrimp disease and potential increase global income in aquaculture.

KEYWORDS: *Lactobacillus* sp., *Penaeus monodon* postlarvae (PL15), *Vibrio* sp., Acute hepatopancreatic necrosis disease.

OADHM-13 SCREENING AND EVALUATION OF POTENTIAL BACTERIA FROM *Pangasius nasutus* AS PROBIOTICS AGAINST PATHOGENIC *Aeromonas hydrophila* AND *Streptococcus agalactiae*

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ABSTRACT

The usage of environmental friendly approach such as probiotic to enhance the immune response, promote growth and survival of various cultured aquatic organism including Pangasius species is important in aquaculture. The survival of Pangasius species have been affected by bacterial diseases. Therefore, this study aims to evaluate potential probiotics isolated from Pangasius nasutus against Aeromonas hydrophila and Streptococcus agalactiae infections as an alternative to the usage of antibiotic. Healthy P. nasutus were dissected to isolate potential bacteria from the internal organs such as intestine and stomach. A total of 70 strains were successfully isolated from the organs (21 strains from stomach and 49 strains from intestine) and subjected for further screening. Aeromonas hydrophila and S. agalactiae were used as pathogens in the series of in vitro antagonism assay which were spot, well and disc diffusion assays. Through preliminary screening, five strains demonstrated the ability to inhibit the growth of pathogen A. hydrophila. Strain S1 (isolated from stomach) and L1 (isolated from intestine) inhibited the growth of A. hydrophila with inhibition zone of 1.5±1mm and 1.2±1mm respectively. Strain L2, L8 and L12 isolated from the intestine inhibited the growth of A. hydrophila with inhibitory zone of 1.0±1mm, 1.2±1mm and 2.0±1mm respectively. Out of five potential probiotics, only strain L2 able to inhibit the growth of S. agalactiae with size of clear zone 1.0±1mm. These five strains were identified using 16s rRNA sequencing. S1 was identified as Lactococcus lactis strain NBRC 100933, L1 (Weissella confusa strain JCM 1093), L2 (Cosenzaea myxofaciens ATCC 19692), L8 (Lactococcus garvieae strain JCM 10343) and L12 (Plesiomonas shigelloides strain DSM 8224). All the strains showed potential as probiotics which can be used in the culture of P. nasutus. However, further research is needed to fully establish and understand the mechanisms and their full potential as probiotics.

KEYWORDS: *Pangasius nasutus,* potential probiotic, *Aeromonas hydrophila, Streptococcus agalactiae*

OADHM-14 ISOLATION AND SELECTION ENDOPHYTE BACTERIA GENUS *PSEUDOMONAS* ASSOCIATED WITH *Sargassum* sp. FROM PANTAI KARAPYAK, PANGANDARAN DISTRICT, INDONESIA

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ABSTRACT

There are several types of macro algae including brown, green and red algae, which have bioactive compound as anti-microbial agents. In Algae, the bioactive compounds produced by endophytes bacteria has many benefits including anti-cancer, anti-coagulant, anti-viral, anti-fungal, anti-bacterial, and anti- inflammatory. This bacteria associated with macroalgae were involved the production of metabolites associated with their host, so they tend to have nearly the same metabolites to defend themselves or as antibiotics. Besides that, there are endophytes bacteria that can prevent the growth of disease bacteria, especially bacteria that often attack cultivated species such as Vibrio sp. and Streptococcus sp. This study aim to identify the endophytes bacteria (S10-3) associated with Sargassum Sp. collected from Pantai karapyak, Pangandaran district, Indonesia using Genomic DNA extraction with Quick-DNA Bacterial Miniprep Kit (Zymo Research, D6005), PCR amplification with My Taq HS Red Mix, 2X (Bioline, BIO-25048), and Bi-directional Sequencing. The results showed that the isolated bacteria (S10-3) identified as novel species from genus Pseudomonas. It was analysed by 16srRNA primers and based on BLAST result, it phylogenetically closely related to Pseudomonas monteilii, Pseudomonas putida, including uncultured Pseudomonas and uncultured bacterium with percentage of identity ranged 99.86-99.93%.

KEYWORDS: Endophyte bacteria; Pseudomonas, Sargassum, Alga

OADHM-15 THE POTENTIALITY OF BIOACTIVE COMPOUNDS AND ENDOPHYTIC BACTERIA FROM BROWN ALGAE AS ANTIMICROBIAL IN AQUACULTURE

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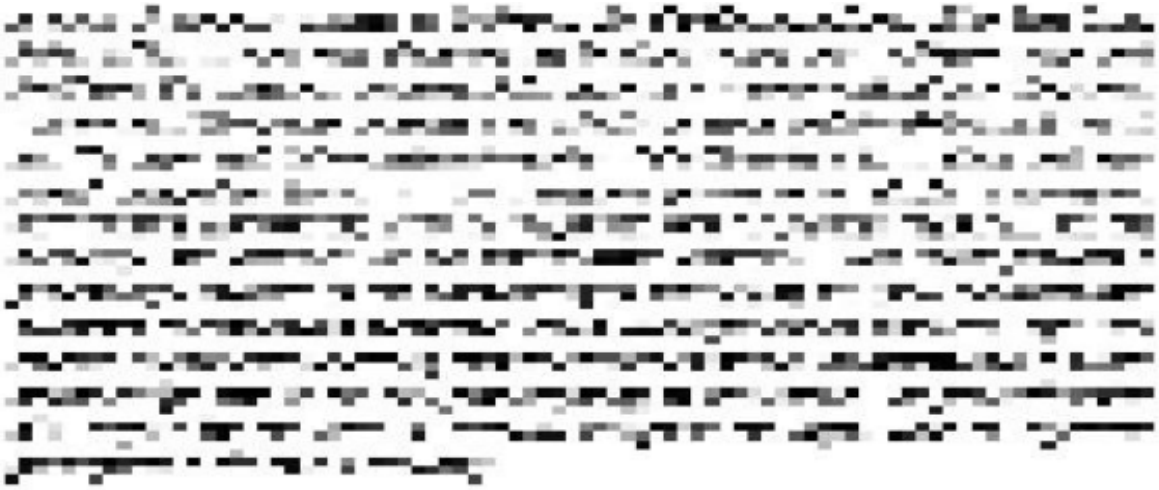
ABSTRACT



KEYWORDS: Algae, antibacterial, bioactive compounds, endophytic, extract, sargassum

DAY 3 (10TH MARCH 2022)
SESSION 24: AQUACULTURE AND FISHERIES; SEAFFOD SAFETY AND SECURITY

Chairperson	Time	Code	Presenter	Title
Dr. Wahidatul Husna Zuldin	1445-1500	OAF-28	Mohd Kamel Wan Ibrahim	Underwater LED Illuminance in A Floating Buoyant for Marine Aquaculture Application
	1500-1515	OSSS-1	Chong In Lio	Predictive Model for The Quality of White Shrimp Using Traditional Method Combined With Multispectral Image Technology Under Different Storage Temperatures
	1515-1530	OSSS-2	Olumide Odeyemi	Microbiological Safety of Seafood Imported to The European Union From Southeast Asia
	1530-1545	OSSS-3	Muhammad Dawood Shah	Therapeutical Potential and Nutraceutical Profiling of North Bornean Seaweeds
	1545-1600	OSSS-4	Cheng-Quan Chen	The Effect of Thyme and Oregano Essential Oil for Preserving the Shelf Life of White Shrimp Under Low-Temperature Storage
	1600-1625		DISCUSSION (Question and Answer)	

OAF-28 UNDERWATER LED ILLUMINANCE IN A FLOATING BUOYANT FOR MARINE AQUACULTURE APPLICATION

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ABSTRACT

Underwater LED lights able to attract marine life such as fish, crabs and prawns. However, specific light characteristics include intensity, wavelength, colour, flickering, and polarization differs the behaviour of marine life. The response of the species such as showing attraction, no response, or repulsion. The limitation of the underwater LED application is that the LED has to remain constantly submerged. The work aims to design a floating device that contains LED to provide attractive light to the surrounding marine life. The work begins with calculating submersion height in the seawater then experimented with submerged LED to determine the LED illuminance versus distance in dark environment. The distance between LED and the light meter was measured by using a ruler and the distance was set to 0.1m. The LED colour was controlled by using an app on mobile phone. The light test procedure then repeated by changing the distance between light meter and LED from 0.1m to 0.8m with an increment of 0.1m. The light test was done for seven different colour of LEDs which are blue, red, green, yellow, purple, white, cyan and deep sky blue. It was calculated that the suitable weight for half submersion of 1 meter 4" pipe is 28 kg of concrete. It was found that cyan and white gave the most brightest colour at close distance but greatly light absorb as the distance further away.

KEYWORDS: N/A

OSSS-1 PREDICTIVE MODEL FOR THE QUALITY OF WHITE SHRIMP USING TRADITIONAL METHOD COMBINED WITH MULTISPECTRAL IMAGE TECHNOLOGY UNDER DIFFERENT STORAGE TEMPERATURES

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ABSTRACT

White shrimp (Litopenaeus vannamei) is rich nutrition (e.g. protein, mineral elements and vitamin) seafood, but the shrimps are susceptible to decompose. In this study, we evaluated the physicochemical indicators (e.g. total volatile-based nitrogen (TVBN), thiobarbituric acid reactive substances, texture, etc.) and microbial indicators (e.g. total viable count (TVC), Pseudomonas, etc.) of white shrimps stored at 0°C, 5°C, 10°C and 15°C by using the combination of traditional freshness analysis technology and multispectral image technology. The preliminary result showed that the freshness of white shrimps at various temperatures analyzed by traditional method, shared the same changing pattern. While the storage time increased, the hardness of white shrimps decreased. However, the amount of TVBN, pH value, TVC, physicochemical properties and microbiological indicators were significantly enhanced. The TVBN and TVC as the most important indicators of evaluating the degree of seafood spoilage, showed that while shrimps had been spoilt at 0°C, 5°C, 10°C and 15°C after 240h, 192h, 120h and 48 h respectively (the TVBN was 39.69 mg/100g, 40.49 mg/100g, 35.15 mg/100g, 39.27 mg/100g, and the TVC was 6.30 log CFU/g, 6.89 log CFU/g, 6.46 log CFU/g, and 6.40 log CFU/g). A subsequent analyses of white shrimp freshness using backpropagation – artificial neural network (BP-ANN) will be studied. The use of BN-ANN may provides a faster and more analysis results of the freshness of white shrimps, the combination of the data of freshness and spectrum with the BP-ANN model could be used for predicting the freshness changes of the white shrimp stored at different temperatures. Finally in this study may help the food industry to Save more inspection time.

KEYWORDS: Multispectral image, Total volatile-based nitrogen, Total viable count, Backpropagation – artificial neural network

OSSS-2 MICROBIOLOGICAL SAFETY OF SEAFOOD IMPORTED TO THE EUROPEAN UNION FROM SOUTHEAST ASIA

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ABSTRACT

KEYWORDS: Seafood safety, food safety, foodborne pathogens, microbiological safety, seafood export, Southeast Asia

OSSS-3 THERAPEUTICAL POTENTIAL AND NUTRACEUTICAL PROFILING OF NORTH BORNEAN SEAWEEDS

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ABSTRACT

Malaysia has a lengthy coastline surrounded by islands, particularly North Borneo, that provide an ideal climate for the cultivation of many seaweed species. Caulerpa lentillifera, Caulerpa racemose (Chlorophyta), Eucheuma denticulatum, Halymenia durvillaei, Kappaphycus alvarezii, (Rhodophyta), Dictyota dichotoma and Sargassum polycystum (Ochrophyta) are some important seaweed species found in North Borneo. The review aims to highlight the therapeutical potential of North Bornean seaweeds and their nutraceutical profiling. North Bornean seaweeds have demonstrated anti-inflammatory, antioxidant, antimicrobial, anticancer, cardiovascular protective, neuroprotective, renal protective and hepatic protective potentials. The protective roles of the seaweeds might be due to the presence of a wide variety of nutraceuticals including phthalic anhydride, 3,4-ethylenedioxythiophene, 2-pentylthiophene, furoic acid (K. alvarezii), eicosapentaenoic acid, palmitoleic acid, fucoxanthin, β-carotene (E. denticulatum), eucalyptol, oleic acid, dodecanal, pentadecane (H. durvillaei), canthaxanthin, oleic acid, pentadecanoic acid, eicosane (C. lentillifera), pseudoephedrine, palmitic acid, monocaprin (C. racemosa), dictyohydroperoxide, squalene, fucosterol, saringosterol (D. dichotoma) and lutein, neophytadiene, cholest-4-en-3-one, cis-vaccenic acid (S. polycystum). Extensive research on seaweed isolates is strongly advised to better understand their bioactivity action mechanisms as well as their commercialization possibilities.

KEYWORDS: Seaweed, North Borneo, Nutraceutical, Secondary metabolites. anti-inflammatory, antimicrobial

OSSS-4 THE EFFECT OF THYME AND OREGANO ESSENTIAL OIL FOR PRESERVING THE SHELF LIFE OF WHITE SHRIMP UNDER LOW-TEMPERATURE STORAGE

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ABSTRACT

Essential oils (EOs) have been commonly used to add spice and flavor to a variety of meals. It has antibacterial properties that could inhibit the growth of Gram-positive and Gram-negative bacteria. In this study, we evaluated the effectiveness of two kinds of EOs in extending the shelf-life of shrimp. The shrimp samples were soaked in thyme and oregano separately, packed in polypropylene bags, frozen for one week, and chilled for three weeks. The results showed that the total viable count (TVC) and total volatile basic nitrogen (TVB-N) of the control group reached 6.5 log CFU/g and 30.2 mg/100g, respectively, after 4 days of storage; indicating the spoilage of shrimps. Interestingly, the shrimp samples soaked in either thyme or oregano had a similar level of TVC and amount of TVBN after 8 days of storage. However, the samples soaked in thyme had a lower value of TVC and TVBN than oregano after 17 days of storage; samples soaked in thyme reached 4.0 log CFU/g and 23.6 mg/100g, respectively, whereas the samples soaked in oregano had only 6.2 log CFU/g and 29.5 mg/100g, respectively. This study concludes that thyme and oregano could effectively preserve the shelf-life of shrimp up to 17 days under low-temperature levels. The findings in this study provide initial information to practitioners in the seafood industry about the use of EO as an alternative to chemical antibacterial compounds for preserving the shelf life of shrimp.

KEYWORDS: Thyme, oregano, essential oil, total viable count, frozen shrimp, seafood shelf life

POSTER PRESENTATION SESSION

DAY 1 (8TH MARCH 2022)
POSTER SESSION 1: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
	1640-1645	PMBC-1	Kyeong Mi Kim	Complete Mitochondrial Genomes of Two *Sargassum* Species, *S. nigrifolium* and *S. yezoense* (Fucales, Phaeophyceae)
	1645-1650	PMBC-2	Ihsan Hani binti Radzi	A New Record of *Thenus indicus* (Leach, 1815) In Kota Kinabalu, Sabah (Malaysia) Based on Morphology and Genetic Identification
	1650-1655	PMBC-3	Byung-Jin Lim	A New Species of The Genus *Thompsonopia* (Copepoda : Calanoida : Pseudocylopiidae) From Malaysia
	1655-1700	PMBC-4	Melissa Versteeg	*Heteractis magnifica* Population Assessments at Coral Reefs of Pulau Perhentian, Terengganu, Malaysia.
Dr. John Madin	1700-1705	PMBC-5	Hye-Won Moon	Shallow-Water Black Corals (Anthozoa: Antipatharia) from Korea With Notes on *Myriopathes n.* sp.
	1705-1710	PMBC-6	Amir Asyraf Bin Zainudin	Population Genetics of Wild *Pangasius nasutus* (Bleeker, 1863) Based on COI Marker Along Pahang River, Malaysia
	1710-1715	PMBC-7	Parivaseni Ravichandran	Hermit Crabs in Southeast Asia: A Review on The Status and Trends of Hermit Crab Studies in Southeast Asian Countries
	1715-1720	PMBC-8	Cheng-Ann Chen	Meiobenthos in the Hydrothermal Vent of Guishan Island, Taiwan
	1720-1725	PMBC-9	Kee Dang Syaryn Kee Mohamad Yasin	Seagrass General Knowledge on Restoration Activities in Sabah
	1725-1730	PMBC-10	Arvie Joy Manejar	The Impact of Urbanization on Fishing Communities in the Philippines

PMBC-1 COMPLETE MITOCHONDRIAL GENOMES OF TWO *Sargassum* SPECIES, *S. nigrifolium* AND *S. yezoense* (FUCALES, PHAEOPHYCEAE)

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ABSTRACT

Sargassum C. Agardh, one of the most important ecological genus on rocky shores, forms marine forests in tropical and temperate regions. Several species heve long been economically important as food and medicine. A total of 23 species are listed in the available literature for South Korea. Two Sargassum species, S. nigrifolium and S. yezoense are genetically very similar based on four gene anlaysis despite the morphological distinctiveness. We sequenced and characterized the complete mitochondrial genomes of two Sargassum species using next-generation genome sequencing methods. In this investigation, the complete mitogenome of S. yezoense was determined for the first time. Genome size and GC content of S. nigrifolium and S. yezoense were slightly different as 34,788 nt vs. 34,767 nt, and 36.5% vs. 39.9%, respectively. Sixty-five genes of two Sargassum species were identified including 35 protein-coding genes, 2 open reading frames (ORFs), 3 rRNA genes, and 25 tRNA genes. The gene synteny was equal between S. nigrifolium and S. yezoense. There were gene length differences in nad7, rns, cox2, rps3, trnW, tatC and rnl, which were made genome variations between two species within the genus Sargassum. Based on the complete mitogenome of two Sargassum species, new mt DNA marker could be selected and employed to study the phylogeography and phylogeny for Fucales.

KEYWORDS: Sargassum, complete mitochondrial genome, Fucales

PMBC-2 A NEW RECORD OF *THENUS INDICUS* (LEACH, 1815) IN KOTA KINABALU, SABAH (MALAYSIA) BASED ON MORPHOLOGY AND GENETIC IDENTIFICATION

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ABSTRACT

Thenus indicus (Leach, 1815) was resurrected in 2007 in a taxonomic revision of the previously monotypic genus of flathead lobsters, Thenus. A specimen collected from the fisheries landings of Kota Kinabalu was identified as T. indicus based on morphological characteristics and supported by mitochondrial cytochrome c oxidase 1 (CO1) gene sequencing. This study presents the first description and taxonomic illustrations of T. indicus in Malaysian waters. The current global distribution of T. indicus and a description of habitat preference are also presented.

KEYWORDS: Scyllaridae, morphology, mtDNA Co1, distribution, habitat.

PMBC-3 A NEW SPECIES OF THE GENUS *Thompsonopia* (COPEPODA: CALANOIDA: PSEUDOCYLOPIIDAE) FROM MALAYSIA

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ABSTRACT

The family Pseudocyclopiidae T. Scott, 1894 is a small and poorly known family of the Calanoida. A new species of the genus Thompsonopia from Kota Kinabalu, Malaysia is described. The new species could be distinguished from its congeners by a combination of the following characters: 1) rostrum separated from cephalosome; 2) genital operculum located distal margin; 3) left P5 of male with a long spine. A key to Thompsonopia species from around the world is also provided.

KEYWORDS: N/A

PMBC-4 HETERACTIS MAGNIFICA POPULATION ASSESSMENTS AT CORAL REEFS OF PULAU PERHENTIAN, TERENGGANU, MALAYSIA

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ABSTRACT

Around the Perhentian Islands, coral reefs have been facing continued degradation. To understand reef health, the Perhentian Marine Research Station (PMRS) has conducted a preliminary study to assess the benthic cover at two coral reef sites, Village Reef at Perhentian Kecil, and Teluk Keke at Perhentian Besar. With traditional benthic assessments focusing predominantly on coral and algae, other direct reef competitors are overlooked. Therefore, the current study examined hosting sea anemone population dynamics at Village Reef and Teluk Keke, including Actinian spp., cluster formation, and hosting status. Data was analysed to inspect benthic coverage and indicators of reproductive success within and between sites. At Village Reef, 203 sea anemone formations were analysed, 98.0% of which were Heteractis magnifica, whilst at Teluk Keke 86.9% of the 176 examined formations regarded Heteractis magnifica. Furthermore, at Village Reef clustered formations were more common and contained more members, with 30.5% clustered with up to five individuals, 15.8% clustered with 10-15 individuals, and 4.4% clustered with over 15 individuals. In contrast, at Teluk Keke 85.8% were solitary, with the remainder clustered in formations of less than five individuals. The analyses also revealed that actively hosting sea anemones were significantly larger than non-hosting sea anemones, and that actively hosting sea anemones displayed clustered formations more often than non-hosting ones. This preliminary study provides the first baseline investigation of hosting sea anemone populations around the Perhentian Islands. Results inform preliminary habitat distributions of hosting sea anemones and serve as a baseline for future distribution assessments and continued monitoring of population reproduction rates and expansion behaviour.

KEYWORDS: Benthic cover, Hosting Sea anemones, Perhentian Islands, Coral reefs

PMBC-5 A REVIEW OF SHALLOW-WATER BLACK CORALS (ANTHOZOA: ANTIPATHARIA) FROM KOREA WITH NOTES ON NEW SPECIES

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ABSTRACT

The specimens which have been collected in the coastal areas of Korea from 1965 to 2019 were examined for the taxonomic study of black corals (order Antipatharia). Previous studies have resulted in reporting 12 species and six genera belonging two families in Korea. In this study, we present one new species (Myriopathes n. sp.) that is similar with Antipathes dendrochristos (Opresko, 2005) from southern Calilfornia Bight based on morphological characteristics in large and bushy colonies that can reach a height of 2 m or more. However, the new species is characterized by having larger spines in size (0.12-0.30 mm) and polyps arranged bilaterally. In addition to describing and illustrating the species, we have examined molecular information based on the partial sequences of the mitochondrial cytochrome coxidase subunit I (COI) and the Internal Transcribed Spacers (ITS) region of gene. Most of the black corals inhabit in the coastal areas of Jeju Island, the most southern part of Korea, and are mainly distributed on the vertical wall of rock from depth of 7-45m. In contrast, Myriopathes n. sp. was found only in Ulleungdo and Dokdo Islands (East Sea) and formed patches at a depth of 30 m or deeper on relatively gentle slopes. Therefore, this species might be affected by cold currents in winter. In this study, we have also found that Myriopathes lata (Silberfeld, 1909) is one of the abundant species in Jeju Island and, unlike other black corals, a widespread one along the coastal areas of Korea by expending from southwestern sea to the eastern sea, up to Ulleungdo Island. The species composition and distribution of black corals provides critical baseline information to predict future environmental change in Korean waters.

KEYWORDS: Black corals, Taxonomy, new species, Myriopathidae, Korean waters

PMBC-6 POPULATION STRUCTURE REVEALED BY 16S rRNA OF *Penaeus monodon* (FABRICIUS, 1798) BROODSTOCKS IN THE INDO PACIFIC REGION

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ABSTRACT

The Asian tiger shrimp, Penaeus monodon (Fabricius, 1798) is the most economically important group of shrimps, which is widely cultured in the world. Genetic variation is a critical factor when selecting superior stocks for aquaculture breeding programs. Current study focuses on determining the genetic diversity and population structure of different Penaeus monodon populations from the Indo-Pacific region. Samples from different populations were collected via institutions and company from each designated country. Based on the 16S rRNA sequences, 12 haplotypes are recognised from 73 samples collected from Malaysia (n=7), Madagascar (n=28), Thailand (n=18), Hawaii (n=11) and Japan (n=9). Analysis revealed population from Malaysia to be the most genetically diverse. The results also suggested Japan to be genetically differentiated from individuals found in other populations. This may be due to the seasonal climates in Japan is different from climates of Malaysia, Thailand, Hawaii and Madagascar, which may had influenced the gene expression of individuals from Japan.

KEYWORDS: 16S rRNA, *Penaeus monodon,* population genetics, Indo-Pacific region

PMBC-7 HERMIT CRABS IN SOUTHEAST ASIA: A REVIEW ON THE STATUS AND TRENDS OF HERMIT CRAB STUDIES IN SOUTHEAST ASIAN COUNTRIES

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ABSTRACT

Hermit crabs are decapods which were known to exist about 100 million years ago. Although a handful of paguroids made through the literature world, most of them were not re-descripted nor recorded especially in the Southeast Asian countries. However, this review paper covers a wholesome understanding on the studies in Southeast Asia from the past years. Out of 11 countries, only six countries were focusing on hermit crab in the past years. A total of 255 species of hermit crabs were found to occur in the Southeast Asian countries. Findings of the recent trend showed that Philippines and Indonesia are the two most active countries in research related to hermit crab while the least is Cambodia, Myanmar, Timor – leste, Brunei and Laos. Results shows that most of the southeast Asian hermit crab studies lean more onto databasing the species diversity (identification and redescription) yet there is so much more to discover in hermit crabs especially in the marvel biodiversity in SEA region. Further discussion and data analysis was done on the species count, hermit crab families, knowledge gap among Southeast Asian researchers, conservation measures, further suggestions and directions to hermit crab studies and hermit crabs' contribution to the economy.

KEYWORDS: Paguroidea, Southeast Asia, Status, Trends

PMBC-8 MEIOBENTHOS IN THE HYDROTHERMAL VENT OF GUISHAN ISLAND, TAIWAN

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ABSTRACT

The shallow-water hydrothermal vent has been reported from several oceans globally yet more data are needed in filling up the missing biological data of global inventory of the shallow-water vents compared with those on deep sea hydrothermal vents. Meiobenthos play a vital role in transitional ecosystems such as intertidal zones and sediment shorelines; structuring and oxygenating the sea bottom by reworking sediments; and in breaking down organic matter. Sampling was conducted in June 2018 in the hydrothermal vent area of Guishan Island. In order to determine the general distribution of benthic invertebrates in the area, samplings were conducted in different sea areas around the hot springs of Guishan Island. Three replicates of surface sediments were collected with a red-cap urine sample bottles using SCUBA diving methods. Seven main taxon of meiobenthos were recorded in the hydrothermal vent area of Guishan Island. Copepode was determined as the most dominant taxon found in the vent area followed by Nematoda. The abundance of meiobenthos in this study ranged from 12.3 to 1643.6 ind. 10 cm^{-2}. Furthermore, results also demonstrated that the density of the meiobenthos increases as the distance from the vent mouth increases. Results of ANOSIM showed significant differences in the meiobenthos abundance in all study transects (p-value: A (0.001); B (0.001); C (0.016). high densities of copepods were observed in the stations further from the vents. The density of marine nematodes, the second dominant maiobenthos group in Guishan Island were found to be higher in the stations nearer to the vent mouth with the lowest abundance in the furthest stations. Marine nematodes were observed to have higher toleration to the extreme characteristic of vent as compared to copepods. Nematode/Copepod ratio tend to be applicable in determining the stress zone of a shallow vent area subject to further investigations on the environment qualities.

KEYWORDS: Nematode; Hydrothermal Vent; Island

PMBC-9 SEAGRASS GENERAL KNOWLEDGE ON RESTORATION ACTIVITIES IN SABAH

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ABSTRACT

Seagrass is one of the important marine ecosystems in Sabah's coastal waters. Sabah has 12 seagrass species out of 16 species in Malaysia. Seagrass has frequently been confused as seaweeds and received the least attention among all marine ecosystems. Coastal development and marine pollution are among major threats to the seagrass ecosystem. The aim of this study is to determine the general knowledge on seagrass and seagrass transplanting efforts as part of restoration activities in Sabah. An online survey (google form) was conducted containing questions on seagrass general knowledge, restoration and transplanting activities. The target survey group is Sabahan more than 18 years old (n=124 respondents) that came from various backgrounds. As a result, 76% of the respondents know what seagrass is where 91% of them can differentiate between seagrass and seaweed. However, only 65% think seagrass is under threat and almost half of the respondents agreed that seagrass transplanting is one of the restoration efforts. For the seagrass awareness program, 67% of the respondents have never heard about seagrass whereas 60% of them do not know about seagrass transplanting. About 43 respondents know the seagrass transplanting, 36 of them think that seagrass transplanting is important and 77% agreed that biological factors, sedimentation, anthropogenic activities, and strong wave are the main challenges for seagrass transplanting activities. The survey shows that Sabahan is generally recognized seagrass and identifies the main threats but lacks knowledge on restoration and conservation efforts. It is suggested the seagrass awareness activities should be carried out to all work of life. Specially fundings for research and related seagrass activities are needed. Support from expertise and communities' involvement is among the key to success in any seagrass conservation efforts.

KEYWORDS: Seagrass, awareness, restoration, transplanting, Sabah

PMBC-10 THE IMPACT OF URBANIZATION ON FISHING COMMUNITIES IN THE PHILIPPINES

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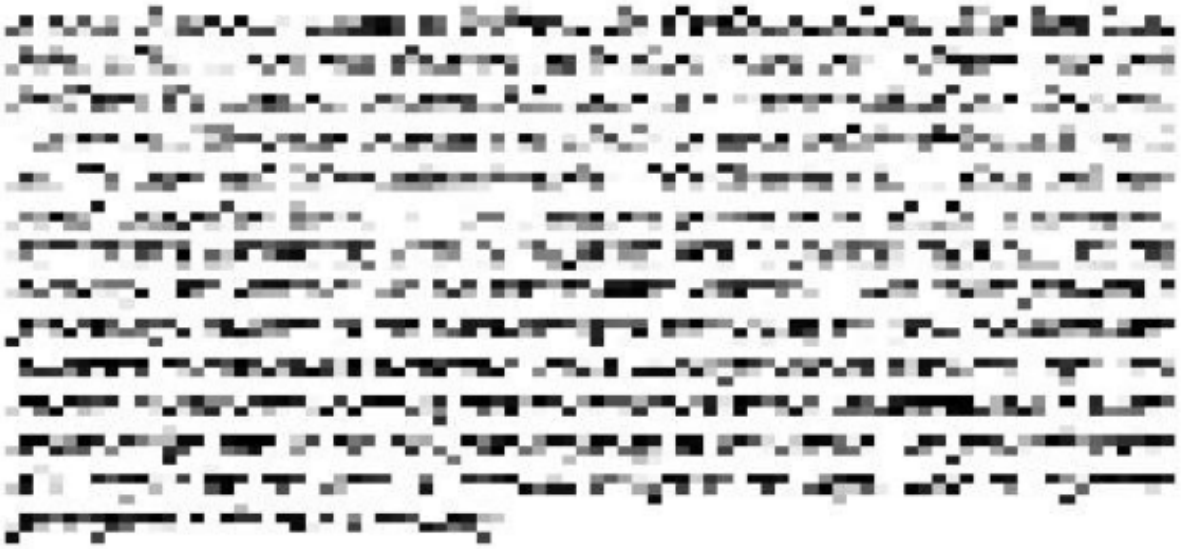
ABSTRACT



KEYWORDS: urbanization, periurban, island, fishing communities, multiple linear regression

DAY 1 (8TH MARCH 2022)
POSTER SESSION 2: NUTRITION AND FEED TECHNOLOGY; SEAFOOD SAFETY AND SECURITY

Chairperson	Time	Code	Presenter	Title
Dr. Audrey Daning Tuzan	1640-1645	PNFT-1	Nurul Nadiah Binti MAsrialah	Effects of Different Microalgal Diet on The Growth Population of Marine Harpacticoid Copepod *Amphiascoides neglectus*
	1645-1650	PNFT-2	Chua Sing Ying	The Effect of Different Concentration of Probiotics (Lacto-sacc) Mixtures on Growth Performance and Feed Utilization of Empurau (Tor tambroides) Fingerlings
	1650-1655	PNFT-3	Rossita Shapawi	Evaluation of Different Levels of Mineral in Anchovy By-Product-Based Diets on Growth Performance of Redclaw Crayfish, *Cherax quadricarinatus*
	1655-1700	PNFT-4	Sitti Raehanah Muhamad Shaleh	Ingestion and Digestion of Diatom Flocs by Juvenile Sea Cucumber *Holothuria scabra* in Captivity
	1700-1705	PNFT-5	Norfazreena Mohd Faudzi	Supplementation of Phytase in Defatted Soybean Meal Feeds in Hybrid Grouper, Tiger Grouper *Epinephelus Fuscoguttatus* X Giant Grouper *E. Lanceolatus* Juvenile
	1705-1710	PNFT-6	Annita Seok Kian Yong	Utilization of Processed Fish Waste as Feed Alternative in Red Tilapia (*Oreochromis* sp.) diets
	1710-1715	PSSS-1	Siti Nor Fatihah Zakaria	Crude B-Glucan Binding Protein Profiling of Hooded Oyster (*Saccostrea cucullata*)
	1715-1720	PSSS-2	Choirul Anwar	Development and Quantitative Assessment of a High-Performance Liquid Chromatography Method for Determination Potential of Polyphenol in *Agardhiella subulate*
	1720-1725	PSSS-3	Shigeharu Senoo	Amur Catfish (*Silurus asotus*): Aquaculture Potential and Challenges

PNFT-1 EFFECTS OF DIFFERENT MICROALGAL DIET ON THE GROWTH POPULATION OF MARINE HARPACTICOID COPEPOD *Amphiascoides neglectus*

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ABSTRACT

Copepods are zooplankton that play an important role as live feed in aquaculture due to their size variety and nutritive properties referring to their smaller sizes of nauplii and adults. The harpacticoid copepods are small in size with high fatty acid content. The marine harpacticoid copepod Amphiascoides neglectus nauplii could be produced in large number as live feed supply when cultured under the right conditions. Furthermore microalgae played important role as basic nutritious diet for zooplankton. However, only a few works are reported for enhance diets for the aquaculture of copepods. This study investigated the effect of three green microalgae; Nannochloropsis oculata, Tetraselmis tetrathele, and Chorella vulgaris on the growth population of A. neglectus. The experiment was done in 21 days in 1L tanks with starting sample of 150 adults in each tank. The growth population was examined based on the population density of nauplii, copepodite and adult every two days. The copepods were fed daily with a total volume of 60 mL at density of 1,000000 cells/mL for each treatment. Results indicates that high population density of the copepod, the culture fed with T. tetrathele showed the highest, followed by N. oculata and C. vulgaris. These green algae are already in common-commercial production that been established in aquaculture Malaysia. Hence, this study will help the industry to choose the most stable and suitable as microalgae in developing commercial copepod culture as live feed.

KEYWORDS: Harpacticoid, *Amphiascoides neglectus*, growth population, green algae, population density

PNFT-2 THE EFFECT OF DIFFERENT CONCENTRATION OF PROBIOTICS (LACTO-SACC) MIXTURES ON GROWTH PERFORMANCE AND FEED UTILIZATION OF EMPURAU (*Tor tambroides*) FINGERLINGS

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ABSTRACT

Tor tambroides, also known as empurau, are Malaysia's most valuable freshwater fish, native to Sarawak. It has high aquaculture production due to its great commercial and conservation for its high market demand. However, empurau is a slow-growing fish. Therefore the cost of feeding is especially high for this fish culture. This study was conducted to evaluate the effect of different concentrations of probiotics (Lacto-sacc) mixtures on growth performance and feed utilization of Empurau (Tor tambroides) fingerling. Lacto-sacc is the mixture of probiotics Lactobacillus acidophilus and Saccharomyces cerevisiae commonly used as feed additives and substitution of antibiotics in the diet. The fingerlings with an average body weight of 6.5g were stocked at the rate of 50 fingerlings/tank. Diets were formulated with 40% protein and supplemented with different concentration of Lacto-sacc forming 4 experimental diet, control diet (T_A), 0.5% Lacto-sacc (T_B), 1.0% Lacto-sacc (T_C) and 1.25% Lacto-sacc (T_D). The fingerlings were fed twice a day with 5% of the average body weight for 20 weeks. As a result, the study showed no significant difference, but empurau fed with a diet supplemented with T_B (0.5% Lacto-sacc) gave the best result for almost all of the parameters studied. T_B show the highest weight gain, specific growth rate (SGR) and lowest feed conversion rate (FCR) compared to other treatments. The control diet (T_A) showed the lowest survival rate (SR), SGR and highest FCR. From observation, the mortality in T_B and T_D was among the larger fish expected due to overfeeding. In contrast, the control group (T_A) mortality was caused by disease infection with pop-eye and red spot symptoms on the skin. The study shows that fingerlings supplied with Lacto-sacc, especially at 0.5% show better growth performance and feed conversion rate than the control diet that was not supplemented with Lacto-sacc.

KEYWORDS: N/A

PNFT-3 EVALUATION OF DIFFERENT LEVELS OF MINERAL IN ANCHOVY BY-PRODUCT-BASED DIETS ON GROWTH PERFORMANCE OF REDCLAW CRAYFISH, *Cherax quadricarinatus*

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ABSTRACT

The purpose of this study was to evaluate the effects of different mineral inclusion in anchovy by-product-based feeds on growth performance of redclaw crayfish juveniles, Cherax quadricarinatus. Five experimental feeds with inclusion of different mineral levels (0, 0.5, 1, 1.5 and 2%) were tested. All formulated feeds were isoproteic (35%) and isolipidic (7%). The diets were fed to triplicate groups of 12 juvenile red claw crayfish with the average initial body weight of 2.20±0.10g in a 30-day feeding trial. There was no significant different in terms of final body weight (g), final length (cm), weight gain (%), length gain (%), specific growth rate (%/d) and survival rate (%) of the juvenile redclaw crayfish at the end of the feeding trial. Feed conversion ratio ranged from 1.60 (Min 0.5) to 1.76 (Min 1). Similar to the growth performance, moulting frequency was not affected by the different mineral inclusions in the diets. Therefore, ABP- based formulated feeds without mineral inclusion can be used at least in a short culture period and higher possibility of including mineral less than 2% in the feeds for juvenile redclaw crayfish in a long term culture period. Considering the good growth and survival of juvenile redclaw crayfish in all treatments, the use of ABP as a source of protein and mineral in feeds for juvenile red claw crayfish is highly recommended as this will definitely reduce the feed cost due to the much lower price of ABP.

KEYWORDS: Redclaw crayfish, *Cherax quadricarinatus*, fish by-product, dietary minerals, formulated feeds

PNFT-4 INGESTION AND DIGESTION OF DIATOM FLOCS BY JUVENILE SEA CUCUMBER *Holothuria scabra* IN CAPTIVITY

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ABSTRACT

There has been growing interest in the development of techniques for sea cucumber hatchery, farming and stock enhancement, particularly the sandfish, Holothuria scabra. Seeds production in the hatchery is being established to accommodate the aquaculture needs and one of the most critical stages is the early juvenile stage. Little knowledge on the nutritional requirements of the juveniles has hindered the sandfish development and hatchery production. In this study, feeding trials were carried out to investigate the feasibility and efficiency of Chaetoceros gracilis flocs as diet for the juvenile sandfish by testing the ingestion and digestion. The rates of ingestion were determined by observing faecal excretion while the cell wall digestion of the diatom was determined by viewing the newly excreted faeces under the fluorescent microscope. Six experimental diets were tested to determine the specific growth rate (SGR), weight gain (WG), condition factor (CF), and the survival of 6 mm juvenile sandfish. The findings revealed that juvenile sandfish ingested the flocs and demonstrated a high cell wall digestion, whereas live diatom Navicula sp. as a control treatment was found to be indigestible. The feeding trial revealed that juvenile sandfish fed with 30% flocs had higher WG and SGR (59.20±27.25% and 3.25±1.22% respectively). This study shows that C. gracilis flocs can be used as an alternative diet for juvenile sea cucumber, and a 30:70 ratio of C. gracilis flocs to sea mud is recommended for better growth of juvenile sandfish in captivity.

KEYWORDS: Sandfish, microalgae flocs, growth, hatchery, *Chaetoceros, navicula*

PNFT-5 SUPPLEMENTATION OF PHYTASE IN DEFATTED SOYBEAN MEAL FEEDS IN HYBRID GROUPER, TIGER GROUPER *Epinephelus fuscoguttatus* X GIANT GROUPER *E. lanceolatus* JUVENILE

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ABSTRACT

A 12-week feeding trial was conducted to determine the effects of phytase supplementation in defatted soybean meal (DSM) based feeds for hybrid grouper, tiger grouper (Epinephelus fuscoguttatus) x giant grouper (E. lanceolatus). The hybrid grouper juveniles (body weight: 6.2±0.0g) were fed with two DSM based feeds (30% protein replacement) containing 0 and 2000 FTU/kg levels of phytase and a control feed (CON) with 100% fish meal (FM). All feed were isoproteic (50%) and isolipidic (12%). The fish (in triplicate tanks) were fed the experimental feed twice a day to apparent satiation level. The growth of fish fed with DSM based feed was higher compared to fish fed with CON. Similarly, fish fed DSM based feed showed significantly higher feed intake compared to CON feed. However, feeding the fish with DSM based feed significantly reduced net protein utilization, hepatosomatic index, viscerosomatic index and apparent digestibility coefficient (ADC) protein compared to CON feed. The ADC of phosphorus was slightly increased with the supplementation of phytase at 2000 FTU/kg in DSM based feed. No significant effect was observed on body proximate composition, morphological condition of the intestine and ADC of lipid in all the treatments. The present study indicates that hybrid grouper can utilize well DSM based feed at 30% level and the phytase supplementation at the DSM replacement level did not provide beneficial effect on the fish performances.

KEYWORDS: Hybrid grouper, defatted soybean meal, growth, feed utilization, nutrient digestibility

PNFT-6 UTILIZATION OF PROCESSED FISH WASTE AS FEED ALTERNATIVE IN RED TILAPIA (*Oreochromis* SP.) DIETS

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ABSTRACT

Fish waste is one of the fish industry's cost-effective and easily accessible ingredient that has not yet been thoroughly researched and used. In this study, fish waste (FW) was first processed by heat or acid hydrolyzed (acetic acid) before adding into tilapia diets (crude protein 40%, crude lipid 10%) at 25% to replace fish meal (FM). Ten weeks of feeding trial was carried out to investigate the effect of the test diets on growth, survival, feed efficiency, body composition of red tilapia (Oreochromis sp.). The feeding trial was conducted in fiberglass cylindrical tanks, each was stocked with 10 red tilapias (initial body weight 7.01±0.06 g). The formulated diets were fed twice daily (0800 and 1600) to apparent satiation to duplicate of fish for each treatment. Based on the proximate analysis and fatty acid profiling of the treated FW, crude protein and fatty acid profiles of the heat treated (HFW) and acid hydrolyze (AFW) FW were not significant different ($P>0.05$). The growth performance, feed conversion ratio, protein efficiency ratio, and net protein utilization in red tilapia showed no significant differences among all treatments, however, the highest body weight gain was observed in red tilapia fed AFW ($P>0.05$). Red tilapia fed with diet HFW contained highest body protein content, followed by fish fed AFW and control diet ($P<0.05$) while body lipid content did not vary among the treatments ($P>0.05$). The fatty acid profile was significantly affected by the different diets; fish fed FW diets contained higher monounsaturated fatty acids, while polyunsaturated fatty acids was higher in control ($P<0.05$). In conclusion, processed FW either by heat or acid hydrolyzed at 25% replacement level of the FM can be utilized by red tilapia without deteriorate the growth, survival, and feed utilization of the fish.

KEYWORDS: Fish waste, Heat treatment, Acetic acid, Red tilapia, Fatty acid profiling

PSSS-1 CRUDE B-GLUCAN BINDING PROTEIN PROFILING OF HOODED OYSTER (*Saccostrea cucullata*)

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ABSTRACT

A crude β-glucan binding protein was isolated from wild oyster, Saccostrea cucullata obtained at Pantai Pandak, Chendering, Terengganu. The present study was to isolate crude β-glucan binding protein of S. cucullata, to characterize the crude β-glucan binding protein using SDS-PAGE and determine the hemagglutination properties crude β-glucan binding protein of S. cucullata in various Red Blood Cell (RBC). A total of 10-15 ml hemolymph from forty oysters was withdrawn using a sterile syringe. β-1,3 glucan binding protein was isolated from the plasma by laminarin precipitation. Total protein concentration was determined following the method of Bradford et al. (1976) using bovine serum albumin (BSA) as a standard. Besides, for SDS-PAGE profiling, samples of purified β-1,3-glucan binding protein from whole plasma, supernatant and pellet were electrophoresed in discontinuous PAGE under denaturing condition (native-PAGE) using 3 % stacking gel (pH 6.5) and 4.5 % separating gel (pH 8.3). The protein has a molecular mass estimated by SDS-PAGE and only 2 protein band was determined. Whole plasma was capable to agglutinate the various Red Blood Cell (RBC) such as human RBC type A, B and O as well as chicken, goat and tilapia. Meanwhile, pellet could only agglutinate human RBC types A, B and O. But, supernatant could agglutinate RBC types such as human RBC types A, B, O, chicken and tilapia. As a conclusion, the crude β-glucan binding protein from S. cucullata was isolated and hemolymph in S. cucullata was present the crude β-glucan binding protein. The crude β-glucan binding protein of S. cucullata was characterized using SDS-PAGE with total molecular mass; 75kDA.

KEYWORDS: crude β-glucan binding protein, *Saccostrea cucullata,* SDS-PAGE, hemagglutination

PSSS-2 DEVELOPMENT AND QUANTITATIVE ASSESSMENT OF A HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY METHOD FOR DETERMINATION POTENTIAL OF POLYPHENOL IN *Agardhiella subulate*

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ABSTRACT

The potential benefits of seaweed in the health maintenance have been increasingly recognized in recent year. Agardhiella subulata is a kind of marine red seaweed, which easy to grow and fast growing on the west coasts of the Atlantic and Pacific Oceans, particulary in Taiwan. Among potential benefits of seaweed, polyphenols are considered potentially antioxidant. A simple and sensitive high-performance liquid chromatography (HPLC) method with UV-visible detection for quantification of polyphenols concentrations in Agardhiella subulata was developed and validated. Red seaweed Agardhiella subulate used in this study was extracted with 95% ethanol. HPLC UV-visible and fraction allowed the identification of 5 polyphenols compounds, including gallic acid, quercetin, catechin, caffeic acid, and ferulic acid, which is the calibration curves were linear with correlation coefficient ranging from 0.9970 to 0.9999 while the values of LOD (0.001–1.27 mg/L), LOQ (0.002–3.86 mg/L), and precision in terms of retention time (%RSD ≤1.14) and peak area (% RSD ≤0.294) were satisfactory. The occurrence of all these polyphenols antioxidant compounds in Agardhiella subulata extract suggested that the developed method is sensitive enough and reproducible and could be used for qualitative and quantitative assessment of polyphenols in seaweed.

KEYWORDS: Polyphenols, method optimization and validation, *Agardhiella subulate*, seaweed

PSSS-3 AMUR CATFISH (*Silurus Asotus*): AQUACULTURE POTENTIAL AND CHALLENGES

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ABSTRACT

The Amur Catfish (Silurus asotus) is a species of freshwater fish in the family Siluridae and is also known as the Far Eastern Catfish, Japanese Catfish, and Chinese Catfish. This catfish species is a carnivore and is widely distributed in Japan, China, Korea, Taiwan, and Vietnam. Amur catfish is known for its fine organoleptic characteristics and high nutritional value, but its potential for aquaculture has yet to be explored. Amur catfish was introduced to Malaysia in 2018 through a research collaboration between Universiti Malaysia Sabah and Kindai University, Japan. In temperate regions, the Amur catfish is farmed only in summer, so its production is limited compared to tropical catfish, which can spawn throughout the year. To further explore the potential of Amur catfish for aquaculture in tropical regions, intensive studies have been conducted on its husbandry, including sex determination, gonadal maturation, and fitness in captivity. Early biological information on larval development was also obtained to further establish the rearing protocol. Findings showed sex of Amur catfish was determined based on the unique morphology of the caudal fin, in which the male has a split fin while females do not. Amur catfish also performed well when reared under tropical conditions. The larvae did not differ from those of other tropical catfish species. Although the Amur catfish is a promising candidate for tropical aquaculture, its cannibalistic behavior remains the main challenge for introduction in Malaysia.

KEYWORDS: Amur catfish, broodstcok management, larval rearing, cannibalistic behavior

DAY 1 (8TH MARCH 2022)
POSTER SESSION 3: MARINE BIODIVERSITY AND CONSERVATION; MARINE POLLUTION AND OCEAN HEALTH; CLIMATE CHANGE: MITIGATION AND ADAPTATION; REMOTE SENSING AND COASTAL OCEANOGRAPHY

Chairperson	Time	Code	Presenter	Title
Dr. Zarinah Waheed	1640-1645	PCCMA-1	Elisa Rumpang	Ecosystem Carbon and Nitrogen on Tropical Peatlands
	1645-1650	PMPOH-1	Héctor del Castillo	The Abandonment of End-Of-Life Tires (ELTS) on the Spanish Coast: Analysis of the Phenomenon and Identification of High Incidence Areas
	1650-1655	PMPOH-2	Thivialosini Siva	Preliminary Data of Physicochemical Changes Associated with Decomposition of Partially Submerged Cadaver Buried at Different Depth in Mangrove Soil
	1655-1700	PMPOH-3	Madihah Jafar-Sidik	The variation of environmental profiles during harmful algal bloom in Sepanggar Bay, Sabah, Malaysia
	1700-1705	PRSCO-1	Muhammad Mazmirul Bin Abd. Rahman	Reliability of Shoreline Delineation Between Sentinel-2 and Landsat 8 Imagery in Determining Shoreline Evolution for DSAS Method: A Case Study in Pahang Coastline
	1705-1710	PRSCO-2	Ashadi Arifin Nur	Numerical Model Around Small Island: Study Case of Kei Island, Indonesia
	1710-1715	PRSCO-3	Indrawan Fadhil Pratyaksa	Calculating The Shifting of Mangrove Area Utilizing Satellite Data in Mundu, Cirebon
	1715-1720	PRSCO-4	Rima Rachmayani	Indian Ocean's Sea Surface Temperature in The Simulated Freshwater Perturbation
	1720-1725	PRSCO-5	Mochamad Riam Badriana	Vertical Distribution of Ocean Parameter in Nusa Dua, Bali, Coastal Area

PCCMA-1 ECOSYSTEM CARBON AND NITROGEN ON TROPICAL PEATLANDS

Elisa Rumpang*[1], Timothy Hill[2], Jon McCalmont[2], Laura Denis[3], Idris Abu Seman[1], Nik Sasha Khatrina[1], Tiara Nales[1], Izzati Mohd Noor[1], Maisarah Jantan[1] & Sim Siong Fong[3]

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ABSTRACT

There is currently unprecedented interest in the carbon budget and greenhouse gas balance of tropical peatlands, particularly under agricultural crops such as oil palm. Tropical land use activities have large impact on the terrestrial carbon cycle, nitrogen dynamics, and land-atmosphere energy budgets, and yet greenhouse gas fluxes from the tropical land surface, particularly from tropical peatlands, are still poorly understood. We aim to conduct one of the first comprehensive assessments of greenhouse fluxes, carbon cycling and nitrogen dynamics of oil palm plantations on peat. These empirical data will form the basis for future modeling studies and experimental studies to improve the sustainability and efficiency of nitrogen fertilizer use.

KEYWORDS: Carbon, tropical peatlands, greenhouse gas

PMPOH-1 THE ABANDONMENT OF END-OF-LIFE TIRES (ELTS) ON THE SPANISH COAST: ANALYSIS OF THE PHENOMENON AND IDENTIFICATION OF HIGH INCIDENCE AREAS

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ABSTRACT

The deterioration of coasts and their waters due to human action is one of the objectives declared by the United Nations as essential to protect marine biodiversity, as well as human and planetary health. This is reflected in the SDG No. 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development. According to the Spanish National Environmental Conference (CONAMA, 2021), marine debris is an international challenge, affecting all countries, regardless of where the waste originates. The United Nations Environment Program defines marine debris as any solid waste of non-natural origin that has been discarded, deposited or abandoned in marine and/or coastal environments, and can be classified according to size as macro debris when it is larger than 5 mm or micro debris when it is smaller. Within macro-debris, the case of End-of-Life Tires (ELTs) stands out. Tires are one of the most frequent plastic pollutants on the planet, which also leads to the generation of micro-waste, as small plastic polymers are released as they wear out. As a result, it is very difficult for marine organisms to develop their lives in them, due to the continuous release of these toxins, which favors the destruction of marine life as well as hindering or preventing other vital human activities such as fishing, and other sports and recreational activities such as diving. The aim of our research is to gain in-depth knowledge of the phenomenon of the abandonment of End-of-Life Tires on the Spanish coast, as well as to point the areas of greatest accumulation, focusing on those located in Natura 2000 Network areas. We present the results of a Delphi method Study for developing reporting guidelines and science forecasting the phenomenon and a survey through different agents involved and affected by the ELTs. This project is developed with the collaboration of the Biodiversity Foundation (Spanish Ministry for Ecological Transition and the Demographic Challenge), through the Pleamar Program, co-financed by the European Maritime, Fisheries and Aquaculture Fund (EMFAF).

KEYWORDS: Coastline, Marine Debris, End-of-Life Tires (ELTs)

PMPOH-2 PRELIMINARY DATA OF PHYSICOCHEMICAL CHANGES ASSOCIATED WITH DECOMPOSITION OF PARTIALLY SUBMERGED CADAVER BURIED AT DIFFERENT DEPTH IN MANGROVE SOIL

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ABSTRACT

Decomposition is a natural process that every organism will undergo after death, described by several stages. Time and efforts are required to dig a grave for disposing of human remains, therefore, bury the body in a shallow grave is more likely will be the choice for criminals to cover up their crimes. The reconstruction of accurate death event of the partially submerged cadavers is important to give closure for any of forensic cases, by locating a clandestine grave and/or estimating the postmortem interval (PMI). A stimulated burial experiment was conducted at Mangrove area located at Biowalk, Universiti Malaysia Terengganu. This area was chosen a burial site as it is constantly experiencing low and high tides, therefore, suitable to study the impact of different burial depths on the decomposition of partially submerged buried bodies. Fatty flesh of commercial pig (Sus scrofa) was used as human surrogate model due to ethical issues. The fatty flesh was allowed to decompose for 120 days of burial interval, buried in the mangrove soil system for three different burial depths. The associated soil that intimately in contact with the fatty flesh was collected at several designated sampling points, corresponding to each decomposition stage. The changes in the post experimental soil pH and decomposition rate were measured. The cadaveric derived lipids of the associated soils were extracted using Modified Bligh-Dyer extraction method and analysed using Gas Chromatography Flame Ion Detector (GC-FID). The soils of 10cm, 15cm and 20cm burial depth demonstrated similar trend in the post experimental soil pH and decomposition rate. However, the concentration of the extractable cadaveric derived lipids found to be different among these the three different burial depths. Hence, these preliminary findings indicate the potential of cadaveric derived lipids and other physicochemical properties to be used as biomarkers to locate the partially submerged clandestine graves and/or to estimate the PMI of the bodies.

KEYWORDS: Partially submerged cadaver; clandestine graves; different burial depths; cadaveric extractable lipids.

PMPOH-3 THE VARIATION OF ENVIRONMENTAL PROFILES DURING HARMFUL ALGAL BLOOM IN SEPANGGAR BAY, SABAH, MALAYSIA

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ABSTRACT

Harmful algal bloom (HAB) events that lead to paralytic shellfish poisoning, fish fatalities, and seawater discolouration have been documented in Sabah's coastal waters. Studies on nutrient analysis during HAB have been carried out periodically in Sabah's waters; however, observation on variations of environmental parameters, primarily colour-producing agents' (CPAs) concentrations, associated with HAB have not been carried out. Hence, this study aims to document environmental parameters and the CPAs over a period of 1 year. The study was conducted along the coastal waters of Sepanggar Bay, Malaysia, where in-situ environmental parameters and sea surface water samples were collected every month for 1 year of monitoring from November 2018 until December 2019. During the study period, the following three HAB events were reported: the first bloom (Bloom Event 1, BE1) in November 2018, the second bloom (Bloom Event 2, BE2) in July 2019, and the third bloom (Bloom Event 3, BE3) in October 2019, all of which were dominated by Margalefidinium polykrikoides species. Two HAB species, M. polykrikoides and Pyrodinium bahamense var. compressum, found in the BE3 were ten times higher than the previous two bloom events. The measured environmental parameters indicated a similar fluctuation in both bloom and non-bloom events. However, during BE3, the CPAs parameters showed larger values. Based on the 1-year monitoring, the fluctuating trend of the recorded environmental parameters exhibited no discernible pattern during pre- and post-bloom occurrences in the studied area. Chlorophyll-a and CDOM, on the other hand, increased during bloom occurrences as com- pared to non-bloom readings.

KEYWORDS: Harmful algal bloom · Environmental parameters · Coloured-producing agents · Suspended particulate matters · Chlorophyll-*a* · CDOM · Monsoonal variation

PRSCO-1 RELIABILITY OF SHORELINE DELINEATION BETWEEN SENTINEL-2 AND LANDSAT 8 IMAGERY IN DETERMINING SHORELINE EVOLUTION FOR DSAS METHOD: A CASE STUDY IN PAHANG COASTLINE

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ABSTRACT

Pahang consists of many beautiful beaches that facing the South China Sea, and most of these beaches are severely threatened by erosion. Coastal erosion can lead to permanent land loss in the coastal area, which surely impacts the livelihood of residential reside near the coastline. There are many methodologies in which one can determine coastline changes, and for this study multi spectral Landsat 8 and Sentinel-2 were compared to show the reliability of shoreline delineation extraction between the spectral imagery for the period from 2018 to 2021. The shortwave infrared 1 from Landsat 8 and Sentinel-2 imagery were downloaded and processed. The different in tidal influences were minimized to the greatest extent possible in which for Landsat 8 is 1.88 m ±0.21 m and Sentinel-2 is 2.1 m ± 0.18 m. The rate of net changes in shoreline positioning was statistically calculated using Linear Regression Rate (LRR). Analysing extracted shoreline from 2021 with ground control point from field visits to calculate the normalized RMSE revealed that Sentinel-2 produced more reliable results than Landsat 8, NRMSE = 0.009 and NRMSE = 0.019, respectively. In overall, Sentinel-2 and Landsat 8 provide consistent results throughout the study area as compared with the National Coastal Erosional Studies 2015 from the Department of Irrigation and Drainage Malaysia.

KEYWORDS: Shoreline Evolution, Shoreline Delineation, Sentinel-2, Landsat 8, Digital Shoreline Analysis System.

PRSCO-2 NUMERICAL MODEL AROUND SMALL ISLAND: STUDY CASE OF KEI ISLAND, INDONESIA

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ABSTRACT

KEYWORDS: Numerical model, Kei island, tides, current, wave

PRSCO-3 CALCULATING THE SHIFTING OF MANGROVE AREA UTILIZING SATELLITE DATA IN MUNDU, CIREBON

Indrawan Fadhil Pratyaksa*[1], Umar Abdurrahman[1], Mochamad Riam Badriana[1]

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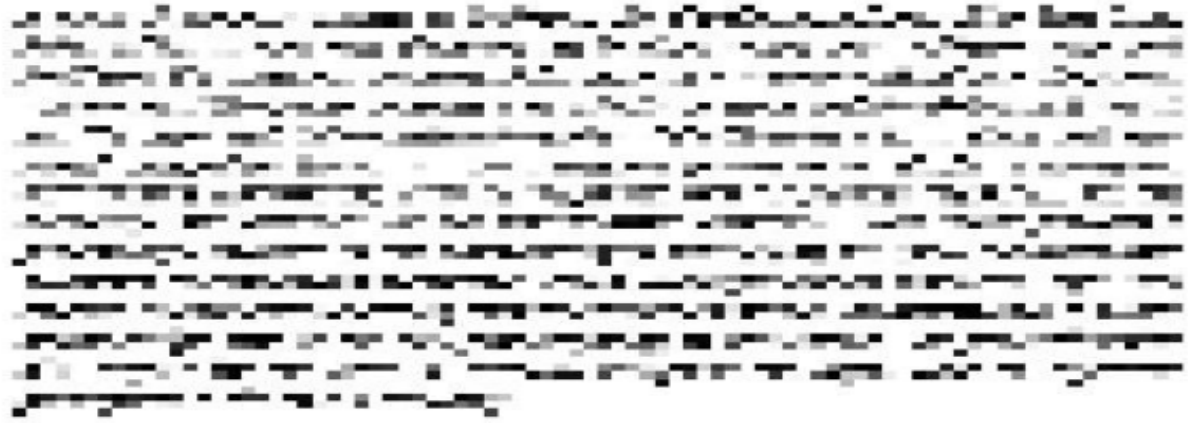
ABSTRACT



KEYWORDS: Satellite imagery, mangrove, mangrove coverage

PRSCO-4 INDIAN OCEAN'S SEA SURFACE TEMPERATURE IN THE SIMULATED FRESHWATER PERTURBATION

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Meteorological, Climatological, and Geophysical Agency (BMKG), Jl. Angkasa I, No.2 Kemayoran, Jakarta Pusat 10610, Indonesia 3
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ABSTRACT

Changes in the climate have been suggested as one of prominent cause on global ocean as part of the earth climate system. This study examines changes in sea surface temperature (SST) in Indian Ocean in connection with the freshwater flux input in the North Atlantic Ocean associated to ice-sheet melting in the Arctic by using the fully coupled global climate model, Community Climate System Model Version 3 (CCSM3). The analysis conducted on SST data as monthly average data for 30 years for the normal condition (CTRL) and 90 years of model simulation divided into three times with 30- years intervals for the "freshwater perturbation" scenario (FN20). Reanalysed data from Simple Ocean Data Assimilation (SODA) and observation data from Satellite of National Oceanic and Atmospheric Administration - Advanced Very High Resolution Radiometer (NOAA-AVHRR) were used to verify the CTRL-CCSM3 simulation and resulted in 5% error between the data. The average temporal pattern of SPL in Indian Ocean for CTRL simulation has a stronger variance than SODA with a Root Mean Square Error (RMSE) value of 0.4. The temporal average SST in o Indian Ocean the CTRL has a higher temperature up to 28.09 C compared to the FN20 o scenario with a lower temperature down to 27.9 C due to freshwater flux input in the North Atlantic Ocean. Hence, this climate change on the addition of freshwater flux in the North o Atlantic Ocean due to ice-sheet melting in the Arctic generate a cooler SST down to 0.19 C in Indian Ocean associated with the global ocean conveyer belt moving system.

KEYWORDS: Freshwater flux, Sea Surface Temperature, Indian Ocean, North Atlantic Ocean,

PRSCO-5 VERTICAL DISTRIBUTION OF OCEAN PARAMETER IN NUSA DUA, BALI, COASTAL AREA

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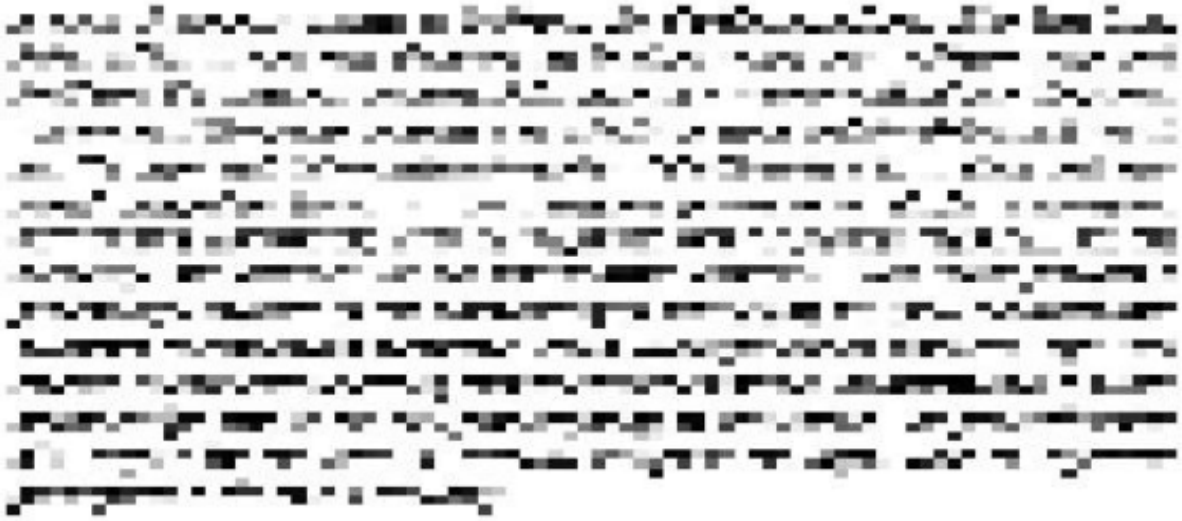
ABSTRACT



KEYWORDS: Nusa dua, Vertical distribution, ctd data

PRSCO-6 BIOCHEMISTRY PARAMETER ON SURFACE SEAWATER AROUND SMALL ISLAND AT SOUTHEAST MALUKU, INDONESIA

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ABSTRACT

KEYWORDS: Numerical model, reanalysis data, Kei island, ocean biochemical properties

DAY 2 (9TH MARCH 2022)
POSTER SESSION 4: MARINE BIODIVERSITY AND CONSERVATIONS

Chairperson	Time	Code	Presenter	Title
	1640-1645	PMBC-11	Hairul Masrini Muhamad	First Description of Biphonal Calls of Irrawaddy Dolphins (*Orcaella brevirostris*)
	1645-1650	PMBC-12	Pushpa Palaniappan	Evidence of Boat Strike Injuries on Green Turtles *Chelonia mydas* at Mabul Island, Sabah, Malaysia
	1650-1655	PMBC-13	Masaki Nawata	Hosts and Seasonal Occurrence of the Planktonic Sea-Louse *Caligus undulatus* in Japanese Waters
	1655-1700	PMBC-14	Ami Shaumi	Fungal Communities Associated with Carapace and Gut of the Marine Crabs *Charybdis natator* and *Monomia haani* in Northern Taiwan
Mr. Muhammad Ali Syed Hussein	1700-1705	PMBC-15	Nur Shahira Bt Idrus	*Caulerpa* Species From Intertidal and Subtidal Areas
	1705-1710	PMBC-16	Ejria Saleh	Occurrence and Distribution of Seagrasses at Northwest of Kudat, Sabah
	1710-1715	PMBC-17	John Madin	Multi Type Marine Ecosystem and Biotic Community of a Small Bay in Tropical Waters
	1715-1720	PMBC-18	Nazia Abdul Kadar	Sea Cucumber Species Distribution at West Coast of Sabah: A Preliminary Study
	1720-1725	PMBC-19	Aimimuliani Adam	Abundance and Size Composition of Billfish By-Catch in Pahang Coastal Waters, Malaysia.
	1725-1730	PMBC-20	Louise Matha George	The Diversity of Marine Mangrove of Taiwan

PMBC-11 FIRST DESCRIPTION OF BIPHONAL CALLS OF IRRAWADDY DOLPHINS (*Orcaella brevirostris*)

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ABSTRACT

The study presents the first quantitative description of biphonal calls of Irrawaddy dolphins, Orcaella brevirostris recorded in the Brunei Bay. Biphonation is the production of two sounds by a single animal simultaneously. This is found in the vocalizations of mammals including dolphins. Two types of biphonal signals are reported for the first time for this species: bitonal whistles and burst-pulse whistles, a combination of tonal and burst pulse elements. Of all acoustics signals analysed (n=1005), only 1.1% were biphonals. The biphonation were recorded when a group of adult dolphins (n=12) were socializing in area at 18 meters depth. The biphonal components of Irrawaddy dolphins may serve additional information as to identity, age or other related factors.

KEYWORDS: biphonals; Irrawaddy dolphins; *Orcaella brevirostris*; behaviour

PMBC-12 EVIDENCE OF BOAT STRIKE INJURIES ON GREEN TURTLES *Chelonia mydas* AT MABUL ISLAND, SABAH, MALAYSIA

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ABSTRACT

Mabul Island, on the east coast of Sabah, Malaysia is famous for its foraging population of green (Chelonia mydas) and hawksbill (Eretmochelys imbricata) turtles. A study was conducted from October 2010 through November 2019 to document the number of boat strike incidents on the in-water population of green turtles in the 2 km^2 reef habitat of Mabul Island. The turtles were caught in their natural habitat, and then brought aboard the research vessel where all boat strike injuries were recorded. Field trips were conducted 22 times within the study period and were limited to between two to four days of sampling during each occasion. There were 78 individual turtles with boat strike injuries (propeller wounds or blunt force trauma) from three life stages (juveniles, subadults and adults (adults were further divided into males and females)). We found that there was a significant relationship between the number of boat strike incidents and the green turtle life stages (χ^2 = 29.69, df = 3, p>0.0001), where juveniles and adult turtles, specifically adult females were the most susceptible to these injuries. As motorised boats are the main mode of transportation in Mabul Island, fast-moving boats can become a hazard to marine life in these waters. Boating speed limits should be introduced in sensitive marine areas in Mabul Island, especially at the shallow reef regions with a depth of less than 20m, to avoid boat collisions with the turtles. In the event of a boat collision, the slow-moving boat with a slower-rotating propeller may cause less severe injuries to the turtles.

KEYWORDS: Boat Collision, Borneo, In-water green turtle population, Wounds

PMBC-13 HOSTS AND SEASONAL OCCURRENCE OF THE PLANKTONIC SEA-LOUSE *Caligus undulatus* IN JAPANESE WATERS

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ABSTRACT

Sea lice, or caligid copepods are known parasites of fish. As some caligids have caused severe economic losses in aquaculture, their life cycle has been intensively studied. However, adults of Caligus undulatus Shen & Li, 1959 have been found exclusively from planktonic samples in the world's oceans, and not from any host fish since its original description. Recently, we discovered parasitism in brackish fish such as Japanese sardinella (Sardinella zunasi) and the dotted gizzard shad (Konosirus punctatus), in the Seto Inland Sea and the Sea of Japan. The occurrence of adult C. undulatus in planktonic samples was restricted to the fall and winter seasons in the Seto Inland Sea when S. zunasi migrates to brackish waters. All post-naupliar developmental stages were also obtained from S. zunasi and consisted of one copepodid, four chalimi, and adult females and males, which are quite common for other congeners. Here, we infer why adult caligids detach seasonally from the host.

KEYWORDS: *Caligus undulatus*, plankton, Japanese sardinella, life cycle

PMBC-14 FUNGAL COMMUNITIES ASSOCIATED WITH CARAPACE AND GUT OF THE MARINE CRABS *Charybdis natator* AND *Monomia haani* IN NORTHERN TAIWAN

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ABSTRACT

KEYWORDS: Crustacea, Eurotiales, marine fungi, metabarcoding

PMBC-15 *Caulerpa* SPECIES FROM INTERTIDAL AND SUBTIDAL AREAS

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ABSTRACT

Caulerpa species is a marine Chlorophyta characterized by extreme morphological variation attributed to different environmental conditions. Caulerpa also exhibits adaptability to various substrates and rarely grows in isolation. Hence, this study aims to determine the diversity and morphological characteristics of Caulerpa species in six habitats at Port Dickson, Negeri Sembilan; (i) intertidal rocks and dead corals area of Blue Lagoon, Teluk Pelandok, and Teluk Kemang, (ii) subtidal rocks, dead corals and sand at Pulau Bagan Pinang, Pulau Arang and Pulau Burong. In-situ surveys and sample collections during low tides covering a distance of 100 m or more along the coastlines of the six habitats mentioned above. Five (5) Caulerpa species, Caulerpa lentillifera, Caulerpa sertularoides, Caulerpa racemosa, Caulerpa prollifera, and Caulerpa verticillata occurred at the areas. Caulerpa racemosa was the common species that occurred in all areas, while Caulerpa prolifera was rare only occurred at Blue Lagoon. Caulerpa racemosa was in abundance attached to the dead corals scattered at Blue Lagoon. The same species was only in small patches attached to rocks and dead corals at Pulau Burong. Morphological plasticity was distinct, e.g., in Caulerpa racemose, where the ramuli size at Blue Lagoon was larger, 0.53 ± 0.15 cm, than those, 0.32 ± 0.19 cm in other areas. The findings also showed that Caulerpa species were commonly associated with other seaweeds such as Halimeda spp. and Padina minor.

KEYWORDS: *Caulerpa, Halimeda*, plasticity, ecology, habitat.

PMBC-16 OCCURRENCE AND DISTRIBUTION OF SEAGRASSES AT NORTHWEST OF KUDAT, SABAH

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ABSTRACT

Recently seagrass is recognised as one of blue carbon importance as it is playing a major role of being globally significant carbon sequestration and oxygenation of the seas. However, the distribution of seagrass species is controlled by various environmental factors, coastal topography, predators, associated biota, natural disturbances, and human interference. The objectives of this study are to identify seagrass species, distribution, and abundance along the shoreline of Kelambu, Kimihang, and Bak-Bak beaches, Northwest of Kudat. This study was carried out in March and August 2020 during low tide by snorkelling. Three 50 m long transects lines were set up perpendicular to the beach with a 25 m interval distance. The transect line was extended from the highest to the lowest zone of the seagrass areas. 1 m2 quadrat was placed at every 5 m interval along the transect line. During the surveys, health seagrasses were observed at 30 m transect line towards subtidal areas. Three seagrass species (Halodule pinifolia, Halophila ovalis, and Thalassia hemprichii) were identified. Small patches of T. hemprichii were only found in March at St 1. H. pinifolia was dominated all study sites. This species is also sharing substrates with H. ovalis. Higher seagrass abundance in August compared to March. Algae and epiphytes were attached to seagrass blades with coverage up to 50 % of the quadrat areas in March. However, the algae cover was (<10% of quadrat) in August. The height of the seagrass canopy is ranging from 5 to 6 cm regardless of species and months of samplings. The substrate is overlaid by soft to compacted mud in March but predominated by sand in August. The survey was carried out at a seagrass meadow closer to the beach where the meadow is affected by sedimentation processes. In the study, areas are generally affected by the seasonal monsoon that could be affecting the seagrass distribution and abundance. It is recommended that a survey should be carried out in deeper areas using SCUBA diving apparatus. Details studies of seagrass are essential to enhance the distribution and relative abundance of seagrass communities in the Coral Triangle areas, despite their global significance and the vital ecosystem services.

KEYWORDS: N/A

PMBC-17 MULTI TYPE MARINE ECOSYSTEM AND BIOTIC COMMUNITY OF A SMALL BAY IN TROPICAL WATERS

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ABSTRACT

Sabah is among the maritime states in Malaysia with a diverse marine ecosystem component and it provides unique habitats for various biotic species. This study assesses the types of marine ecosystem habitat as well as biotic inhabitants in Usukan Cove, a small bay located on the west coast of the state. The mapping method was used to estimate the surface area of each ecosystem components whereas a specific sampling methods for each different ecosystem was used to determine the ecological indicators of biotic inhabitants. The results show that at least five different ecosystems include coral reefs, seagrass beds, Sargassum beds, rocky shore and sandy beaches can be found in the small bay (i.e. 3.94 km^2) indicating a high habitat heterogeneity to support optimal biodiversity of biotic communities. The coral reef consists of at least 14 families with 38 genera of hard coral dominated by Faviidae (6 genera), Fungiidae (6 genera) and Merulinidae (4 genera) with an estimated percentage covers of nearly 50%. The coral reefs itself provide habitat for numerous species of fish (115 species) of mostly Pomacentridae accounted for 53.4% of abundance while invertebrates with 37 species of mostly mollusk could reach highest density of nearly 211 per 100 m^2. Apart from rich species community of coral reefs, the intertidal shore also equally contributed to the diversity of biotic community with estimated 38 species of invertebrate (i.e. mostly gastropod) along with fishes, macroalgae and seagrasses. The findings show the optimal range of biodiversity and population density of biotic communities inhabiting the small bay. These are comparable to the productivity of most protected marine areas in Sabah's waters thus conservation efforts need to be intensified to maintain the sustainability of the marine habitat found in the ecologically productive bay. In the future, methods to reduce anthropogenic impacts on marine habitats and its inhabitants need to emphasized in research and conservation activities.

KEYWORDS: Marine Ecosystem; Biotic Community; Coastal Bay Sabah; Tropical Waters

PMBC-18 SEA CUCUMBER SPECIES DISTRIBUTION AT WEST COAST OF SABAH: A PRELIMINARY STUDY

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ABSTRACT

Southeast Asian countries such as the Philippines, Vietnam, Thailand, Indonesia and Malaysia, are the main producer of sea cucumber with significant economic value worldwide. Sea cucumbers often consumed for health benefits especially for wound healing. More than 80 species of sea cucumber (Holothuroidea) can be found inhabiting the marine and coastal waters of Malaysia. Sea cucumber has been exploited in making liniment oil, juice, balm, gel facial wash, soap and in food industry. The current study aimed to record the species distribution of sea cucumbers species (Holothuroidea) at Kg. Kebagu, Kg. Ambong and Pulau Manukan. Seven species of Holothuroidea were recorded in this study which were Holothuria atra, Holothuria leucospilota, Holothuria sp., Holothuria scabra, Holothuria edulis and Holothuria aff. impatiens. Kg Kebagu showed the highest diversity of sea cucumber species (H'=0.279, J'= 0.948) compared to Pulau Manukan (H'=0.451, J'= 0.651) and Kg. Ambong (H'=0, J'= 0). The species Holothuria atra was the dominant taxa. Further study covering more locations need to be conducted to understand the sea cucumber species distribution in Sabah.

KEYWORDS: Sea cucumber, species diversity, species evenness, species distribution, Holothuroidea

PMBC-19 ABUNDANCE AND SIZE COMPOSITION OF THE BILLFISHES BY-CATCH ALONG PAHANG COASTAL WATERS

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ABSTRACT

Billfish or "Layaran", as locals know them, are not primary fisheries resources in Malaysia, nevertheless it has vital contribution to the national tourism; as a solely marine sport fishing offered in the country. The establishment of Royal Pahang Billfish International Challenge in Rompin, Pahang has led to the expansion of the local socio-economic, with RM18 millions generated during the previous tournament. Limited research the billfish resources in Malaysia urge for the drastic actions in managing and conserving the billfish Therefore, this study was done to determine the abundance and size composition of by-catch billfish along Pahang coastal waters. Billfish samples were collected from LKIM Fish Landing Complex, Kuantan, Pahang from March to December 2021. In laboratory, the billfish's round weight (RW) was measured using digital weight scale and morphometric measurements were measured using measuring tape. All billfishes collected were identified as Indo-Pacific Sailfish (Istiophorus platypterus) and no other species was observed. Monthly abundance showed that there was an increasing trend from March to April and a decreasing trend from November to December. Highest abundance of sailfish was recorded in April (n = 13) and the lowest in March (n = 2). This fluctuated trend was coincided with most of the studies on billfish abundance in Pacific Ocean region which was corresponded to the spawning activities of the fish that was expected to occur from April to November. With regards to the size composition, RW of the billfish collected ranged between 3.0 to 19.5 kg, with the mean of 7.3kg. Most of the billfish RW were in the category of 4.0 to 6.0 kg. As for the length composition, the total length of the billfish collected ranged between 100 to 229 cm. Meanwhile, the lower jaw-fork length (LJFL) measured were between 89 to 175 cm, with the mean of 122 cm. Range of the EFL and PFL were between 77 to 153 cm and 41.5 to 137 cm, respectively. Lastly, the PDL and PAL ranged between 41.5 to 103 cm and 21.8 to 61 cm, respectively. The monthly variation in size composition showed that the largest size of sailfish can be observed in May while the smallest size of sailfish was observed in December. This size composition indicated that the sailfish found in Pahang waters were composed of juvenile and adult fish (early adult and recently-spawned adult). All these sailfishes were assumed to be in their migration journey from northernly waters (China, Taiwan, and Japan) toward southernly waters (Australia) and stop by along Pahang waters for nursery and feeding. These findings provided a baseline data for a better understanding of the billfish occurrence along Pahang coastal waters, thus help in development of well-designed conservation and management strategies of the billfish in Malaysian waters.

KEYWORDS: N/A

PMBC-20 THE DIVERSITY OF MARINE MANGROVE FUNGI OF TAIWAN

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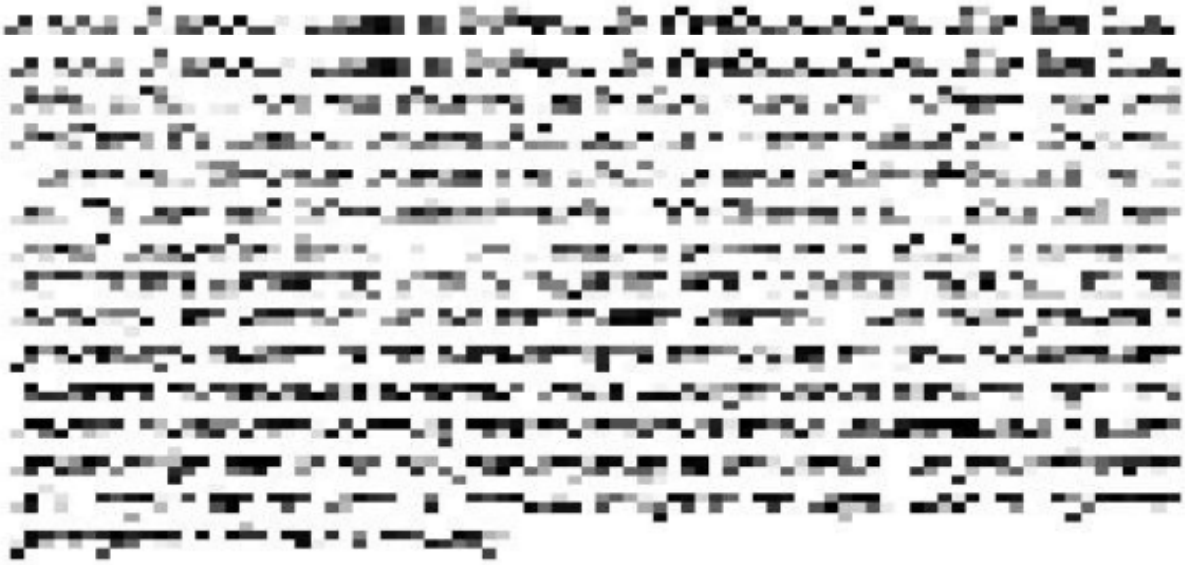
ABSTRACT



KEYWORDS: Marine mangrove, fungi, diversity

DAY 2 (9TH MARCH 2022)
POSTER SESSION 5: AQUACULTURE DISEASES AND HEALTH MANAGEMENT

Chairperson	Time	Code	Presenter	Title
Dr. Muhammad Dawood Shah	1640-1645	PADHM-1	Lein En Yao	*In-vitro* Isolation and Characterization of Potential Probiotic from Gastrointestinal Tract of Tropical Spiny Lobster *Panulirus ornatus* Suitable for Spiny Lobster Farming
	1645-1650	PADHM-3	Sow Cyn Shieng	Evaluation of Biofilm Formation on Different Probiotics Bacteria for Giant Freshwater Prawn *Macrobranchium rosenbergii* Culture
	1650-1655	PADHM-4	Muhammad Syafiq Aizat Bin Hamid	Assessment of Microalgae-Based Feed, *Chlorella vulgaris* as Immunostimulant for Red Hybrid Tilapia (Oreochromis sp.) on Growth, Histopathological Change and Disease Resistant
	1655-1700	PADHM-4	Clara Edah Norman	Antiparasitic Potential of a Seaweed Against the Parasitic Leech *Zeylanicobdella arugamensis* (Hirudinea) in Marine Aquaculture
	1700-1705	PADHM-5	Balu Alagar Venmathi Maran	A New Species of Parasitic Copepod *Nemesis* Risso, 1826 (Siphonostomatoida: Eudactylinidae) From the Gills of Coralcat Shark *Atelomycterus marmoratus* (Anonymous [Bennett], 1830) From Malaysia
	1705-1710	PADHM-6	Rafidah Binti Othman	Effect of oral treatment of methyltestosterone (MT) on sex differentiation and growth in juvenile yellow perch (Perca flavescens)
	1710-1715	PADHM-7	Md.Safiul Alam Bhuiyan	Optimization Assay for Detection of Avian Infectious Bronchitis Virus (IBV) Using an Electrochemical DNA Biosensor

PADHM-1 *IN-VITRO* ISOLATION AND CHARACTERIZATION OF POTENTIAL PROBIOTIC FROM GASTROINTESTINAL TRACT OF TROPICAL SPINY LOBSTER *Panulirus ornatus* SUITABLE FOR SPINY LOBSTER FARMING

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ABSTRACT

Tropical spiny lobster Panulirus ornatus is one of the most prospective aquaculture species due to its high market value. Till now, methods to raise spiny lobster from eggs to adults is unavailable because of their long larval rearing stage, mass mortality, nutrient deficiency, and disease infection. One of the promising methods to overcome the spiny lobster culture obstacles is probiotics. Studies show the effectiveness of commercial probiotics and marine probiotics in spiny lobster culture. Gastrointestinal (GI) microbiota is a group of microorganisms that lives in symbiosis with the host and provides various beneficial biological functions towards the host. Thus, the study aims to isolate, screen and characterize the potential probiotics from the GI tract of spiny lobster. Bacteria strains were successfully isolated from the GI tract of P.ornatus on Trypticase soy agar (TSA) and De Man, Rogosa and Sharpe (MRS) agar. Bacteria count on TSA was range between 7.14 x 10^4 *and 4.17 x* 10^7 *and bacteria count on MRS agar was a range between 1.81 x* 10^2 *and 4.09 x* 10^2*. Isolated bacteria strains on TSA and MRS agar were then characterized using biochemical test kits where some of them were identified as Shewanella putrefaciens, Stenotrophomonas maltophili, Alcaligenes faecalis, Alcaligenes xylosoxidans and Acinetobacter with probabilities >95%. Antimicrobial properties of isolated strains were tested against Vibrio parahaemolyticus and Photobacterium damselae. However, only 1 bacteria strain isolated on TSA shows antagonistic towards Vibrio parahaemolyticus, and no bacteria isolated on MRS agar shows antagonistic towards both tested pathogens. Bacteria strains and then tested for their enzymatic activities (amylase, protease, cellulase and lipase). 35 out of 50 bacteria strains tested showed positive results and could produce at least one of the enzymes. Futures characterize assay such as stability at various temperatures, salinity, and pH, resistance to stimulated gastric and intestinal fluid, auto-aggregation assay, and toxicity test will be tested on isolated bacteria strains. Lastly, isolated bacteria strains that show promising results on the characterized assay will be molecularly identified using 16S gene sequencing.*

KEYWORDS: N/A

PADHM-2 EVALUATION OF BIOFILM FORMATION ON DIFFERENT PROBIOTICS BACTERIA FOR GIANT FRESHWATER PRAWN *Macrobranchium rosenbergii* CULTURE

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ABSTRACT

Biofilm is defined as a community of microorganisms composed by both autotrophic and heterotrophic organisms associated to an extra-cellular matrix mainly produced by bacteria adhered to a submersed surface. Beside, biofilm are commonly recognized as being important for bacteria's survival and persistence in harsh environment. They also can be consider as good source in promoting growth, improve immunity of culture organism. This research aims to evaluate biofilm formation on different probiotics bacteria for giant freshwater prawn Macrobranchium rosenbergii culture. Six potential probiotics were screened for their potential in forming biofilm; Lysinibacillus fusiformis strain A1 and Bacillus sp. strain A2 (isolated from Amphora sp.), Bacillus amyloliquefaciens strain L9 and L11(isolated from the hemolymph of blue swimming crab), Lysinibacillus fusiformis strain SPS11(isolated from Spirulina sp) and Lysinibacillus sphaericus strain NAS32 (isolated from Nannochloropsis sp.), Biofilm formation assay was done using 96-well polyvinyl chloride microtiter plate. The biofilms produced on polyvinyl chloride were stained with 1% of crystal violet and the absorbance of these solutions was measured at 595nm. Results showed that B. amyloliquefaciens strain L9 and strain L11 had the highest optical density recorded at 48 hr with 15.8 and 12.35 respectively compare to L. fusiformis strain A1 and Bacillus sp. strain A2 and L. fusiformis strain SPS11, Lysinibacillus sphaericus strain NAS32 at the same time interval. Thus, B. amyloliquefaciens strain L9 and L11 showed the highest biofilm formation and has the potential to be used as probiotics in M.rosenbergii culture.

KEYWORDS: Biofilm, Probiotics, Bacteria, *M. rosenbergii* , Growth

PADHM-3 ASSESSMENT OF MICROALGAE-BASED FEED, *Chlorella vulgaris* AS IMMUNOSTIMULANT FOR RED HYBRID TILAPIA (*Oreochromis* SP.) ON GROWTH, HISTOPATHOLOGICAL CHANGE AND DISEASE RESISTANT

Muhammad Syafiq Aizat Hamid, Khozirah Shaari and Ina Salwany Md Yasin

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ABSTRACT

Microalgae are photosynthetic microorganisms present in all existing earth ecosystems and have the ability to produce many beneficial products. Therefore, interest in microalgae research has amplified in the search for a new fish feed that able improve the fish health and survival. Plenty of research described many advantages of using microalgae, Chlorella sp. for fish health than other available feedstock's. In this study, Chlorella sp. are mixed with fish feed to observe the effect of Chlorella sp. microalgae towards the red hybrid tilapia (Oreochromis sp.) health. Hence, the aim of this study is to observe the growth, effect of microalgae feed towards the fish histopathology and survivality of the fish against Streptococcus sp. and Aeromonas sp. infection. First, microalgae Chlorella vulgaris is cultured in large scale and centrifuge to obtain microalgae pellet and mix with commercialized fish feed with 2.5% incorporation based on previous studies. Then, fish were fed with microalgae-based feed twice a day for three weeks. Fish growth were observed until 7 weeks and weight of the fish is taken every week. Next, the trial is continuing with fish survivality following intraperitoneal injection challenge using pathogenic bacteria A. hydrophila and S. agalactiae at week 4 and will be observed for two weeks. Fish organs (spleen, liver and brain) will be collected to observe the histopathological changes at week 0 and week 7 (after challenge). The result shows that fish fed with microalgae – based feed has elevated growth rate compared to fish fed with commercialized feed. In 14 days post-infection, fish fed with microalgae-based feed exhibited RPS (relative percentage survival) of 66.67±1.52% compared to fish fed with commercialized feed with RPS 33.33±0.57% following S. agalactiae challenged meanwhile, the fish fed with microalgae-based feed exhibited RPS of 90.00±3.00% compared to fish fed with commercialized fish feed with RPS of 40.00±1.00% following A.hydrophila challenged. In fish histopathological change, fish with commercialized feed shows larger area of cell necrosis in liver and spleen and meningitis infection on brain tissue while fish fed with microalgae-based feed shows has smaller area of cell necrosis and no sign of meningitis infection on brain tissue. Lastly, this study could enhance the understanding of microalgae as great potential as feed fish ingredient as well as immunostimulant in resisting common pathogenic bacteria in aquaculture industry.

KEYWORDS: microalgae, fish feed, fish growth, fish immune system, immune related genes, histopathology

PADHM-4 ANTIPARASITIC POTENTIAL OF A SEAWEED AGAINST THE PARASITIC LEECH *Zeylanicobdella arugamensis* (HIRUDINEA) IN MARINE AQUACULTURE

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ABSTRACT

Marine fish farmers in Sabah are recently, impacted by an infestation of the marine leech parasite in grouper aquaculture. Zeylanicobdella arugamensis (Hirudinea, Piscicolidae), has been known to infest a variety of cultured fishes that has led to the mortality of host fishes in a short period of time. Caulerpa lentillifera (Caulerpaceae), a green seaweed found in Sabah, also known as 'sea grapes', has been selected to experiment its antiparasitic potential kill the leeches as a natural control method. The objective of the study was to investigate the antiparasitic efficacy of the seaweed extract against Z. arugamensis. The leech-infested groupers were collected from the fish hatchery, and the isolated leeches were subjected to several dosages of the methanol extract of C. lentillifera. The experiment was carried out using various concentrations of the extract such as 25 mg/ml, 50 mg/ml, and 100 mg/ml. The results revealed 100% mortality at 0.32 ± 0.09 minutes at a concentration of 100 mg/ml, followed by 50 mg/ml and 25 mg/ml, compared to the normal control group treated with seawater. The group treated with 0.25% (v/v) of formalin also resulted in 100% mortality in 0.12 ± 0.03 minutes. The phytochemical composition of the extract was determined using the gas chromatography-mass spectrometry analysis to better understand about the main compounds responsible for its antiparasitic properties. The seaweed highlighted with the presence of several bioactive compounds of diverse natures at various percentages. As a result, it was discovered that the methanol extract of C. lentillifera mostly includes essential phytochemical components and showed a strong antiparasitic efficacy against marine leech parasites. It can act as a potential antiparasitic agent in marine aquaculture.

KEYWORDS: *Zeylanicobdella arugamensis*, Parasite, Leech, Disease, Natural Control, Seaweed, Bioactive Compounds, Aquaculture

PADHM-5 A NEW SPECIES OF PARASITIC COPEPOD *Nemesis* RISSO, 1826 (SIPHONOSTOMATOIDA: EUDACTYLINIDAE) FROM THE GILLS OF CORALCAT SHARK *Atelomycterus marmoratus* (ANONYMOUS [BENNETT], 1830) FROM MALAYSIA

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ABSTRACT

The family Eudactylinidae Wilson C.B., 1932 globally includes 62 valid species under12 genera, among them the genus Eudactylina van Beneden, 1853, is the most diverse genus with 38 species followed by Nemesis Risso, 1826 with 13 valid species. The copepod, Nemesis santhadevii sp. nov. (Siphonostomatoida: Eudactylinidae) parasitizing the gill filaments of the Coral catshark Atelomycterus marmoratus (Anonymous [Bennett], 1830) off Kota Kinabalu waters, Malaysia is described and illustrated. The genus Nemesis was established as a monotypic genus for the type species N. lamna Risso1826 (= Nemesis lamna lamna Risso, 1826) by Risso. Later, N. versicolor Wilson C.B., 1913 was found from hammer-head shark, Sphyrna zygaena, and N. atlantica Wilson C.B., 1922 from sharp-nosed shark, Scoliodon terraenovae, respectively. Other two species such as Nemesis carchariaeglauci (Hesse, 1883) and Nemesis robusta (Beneden, 1851) were transferred to the genus Nemesis The new species Nemesis santhadevii is characterized by: 1) Cephalothorax sub-circular, 1.3 times as wide as long, overlapping second thoracic segment; 2) Fifth segment 0.4 times the width of fourth;3) Genital segment slightly narrower than fifth; 4) Abdomen three segmented; 5) Caudal rami ovate, with two large and three small spines; 6) Antenna segment 2 with a patch of 34 to 38 blunt spines. It is a first record of parasitic eudactilinid copepod from Malaysia. Checklist of global valid species of Nemesis Risso, 1826 has also been discussed.

KEYWORDS: Fish parasite, Copepod, Coral catshark, Eudactylinid, New species, Kota Kinabalu, Sabah, Checklist

PADHM-6 EFFECT OF ORAL TREATMENT OF METHYLTESTOSTERONE (MT) ON SEX DIFFERENTIATION AND GROWTH IN JUVENILE YELLOW PERCH (*Perca flavescens*)

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ABSTRACT

A study was conducted to evaluate the gonad differentiation of juvenile yellow perch (YP, Perca flavencens) and determine the latest labile period related to hormone treatment. Juvenile fish were subjected to two dietary concentrations of methyltestosterone (MT; 20 and 50 mg/kg feed) for 60 days in three (3) age groups of 38-, 46-, and 67-days post-hatching (dph), where control group were fed with standard commercial feed. Following a 10-month on-growing period, sex phenotypes were determined by gross and histological gonad morphology. Results showed the juvenile YP responded to the exogenous hormone when it was applied at 38 dph for both 20 and 50 mg/kg feed resulting in 100% males. At 46dph, only 50 mg/kg feed resulted in 100% males. Both MT-treated at 38 and 46 dph significantly differed (P<0.01) from the expected normal population of male: female (1:1). MT-treated at 67 dph resulted in 37% and 25% intersex fish for both 20 and 50 mg/kg feed dosage group, respectively. MT-treated at 38 and 46 dph promoted growth and showed significantly heavier mean body weight (P<0.05) compared to control. The gonadosomatic index (GSI) of MT-treated at 38 and 46 dph was significantly lower than control. This study provides the first evidence that juvenile YP can be successfully masculinized when the treatment is initiated at the age of up to 46 dph. The result is important for sex control in aquaculture.

KEYWORDS: N/A

PADHM-7 OPTIMIZATION ASSAY FOR DETECTION OF AVIAN INFECTIOUS BRONCHITIS VIRUS (IBV) USING AN ELECTROCHEMICAL DNA BIOSENSOR

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ABSTRACT

Infectious bronchitis virus (IBV) is under Gammacorona of avian species, which is characterized by respiratory infections, nephropathy and permanent damage to the oviduct, resulting in high mortality in chicken. IBV has led to severe economic losses and inadequate facilities of farm-based diagnosis, therefore it is becoming a major challenge for the prevention and control of IBV disease. In this study, a label free DNA biosensor was employed for the universal detection of IBV associated with target-specific Orf gene using the concept of DNA hybridization. An electrochemical DNA biosensor was developed based on a gold electrode fabricated with a nanocomposite covering Chitosan (CS), Muti-walled carbon nanotubes (MWNTs) and highly reactive Glutaraldehyde (GTD) was used as functional arm linker to covalently bonding with NH2-ssDNA probe through aldehyde–ammonia condensation reaction. Under optimum parameters, the immobilization and hybridization efficiency were monitored with Cyclic Voltammetry (CV) and Differential Pulse Voltammetry (DPV) with methylene blue (MB) acting as a redox indicator. The modified biosensor has been exposed to be highly sensitive and specific after being evaluated with complementary, non-complementary, and mismatched sequences by the inaccessible interaction between the MB and guanine bases. The proposed DNA biosensor was capable of detecting target DNA with a linear range of 2.0×10^{-12} to 2.0×10^{-5} molL-1 with a limit of detection (LoD) and limit of quantification (LoQ) of 2.6 nM and 0.79 nM respectively. Furthermore, cross-reactivity studies were performed against non-IBV virus that represented a constantly sensitive detection leading to the different levels of MB current signals compared with the IBV target. Finally fabricating DNA biosensor was carried out the hybridization event from the real sample analysis on cDNA and PCR products with selected probe modified AuE. The assay demonstrated the recovery rates approx. 95.41-99.97% for IBV target by the presence of real sample analytes compared with base line of synthetics target oligonucleotides. The results showed that the DNA biosensor has the potential for sensitive detection of any strain of IBV and provides a rapid, sensitive and alternative technique for the diagnosis of IBV disease.

KEYWORDS: Avian infectious bronchitis virus; electrochemical biosensor; cyclic voltammetry; Immobilization; hybridization

DAY 2 (9TH MARCH 2022)
POSTER SESSION 6: AQUACULTURE AND FISHERIES

Chairperson	Time	Code	Presenter	Title
Dr. Chong Wei Sheng	1640-1645	PAF-1	Esraa E. Abouelmaaty	Induce Spawning and Larval Development of *Tripneustus gratilla*, Red Sea, Egypt
	1645-1650	PAF-2	Fatin Nabilah Bt Mohamad Sahadan	Molecular Characterization and Phylogenetic Classification of GNRH Hormones in River Catfish *Hemibagrus nemurus*
	1650-1655	PAF-3	Mohd Akmal Bin Sobari	Preliminary Investigation of Length-Weight, Length-Length Relationships, and Condition Factor of Four *Scombridae* Species in Kuala Perlis
	1655-1700	PAF-4	Muhammad Amir Danial Bin Zahaludin	Field efficacy of an Inactivated *Vibrio harveyi* against Vibriosis in Cage-Cultured Asian Seabass, *Lates calcarifer*
	1700-1705	PAF-5	Jamil Bin Musel	Length Frequency Distribution and Length-Weight Relationship of *Rastrelliger kanagurta* in Sarawak, Malaysia
	1705-1710	PAF-6	Zaidnuddin Bin Ilias	Recent Observation on *Holothuria Scabra* Population And Maturity From Johor Straits
	1710-1715	PAF-7	Teruaki Yoshida	Ingestion Rate of The Soft Coral *Palythoa* sp., Fed With *Artemia* Nauplii
	1715-1720	PAF-8	Nur Fatihah Abd Halid	Grading Based on The Body Colouration of *Betta splendens* Variety Super Red Plakat
	1720-1725	PAF-9	Ching Fui Fui	Recovery under Different Stocking Density of Stunted Growth Asian Seabass, Lates calcarifer Juvenile
	1725-1730	PAF-10	Julian Ransangan	Effect of Feeding Regime on Growth and Survival of Asiatic Hard Clam, *Meretrix meretrix*, Larvae in Hatchery Condition
	1730-1735	PAF-11	Audrey Daning Tuzan	Biodiversity and Biological Aspects of Spiny Lobster Species at Kota Kinabalu, Sabah, Malaysia: A Preliminary Study

PAF-1 INDUCE SPAWNING AND LARVAL DEVELOPMENT OF *Tripneustus gratilla*, RED SEA, EGYPT

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National Institute of Oceanography and Fisheries, Suez, Egypt

ABSTRACT

KEYWORDS: Aquaculture, sea urchins, *T. gratilla*, spawning, induction and larval development.

PAF-2 MOLECULAR CHARACTERIZATION AND PHYLOGENETIC CLASSIFICATION OF GNRH HORMONES IN RIVER CATFISH *Hemibagrus nemurus*

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ABSTRACT

Hemibagrus nemurus (Valenciennes 1840), known as river catfish or "ikan baung", an indigenous species in Malaysia; is a very tasteful food fish due to its flesh quality and high nutritional value. In 2019, Department of Fisheries Malaysia reported the annual production of H. nemurus was only 1.51% of the total aquaculture production in Malaysia. Problems of breeding and spawning, low hatchability and its slow growth restrict the production of this species. Gonadotropin-releasing hormone (GnRH) is the main neuroendocrine peptide require in the reproduction system of fish and other vertebrates. However, characterizing the involvement of GnRH in fish reproduction especially in this particular species has been complicated by the discovery of multiple GnRH forms. The GnRH, which consist of GnRH-I and GnRH-II are decapeptide hormones that stimulate the release of gonadotropin hormones from the anterior pituitary, and later the gonadotropins will act on the gonad to induce oogenesis and spermatogenesis by stimulating the production of sex steroid. In this study, we will study molecular characterization and phylogenetic study of GnRH hormone subunit genes (GnRH-I and –II) in H. nemurus. Brain tissues of adults H. nemurus (±400-600 g) were collected and the total RNA was extracted using TRIzol® Reagent, and later was reversed-transcribed into cDNA using QuantiTect® Reverse Transcription Kit. Initial PCR amplification was performed using degenerated primers to obtain the partial sequences of GnRH-I and -II subunit genes. Later, Rapid Amplification of cDNA End (RACE) PCR was performed to obtained the 5′ and 3′ unknown sequences of GnRH-I and –II genes. All successful PCR products were cloned into TOPO® TA Cloning® kit. The cloned product was sent for sequencing following sequence assembly analysis and phylogenetic analysis. Amplification of partial GnRH-I and –II produced bands at 136bp and 140bp for GnRH-I and –II, respectively. The 5′RACE-PCR results produced bands at 337bp and 374bp for GnRH-I and -II, respectively, while 3′RACE-PCR results produced bands at 303bp and 227bp for GnRH-I and -II, respectively. Phylogenetic analysis showed GnRH-I and –II species were clustered together with similar Siluriformes order, which consist most of catfish species. In this study, the molecular characterization of GnRH subunit genes of H. nemurus was determined, which could offer an advanced study to develop a new GnRH implant delivery system for artificial breeding of H. nemurus and other fish spp. This can be used by the fish farmers to improve the reproduction of cultured fish for sustainable aquaculture.

KEYWORDS: molecular characterization, cloning, GnRH analogue, *Hemibagrus nemurus*, gonadotropin-releasing hormone

PAF-3 PRELIMINARY INVESTIGATION OF LENGTH-WEIGHT, LENGTH-LENGTH RELATIONSHIPS, AND CONDITION FACTOR OF FOUR *Scombridae* SPECIES IN KUALA PERLIS

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ABSTRACT

The Scombridae family of ray-fined fish includes tunas, bonitos and mackerels. This family is familiar with food fishes and economically important fish species that local fishers commonly catch. This paper elaborated the length-weight, length-length, and condition factor of four Scombridae species collected at landing jetties located at Kuala Perlis. The fish samples were obtained from coastal fishers and fishing vessels using drift nets and trawl nets. Around 110 kg of unsorted fish samples were collected and identified. The conventional formula $W = aL^b$ was used to calculate the length-weight relationship, and a simple linear regression was constructed to estimate the length-length relationships. The Fulton's condition factor was estimated using the formula $K = W(100) / L^3$. A total of 232 individuals comprised four species, namely Auxis rochei, Euthynnus affinis, Rastrelliger brachysoma, and Rastrelliger kanagurta were measured and weighed. The values of exponent b for three species were higher than 3 showing positive allometric growth, except for Rastrelliger brachysoma displayed negative allometric growth (b = 2.837). The length-length relationship results also showed that the variables were highly correlated. (r2 > 0.95). The condition factor for all species also higher than 1, which defines the well beings of fish in this area. The findings of this study shall contribute to the fundamental knowledge of length-weight relationship of four Scombridae species, which is important for fishery management and conservation strategies.

KEYWORDS: Length-weight, length-length, condition factor, *Auxis rochei*, *Euthynnus affinis*, *Rastrelliger brachysoma*, *Rastrelliger kanagurta*

PAF-4 FIELD EFFICACY OF AN INACTIVATED *Vibrio harveyi* VACCINE AGAINST VIBRIOSIS IN CAGE-CULTURED ASIAN SEABASS, *Lates calcarifer*

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ABSTRACT

Vibrio harveyi is an important aquaculture pathogen that causes vibriosis and infects a large number of fish species. Vibriosis is regarded as an epizootic, described as a global outbreak of communicable disease temporarily occurring in limited geographical areas. Vaccination is one of the alternatives to overcome the disease outbreaks and was reported to be more effective and safer to human and environment than antibiotics. In previous experiment, this vaccine showed promising results where the vaccinated fish was found to have an RPS of 70% to 85% against multiple Vibrio spp. such as V. harveyi, V. alginolyticus and V. parahaemolyticus. In this study, the field trial was conducted at Pulau Ketam, Klang, Selangor. Thus, a newly developed feed-based killed V. harveyi vaccine was used to study the growth performance and immune response of this kind of vaccine in Asian seabass. A total of 4800 Asian seabass, Lates calcarifer of 182 ± 31 g were separated into 2 cage groups, in duplicate. Fish of Group 1 were not vaccinated, and Group 2 was vaccinated with feed-based killed Vibrio harveyi vaccine. Vaccinations were done on days 0, 14 and 42 orally using the feed-based bacterin vaccine at 4% body weight. Samples of serum for antibody study were collected at 14-day intervals throughout the 16-week study period. Following vaccination by the feed-based vaccine, IgM antibody levels showed significant ($p<0.05$) increase in serum as early as week 2 and peaked at week 8. In our opinion, this feed-based vaccine offers an opportunity for a comprehensive immunization regime.

KEYWORDS: Oral vaccine, Vibriosis, *Vibrio harveyi*, IgM, *Lates calcarifer*

PAF-5 LENGTH FREQUENCY DISTRIBUTION AND LENGTH-WEIGHT RELATIONSHIP OF *Rastrelliger kanagurta* IN SARAWAK, MALAYSIA

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ABSTRACT

Length frequency distribution and Length-weight relationship of Rastrelliger kanagurta was estimated using FAO-ICLARM Fisheries Stock Assessment Tools II (FISAT II). Samples were collected from five specified locations around Sarawak from 2016 – 2018. The fork length (FL) ranged from 8.0 cm to 25.0 cm and total weight was between 7.0 g to 243.0 g. The length frequency distribution for Rastrelliger kanagurta suggested that the population consisted of two dominant length groups at 10.5 cm and 17.5 cm, respectively. From the graph, length at first maturity, L_m was estimated at 14.5 cm and it shows that 66% of Rastrelliger kanagurta landed in the area was caught after reaching its first maturity. The equation of length-weight relationship was estimated as $W = 0.01L^{3.15}$ with r^2 higher than 0.90. The species shows a strong positive correlation indicates that as the length increases, weight also increases. Such data is valuable for establishing a monitoring and management system in Sarawak.

KEYWORDS: *Rastrelliger kanagurta*, FAO-ICLARM Fisheries Stock Assessment Tools II (FISAT II), positive allometric growth, Sarawak

PAF-6 RECENT OBSERVATION ON *Holothuria scabra* POPULATION AND MATURITY FROM JOHOR STRAITS

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ABSTRACT

Fisheries Research Institutes of Langkawi depended on sea cucumber broodstocks from Johor, for sea cucumber breeding project. The sea cucumber was collected from the sea at low spring tide by fishermen. As maturity cannot be determined from the external features, selection of mature sea cucumber is difficult. A study was conducted to determine the population structure of the sea cucumbers and the maturity status. All sea cucumbers received were weighed and measured to determine the relationship of length and weight and to get the size frequency data. Apart from that, a five percent subsample was also dissected to determine the maturity stage of the gonads and to obtain the gonadal index for the season. This study was conducted on 253 samples bought on December 2021 during the eastern monsoon season of Peninsular Malaysia. The sea cucumber samples weight was between 25 g – 260 g with an average of 112.0 ± 2.6 g. The length was between 8.0 – 19.0 cm with an average length of 12.21 ± 0.11 cm. The weight length relationship calculated was $W= 0.633577871L^{2.0477}$*. The relationship is useful to estimate the sea cucumber biomass in the wild. On the other hand, dissection of the sea cucumber samples resulted in 100% unproductive individuals without any gonads. Thus, the gonadal phase and sexual percentage of the samples cannot be determined. In conclusion, the sea cucumber population mean weight was smaller than the minimum aquaculture produced sea cucumber which is at 300 g. This might probably show that the population was collected outside breeding season or being held in captivity for a long time resulting in regressed gonad.*

KEYWORDS: Length and weight relationship, gonadal index, sea cucumber *Holothuria scabra*

PAF-7 INGESTION RATE OF THE SOFT CORAL *Palythoa* SP., FED WITH ARTEMIA NAUPLII

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ABSTRACT

Soft corals from the Zoantharia order, the third-largest from the Hexacorallia subclass, such as Palythoa sp., play an important role in maintaining the structure and function of reef ecosystems. Being an intertidal zoanthid, Palythoa sp. is frequently exposed to stressors such as anthropogenic activities and climate change. The soft coral, Palythoa sp. is known to be mixotrophic and supplements nutrition from photosynthesis with heterogeneous predation on zooplankton, which helps the coral survive during bleaching events. Information on the feeding of soft corals is important to determine their energy budgets and can facilitate the maintenance of their stock in aquaculture systems, but such studies on soft corals are scarce. Hence, a feeding experiment was carried out on mini colonies of Palythoa sp. collected from Kota Kinabalu waters. Objectives of this study were to (1) confirm if Palythoa sp. feed on external prey, and (2) to obtain the heterogenous feeding rate of Palythoa sp. The mini colonies of Palythoa sp. were established on round concrete discs and cultured in a semi-outdoor tank with 8 hours of overhead LED lighting in addition to the ambient light. The colonies were maintained without external feed supply for about three months prior to the start of the feeding experiment. The coral polyps ranged from 0.40–0.60 cm in diameter. The soft coral discs were placed inside individual plastic bottles with 250 mL of ambient seawater and fed with freshly hatched (24 h) Artemia nauplii at 28, 36, 60, 176, and 288 ind. L^{-1} in triplicates. Water temperature was maintained by placing the bottles inside the tank with recirculating water flow. After 24 h incubation in the dark, Artemia nauplii were filtered out and counted. Palythoa sp. fed heterogeneously on Artemia nauplii with ingestion rates ranging 0.42 ± 0.12 ind. $polyp^{-1}$ hr^{-1} to 3.25 ± 0.50 ind. $polyp^{-1}$ hr^{-1} and were significantly different among treatments (ANOVA, $p < 0.05$). The ingestion rate increased as feed density increased, implying that the lower ingestion rates at the lower feed densities were limited by the availability of prey, as Palythoa sp. is sessile and relies on encounter rates. The ingestion rate did not reach a peak with increasing feed density, implying the maximum ingestion rate for Palythoa sp. is higher than the experimental conditions of this study. The positive ingestion response to Artemia density increase suggests heterogenous feeding is an important part of Palythoa sp. nutrition in the absence of light. Future studies with higher feeding densities or shorter feeding times are recommended to confirm the optimal feeding density for Palythoa sp.

KEYWORDS: *Palythoa* sp., ingestion rate, *Artemia*

PAF-8 COLOUR GRADING OF *Betta splendens* OF SUPER RED PLAKAT VARIETY

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ABSTRACT

Betta splendens varieties come in a range of vibrant colours and patterns. The value of B. splendens is greatly influenced by body colour and pattern. For the solid coloured B. splendens, the intensity of single colour in the body affects the grade or quality of the fish. There is limited information on body colour grading for solid coloured B. splendens. Thus, this study was conducted to describe and classify the juvenile quality produced by high-grade and normal-grade Betta splendens of Super Red Plakat based on body colouration. Twenty juveniles produced from high-grade and normal-grade broodstock were classified into three groups of body colour. Redness and brightness of whole body part except the eye was calculated to determine the HTML colour names and Hex colour codes for each group. At 49 days after hatched (DAH), body colour started to differentiate with no differences in the range of brightness and redness for fish produced either by high- or normal-grade broodstock. Maroon (#800000), saffron red (#931314) and love red (#E41B17) reflect the body colour of fish in the high-, normal- and low-quality group, respectively. However, upon maturity at the 98 DAH, there are differences in the range of brightness and redness for fish produced either by high- or normal-grade broodstock. Fish produced by high-grade broodstock can be classified as black bean (#3D0C02), maroon (#800000) and wine red (#8B0000) for high-, normal- and low-quality groups, respectively. Whereas fish produced by normal-grade broodstock are classified as black bean (#3D0C02), red blood (#660000) and cranberry (#9F000F) for high-, normal- and low-quality groups, respectively. High-grade broodstock usually results in the increased redness on the body colour of offspring. Conclusively, the body colour classification of B. splendens of the Super Red Plakat variety gives a clear benchmark for grading purposes.

KEYWORDS: Grading, body colour, *Betta splendens*, Super Red Plakat

PAF-9 RECOVERY UNDER DIFFERENT STOCKING DENSITY OF STUNTED GROWTH ASIAN SEABASS, *Lates calcarifer* JUVENILE

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ABSTRACT

Growth heterogeneity is the most common phenomenon observed in a single production of Asian seabass (Lates calcarifer) with the majority of juveniles exhibiting stunted growth. The objective of this study was to determine the ideal stocking density to promote growth of stunted Asian seabass. To begin, Asian seabass (total length: 1.18 ± 0.18 cm, body weight: 0.05 ±0.02 g) were distributed into three groups at three different stocking densities of 10, 20, and 30 fish per tank (7 litres). The experiment was conducted for 20 days. Final growth, survival, incidence of cannibalism and stress response were compared. The results showed that the lowest stocking density (10 fish) had significantly higher survival (53.33 ±15.28%) and body weight (0.53 ±0.05 g) compared to the other treatments. However, stocking density did not improve the growth of total length of stunted Asian seabass, although relatively higher total length (3.06 ±0.09 g) was observed at the lowest stocking density in this study. The incidence of cannibalism was also relatively low throughout the experimental period and stress was undifferentiated. The present study concluded that stocking density could not contribute to the recovery of stunted growth in total length, but a lower stocking density of 10 fish per tank improved the survival rate and overall health of the fish.

KEYWORDS: Asian seabass, stunted growth, stocking density, growth performance, cannibalism and stress

PAF-10 EFFECT OF FEEDING REGIME ON GROWTH AND SURVIVAL OF ASIATIC HARD CLAM, *Meretrix meretrix*, LARVAE IN HATCHERY CONDITION

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ABSTRACT

Asiatic hard clam (Meretrix meretrix) is a commercially important bivalve in Sabah. It has high market demand but has already shown a sign of overexploitation. Induced spawning of this bivalve in hatchery had been conducted and showed promising result. However, larval mortality during rearing stage is still the main challenge for mass seed production. Thus, the present study was conducted to determine the effect of feeding ration to the larval survival. The broodstock of the bivalve were sourced from Marudu Bay (Northwest Sabah) and acclimatized at 27-31°C, 28-34 ppt and pH 7-9 for two weeks at the Borneo Marine research Institute, Universiti Malaysia Sabah. The broodstocks were then induced to spawn by heat-shock method. Upon spawning, gametes were collected and put in different tanks for incubation until D-shape stage (after 24 hours incubation). The larvae were then fed with mixed microalgae (Isochrysis sp, Nannochloropsis sp and Chaetoceros sp.) at different rations: A (1.5:1:1), B (1:1.5:1), C (1:1:1.5) and D (1:1:1), respectively twice a day. The survival of the larvae was observed for 6 days period. The result shows that the larvae given ration A exhibited the highest survival rate (1.92%) followed by B (1.02%), C (0.65%) and D (0.22%). Statistical analysis shows that the survival rate of the larvae given rations B and C did not significantly differ from A and D. However, larvae fed with ration A exhibited significantly higher survival rate compared to larvae given with ration D ($p<0.05$). The current study suggests that mixed live microalgae with high concentration of Isochrysis sp. improves survival rate of Asiatic hard clam larvae and hence can be exploited further in mass seed production of Meretrix meretrix in hatchery in the near future.

KEYWORDS: Larval rearing, seed production, Veneridae, venus clam

PAF-11 BIODIVERSITY AND BIOLOGICAL ASPECTS OF SPINY LOBSTER SPECIES AT KOTA KINABALU, SABAH, MALAYSIA: A PRELIMINARY STUDY

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ABSTRACT

Spiny lobsters (Panulirus spp) are a valuable commercial species that play an important component in the Malaysias fisheries sector, especially in Sabah. The high demand in the local and international market and low spiny lobsters supply have driven most fisheries to an excess of fishing capacity and created overfishing. The current study aimed to identify species and biological aspects of the genus Panulirus in Kota Kinabalu. Data were carried out in April- September 2019 by taking samples from the fishermen. A total of 637 lobsters were collected and analyzed descriptively by identifying morphologically and recording the number of individuals per species. Four species of spiny lobsters were recorded in his study, which were Panulirus longipes, Panulirus ornatus, Panulirus versicolor, and Panulirus polyphagus. The species P. longipes was the dominant taxa. The minimum berried female size for P. longipus was 51.9 mm carapace length (CL) while P. versicolor (73.5mm), P. ornatus (76.3mm) and P. polyphagus (89.2mm). The correlation between carapace length-body weight for females are P. longipus, P. versicolor, P. ornatus and P. polyphagus were (R^2 = 0.1054), (R^2 = 0.544), (R^2 = 0.0841) and (R^2 = 0.1522) whereas the correlation between between carapace length-body weight for males are P. longipus, P. versicolor, P. ornatus and P. polyphagus (R^2 = 0.329), (R^2 = 0.179), (R^2 = 0.0491), and (R^2 = 0.2796). Further study needs to be conducted to understand the size of maturity of males and the distribution and connectivity of lobster populations by analyzing the species variations in each life stage.

KEYWORDS: Spiny lobster, Panulirus, species diversity, size at maturity

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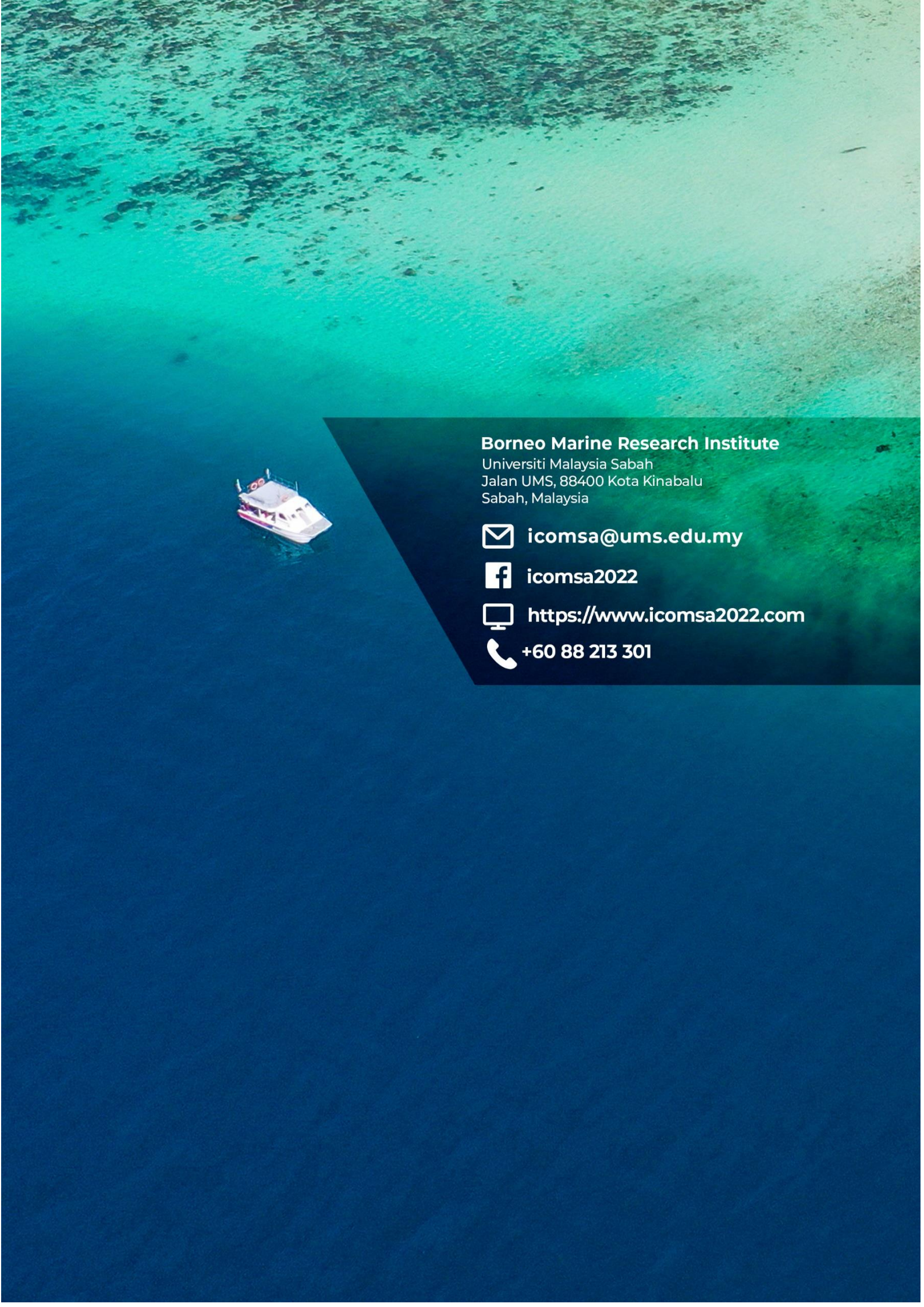

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ABUNDANCE & SIZE COMPOSITION OF BILLFISH BY-CATCH ALONG PAHANG WATERS

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PROBLEM STATEMENT

The billfish migration across Pahang coastal waters has create vital economic expansion (RM18millions revenue yearly), with the establishment of Royal Pahang Billfish International Challenge (RPBIC); a solely marine sport fishing in Malaysia. However, a dramatically declined in billfish catch were reported from 2016 to 2019 and the reason is unknown due to the lack of monitoring efforts. Thus, this study was conducted to determine the abundance of billfish by-catch and its size variation. This provided database for better management & conservation billfish resources.

RESEARCH METHOD

Purchased billfish at LKIM Fish Landing Complex, Kuantan

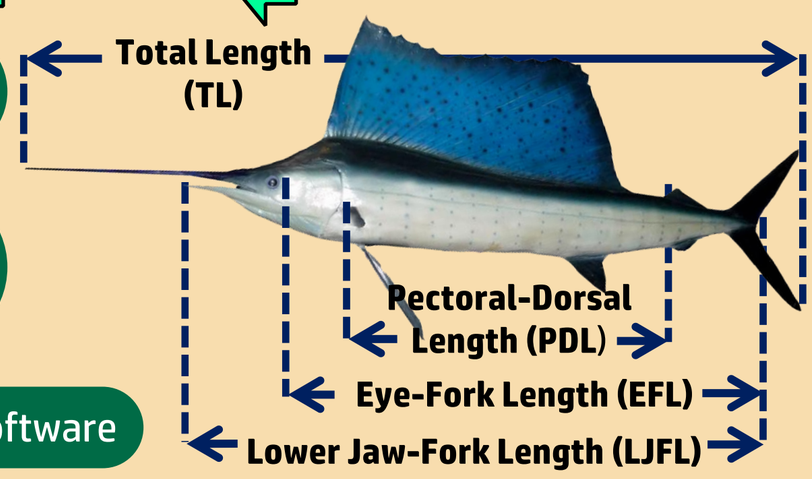
Kept in ice & bring to lab

Morphology observed for species identification

Measured round weight (using digital weight scale)

Measured morphometric length using measuring tape (see figure)(ICCAT, 2016)

Analyzed data using PAST software



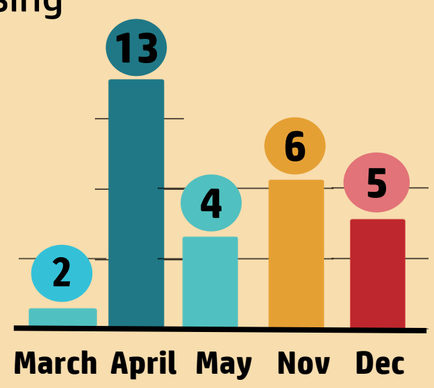
RESULTS & DISCUSSIONS

SPECIES

Only Indo-Pacific species (*Istiophorus platypterus*) was observed - obviously identified through sail-like first dorsal fin that is prominently greater than body depth (Nakamura, 1985). This consistent with the data from RPBIC which only sailfish were caught since past 5 years & marlin was last observed in 2012.

ABUNDANCE

Thirty billfish were collected, with the abundance showed increasing trend from March to April & declined from November to December. However, no data was obtained from June to October due to the Restriction Movement Order throughout Covid-19 outbreak in 2021.



The peak abundance of billfish in Rompin occurred in July & Aug. which lasted until Nov.

Ahmad et al., 2009

The peak abundance of the sailfish usually occurred during the peak of spawning season where the sea surface temperature is high.

Simms et al., 2010

Increasing SST might affecting the billfish population dynamics in Pahang, resulting in possible loss of breeding habitats & changes in prey availability

Pratt et al., 2021

SIZE COMPOSITION

The RW recorded in Pahang waters was significantly lower compared to billfish in Taiwan, Florida & Mexico.

Chiang et al., 2004; Ortega-Garcia et al., 2018; Richardson, 2008

TL, LJFL & EFL were significantly smaller compared to Indo Pacific species observed in Taiwan, Andaman (India) & Bali (Indonesia) coastal waters.

Chiang et al., 2004; Setyadji et al., 2012

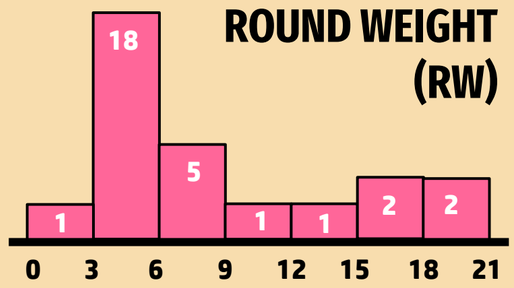
Morphometric lengths of *I. platypterus* in Rompin-Kuantan waters in 2009 was bigger than this study.

Ahmad et al., 2009

Size composition indicated that most of the sailfish were juvenile & early adult stages.
Juvenile: 65-130cm of LJFL
Adult: 170-270 cm of LJFL

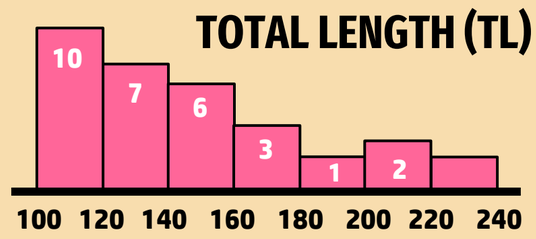
ICCAT, 2007

ROUND WEIGHT (RW)



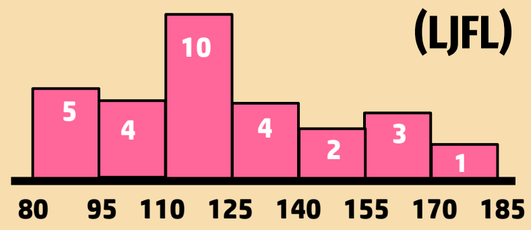
7.3 kg Range: 3.0-19.5 kg

TOTAL LENGTH (TL)



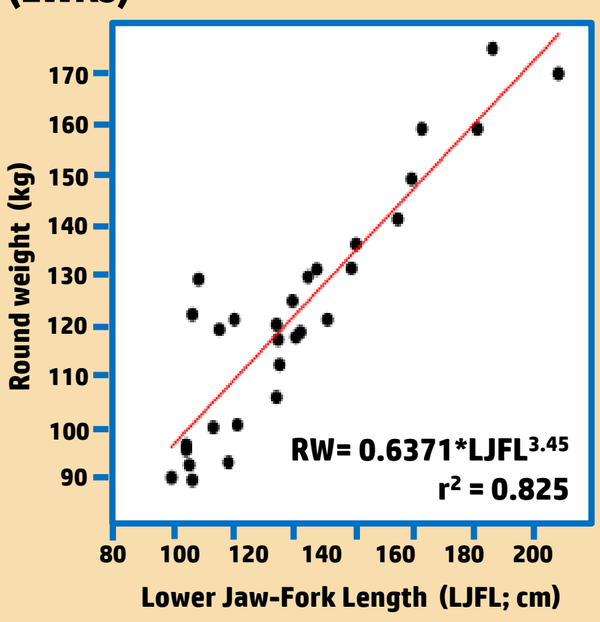
Range: 100-229 cm **141.4 cm**

LOWER JAW-FORK LENGTH (LJFL)



Range: 89 -175 cm **122 cm**

LENGTH-WEIGHT RELATIONSHIP (LWRs)



Linear regression showed a significant correlation (r^2=0.825, $p<0.05$) between LJFL & weight of the billfish from this region, indicated healthy & ideal habitat conditions.

In this study, *I. platypterus* exhibited an isometric growth ($b=3.45$, $p<0.05$), contradict with studies elsewhere which LWRs of the species is allometric ($b<3$). This might be due to the compressed & elongated body structure of the species

Kar et al., 2015

CONCLUSION

As conclusion, only Indo-Pacific species (*Istiophorus platypterus*) can be found in Pahang coastal waters with the abundance of by-catch comparatively low throughout the year. However this abundance partially reflected the actual abundance due to some factors; (1) unavailability of the data due to the Restriction Movement Order & (2) high competition to get the billfish from other buyers. Thus proper sampling planning need to be done in future to avoid similar issue to occur. In term of size composition, it indicated that the billfish caught along Pahang coastal waters consist of juvenile & early adults. The occurrence of billfish in Pahang water might be for feeding, which needs for further investigation.

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