

Book of Abstracts

The 10th International Conference on Multidisciplinary Research (ICMR) in Conjunction with The 2nd International and National Symposium on Aquatic Environment and Fisheries (INSAEF) 2021

*A Multidisciplinary Approach Towards
a Sustainable Eco Blue Industries 4.0*

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Welcoming Speech

Vice Rector of Academic Affairs

Universitas Syiah Kuala

Assalamu'alaikum warahmatullahi wabarakatuh. Peace be upon you, and Allah's mercy and blessings. The honorable:

Chairman of the Institute for Research and Community Service, Universitas Syiah Kuala: Prof. Dr. Taufik Fuadi Abidin, S.Si, M.Tech.

Dean of the Faculty of Marine and Fisheries, Universitas Syiah Kuala.

Ladies and gentlemen, participants of The 10th International Conference on Multidisciplinary Research (ICMR) in conjunction with The 2nd International and National Symposium on Aquatic Environment and Fisheries (INSAEF).

Praise and gratitude be onto Allah SWT because by His grace we can be brought together in this scientific forum. Shalawat and greetings I uphold the Prophet Muhammad SAW.

Welcome to the keynote speakers: Prof. Shu-Kun Hsu from National Central University, Taiwan, Prof. Dr. Kasi Marimuthu from AIMST University, Malaysia, Dr. Morelia Urlaub from GEOMAR, Germany, Dr. Ir. Irwan Meilano, M.Sc from Bandung Institute of Technology, Indonesia.

I also would like to welcome the invited speakers: Dr. Frauke Klingelhoefler from IFREMER, France, Prof. Marc-André Gutscher from Université de Bretagne Occidentale, France, Dr. Zarina Md Nor from Universiti Sains Malaysia, Malaysia, Muhammad Nasir Badu, Ph.D from Universitas Hasanuddin, Indonesia, Dr. Do Hai Yen from Tan Trao University, Vietnam, Prof. Hasrita Lubis from UISU, Indonesia, and Dr. Nur Fadli from Universitas Syiah Kuala, Indonesia. We give great appreciation for your willingness to attend this online activity.

Ladies and gentlemen, the Research Centre for Marine and Fisheries, Universitas Syiah Kuala was founded in 2006 and currently has 40 researchers in several exciting scope of marine and fisheries. As a form of our contribution to the world of research, since 2008 every year we hold international conferences, which involves not only researchers from Indonesia but also from various other parts of the world. Last year, we managed to hold The 1st

International and National Symposium on Aquatic Environment and Fisheries (INSAEF), which was attended by more than 200 participants from four continents.

This year, due to the conditions of the COVID-19 Pandemic currently sweeping across the world, we are holding this activity online. We hope that even if we do not meet face to face, the essence of this scientific meeting is not lost. The spirit to continue to collaborate in terms of research and publication is one of our goals. We hope that the research network that has been built before can be expanded and strengthened in the future. Hopefully, world problems, especially in the maritime and fisheries sector, can be resolved with our research innovations.

Ladies and gentlemen,

I will not go into overdrive in this speech, I just want to say 'Happy Presentation to Ladies and Gentlemen!'. We apologize for any shortcomings and inconveniences during this activity.

Thank you.

Wassalamualaikum warahmatullahi wabarakatuh.

Prof. Dr. Ir. Marwan

Vice Rector of Academic Affairs, Universitas Syiah Kuala

Preface

Chairman of the Institute for Research and Community Service

Universitas Syiah Kuala

The ocean, covering the earth's surface for approximately 71%, promises a better future to live by ocean development through the exploitation, preservation, and regeneration of the marine environment. Several sectors are included in ocean development, from the conventional part (aquaculture, fisheries, tourism, maritime transport) to the more emergent space (marine renewable energy, blue carbon services, seabed mining, and bioprospecting). However, those marine resources and ocean services face challenges such as inadequate care for marine resources and ecosystem services of the ocean, which has been decreasing and degrading the ocean resources rapidly. Therefore, the based research insight from researchers and academicians will be beneficial to maintain the sustainability of ocean development.

Universitas Syiah Kuala, through the Institute for Research and Community Services, had established the Research Centre for Marine and Fisheries in 2006. It currently has 40 researchers in several exciting scopes of marine and fisheries. As a form of our contribution to the world of research, since 2008, this research center has organized an international conference, which involves researchers from Indonesia and various other parts of the world. Last year, the 1st International and National Symposium on Aquatic Environment and Fisheries (INSAEF) were successfully held, attended by more than 200 participants from four continents. This year, the 10th International Conference on Multidisciplinary Research (ICMR), in conjunction with the 2nd International and National Symposium on Aquatic Environment and Fisheries (INSAEF), has received 100 abstracts from several countries, i.e., Malaysia, Vietnam, India, Taiwan, and Indonesia. The ICMR is an annual event, jointly organized by the School of Distance Education (SDE), Universiti Sains Malaysia (USM), Pulau Pinang, Malaysia, the Islamic University of North Sumatra (UISU), Medan, Indonesia, Universitas Syiah Kuala (USK), Banda Aceh, Indonesia, Hasanuddin University (Unhas), Makassar, Indonesia, and Tan Trao University, Tuyen Quang, Vietnam. The ICMR will be a platform for an academician to share their findings and provide insights to explore current discoveries and technologies. Sharing research findings can be channeled into discoveries for improving a sustainable

environment. The 10th ICMR strives for an opportunity in conjunction with the 2nd INSAEF as the theme for the conference this year is "a Multidisciplinary Approach Toward a Sustainable Eco-Blue Industries 4.0". The INSAEF has been an excellent conference platform for communicating the issues of the aquatic environment and fisheries.

We welcome four keynote speakers. They are Prof. Shu-Kun Hsu (Chairman of Center for Environment Studies, National Central University, Taiwan), Prof. Dr. Kasi Marimuthu (AIMST University, Malaysia), Dr. Irwan Meilano (Dean of the Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia) and Dr. Morelia Urlaub (Research Fellow, Geomar, Germany). The conference also invited seven invited speakers, Dr. Zarina Md Nor (Universiti Sains Malaysia, Malaysia), Associate Prof. Muhammad Nasir Badu, Ph.D. (Universitas Hasanuddin, Indonesia), Dr. Do Hai Yen (Tan Trao University, Vietnam), Dr. Frauke Klingelhofer (IFREMER, France), Prof. Marc-André Gutscher (Université de Bretagne Occidentale, France), Prof. Hasrita Lubis, M.Pd (Universitas Islam Sumatera Utara, Indonesia), and Dr. Nur Fadli (Universitas Syiah Kuala, Indonesia). We give great appreciation for their willingness to attend this online activity and share their latest research on the field.

It is already two years since the pandemic has shifted our workspaces to home. However, we believe that communication amongst the scientist should remain connected and updated. The ICMR and INSAEF have welcomed researchers, scientists, and students worldwide with related topics to share their work, thoughts, ideas, and learning something new in this challenging time. We hope that even though we do not meet face to face, the essence of this scientific meeting is not lost. The spirit to continue to collaborate in terms of research and publication is one of our goals. We hope that the research network that has been built before can be expanded and strengthened in the future. Hopefully, world problems, especially in the marine and fisheries sector, can be resolved with our research innovations.

Regards,

Prof. Dr. Taufik Fuadi Abidin, S.Si., M.Tech

Chairman of the Institute for Research and Community Services, Universitas Syiah Kuala

Preface

ICMR Member

Universiti Sains Malaysia, Malaysia

The International Conference of Multidisciplinary Research (ICMR) has been one of the platforms for researchers in Universiti Sains Malaysia to collaborate and to share their research interests with colleagues from well known Indonesian universities for years. This 10th ICMR is more interesting as it is simultaneously held with the 2nd INSAEF. It is noted that the participation from Universiti Sains Malaysia and Malaysia is small. The pandemic is still rampant in Malaysia that limit research progress in some fields and it is more challenging to get research funding well. We are hoping that the next ICMR will be attended by more Malaysian researchers.

Kudos to Dr Haekal and his team from Universitas Syiah Kuala, Indonesia who has successfully organized this conference. Their tireless effort is much appreciated. An appreciation from USM to other collaborators as well. May the benefits of this conference transcend beyond the physical boundaries of countries and the networking/friendship formed from this conference transcend beyond time.

Dr. Zarina Md Nor

Preface

ICMR Member

Tan Trao University, Viet Nam

Tan Trao University is the public university located in the North of Vietnam, at Tuyen Quang Province. This is the first year the university has participated as one of the members of the International Conference of Multidisciplinary Research (ICMR). It has been our honor to join this excellent event. In the context of “new normal” under the effect of the pandemic Covid-19, ICMR2021 with theme “**A Multidisciplinary Approach Toward a Sustainable Eco-Blue Industries 4.0**” will be the highlight scholarly event for researchers and academicians to share and present their latest work that focusing on the issues of the aquatic environment and fisheries.

We would like to express our gratitude and appreciation to the organizing team from Universitas Syiah Kuala, Indonesia for their hard work to make ICMR 2021 successful. Thereby, ICMR will be continued maintaining itself valuable. Special thanks go to Dr. Heakal Azief Haridhi for his invaluable organizing efforts. Without his skills the conference could not have been such a technical success and well collaborated among diversified universities in ASEAN region.

Dr. Do Hai Yen

Welcoming Speech Chairperson of The 10th ICMR in Conjunction with The 2nd INSAEF 2021

Excellences, Distinguished Participants, Ladies, and Gentlemen,

On behalf of the conference committee, I am honored and delighted to welcome you to the 10th International Conference on Multidisciplinary Research (ICMR) in conjunction with the 2nd International and National Symposium on Aquatic Environment and Fisheries (INSAEF) of Universitas Syiah Kuala. I wish to take this opportunity to welcome all the participants, the keynote, and our invited speakers for coming to our campus virtually.

It is already two years since the pandemic has shifted our workspaces to home. However, we believe that communication amongst the scientist should remain connected and updated. This conference (The ICMR and INSAEF) has a theme “A Multidisciplinary Approach Towards a Sustainable Eco Blue Industries 4.0” has welcomed the researchers, scientists, and students around the world with related topics to share their work, thoughts, ideas, together with learning something new in this challenging time.

The ICMR and INSAEF participants come from all around Indonesia (from Aceh to Papua), Malaysia, Vietnam, and Taiwan representing the students, lecturers, and researchers. The committee received 100 abstracts consisted of 60 oral and 40 posters presenters.

Our technical program is rich and varied with four keynote speeches, seven invited talks, and seven parallel sessions. On this occasion, I also wish to welcome our keynote speaker Prof. Shu-Kun Hsu (Chairman of Center for Environment Studies, National Central University, Taiwan), Prof. Dr. Kasi Marimuthu (AIMST University, Malaysia), Dr. Irwan Meilano (Dean of the Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia) and Dr. Morelia Urlaub (Researcher Marine Geodynamics, Geomar, Germany).

We were also honored to host our invited speakers Dr. Zarina Md Nor (Universiti Sains Malaysia, Malaysia), Associate Prof. Muhammad Nasir Badu, Ph.D. (Universitas Hasanuddin, Indonesia), Dr. Do Hai Yen (Tan Trao University, Vietnam), Dr. Frauke Klingelhofer (IFREMER, France), Prof. Marc-André Gutscher (Université de Bretagne Occidentale, France), Prof.

Hasrita Lubis, M.Pd (Universitas Islam Sumatera Utara, Indonesia), and Dr. Nur Fadli (Universitas Syiah Kuala, Indonesia).

Finally, as the chairman of the 10th ICMR in conjunction with the 2nd INSAEF 2021, I am in debt of sincere thanks to the people who have worked, planning, organizing and support this event, especially the Organizing Committee members who have worked out, extremely difficult to mention their effort one by one so that the conference and its programs could run smoothly.

I also would like to sincerely thank the Rector of Syiah Kuala University Prof. Dr. Samsul Rizal, M. Eng., Vice-Rector of Academics Affair Prof. Dr. Ir. Marwan, and the Dean of Faculty of Marine and Fisheries Prof. Dr. Muchlisin, ZA., M.Sc and all the staff of the Faculty of Marine and Fisheries as well as the Research Center for Marine Sciences and Fisheries.

I sincerely hope you will enjoy the conference and I highly expect that this meeting will catalyze and strengthening cooperation among us in the future.

Haekal Azief Haridhi, Ph.D

Guidelines for Presenters

Dearly all The 10th ICMR in conjunction with The 2nd INSAEF presenters, In aiming for an orderly virtual conference, we hugely appreciate your cooperation and support regarding several technical things specified below:

A. Oral Presentation

1. Parallel sessions will be clustered according to symposium topics with each session chaired by one person assisted by one administrator, and attended by both presenters and participants.
2. Link of Zoom Webinar and Zoom Meeting will be sent by email and WhatsApp Group a few days before the event.
3. Each presenter is required to put their registration number as the Zoom username following the format: Registration No._Name of presenter.
4. For example: INS21-P-199_Prof Tina.
5. The time limit for oral presenters is 10 minutes, including for presentations and QnA sessions (Strict time-keeping). The moderator will strictly enforce these time limits.
6. Each presenter will make presentation after being welcomed by the moderator,
7. The material of presentation will be shared and controlled by the operator.
8. All the presenters and participants are required to use the virtual background that we have sent (file attached),
9. Avoid wearing clothes in bright colors or patterns to ensure good image quality, avoid excessive and fast movements (dark clothes with a solid color are preferred).
10. Always switch your microphone off when not in use.
11. It is recommended to use the headphone.
12. The presenters are expected to be stand-by 10 minutes before their schedule in their parallel link (Parallel Room).
13. The presenters are required to submit the material presentation in PPT format to insaef2020@unsyah.ac.id before September 26, 2021.

B. Poster Presentation

1. The poster presentation will be presented as a flash presentation.
2. The time provided for poster presenter is only 5 minutes for the presentation without question and answer session (Strict time-keeping). The moderator will strictly enforce these time limits.
3. The posters should be a single page or slide that summarizes your research (PPT files only).

4. To avoid exceeding the available space size, poster size should be A0 (841 x 1189 mm or 33.1 x 46.8 in).
5. The poster must be written in English and the length of manuscript is about 800- 1000 words.
6. The poster follows the following divisions: a title, names of authors and institutions, abstract, introduction, materials and methods, results and discussion, conclusions, and references.
7. In general, there are no restrictions on colors and font choice.
8. The poster should be submitted to insaef2020@unsyiah.ac.id before September 26, 2021.

Committees

Advisory Board

- ✚ Prof. Dr. Ir. Samsul Rizal, M.Eng
- ✚ Prof. Dr. Muchlisin Z.A., S.Pi., M.Sc
- ✚ Dr. Muhammadar, S.T., M.P
- ✚ Drs. Muhammad, M.Si
- ✚ Dr. Zulkarnain, S.Si., M.Si
- ✚ Prof. Dr. Ir. Syamsul Rizal
- ✚ Dr. Muhammad Irham, S.Si, M.Si
- ✚ Dr. Nur Fadli, S.Pi., M.Sc

Organizing Committee

- ✚ Haekal Azief Haridhi, Ph.D (Chairman)
- ✚ Sri Agustina, M.S (Co-Chairman)
- ✚ Nurfadillah, M.Si (Secretary)
- ✚ Iko Imelda Arisa, M.Si (Administration Division)
- ✚ Chitra Octavina, M.Si (Chief of Paper Submission Secretariat & Publication)
- ✚ Alvi Rahmah, M.Si (Chief of Program and Schedule)
- ✚ Syahrul Purnawan, M.Si (Chief of IT)
- ✚ Rian Juanda, S.Kel, M.Si (Chief of Publication, Documentation & Media Cente)
- ✚ Edy Miswar, S.Si., M.Si (Chief of Venue and Logistics)

Schedule

**The 10th International Conference on Multidisciplinary Research (ICMR) in
Conjunction with The 2nd International and National Symposium on Aquatic
Environment and Fisheries (INSAEF) 2021 Rundown Schedule
Monday - September 27th, 2021 - Banda Aceh, Indonesia**

Time (Indonesia Time)	Schedule	PIC
08.00 – 08.30	Registration	Cut Dara Dewi and Nururrahmi
08.30 – 08.40	Opening	Armia Natsir
08.40 – 09.00	Reciting of Holy Quran	Luthfy Utomo Hafidz; Laras Nauna
09.00 – 09.05	Singing The National Anthem of Indonesia "Indonesia Raya"	Video (Committee)
09.05 – 09.10	Chair Person's Report Speech	Chief of Committee Haekal Azief Haridhi, Ph.D
09.10 – 09.20	Preface and Opening Remarks	Rector of Universitas Syiah Kuala represented by Vice Rector of Academics Prof. Dr. Ir. Marwan
09.20 – 09.25	Do'a	Luthfy Utomo Hafidz; Laras Nauna
09.25 – 09.35	Break (Video of Aceh traditional dance)	Committee
09.35 – 11.20	Keynote Speakers (Special Sessions)	
	Moderator: Dr. M. Irham	
	Chairman of Center for Environmental Studies, NCU, Taiwan	Prof. Shu-Kun Hsu
	Department of Biotechnology, Faculty of Applied Science, AIMST University, Malaysia	Prof. Dr. Kasi Marimuthu

	Dean of the Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia	Dr. Ir. Irwan Meilano, M.Sc
11.20 – 12.00	Parallel Sessions - Part I (Poster Presentation)	Committee
12.00 – 13.20	Lunch and Dhuhur Prayer	Committee
13.20 – 13.40	Invited Speaker* (Special Sessions)	
	Dr. Zarina Md Nor (Universiti Sains Malaysia, Malaysia)	Moderator Room 1
	Muhammad Nasir Badu, Ph.D (Universitas Hasanuddin, Indonesia)	Moderator Room 2
	Dr. Do Hai Yen (Tan Trao University, Vietnam)	Moderator Room 3
	Dr. Frauke Klingelhofer (IFREMER, France)	Moderator Room 4
	Prof. Marc-André Gutscher (Université de Bretagne Occidentale, France)	Moderator Room 5
	Prof. Hasrita Lubis, M.Pd (Universitas Islam Sumatera Utara, Indonesia)	Moderator Room 6
	Dr. Nur Fadli (Universitas Syiah Kuala, Indonesia)	Moderator Room 7
13.40 – 16.15	Parallel Sessions - Part II (Oral Presentation) and Student Sessions	Committee
16.15 – 16.30	Break and Ashar Prayer	Committee
16.30 – 17.10	Keynote Speakers (Special Sessions)	
	Moderator: Dr. Ella Meilianda	
	Research Scientist, Marine Geodynamics, GEOMAR, Germany	Dr. Morelia Urlaub
17.10 – 17.40	Closing (including the announcement of best oral, best poster, and best student presenter)	Master of Ceremony

**The 10th International Conference on Multidisciplinary Research (ICMR) in
Conjuction with The 2nd International and National Symposium on Aquatic
Environment and Fisheries (INSAEF) 2021
RUNDOWN SCHEDULE**

Monday – September 27th, 2021 – Banda Aceh, Indonesia

Time (Indonesia Time)	Schedule	PIC
08.00 – 08.30	Registration	Committee
08.30 – 09.35	Opening and Break	Armia Natsir
09.35 – 11.20	Keynote Speakers (Special Sessions)	Moderator: Dr M. Irham
	Chairman of Center for Environmental Studies, NCU, Taiwan - Prof. Shu-Kun Hsu	
	Department of Biotechnology, Faculty of Applied Science, AIMST University, Malaysia - Prof. Dr. Kasi Marimuthu	
	Dean of the Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia - Dr. Ir. Irwan Meilano, M.Sc	
11.20 – 12.00	Parallel Sessions - Part I (Poster Presentation)	Committee
12.00 – 13.20	Lunch and Duhur Prayer	Committee
13.20 – 13.40	Invited Speaker* (Special Sessions)	
	Dr. Zarina Md Nor (Universiti Sains Malaysia, Malaysia)	Moderator Room 1
	Muhammad Nasir Badu, Ph.D (Universitas Hasanuddin, Indonesia)	Moderator Room 2
	Dr. Do Hai Yen (Tan Trao University, Vietnam)	Moderator Room 3
	Dr. Frauke Klingelhoef (IFREMER, France)	Moderator Room 4
	Prof. Marc-André Gutscher (Université de Bretagne Occidentale, France)	Moderator Room 5
	Prof. Hasrita Lubis, M.Pd (Universitas Islam Sumatera Utara, Indonesia)	Moderator Room 6
	Dr. Nur Fadli (Universitas Syiah Kuala, Indonesia)	Moderator Room 7
13.40 – 16.15	Parallel Sessions - Part II (Oral Presentation) and Student Sessions	Committee
16.15 – 16.30	Break and Ashar Prayer	Committee
16.30 – 17.10	Keynote Speakers (Special Sessions)	Moderator: Dr. Ella Meilianda
	Research Scientist, Marine Geodynamics, GEOMAR, Germany - Dr. Morelia Urlaub	
17.10 – 17.40	Closing	Master of Ceremony

KEYNOTE SPEAKERS

Time (Indonesia Time)	Institution	Keynote Speakers	Moderator
09.35 – 10.10	Chairman of Center for Environmental Studies, NCU, Taiwan	Prof. Shu-Kun Hsu	Dr M. Irham
10.10 – 10.45	Department of Biotechnology, Faculty of Applied Science, AIMST University, Malaysia	Prof. Dr. Kasi Marimuthu	Dr M. Irham
10.45 – 11.20	Dean of the Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia	Dr. Ir. Irwan Meilano, M.Sc	Dr M. Irham
16.30 – 17.10	Research Scientist, Marine Geodynamics, GEOMAR, Germany	Dr. Morelia Urlaub	Dr. Ella Meilianda

INVITED SPEAKERS

Time (Indonesia Time)	Institution	Moderator	Room
13.20 – 13.40	Dr. Zarina Md Nor (Universiti Sains Malaysia, Malaysia)	Dr. Zarina Md Nor	Room 1
	Muhammad Nasir Badu, Ph.D (Universitas Hasanuddin, Indonesia)	Muhammad Nasir Badu, Ph.D	Room 2
	Dr. Do Hai Yen (Tan Trao University, Vietnam)	Dr. Do Hai Yen	Room 3
	Dr. Frauke Klingelhofer (IFREMER, France)	Siska Mellisa, S.Kel., M.Sc	Room 4
	Prof. Marc-André Gutscher (Université de Bretagne Occidentale, France)	Sri agustina, S.Si., M.S	Room 5
	Prof. Hasrita Lubis, M.Pd (Universitas Islam Sumatera Utara, Indonesia)	Adrian Damora, S.Pi., M.Si	Room 6
	Dr. Nur Fadli (Universitas Syiah Kuala, Indonesia)	Dedi Fazriansyah Putra, S.St.Pi., M.Sc	Room 7

STUDENT SESSIONS (Room 1)

No	Time	Registration No	Presenters	Affiliation	E-mail	Title
1	13.50 - 14.00	INS21-O-001	Febryanto Simanjuntak	Center for Space and Remote Sensing Research	febryantosimanjuntak25@gmail.com	Depiction of Typhoon Mangkhut (2018) and its impact based on satellite observations
2	14.00 - 14.10	INS21-O-002	Rd Salsa Dewi Kusuma	Marine Science Study Program, Universitas Padjajaran, West Java, 45363, Indonesia	salsa18003@mail.unpad.ac.id	Design and Development of Low-Cost Multiparameter Ocean Observation Instrument
3	14.10 - 14.20	INS21-O-003	Alfinna Yebelanti	Marine Science Department Universitas Padjadjaran	alfinna18001@mail.unpad.ac.id	Patterns, Types, and Distributions of Macroplastic Debris Based on Oceanographic Conditions and Community Perspectives: Case Studies in Muara Gembong Downstream of Citarum
4	14.20 - 14.30	INS21-O-004	Khansa Iklila Hanifa	Sekolah Alam Perkasa	bundaalfa1981@gmail.com	Social, Cultural, Economic and Mangrove Resources of Gampong Lapeng, Pulo Breuh Aceh Besar
5	14.30 - 14.40	INS21-O-005	Nur Rohim	Study Program of Aquatic Resource Management, Graduate School, IPB University, Bogor, 16680, Indonesia	nurrohimi@apps.ipb.ac.id	Aquatic Environmental Characteristic of Singkil Swamp Wildlife Reserve in Aceh Singkil Regency as Basis of Freshwater Fisheries
6	14.40 - 14.50	INS21-O-006	Mahardiani Putri Naulia Batubara	Marine Science Department, Faculty of Fishery and Marine Science, Diponegoro University	mahardianiputri@gmail.com	The Appearance and Relationship between Madden-Julian Oscillation and Sea Surface Temperature in Tropics Area in 2010 – 2020
7	14.50 - 15.00	INS21-O-009	Asep Sahidin	Fisheries Department, Fisheries and Marine Science Faculty, Universitas Padjadjaran	asep.sahidin@unpad.ac.id	Assessment Of Water Quality Based On Biological Indices Of Macrobenthos: A River Under Pressure From Tourism Activities

Room 1

Moderator : Dr. Zarina Md Nor

Commitee: Cut Dara Dewi (PIC), Alfis Syahril (IT)

ORAL SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
13.25 - 13.30		Room Registration				
13.30 - 13.50		Invited Speaker	Dr. Zarina Md Nor	School of Distance Education, Universiti Sains Malaysia	zarina.nor@usm.my	Precarious Employment amongst Low Income Single Mothers in Malaysia: The implications on family wellbeing.
1	13.50 - 14.00	INS21-O-001	Febryanto Simanjuntak	Center for Space and Remote Sensing Research	febryantosimanjuntak25@gmail.com	Depiction of Typhoon Mangkhut (2018) and its impact based on satellite observations
2	14.00 - 14.10	INS21-O-002	Rd Salsa Dewi Kusuma	Marine Science Study Program, Universitas Padjajaran, West Java, 45363, Indonesia	salsa18003@mail.unpad.ac.id	Design and Development of Low-Cost Multiparameter Ocean Observation Instrument
3	14.10 - 14.20	INS21-O-003	Alfinna Yebelanti	Marine Science Department Universitas Padjajaran	alfinna18001@mail.unpad.ac.id	Patterns, Types, and Distributions of Macroplastic Debris Based on Oceanographic Conditions and Community Perspectives: Case Studies in Muara Gembong Downstream of Citarum
4	14.20 - 14.30	INS21-O-004	Khansa Iklila Hanifa	Sekolah Alam Perkasa	bundaalfa1981@gmail.com	Social, Cultural, Economic and Mangrove Resources of Gampong Lapeng, Pulo Breuh Aceh Besar
5	14.30 - 14.40	INS21-O-005	Nur Rohim	Study Program of Aquatic Resource Management, Graduate School, IPB University, Bogor, 16680, Indonesia	nurrohim@apps.ipb.ac.id	Aquatic Environmental Characteristic of Singkil Swamp Wildlife Reserve in Aceh Singkil Regency as Basis of Freshwater Fisheries
6	14.40 - 14.50	INS21-O-006	Mahardiani Putri Naulia Batubara	Marine Science Department, Faculty of Fishery and Marine Science, Diponegoro University	mahardianiputri@gmail.com	The Appearance and Relationship between Madden-Julian Oscillation and Sea Surface Temperature in Tropics Area in 2010 – 2020
7	14.50 - 15.00	INS21-O-009	Asep Sahidin	Fisheries Department, Fisheries and Marine Science Faculty, Universitas Padjajaran	asep.sahidin@unpad.ac.id	Assessment Of Water Quality Based On Biological Indices Of Macrobenthos: A River Under Pressure From Tourism Activities

Room 2

Moderator : Muhammad Nasir Badu,
Ph.D

Committee: Rahmi (PIC), Riyan Maulana (IT)

ORAL SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
13.25 - 13.30		Room Registration				
13.30 - 13.50		Invited Speaker	Muhammad Nasir Badu, Ph.D	Universitas Hasanuddin, Indonesia		People smuggling to Australia: An Overview Of Maritime Transnational Crime
1	13.50 - 14.00	INS21-P-011	Desi Novita	Universitas Islam Sumatera Utara, Medan, 20217, Indonesia	desi.novita@uisu.ac.id	Determination of superior agriculture commodities in North Sumatra Province
2	14.00 - 14.10	INS21-P-023	Dr.rer.nat. Am Azbas Taurusman	IPB University	azbas@apps.ipb.ac.id	Social, Economic and Institutional Study of Purse Seine Fisheries based on the Ecosystem Approach in Kutaraja Ocean Fishing Port, Banda Aceh
3	14.10 - 14.20	INS21-P-037	Rani Hafsaridewi	Research Center for Marine and Fisheries Socio Economics	hafsaridewi@yahoo.com	Study on the Seaweed Farming Community Resilience of in Pandeglang
4	14.20 - 14.30	INS21-P-055	Wempie Yuliane	University Andalas	wempie_y@yahoo.com	Community Based Tourism in Nagari Lawang, West Sumatera: Participation Approach Analysis
5	14.30 - 14.40	INS21-P-075	Nur Anita Yunikawati	Universitas Negeri Malang	nur.anita.fe@um.ac.id	Tourism Revival Strategy During Covid19 Pandemic : A Case Study In The Kemiren Traditional Village, Indonesia.
6	14.40 - 14.50	INS21-P-088	Nizalmie Azani	Institute of Tropical Aquaculture and Fisheries, Universiti Malaysia Terengganu, 21300 Kuala Nerus, Terengganu, Malaysia	nadiyah.rasdi@umt.edu.my / muhammadnizalmie@gmail.com	Survival, reproduction and generation time of freshwater zooplankton (<i>Ceriodaphnia</i> sp.) on different enrichment and its potential use in freshwater aquaculture
7	14.50 - 15.00	INS21-P-094	Retno Widihastuti	Balai Besar Riset Sosial Ekonomi Kelautan dan Perikanan	echamichelle@gmail.com	Institutional strengthening in supporting aquaculture bussiness development in Magelang Regency
8	15.00 - 15.10	INS21-P-097	Muhammad Adli Abdullah	Faculty of Law Universitas Syiah Kuala Darussalam 23111 Banda Aceh Indonesia	bawarith@unsyiah.ac.id	Adat laot adaptation for sustainable fisheries development in Aceh Province

Room 3

Moderator : Dr. Do Hai Yen

Committee: Ratna Mutia Aprilla (PIC), Rizki Firdausi (IT)

ORAL SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
13.25 - 13.30		Room Registration				
13.30 - 13.50		Invited Speaker	Dr. Do Hai Yen	Tan Trao University, Vietnam	dohaiyentq@gmail.com	European Union-Vietnam Free Trade Agreement (EVFTA): Opportunities and Challenges for Vietnam's Seafood Exports
1	13.50 - 14.00	INS21-P-001	M. Shabri Abd Majid	Department of Economics, Faculty of Economics and Business, Universitas Syiah Kuala (USK)	mshabri@unsyiah.ac.id	What Contributes to Micro, Small, and Medium Enterprises' Productivity in Fisheries Sector in Aceh, Indonesia?
2	14.00 - 14.10	INS21-P-009	Rahayu Sri	Islamic University of North Sumatera	sri.rahayu@fe.uisu.ac.id	Intellectual Capital And Islamic Corporate Social Responsibility On The Financial Performance of Sharia Commercial Banks in Indonesia
3	14.10 - 14.20	INS21-P-021	Arifa Pratami	Universitas Islam Sumatera Utara, Medan	pratamiarifa@gmail.com	Financial technology lending services peer to peer perspective of the Pantai Cermin Kabupaten Serdang Bedagai
4	14.20 - 14.30	INS21-P-035	Syafruddin Chan	Universitas Syiah Kuala	syafuruddin.chan@unsyiah.ac.id	The impact of the spread of covid-19 on marine tourism-based small businesses and suggested recovery plans
5	14.30 - 14.40	INS21-P-046	Sheila Fitriana	Universitas Islam Sumatera Utara	sheila.fitriana01@gmail.com	Profile of Rational Thinking Ability Skills and Student Learning Motivation in Physics Learning
6	14.40 - 14.50	INS21-P-051	Fenty Puluhulawa	State University of Gorontalo	fentypuluhulawa@ung.ac.id	Public Participation in Regulation on The Protection of Marine Resources
7	14.50 - 15.00	INS21-P-059	Nurmalita	Universitas Malikussaleh	nurmalita@unimal.ac.id	Utilization of Gayo coffee husk waste for natural activated carbon obtained by two activation method
8	15.00 - 15.10	INS21-P-084	Naeruz Milla	Fakultas Ekonomi Universitas Islam Sumatera Utara	milla.naeruz@gmail.com	The impact of economic due to technological developments, digital payment, and fluctuation in interest rates and exchange rate
9	15.10 - 15.20	INS21-P-092	M Nasir	Management Department, Faculty of Economics and Business, Syiah Kuala University, Indonesia	syafuruddin.chan@unsyiah.ac.id	The function of the attitude of islamic banks in coastal societies in mediating the effect of emotional attachment on continuance intention of islamic banks

Room 4

**Moderator : Siska Mellisa,
S.Kel., M.Sc**

Comitee: Alvi Rahmah (PIC), Nasrullah (IT)

POSTER SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
11.20 - 11.25		Room Registration				
1	11.25 - 11.30	INS21-P-012	Muhammad Irham	Program studi Ilmu Kelautan, Fakultas Kelautan dan Perikanan, Universitas Syiah Kuala	irham@unsyiah.ac.id	Two-dimensional hydrodynamics in the west coast of Aceh Besar: an overview of tidal dynamics and wind forces
2	11.30 - 11.35	INS21-P-014	Ilham Zulfahmi	Universitas Syiah Kuala	ilham.zulfahmi@unsyiah.ac.id	Commercial Marine Fish from Weh Island, Indonesia: Checklist, Distribution Pattern, Conservation Status, and Economic Importance
3	11.35 - 11.40	INS21-P-016	Muhammad Irham	Program Studi Ilmu Kelautan, Fakultas Kelautan dan Perikanan, Universitas Syiah Kuala	irham@unsyiah.ac.id	Coastal risk analysis in the west coast of Aceh Besar based on geo-oceanographic parameters
4	11.40 - 11.45	INS21-P-017	Iko Imelda Arisa	Universitas Syiah Kuala	ikoimeldaarisa@unsyiah.ac.id	The effect of Cassia alata L. Leaf extract on egg hatchability and survival of <i>Pangasius</i> sp.
5	11.45 - 11.50	INS21-P-030	Alfis Syahril	Department of Aquaculture, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia	alfissyahril16@gmail.com	Vannamei <i>Litopenaeus vannamei</i> Shrimp Production in Tarpaulin Ponds with Various Stocking Densities
6	11.50 - 11.55	INS21-P-039	A A Muhammadar	Departement of Aquaculture, Faculty of Marine and Fisheries, University Syiah Kuala, Banda Aceh, Indonesia	muhammadar@unsyiah.ac.id	Long-weight relationship and bioreproduction aspects of Tiger shrimp (<i>Penaeus monodon</i> Fabricius, 1798) and Banana shrimp (<i>Penaeus merguensis</i> De Man, 1888) in Lampulo, Aceh.
7	11.55 - 12.00	INS21-P-040	Agus Widi Priana	Universitas Syiah Kuala	ichsansetiawan@unsyiah.ac.id	Mapping Potential Fishing Zones Based on Sea Surface Temperature and Chlorophyll-a in Aceh Besar Waters
8	12.00 - 12.05	INS21-P-043	Kavinta Melanie	Universitas Syiah Kuala	kavintamelanie@unsyiah.ac.id	The prevalence and intensity of ectoparasites that infected tilapia in Floating Net Cages
9	12.05 - 12.10	INS21-P-045	Ichsan Setiawan	Universitas Syiah Kuala	ichsansetiawan@unsyiah.ac.id	Refraction and diffraction of sea waves in Lhoknga and Lampuok Coastal Waters, Aceh Besar District, Indonesia
10	12.10 - 12.15	INS21-P-079	Alvi Rahmah	Universitas Syiah Kuala	alvi_rahmah@unsyiah.ac.id	Study of Determining the Fishing Season for Tiger Grouper (<i>Epinephelus fuscoguttatus</i>) Landed at Kutaraja Fishing Port, Banda Aceh
11	12.15 - 12.20	INS21-P-081	Siska Mellisa	Department of Aquaculture, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia.	siska_mellisa@unsyiah.ac.id	Induction of Oocyte Developer Hormones (Oodev) on The Maturity of Kawan fish (<i>Poropuntius tawarensis</i>)
Break (Dzuhur Prayer)						

ORAL SESSION						
13.25 - 13.30		Room Registration				
13.30 - 13.50	Invited Speaker	Dr. Frauke Klingelhofer	IFREMER, France	fklingel@ifremer.fr	The French research institute Ifremer and the french Caribbean research projects	
1	13.50 - 14.00	INS21-P-010	Asep Hamzah	Jurusan Ilmu Perikanan, Fakultas Pertanian, Universitas Sultan Ageng Tirtayasa	asep.hamzah@untirta.ac.id	SIgnificant environmental aspects analysis on Karangantu archipelago fishing port, Banten Province
2	14.00 - 14.10	INS21-P-027	Mainisa	Aquaculture Department, Agriculture Faculty, Universitas Malikussaleh, North Aceh 24355 Indonesia.	mainisa@unimal.ac.id	Implementation of Astaxanthin to Increase the Pigmentation and Growth of Clownfish
3	14.10 - 14.20	INS21-P-036	Farah Diana	Teuku Umar University	mahendra@utu.ac.id	Rice and Fish Productivity and Farming Business Analysis Minapadi on Legowo Systems and Endemic Fish
4	14.20 - 14.30	INS21-P-038	Mahendra	Teuku Umar University	mahendra@utu.ac.id	The Effect of Different Stock Dents on The Performance of Polets (Macrobracium Rosenbergi) and Production of Rice Plant in Rice Systems
5	14.30 - 14.40	INS21-P-041	Prama Hartami	Malikussaleh University, Jl. Cot Tengku Nie Reuleut Muara Batu, Aceh Utara 24355, Indonesia	prama.hartami@unimal.ac.id	Increased Production of Catfish (Clarias gariepinus) Seeds through Accelerated Rematuration of Female Broodstock Using Induction of Natural and Hormonal Materials
6	14.40 - 14.50	INS21-P-053	Z A Muchlisin	Universitas Syiah Kuala	muchlisinza@unsyiah.ac.id	Current Research on the Indonesian Mahseer (Genus Tor) With Focusing on Aceh Region
7	14.50 - 15.00	INS21-P-054	Rahmatul Fajri	Universitas Samudra	rahmatulfajri@unsam.ac.id	Doping Nikel (Ni) Metal in Zeolitic Imidazolate Framework-8 By Using Green Synthesis Method
8	15.00 - 15.10	INS21-P-085	Nurhayati	Fakultas Pertanian Universitas Islam Sumatera Utara	nurhayatijb@yahoo.co.id	The effect of concentration of AB Mix and ZPT solutions on the growth and production of Mustard Plants (Brassica juncea L.) in hydroponic Wick Systems
9	15.10 - 15.20	INS21-P-041	Prama Hartami	Malikussaleh University, Jl. Cot Tengku Nie Reuleut Muara Batu, Aceh Utara 24355, Indonesia	prama.hartami@unimal.ac.id	Increased Production of Catfish (Clarias gariepinus) Seeds through Accelerated Rematuration of Female Broodstock Using Induction of Natural and Hormonal Materials
10	15.20 - 15.30	INS21-P-003	Nadia Amsalia	Department of Marine Sciences, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia.	srizal@unsyiah.ac.id	The impact of current speed on sea surface temperature and salinity patterns in the Bay of Bengal
11	15.30 - 15.40	INS21-P-100	Nyak Amir	Universitas Syiah Kuala	muhammad@unsyiah.ac.id	Analysis of lighting of a football stadium

Room 5

Moderator : Sri agustina, S.Si., M.S

Committee: Irma Dewiyanti (PIC), Syahrul Purnawan (IT)

POSTER SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
Room Registration						
1	11.25 - 11.30	INS21-P-008	Yayang Rifka/Chitra Octavina	Universitas Syiah Kuala	chitraoctavina@unsyiah.ac.id	Community structure of invasive aquatic invertebrates in coral reef ecosystems in the KKPD PISISI Simeulue
2	11.30 - 11.35	INS21-P-044	M. Agustiar/Chitra Octavina	Universitas Syiah Kuala	chitraoctavina@unsyiah.ac.id	Community Structure Of Mangrove In Lambadeuk Village, Peukan Bada District, Aceh Besar Regency
3	11.35 - 11.40	INS21-P-048	Akmal Rizqullah	USK	dfputra@unsyiah.ac.id	Growth Performance of Green mussel (<i>Perna viridis</i> L.) at Different Depths in Estuary of Alue Naga Village, Banda Aceh
4	11.40 - 11.45	INS21-P-068	Ulfa Fariansyah/Irma Dewiyanti	Marine and Fisheries Faculty	irmadewiyanti@unsyiah.ac.id	Cellulase enzyme activity by bacteria cellulolytic isolated from water of mangrove ecosystem in Aceh Besar and Banda Aceh
5	11.45 - 11.50	INS21-P-071	Dian Wahyudi/Sri Agustina	Department of marine Sciences, Faculty of marine and fisheries, Universitas Syiah Kuala	sri_agustina@unsyiah.ac.id	Identification of marine debris at Pulau Nasi, Aceh Besar Regency
6	11.50 - 11.55	INS21-P-072	Sari Afriani	Marine Science Department, Marine and Fisheries Faculty, Universitas Syiah Kuala	mariaulfah@unsyiah.ac.id	Identification and inventory of macroinvertebrate in West Simeulue, Aceh, Indonesia
7	11.55 - 12.00	INS21-P-076	Syahrul Purnawan	Ilmu Kelautan Universitas Syiah Kuala	syahrulpurnawan@unsyiah.ac.id	The Comparison of Coastal Sediment Layers' Characteristics in Lhoong District, Aceh Besar Regency
8	12.00 - 12.05	INS21-P-089	Farah Syahliza	Department of Marine Science, Faculty of Marine and Fisheries, Syiah Kuala, University, Banda Aceh,	syahlizafarah11@gmail.com	Potency of Secondary Metabolite from Sea anemone (<i>Diadumene lineata</i>) as pancreatic anticancer
9	12.05 - 12.10	INS21-P-090	Maria Ulfah	Department of Marine Science, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia	mariaulfah@unsyiah.ac.id	Prevalence and abundance of coral disease in Aceh, Indonesia
10	12.10 - 12.15	INS21-P-091	Maria Ulfah	Department of Marine Science, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia	mariaulfah@unsyiah.ac.id	Characteristic of nests and the existence of Laut Tuntong (<i>Batagur borneoensis</i>) in mangrove ecosystems on Pusing Cium Island, Aceh Tamiang Regency
Break (Dzuhur Prayer)						

ORAL SESSION						
13.25 - 13.30		Room Registration				
13.30- 13.50		Invited Speaker	Prof. Marc-André Gutscher	Université de Bretagne Occidentale, France	gutscher@univ-brest.fr	Monitoring an active submarine fault (offshore Catania, Sicily) using a 6-km long fiber-optic strain cable: The FOCUS experiment
1	13.50 - 14.00	INS21-P-099	Haekal Azief Haridhi	Research Center for Marine Sciences and Fisheries, Universitas Syiah Kuala	haekal.azief.haridhi@unsyiah.ac.id	Bodywave Dispersion Characteristics of Regional Deep Earthquake at Sumatra and Southern Ryukyus Subduction Zone
2	14.00 - 14.10	INS21-P-007	Nguyen Huu Dung	University of Transport technology	dungnh@utt.edu.vn	Impacts of climate change on coastal province and cities of Vietnam – Reality and emerging problems
3	14.10 - 14.20	INS21-P-018	Riza Yuliratno Setiawan	Universitas Gadjah Mada	riza.y.setiawan@ugm.ac.id	Satellite remote sensing reveals coastal wind variability off the central Maluku Islands
4	14.20 - 14.30	INS21-P-047	Muhammad Syukri	Universitas Syiah Kuala	amsir@unsyiah.ac.id	Seismic Velocity (Vp AND Vs) Correlation Generated from Refraction and Downhole Measurements
5	14.30 - 14.40	INS21-P-050	Jamilah Husna	Islamic University of North Sumatra (UISU)	jamilah.husna@ft.uisu.ac.id	The Differences of the Atomic and the Optical Properties Percentage of ZnO Material that Caused by Variants Annealing Temperature Treatment.
6	14.40 - 14.50	INS21-P-063	Gulmira Azieva	L.N. Gumilyov Eurasian National University	kerimkhulle@gmail.com	Estimation of the volume of production of turbine vapors of a fuel boiler with stochastic exogenous factors
7	14.50 - 15.00	INS21-P-066	Saberina Hasibuan	Riau University	sabe_rinahs@yahoo.com	Sedimentation Rate of Feed on The Ground Pond Red-Yellow Podzolic (Pmk) Patin Intensive Fish Farming
8	15.00 - 15.10	INS21-P-077	Koko Ondara	Marine Science, Universitas Syiah Kuala	syahrulpurnawan@unsyiah.ac.id	Concentration of Dissolved Heavy Metal Around The Rupert Waters Industrial Activity, Malacca Strait
9	15.10 - 15.20	INS21-P-086	Winnie Retna Melani	Department of Aquatic Resources Management, Faculty of Marine Science and Fisheries, Raja Ali Haji Maritime University, Politeknik Street, Senggarang, Tanjungpinang City 29111, Indonesia	winnie@umrah.ac.id	Characterization of hydrological aspects in Kolong Enam Pond, Kijang, Bintan Island - Indonesia
10	15.20 - 15.30	INS21-P-098	Haekal Azief Haridhi	Research Center for Marine Sciences and Fisheries, Universitas Syiah Kuala	haekal.azief.haridhi@unsyiah.ac.id	Relative Delays of Bodywave Arrivals of Regional Deep Earthquake Between Two Subduction System: Sumatra and Southern Ryukyus
11	15.30 - 15.40	INS21-P-096	Andreas V H Simanjuntak	Badan Meteorologi Klimatologi dan Geofisika (BMKG), 22123 Aceh Besar, Aceh, Indonesia	muksin.umar@unsyiah.ac.id	Swarm earthquakes in Kutacene, Aceh: Volcanic or tectonic activities?

Room 6

**Moderator : Adrian Damora,
S.Pi., M.Si**

**Commitee: Mutia Ramadhaniaty (PIC), Yudi
Haditiar (IT)**

POSTER SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
Room Registration						
11.20 - 11.25						
1	11.25 - 11.30	INS21-P-015	Nurliza Zaiyana	Centre for Aquatic Research and Conservation (CARC), Ar-Raniry State Islamic University, Banda Aceh, Indonesia	ilham.zulfahmi@unsyah.ac.id	Alteration in Gill and Skin of Snakehead (Channa striata) Due to Ectoparasite Infection: Pathological and Histological Studies
2	11.30 - 11.35	INS21-P-032	Anwar Deli	Department of Agribusiness, Faculty of Agriculture, Universitas Syiah Kuala	anwar_deli@unsyah.ac.id	The effect of rice harvest failure on the area of insured land in Aceh province
3	11.35 - 11.40	INS21-P-033	Nurlaili	BBRSEKP	lelykesa_antrop@yahoo.com	Gender-Disaggregated Data on Fish Farming Business in Cirata Reservoir, Cianjur Regency, West Java
4	11.40 - 11.45	INS21-P-069	Imelda Agustina/Ratna Mutia Aprilla	Universitas Syiah Kuala	agustinaimelda1208@yahoo.com	Study of the effect of sea surface temperature on purse seine in Perairan Utara Aceh, Indonesia
5	11.45 - 11.50	INS21-P-070	Nanda Muhammad Razi/Mutia Ramadhaniaty	Universitas Syiah Kuala	mariaulfah@unsyah.ac.id	DNA Barcoding and Trends in Shark Catches Landed on the West and East Coast of Aceh
6	11.50 - 11.55	INS21-P-073	Titien Sofiat/Ratna Mutia Aprilla	Universitas Syiah Kuala	ratnamutia@unsyah.ac.id	Analysis of Main Facilities Utilization Level In Kuala Langsa Fish Landing Base, East Aceh, Aceh.
7	11.55 - 12.00	INS21-P-078	Adrian Damora	Faculty of Marine and Fisheries, Universitas Syiah Kuala	adamora@unsyah.ac.id	Profit maximization of blue swimmer crab fishing through the spatial bioeconomic approach in the Marine Protected Area of Bintan, Indonesia
8	12.00 - 12.05	INS21-P-082	Adrian Damora	Faculty of Marine and Fisheries, Universitas Syiah Kuala	adamora@unsyah.ac.id	Hispathological in the hepatopancreas of Pacific white shrimp (Litopenaeus vannamei) infected by white feces disease
9	12.05 - 12.10	INS21-P-083	Adrian Damora	Faculty of Marine and Fisheries, Universitas Syiah Kuala	adamora@unsyah.ac.id	Fishing productivity of yellowfin tuna with purse seines and handlines based in Banda Aceh, Indonesia
10	12.10 - 12.15	INS21-P-087	Yopi Ilhamsyah	Department of Marine Science, Faculty of Marine Science and Fisheries, Syiah Kuala University Banda Aceh-Indonesia 23111	yopi.ilhamsyah@unsyah.ac.id	Sensitivity experiments of Cumulus Parameterization of heavy rainfall over complex topography of Aceh, Indonesia
Break (Dzuhur Prayer)						

ORAL SESSION						
13.25 - 13.30		Room Registration				
13.30- 13.50		Invited Speaker	Prof. Hasrita Lubis, M.Pd	Universitas Islam Sumatera Utara, Indonesia		Higher Education in the Era of Revolution 4.0
1	13.50 - 14.00	INS21-P-004	Ravinder	Chandigarh University	ravinder.e1795@cumail.in	Role of Artificial Intelligence & Human Resource Management in Education Sector
2	14.00 - 14.10	INS21-P-005	Nana Mardiana	Universitas Islam Sumatera Utara, Medan, 20217, North Sumatera, Indonesia	mdna.nana1@gmail.com	Alternative Kits and Worksheets on Light and Optics as Science Experimental Devices at Home for Middle School Student
3	14.10 - 14.20	INS21-P-006	Ratna Soraya	Universitas Islam Sumatera Utara, Medan, 20217, North Sumatera, Indonesia	mdna.nana1@gmail.com	Learning Management Strategi New Normal Era
4	14.20 - 14.30	INS21-P-005	Nana Mardiana	Universitas Islam Sumatera Utara, Medan, 20217, North Sumatera, Indonesia	mdna.nana1@gmail.com	Alternative Kits and Worksheets on Light and Optics as Science Experimental Devices at Home for Middle School Student
5	14.30 - 14.40	INS21-P-022	Nurhaizan Sembiring	Universitas Islam Sumatera Utara, Medan	nurulhaizan007@gmail.com	Long Life Education In Context Of Islam Education
6	14.40 - 14.50	INS21-P-028	Onrizal	Faculty of Forestry, Universitas Sumatera Utara	onrizal@usu.ac.id	New occurrence and length-weight relationships of living fossil in Jaring Halus Island, North Sumatra
7	14.50 - 15.00	INS21-P-034	Riyan Maulana	Universitas Syiah Kuala	irwan@unsyiah.ac.id	The Effectiveness of TOEFL FKP App for Final-Year Students of Marine Science Faculty Syiah Kuala University, Indonesia
8	15.00 - 15.10	INS21-P-095	Yusrizal Akmal	Department of Aquaculture, Faculty of Agriculture, Universitas Almuslim, Bireuen, Indonesia	ilham.zulfahmi@unsyiah.ac.id	Comparative anatomy of the caudal fin (Pinna caudalis) Tor douronensis and Tor soro
9	15.10 - 15.20	INS21-P-042	Hafinuddin Hasanuddin	Department of Fisheries Faculty of Fisheries and Marine Science Universitas Teuku Umar, Aceh, 23617, Indonesia	hafinuddin@utu.ac.id	Performance of hand line and drift gill net at palm fiber fish aggregating devices (FADs)

Room 7

Moderator : Dedi Fazriansyah Putra, S.St.Pi., M.Sc

Comitee: Ismarica (PIC),

Reza Wafdan (IT)

POSTER SESSION						
No	Time	Registration No	Presenters	Affiliation	E-mail	Title
11.20 - 11.25		Room Registration				
1	11.25 - 11.30	INS21-P-024	Hafiz Haridhi	Universitas Syiah Kuala	hafizmubarraq@gmail.com	Fiqh Review on Zakah of Marine Resources
2	11.35 - 11.40	INS21-P-025	Naili Sumaiya	Universitas Syiah Kuala	nailysumaiya@gmail.com	Regulation of Foreign Tourist Dress Ethics in the Realization of Maritime-Based Halal Tourism in Sabang City
3	11.40 - 11.45	INS21-P-049	Adli Waliul Perdana	Department of Aquaculture, Faculty of Marine and Fisheries, Universitas Syiah Kuala	adliwaliul@unsyiah.ac.id	The effect of β -glucan provision in feed on seed growth of white cross (lates calcarifer)
4	11.45 - 11.50	INS21-P-057	Nanda Ulfa Khaira/Nur Fadli	Universitas Syiah Kuala	nurfadli@unsyiah.ac.id	Length-weight relationships and condition factors of the one-blotch grouper (<i>Epinephelus melanostigma</i>) fished in the northern coast of Aceh, Indonesia: a preliminary study
5	11.50 - 11.55	INS21-P-058	Maulana Wali Akbar	Fakultas Kelautan dan Perikanan Universitas Syiah Kuala	irham@unsyiah.ac.id	Catching Investigation of Yellow Fin Tuna (<i>Thunnus Albacares</i>) Based on the Distribution of Chlorophyll-a in the North Waters of Aceh: A November and December Analysis
6	11.55 - 12.00	INS21-P-064	Nurfadillah	Department of Aquaculture, Faculty of Marine and Fisheries Universitas Syiah Kuala	nurfadillah@unsyiah.ac.id	Community structure of plankton in Aneuk Laot Lake Sabang Pulau Weh
7	12.00 - 12.05	INS21-P-065	Ismarica	Departement of Aquaculture, Faculty of Marine and Fisheries, Syiah Kuala University , 23111 Banda Aceh, Indonesia	dfputra@unsyiah.ac.id	Study of growth and morphological development of Tilapia (<i>Oreochromis niloticus</i>) larvae in BBI Lukup Badak, Aceh Tengah
8	12.05 - 12.10	INS21-P-074	Rosi Rahayu	Departmen of Fisheries Resource Utilization	rosirahayu88874@gmail.com	Fishing Vessel Queue in Kuta Radja Fishing Port
9	12.10 - 12.15	INS21-P-080	Nurfadillah	Department of Aquaculture, Faculty of Marine and Fisheries Universitas Syiah Kuala	nurfadillah@unsyiah.ac.id	Polyculture of Tilapia (<i>Oreochromis niloticus</i>) and Lemeduk (<i>Barbonymus schwanenfeldii</i>) in floating net cages as a strategy for utilizing natural food
Break (Dzuhur Prayer)						

ORAL SESSION						
13.25 - 13.30		Room Registration				
13.30- 13.50		Invited Speaker	Dr. Nur Fadli	Universitas Syiah Kuala, Indonesia		Genetic Conservation of Groupers (Family Epinephelidae) in Aceh, Indonesia
1	13.50 - 14.00	INS21-P-013	Viqqi Kurnianda	Department of Marine Science, Faculty of Marine and Fisheries, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia	viqqikurnianda@unsyiah.ac.id	Biodiversity of the Indonesian Marine Sponge Genus Aaptos with Molecular Networking Approach
2	14.00 - 14.10	INS21-P-002	Ichsan Rusydi	Department of Marine Science, Faculty of Marine and Fisheries, Universitas Syiah Kuala (USK)	ichsanrusydi@unsyiah.ac.id	Study of the prevalence and intensity of ectoparasites in cultivated Green Mussel (<i>Perna viridis</i> L.) in Alue Naga Waters, Banda Aceh
3	14.10 - 14.20	INS21-P-019	Sulistiono	IPB University	onosulistiono@gmail.com	Diversity, Distribution and Species Status of the Fish in Banten Bay
4	14.20 - 14.30	INS21-P-029	Muhammad Algifari	Universitas Hasanuddin	nadiarti@unhas.ac.id	Epifaunal Community Structure in the Tropical Seagrass Beds of Barrang Lompo Island, Makassar Indonesia
5	14.30 - 14.40	INS21-P-031	Mai Suriani/Nurul Najmi	Teuku Umar University	nurulnajmi@utu.ac.id	Community Structure of Marine Plankton from Gosong Island waters, Southwest Aceh
6	14.40 - 14.50	INS21-P-056	Sri Jumiati/Nur Fadli	Universitas Syiah Kuala	nurfadli@unsyiah.ac.id	Length-weight relationships and condition factors of Cephalopholis argus harvested in the northern coast of Aceh, Indonesia
7	14.50 - 15.00	INS21-P-060	Gatut Bintoro	FPIK Universitas Brawijaya	gbintoro@ub.ac.id	Utilization Status and Length-Weight Relationship of Longtail Tuna (<i>Thunnus Tonggol</i>) Caught in Indramayu Waters West Java
8	15.00 - 15.10	INS21-P-061	Muhammadar Abdullah Abbas	Faculty of Marine and Fisheries, Universitas Syiah Kuala	muhammadar@unsyiah.ac.id	Proximate Composition and Fatty Acids Profiling of Sea Horse Originated From Simeulue, Aceh-Indonesia
9	15.10 - 15.20	INS21-P-067	Suci Budi Faradilla	Marine Sciences Department, Marine and Fisheries Faculty, Universitas Syiah Kuala, Darussalam, Banda Aceh, Indonesia. 23111	s.karina@unsyiah.ac.id	Secondary Metabolites Screening of Echinothrix Diadema from Iboih Waters, Weh Island, Indonesia

Keynote Speakers

Prof. Shu-Kun Hsu

National Central University, Taiwan

Seabed Gas Emissions and Their Implications

Shu Kun Hsu

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Emission of gases out of seafloor is a common feature around the world. Particularly, gas emissions would occur in the places bearing gas hydrates or of active volcanic regions. The former is usually at the polar regions or in the continental margins. Because the emitting gases often contain methane or carbon dioxide, two greenhouse gases, they might jeopardize our submarine environment or climatic system of the Earth. The usual features indicating gas emission out of seabed are gas plumes (or gas flares) in water column, pockmarks on the seafloor or seismic blanking phenomena in seabed. The emission of gases is related to the overlying load; therefore, the submarine gas emission phenomenon is generally periodic. Here, examples from the areas of offshore SW Taiwan and of offshore NE Taiwan are illustrated. Off southwest Taiwan, the BSR (bottom simulating reflector) phenomenon is widespread, implying a rich reserve of gas hydrate. The gas hydrate dissociation off SW Taiwan generally occurs at a water depth of ~600 meters. The dissociated gases may migrate landward in the region where the initial orogeny of southern Taiwan has occurred between the Philippine Sea Plate and the Eurasian Plate. In consequence, mud diapirs are distributed in the offshore and onshore area of southern Taiwan. Additionally, some upward migrating gases with strong flux could create mud volcanoes. The migrating gases in the seabed may also cause continental slope instability. On the other hand, the offshore area of northeast Taiwan belongs to the westernmost Okinawa Trough back-arc basin. Because the fast rifting of the southern Okinawa Trough, its back-arc volcanism is very active. Gas plumes are also widespread. However, those gas plumes seem to be associated with newly hydrothermal sites, instead of well-developed volcanic seamounts. Those gas plume sites are particularly of interest in terms of submarine mineral ores.

Keywords: gas emission; gas plume; seabed; pockmark; gas hydrate; hydrothermal; Taiwan.

Prof. Dr. Kasi Marimuthu

AIMST University, Malaysia

Immunostimulants Application in Sustainable Aquaculture

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Globally fish culture is an important industry where the production of fish significantly increases every year. In intensive fish farming practices, stressors like overcrowding, transport, handling, size grading, and poor water quality are common problems. The increased intensification of aquaculture has led to a high number of disease outbreaks with an increasing range of pathogens, resulting in high mortality and leading to great economic losses in aquaculture. It has been widely demonstrated that farmed fish are more susceptible to various pathogenic microbes. In order to improve the health conditions of aquatic organisms, several technical strategies including improved husbandry, nutrition, and better water quality, optimal stocking density, and use of vaccines, probiotics, and immunostimulants have been proposed in recent years. Prophylaxis, based on sanitary isolation, is difficult to achieve and impractical due to the presence of other fish species, invertebrates, or the water itself. Antibiotic therapy is a frequently used strategy in intensive rearing of fish but can result in enhanced microbial resistance, accumulation of residues in tissues, and immunosuppression in fish. Hence, the enhancement of the immune system of fish is considered the most promising method of preventing fish diseases in aquaculture. This enhancement can be achieved with the application of vaccines, which enhance the specific immune response of the fish and are considered to be the most effective agents. Further, the use of antibiotics and chemotherapeutics to combat fish diseases has several drawbacks such as the risk of generating resistant pathogens, bioaccumulation, and environmental pollution. The available commercial vaccines are expensive for fish farmers and are specific against particular pathogens. In contrast to vaccines, immunostimulants enhance the non-specific immune response of fish. The use of immunostimulants as an alternative to the drugs, chemicals, and antibiotics which are currently being used to control fish diseases in aquaculture is attracting the attention of many farmers as well as researchers. The use of immunostimulants as dietary supplements can improve the innate defense of fish that providing resistance to pathogens in periods of high stress during grading and reproduction. Several immunostimulants namely glucan, chitin, lactoferrin, levamisole, and some medicinal plant extracts or biologically derived products have been used to control fish diseases. The major components of the innate immune system of fish are macrophages, monocytes, granulocytes, and humoral elements, like lysozyme which are reported by many researchers in detail. Several biological and synthetic compounds have also been shown to enhance the nonspecific immune system of cultivated fish. In this context, numerous studies have focused on the use of medicinal plant products as potential therapeutic measures for modulating the immune response and are specifically to prevent and control fish diseases. This review will highlight the research being carried out on the utilization of animal and plant-originated products or compounds that have been explored and shown to enhance the immune system of fish for sustainable aquaculture.

Keywords: Immunostimulants, herbal, fishes, sustainable aquaculture.

Dr. Morelia Urlaub

GEOMAR, Germany

F flank Instability of Coastal and Ocean Island Volcanoes – a Shoreline Crossing Process

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Volcanoes are among the most rapidly growing geological structures on Earth. Consequently, their edifices suffer structural instability that may result in lateral flank collapses, such as the 1980 Mt St Helens event or the 2018 collapse of Anak Krakatau (Indonesia). The seafloor displays the geological remnants of collapses of nearly all ocean island volcanoes, including Hawaii and the Canary Islands. Such collapses of coastal and ocean island volcanoes can cause damaging tsunamis and thus pose ocean-wide hazards. However, it is difficult to evaluate their hazard potential mainly due to a lack of understanding of the causes of collapse. For coastal and ocean island volcanoes, most research and the vast majority of monitoring activities are biased towards the often comparatively small part of the volcano above sea level, while the largest part of the volcanic edifice is typically submerged in water. Despite this stark contrast, much less is known about the submarine areas as they are much harder to access. Using the example of Mount Etna (Italy) as well as several other case studies, I demonstrate that shoreline crossing analyses of volcano-tectonic structures and edifice deformation are necessary for understanding the mechanisms that control the volcano's structural stability. Data acquisition and monitoring in the deep sea is technologically and logistically challenging, but possible. It significantly extends onshore data sets with the potential to transform our current understanding and approaches to monitoring volcano hazards.

Keywords: geohazards, flank collapse, seafloor deformation, submarine monitoring

Dr. Ir. Irwan Meilano, M.Sc

Bandung Institute of Technology, Indonesia

Lessons from the Destructive Earthquake in Palu and Ambon: Perspectives from Earth Science

Irwan Meilano

Faculty of Earth Sciences and Technology

Institute of Technology Bandung (ITB)

The Palu earthquake M7.5 2018 was followed by three very unusual phenomena: ground rupture, tsunamis, and liquefaction-induced landslides. Although the source of the Palu earthquake has been listed in Indonesia's earthquake map, the number of victims due to this disaster reached 4,340 dead, more than 70,000 buildings were damaged, and the number of refugees was 70,821. A year after the Palu earthquake, eastern Indonesia experienced the M6.2 2019 Ambon earthquake. A total of 41 people died, and 1,578 others were injured. More than 6,000 buildings were damaged or destroyed across Ambon and Maluku. More than 150,000 people were evacuated and set up temporary camps due to fears of aftershocks and building collapses. The earthquake in Ambon originated from a fault that had not been previously defined in the Indonesian earthquake hazard map. The case of Palu and Ambon earthquake have many unique challenges, unusual problems, and the tradeoff between earth science, legal rules, community involvement, and disaster knowledge.

Invited Speakers

Dr. Frauke Klingelhofer

IFREMER, France

The French Research Institute Ifremer and The French Caribbean Research Projects.....

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Ifremer, the french national institute for Ocean Science conducts research which is grounded in sustainable development and open science. It coordinates the french research fleet, including 11 vessels, a manned submersible, two remotely operated vehicles and two autonomous underwater vehicles. The research areas include marine and digital infrastructures, biological resources and environment, oceanography and ecosystem dynamics, and physical resources and deep-sea ecosystems. Since 2008 Ifremer has conducted and participated in several research cruises in the Caribbean region, in the scope of the "Law of the Sea" project, e.g. the Antiplac cruise in 2008, or as research projects, e.g. the Antithesis cruises in 2013 and 2015. Main focus of the research projects were in the Lesser Antilles region, where several deep seismic cruises were conducted and offshore Haiti, with a seismological recording of the aftershocks of the 2010 Haiti (Mg 7.0) earthquake. For the future, several follow-up projects are being prepared, both in the Lesser Antilles subduction zone, with a 3D wide-angle seismic data acquisition followed by coring of fluid extrusion sites (Manta-Ray cruise scheduled for 2022), and offshore Haiti, combining a deep seismic experiment with a study of fluid behaviour in the main faults (Haïti-TWiST cruise possibly scheduled in 2023 or 2024). The results of these cruises will be the base for the IODP drilling proposition Haïti-Drill. This presentation will give a description of the Ifremer institute, show a summary of the most important results from past cruises in the Caribbean region and expose the future projects.

Keywords: Antilles, seismic data acquisition, earthquakes, deep structure

Prof. Marc-Andre Gutscher

Universite de Bretagne Occidentale, France

Monitoring an Active Submarine Fault (Offshore Catania, Sicily) Using a 6-Km Long Fiber-Optic Strain Cable: The FOCUS Experiment

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In October 2020 we deployed a 6-km long fiber-optic strain cable across an active fault on the seafloor 25 km offshore Catania Sicily (an urban area of 1 million people) to monitor possible tectonic movement using laser reflectometry. Brillouin Optical Time Domain Reflectometry (BOTDR) is commonly used for structural health monitoring (bridges, dams, etc.) and under ideal conditions, can measure small strains (10⁻⁶) along a fiber-optic cable. The FocusX1 expedition, (6-21 October 2020) onboard the vessel Pourquoi Pas? was the first experiment of the European funded FOCUS project (ERC Advanced Grant). We performed micro-bathymetric mapping using the ROV Victor6000 to select the best path for the cable track. Next we connected a custom designed 6-km long fiber-optic cable (Nexans Norway) to the Test Site South seafloor observatory (operated by INFN-LNS) in 2100 m water depth via a new Y-junction frame and cable-end module. The cable was deployed using a deep-water cable-laying plow system to bury the cable 20 cm in the soft sediments and increase coupling with the seafloor. The cable track crosses the North Alfeo Fault at four locations. Laser monitoring began on 18 October 2020 and is being calibrated by a network of eight seafloor geodetic instruments (ixblue Canopus acoustic beacons) deployed on 15 October 2020 (for 3 - 4 years). During the FocusX2 expedition, scheduled in January 2022, a passive seismological experiment is planned to record regional seismicity. It will consist of a temporary network of 31 Ocean Bottom Seismometers (OBS) on the seafloor and seismic stations on land, supplemented by INGV permanent land stations. The simultaneous use of laser reflectometry, seafloor geodetic stations as well as seismological land and sea stations will provide an integrated system for monitoring a wide range of slipping event types along the North Alfeo Fault (e.g. - creep, slow-slip, rupture). A long-term goal of the project is the development of dual-use telecom cables with industry partners.

Keywords: tectonics; monitoring; active faults; earthquakes; laser reflectometry; fiber-optics, submarine cables, Sicily, Mediterranean.

Dr. Zarina Md Nor
Universiti Sains Malaysia, Malaysia

Precarious Employment amongst Low Income Single Mothers in Malaysia: The Implications on Family Wellbeing

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Single motherhood has been well documented to have adverse impacts on financial wellbeing and they are prone to fall into poverty trap. In Malaysia, the term single mother generally refers to widowed and divorced mothers. Income earned from employment is one of the main sources of livelihood for single mothers, which sometimes supplemented by child support and other transfers such as pension, welfare assistance, tithes (zakat) and hands out. The types of employment held by low income single mothers are rather limited due to their level of educational attainment, locality, mobility and childcare responsibility. These barriers seem to restrict their work choices and they have to find ways around it, usually by entering informal employment or self-employment sector. This study discusses employment characteristics of single mothers from the lowest quantile of the society. It is important to explore this issue as these mothers are likely raising their children in constant hardship. This study employs a qualitative quest to gain a deeper understanding of this issue. The respondents of this study come from different states in Peninsular Malaysia. Upon completion of this study, we could suggest that precarious employment of single mothers posed a real threat for the wellbeing of their family. Those involved in informal sectors are the most vulnerable. Without a proper employment contract as in formal sectors, they have no work benefits or protection against unforeseen circumstances. Insufficient and irregular income worry them endlessly as the survival of their family is at stake. Moreover, worries about financial situation could also lead to other health concerns. The findings of this study emphasize urgency of government intervention that is well planned and targeted. The society at large should also be more sensitive and empathetic towards single mothers and their children. Indeed, children living in poverty should not be tolerated at all.

Keywords: single mothers, employment, financial wellbeing, poverty, Malaysia

Muhammad Nasir Badu, Ph.D

Universitas Hasanuddin, Indonesia

People Smuggling to Australia: an Overview of Maritime Transnational Crime

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The purpose of this study is to find out people smuggling operations to Australia carried out in Indonesia. This study uses a research method that relies on qualitative descriptive analysis with data collection carried out by literature review, interviews, observations, and archival records to obtain primary and secondary data. The results show that people smuggling crimes in Indonesia occur because of the desire of refugees to leave immediately to Australia prior to the call to depart in accordance with UNHCR and recipient country requirements. The crime of people smuggling in Indonesia involves various parties, namely international syndicates, government employees, soldiers and fishermen. This crime was committed by sea.

Keywords: transnational crime, maritime, people smuggling, refugees, Indonesia and Australia

Do Hai Yen

Tan Trao University, Vietnam

European Union – Vietnam Free Trade Agreement (EVFTA): Opportunities and Challenges for Vietnam's Seafood Exports

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The EVFTA has come into force from August 1, 2020. This Agreement has opened up many opportunities for Vietnam's seafood industry to export to European markets, but it also faces many difficulties and challenges. The number of enterprises participating in exporting seafood to the EU has increased by 15% per month. However, they also face typical difficulties and challenges such as: the application of documents and certification regulations required by the EU, traceability issues, dumping. By using the SWOT analysis tool, the study proposes solutions to promote Vietnam's seafood exports in the coming time as follows: 1) raising awareness, responsibility and technology for aquaculture farmers; 2) improving the competitiveness of enterprises in the seafood industry; 3) the government should continue to implement effective policies to support production and trade for the seafood export activities.

Keywords: EVFTA, Seafood export, SWOT, opportunities, challenges

Prof. Hasrita Lubis
UISU, Indonesia

Higher Education in The Era of Revolution 4.0

Hasrita Lubis

Universitas Islam Sumatera Utara, Indonesia

Higher education undergoes changes in every process of the Industrial revolution. Likewise, at the beginning of the Fourth Industrial Revolution (Schwab, 2015). There has been an almost unprecedented change in the past, therefore there are opportunities to implement digital technology, which is known as Education 4.0 (Feldman, 2018). Over time, society has experienced systemic changes, in the face of Education 4.0 which is a challenge for higher education to give a positive response to students. Aspects of change include access to knowledge, knowledge transformation, and the high expectation that students have for their voices to be heard and become an integral part of their learning planning. However, the opening of opportunities for the implementation of digital technology needs to be managed very wisely in terms of the business world and the world of work.

Keywords: *Education 4.0; student voice; higher education; learning objectives; Revolution.*

Dr. Nur Fadli

Universitas Syiah Kuala, Indonesia

Genetic Conservation of Groupers (family Epinephelidae) in Aceh, Indonesia

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The groupers (family Epinephelidae) are among the most important commercial fish groups globally, including in the Aceh region, with many members under threat of extinction. Even though the groupers have high economic value and market demand in Aceh, there is still limited information on their bio-ecology and their molecular information. Therefore, to address these issues, molecular-based studies were conducted in the Aceh region. The study was utilized molecular markers (mainly mitochondrial DNA) to (1) DNA barcoding of commercially important groupers in Aceh, (2) Observe phylogeography pattern of several grouper species in the Aceh and Indo Malay Archipelago region (IMA), and (3) Population genetics of the aeorlate grouper (*Epinephelus aeorlatus*) in the IMA. Sampling was conducted in Aceh and across the Indo-Malaya Archipelago for specific objectives. The study found that Aceh has high grouper diversity, as revealed by the DNA barcode. In addition, the phylogeography study revealed genetic structuring for *Epinephelus areolatus* in the IMA region. At least two discrete *E. areolatus* lineages were detected encompassing the IMA region (western part of IMA and a combined central and eastern lineage of IMA) as revealed by population genetic analyses. Therefore, the fish populations should be treated as a separate management unit in management and conservation. Overall, the molecular data collected from this study would be beneficial for the future management plan of grouper in Aceh and Indonesia.

Keywords: Kerapu, reef fish, molecular genetics, phylogeography, population genetic.

Participants

Depiction of Typhoon Mangkhut (2018) and Its Impact Based on Satellite Observations

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Typhoons play a critical role in controlling the earth's heat balance. In addition, typhoons can be devastating natural disasters that threaten society's long-term sustainability and growth. Nevertheless, the impacts of typhoon Mangkhut that occurred in mid-September 2018 on meteorological and oceanographic conditions have not been described in detail. Therefore, this study aims to describe the typhoon Mangkhut and its impact on meteorological and oceanographic conditions over Hong Kong and the northern coast of the Philippines, respectively. Focusing the analysis on remote sensing data, multi-sensor satellite data were employed to investigate the ocean parameter changes as the typhoon pass over the Pacific Ocean. Daily meteorological data at five weather stations in Hong Kong were collected to examine the impact of typhoon Mangkhut on meteorological conditions when it made landfall over Hong Kong. A comparison of the satellite-derived sea surface temperature (SST) product was carried out with the ocean temperature profiles obtained from Argo floats. The results showed the wind speed and rainfall (air temperature and air pressure) in the five weather stations are significantly increased (decreased) as the typhoon made landfall over Hong Kong on 15 Sep. The cooling of SST was observed up to -4°C within the Category-5 time period. Based on the sea surface height data, the typhoon Mangkhut enhanced the negative mean value sea level anomaly (10 to 20 cm) over the Pacific Ocean. The enhancement of chlorophyll-a is also observed during the typhoon period. The increment is up to 2.7-4.3 mg m⁻³ on the eastern coast of Hong Kong. Typhoon Mangkhut also depressed the thermocline layer which indicates an upwelling event in the northern coast of the Philippines followed by positive chlorophyll-a and negative SST anomaly values. These results indicate remote sensing data has great potential for monitoring typhoon events and their impact on ocean conditions.

Keywords: typhoon Mangkhut; sea surface temperature; chlorophyll; satellite; upwelling.

Design and Development of Low-Cost Multiparameter Ocean Observation Instrument

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Indonesian waters have unique and complex water mass characteristics, therefore valid and real-time measurement of valid oceanographic data is needed to monitor oceanographic conditions in Indonesia, but in fact, in situ measurements require time, effort and expensive costs. The purpose of this research is to design a simple prototype of a multiparameter marine observation instrument based on the Arduino Uno integrated microcontroller with a pump system and low cost. The stages in the research include manufacturing design, tool system design, component installation and data validation test. It is made in a compact shape with acrylic base material and is equipped with three main sensors namely, conductivity sensor, pH and DS18B20 for temperature. This instrument is said to be successful if the measurement data results have an error value of $\pm 5\%$ and accuracy value of $\geq 95\%$.

Keywords: Instrumentation; Microcontrollers; Sensors; Arduino; Oceanographic Parameters; Ocean Monitoring.

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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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 95 questionnaires representing local government, Local NGOs, and communities were conducted. The results of the research stated 70 hotspots derived from questionnaires are located in Muara Kuntul and 30 hotspots are located in Muara Pecah. The visualization results of oceanographic parameters of currents, wind, and tides in April, July, August 2021 show that the direction and energy of the parameters come from Jakarta Bay into Muara Gembong through Muara Jaya until Muara Bendera. Based on the appropriate data between the results of public perception research and oceanographic conditions obtained similarity that show the suitability of hotspot locations and most of garbage in the research area has come from other places.

Keywords: Citarum; Plastic Waste; Hotspot; Perception; Oceanography; Muara Gembong

Social, Cultural, Economic and Mangrove Resources of Gampong Lapeng, Pulo Breuh Aceh Besar

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Socio-cultural and economic of a community will be able to help provide information related to the condition of the community. Mangroves are plants that are the result of cultivation activities or taken from nature. This study aims to determine the social, cultural, economic and also the condition of the remaining mangroves in Lapeng Village. In addition, to get to know the preservation of culture and customs in Lapeng Village. The benefit of this activity is to provide information and knowledge. This research uses descriptive qualitative method with 5 research subjects. The plot used in this research is 1 plot of 50x50 meters. The results showed that the social conditions of the Lapeng community were open and friendly in receiving guests who came to visit. A very strong culture in Lapeng village is the recommendation not to go to sea on Fridays. The economic condition of Lapeng villagers depends on the weather and sea season. In the east wind season, the income generated at sea will decrease in nominal value because fishermen can find fish easily. The types of mangroves in Lapeng Village are Rhizophora and Avicennia.

Keywords: Socio-Cultural, Economic, Mangrove

Aquatic Environmental Characteristic of Singkil Swamp Wildlife Reserve in Aceh Singkil Regency as Basis of Freshwater Fisheries

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Singkil Swamp Wildlife Reserve is a peat swamp ecosystem located in Aceh Singkil Regency, Aceh Province. Peat swamp ecosystems have an important function in protecting and balancing water systems, carbon stocks and biodiversity conservation. However, information on the characteristics of the waters of this ecosystem is still not widely known. This study aims to determine the aquatic environmental characteristics of the Singkil Swamp Wildlife Reserve covering the physical and chemical parameters of the water and the relationship between those parameters. Sampling was carried out through field observations both in-situ and ex-situ at 5 stations for 3 months (April-June 2021). Observations were made on water quality parameters namely temperature, transparency, depth, current, color, water smell, pH, DO, TDS, TSS, conductivity, phosphate and nitrate. Analysis of the data was conducted, namely correlation analysis and PCA (Principal Component Analysis). The water color is black and acidic which is a characteristic of swamp waters. The results of the measurement of water quality parameters indicate that TDS (17.67-26.33 mg/l), TSS (61.5-122.5 mg/l), phosphate (0.02-1.16 mg/l), and nitrate (9.55-15.45 mg/l) were suitable for freshwater fish farming, livestock and crop irrigation. Based on the grouping of station conditions, station 1 tends to have a higher value expressed by the main components such as temperature, pH, TDS, conductivity and phosphate.

Keywords: Water Quality, Freshwater, Peat Swamp

The Appearance and Relationship between Madden-Julian Oscillation and Sea Surface Temperature in Tropics Area in 2010 – 2020

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Indonesia, located in the tropical area, is heavily affected by various global, regional or local weather phenomena, one of which is the MJO (Madden-Julian Oscillation). At its active stage, MJO has been shown to increase the probability of extreme weather in Indonesia about 60-90% by the increase of rainfall intensity. This condition is supported by SST conditions and wind circulation disturbances that encourage the process of evaporation from the sea to form convective clouds. Therefore, in this study, the relationship between MJO active in phase 3, 4, 5, and 6 and SST conditions will be analyzed spatially and temporally. This study is conducted from 2010 -2020 uses qualitative and quantitative methods. Quantitative analysis is used to determine the large correlation between active MJO and SST conditions in Indonesian waters. In addition to the RMM1 and 2, MW_IR OISST (microwave-infrared optimum interpolation sea surface temperature). The results of this study showed that MJO active in Indonesia every year and reaches its peak every three years, namely in 2012, 2015, and 2018, except when MJO active in phase 3. The coefficient of correlation between MJO intensity and SST indicates the highest value when MJO active in phase 6 in 2017, which is -0.996. While the lowest correlation coefficient values occur when MJO is active in phase 3 in 2020 at -0.02.

Keywords: Madden-Julian Oscillation, Sea Surface Temperature, Heat Flux, Saturation, Rainfall Intensity

Assessment of Water Quality Based on Biological Indices of Macroenthos: a River Under Pressure from Tourism Activities

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Cijulang River is one of the leading ecotourism objects in Pangandaran, West Java Province, Indonesia. However, the river has a variety of activities that can increase the water pollution in the river such as Green Canyon cliffs tourism, ecotourism of mangrove conservation, housing, and industrial siting. Macroenthos is one of the bio-indicators that can assess the rate of water pollution in rivers, especially their organic pollutants. Therefore, this research aims to determine water pollution status in Cijulang River Tourism by comparing various biotic indices. The study was conducted at four site sampling locations from upstream to downstream in the rainy season period and dry season period using different methods namely, line transect model, water quality assessment by biological indexing (diversity, species dominant, and family biotic), species deficit, and organic measurement. The research showed 5873 macroenthos and divided into 27 species with an average abundance of 167 ind.m⁻² and are mainly dominated by gastropod species *Faunus ater* (40%). They are extreme species that can live in high organic pollution and water salinity. This divided the research of quality water assessment of Cijulang River into three categories as follows: slightly polluted (score 36-46) at Green Canyon site, moderately polluted (score 50-60) at Boat Shelter and Muara Cijulang location, and highly polluted (score 66) at Nusawiru site.

Keywords: Pangandaran, Bio-Indicator, Organic, Pollution

Measuring and decomposing Productivity of Fisheries SMEs in Indonesia

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This study empirically explores relative productivity and its decompositions of the fisheries SMEs across 23 districts/cities in Aceh province, Indonesia over the period 2016-2020. The study gathered primary data by distributing questionnaires to select fisheries SMEs using a stratified random sampling technique. Data Envelopment Analysis (DEA) approach is used to measure relative productivity of the fisheries SMEs, while the Malmquist Total Factor Productivity (TFP) index is utilized to measure productivity decompositions. The study documented a low productivity level of fisheries SMEs across the province. Changes in efficiency level are recorded as the highest contributor to the TFP of fisheries SMEs as compared to their technical efficiency changes. These findings suggested that to improve their TFP; the fisheries SMEs incessantly improve technical efficiency by adopting good business governance principles and expansively utilizing information and communication technology facilities. Fisheries SMEs need to take full advantage of existing financial resources, select, and combine the right mix of inputs to produce the highest output. Finally, the government is advised to prioritize improving the performance of fisheries SMEs that have lower TFPs across the province by providing additional capital aids and various training programs to enhance their entrepreneurial and managerial skills in a sustainable manner.

Keywords: Efficiency; Technical Efficiency; DEA; Fishery and Aquaculture Sector.

Study of the Prevalence and Intensity of Ectoparasites in Cultivated Green Mussel (*Perna viridis* L.) in Alue Naga Waters, Banda Aceh

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Parasites are a major problem in the survival of biota or green mussels because parasites are organisms that live in other organisms. Parasites can harm the host they live in because these organisms will absorb nutrients from the host they live on, damage tissues and cause infection. This study aims to examine the types of ectoparasites and to determine the prevalence and intensity values of green mussels (*Perna viridis* L.) cultivated in the Alue Naga reservoir, Banda Aceh. The study was conducted in July 2020, identification of parasites was carried out at the Fish Quarantine Station, Quality Control and Safety of Class 1 Fishery Products in Aceh. The research method used was a survey method with a sampling technique using random sampling. Observations were made visually and using a microscope on the target organs in the shell, gills and mantle. Furthermore, the parasites found in green mussels were identified using the Kabata book (1984). Based on the research results found 4 types of ectoparasites, namely cysts perkinsus sp. (Protozoa) on the coat, *Balanus* sp. (Crustacea) on the shell, Monogenea (platyhelminthes) on the gills, Copepoda (Crustacea) on the gills, and it is known that the highest intensity value is 1.16 and the highest prevalence value is 74%. parasite barnacles (*Balanus* sp.), while the lowest intensity value is 1 and the prevalence value is 1% cysts perkinsus sp. The water quality values were pH 8.7, temperature 29 C, dissolved oxygen 4.8 Ppm, salinity 31 Ppt, depth 1.53 m, brightness 70 cm, and current 17 m / s. The value of water quality parameters in Alue Naga waters is still in optimum condition for the growth of green mussels.

Keywords: Random sampling, *Perna viridis* L., *Balanus* sp., *Perkinsus* sp. Cysts, parasites.

The Impact of Current Speed on Sea Surface Temperature and Salinity Patterns in the Bay of Bengal

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The Bay of Bengal is a semi-enclosed bay basin with its southern side open and in direct contact with the Indian Ocean. In the north it is bordered by mainland Bangladesh and in the east it is bordered by the Andaman Sea. The Indian Ocean Monsoon System, which has a tropical climate, distributes the conditions of circulation movement. Therefore, the current circulation is very influential in the condition of the ocean parameters. The purpose of this study was to examine the effect of current velocity on the distribution pattern of sea surface temperature (SST) and sea surface salinity (SSS) in February and August in 2017 in the waters of the Bay of Bengal. This study uses the results of HYCOM data for the main parameters, namely current, temperature and salinity which were analyzed with the calculation results of NCEP precipitation data and ECMWF data for evaporation. The results of the data obtained in February showed the average current velocity conditions and low SST and relatively high SSS in the south. In August the average current speed and SST is high and SSS is low. The results of the average data of low rainfall and relatively low evaporation are produced in February, the results of the average high rainfall and relatively high evaporation are produced in August. The resulting value gives the results of the relationship between current circulation and changes in parameter conditions in the waters.

Keywords: Bay of Bengal, HYCOM, Current Speed, SST, SSS, Monsoon.

Role of Artificial Intelligence & Human Resource Management in Education Sector

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This paper presents the usage of modernized thinking in HR in light of changes of advancement in the Education Sector. For all intents and purposes, all affiliations are using man-made awareness to construct adequacy of HR in the Education Sector. The movement begins with motorized strategy in enlistment till execution assessment of agents. Various leveled pioneers and human resources. We will discuss both points of view in this article, as people acknowledge man-made cognizance as a guide and a threat to their occupations. We have dismembered a segment of the top associations as a reference which is into modernized thinking for our assessment. We have focused on the challenges and limitations of man-made thinking in the current business circumstance. The examination will in like manner give a brief perception of things to come objective of modernized thinking.

Alternative KITS and Worksheets on Light and Optics as Science Experimental Devices at Home for Middle School Student

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The aims of this research concerned to develop an alternative kits and worksheet on light and optics as science experimental devices at home for middle school student. The method used is a research and development. Alternative kits and worksheet has been tested for feasibility through empirical testing and validation. The research data were analyzed by calculated the index of each indicator instrument experiment. The result showed that science experimental devices is appropriate for home learning activity according to evaluation by a material expert and peer reviewers as well as according to result of middle school students try outs with respective high category.

Keywords: Alternative Kits; Worksheets; Light and Optics; Experimental Devices

Learning Management Strategy New Normal Era

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The Covid-19 pandemic has an impact on various sectors of life, including in learning activities. The government as a decision maker makes policies to carry out online learning activities in order to slow the spread of Covid-19. Principals as leaders in learning activities require the right strategy in implementing online learning that supports government policies. The strategy used in school management in the era of new habits due to the Covid-19 pandemic is expected to be able to maintain the quality of learning activities as in the pre-pandemic period in the schools they lead. The purpose of this study was to determine the principal's leadership strategy in dealing with learning in the era of new habits. The method used was a qualitative method. From the results of the study, it can be concluded that the principal's leadership strategies in dealing with learning in the new era of habits is; 1) to make online learning policies in schools by involving relevant teachers and school officials; 2) to improve the facilities and quality of ICT infrastructure in learning activities in schools; 3) to improve the quality of human resources in integrating IT for learning activities; 4) to communicate with parents or guardians of students; 5) to provide understanding to students about online learning activities; 6) to be ready and open in dealing with the changes in learning activities in the future.

Keywords: Strategy; Leadership; Management; Learning; New Normal Era; Covid-19

Impacts of climate change on coastal province and cities of Vietnam – reality and emerging problems

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Vietnam is a country with thousands of kilometers of coastline. Therefore, when climate change takes place more and more strongly, it has had a great impact on many fields of life of Vietnam in coastal areas and cities. Fields of life which are agricultural production, residential development planning along the coast, shrinking territory, health, habitat, biodiversity and some other issues are seriously affected by climate change. From the above issues, Vietnam faces many risks and challenges to deal with climate change; Thereby, it is necessary for Vietnam to propose solutions to minimize bad and negative impacts and some solutions to adapt to the above situation.

Keywords: climate, climate change, coastal provinces and cities, Vietnam

Community Structure of Invasive Aquatic Invertebrates in Coral Reef Ecosystems in the KKPD PISISI Simeulue

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This study aims to determine the structure of invasive aquatic invertebrate communities comparison of abundance of invasive aquatic invertebrates with the coral cover on coral reef ecosystems in PISISI KKPD. This research was conducted in September 2019 using the purposive sampling method, while the acquisition of invasive aquatic invertebrate data using belt transect method and coral reef data collection using the Point Intercept Transect (PIT) method. The results of the study found that the structure of invasive aquatic invertebrates in PISISI KKPD was in a good category as indicated by the total abundance of invasive aquatic invertebrates by 39.67 ind/m², the index of invasive aquatic invertebrate diversity by 1.50 with the moderate category, the uniformity index by 1,06 with a high category and a dominance index of 0.44 with a low category. The distribution of invasive aquatic invertebrates in KKPD PISISI belongs to the distribution of clusters. Comparison of the highest invasive invertebrate water abundance was 12.83 ind/m² and the percentage of coral cover was 29.83% and the lowest abundance of invasive invertebrate water was 3.67 ind/m² and the percentage of coral cover was 54.67% indicating the influence between the abundance of aquatic invertebrates invasive of the percentage of coral cover.

Keywords: Invasive Aquatic Invertebrates; Distribution; Community Structure; Coral Reef

Intellectual Capital and Islamic Corporate Social Responsibility on The Financial Performance of Sharia Commercial Banks in Indonesia

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This study aims to examine Intellectual Capital, Islamic Corporate Social Responsibility on the Financial Performance of Islamic Commercial Banks in Indonesia based on the Islamicity Performance Index. The dependent variable is the Financial Performance of Islamic Commercial Banks in Indonesia based on the Islamicity Performance Index. The independent variables used in this study are Intellectual Capital and Islamic Corporate Social Responsibility. The population in this study is 14 Islamic banking companies. The sampling technique used purposive sampling, as many as 8 Islamic banking 2016-2019. The data were analyzed using Partial Least Square (PLS) tools. General Sharia based on Islamic City Performance Index with indicators of Equitable Distribution Ratio and Profit Sharing Ratio. Islamic Corporate Social Responsibility has no effect on the Islamic City Performance Index with indicators of Equitable Distribution Ratio and Profit Sharing Ratio.

Keywords: Intellectual "Capital (IC), Structural Capital Value Added (STVA), Islamic Corporate Social Responsibility (ICSR), Sharia Commercial Bank Performance, Islamicity Performance Index, Equitable Distribution Ratio (EDR), Profit Sharing Ratio" (PSR).

Two-Dimensional Hydrodynamics in the West Coast of Aceh Besar: an Overview of Tidal Dynamics and Wind Forces

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This study examines tidal hydrodynamics and wind force in the western waters of Aceh Besar, the Lhoknga area, which is an industrial area on the west coast of Aceh Besar. This study is important to evaluate the existing condition of the Lhok Nga waters and mitigate environmental changes in the future. The research method is based on numerical simulation of 2D tidal hydrodynamics of M2, S2, N2, K1, and O1 components and the influence of wind force. The results show that the tidal range in Lhok Nga waters reaches 1.02 meters (RMSE=0.0526). In general, the tidal current circulation moves from the north and south to the offshore. Tidal currents are more dominant in influencing the total current circulation than wind force. However, winds especially during the Northeast monsoon (NEM) strengthen the circulation of tidal currents heading offshore. This effect tends to be greater than during the Southwest monsoon (SWM).

Keywords: 2D Hydrodynamics; Northeast Monsoon; Southwest Monsoon; Full Moon; Tidal Component.

Biodiversity of the Indonesian Marine Sponge Genus *Aaptos* with Molecular Networking Approach

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Many natural products have been isolated from the cryptic species of the Indonesian marine sponge. Despite this, it remains unclear how sponges produce such a diverse array of metabolites and their relationship to sponge diversity. During our expedition in 2017-2019, we collected the Indonesian marine sponge genus *Aaptos*, which was found surrounding Aceh and Sabang Islands, the western part of the Indonesian archipelago. Further, all specimens were subjected to a feature-based molecular networking approach to understand their relationship. The molecular phylogenetic clades of genus *Aaptos* were examined by cytochrome oxidase I (COI) while the presence of their chemotypes were confirmed by chemical analysis based on bioassay-guided separation with several steps of chromatography. As a result, the species of *Aaptos suberitoides*, *Aaptos aaptos*, *Aaptos nigra*, *Aaptos lobata*, and *Aaptos* sp. were confirmed by the molecular phylogenetic. On the other hand, chemical analysis showed the presence of alkaloid-class molecules on the all specimens. Interestingly, feature-based molecular networking revealed the whole figure of cryptic species were formed a clear and distinct group together with their chemotypes. Consequently, it confirmed the relationship between the presence of each species as well as its chemotype may be distinguished clearly. In conclusion, we suspect chemical analysis of genus *Aaptos* have unknowingly conflated between different cryptic species, resulting in seemingly idiosyncratic chemical variations.

Keywords: Biodiversity; genus *Aaptos*; cryptic species; molecular networking

Commercial Marine Fish from Weh Island, Indonesia: Checklist, Distribution Pattern, Conservation Status, and Economic Importance

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In this study, we firstly report a systematic checklist of commercial marine fish from Weh Island, Indonesia, including notes on their distribution pattern, conservation status, and economic importance. Fish sampling was conducted at three major fish markets in Weh Island, namely Cangkoan Fish Market, Kuta Timu Fish Market, and Balohan Fish Market. Results showed that a total of 50 fish species belonging to 8 orders and 24 families were recorded. Carangidae (12%, 6 species) was predominant family, followed by the Scaridae (10%, 5 species), the Caesionidae, Lutjanidae, Scombridae, and Serranidae (8% of each, 4 species), and Mullidae and Nemipteridae (6% of each, 3 species). Based on the IUCN red list, commercial marine fish in the Weh Island were dominated by the "Least Concern" category (78%, 39 species), followed by the "Not Evaluated" category (14%, 7 species), the "Near Threatened" category (4%, 2 species), and the "Data Deficient" category (4%, 2 species). The market price of the fish ranged from 0.34 USD/kg to 6.19 USD/kg, with three fish families that were included in the high commercial value, namely the Clupeidae, Carcharhinidae, and Serranidae. Several indicators reef fish such as Scaridae family are still commercialized massively in Weh Island Fish Market. From this survey, we conclude that Weh Island has potential as an export station for Serranidae fish. However, this study indicated that the complementary information on biological aspects of major marine commercial fish from Weh Island is lacked.

Keywords: Fish Market, Carangidae, Distribution Pattern, Least Concern Category, High Commercial Value

Alteration in Gill and Skin of Snakehead (*Channa striata*) Due to Ectoparasite Infection: Pathological and Histological Studies

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Gills and skin are the main body parts that are often infected with ectoparasites. The purpose of this study was to determine the macropathology and histology of the gills and skin of snakehead fish (*Channa striata*) infected with ectoparasites. The results showed that the macropathology of the skin, gills and fins of snakehead fish infected with ectoparasite *Trichodina* sp. *Tetrahymena* sp. *Gyrodactylus* sp. *Dactylogyrus* sp. changes in color, excess mucus production, the color of the gills looks dull, there is irritation on the body surface of the snakehead fish and hemorrhages on the skin of the snakehead fish. Histologically, the gills of snakehead fish infected with ectoparasites experienced swelling of the primary and secondary lamellae, the secondary lamellae were irregular, the mucus cells ruptured, and they were bleeding. The skin tissue of snakehead fish infected with ectoparasites experiences swelling in the epidermal layer.

Keywords: Hemoragi, Mucus Secretion, Irritation, Lamellae, Epidermal Layer

Coastal Risk Analysis in the West Coast of Aceh Besar Based on Geo-Oceanographic Parameters

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This study aims to determine how much coastal risk is based on geo-oceanographic parameters to the distance property on the west coast of Aceh Besar. This research was conducted in the western region of Aceh Besar from October 2020 to December 2020 and data processing was carried out at the Geographic Information System (GIS) Laboratory of the Faculty of Marine and Fisheries, Syiah Kuala University. The method used is a combination of the Coastal Risk Index model and the Likert method by classifying the level of vulnerability and the level of coastal risk. The results show that more than 60% of the west coast of Aceh Besar is in the level between high to very high vulnerability and about 40% are in a very high risk of changes. Areas with sandy beach geomorphology that have low elevations, have high waves, are close to residential areas, ponds and plantations are very vulnerable and very risky in the event of coastal disasters such as storm surges, tidal flooding, climate change and sea level rise.

Keywords: Coastal Risk, Geo-Oceanographic Parameters, Coastal Vulnerability, Coastal Morphology, Coastal Disasters

The Effect of *Cassia alata* L. Leaf Extract on Egg Hatchability and Survival of *Pangasius* sp.

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This study aims to determine the best concentration of addition of *Cassia alata* L. leaf extract for the treatment of fungal infection in hatchability of catfish (*Pangasius* sp.) eggs. This research was conducted at the Blangpidie Fish Seed Center (BBI). Aceh Barat Daya from July to August 2020. Statistical analysis used a completely randomized design (CRD) method with 7 treatment levels and 3 replications. The treatments were conducted by soaking the catfish eggs in the leaf extract for 20 minutes. Those treatments were A (control), B (2.5 ppm), C (5 ppm), D (7.5 ppm) E (10 ppm), F (12.5 ppm), and G (15 ppm). ANOVA test results showed that the addition of leaf extract *Cassia alata* L. had a significant ($P < 0.05$) effect on hatchability and survival of catfish larvae (*Pangasius* sp.). A concentration of 15 ppm is the best with a hatchability value of 85.33% and a concentration of 10 ppm is the most optimum for the survival value of catfish larvae, namely 92.99%.

Keywords: *Pangasius* sp., *Cassia alata* L., Hatching Rate, Survival Rate

Satellite remote sensing reveals coastal wind variability off the central Maluku Islands

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The Maluku Islands (henceforth MI) are situated in the northeastern Indonesia. Ocean region off the central MI is pivotal as it provides a course for the Indonesian Throughflow via the Lifamatola passage. However, sea surface dynamics off the central MI is unknown until recently due to inadequate in situ measurements. The present study aims to decipher the effect of coastal wind variability on the sea surface off the central MI by analysing long-term datasets (2007-2019) of satellite-derived sea surface wind, sea surface temperature (SST), and surface chlorophyll-a concentration. Also, we investigate the influence of extreme climate events of the 2015 El Niño-Southern Oscillation (ENSO) and the 2019 Indian Ocean Dipole (IOD) on ocean parameters. Results show that the prevailing southeasterly winds over the central MI induce SST cooling and phytoplankton bloom. Our correlation analysis revealed that the ENSO and IOD play significant role in defining spatial distribution of the coastal wind, SST, and phytoplankton bloom in the research area. The anomaly analysis exhibits distinct oceanographic features during the climate extreme events of 2015 and 2019. Collectively, results of the present research highlight the importance of coastal wind variability and extreme events in shaping ocean surface characteristics and perhaps regional fisheries production.

Keywords: wind; sea surface temperature; chlorophyll-a; ENSO; IOD; Maluku Islands.

Diversity, Distribution and Species Status of the Fish in Banten Bay

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Banten Bay area is one of the areas that has large potential of fish resources, both freshwater, estuary and marine fish. This study aims to analyze the species and status of fish found in the coastal area. Sampling was carried out 7 times, i.e. in February-March 2019 (on Cengkok coastal area), January-February, August-September 2020 (on Bojonegara coastal area) and February-April 2021 (Kemayungan-Lindung coastal area) of the Banten Bay, using gill nets, cast net, hand-line, beach seine and mini trawl. Based on the study, the fish caught on the coast of Banten Bay consisted of 109 species, distributed in the three areas, namely Cengkok coastal water (32 species), Bojonegara (56 species) and Kemayungan-Landik (52 species). These fish were spread in marine areas (33-49%), fresh water (12-31%), estuaries (9-19%), freshwater and estuaries (2-9%), seas and estuaries (7-21%), and marine, estuary and freshwater (4-18%). The common fish species found at the location was *Ellochelon vaigiensis*, *Planiliza subviridis*, and *Leiognathus equula*. In general, the fish found were classified as LC (least concern), however, there were 2 species classified as VU (vulnerable) and 2 species classified as NT (near threatened). According to the finding of species that are VU and NT status, catch activities at this location need to be more careful, so that these fish species do not become extinct.

Keywords: Fish Ecology, Resources, Species Monitoring

Financial Technology Lending Services Peer to Peer The Perspective of the Pantai Cermin Kabupaten Serdang Bedagai

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Financial Technology (Fintech) is a technology that continues to develop today. This is driven by the development of the Industrial Revolution 4.0, which offers advances in fintech services. As for the problem in this research is how Financial Technology Lending Peer to Peer in the view of the people of Pantai Cermin. The purpose of this study is to analyze Peer to Peer Financial Technology Lending in the view of the Pantai Cermin community. The method used in this research is descriptive qualitative, which means describing the research subject. Fintech services are financial services that make financial transactions serve faster, and save time and costs, also this service is the future of financial transactions around the world, where financial transactions can be carried out without the need for physical money by using Internet of Things (IoT) applications with thereby changing the habits of transactions between banks and customers. This situation has an impact on the public interest (Maslahah) of human life throughout the world, including the Pantai Cermin community. However, for the people of Pantai Cermin, in addition to accepting progress that can be utilized, they must also consider whether it is permissible (halal) or prohibited (haram) from a legal point of view. The existence of Sharia fintech is of course in line with the objectives of Sharia, namely to maintain the benefit of the people in line with the majority religion adopted by the Pantai Cermin community, namely Islam. The existence of this fintech is expected to contribute to the development of the coastal economy and at the same time strengthen the technology-based halal industry ecosystem chain so as to create financial inclusion.

Keywords: Fintech 1; Peers to Peers 2; Public 3

Long life education In Context Islam Education In Coastal Area Region Regency of Serdang Bedagai Provinsi North Sumatra

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Long life education which is also known as by long life education, also become the responsibility with in its execution, that goodness is family old fellow, school and society governmental. such education represent activity which intrinsically able to form the perfect person human being x'self, as khalifah and Abdullah on earth, hence with the education human being able to arrange life a world of final purpose from altogether life. To realize the above picture, hence education region of coastal area coast which simply but extend this central to three condition namely informally, formal and non formal aim to have, potency with the knowledge and own the values, and also urgency in its life based on with the bases islami with forming godly and religious human being to its The infinite, to become the human being which ma'ruf and awaked from immorality and snubbing. Education own the meaning which urgen, because with the education contain the element lift the standing and prestige of human being along the life, its meaning is education continuously experience of the growth as according to its epoch change, because of the mentioned, hence education need the growing to develop in 'self of human being from starting early days till a period of/to final.

Keywords : long life education, coastal area

Social, Economic and Institutional Study of Purse Seine Fisheries based on the Ecosystem Approach in Kutaraja Ocean Fishing Port, Banda Aceh

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The purse seine is the most dominant fishing gear used by fishermen at the Kutaraja Ocean Fishing Port. It has an effect on increasing the number of fishing fleets and fishing efforts per year. The increase is feared to have a negative impact on fishermen because it can trigger competition and conflict between fishermen, violate the law, and even affect fishermen's income. This study aims to assess the status and formulate fisheries management actions regarding social, economic, and institutional aspects of fishing based on purse seines in PPS Kutaraja. This research activity was carried out in 2018, and data was collected through a survey method by conducting in-depth interviews with several respondents and analyzed using the Flag Modeling technique. The results showed that based on the composite value of the social domain was 91.66% in a very good category, the economic domain was 33.33% in poor condition, and the institutional domain was 67.66% in good shape. These results indicate that economic management actions need to be better pursued so that purse seine fisheries remain sustainable in accordance with social, economic, and institutional conditions by: (1) implement a profit-sharing system following applicable regulations; (2) strengthening good cooperation between stakeholders; (3) open dissemination of the importance of Panglima Laot customary rules; (4) improve supervision and law enforcement; (5) increase the synergy of regulations, institutions and stakeholder capacities.

Keywords: EAFM, Purse Seine, PPS Kutaraja, Fishery Management, Flag Modeling Technique

The Regulation of Foreign Tourist Dress Ethics in the Realization of Maritime-Based Halal Tourism in Sabang City

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The Aceh government which has special autonomy under the leadership of the mayor of Sabang, has issued special regulations to support the implementation of 'good' and 'halal' tourism. This regulation is stated in Qanun Number 9 of 2019 concerning the Master Plan for Tourism Development of Sabang City for 2019-2027. The stipulation of these regulations clearly indicates the spirit of halal, including the ethics of dress which is a local identity in the management of marine tourism in the city of Sabang which can be seen in many points of mentioned qanun. The indications of halal values in the qanun need to be looked at further on the overall coverage of halal aspects that need to be applied to support halal tourism with local identity and global competitiveness. Normative research by looking at the scope of government regulations that is presented qualitatively shows the need for the scope of rules or derivative rules from the side of international tourists in terms of the obligation to comply with local halal norms and ethics, such as etiquette for beachfront dress and supervision. This is because the embodiment of halal tourism in products, governance, facilities, and supervision must support social, ethical, customary and local communities. The preference for halal tourism that has been declared by the government must not prioritize the quantity of tourism but prioritize the quality of halal, wisdom and social culture of the local community. Dissemination of information and travel rules to tourists who arrive must also be massive by involving government officials, village officials, and also the community. The halal identity that remains inherent in every aspect of tourism control can even give a different prestige in the eyes of foreign tourists. Therefore, the government needs to consider the derivatives of these regulations in order to create universality in regulations and supervision of travel to foreign tourists.

Keywords: Foreign Tourist; Dress Ethics; Halal Tourism; Sabang City.

Fiqh Review on Zakah of Marine Resources

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The obligation of zakah for Muslims is imposed on valuable assets and it reaches the nishab level. The objectives of the shari'ah of zakah are to create an even distribution of income, avoid social inequality and raise the standard of living of the poor. Every asset that is obtained by a human being in the form of findings, results of efforts, work, gifts, and others that is fully owned, by achieving the nishab, must be paid its zakah. In classical fiqh, the classification of zakah maal is still limited, so that scholars continue to develop its classification with various legal istinbath methods. Zakah on marine resources also raises interpretations among scholars so that it needs to be studied from a fiqh perspective. Marine resources, both valuable goods and fisheries in large quantities which are used as sources of income and reach the nishab, need to be reviewed for its zakah regulation. This study is a literature review that reviews classical to modern zakah fiqh. This normative research found that marine resources that reach the nishab must be taken out as zakah for agriculture, commerce, mining, and others. Differences of opinion among scholars in arguing whether or not zakah on the sea resources is obligatory are based on the presence or absence of sources of livelihood from marine products at that time, so that differences in times led to differences of opinion. However, marine resources today have become a big source of livelihood for certain people. So that all forms of income that reach the nishab must be issued zakah. It can be concluded, that the zakah level of the traded marine products can be verified to commercial zakah or gold and silver zakah, which is 2.5%, or zakah on findings, which is between 2.5% and 20%, it depending on the type of resources obtained.

Keywords: Fiqh, Fiqh Zakah, Marine Resources Zakah, Sea Resources Zakah

Implementation of Astaxanthin to Increase the Pigmentation and Growth of Clownfish

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One of the more conspicuous groups of fish on tropical reefs is the anemone fish. Anemone fishes are the most popular attraction of aquarists, and they are important in the aquarium trade, very high demand in the market, surface bright color and diverse, interesting display and especially the unique symbiotic relationship with sea anemones. This study focused on feeds were added by different level concentrations of astaxanthin to investigate the effects of astaxanthin to the skin pigmentation and fish growth. The experimental objects were two species, namely orange clownfish (*Amphiprion percula*) and maroon clownfish (*Premnas biaculeatus*) that were conducted in different experiments. *Amphiprion percula* was fed the commercial diet with different level concentrations of astaxanthin (A: without astaxanthin added; B: 25 mg/kg astaxanthin, C: 30 mg/kg astaxanthin, and D: 35 mg/kg astaxanthin), whereas *Premnas biaculeatus* fed with different level concentrations (A: without astaxanthin added; B: 100 mg/kg astaxanthin, C: 200 mg/kg astaxanthin, and D: 400 mg/kg astaxanthin). Pigmentation was analyzed using Adobe Photoshop software. There were no significant differences ($p>0.05$) were found in growth, and survival rate among fish from all dietary treatments. The results showed that the addition of astaxanthin for *Amphiprion percula*, treatment D (35 mg/kg astaxanthin) gave the highest redness value for pigmentation, growth, and survival rate. While the experiment on *Premnas biaculeatus* showed that the redness value in treatment D (400 mg/kg astaxanthin) was significantly ($P<0.05$) highest than in the other level concentrations. Given astaxanthin with high concentration in feed could improve pigmentation of clownfish.

Keywords: Clownfish, Astaxanthin, Pigmentation, Growth.

New Occurrence and Length-Weight Relationships of Living fossil in Jaring Halus Island, North Sumatra

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This research aims to report the presence of *Lingula* sp. and to determine its growth pattern based on the analysis of the length-weight relationship. *Lingula* sp. has a pair of valves that are light green to brownish. The valves are shiny and have pale white tentacles. Founded as infauna at a depth of 5-10 cm. The number of samples for the relationship between length and weight of 190 individuals were obtained by fishermen from the coast of Pulau Jaring Halus Langkat, North Sumatra. Length measurements were made based on standard length and shell weight without tentacles. The minimum length of the test sample is 20 mm and a maximum of 5.8 mm, with a minimum weight of 1.16 g and a maximum of 13.72 g. The growth pattern shows a value of $b < 3$ which is negative allometric growth which means that the length increase is faster than the weight gain, with the equation of the relationship between length and weight $W = 0.2501 L^{2.5177}$.

Keywords: Brachiopoda; Lingulata; Standart-Length; Allometric Negative.

Epifaunal Community Structure in the Tropical Seagrass Beds of Barrang Lompo Island, Makassar Indonesia

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Barrang Lompo Island is one of the most densely populated small islands in the Spermonde Archipelago. The various activities of the local population produce all kinds of waste and sewage which are discharged into coastal waters and can also affect the condition of the seagrass beds including the structure of associated organisms such as epifauna. The purpose of this study was to determine the structure of the epifaunal community in seagrass beds, including species composition, frequency of occurrence, epifaunal density and diversity indexes (H', d, J, and dominance) as well as the relationship between the seagrass percentage cover and the associated epifauna in the Barrang Lompo Island seagrass meadows. To compare epifaunal density, diversity indices (H, d, J and dominance), seagrass density and seagrass percentage cover based on the distance from the coast from the inner inshore to the outer inshore zones (10 m from the coast to 210 m from the coast), the data were analysed using one-way Anova. The strength of the relationships of epifaunal density and epifaunal diversity indices (H', d, J) with seagrass density and seagrass percentage cover were evaluated using the Pearson-Product Moment correlation test. All statistical analyses were carried out in Graphpad PRISM ver. 5. The observations revealed that 56 species belonging to 31 families, 7 classes, and 3 phyla were present in Barrang Lompo Island waters with the gastropod class having the highest frequency of occurrence. The values obtained for the diversity, uniformity and Margalef species richness indices were varied. Meanwhile, epifaunal density was found to be higher in the area nearest to the coastline (inner inshore) compared to the area further offshore (outer inshore) ($P < 0.05$).

Keywords: Seagrass; Macrozoobenthos; Epifauna; Barranglompo Island; Community structure

Vannamei *Litopenaeus vannamei* Shrimp Production in Tarpaulin Ponds with Various Stocking Densities

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The vannamei shrimp *Litopenaeus vannamei* is a high-value fishery commodity that has the advantage of being able to survive in high-density environments. In aquaculture activities, stocking density is useful for determining the number of fry to stock on the area of rearing media. The purpose of the study was to collect the optimal data on live shrimp, Mean Body Weight (MBW), and Food Conversion Ratio (FCR) of white shrimp *Litopenaeus vannamei* at various stocking densities. The research was conducted from January through May of 2021. This study employed a completely randomized design (CRD) method that included three treatments with three replications: stocking density of 100 fish/m², 150 fish/m², and 200 fish/m² in tarpaulin pond containers. The results of the analysis of production performance study revealed that the treatment with a stocking density of 200 fish/m² had a higher survival rate than the other treatments, which is 86.46 percent. In the treatment of 100 fish/m², the best feed conversion ratio (FCR) and average weight of shrimp (Mean Body Weight) were 1.29 and 39.67 grams.

Keywords: Vannamei Shrimp; Survival Rate; Stocking Density; FCR

Community Structure of Marine Plankton from Gosong Island waters, Southwest Aceh

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The purpose of this research is to determine the structure of the phytoplankton and zooplankton communities in the waters of Gosong Island. The research was conducted in May 2021 around the island with 4 stations and 4 replications. Plankton samples were carried out using a plankton mesh size of 30 microns. Calculation of plankton and identification using SRC using a census. The results showed the presence of phytoplankton consisting of Cyanophyceae, Bacillariophyceae, and Dinophyceae consisting of 51 species. Zooplankton found 26 species consisting of protozoa, Crustaceae, Urochordata, Gastropods, Pelecypoda, Polychaeta and Nematodes. The largest percentage was found in the Cyanophyceae group up to 87.89% and Dinophyceae was the group with the lowest percentage (1.62%). The largest percentage presence of Crustaceans and protozoa, Gastropoda appears only about 48.67, while Urochordata, Pelecypoda, Polychaeta and nematodes have a percentage that is less than 1 (0.10-1.63). The range of diversity index values ranged from 0.53 to 1.39. Phytoplankton and zooplankton with the highest abundance were found in *Trichodesmium* sp. and Nauplius (stadia). While the lowest abundance was found in *Asterolampra* sp. (phytoplankton) and polychaeta and nematodes (zooplankton) species.

Keywords: Diversity Index, Zooplankton, *Richelia* sp.

The Effect of Rice Harvest Failure on The Area of Insured Land in Aceh Province

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Agricultural insurance is a risk transfer that can provide compensation due to farming losses so that the sustainability of farming can be guaranteed. Rice farming insurance (AUTP) is a pilot program or pilot project that has been implemented in Aceh Province since 2015. However, the realization of the insurance program is still very low from the target set. The central government coordinates with local governments to implement the AUTP program by issuing a policy of providing premium subsidies of 80 percent or Rp. 144,000/Ha/MT of the total premium of Rp. 180,000/Ha/MT. AUTP participants only pay a premium of 20% per hectare of land insured with an insured value of Rp. 6,000,000/Ha with conditions damaged or failed at least 75%. The purpose of this study is to see the effect of a simple regression analysis of the area of failed rice harvest on the area of land insured in Aceh Province. This study uses secondary data from 2010-2019. Researchers used simple regression analysis. The results of this study indicate from the results of simple regression analysis that the effect of the area of rice harvest failure on the area of land insured in Aceh Province is not significantly affected by the area of rice harvest failure and the area of land insured in Aceh Province.

Keywords: Agricultural Insurance, Rice farming insurance, Crop failure, Land area insured

Gender-Disaggregated Data on Fish Farming Business in Cirata Reservoir, Cianjur Regency, West Java

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This paper aims to analyze gender in the fish farming business in Cirata Reservoir, Cianjur Regency, West Java. The study was conducted in October 2020 in Cirata Reservoir, Cianjur Regency, West Java. This study uses a survey method by conducting structured interviews using questionnaires and in-depth interviews with fish farming actors, men and women. Gender analysis using a gender equality and social inclusion approach can facilitate the process of applying a gender equality and justice perspective that not only pays attention to women and men but also marginal groups in which there are women and men. The results of the study that one of the implications of the concept of gender can be seen in the role or work in both the domestic (household) and business domains. The role or work of men in other places may be carried out by women in the other place. The presentation of gender-disaggregated data and information on KJA (Keramba Jaring Apung) is expected to illustrate the role and contribution of business actors and map issues related to gender issues, so that it is expected to provide recommendations for improvement in realizing gender equality in aquaculture.

Keywords: Fish Farming, Gender-Disaggregated Data, Cirata

The Effectiveness of Toefl FKP APP for Final-Year Students of Marine Science Faculty Syiah Kuala University, Indonesia

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This paper reports the final-year students' needs of English and its effectiveness in joining TOEFL Class conducted by Academic of FKP and using TOEF FKP application in learning process. There were about 120 final-year students in the academic year 2020-2021 as the primary subjects of this research. The researcher administered questionnaires and conducted interviews to collect the data. The results found that the students need English skill to face challenges in the future for their career. It was also found that there were a high demand for TOEFL Certificate as a proof such as they are able using English, as a graduation requirement in the Faculty and as equipment in order to work in international maritime industries. Therefore, most of the students placed English skill as their highest priority. It is concluded that the results of this investigation should be taken into account in developing teaching, learning materials and its regulation for marine student and TOEFL FKP Section.

Keywords: Effective Learning; Teaching development; Learning through media

The Impact of the Spread of Covid-19 on Marine Tourism-Based Small Businesses and Suggested Recovery Plans

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Since the COVID-19 pandemic emerged, it has had a real negative impact on people's businesses including in the service sector. The implementation of the Community Activity Restriction (PPKM) policy by the Government of Indonesia since early 2021 to deal with the Covid-19 pandemic in Indonesia from the business aspect has a more pronounced impact than similar policies carried out in the previous year. One of the business lines that are most affected by the pandemic is the marine tourism sector. Pulau Weh is one of the marine tourism destinations in western part of Indonesia. Pulau Weh offers snorkeling, diving, cruising and yachting destinations. Many small business sell service products based on the needs of tourists. This pandemic has made many businesses suffer losses and some even went bankrupt. This phenomenon is supported by Bank Indonesia research which states that as many as 87.5 percent of MSMEs are affected by the Covid-19 pandemic of this amount, around 93.2 percent of them were negatively affected on the sales side which ultimately put pressure on profits and cash flow. The purpose of this study is to find out the real impact of the COVID-19 epidemic on tourism-based small businesses in the island, as well as what recovery strategies that should be undertaken from the standpoint of company owners, including potential for leveraging digital business technology. This research was conducted using a quantitative descriptive method. Data gathered using online questionnaires. 50 questionnaires distributed using non-probability sampling. The distribution of Covid-19 had a detrimental effect on the small companies who participated in this study. The greatest consequence is a decrease in revenues due to a decrease in demand for its products and services. As a result, firms downsized by reducing their business scale and laying off staff. Companies are beginning to employ technology to enter digital industries, such as joining online apps and selling more aggressively in e-markets.

Keywords: Covid-19; Recovery Strategy; Digital Business; Micro, Small and Medium Enterprises, Marine Tourism

Rice and Fish Productivity and Farming Business Analysis Minapadi on Legowo Systems and Endemic Fish

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Minapadi is a fish rearing system in rice fields that is carried out with rice plants. This study aims to increase the income of farmers with high productivity of rice yields and increase the production of endemic fish. The method used is a Completely Randomized Design (CRD) experiment with 4 treatments and 3 replications. The treatments were: A1B1 (legowo 2:1 and giant prawns), A1B2 (legowo 2:1 and serukan fish), A2B1 (legowo 4:1 and giant prawns), and A2B2 (legowo 4:1 and serukan fish). This research was conducted for 90 days in the rice fields of Lango Village, Pante Ceureumen District, West Aceh Regency. Parameters observed were rice productivity, fish survival and fish growth. The results showed that the best treatment was A1B1 (legowo 2: 1 and giant prawns) by producing an average value of rice productivity of 3.04 tons/ha, an average survival value of 84% of prawns and an average growth rate of 4536 g. From the results of this study, the application of the Minapadi system with giant prawns had a positive impact on the observed parameters.

Keywords: Endemic Fish; Legowo; Minapadi; Productivity

Study on the Seaweed Farming Community Resilience of in Pandeglang

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Research on community resilience has been widely carried out around the world. However, until now there is no standard concept of resilience. This is because resilience is a dynamic concept that depends on the point of view and various aspects. Sumur District was formerly a center for seaweed cultivation in Pandeglang Province. However, due to the Tsunami disaster in December 2018 it had destroyed the seaweed center. The purpose of this research is to analyze the resilience of the seaweed farming community after the tsunami disaster. The method used in this study is a survey method with data collection techniques using in-dept interview techniques with key informants and FGDs with stakeholders and local government. Analysis of the data used is descriptive analysis. Based on the results of the study, after experiencing the tsunami disaster, no seaweed cultivators could return to cultivate seaweed. Viewed from the point of view of community resilience, the seaweed farming community in Sumur District is an unresilient community. However, from the point of view of family resilience, this seaweed cultivator can be resilient by changing sources of livelihood. Factors that affect the level of community resilience are ecosystem changes, marketing, and the dependence of seaweed farmers on local champions. This can be a lesson learned for local governments that have seaweed centers. If you want to maintain seaweed as the main community for cultivation in your area, you must pay attention to these factors. This can be a lesson learned for local governments that have seaweed centers. If seaweed is to be maintained as the main commodity for cultivation in their area, these factors must be considered.

Keywords: Community Resilience; Tsunami; Seaweed Cultivator; Disaster.

The Effect of Different Stock Dents on the Performance of Polets (*Macrobracium rosenbergii*) and Production of Rice Plant in Rice Systems

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Minapadi is a fish rearing system in rice fields that is carried out with rice plants. This study aims to increase the income of farmers with high productivity of rice yields and increase the production of giant prawns. The method used was a Completely Randomized Design (CRD) experiment with 3 treatments and 3 replications. The treatments were: P1 = stocking density of 40 birds/m², P2 = stocking density of 60 birds/m², P3 = stocking density of 80 birds/m². This research was conducted for 90 days. Parameters observed were rice productivity, fish survival, and growth. The results showed that the best treatment was P3 = stocking density of 80 birds//m². by producing an average value of rice productivity of 2.94 tons/ha, the average value of shrimp survival is 78% and the average value of growth of giant prawns is 4680 gr. From the results of this study, the application of the Minapadi system with giant prawns had a positive impact on the observed parameters ($P < 0.05$) and provided benefits for farmers.

Keywords: *Macrobracium rosenbergii*, Stocking Density, Minapadi, Performance.

Long-Weight Relationship and Bioreproduction Aspects of Tiger Shrimp (*Penaeus monodon* Fabricius, 1798) and Banana Shrimp (*Penaeus merguensis* De Man, 1888) in Lampulo, Aceh

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The purpose of this study was to determine the relationship between length and weight and aspects of reproductive biology (sex ratio and gonad maturity level) of tiger shrimp (*Penaeus monodon*) and Banana shrimp (*Penaeus merguensis*). This research was conducted in January-February 2021. The research method used is Simple Random Sampling, by taking a random sample of shrimp from the catch of fishermen in one trip. The total sample observed was 145 shrimp, which were obtained from the catch of fishermen in one trip as much as 10% from the eastern waters of Aceh which landed at fishing landing port Lampulo, Aceh. The sample was then measured in length, weighed, and observed aspects of reproductive biology at the Laboratory of Histology and Fish Nutrition, Faculty of Marine Science and Fisheries, Universitas Syiah Kuala. The results showed that the carapace length of *Penaeus monodon* and *Penaeus merguensis* shrimp caught in the eastern waters of Aceh ranged from 19-35 mm and 17-32 mm, with a negative allometric growth pattern, and dominated by female shrimp. The level of gonad maturity was dominated by levels I and II, but at the time of the study there were no levels of gonad maturity level III and IV. The data from this study can be used as a reference for further research.

Keywords: Shrimp, Growth, Sex Ratio and Gonadal Maturity

Mapping Potential Fishing Zones Based on Sea Surface Temperature and Chlorophyll-a in Aceh Besar Waters

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Utilization of potential fishery and marine resources is still not maximally used by fishermen. Sea surface temperatures and the spread of chlorophyll-a through remote sensing systems can be used as potential fishing zones. This study aims to determine potential fishing zones using geographic information systems through the distribution of sea surface temperatures and the value of chlorophyll-a concentrations in Aceh Besar waters which is expected to improve the sustainability of fishing efforts. This research was conducted in January-December 2019 using geographic information system by extracting satellite imagery from Moderate Resolution Imaging Spectroradiometer (MODIS) and sea surface temperature overlay method with chlorophyll-a concentration. The results found the highest sea surface temperature value was in April at 31.62°C and the lowest temperature was in December at 28.45°C. The highest average chlorophyll-a concentration in Aceh Besar waters was 1.53 mg/m³ in December and the lowest concentration of chlorophyll-a in June and September was 0.20 mg/m³. Suspected potential fishing zones during January to December 2019 were found as many as 62 potential fishing zones, namely in the Western, Northwest and Eastern waters of Aceh Besar. The most zones are in December as many as eight zones, namely in the Western, Northwest and East parts of Aceh Besar waters and the least found in July as many as one zone that is in the Western part of Aceh Besar waters. When compared to fishing operations areas, the potential fishing zone is in the western part of Aceh Besar waters.

Keywords: Chlorophyll-a, Remote Sensing, Geographic Information Systems, Sea Surface Temperature, Fishing Potential Zones

Increased Production of Catfish (*Clarias gariepinus*) Seeds through Accelerated Rematuration of Female Broodstock Using Induction of Natural and Hormonal Materials

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This study aims to determine the effectiveness of Oodev and turmeric flour to the feed to accelerate the rematuration of female broodstock catfish for increasing seed production. The method was a non-factorial completely randomized design with 4 treatments and 3 replications. The treatments are (A) control, (B) Oodev 0.3 ml/kg of feed, (C) turmeric flour 5 gr/kg of feed and (D) a combination of Oodev + turmeric flour. The results showed that D treatment was the best treatment which produced a GSI value of $14.57 \pm 2.53\%$, time period of rematuration was 32.33 ± 4.16 days, egg diameter was 1.27 ± 0.12 mm, fecundity was $22.939.97 \pm 880.38$ eggs/ kg of broodstock weight, fertilization rate was $80.18 \pm 9.75\%$, hatching rate was $79.80 \pm 2.88\%$, and larval survival reached $83.17 \pm 9.69\%$. Meanwhile, the specific growth of seed length in all treatments had relatively the same value or there was no effect of all treatments. Statistical analysis also showed that the D treatment provided a significant value ($P < 0.05$) for the parameters of GSI, time period of rematuration, egg diameter, broodstock fecundity, fertilization rate, hatching rate and larval survival. Treatment D also had an impact on increasing the number of seeds production by 29.87% of the control.

Keywords: Enrichment, Female Broodstock, Reproduction Performance, Rematuration.

Performance of Hand Line and Drift Gill Net at Palm Fiber Fish Aggregating Devices (FADs)

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The function of FADs is as a shelter for fish, a gathering place for fish, a place to spawn for fish, and as a place for fish food sources. Fishing gear has operated around FADs like hand line and drift gill net. But hand line and drift gill net performances at palm fiber FADs in Aceh Jaya District is unknown. Therefore, the purpose of this study is to determine the performance of hand line and gill net drifting at FADs in the waters of Calang, Aceh Jaya District. The research method used in this research is the experimental fishing. The data collection process uses hand line fishing gear and drift gill net which are operated around the FADs for 45 minutes/sampling. The results of this study are the specifications/performance of the hand line fishing gear, which are as follows: the main line has a length of 100 m with polyamid material no 60, 10 cm length of branch line with polyamid material no 30. Swivel no 5, hook no 13 with the alpine brand, and a weight made of iron with a weight of 500-600 gram. The specifications/performance of the drift gill net fishing gear are as follows: the gill net body is made of polyamid material with a net length of 100 m and a body width of 8 m with a mesh size of 1.5 inch. Headrope, footrope, lower riser and bouy rope are made of polyethylene. Total of sinker of drift gill net is 600 units and bouy amount is 300 units.

Keywords: Hand Line, Drift Gill Net, Palm Fiber, FADs, Aceh Jaya District

The Prevalence and Intensity of Ectoparasites that Infected Tilapia in Floating Net Cages

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This research aims to know the prevalence and intensity of ectoparasites on tilapia (*Oreochromis niloticus*) in the floating net cages of Batang hari river, Jambi. The research was conducted in February through March 2020, taking samples from 3 stations in each predetermined floating net. From each station 30 fish were taken for parasite inspection at Stasiun Karantina Ikan, Pengendalian Mutu dan Keamanan Hasil Perikanan Kelas I Jambi. The observations found 3 types of ectoparasites namely *Dactylogyrus sp.*, *Epistylis sp.*, and *Oodinium sp.* The highest ectoparasite prevalence rate was found in the species *Epistylis sp.* with a value of 37.7% and an intensity value of 24.7 ind/fish. The prevalence of *Dactylogyrus sp.* found a prevalence value of 26.6% and an intensity value of 1.3 ind/fish. The lowest prevalence value was from *Oodinium sp.* with a prevalence value of 7.7% and an intensity value of 3.2 ind/fish. The prevalence and intensity values of tilapia ectoparasites based on the location respectively were 56.6% and 23 ind/fish (station I), 50% and 18.6 ind/fish (station II) and 43.3% and 17.6 ind/fish (station III).

Keywords: Prevalence; Intensity; Ectoparasites; Tilapia.

Community Structure of Mangrove in Lambadeuk Village, Peukan Bada District, Aceh Besar Regency

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This study aims to determine the condition of the mangrove ecosystem through a mangrove community structure approach in Lambadeuk Village, Peukan Bada District, Aceh Besar District. This research was conducted in November 2017 using the stratified sampling method. The results showed that there were only 2 types of mangroves, namely *Rhizophora apiculata* and *Rhizophora mucronata*. The highest species density (Di) of mangrove *R. apiculata* at station 2, while the *R. mucronata* was only found at station 1 and 3. The highest relative density (RDi) of *R. apiculata* at station 2, while the *R. mucronata* was only found at station 1 and 3. The highest frequency of species (Fi) and species cover (Ci) of *R. apiculata* and *R. mucronata* at station 1 and 3. The highest species cover (Ci) and relative species cover (RCi) of *R. apiculata* at stations 2, while the species *R. mucronata* was only found at station 1 and 3. The important value index (INP) obtained ranged from 183.789 - 253.655%. Therefore, the condition of the mangrove ecosystem in Lambadeuk Village is quite good, but monitoring and management of coastal ecosystems must continue to be carried out, especially planting other genera of mangroves.

Keywords: *Rhizophora mucronata*; *Rhizophora apiculata*; Lambadeuk; Mangrove.

Refraction and Diffraction of Sea Waves in Lhoknga and Lampuuk Coastal Waters, Aceh Besar District, Indonesia

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This study discusses the refraction and diffraction of sea waves in the coastal waters of Lhoknga and Lampuuk. The coastal waters are located in the western waters of Aceh Besar, which borders the Indian Ocean and Sumatra Island. The stages of the wave refraction and diffraction model are based on the significant average wave height H_{mo} and the average wave peak period T_p 2019-2020 from offshore sourced from the WaveWatch III (WW3) global wave model. The method used is using the equation of refraction and diffraction of sea waves which are discretized with the finite difference with significant input height and period of peak sea waves from offshore. The output of sea wave refraction and diffraction consists of propagation, height distribution, and wave direction in the coastal waters of Lhoknga and Lampuuk. The results of wave propagation in the coastal waters of Lhoknga and Lampuuk towards the coast from the west produce an average height distribution of 1 m to 2 m and close to zero to the coast. Based on the results of wave propagation, it was found that in the area around the headland a convergence zone was formed and in the area around the bay, a divergence zone was formed.

Keywords: Sea Wave Propagation, Refraction, Diffraction, Distribution Of Wave Height

Profile of Rational Thinking Ability Skills and Student Learning Motivation in Physics Learning

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Based on observations in the field, the learning process of Physics is still teacher-centered and does not provide opportunities for students to build their own knowledge through rational thinking skills. The research aims to describe the profile of rational thinking skills and student motivation. The research method used descriptive research with a single case design for the 32 students of SMPS AL WASHLIYAH 8, who are studying temperature and heat. The technique sampling used accidental sampling or convenience sampling. The results showed that students' rational thinking skills were still low, aspects of students' remembering, classifying and evaluating skills were at the highest achievement with percentages of 94%, 95%, and 95% respectively, aspects of generalizing skills were in the medium category with a percentage of 70 %, while the aspect of comparing and analyzing skills is in the very low category with percentages of 30% and 48%, respectively. The student's learning motivation profile includes the variables of persevering in facing tasks, being tenacious in facing difficulties, showing interest, and independent learning showing results in the medium category. Based on the results of the study, it is necessary to conduct an in-depth experimental study to see the success in improving the rational thinking skills of junior high school students in learning physics.

Keywords: Rational Thinking Skills, Learning Motivation, Physics Learning

Seismic Velocity (V_p and V_s) Correlation Generated from Refraction and Downhole Measurements

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The study of empirical correlation between seismic refraction and downhole velocities has been established to propose an alternative way in determining in-situ velocities. Two different study areas have been chosen based on geological setting; first is Sungai Batu, Kedah which is classified as sedimentary area and second is USM campus Pulau Pinang which is classified as residual soil area. The study also applied both of P- and S-wave measurements. It is found that seismic downhole velocities are linearly related to seismic refraction velocities described by strong R^2 value of 0.62 – 0.66 for both study areas and wave applied. In terms of cost, data coverage and fast data acquisition, this study concluded that seismic refraction can be used as an alternative in determining in-situ seismic velocities.

Keywords: Correlation, Downhole, Refraction, Velocities, Seismic Refraction

Growth Performance of Green mussel (*Perna viridis* L.) at Different Depths in Estuary of Alue Naga Village, Banda Aceh

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Green mussel (*Perna viridis* L.) is one of economically valuable shellfish that can be potentially developed to support the people economic income. This study aimed to investigate the growth performance of green mussels at different depths. Two different depth of green mussels' culture was repeated three times with 15 ind each. The depth treatment used were 0.9 m depth and on the surface of the water. The results showed that the growth parameters measured of green mussels with a depth of 0.9 m and water surface were weight gain, length gain, daily growth rate, daily length growth rate, specific growth rate, specific length rate by values of 10.33 ± 0.43 g, 38.12 ± 2.02 mm, 0.11 ± 0.004 gr/day, 0.39 ± 0.02 mm/day, 1.60 ± 0.11 %/day, and 0.80 ± 0.02 %/day and 8.09 ± 0.21 g, 33.66 ± 0.92 mm, 0.08 ± 0.002 g/day, 0.34 ± 0.01 , 1.27 ± 0.03 %/day and 0.74 ± 0.02 %/day, respectively. Based on the result. The growth performance of 0.9m depth culture were significantly better that water surface culture. Therefore, it is concluded that the 0.9 m of green mussel culture is suggested to obtain the better growth performance.

Keywords: Shellfish, Marine,

The Effect of β -Glucan Provision in Feed on Seed Growth of White Cross (*Lates calcarifer*)

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White snapper *Lates calcarifer* is one of the marine fish commodities that has important economic value. The addition of immunostimulant ingredients in feed is believed to increase immunity and increase fish growth. This study aims to determine the effect of adding β -glucan to feed on white snapper (*Lates calcarifer*). This study used a completely randomized design (CRD) consisting of 5 treatments with 3 repetitions. White snapper used with a weight of ± 6 grams and a length of ± 7 . The frequency of feeding is done 3 times a day. The results of the ANOVA test showed that the addition of β -glucan in the feed significantly affected the growth rate of the fry of white snapper (*Lates calcarifer*) ($P > 0.05$). The best treatment in this study was treatment E (commercial feed + β -glucan 8g/kg feed) which gave the best growth in White snapper where this treatment was able to increase absolute weight (4.51 ± 0.29), absolute length (4.84 ± 0.284), specific growth rate (2.09 ± 0.15), FCR (1.00 ± 1.00), feed utilization efficiency (97.42 ± 0.50) and survival (100.00 ± 0.00).

Keywords: β -glucan, white snapper seed, growth rate, anova

Study of the Differences an Atomic and the Optical Properties Percentage of ZnO that Caused by Annealing Temperature Varying in purpose to obtain of Good ZnO Buffer Layer Performances for Solar Cells Application

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Zinc oxide (ZnO) is one of the established semiconducting material that generally have been use in thin film solar cell and for other types of solar cells as well. In this paper, the intrinsic ZnO was deposited using a physical vapor deposition method (PVD) by applied the sputtering technique. Meanwhile, for the ZnO thickness was varying in thinner thickness and were kept in nanosize, and for the annealing temperature it was varied in the range 200 up to 400 oC. Based on the characterization results we found that the overall transmittance of ZnO material for both condition (deposited and annealed) were in the visible spectrum wavelength area which is this condition confirming that the ZnO as the transparent semiconducting material. Furthermore, the percentage changed of the atomic in this material have been studied with the results shows that the oxygens contain more dominant in the annealed samples than as deposited one.

Keywords: Intrinsic Zinc Oxide (i-ZnO); Optical Properties; Pulse Vapor Deposition (PVD);Sputtering, Annealing.

Public Participation in Regulation on The Protection of Marine Resources

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This article will discuss the importance of public participation and participation in supervising marine resources, so as to provide protection for marine resources. This is important considering that Pohuwato Regency is one of the areas located in the Tomini Bay area, one of the bays that has a lot of potential for fishery resources. In addition, beautiful coastal areas as well as coral reefs and mangroves are assets of this area. Destruction fishing is one of the threats to the environment. In addition to having an impact on reducing fishery resources in the region, it is also feared that it will damage the ecosystem. Therefore, to maintain its sustainability, public participation is needed. The results of the research show that the existing laws and regulations have provided opportunities for the public to participate in monitoring and reporting if there are indications of unlawful acts. To optimize community participation, it is necessary to pay attention to various factors. The research was conducted using an empirical juridical approach. Data collection is carried out through a process of interviews and focus discussions with various relevant stakeholders determined purposively. Data were analyzed descriptively.

Keyword: Marine Resources, Public Participation, Regulation.

Current Research on the Indonesian Mahseer (Genus Tor) With Focusing on Aceh Region

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Indonesia has a big potency on freshwater fish in the world, and some of them have commercial value, and therefore, its very prospective as target fish for aquaculture, one of which is the Tor genus or Indonesian mahseer. This group of fish is widespread in Sumatra, Java, and Kalimantan. The province of Aceh has the potential for this mahseer or locally known as keureling fish. Unfortunately, the population of keureling fish has been decreasing significantly in the wild. The previous study reported that there are three species of Tor are occurred in Aceh waters, however, based on the genetic studies, there were only two species valid species, namely *Tor tambra* and *T. bambroides*. *Tor tambra* has a wider distribution and larger population than *T. bambroides*. Several studies related to keureling fish in Indonesian waters and especially Aceh waters have been carried out and published, including on distribution, length-weight relationships, and condition factors, prevalence and intensity of parasites, feeding habits, and genetics. In addition, several studies related to the development of its cultivation have been carried out also, for instance, study on the domestication techniques for prospective broodstock, protein and vitamin requirements for larvae, and stocking density. In this paper, the recent studies on Tor fish have discussed.

Key words: Keureling, Bio-Ecology, Gish Nutrition, Fish Genetic, Parasites of Aquatic Animal

Doping Nikel (Ni) Metal in Zeolitic Imidazolate Framework-8 By Using Green Synthesis Method

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Ni-ZIF-8 has been synthesized with methanol solvent at room temperature (25-30°C), with molar composition of zinc nitrate: 2-methylimidazolate : TEA = 1: 4: 4. Furthermore, Ni-ZIF-8 has been synthesized using filtrate from previous synthesis. Repetition of Ni-ZIF-8 synthesis using filtrate from previous synthesis can be done six times. The produced samples were investigated using XRD, FT-IR and SEM. XRD pattern of Ni-ZIF-8 which been synthesis using filtrate previously has same peaks with Ni-ZIF-8 first synthesized. FTIR spectra of Ni-ZIF-8 synthesized has functional group of the Ni-ZIF-8 materials showed in the FTIR spectra as a peak at about 422 cm⁻¹ which indicated the presence of zinc bonded to the nitrogen in Ni-ZIF-8. Base on SEM analysis particles size of Ni-ZIF-8 with using filtrate from previous synthesis are bigger than first Ni-ZIF-8. The result show that Ni-ZIF-8 synthesized using reuse filtrat was successfully.

Keywords: Synthesized, ZIF-8, Green Chemistry

Community Based Tourism in Nagari Lawang, West Sumatera: Participation Approach Analysis

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Community-Based Tourism (CBT) is one of the emerging tourism models in the last few decades as an alternative to mass tourism in all over the world. This can be categorized as sustainable tourism because it includes local people participation, and conservation. Lawang Village (known as Nagari Lawang in West Sumatera language) is one of the village in the West Sumatera Indonesia that has been trying CBT since 2012 with rich potential tourisms: culture, nature, adventure, traditional culinary, and handy craft. However, this is not as easy for CBT conducted successfully benefiting stakeholders because of two major dominated private-owned tourism objects. Initaly the CBT was promoted and initiated by one of the owner of private tourism, now it is just has lost its power and continuity and faced problems such as lack of human resources, loss global promotion, and finally the collaps of many homestays that have been designed before. However some local economic activities like traditional baverage production called"tebu lawang" and traditional gift shop are still running well. The purposes of this study are to find the community participation level in CBT Lawang and to determine the proper policy to recover CBT's profitable business. To achieve the study purposes this research used qualitative research design. Primary data were collected through observation, interview, and focus group discussion (FGD). The study results shows that based on Anrstein Participation Theory, CBT Lawang lies on the second step of participation where local people support tourism but has no access to resolve problems. Based on the SWOT analysis, the role of government from the lowest level until the highest, is the key point to make the two dominant private-owned tourism object have better position to support CBT Lawang.

Keywords: community based tourism, participation, lawang, government support

Length-weight Relationships and Condition Factors of *Cephalopholis argus* Harvested in The Northern Coast of Aceh, Indonesia

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The peacock hind grouper (*Cephalopholis argus*) is among several highly exploited grouper fishes globally. Categorized as least concern (LC) in the IUCN Red List, biological information on the species is limited in Indonesia, especially in the Aceh region. This study aimed to investigate various biological features of the species collected on the northern coast of Aceh. The fishes were collected from Pelabuhan Perikanan Samudera (PPS) Lampulo, Kuta Alam District, Banda Aceh, Aceh from June - September 2020. In total, 30 *C. argus* were collected in this study. The total length (TL) varied between 136.0-284.0 mm while weight (W) ranged between 46.5-460.0 g. In addition, Fulton's condition (K) ranged from 1.45-4.61 and relative weight (Wr) ranged from 81.75-128.53 g. The LWRs analysis revealed a b value of 3.1329 with a correlation coefficient of 0.94 indicating a positive allometric growth pattern. This study provides an important reference point for the peacock hind grouper that will assist in building a feasible fisheries management of the species.

Keywords: Grouper, Kerapu, Fisheries, IUCN, Total Length

Length-weight Relationships and Condition Factors of the One-Blotch Grouper (*Epinephelus melanostigma*) Fished in The Northern Coast of Aceh, Indonesia: A Preliminary Study

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The one-blotch grouper (*Epinephelus melanostigma*) is among a number of highly used grouper fishes globally. Considered as least concern (LC) in the IUCN Red List, biological data on the species is limited in Indonesia, particularly in the Aceh region. This study intended to explore several biological characteristics of *E. melanostigma* gathered on the northern coast of Aceh. The fishes were collected from Pelabuhan Perikanan Samudera (PPS) Lampulo, Kuta Alam District, Banda Aceh, Aceh from June - September 2020. In total, 32 *E. melanostigma* samples were gathered in this study. The total length (TL) varied between 141.5 to 280.4 mm while weight (W) ranged between 45.1 to 446.4 g. In addition, Fulton's condition (K) varied from 1.47 to 4.80 and relative weight (Wr) varied from 84.37 to 110.55 g. The LWRs analysis showed a b value of 3.2511 ($r^2=0.99$), showing a positive allometric growth pattern. This study presents an important reference point for the one-blotch grouper that will assist in building a viable fisheries management of the species.

Keywords: Grouper, Kerapu, Fisheries, IUCN, Total Length

Catching Investigation of Yellow Fin Tuna (*Thunnus Albacares*) Based on the Distribution of Chlorophyll-a in the North Waters of Aceh: A November and December Analysis

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The purpose of this study was to analyze the effect of the distribution of chlorophyll-a on the catch of yellowfin tuna in the northern waters of Aceh. This research was conducted in the north of Aceh waters starting from November to December 2020. The research method used was to collect primary and secondary data. Primary data is collected by direct survey in the field by following the activities of fishermen and recording the number of catches. Secondary data obtained from Aqua Modis satellite imagery in the form of chlorophyll-a data spatially and temporally. The catch data analysis used the CPUE model, while the chlorophyll-a analysis was carried out using the SeaDas 7.5 software in combination with ArcGIS. The analysis shows that the catch of yellowfin tuna is greater in November than in December, while the distribution of chlorophyll-a content is greater in December than November. The results of the analysis showed that the coefficient of determination (Adjusted R Square) was 0.09, which means that the relationship between chlorophyll-a and yellowfin tuna catches was only 9% and the other 91% was influenced by other factors. These results inform that the content of chlorophyll-a does not show a significant relationship to the catch of yellowfin tuna.

Keywords: Yellowfin Tuna; Chlorophyll-A; CPUE Model; Caching Area; Satellite Imagery

Utilization of Gayo Coffee Husk Waste for Natural Activated Carbon Obtained by Two Activation Method

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Processing of coffee beans provides a by-product in the form of coffee skin, which has the potential to become waste that can pollute the environment. In this paper, we reported the use of coffee husks into natural activated carbon which will then be used as a catalyst for hydrogen absorbing materials. In this work, the Gayo robusta coffee skin waste (*Coffea Canephora*) was made by a two-step activation method, carbonization with a slow pyrolysis process and activation using NaOH solution. The effect of activation solution concentration on the characteristic of activated carbon was studied based on functional group analysis and surface chemistry with Fourier Transform Infra-Red (FTIR) spectroscopy. Then, the micropore analysis was obtained by Brunauer-Emmett-Teller (BET), and finally the morphological was observed using Scanning Electron Microscopy (SEM). The results of the sample analysis will be discussed further.

Keywords: Coffee Skin, By-Product, Activated Carbon, Two Step Activation, Slow Pyrolysis

Sustainable Management of Fisheries Resources in Java Sea: Utilization Status of Longtail Tuna (*Thunnus tonggol*) Resource in Indramayu Waters West Java Case Study.

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Longtail tuna (*Thunnus tonggol*) is a pelagic fish which is generally found in tropical waters. This fish has high economic value, so this tuna is commercialized. Research on fisheries resource sustainability through bioeconomics assessment is necessary to be done in order to determine the status of longtail tuna resource utilization. This research was conducted in south part of Java Sea namely Indramayu waters West Java from January 2020 to April 2020 which aims to estimate utilization status of longtail tuna (*T. tonggol*) namely exploitation rate, maximum sustainable yield (MSY), total allowable catch (TAC), maximum economic yield (MEY), and open access (OA), and to determine length and weight relationship. The research used quantitative descriptive method based on secondary catch and effort data from 2010 to 2019 as well as length weight primary data as much as 987 fish. Result showed that catch and effort at MSY level was 8,453 tons/year and 2,974 trips/year respectively with value of TAC as much as 6,762 ton/year. While the estimated values of catch and effort at MEY level was 8,168 tons/year and 2,427 trips/year with optimum profit as much as Indonesian dollar rupiah (IDR) 88.98 billion. Another analysis indicated that OA level was achieved when effort reached at 4,855 trips/year and whilst exploitation rate was 119%. Last but not least, length weight relationship analysis indicated that fish had isometric relationship with equation $W = 0.0147L^{3.039}$. In conclusion, the fish has an isometric length weight relationship and the utilization status of fish is in over exploited condition hence exploitation level must be decreased in order to maintain stock sustainability.

Keywords: Longtail tuna, maximum economic yield, over exploited, sustainable management, total allowable catch.

Proximate Composition and Fatty Acids Profiling of Sea Horse Originated From Simeulue, Aceh-Indonesia

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The aim of this study was to determine the proximate composition, quantitative of fatty acids analysis as well as the content in the sea horse sample, *Hippocampus* sp which originated from Sibigo waters, Simeulue, Aceh, Indonesia. In this study, proximate composition and amino acids of sea horse, *Hippocampus* sp. from Siemelue, Aceh, Indonesia was determined. Based on the proximate analyses that had been conducted, results showed that protein was the most abundantly found in the sea horse (39,32%), orderly followed by carbohydrate (28,48%), ash (25,43%), lipid (0,57%) and moisture (6,29%) (dry weight basis). Fatty acids profiling and analysis were also conducted by using the a GC-MS (Gas Chromatography-Mass Spectroscopy). the samples were divided into two size that 3-5 cm (small seahorse) and 6-10 cm (big size). The analysis results showed that sample possessed of saturated fatty acids in big size were palmitic acid, stearic acid, myristic acid, and lauric acid. while unsaturated fatty acids were arachidonic acid, linoleic acid and oleic acid. Traces of saturated fatty acids in small seahorse were found in the sample including palmitic acid, stearic acid, miristic acid and lauric acid, while unsaturated fatty acids were linoleic acid and oleic acid. The highest saturated fatty acid in seahorse was palmitic acid (60.67%), and unsaturated fatty acids were oleic acid (45.5%), arachidonic acid (25.08%) and linoleic acid (0.93%).

Keywords: Sea Horse, Proximate, Fatty Acids

Estimation of the Volume of Production of Turbine Vapor of a Fuel Boiler with Stochastic Exogenous Factors

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The paper is based on the analysis and review of the conceptual principles, methodology and practice of modeling water-steam processes of a fuel boiler of power plants; implementation of algorithms and models of the theory of system dynamics, white and pink noise; using computational technologies of differential difference equations and numerical integration methods, the values of the input parameters of the production of turbine vapor of the fuel boiler are determined, which, regardless of stochastic exogenous factors, provide stable states of the necessary and model volumes, norms of water intake and output of turbine vapor of the fuel boiler.

Keywords: production of turbine vapor; water-steam processes; system dynamics; exogenous stochastic factors.

Community Structure of Plankton in Aneuk Laot Lake Sabang Pulau Weh

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The role of plankton as natural food affects the potential of fish in the waters. The structure of the plankton community in the Aneuk Laot lake can provide an overview of the stability of these waters. This study aims to determine the plankton biomass and the structure of the plankton community of Lake Aneuk Laot Sabang. This research was conducted in September 2019 in the waters of Lake Aneuk Laot. Determination of observation stations using the stratified random sampling method, identification of plankton using the census method and analysis of chlorophyll-a using the Trichomatic method. The results showed that the plankton composition consisted of 27 phytoplankton and 4 zooplankton genera which were divided into Bacillariophyceae (35%), Chlorophyceae (19%), Cyanophyceae (16%), Zygnematophyceae (10%), Dinophyceae (3%), Euglenophyceae (3%) and Crustacean class (13%). The abundance of plankton was 21,333 ind/l, The most abundant type is Navicula sp. Diversity index value (2.97) is category high, evenness index (0.87) and low dominance index (0.07). Chlorophyll-a values ranged from 2.84 to 4.84 mg/l including the medium nutrient category. Aneuk Laot Lake has a high level of community stability with trophic status of mesotrophic-eutrophic.

Keywords: plankton biomass, trophic status, community stability, Chlorophyll-a

Study of Growth and Morphological Development of Tilapia (*Oreochromis niloticus*) Larvae in BBI Lupuk Badak, Aceh Tengah

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Tilapia (*Oreochromis niloticus*) is one type of fish that has high economic value and is widely consumed by the community. Therefore, the growth and development of tilapia larvae need to be considered. This study aims to determine the growth and development of tilapia larvae. The parameters in this study were observations of total larval length (TL), daily growth rate (LPH), and morphology of tilapia larvae. This research was conducted for 30 days. Measurements of total length growth and morphological development of tilapia larvae were measured on days 1, 5, 10, 15, 20, 25 and 30 DAH (Days After Hatching). Data were analyzed descriptively. The results of this study showed that the growth of tilapia larvae from day 1 to day 30 increased. The development of tilapia larvae in the yolk sac phase occurred on day 1-7 and the transition phase (from endogenous feeding to exogenous feeding) occurred on day 6-7 DAH, and on day 8 the yolk sac had been exhausted. The morphological development of tilapia larvae began to form completely on day 10 DAH.

Keywords: *Oreochromis niloticus*, Growth, Morphology

Sedimentation Rate of Feed on the Ground Pond Red-Yellow Podzolic (PMK) Patin Intensive Fish Farming

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Sedimentation pond fish farming is largely sourced from excess feeding. Estimation of sedimentation rate in an intensive Patin uses a tin container (chamber / sediment traps) were placed in the pond (5 cm below the surface of the water) and in the bottom of the pond (5 cm above the sediment surface) and measured as a fully solid. A number of water quality data serve as a model approach to running this sedimentation in the pond are as follows temperatures, Turbidity, water pH, DO, CO₂, organic matters, alkalinity, and hardness. This study aims to determine the sedimentation rate of feed on a red-yellow podzolic soil pool (PMK) intensive catfish culture. Age 0-20 years is a treatment pond has been divided into four, namely: P1 (age 0-5 years), P2 (aged 6-10 years), P3 (aged 11-15 years) and P4 (age 16-20 years). The results were obtained on linear equation model catfish pond sedimentation rate with an average increase sedimentation of 50 mgL⁻¹ day⁻¹.

Keywords: Sedimentation, Pond Age, Total Solids, Water Quality, Red-Yellow Podzolic Soil

Secondary Metabolites Screening of *Echinothrix diadema* From Iboih Waters, Weh Island, Indonesia

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Some studies had identified six species of sea urchin in Iboih Waters, Weh Island, Indonesia, namely; *Diadema setosum*, *Diadema savignyi*, *Echinothrix diadema*, *Echinothrix calamaris*, *Centrostephanus redgersii*, and *Echinometra mathei*. Sea urchin was known rich of secondary metabolites content in its thorn, shell and gonad. Those compounds had been revealed and reported from three species of sea urchins, and three others are still in studied. The objective of this study was to figure out the secondary metabolites content in thorn, shell, and gonad of sea urchins (*Echinothrix diadema*) collected from Iboih Waters. The study was conducted from February to April, 2021, and samples were treated and analyzed at at Laboratory of Marine Chemistry and Fisheries Biotechnology, Faculty of Marine and Fisheries, Universitas Syiah Kuala. The study carried maceration method using methanol as a solvent. The yield of the thorn, shell, and gonad extract were 61.95%, 87.85% and 92.05%, respectively. Based on phytochemical screening, it was found that thorn of *E. diadema* didn't show any secondary metabolites, while the shell contained of triterpenoids, and the gonad contained of flavonoids, triterpenoids, and saponins.

Keyword: Sea Urchin, *Echinothrix diadema*, phytochemical screening, thorn, shell, gonad

Cellulase Enzyme Activity by Bacteria Cellulolytic Isolated from Water of Mangrove Ecosystem in Aceh Besar and Banda Aceh

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Cellulolytic bacteria that produce cellulase enzymes play an essential role in degrading cellulose in their growth media. The carbon source contained in the water contains cellulose which can be utilized by cellulolytic bacteria for its growth by producing cellulase enzymes. Cellulose is the biggest energy potential that comes from nature which can be renewed. The presence of cellulolytic bacteria strongly supports the fertility and productivity in mangrove waters. The objectives of present study was to analyze the activity of enzyme cellulase qualitatively through the cellulolytic index and quantitatively through the activity and specific activity of the cellulase enzyme. Experiment of qualitative enzyme activity was carried out at the Microbiology laboratory SKIPM Aceh, and quantitative enzyme activity was conducted at the Microbiology Laboratory, Biology Department, IPB. Isolation of cellulolytic bacteria isolated from mangrove water was used with Carboxy Methyl Cellulose (CMC 1%) selective media using the spread plate method. The ability of bacteria to produce cellulase was tested qualitatively using the spot technique, this test was carried out using the Congo Red 0.1% method. Furthermore, the activity of cellulase enzymes as quantitative assay adopted DNS spectrophotometric methods. Measuring the specific activity of the cellulase enzyme can be determined by using the Lowry method. There were 21 isolates that have clear zone and have the ability to produce cellulase enzymes from 49 isolates that were successfully purified. The highest cellulolytic index (CI) was produced by BAME21 isolate with the value of 5.50 included in the high category, followed by BAMD26 and BAMA26 isolates, the value were 1.55 and 1.05 categorized into medium category. The other isolates were in the low cellulolytic index category. There were 2 isolates that had the highest CI and those were different species based on biochemical test continued to quantitative enzyme activity assay, namely BAME21 and BAMD26. The highest cellulase enzyme activity of BAME21 and BAMD26 were occurred at the 24th hr at 0.0029 U/ml and at 48th hr at 0.0012 U/ml, while the specific cellulase enzyme activity in BAME 21 and BAMD26 isolates were at 24th and 48th which were 0.210 U/mg and 0.097 U/mg, respectively. The qualitative assay showed that cellulolytic index were categorized low, medium, and high, moreover the value of quantitative assay described that the cellulase enzyme activity and the specific enzyme activity was low activity.

Keywords : qualitative assay; quantitative assay; mangrove water; cellulase enzyme; microorganism

Study of the Effect of Sea Surface Temperature on Purse Seine in Perairan Utara Aceh, Indonesia

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Aceh fishermen in Kutaraja PPS generally carry out fishing operations around the waters of North Aceh which have abundant and diverse biological potential. Catches in the waters of North Aceh are still heavily influenced by several natural factors that often occur in certain seasons, one of which is the factor of Sea Surface Temperature (SST) based on this research about the effect of SST on the purse seine catches based in PPS Kutaraja Banda Aceh. The purpose of this study was to determine the catches of purse seine fishermen in PPS Kutaraja to know the distribution of SST, and to determine the effect of sea SST on the catches of purse seine based in Kutaraja Banda Aceh PPS. This research was conducted in November 2019 at the PPS Kutaraja. Analysis of the data used in this study is purse seine catch data obtained from UPTD from 2015-2019 tabulated in tabular and graphical format, SST distribution obtained from Aqua-MODIS satellites from 2015-2019 using SeaDas software and analysis used to see the effect of SPL on catch is using linear regression analysis. Fish catches using Purse seine fishing gear with the highest vessel size of 11-20 GT in 2018 with a total of 2,499,634 kg while the lowest catch in 2016 with a total of 1,460,220 kg. The distribution of SST found in the waters of North Aceh shows that the highest temperature occurred in 2015 which was 30.24 oC while the lowest occurred in 2016 which was 29.04 oC. From the results of linear regression analysis showed that the SST in the waters of North Aceh showed a coefficient of determination (R^2) of 0.2279. This value can give a picture that the SST parameters contribute to fish catches of 22.79% and the rest is influenced by other oceanographic factors. While the correlation coefficient (r) of 0.477 means that this condition can indicate sufficient correlation with the direction of the relationship that is positive.

Keywords: Effect of sea surface Temperature On Catches, Purse Seine, Perairan Utara Aceh.

DNA Barcoding and Trends in Shark Catches Landed on the West and East Coast of Aceh

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Shark is a cartilaginous fish that is widely hunted because it has high economic value. The waters of Aceh are directly adjacent to the Indian Ocean and the South China Sea, making it a preferred habitat for pelagic fish, especially sharks. Information on shark species landed in the waters west and east of Aceh is very limited due to difficulties in identification and commonly used area names. This study aims to see the trend of shark catches from 1989-2011, and to find out specifically what types of sharks are most often landed in Aceh waters. The method used in this research is secondary data and primary data. Secondary data was obtained from the Aceh Fisheries Statistics data for 1989-2011 for catches in the eastern and western regions of Aceh. Primary data consists of four stages, namely sample collection, identification using identification books, molecular identification (COI) and phylogenetic analysis. The results of the study shown by the trend of statistical data on west coast shark catches increased from 1990 to 1996, but there was a drastic decline in 2005 by 75%. This was caused by the tsunami which caused the fishing port to be completely damaged. The graph of the trend of east coast shark catches looks up and down from 1989 to 2003 and experienced a drastic decline in 2004 to 2005. The highest increase occurred in 2007 which reached 2244 tons. The results of the molecular analysis of 45 tissue samples from 5 locations showed that there were 15 species, namely *Carcharhinus sorrah*, *Carcharhinus amboinensis*, *Triaenodon obesus*, *Isurus oxyrinchus*, *Spyrma zygaena*, *Spyrma lewini*, *Loxodon cf. macrorhinus*, *Hemipristis elongaria*, *Stagostoma fasciatum*, *Nebrius ferrugineus*, *Chilloscyllium punctatum*, *Rhynchobatus australiae*, *Isurus oxyrinchus*, *Alopias pelagicus*, and *Alopias superciliosus*.

Keywords: Aceh; Barcode; COI; Sharks Catch; *Alopias superciliosus*; *Spyrma lewini*

Identification of Marine Debris at Pulau Nasi, Aceh Besar Regency

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Marine debris has been a global issue requiring actions from all parties to reduce its abundance. Since the availability of marine debris data in Aceh Province is hardly presented, this research was conducted to identify the type and the abundance of marine debris found in Nasi Island, Pulau Aceh District, Aceh Besar Regency. The sampling was carried out at four stations namely Nipah Beach, Pasie Janeng Beach, Alue Riyeung Beach, and Lhok Reudeup Beach. The method used was the Shoreline Transect which was stretched along 100 m with an observation area of 4 m. The observation period was carried out 3 times, namely in July, October and December 2019. The most types of rubbish for bottled plastic drinking water are in Lhok Reudeup Beach, plastic cups drinking water in Lhok Reudeup Beach, and besides plastic drinking water in Alue Riyeung Beach.

Keywords: Shoreline Transect, Plastic Bottle, Plastic Cup.

Identification and Inventory of Macroinvertebrate in West Simeulue, Aceh, Indonesia

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West Simeulu is a Marine Protected Area that has been determined by the Governor of Aceh since 2018. Identification and inventory the abundance of macroinvertebrates in West Simeulue can be used as an initial reference to see effectiveness of the designation of this area as a Marine Protected Area. Macroinvertebrates are biotic components in aquatic ecosystems that can describe the physical, chemical and biological conditions of waters, so that they can be used as bioindicators of the quality of waters. This research was conducted in September 2019. This study uses the belt transect method with the depth of 3 to 9 meters. The results of this study found 6 species of macroinvertebrates with 4 different phylum. The highest abundance value came from the *Diadema urchin*, which had an abundance values of 5240 ind/ha.

Keywords: Abundance, Macroinvertebrate, Marine Protected Area; West Simeulue.

Analysis of Main Facilities Utilization Level in Kuala Langsa Fish Landing Base, East Aceh, Aceh.

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Fishing ports are an important factor in supporting various capture fisheries activities in Aceh. One of the fishing ports in East Aceh is the Kuala Langsa Fish Landing Base (PPI). The available facilities at PPI Kuala Langsa are currently not being used optimally by fishermen. The problems in managing PPI Kuala Langsa are inadequate facilities and supporting infrastructure, therefore good port facility management is needed to be able to provide facilities and infrastructure more effective and efficient. This condition is much more uncondusive when the fishing season arrives, the loading and unloading activities will become more heavy, with the result that requiring a wider and more spacious landing area. This study aims to find out the actual condition of the fishing port dock and port pond facilities at PPI Kuala Langsa, and determine the utilization level of the fishing port dock and port pond facilities according to spatial and time at PPI Kuala Langsa. The research was conducted in August 2020 using survey methods and interviews with 18 fishermen. The actual conditions were then analyzed descriptively, whereas level of used facilities was analyzed by using formula from the Director-General of Capture Fisheries (1981). The results showed that the level of spatial utilization on the fishing port dock was 105% and based on time was 45%. This showed that the use of the dock based on spatial utilization has crossed the limit and based on time was not optimal. The utilization level according to spatial and time analysis indicated that the use of the facility is still within optimal limits. According to the results of this research, it is necessary to develop a fishing port dock facility because it has exceeded capacity.

Keywords: PPI Kuala Langsa, Utilization Level, Fishing Port Dock, Port Pond

Fishing Vessel Queue in Kuta Radja Fishing Port

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Kuta Radja Fishing Port is one of the biggest port with highest activity in Aceh Province. Nevertheless, when unloading process, fishing vessel often happen long queue of fishing vessel. This study aims to identify the vessel queue landed in Kuta Radja Fishing Port, identify the degree of usefulness of the system utility of unloading facilities and identify the ship waiting time in the queue at Kuta Radja Fishing port. The methods used was case study and standard formula of multi channel single phase . The results showed that the model queue that occurred in Kuta Radja Fishing Port was (M/M/5): (FCFS / I / I). Based on calculations by the standard formula queuing model, it was obtained that the rate of arrival of the vessel unloading was 14 vessels / day and the rate of the service time was 16 vessels / day. Value of waiting time in the queue was 0 hour and the number of vessels that queue did not exist, while the waiting time in the system was 2.5 hours and the number of ships arriving in the system was 1 ship. The result of the calculation also showed that utility value of the system almost reached the optimum value (0.875) and the probably no ship in a system was 0.42. The efforts that can be made to accelerate the performance of fish unloading in Kuta Radja Fishing Port, namely using cranes as tools when unloading fish on fishing vessel.

Keywords: Unloading Speed, Unloading Fish, Queue Model

Tourism Revival Strategy During Covid19 Pandemic : A Case Study In The Kemiren Traditional Village, Indonesia

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The adoption of new habits in Indonesia has an impact on a variety of sectors, where all Indonesians must adhere to health protocols in everything they do. Wearing masks, washing hands, maintaining distance, staying away from crowds, and limiting mobility are all examples of the 5M. The adoption of this new habit alters travel habits. Tourism is required to implement the CHSE (Clean, Healthy, Safety, and Environment) program. It also encourages tourism sector actors to obtain a CHSE certificate from the Ministry of Tourism and Creative Economy in order to organize sustainable tourism that supports the government's CHSE program. The purpose of this research is to examine the tourism actors' strategies for increasing the number of tourists in the Osing Tribe Traditional Village in Kemiren. The qualitative case study research method is used in this study. The study is being conducted at the Traditional Tourism Village in Kemiren Village, Glagah District, Banyuwangi Regency. Based on the findings of the research, POKDARWIS's strategies have included the use of virtual media, with virtual tours held as promotional media during the pandemic. Furthermore, POKDARWIS's accomplishments can be seen in the Osing Tribe Traditional Village's designation as a Sustainable Tourism Village by the Ministry of Tourism and Creative Economy. This certainly encourages tourists to visit the Osing Tribe Traditional Village directly. Furthermore, the main strategy is to create a mini package, which is intended for tourism in small quantities, which only amount to 5-10 visitors per day. The most important strategy, however, is to support the CHSE tourism program, broaden the reach of CHSE certificates, provide hand washing facilities, and adhere to strict health protocols.

Keywords: Tourism, Revival Strategy, Covid 19 Pandemic, Case Study

The Comparison of Coastal Sediment Layers' Characteristics in Lhoong District, Aceh Besar Regency

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This study was conducted to determine the sediment characteristics in different vertical layers based on grain size in the lowest low tide zone in November 2018, January 2019 and March 2019 at Lhoong Beach of Lhoong District of Aceh Besar Regency. The samples of this research were collected from 3 stations, each station 500 meters apart. The result showed that the highest grain size value was in November 2018. The sandy sediment was found at station one in January 2019, while at the other stations was gravelly sand. The type of season and environment influence the sediment layer. It can be seen in November that the sediment size is higher than of other months, especially in the 5-10 cm layer. Vertically spatial, in January and March the grain size value obtained was small, the deeper the layer, the smaller the grain size. Meanwhile, in November the grain size of the layers tended to be the same.

Keywords: Sediment Characteristic, Gravelly Sand, Lhoong Beach

Concentration of Dissolved Heavy Metal Around the Rupert Waters Industrial Activity, Malacca Strait

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The area of Rupert Island has developed rapidly in recent periods which is marked by the increase in coastal residential areas, commercial centers, industries, ports and also increased sea transportation. This increase in activity can lead to a decrease in the water quality of the Rupert Strait. This study aims to analyze the water quality of dissolved heavy metals i.e., Cadmium (Cd), Copper (Cu), Lead (Pb), Zinc (Zn) and Nickel (Ni) in the waters of the Rupert Strait. Sampling of surface water using sample bottles was carried out at 9 observation stations from the waters of West Rupert to South Rupert. The results of the analysis show that the lead and nickel values still meet the threshold values set by the Minister of Environment No.51 of 2014. A total of 30% of the sample points for cadmium testing water do not meet the quality standards and have been polluted. Meanwhile, the values of copper and zinc have exceeded the specified quality standards and have polluted the waters of the Rupert Strait. There is a need for a mechanism from various aspects to maintain water quality that still meets the threshold and certain efforts are needed to reduce heavy metal pollution, namely copper and zinc in the waters of the Rupert Strait and its surroundings.

Keywords: Rupert Island, Pollution, Water Quality

Profit Maximization of Blue Swimmer Crab Fishing Through the Spatial Bioeconomic Approach in the Marine Protected Area of Bintan, Indonesia

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Blue swimmer crab (BSC) is an important fishery resource that is strongly associated with the Bintan Regency Marine Protected Area (KKLD Kabupaten Bintan), and its fishing effort is one of the main livelihoods of fishers living around the MPA. A spatial approach should be applied in the BSC fishery management instead of the conventional approach, that assumes fish resources to have a spatially homogeneous distribution. The spatial bioeconomic model has been used to maximize the fishing revenue at three landing sites inside the MPA and one location outside the MPA. There are differences in BSC fishing effort between seasons at the four landing sites concerning profit maximization. These differences can actually be considered very small because of the fishery's small-scale character and its tendency to always meet high levels of livelihood needs so that there are no significant differences between seasons. During the peak fishing season, fishing trips can be optimized in Senggarang (outside the MPA) with 152 trips per boat and estimated total revenue of IDR 29,500,000 per boat. During the drought season, fishing trips can be optimized in Berakit (inside the MPA) with 61 trips per boat and an estimated total revenue of IDR 2,700,000 per boat. The results of this study can strengthen the policies in place for the east and north coasts of the Bintan Regency as an MPA.

Keywords: Blue Swimmer Crab, Spatial Bioeconomic, Marine Protected Area, Small-Scale Fisheries

Study of Determining the Fishing Season for Tiger Grouper (*Epinephelus fuscoguttatus*) Landed at Kutaraja Fishing Port, Banda Aceh

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The tiger grouper (*Epinephelus fuscoguttatus*) is a type of fish landed at the Kutaraja Fishing Port using hand-line fishing gear. Therefore, it is necessary to determine the right fishing season to make it easier for fishermen to carry out of fishing operations for tiger grouper effective. This research was conducted in July-August 2020, at Kutaraja fishing port, Banda Aceh. The collection of data recovery from 2014-2019 using the moving average method. The research data were obtained from primary data fishing trip, operating distance, and catch, and secondary data (time series data on tiger grouper catches 2014-2019, as well as research-related literature). The catch per unit effort (CPUE) of handline fishing gear landed at Kutaraja fishing port tends to decrease every year. The highest CPUE occurred in 2015 and the lowest in 2018. The value of fishing season index of tiger grouper (*Epinephelus fuscoguttatus*) showed that fish can be caught throughout the year. Based on the criteria for determining the fishing season, the value of fishing season index (100%) is included in the peak season. The results showed that the peak season for tiger grouper landed at Kutaraja fishing port occurred in February (201.0%), March (127.2%), June (161.0%), and July (146.1%). Meanwhile, the value of fishing season index was 50% to <100% includes the medium fishing season in January (75.0%), August (91.2%) and December (84.3%), and the low season occurs in May (33, 6%), September (31.3%), October (19.9%) and November (41.8%) with the value less than 50%.

Keywords: Tiger grouper, CPUE, Fishing Season Index, Kutaraja Fishing Port

Polyculture of Tilapia (*Oreochromis niloticus*) and Lemeduk (*Barbonymus schwanenfeldii*) in floating net cages as a strategy for utilizing natural food

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Polyculture is a sustainable aquaculture system because it can reduce environmental pollution and increase feeding efficiency. The purpose of this study was to analyze the performance of growth, biomass and food competition for tilapia as the main commodity and lemeduk fish as a secondary commodity with a polyculture system in floating net cages. The research method used a Completely Randomized Design (CRD) consisting of 5 treatments and 3 replications, namely: treatment A (60 tilapia), Treatment B (tilapia 40 + lemeduk 20), Treatment C (tilapia 30 + lemeduk 30), Treatment D (tilapia 20 + lemeduk 40), and Treatment E (lemeduk 60). The research container uses floating net cages with a size of $0.5 \times 0.5 \times 1$ m. Parameters observed were absolute length growth, absolute weight growth, specific growth rate, biomass production, competition index, and water quality. The results showed that the polyculture system of tilapia and lemeduk at different stocking densities had a significant effect on absolute length growth, specific growth rate, biomass production, and had low competition between tilapia and lemeduk. The best treatment was found in treatment B (N 40+ L 20) and treatment C (N 30+ L 30) with absolute length growth value ($3.20 \text{ cm} \pm 0.17$), specific growth rate ($3.83\% \pm 0.36$), biomass of tilapia ($94.36 \text{ g}/0.5\text{m}^2 \pm 16.45$) and total biomass ($100.69 \text{ g}/0.5\text{m}^2 \pm 5.49$). Hence, the polyculture system is better than the monoculture system and the absence of competition between tilapia and lemeduk in using food.

Keywords: Competition index, growth performance, monoculture, biomass, Trophic interaction

Induction of Oocyte Developer Hormones (Oodev) on The Maturity of Kawan fish (*Poropuntius tawarensis*)

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Kawan fish (*Poropuntius tawarensis*) is an endemic fish belonging to the Cyprinidae family found in *Laut Tawar* Lake, Central Aceh, Indonesia. *Kawan* fish has a limited distribution. The fertilization only occurs in the rainy season. The study aimed to analyze the Oodev hormone with different doses on the maturity of *kawan* fish. The method used was a completely randomized design (CRD) with 3 treatments and 3 replications, namely: A (control), B (0.25 mL/kg hormone dose), and C (0.50 mL/kg hormone dose). The parameters used in this study were gonado maturity index (GIC), egg diameter, coefficient of diversity of egg diameter, fecundity, and hepatosomatic index. The study revealed the highest value found in treatment C which the value of egg diameter was 0.8791 ± 0.02 mm, egg diversity coefficient was $6.46 \pm 0.49\%$ and fecundity was 869 ± 33.99 egg/kg. While the highest gonadal maturity index was found in treatment B ($10.41 \pm 2.03\%$). The induction of Oocyte developer (Oodev) hormone on the maturity of *kawan* fish did not significantly affect the hepatosomatic index (HSI). The use of Oodev hormone is efficient used to accelerate the gonad maturity of fish.

Keywords: Kawan Fish, Oodev Hormone, Gonado Maturity Index

Histopathological in the Hepatopancreas of Pacific White Shrimp (*Litopenaeus vannamei*) Infected by White Feces Disease

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The high production of Pacific white shrimp (*Litopenaeus vannamei*) in Pidie Jaya impacts the decline in water quality around the ponds due to aquaculture waste. This condition causes shrimp to be susceptible to diseases, one of which is white feces disease (WFD). The objective of the present study was to determine the level of hepatopancreatic damage caused by WFD through histopathological performance. Four shrimp samples were taken randomly from two semi-intensive ponds in Meurah Dua District, Pidie Jaya Regency, Aceh, Indonesia. The results showed that the histopathology in the hepatopancreas was severely damaged, including vacuolization, fat degeneration, and necrosis in ponds with higher ammonia concentrations. According to pH, temperature, salinity, and ammonia concentrations, ponds near settlements were more polluted than ponds far from residential areas, projected by histopathological obstruction of the shrimp's hepatopancreas, which was more damaged.

Keywords: Mortality Rate, Semi-Intensive Pond, Water Quality, Aceh

Fishing Productivity of Yellowfin Tuna with Purse Seines and Handlines Based in Banda Aceh, Indonesia

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The northern and western waters of Aceh are potential areas for yellowfin tuna (YFT) fishing in the eastern part of the Indian Ocean. Fishers catch this species using purse seines and handlines landed at different locations in Banda Aceh City. The objective of the present study was to analyze the fishing productivity of YFT based on catch per unit effort (CPUE) and the average catch size to compare with the size at maturity of the species. Data collection was carried out from November to December 2019 in the Fishing Port of Lampulo and Tuna Landing Site in Gampong Jawa. The results showed that the CPUE of purse seines and handlines experienced monthly and annual fluctuations during the 2015-2019 period. The peak of YFT's fishing season with the two fishing gears occurs from September to November. The highest annual CPUE for purse seines occurred in 2019, while handlines occurred in 2015. The juvenile fish category dominated the YFT caught in purse seines at 64%, while the adult fish category dominated handlines at 78%.

Keywords: CPUE, fishing season, juvenile, Indian Ocean

The Impact of Economic Growth Due to Technological Developments, Digital Payments and Fluctuations in Interest Rates and Exchange Rates in Indonesia

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Technological developments have an impact on the payment system, namely E-Money. E-Money moved very fast in 2018 and 2019, in 2018 E-Money was at 50.3% of the money in circulation and economic growth increased by 5.4% even though interest rates in that year were at 6%. This means that some Indonesians have started to make changes to the payment system. The transition to digitalization in the financial sector is accompanied by a fundamentally new transformation of socio-economic relations in society. The Fintech concept is considered both in the context of technological innovation and the establishment of a sustainable digital financial infrastructure that tends to ensure the availability of effective services in financial markets, including for small and medium-sized companies, (Vovchenko, Galazova, Sopchenko, & Dzhu, 2019). Robert Sollow This school focuses its theory on three factors that influence economic growth, namely physical capital, labor, and technological developments. This study uses secondary time series data from 2004-2019 quarterly using Multiple Regression (OLS/One Least Square) and processed using the eviews 10 application. This study aims to determine the impact of technology on economic growth. And the results show that first, credit cards have a negative and significant effect on technology and Debit Cards, EMoney, have a positive and significant effect on technology. Emoney has a negative and significant effect on economic growth, interest rates have a negative and insignificant effect on economic growth, the exchange rate has a negative and significant effect on economic growth, and technology has a positive and significant effect on economic growth

Keywords : Technology, E-Money, Interest Rate, Exchange rate, Economic Growth

The Effect of Concentration of AB Mix and ZPT Solutions on The Growth and Production of Mustard Plants (*Brassica juncea* L.) in Hydroponic Wick Systems

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This research was conducted in the greenhouse at the Experimental Garden of the Faculty of Agriculture Universitas Islam Sumatera Utara, Sub-district Gedung Johor, Medan Johor District, Medan City, North Sumatra Province. This research was conducted from November to December 2020. This study aims to determine the effect of concentration of AB Mix and ZPT solutions on the growth and production of mustard greens. This study used a completely randomized design (CRD) with two treatment factors, namely the concentration of AB Mix solution and ZPT application. The first factors, namely the concentration of AB Mix solution consisting of 3 levels, namely: K_0 = control, K_1 = 550 ppm, K_2 = 1100 ppm. The second factor was giving ZPT the earliest in 3 levels, namely: Z_0 = control, Z_1 = 0.5 ml, Z_2 = 1 ml. The parameters observed were plant height, number of leaves, leaf length, leaf width, wet weight and dry weight. Its is know from the results concentrations of AB Mix solution significantly affected plant height, number of leaves, leaf length, leaf width, wet weight and dry weight. The administration of ZPT had a significant effect on leaf width but had no significant effect on plant height, number of leaves, leaf length, wet weight and dry weight. The interaction of AB Mix solution concentration and ZPT administration had no significant effect on the growth and production of mustard greens.

Keywords: Mustard Plants 1, AB Mix Concentration 2, ZPT 3.

Characterization of Hydrological Aspects in Kolong Enam Pond, Kijang, Bintan Island - Indonesia

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Bintan Island in the Riau Islands Province is classified as a small island ($\pm 1170 \text{ km}^2$) with limited freshwater resources. The availability of raw water on Bintan Island will certainly be determined by the characteristics of hydrobiological aspects of Bintan Island. Fulfillment of freshwater needs is carried out through the creation of raw water shelters in the form of reservoirs, pond, dams, or abandoned bauxite mining pits. One of the raw water sources on Bintan Island is Kolong Enam Pond. This study aims to examine the hydrological aspects of Kolong Enam Pond in Bintan Island. The main data used in this study is digital elevation model (DEM) to extract hydrobiological aspects on Bintan Island. In our study found that Bintan Island has nine sub-watersheds. Kolong Enam Pond is located in the catchment area of Gunung Lengkuas, Kecamatan Bintan Timur. The catchment area of Kolong Enam Pond has an area of 1067,31 ha, which consists of 3 river orders. With regard to vegetation coverage from 2000-2018, it is indicated that there has been a decrease in vegetation coverage in the Kolong Enam Pond water catchment area.

Keywords: Hydrology, pond, vegetation coverage, watershed

Sensitivity Experiments of Cumulus Parameterization of Heavy Rainfall over Complex Topography of Aceh, Indonesia

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Aceh is located in the far northwest tip of the Sumatera Island. The central region is covered by high Bukit Barisan Mountain. Previous research show difficulties in simulating the weather condition over complex terrain. Heavy rainfall leading to floods occurred during Oct. 30 – Nov. 03, 2014, Inundating 12 subdistricts in West Aceh. The objective of the research is to simulate heavy rainfall associated with floods under different schemes over complex terrain. The research employs RegCM4.7. Global surface datasets and ERA-interim (EIN75) are utilized in the Initial and Boundary conditions. Cumulus parameterization settings over Land and ocean are Grell, Emanuel and Kain-Fritsch. The simulation produces the spatial resolution of 20km of rainfall. In terms of estimating heavy rainfall leading to floods relative to TRMM (satellite rainfall), the combination of, i.e., Emanuel-Emanuel, Grell-Emanuel, Kain-Fritsch-Grell, Kain-Fritsch-Kain-Fritsch show good performances. In terms of capturing floods-affected areas relative to TRMM, the combination of cumulus parameterization over land and ocean, i.e., Emanuel-Emanuel, Grell-Emanuel, Grell-Grell, Kain-Fritsch-Grell show good performances except for Kain-Fritsch- Kain-Fritsch.

Keywords: Floods; RegCM4.7; 20km of rainfall; TRMM;

Survival, Reproduction and Generation Time of Freshwater Zooplankton (*Ceriodaphnia* sp.) on Different Enrichment and Its Potential Use in Freshwater Aquaculture.

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In an aquatic habitat, zooplankton organisms are an extremely valuable resource for aquaculture purposes. Potential zooplankton species (*Ceriodaphnia* sp.) have further explored to evaluate its applicability in freshwater aquaculture. There is a need to find more options other than *Artemia* as live food options in freshwater hatcheries. In exploring further of other live feed, we need to also be able to cultivate them with proper nutrition in hatcheries. Hence, this freshwater zooplankton must be proven by their nutritional improvement and validating the food efficiency via its growth and reproduction capacities. Thus, this study was conducted by enriched the zooplankton with rice bran, soybean meal, *Chlorella vulgaris*, *Spirulina* sp. and unenriched zooplankton (control). The result showed that best growth performance *Ceriodaphnia* sp. occurred when enriched with organic base compared to microalgae. Meanwhile, the best initial age of reproduction occurred when enriched with rice bran (4.00 ± 1.00 days) compare to others treatment. Besides, the gross and net reproduction rate of *Ceriodaphnia* sp. differed with other enrichments where, rice bran and soybean meal also have highest rate (2.48 ± 0.09 and 2.17 ± 0.10 offspring/female) and (2.07 ± 0.08 and 1.85 ± 0.12 offspring/female) compared to other treatments. The generation time for *Ceriodaphnia* sp. were shorter when enriched with *Spirulina* sp. (5.23 ± 0.69 days) and longer when enriched with rice bran (6.84 ± 0.94 days). This study indicates that rice bran and soybean meal constitute better sources of enrichment to improve the growth performance and life history of zooplankton.

Keywords: Zooplankton; Enrichment; Survival rate; Life history parameter; Aquaculture.

Potency of Secondary Metabolite from Sea anemone (*Diadumene lineata*) as Pancreatic Anticancer

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Research on the potential of secondary metabolite of sea anemone (*Diadumene lineata*) as anticancer of the pancreas was conducted from August 2019 to January 2020 at Laboratory of Marine Chemistry and Fisheries Biotechnology, Faculty of Marine and Fisheries, Syiah Kuala University and Laboratory of Marine Natural Products, University of the Ryukyus, Japan. The purposes of this study were to isolate and characterize secondary metabolite of the sea anemone which has biological activity as an anticancer for the pancreas (PANC-1). The method used as an anticancer test using MTT assay and analysis of the characterization of the compound using FT-IR and NMR spectroscopy. The active compound was obtained from several steps of chromatography in the fraction of n-hexane:ethyl acetate (7:3) coded FS-1-21. The results of FT-IR spectrum interpretation showed that the compound FS-1-21 produced a wave number absorption at 3430.74 cm⁻¹ which indicated the presence of vibrations of the alcohol group (R-OH) and at wave numbers 2937.06 cm⁻¹ and 2877.27 cm⁻¹ indicated a vibrational hydrocarbon group (R-CH). Analysis using NMR spectroscopy resulted in a chemical shift value at δ_{H} 5.27 ppm (dt); 5.74 ppm (dd) showed the presence of two carbon sp² CH olefin (H₂C = CH) on carbon C-6 and C-28 and a carbon sp² exomethylene on carbon C-29. Comparison of the FS-1-21 NMR data with previous spectroscopic data of related compounds showed that the compound FS-1-21 was a steroid epimer of 24(*R,S*)-hydroperoxy-26-vinylcholesterol. The bioactivity test showed that have the substances activity at concentration of IC₅₀ = 0,048 μ g / mL against pancreatic cancer cell.

Keywords: *Diadumene lineata*; Sea Anemone; Steroid; Anticancer; Bioactivity

Prevalence and Abundance of Coral Disease in Aceh, Indonesia

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The aims of this research was to know the prevalence, abundance and types of coral diseases detected in Aceh. Method used in this research was a 20x20m belt transect with 3 replicates. Results show that the prevalence value was between 27,94% - 58,25 %. The value was quite higher if compared with other prevalence on some place in Indonesia. Average value of coral disease abundance in his research was 0,23 ind/m². There was 13 types of coral disease found during sampling, including fish bite, drupell predation, *Acanthaster planci* predation, white syndrome, ulcerative white spot, focal bleaching, non-focal bleaching, invertebrata galls, sponge overgrowth, cyanobacteria, pigmentation response, sedimentation damage, algae overgrowth. The most infected coral genus was *Acropora* with branching growth form.

Keywords: Abundance, Coral diseases, Prevalence

Characteristics of Nests and The Existence of Laut Tuntong (*Batagur borneoensis*) in Mangrove Ecosystems On Pusung Cium Island, Aceh Tamiang Regency

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Tuntong (*Batagur borneoensis*) is one of the animals whose status is almost extinct and is included in the list of protected animals based on PP no. 7 of 1999. Based on data from the International Union for Conservation of Nature (IUCN), sea tuna is ranked 25th out of 327 species in the world which are included in the rare category. The purpose of this study was to determine the number and characteristics of nests and the number of eggs from sea tuntong (*Batagur borneoensis*) in Aceh Tamiang. This research was conducted from November 2019 to January 2020 on Pusung Kiss Island, Seruway District, Aceh Tamiang Regency. Determination of the sampling location using purposive sampling method at 2 observation stations. Tuntong nests were found only at station 1. The nests found in November were 9, December 7 and January 6, with a total of 22 nests for 3 months. The number of eggs produced per hole is 11-27 eggs. Sea tuna eggs produced in November 0, December 11, and January were 97 eggs, with a total of 107 eggs for 3 months.

Keywords: sea tuna, IUCN, nest, eggs

The Function of The Attitude of Islamic Banks in Coastal Societies in Mediating The Effect of Emotional Attachment on Continuance Intention of Islamic Banks

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This study aims to analyse the factors that cause the reluctance of Islamic bank customers in coastal areas to be loyal and not switch to other banks. The population in this study are conventional bank customers who live in Aceh, North Sumatra and Riau. The sample size in this study was 350 respondents. Sampling was carried out using a stratified random sampling method with the following proportions: Aceh 25%, North Sumatra 50% and Riau 25%. In this study, the sampling method used the census technique. Data analysis used SEM (Structural Equation Modelling) to verify the path of the relationship between variables. The results showed that of the 3 direct hypotheses tested, the effect of Emotional Attachment on Attitude, The effect of Emotional Attachment on Continuance Intention, The effect of Attitude on continuance intention, all of which show a significant effect. The significance that occurs in this direct test indicates that there is a match between the research model developed and the facts in which this research was conducted. On the indirect effect tested, although it showed significant results, the role of attitude in mediating the effect of emotional attachment on continuance intention through attitude is partial.

Keywords: Emotional Attachement, Attitude, Continuance Intention, coastal societies, Islamic banks

The Role of Customer Satisfaction in Mediating The Effect of The Evaluation of The Bank's Compliance with Islamic Law on The Continuous Intention to Use Islamic Banking Among Coastal Communities

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This study aims to analyze the factors that cause low intention of Islamic bank customers to continue using banks' services, especially among those who live in coastal areas. The population in this study is the coastal community who are customers of Islamic banks and domiciled in the coastal areas of Aceh and North Sumatra. The sample size in this study was 200 respondents (Hair, 2009). Sampling was done by stratified random sampling method with the following proportions: Aceh 40%, North Sumatra 60%. In this study, the sampling method used the census technique. Data analysis used SEM (Structural Equation Modelling) to verify the path of the relationship between variables in this study using IBM SPSS-AMOS software version 22. The results showed that Of the 3 direct hypotheses tested, the effect of Evaluation of bank's compliance with Islamic law on Customer satisfaction, the effect of Evaluation of bank's compliance with Islamic law on Continuous Intention to Use Islamic Banking and The effect of Customer Satisfaction on Continuous Intention to Use Islamic Banking, all of which show a significant effect. On the indirect effect tested, the effect of Evaluation of bank's compliance with Islamic law on Continuous Intention to Use Islamic Banking mediated by Customer Satisfaction has also a significant effect. In contrast to previous studies, which mostly analyzed the reluctance of customers to switch to sharia banks because of the profit motive, this study tries to look at the phenomenon of the reluctance of coastal communities to stay in Islamic banks, especially related to the aspect of compliance with Islamic law which is carried out by Islamic bank practitioners as seen from customer perceptions.

Keywords: Customer Satisfaction, Banks compliance with Islamic law, Continuous Intention to Use Islamic Banking, coastal community

Institutional Strengthening in Supporting Aquaculture Business Development in Magelang Regency

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The development of the aquaculture business is one of the triggers for economic growth in a community. The Ministry of Maritime Affairs and Fisheries through the tilapia cultivation village business development program has a target to make potential aquaculture areas have a competitive and sustainable aquaculture system and business. Where the institutional function becomes important in its implementation. This study aims to analyze the institutional function of the farming community in encouraging business development. The research was conducted in 2021 in Magelang Regency. The research location has a low level of household tilapia consumption or number six after the five largest regencies in Central Java, namely 14.44 kg capita, and the need for tilapia is 1,260 tons in 2018. With an average annual production of tilapia of 6,426.28 tons per year, it describes that most of the tilapia production is used to meet the needs of local and foreign markets. The collection technique was carried out through observation and interviews in the form of questionnaires, focus group discussions (FGD), and interviews with key informants. Primary data describes the existing conditions of fishery management especially the institutional aspect. While secondary data, among others, are related to fishery production, regional fish consumption, area of aquaculture land, number of aquaculture households, and local regulations related to fishery management. Data analysis used descriptive qualitative. The results of the study show that up to 60 respondents, up to now, have not been able to access aquaculture assistance, one of which is aquaculture technology that is currently needed to encourage fish village business development programs. One of the options given is the need for institutional strengthening in the form of cooperatives. Cooperative institutions can be an effort to strengthen institutions to facilitate access to commercial and low-interest financing.

Keywords: business, development, aquaculture, tilapia, institutional

Comparative Anatomy of the Caudal Fin (*Pinna caudalis*) *Tor douronensis* and *Tor soro*

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Tor douronensis and *Tor soro* are two of the four species of fish of the genus *Tor* that live in Indonesian waters. However, studies related to the osteology of these two fish are still rarely revealed. This study aims to compare the morphology of the caudal fin (pinna caudalis) *Tor douronensis* and *Tor soro*. The research stages include sample preparation, making skeleton preparations, image analysis and identification of skeleton terminology. *Tor douronensis* fish were collected from the waters of the Pagar Alam area, Lahat Regency, South Sumatra, while *Tor soro* was collected from the waters of Bukit Lawang, Bohorok District, Langkat Regency, North Sumatra Province. The caudal fin (*pinna caudalis*) is part of the *ossa urostylus* which produces optimal hydrodynamic propulsion. Caudal fin Genus *Tor* is part of the *ossa urostylus* which is composed of 31 caudal fin rays (*pinnae*), six *os hypural*, *os parhypural*, *os pleurostylus*, *os epural*, dan *os uroneuralis*. The ventral part of *Tor douronensis* and *Tor soro* is composed of the *os parhypural* and the 1st and 2nd *os hypural*. *Tor douronensis* has a *os parhypural* that is more prominent and separates from the haemal spine compared to *Tor soro*. The dorsal part is composed of the 3rd to 6th *os hypural*, in *Tor soro* the *os hypural* is fused with cartilage. *Os pleurostylus* *Tor douronensis* has a more prominent shape than *Tor soro* and there is enlargement in the posterior part. The 3rd *os hypural*, and 4th *os hypural* on *Tor soro* have the largest size. The *Tor soro* has three neural spines and three haemal spines to support the rays of the caudal fin. The caudal fin bones of *Tor douronensis* and *Tor soro* are relatively similar to those of some fish from the family Cyprinidae. The results of this study can be used as an alternative to identify *Tor douronensis* and *Tor soro* by osteology.

Keywords: *Tor douronensis*; *Tor soro*; caudal fin; pinna caudalis

Swarm Earthquakes in Kutacane, Aceh: Volcanic or Tectonic Activities?

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Mt. Bandahara, located in the northern part of the Southeast Aceh region, Indonesia, had an increase of unclear swarm activities from September until November 2020. The swarm activities are close to the active fault, namely Tripa fault but it was clearly influenced by a potential volcanic tremor or dike. The swarm activities are the first phenomena in the Aceh region, and there had been no history of said seismic event. To highlight the swarm activities, we analysed the hypocentre distribution that recorded by Badan Meteorologi Klimatologi dan Geofisika (BMKG) from July 2020 to January 2021. The arrival of P and S-wave from 103 events to construct an optimum 1-D seismic velocity using coupled-hypocentres relocation was collected. The earthquakes were selected based on the azimuthal gap, minimum number of stations and travel-time residual. The total of P-phase picks was 687 while the S-phase was 321 in the distance of $0^\circ - 5^\circ$ with the azimuthal gap $< 180^\circ$. The arrival data were simultaneously inverted with 81 initial models and converged into a unique final model. Finally, the different velocities occurred in the upper and lower of the crustal thickness of 0 – 40 km. The V_p values are about 5.0 – 7.0 km/s and 3.0 – 5.0 km/s for V_s value while the V_p/V_s ratio are ranging from 1.5 to 1.7. Our preliminary results indicate that the potential swarm activities near to Mt. Bandahara maybe triggered by an unknown active fault due to the less information of volcanic activity from Mt. Bandahara. The intense swarm activity may also from the dike in the most upper crustal area, not to mention events that caused by others volcanic activities.

Keywords: Swarm, Volcano, Earthquake, Hypocenter, Relocation, Seismic Velocity

Adat Laot Adaptation for Sustainable Fisheries Development in Aceh Province

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In Aceh's fishing community, the customary law of the sea is still exists. This paper aims to determine to what degree the existence of customary law of the sea and Panglima laot can be adapted for sustainable development of Aceh's fisheries. This research is based on a review of documents, laws and regulations, the data used is in the form of legal materials analysis. This analysis approach is critical in terms of state law because it answers how the state legal framework responds to community fisheries regulation based on customary law of the sea. Panglima Laot's viewpoint is quite important on both the normative and reality sides, especially considering his role and function, which is very directed to the meaning of nature based on religious beliefs. It seems that in viewing welfare not just in physical form, but also in non-physical form, led to the concept of environmental sustainability. Physically, welfare is defined as an increase in wealth, but there is also a need to maintain environmental sustainability and the ability to comfortably utilize existing fisheries resources.

Keywords: adat laot, fisheries development, sustainable fisheries, Aceh.

Analysis of Lighting of a Football Stadium

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Lighting is an essential element for human life. Based on the decree of the Minister of Health No.1405/Menkes/SK/XI/2002 Date: 19 November 2002 concerning the requirements and procedures for the implementation of healthy working environment. Indonesian National Standard 16-7062-2004 states that the quality of the inadequate lighting gives bad effects for visual function, the environment around the workplace, and psychological aspects that can be felt as fatigue, feeling less comfortable, less alertness until the effects of the most serious such as accident. The purpose of the study was to determine the intensity of the lighting, the spread of light, lighting design, type of lamp, light bulb conditions, efficiency of energy usage, and maintenance of the football stadium lights. This study employed a qualitative descriptive approach using the type of evaluation research. The subject of this research is Harapan Bangsa Football Stadium in Banda Aceh. Data analysis techniques are: data reduction, data display, and drawing conclusion. The findings of the research showed that the lighting intensity of Harapan Bangsa Football Stadium was 341 lux. Meaning that it was deficit of 458.8 lux of the standard set by PT Liga Indonesia (800 lux), deficit of 959 lux of the standard set by AFC (1.200 Lux), and deficit of 1659 of the standard set by FIFA 2000 Lux. Lighting in the Harapan Bangsa Football Stadium spread unevenly. The lighting intensity design of the stadium was 594 lux. The kind of light bulb used was mercury. The electric power needed to support all of lamps was 377. 200 Watt. The type of light bulb used was Philips trademark. Most of the light bulbs were broken and expired. The use of mercury lamps have not been efficient in energy use. The maintenance of the lamps has not maximized yet.

Keywords: analysis, lighting, football stadium

Relative Delays of Bodywave Arrivals of Regional Deep Earthquake Between Two Subduction System: Sumatra and Southern Ryukyu

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The subduction zones around the world are known for the location of major seismic energy release through large – mega earthquakes. The earthquakes occur at the subduction zone occurs at shallow to deep, where the seismicity distribution mimics the plate boundary between subducting and overriding plates and or known as Wadati-Benioff Zones. Even though a large – mega-earthquake occurred at the shallow portion of the subduction zone (shallower than 35 km depth), the intermediate deep earthquake could give a major risk and damage as well, such as the Padang earthquake that occurred on 30 September 2009 Mw 7.6 at a depth of 90 km as an intra-slab earthquake at the Sumatra subduction zone, and the 1909 Taipei earthquake which occurred on 14 April 1909, Mw ~7 at a depth of 50-100 km. The Sumatra and Southern Ryukyu subduction zone are tectonically different, however, both have indicated the existence risk from the intermediate-deep earthquake. In this study, by using a recently developed technique to estimate the bodywave dispersion, we could calculate the relative delays of the frequency-dependent seismic wave energy arrival at the seismic stations along these subduction zones. The result indicates that the Southern Ryukyus has larger delays of the high-frequency energy with delayed more than 2 seconds, while the Sumatra subduction zone showed a range of delays between 1.5 – 2 seconds of high-frequency energy (≥ 2 Hz). This indicates that the Southern Ryukyus subduction zones may expose a larger thread of ground movement anomalies relative to the regional deep earthquake compared to the Sumatra subduction zone. Thus, the Taipei area and the surrounding northern coast cities are at a greater threat of damage resulted from the intermediate – deep earthquake.

Keywords: bodywave dispersion, deep earthquake, Sumatra, Ryukyu.

Bodywave dispersion characteristics of regional deep earthquake at Sumatra and Southern Ryukyus subduction zone

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The convergent plate boundaries known as the subduction zone is the location where the cold, hydrate, and old oceanic plate subduct under the hot, dry, and young continental plate. The top of the oceanic plate, i.e. the oceanic crust usually is less than 6 km thick carries the hydrate material to the hot continental mantle, which is commonly an indication of the occurrence of the deep earthquake. From the recent studies, the deep regional earthquake bodywave signal that occurred at the subduction zone was found dispersed and or shown as a waveguide. Thus, by examining these signals, we could further estimate the thickness of the oceanic crust of the subduction zone, where it acts as a low-velocity layer compared to the surrounding continental and oceanic mantle, inversely it is known as a high-quality material (preserve the high-frequency energy). A narrow bandpass signal and the maximum of Hilbert transform envelope are being used to estimate the delay time of the dominant frequency energy between Sumatra and the Southern Ryukyus. It was found that the Southern Ryukyus has a larger delay with the dominant frequency at 2 Hz, thus, it is postulated that the oceanic crust at the Southern Ryukyus is thicker than the oceanic crust at the Sumatra subduction zone.

Keywords: waveguides; deep earthquake; Sumatra; Ryukyu.

