INSAEF 2020

International and National Symposium on Aquatic Environment and Fisheries

Book of Abstracts

INTERNATIONAL AND NATIONAL SYMPOSIUM ON AQUATIC ENVIRONMENT AND FISHERIES

24 September
Banda aceh, indonesia

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WELCOMING SPEECH
Dean of Faculty of Marine and Fisheries
Syiah Kuala University

Assalamu'alaikum warahmatullahi wabarakatuh.

Peace be upon you, and Allah's mercy and blessings.

The honorable:

Chancellor of Syiah Kuala University: Prof. Dr. Ir. Samsul Rizal, M.Eng.

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

Deputy Deans of the Faculty of Marine Affairs and Fisheries, Syiah Kuala University, as well.

Ladies and gentlemen, participants of The International and National Symposium on Aquatic, Environment and Fisheries 2020.

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. Dr. Arif Satria, S.P, M.Si - Rector of IPB University, Prof. Dr. Agung Dhamar Syakti - Rector of Raja Ali Haji Maritime University; invited speakers: Prof. Dr. Mohd Siti Azizah from Universiti Malaysia Terengganu - Malaysia, Dr. Sebastian Ferse of Leibniz Center for Tropical Marine Research - Germany, Dr. Sally Keith from Lancaster University, United Kingdom, Dr. Hawis Madduppa from IPB University - Indonesia, and Achmad Adhitya, Ph.D from the Overseas Alumni Network. We give great appreciation for your willingness to attend this online activity.

Ladies and gentlemen, the Faculty of Marine Affairs and Fisheries, Syiah Kuala University was founded in 2013 and currently has three undergraduate study programs, namely Marine Science, Aquaculture, and Fishery Resources Utilization. As a form of our contribution to the world of research, since 2018 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 2nd International Conference on Fisheries, Aquatic, and Environmental Sciences as well as The 6th Annual Conference of the Asian Society of Ichthyologists, 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. Muchlisin Z.A., S.Pi, M.Si

WELCOMING SPEECH
Chairperson of INSAEF 2020

Excellences, Distinguished Participants, Ladies, and Gentlemen,

On behalf of the conference committee, I am honored and delighted to welcome you to the 1st International and National Symposium on Aquatic Environment and Fisheries (INSAEF) 2020 of Syiah Kuala University. I wish to take this opportunity to welcome all the participants, the keynote, and our invited speakers for coming to our campus virtually.

This year is a different year. The pandemic has shifted our workspaces to home. However, we believe that communication amongst the scientist should remain connected and updated. The INSAEF allows the researchers, scientists, and students of the aquatic environment and fisheries to share their work, thoughts, ideas, learn from and lean on each other in this challenging time.

The INSAEF participants come from all around Indonesia (from Aceh to Papua), Malaysia, and Japan, representing the students, lecturers, and researchers. The committee received 159 abstracts consisted of 92 oral presenters and 65 posters.

Our technical program is rich and varied with two keynote speeches, five invited talks, and seven parallel sessions. On this occasion, I also wish to welcome our keynote speaker Prof. Dr. Agung Dhamar Syakti, S.Pi, DEA (Rector of Universitas Maritim Raja Ali Haji), Prof. Dr. Muchlisin, ZA., M.Sc (Dean of Faculty of Marine and Fisheries, Syiah Kuala University) and our invited speakers Prof Dr. Siti Azizah Mohd Noor (Universiti Malaysia Terengganu), Associate Prof. Dr. Hawis H. Maduppa (IPB University), Dr.

Sebastian Ferse (ZMT, Bremen), Dr. Sally Keith (Lancaster University) and Achmad Adhitya, Ph.D. (co-founder Jaringan Alumni Luar Negeri).

Finally, as the chairman of INSAEF 2020, I know that the success of the conference depends ultimately on the many people who have worked with us in planning and organizing both the technical program and supporting arrangements. I thank the Organizing Committee members who have all worked extremely hard to detail essential aspects of the conference programs, including the Rector of Syiah Kuala University Prof. Dr. Samsul Rizal, M. Eng. and the Dean of Faculty of Marine and Fisheries Prof. Dr. Muchlisin, ZA., M.Sc.

I sincerely hope you will enjoy today and hope today's event will catalyze strengthening cooperation among us in the future.

Nur Fadli, Ph.D

Schedule

The 1st INTERNATIONAL AND NATIONAL SYMPOSIUM ON AQUATIC, ENVIRONMENT, AND FISHERIES -INSAEF 2020 RUNDOWN SCHEDULE SEPTEMBER 24, 2020

Time	Schedule	PIC	Platform
08.00 – 09.00	Registration	Committee	Zoom (IT: Nasrullah)
09.00 – 09.03	Opening	Master of Ceremony (Miftahul Jannah)	Zoom (IT: Nasrullah)
09.03 – 09.08	Reciting of Holy Quran	Luthfy Utomo Hafidz, S.Pi	
09.08 – 09.12	Singing The National Anthem of Indonesia "Indonesia Raya"	Video (Committee)	
09.12 – 09.18	Chair Person's Report Speech	Chief of Commitee (Dr. Nur Fadli, M.Sc)	
09.18 – 09.28	Greetings	Dean of Marine and Fisheries Faculty (Prof. Dr. Muchlisin ZA, M.Sc)	
09.28 – 09.38	Preface and Opening Remarks	Rector of Syiah Kuala University (Prof. Dr. Ir. Samsul Rizal, M. Eng)	
09.38 – 09.43	Do'a	Luthfy Utomo Hafidz, S.Pi	
09.45 – 10.45	**Keynote Speakers**	Moderator: Dr. Haekal Azief Haridhi, M.Sc	Zoom (IT: Nasrullah)
	Universitas Maritim Raja Ali Haji, Indonesia	**Prof. Dr. Agung Dhamar Syakti, S.Pi., DEA**	
10.45 – 10.55	Break and Art Performance	Video (Committee)	
10.55 – 11.30	**Keynote Speakers**	Moderator: Dr. Haekal Azief Haridhi, M.Sc	
	Universitas Syiah Kuala, Indonesia	**Prof. Dr. Muchlisin ZA, M.Sc**	
11.35 – 12.00	**Invited Speaker***		
	1. Prof. Siti Azizah (Universiti Malaysia Terengganu, Malaysia) - Molecular Diversity of Fresh Water Fishes in Southeast Asia with spesial Focus on the Mastacembelidae	Moderator: Dedi Fazriansyah Putra, M.Sc	Zoom (IT: Nasrullah, S.Kom and Syahrul Purnawan, M.Si)

Time	Schedule	PIC	Platform
	2. Dr rer nat Hawis Maduppa, M.Si (IPB University) - Exploring Indonesian Marine Biodiversity by Using Frontiers eDNA Metabarcoding and Molecular Approach	Moderator: Dr. Muhammad Irham, M.Si	
	3. Achmad Adhitya, Ph.D (University of Leiden/Jaringan Alumni Luar Negeri) - Build Sustainablitiy Roadmap in Indonesia: Challenges Faced and Future Technology	Moderator: Chitra Octavina, M.Si	
12.00 – 13.10 13.15 – 15.50	Lunch and Dhuhur Prayer **Parallel Session (Oral Presentation)**	Committee Committee	Zoom (IT: Nasrullah, S.Kom) Zoom
15.00 - 15:20	**Invited Speaker** 1. Dr. Sebastian Ferse (Leibniz Centre for Marine Tropical Research, Bremen) -	Moderator: Dr. Haekal Azief Haridhi, M.Sc	Zoom (IT: Syahrul Purnawan, M.Si)
15.00 - 15:20 15.50 – 16.10 16.10 – 17.10	2. Dr. Sally Keith (Lancaster University) -	Moderator : Sofyatuddin Karina, M.Sc	Zoom (IT: Nasrullah, S.Kom)
	Break and Ashar Prayer	Committee	Zoom (IT: Nasrullah, S.Kom)
	Parallel Session (Poster Presentation)	Committee	Zoom
17.15 – 17.30	Closing	Master of Ceremony (Miftahul Jannah)	Zoom (IT: Nasrullah, S.Kom)
08.00 – 09.00 09.00 – 09.03	Registration Opening	Committee Master of Ceremony (Miftahul Jannah)	Zoom (IT: Nasrullah) Zoom (IT: Nasrullah)
09.03 – 09.08	Reciting of Holy Quran	Luthfy Utomo Hafidz, S.Pi	Zoom (IT: Nasrullah, S.Kom)

Note: *everyone can chooose 1 (one) link in this session

Program, Room 1

Moderator : Dedi Fazriansyah Putra, M.Sc					
IT: Syahrul Purnawan, M.Si					
PIC : Rizwan, M.Si					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.10**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13.20-13:30	INS20-012	Muhammad Fadhlullah	The application of different heat processing technique on eel (*Monopterus albus*)	Politeknik Kelautan dan Perikanan Karawang
5	13.30-13:40	INS20-014	Lusi Herawati Suryaningrum	The Digestibility of Improved Sugar Cane Bagasse on *Barbonymus schwanenfeldii*	Research Institute for Freshwater Aquaculture and Fisheries Extension (RIFAFE)
6	13:40-13:50	INS20-024	Nur'ainun Muchlis	Biological characteristics of silver sillago (*Sillago sihama* Forsskal) in Bombana water, South East Sulawesi	Research Institute for Marine Fisheries
7	13.50-14.00	INS20-028	Vitas Atmadi Prakoso	Similarity and Genetic Relationship Analysis of 28 Species of Pangasiidae (Siluriformes, Ostariophysi)	Research Institute of Freshwater Aquaculture and Fisheries Extension
8	14.00-14.10	INS20-029	Iko Imelda Arisa	Study of The Spread of White Feces Disease (WFD) on Litopenaeus vannamei in Semi- Intensive ponds in Aceh Besar District Aceh Province, Indonesia	Universitas Syiah Kuala
9	14.10-14.20	INS20-019	Muhammad Mukhlis Kamal	Ecosystem approach applicabilty to sustain endemic fish in Lake Laut Tawar, Aceh	Department of Aquatic Resources Management, Faculty of Fisheries and Marine Science, IPB
10	14.20-14.30	INS20-114	Yuli Andriani	Effect addition of fermented restaurant waste meal on feed to growth of Nile Tilapia (Oreochromis niloticus)	Universitas Padjadjaran
11	14.30-14.40	INS20-173	Safrida	Effect of diet combination of avocado Persea americana M. and pumpkin Cucurbita moschata D seed on the growth performance, feed conversion, and nutrient content in Gouramy	Universitas Syiah Kuala
12	14.40-14.50	INS20-086	Samliok Ndobe	Probiotic enrichment of commercial feed to improve tilapia (Oreochromis niloticus) growout performance	Faculty of Animal Husbandry and Fisheries, Tadulako University

13	14.50-15.00	INS20-087	Gregorius Nugroho Susanto	Genital reversal of betta fish by immersion using steroid extract of sea urchins	Department of Biology, Faculty of Mathematics and Natural Sciences, University of Lampung
14	15.00-15.10	INS20-104	Muhammadar A.A	Observation of male and female seahorse food types in the waters of Weh Island,	Unversitas Syiah Kuala
15	15.10-15.20	INS20-106	Muhammadar A.A	Study of length-weight relationship Metapenaeopsis mogiensis in Pidie Seawaters, Indonesia	Unversitas Syiah Kuala
16	15.20-15.30	INS20-153	Kavinta Melanie	Toxic effect of lead (Pb) exposure on hatching rate and larvae abnormalities of nile tilapia (Oreochromis niloticus)	Unversitas Syiah Kuala
17	15.30-15.40	INS20-157	Thia Monica	Artemia sp enrichment with vitamin C and taurine to support growth and survival rate of Vaname (Litopenaeus vannamei) larvae	Universitas Lampung
18	15.40-15.50	INS20-067	Rizwan	Socio - Economic studies of coastal communities around Kutaraja Fishing Ports, Banda Aceh, Indonesia	Unversitas Syiah Kuala
19	**15:50-16:10**	**Break**			
20	**16:10-17:10**	**Poster Session**			
21	**17.15-17.30**	**Closing**			

Program, Room 2

Moderator : Dr. Haekal Azief Haridhi, M.Sc					
IT : Syahrul Purnawan, M.Si					
PIC: Ratna Mutia Aprilla, M.Si					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13:20-13:30	INS20-009	Abdi Tunggal Priyanto	Predicting and managing future Indonesian reefs under multiple climate change scenarios	Kementerian Kelautan dan Perikanan
5	13.30-13.40	INS20-020	Yopi Ilhamsyah	Future climate change impact on oceanic states of the Indonesian waters Based on CMIP5	Universitas Syiah Kuala
6	13.40-13.50	INS20-025	Ilham Zulfahmi	Strategy and facilitating model for small scale terasi business at the Camar Laut small enterprises	UIN Ar-Raniry
7	13.50-14.00	INS20-027	Achmad Fachruddin Syah	Distribution of fishing vessels and its oceanography characteristic in the eastern Indian Ocean off Sumatera	University of Trunojoyo Madura
8	14.00-14.10	INS20-032	Moh. Saleh	Policy Analysis of Marine Tourism of Gili Iyang Island, Madura, Indonesia.	Brawijaya University
9	14.10-14.20	INS20-082	M. Akhyar	Generation of ocean internal wave with vertical-slice hydrodynamic simulation	Universitas Syiah Kuala
10	14.20-14.30	INS20-083	Auliati	Effect of monsoon on ocean productivity in Aceh waters	Universitas Syiah Kuala
11	14.30-14.40	INS20-084	Putri Sri Didta	Identification of M2 tidal velocity and energy in the eastern waters of Aceh based on numerical simulation	Universitas Syiah Kuala
12	14.40-14.50	INS20-085	Yunita	The influence of monsoon on mixed layer depth in the northern waters of Aceh in 2017	Universitas Syiah Kuala
13	14:50-15:00	INS20-126	Abu Bakar Sambah	Impact of ENSO and IOD on Chlorophyll-a Concentration and Sea Surface Temperature in the Bali Strait	Brawijaya University
14	**15:00 - 15:20**	**Invited Speaker**	**Dr. Sebastian Ferse**		**Leibniz Centre for Marine Tropical Research, Bremen**
15	15.20-15.30	INS20-034	Zulkarnain Jalil	Nano-hematite Properties of Lampakuk Iron Ore Identified by X-rays Method	Universitas Syiah Kuala
16	15.30-15.40	INS20-044	Yulianto Suteja	Spatiotemporal of microplastic in surface water of Benoa Bay, Bali	Udayana University
17	15.40-15.50	INS20-041	Achmad Fachruddin Syah	Response of oceanographic conditions to	University of Trunojoyo Madura

				the distribution of Skipjack tuna (*Katsuwonus pelami* s)	
18	**15:50-16:10**	**Break**			
19	**16:10-17:10**	**Poster Session**			
20	**17.15-17.30**	**Closing**			

Program, Room 3

Moderator : Dr. Muhammad Irham, M.Si					
IT : Nasrullah, S.Kom					
PIC : Cut Meurah Nurul 'Akla					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13:20-13:30	INS20-037	Ananingtyas S Darmarini	Diversity and abundance of phytoplankton in Lubuk Damar, AcehTamiang, Indonesia	Teuku Umar University
5	13.30-13.40	INS20-073	Sunardi	Semi natural turtle egg hatching at Taman kili kili beach, Trenggalek, East Java	Universitas Brawijaya
6	13:40-13:50	INS20-076	Muhammad Al Rizky Ratno Budiarto	Community Structure of Seagrass in Siantan Tengah Anambas Islands National Marine Protected Area	Padjadjaran University
7	13.50-14.00	INS20-042	Teuku Haris Iqbal	Effect of Different Depth on Fish Catches in Hajoran Coast of Central Tapanuli District: Case on Bamboo Platform Lift Net	Universitas Syiah Kuala
8	14.00-14.10	INS20-026	Roza Elvyra	DNA Barcode of Belodontichthys dinema from Indragiri and Tapung Rivers, Indonesia	Universitas Riau
9	14.10-14.20	INS20-101	Muhammad Natsir	An Attempt of Digitalization Bali Strait Purse Seine Captured Fisheries Data	Center for Fisheries Research and Future University Hakodate
10	14.20-14.30	INS20-111	Viqqi Kurnianda	Cryptic Species of the Soft Coral Sarcophyton in Sabang Island	Universitas Syiah Kuala
11	14.30-14.40	INS20-016	Prihatiningsih	Some biological stock indicators of Red Bigeye (*Priacanthus macracanthus* Cuvier, 1829) in Palabuhan Ratu Waters, Indonesia	Research Institute of Marine Fisheries
12	14.40-14.50	INS20-123	Nadiah W. Rasdi	The effect of copepod enriched-vegetable based diet on Giant Tiger Prawn's (*Panaeus monodon*) post-larvae	Universiti Malaysia Terengganu
13	14:50-15:00	INS20-124	Ichsan	Growth of oyster (Crassostrea sp.) with different density in oyster aquaculture in Alue Naga Waters, Banda Aceh	FKP Unsyiah
14	15.00-15.10	INS20-008	Yonvitner	Length based data of Nemipterus japonicus to Spawning Potential Ratio (SPR) Estimation on Small Scale Fisheries (SSF) in Sunda	IPB University
15	15.10-15.20	INS20-129	Zainal A. Muchlisin	Effect of stocking density of the growth performance, survival rate and feed utilization of the eels Anguilla bicolor (Pisces: Anguillidae) larvae	Universitas Syiah Kuala
16	15.20-15.30	INS20-142	Dedi Noviendri	Fucoxanthin: A Marine Carotenoid Has Anticancer Activities and Apoptosis-Inducing Effect (A Review)	Ministry of Marine Affairs and Fisheries, Republic of Indonesia

17	15.30-15.40	INS20-093	Tumpak Sidabutar	The Variability of Potentially Harmful Algal Bloom (HABs) Species of Phytoplankton in Jakarta Bay	Research Centre for Oceanography - LIPI
18	15.40-15.50	INS20-174	Suri Purnama Febri	Application of virgin coconut oil (VCO) in feed in efforts to increase growth and survival rate of Red Tilapia (*Oreochromis* sp.)	Universitas Samudra
19	**15:50-16:10**	**Break**			
20	**16:10-17:10**	**Poster Session**			
21	**17.15-17.30**	**Closing**			

Program, Room 4

Moderator : Sofyatuddin Karina, M.Sc					
IT : Nasrullah, S.Kom					
PIC : Irma Dewiyanti, M.Sc					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	**13.20-13.30**	INS20-023	Umi Chodrijah	Growth estimates of Pelagic Thresher Shark (Alopias pelagicus Nakamura, 1935) in the Indian Ocean Southern Java waters	Research Institute for Marine Fisheries
5	**13.30-13:40**	INS20-039	Yaya Ihya Ulumuddin	Three in one coastal ecosystem: mangrove, seagrass and coral reefs for coral reef fish communities	Pusat Penelitian Oseanografi LIPI
6	13:40-13:50	INS20-074	Dr. Heru Fahlevi	The prospect of fish cold storage business in Aceh amidst the Covid-19 pandemic	Universitas Syiah Kuala
7	13.50-14.00	INS20-018	Yulius	Fishing ground mapping based on Chlorophyll-a distribution using Aqua Modis Satellite Imagery in fisheries management area (WPP) 712	Marine Research Center Research Agency & Human Resource Development, Ministry of Marine Affairs and Fisheries
8	14.00-14.10	INS20-060	Widianingsih widianingsih	The Growth Pattern of Sea Cucumber Acaudina sp From the Delta Wulan, Demak, Central of Java.	Universitas Diponegoro
9	14.10-14.20	INS20-003	Ulung Jantama Wisha	Coral Bleaching in Manjuto Beach, West Sumatra, Indonesia: Geological and Oceanographical Perspectives	Research Institute for Coastal Resources and Vulnerability
10	14.20-14.30	INS20-005	Samsul Rizal	The Correlation between Salinity and the Extents of the Ponds and Types of Mangrove Vegetation on Brackish Water Ponds in the Mahakam Delta, East Kalimantan	Universitas Mulawarman
11	14.30-14.40	INS20-049	Irma Dewiyanti	Mangrove Litter Productivity and in Relation to Environmental Properties of Water in Pusong Cium, Seruway, Aceh Tamiang	Universitas Syiah Kuala
12	14.40-14.50	INS20-117	Eri Yusni	Bioaccumulation of Heavy Metal of Lead (Pb) in White Shrimp (Penaeus merguiensis) on Sediments in Belawan Sea Waters, North Sumatra Province	University of Sumatera Utara
13	14.50-15.00	INS20-071	Rian juanda Djamani	Biological aspects of sharks landed in Kutaraja Fishing Port, Banda Aceh, Indonesia	Universitas Syiah Kuala

14	**15:00 - 15:20**	**Invited Speaker**	**Dr. Sally Keith**		**Lancaster University**
15	15.20-15.30	INS20-167	Farizan Aris	Evaluation of molecular biological method for water pollution monitoring using Allium cepa model.	Universiti Teknologi Mara
16	15.30-15.40	INS20-150	Rita Diana	Floral composition and accumulation of above- ground carbon of abandoned shrimp pond in Muara Badak East Kalimantan	Mulawarman University
17	15.40-15.50	INS20-159	Eli Jamilah Mihardja	Campaigning "Botak" (Bogor without plasctic bags) as a environmental communication model for reducing plastic waste	Universitas Bakrie
18	**15:50-16:10**	**Break**			
19	**16:10-17:10**	**Poster Session**			
20	**17.15-17.30**	**Closing**			

Program, Room 5

Moderator : Siska Mellisa, M.Sc					
IT : Reza Wafdan, M.Si					
PIC: Alvi Rahmah, M.Si					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13.20-13.30	INS20-063	M. Shabri Abd. Majid	What determines aquaculture fish production? Empirical evidence from South Aceh Regency	Universitas Syiah Kuala
5	13.30-13.40	INS20-064	M. Shabri Abd. Majid	Does Pawang Laot Leadership Matter for Enhancing Fishermen's Work Culture and Welfare?	Universitas Syiah Kuala
6	13.40-13.50	INS20-059	Armen Zulham	Socio - Economic Assessment of Brackishwater Aquaculture Bussiness in Aceh Tamiang Regency	Research Center for Marine and Fisheries Socio Economics
7	13.50-14.00	INS20-062	Rizki Aprilian Wijaya	Economic Analysis of Shrimp Aquaculture in Aceh Besar Regency Based on Different Land Areas	Research Center for Marine And Fisheries Socio Economic - MMAF
8	14.00-14.10	INS20-065	Suci Aksarina Ikhsan	Safety Risk Factors Research of the Operation Purse Seine Catching at Riau Islands	Politeknik Kelautan dan Perikanan Dumai
9	14.10-14.20	INS20-098	Nendah Kurniasari	Strenghtening maritime cultures as a source of creative ideas for maritime tourism development in Kuta, Lombok Tengah	Balai Besar Riset Sosial Ekonomi Kelautan dan Perikanan
10	14.20-14.30	INS20-081	Tenny Apriliani	Lobster Aquaculture Business in East Lombok Regency: Challenges and Prospects	Research Center for Marine and Fisheries Socio Economic
11	14.30-14.40	INS20-058	Ratu Sari Mardiah	Analysis of Data Collection System of Fish Catches Landed at PPI Dumai	Politeknik Kelautan dan Perikanan Dumai
12	14.40-14.50	INS20-097	Hakim Miftakhul Huda	Business Sustainability of fisheries utilization in Padang	Research Center for Marine and Fisheries Socio- Economics, Jakarta, Indonesia
13	14.50-15.00	INS20-112	Syafruddin Chan	Does Online Marketing Help in Promoting Fish? Case Study on Processed Fish Companies in Aceh, Indonesia	Universitas Syiah Kuala
14	15.00-15.10	INS20-118	Dini Purbani	Application of geographic information systems in the management of small islands (Case study: Assessment of the ideal pier spread in Derawan Islands)	Ministry Marine Affairs and Fisheries
15	15.10-15.20	INS20-136	Nurlaili	Strategy for Strengthening Gender Mainstreaming (PUG) in the Marine and Fisheries Sector	bbrsekp
16	15.20-15.30	INS20-139	Nurlaili	Gap Analysis of LPMUKP Business Financing Models: Lesson Learn the Implementation of LPMUKP Financing Programs in Several Locations in Indonesia	bbrsekp

17	15.30-15.40	INS20-144	Hikmah	Potential empowerment of women through the development business group in of decorative fish culture Bojongsari Sub-District, Depok	Balai Besar Riset Sosial Ekonomi Kelautan dan Perikanan
18	15.40-15.50	INS20-164	Retno Widihastuti	Dynamic of Small-Scale Fishing Marketing Behavior in Kec. Cilincing, North Jakarta In The Face of Covid-19 Pandemic	Balai Besar Riset Sosial Ekonomi Kelautan dan Perikanan
19	**15:50-16:10**	**Break**			
20	**16:10-17:10**	**Poster Session**			
21	**17.15-17.30**	**Closing**			

Program, Room 6

Moderator : Adrian Damora, M.Si					
IT: Reza Wafdan, M.Si					
PIC : Sari Afriani, M.Si					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13.20-13.30	INS20-043	Agus Santoso	LB-SPR Model for Eestimating Successful Adaptation of Invasive Crayfish (Cherax quadricarinatus, Morten) in Java	Terbuka University
5	13.30-13.40	INS20-166	Norfatimah Mohamed Yunus	Species identification of Rasbora sumatrana through the cytochrome oxidase subunit I DNA barcoding marker.	Universiti Teknologi Mara
6	13.40-13.50	INS20-120	Muhammad	Coral Reef and Reef Fishes of Core Zone MPAs Aceh Besar	Universitas Syiah Kuala
7	13.50-14.00	INS20-154	Pelita Octorina	Dealing with predators : morphologycal defendse of Daphnia (D. galeata and D. Longispina) against cladoceran predator	Departemen Akuakultur Universitas Muhammadiyah Sukabumi
8	14.00-14.10	INS20-004	Diana Arfiati	Utilization of semi-aerobic Bamboo Cover in an Effort Decrease Organic Matter	Brawijaya University
9	14.10-14.20	INS20-047	Anastasia Dewi Pujanna	Study of the Suitability of Mooring Jetty Facilities to the Number of Mooring Vessels on Kutaraja Oceanic Fishing Port, Banda Aceh	Universitas Syiah Kuala
10	14.20-14.30	INS20-030	Uun Yanuhar	Profile of Myxobolus Infection in Koi Fish Gill Tissue (Cyprinus carpio) From Land Pond, Nglegok, Blitar Regency	Aquatic Resources Management, Faculty of Fisheries and Marine Science,
9	14.30-14.40	INS20-031	Uun Yanuhar	The Profile of Myxobolus Infection in the Gill Tissue of Common Carp (Cyprinus carpio L.) Strain Punten from Concrete Ponds, Punten, Batu Regency	Aquatic Resources Management, Faculty of Fisheries and Marine Science, University of Brawijaya
10	14.40-14.50	INS20-147	Wahyu Budi Setyawan	Effect of human activities on coastal landform recovery after the large tsunami of 26 December 2002 at Padang Seurahet coastal zone, Meulaboh, West Sumatera Island,	Research Centre for Oceanography - LIPI
11	14.50-15.00	INS20-095	Desiana Trisnawati Tobigo	Effect of enriching feed with fish oil on the growth and survival of climbing perch (*Anabas testudineus*)	Universitas Tadulako, Palu
12	15.00-15.10	INS20-162	Hartati	Adoption of product diversification technology in marginal ponds	Universitas Muhammadiyah Kendari
13	**15:50-16:10**	**Break**			
14	**16:10-17:10**	**Poster Session**			
15	**17.15-17.30**	**Closing**			

Program, Room 7

Moderator : Chitra Octavina, S.Kel., M.Si					
IT: Alfis Syahril, M.Si					
PIC : Mutia Ramadhaniaty, S.Kel., M.Si					
No.	**Time**	**Registration No**	**Author**	**Title**	**First Author's Affiliation**
1	**11.30-12.00**	**Invited Speaker**			
2	**12.00-13.15**	**Lunch and Dhuhur Prayer**			
3	**13.15-13.20**	**Room Registration**			
4	13.20-13.30	INS20-011	Nebuchadnezzar Akbar	Keragaman Genetik dan Filogenetik Kepiting Biola (Uca spp) Di Pesisir Pantai Jailolo, Kabupaten Halmahera Barat	Universitas Khairun Ternate
5	13.30-13.40	INS20-048	Novia Arinda Pradisty, M.Sc	Breakdown of mangrove leaf litter in natural and rehabilitated mangrove forests of Perancak estuary, Bali, Indonesia	Institute for Marine Research and Observation, Indonesian Ministry of Marine Affairs and Fisheries
6	13.40-13.50	INS20-054	Zulpikar	Penggunaan Hormon Giberellin Dan Auksin Dalam Budidaya Rumput Laut (Eucheuma cottonii) Dengan Sistem Longline Di Kabuapetn Aceh Singkil	Universitas Malikussaleh
7	13.50-14.00	INS20-096	Tumpak Sidabutar	The Occurrences of Algal Blooms Associated with Hydro-oceanography and Climatology	Research Centre for Oceanography - LIPI
8	14.00-14.10	INS20-119	Muhammad Rusdi	Spatial Technology Applications on Banda Aceh Coastal Water Salinity Mapping for Settlement	Remote Sensing and Cartography Lab, Universitas Syiah Kuala
9	14.10-14.20	INS20-135	Septa Riadi	Analisis Kualitatif Kebijakan, Legalisasi penangkapan benih lobster di Indonesia	IPB University
10	14.20-14.30	INS20-152	Dony Apdillah	Pengembangan SOK Bintan untuk monitoring cuaca pesisir dan dinamika muka air laut	Universitas Maritim Raja Ali Haji
11	14.30-14.40	INS20-172	Alimuddin Laapo	Maximum Economic Yield Estimation of the Pelagic Fish Resources in the Sea Area of Tojo Una-Una Regency	Tadulako University
12	14.40-14.50	INS20-110	Muhammad Mahmudi	Daya Serap Mangrove Jenis Avicennia alba dan Rhizophora mucronata Di Bee Jay Bakau Resort, Probolinggo	Universitas Brawijaya
13	14.50-15.00	INS20-177	Fitria Ulfah	Potensi pengembangan budidaya pada kawasan konservasi perairan (Studi kasus: KKPD Datok Bandar, Kabupaten Lingga)	Universitas Maritim Raja Ali Haji
14	**15:50-16:10**	**Break**			
15	**16:10-17:10**	**Poster Session**			
16	**17.15-17.30**	**Closing**			

Poster List, Room 1

Moderator : Dedi Fazriansyah Putra, M.Sc					
Commitee: Syahrul Purnawan, M.Si (IT); Rizwan, M.T (PIC)					
No.	**Time**	**Registration No**	**Author**	**First Author's Affiliation**	**Title**
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-089	M. Ali Sarong	Master of integrated coastal resource management	Study of Bivalvia habitat in the mangrove area of Aceh Jaya district, Aceh province
3	16.20 – 16.25	INS20-109	M. Ali Sarong	FKIP Unsyiah	Analysis of the existence of epifauna gastropode based on the substrates of mangrove ecosystem in Sampoinit, Aceh Jaya District, Aceh Province
4	16.25 – 16.30	INS20-170	Zainal A. Muchlisin	FKP Unsyiah	Length-weight relationship and condition factors of four introduced fish species in Lake Aneuk Laot, Weh Island, Aceh Province, Indonesia
5	16.30 – 16.35	INS20-033	Zulkarnain Jalil	Universitas Syiah Kuala	Sub-Surface Identification of beach sands in Lamreh, Aceh Besar by using Very Low Frequency method based on Resistivity mode (VLF-R)
6	16.35 – 16.40	INS20-021	Ichsan Setiawan	Universitas Syiah Kuala	Analysis of wave measurements in November 2018, January 2019 and March 2019 in the coastal waters of Leupung and Lhoong, Aceh Besar District, Indonesia
7	16.40 – 16.45	INS20-066	Yopi Ilhamsyah	Universitas Syiah Kuala	Current Observation by using ADCP in the Western Aceh Waters: 2017 R/V Baruna Jaya VIII Expedition
8	16.45 – 16.50	INS20-138	Rianjuanda	Universitas Syiah Kuala	Analysis of differences in three types of natural bait and immersion time of folded traps against mud crabs (Scylla serrata): Laboratory scale
9	16.50 – 16.55	INS20-145	Rianjuanda	Universitas Syiah Kuala	Study of grouper (Serranidae) landed in Tradisional Fishing Port, Kota Bawah Timur, Kecamatan Sukakarya, Sabang, Indonesia
10	16.55 – 17.00	INS20-079	Syahrul Purnawan	Universitas Syiah Kuala	Distribution of TSS value at Northern Waters, Banda Aceh
11	17.00 – 17.05	INS20-141	Syahrul Purnawan	Universitas Syiah Kuala	Simulation Of Particle Tracking in Banda Aceh Waters
12	17.05 – 17.10	INS20-164	Dedi Fazriansyah Putra	FKP Unsyiah	Substitution of soybean meal by fermented tofu dregs in the diet of milkfish (Chanos chanos)
13	**17.15-17.30**	**Closing**			

Poster List, Room 2

Moderator : Haekal Azief Haridhi, M.Sc					
Commitee: Syahrul Purnawan, M.Si (IT); Ratna Mutia Aprilla, M.Si (PIC)					
No.	**Time**	**Registration No**	**Author**	**First Author's Affiliation**	**Title**
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-050	Fajriah, S.Pi., M.Si	Universitas Muhammadiyah Kendari	Strategy for the Development of Local Fisheries Product Processing in Coastal Areas North Konawe Regency
3	16.20 – 16.25	INS20-052	Fajriah, S.Pi., M.Si	Universitas Muhammadiyah Kendari	Waste Management Model in the Residential Environment of the Bajo Tribe, Torokeku Village, South Konawe Regency, Southeast Sulawesi Province
4	16.25 – 16.30	INS20-036	Indah Permata Sari	Magister Pengelolaan Sumberdaya Pesisir Terpadu Univeristas Syiah Kuala	The distribution of the macro-zoobenthos community based on the characteristics of the mangrove sediments in Aceh Besar
5	16.30 – 16.35	INS20-090	Afdhal Fuadi	Geospatial Information System Laboratory, Faculty of Marine Affairs and Fisheries, Syiah Kuala University, Banda Aceh	Behaviour of tilapia, salinity different, laboratorium scale
6	16.35 – 16.40	INS20-068	Aulia Pratiwi	Universitas Syiah Kuala	Analysis of Management Performance Index and User Satisfaction Index in Kutaraja Fishing Port, Banda Aceh, Indonesia
7	16.40 – 16.45	INS20-078	Firman M Nur	Universitas Syiah Kuala	LWRs and blood glucose of three species ornamental fish from Bira Cot River, Aceh Besar, Indonesia
8	16.45 – 16.50	INS20-131	Adli Waliul Perdana	Universitas Syiah Kuala	Morphometric analysis of three species gourami group (Osphronemidae) from Aceh Waters, Indonesia
9	16.50 – 16.55	INS20-125	Silvia Triola Audina	Fakultas Kelautan dan Perikanan Universitas Syiah Kuala	Leading Commodities Analysis of Capture Fisheries in Belawan Fishing Port
10	16.55 – 17.00	INS20-061	Aufa Musfidah	Universitas Syiah Kuala	Analysis of Catch Composition in Gampong Deah Raya, Syiah Kuala Banda Aceh
11	17.00 – 17.05	INS20-057	Haekal Azief Haridhi	Universitas Syiah Kuala	The characteristics of body-wave records between forearc and backarc region at the Sumatra subduction zone from deep regional earthquakes
12	17.05 – 17.10	INS20-094	Haekal Azief Haridhi	Department of Marine Sciences, Faculty of Marine and Fisheries, Syiah Kuala University, Banda Aceh, Indonesia	Identification of fishing ground hotspot of traditional purse seine fisher at northern waters of Aceh – A community-based data collection approach
13	**17.15-17.30**	**Closing**			

Poster List, Room 3

Moderator : Dr. Muhammad Irham, M.Si
Commitee: Nasrullah (IT);
Cut Meurah Nurul 'Akla (PIC)

No.	Time	Registration No	Author	First Author's Affiliation	Title
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-149	Ulya Khairumi	Universitas Syiah Kuala	Histopathological Study Of The Hepatopancreas Of Asian Tinger Shrimp (Penaeus monodon) Traditional Ponds at
3	16.20 – 16.25	INS20-100	Edy Miswar	FKP Unsyiah	Fisheries Processing Status Related to EAFM (Ecosystem Approach Fisheries Management) Implementation on Fishing Technique Domain at Fishing Port of
4	16.25 – 16.30	INS20-102	Edy Miswar	FKP Unsyiah	Effectiveness Level of Implementation of Fishing Logbook Regulation On ≥ 60 Gt Boat at Lampulo Fishing Port
5	16.30 – 16.35	INS20-103	Edy Miswar	FKP Unsyiah	Case Study of Eleminating Illegal Unreported Unregulated Fishing at
6	16.35 – 16.40	INS20-105	Edy Miswar	FKP Unsyiah	Fisherman Obedient Level Toward Vessel Monitoring System (VMS) In the Fishing Port of Perikanan Samudera Belawan
7	16.40 – 16.45	INS20-107	Nurfadillah	Faculty of Marine and Fisheries, Universitas Syiah Kuala	Length-weight relationship (LWR) of mud crabs (Scylla sp.) in mangrove waters Peukan Bada Aceh Besar as the
8	16.45 – 16.50	INS20-108	Cut Dara Dewi	Faculty of Marine and Fisheries, Universitas Syiah Kuala	The effectiveness of katuk leaves extract (Sauropus androgynous) as an antibacterial Vibrio sp on the survival rate and growth of vannamei shrimp
9	16.50 – 16.55	INS20-077	Alfis Syahril	FKP Unsyiah	The Effect of ethanolic extracts Ulva lactuca on growth performance and survival rate of milk fish (Chanos chanos)
10	16.55 – 17.00	INS20-122	Nurfadillah	FKP Unsyiah	ndex competition and Growth performance of Tilapia (*Oreochromis niloticus*) and native spesies in the
11	17.00 – 17.05	INS20-075	Cut Meurah Nurul 'Akla	FKP Unsyiah	Study of the Core Zone Areas in Peukan Bada and Lhoknga Marine Protected
12	17.05 – 17.10	INS20-072	Muhammad Irham	FKP Unsyiah	Spatial analysis of accretion, abrasion and shoreline change in banda aceh costal
13	**17.15-17.30**	**Closing**			

Poster List, Room 4

Moderator : Sofyatuddin Karina, S.Si., M.Sc.					
Commitee: Nasrullah (IT); Irma Dewiyanti, M.Sc (PIC)					
No.	**Time**	**Registration No**	**Author**	**First Author's Affiliation**	**Title**
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-178	Dr. Sulaiman, S.H., M.H	Universitas Syiah Kuala	Harmonization of laws on the management of pantang and concervation coastal area in Aceh Besar
3	16.20 – 16.25	INS20-038	Rossy Azhar	Magister Manajemen Sumberdaya Pesisir Terpadu	Spatial Distribution of Mangrove Using A Geographic Information System in Aceh Besar
4	16.25 – 16.30	INS20-053	Makwiyah A. Chaliluddin	Universitas Syiah Kuala	Management of Environmentally Friendly Fishing Gears Based on the Code of Conduct for Responsible Fisheries in Pidie District
5	16.30 – 16.35	INS20-140	Irma Dewiyanti	Universitas Syiah Kuala	Physical and Chemical Characteristics of Soil in Mangrove Ecosystem Based on Differences Habitat in Banda Aceh and Aceh Besar
6	16.35 – 16.40	INS20-040	Irma Dewiyanti	Universitas Syiah Kuala	Community Structure of Gastropods and Bivalves Associated in Mangrove Ecosystem at Pusung Cium Island, Seruway, Aceh Tamiang
7	16.40 – 16.45	INS20-175	Agung Setia Batubara	Universitas Syiah Kuala	Truss-traditional morphometric of Tropical Eel (Anguilla spp.) from Aceh Waters, Indonesia
8	16.45 – 16.50	INS20-115	Nur Fadli	Universitas Syiah Kuala	The composition and production of fishes landed in fish landing site in the eastern coast of Aceh region
9	16.50 – 16.55	INS20-127	Nur Fadli	Universitas Syiah Kuala	Biological aspects of the golden hind grouper (Cephalopholis aurantia) harvested in the northern coast of Aceh, Indonesia (a preliminary study)
10	16.55 – 17.00	INS20-128	Nur Fadli	Universitas Syiah Kuala	A preliminary study on biological aspects of the orange-spotted grouper (Epinephelus coioides) harvested in the northern coast of Aceh, Indonesia
11	17.00 – 17.05	INS20-130	Nur Fadli	Universitas Syiah Kuala	One-blotch grouper (Epinephelus melanostigma): a preliminary study on some biological aspects
12	17.05 – 17.10	INS20-121	Sofyatuddin Karina	Universitas Syiah Kuala	Analysis of Chlorophyll-a and Phytoplankton Abundance in Ujung Pancu Waters, Aceh Besar Province, Indonesia
13	**17.15-17.30**	**Closing**			

Poster List, Room 5

Moderator : Siska Mellisa, S.Kel., M.Sc.
Commitee: Reza Wafdan (IT);
Alvi Rahmah, M.Si (PIC)

No.	Time	Registration No	Author	First Author's Affiliation	Title
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-165	Rinaldi Ashari	FKP Unsyiah	Ectoparasite Analysis on Mangrove Crabs (Scylla sp.) in Soft Shell Crab Aquaculture in Banda Aceh city, Indonesia
3	16.20 – 16.25	INS20-156	Cut Zeni Ariani	Universitas Syiah Kuala	Fish Marketing Strategy and System at Fish Landing Port in Bawah Timur City, Sukakarya District, Sabang.
4	16.25 – 16.30	INS20-088	Mutia Ramadhaniaty	Universitas Syiah Kuala	Biodiversity of Bivalves at the Mangrove Ecosystem in Kampung Jawa Banda Aceh
5	16.30 – 16.35	INS20-035	Chitra Octavina	FKP Unsyiah	Lengh-weight relationship of Lingula sp. on the Ujong Pancu beach, Aceh Regency and Syiah Kuala, Beach Banda Aceh City
6	16.35 – 16.40	INS20-099	Chitra Octavina	FKP Unsyiah	Biological Community Structure in Krueng Sarah River, Aceh Besar District
7	16.40 – 16.45	INS20-022	Maria Ulfah	Universitas Syiah Kuala	Identification of caridea cryptic organism (crustacea) on the Pocillopora dead coral in Sabang Island
8	16.45 – 16.50	INS20-051	Maria Ulfah	Universitas Syiah Kuala	Identification and inventory of coral fish abundance in the regional waters conservation area (KKPD) of West Simeulue
9	16.50 – 16.55	INS20-069	Alvi Rahmah	FKP Unsyiah	Purse Seine Productivity in Lhok Pawoh Fishing Port, Sawang, South Aceh
10	16.55 – 17.00	INS20-158	Salmarika	FKP Unsyiah	The Role of Panglima Laot towards Fisheries Management Based on Ecosystem Approach in Banda Aceh City
11	17.00 – 17.05	INS20-091	Siska Mellisa	Universitas Syiah Kuala	The Effectiveness of Feeding Artemia Enriched With Vitamin C on The Growth Performance and Survival of Lemeduk Fish Larvae (Barbonymus Schwanenfeldii)
12	**17.15-17.30**	**Closing**			

Poster List, Room 6

Moderator : Adrian Damora, S.Pi., M.Si **Commitee: Reza Wafdan (IT);** **Sari Afriani, M.Si (PIC)**					
No.	**Time**	**Registration No**	**Author**	**First Author's Affiliation**	**Title**
1	**16.10 – 16.15**	**Room Registration**			
2	16.15 – 16.20	INS20-116	Ita Riniatsih	Universitas Diponegoro	Monitoring the seagrass ecosystem using the Unmanned Aerial Vehicle (UAV) in coastal water of Jepara
3	16.20 – 16.25	INS20-056	Rosmawati	IAIN Ambon	Enhalus acoroides seagrass restoration using the polybag method in the coastal waters of Waai Village Central Maluku Regency
4	16.25 – 16.30	INS20-143	Sri Agustina	Universitas Syiah Kuala	Identification of Inorganic Debris at Mangrove Ecosystem, Gampong Jawa, Banda Aceh
5	16.30 – 16.35	INS20-155	Iko Imelda Arisa	FKP Unsyiah	The Effect of Papain and Bromelain Enzymes on The Growth and Feed Utilization of Post Larva Litopenaeus vannamei
6	16.35 – 16.40	INS20-120	Muhammad	FKP Unsyiah	Coral Reef and Reef Fishes of Core Zone MPAs Aceh Besar
7	16.40 – 16.45	INS20-092	Sari Afriani	FKP Unsyiah	The Assessment of Water Quality Using STORET Method in The Northern Waters of Banda Aceh
8	16.45 – 16.50	INS20-132	Adrian Damora	Universitas Syiah Kuala	Length at First Maturity of Three Reef Fish Species from Wakatobi Islands, Southeast Sulawesi, Indonesia
9	16.50 – 16.55	INS20-133	Adrian Damora	Universitas Syiah Kuala	Growth, Mortality, and Exploitation Rate Estimation of Indian Scad (Decapterus russelli) in the Northern and Western Waters of Aceh
10	16.55 – 17.00	INS20-134	Adrian Damora	Universitas Syiah Kuala	Growth, Mortality, and Exploitation Rate Estimation of Skipjack Tuna (Katsuwonus pelamis) in the Northern and Western Waters of Aceh
11	17.00 – 17.05	INS20-137	Adrian Damora	Universitas Syiah Kuala	White-edged Lyretail (Variola albimarginata): A Preliminary Study on Some Biological Aspects
12	17.05-17:10	INS20-163	Adrian Damora	FKP Unsyiah	Food and Feeding Habits of 2 species ornamental Fishes from Bira Cot, Aceh Besar, Indonesia
13	**17.15-17.30**	**Closing**			

Invited Speakers

Southeast Asian freshwater fish biodiversity: the genetic legacy of the paleo drainage evolution

Siti Azizah Mohd Nor[1,2*], Jamsari Amirul Firdaus Jamaluddin[2], Nurul Farhana Samsudin[2], Lim Hong Chiun[3], Muchlisin Zainal Abidin[4]

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[3]*Institute of Oceanography, National Taiwan University, Taipei, Taiwan.*
[4]*Faculty of Marine and Fisheries, Syiah Kuala University, Banda Aceh, Indonesia.*
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Despite covering only less than 4% of the world land area, Southeast Asia harbors an astonishing 25% of the global biodiversity and high endemism. The dynamic geological and climatic history of the region is hypothesized as the most important aspects driving present day species richness, diversification, and distribution of biodiversity across the region. Towards a better understanding of these effects, we utilized molecular markers to address several freshwater fish taxa (e.g. spiny eel, halfbeak, and killifish) systematics and population genetic structure and evaluate the role of historical biogeography events on their evolutionary diversification and current distribution. The findings revealed greater diversity than previous studies based on morphological approach and uncovered deep intraspecific lineage diversity, which is attributed to low dispersal capabilities, ancient evolutionary history, biogeographical patterns, dynamic river systems, or even cryptic speciation. The origin, distribution, demographic history and genetic structure of these species are perhaps best understood in the context of dispersal and vicariance events, which is consistent with a scenario of river incision and capture related to geological events especially in the evolution of Paleo Red River due to the uplift of the Tibetan Plateau and Sundaland sea level oscillations. Taking these taxa as examples, even in well-studied river systems, the tropical fish diversity is far from resolved and pending major revisions in many taxa. More detailed paleobiogeographical reconstructions covering various groups of taxa are needed to gain a more unified understanding and firm conclusion on why biotic distribution is uneven and how both biotic and abiotic influences might control the ecological and evolutionary dynamics of species over geological time scales.

Keywords: Southeast Asia, Freshwater fish, Molecular genetics, Biogeography, Biodiversity

eDNA metabarcoding illuminates species diversity and composition differently across Indonesian coral reefs

Hawis Madduppa[1*], Ni Kadek Dita Cahyani[2], Aji Wahyu Anggoro[2], Beginer Subhan[1], Edwin Jefri[3], Lalu Mukhsin Iqbal Sani[4], Dondy Arafat[1], Nebuchadnezzar Akbar[5], Dietriech Geoffrey Bengen[1]

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The environmental DNA (eDNA) metabarcoding is an evolving tool that can provide broader assessments of marine biodiversity than traditional census methods, especially for rarity and elusiveness. The outputs of this approach is important particularly to provide reliable data for conservation and fisheries management. We conducted a study using eDNA to assess marine biodiversity across Indonesian coral reef system, and investigated sequence abundance and distribution of taxa interest in coral reef associated organisms. We chose three major phyla (Chordata, Mollusca, and Echinodermata) across locations and fisheries management areas. A total 13,819,634 reads corresponding to 23,252 unique sequences were generated from the COI amplicons obtained from 92 sea water eDNA samples from nine locations and 17 sites. Alpha diversity showed a significant difference in richness across locations based on Chao1 and Shannon indices (ANOVA: $p<0.05$). Beta diversity analysis reported a significantly different composition across locations (PERMANOVA: $p<0.05$) based on Bray-Curtis and Jaccard indices. The snapshot of interest taxa within phylum observed from the dataset include reef fishes, marine mammals, Molluscs, and Echinoderms. The interest taxa were not distributed equally over the entire sampling area. Here we show that the percentage of sequenced species among families is highly variable, which prevents any robust estimation of species richness. Interestingly, two locations in this study showed a similarly high percentage of unidentified taxa with two distinct characteristics, Raja Ampat is relatively remote, and pristine reefs and Seribu Islands are located in northern Jakarta which has high anthropogenic pressure. Overall, 45% of our data was identified into species level and 55% was classified as unidentified taxa. Despite still limited by poor species level assignment, our results suggested that eDNA approach could provide a powerful tool to detect differences in species composition across regions. Nonetheless, when complemented with other species identification technique, this method is very useful to evaluate marine biodiversity on a large scale and to provide a necessary data for region wide coral reef management strategy. Knowing species diversity and the degree to which they are distributed is a fundamental concern for marine ecology and an important part to forecast population dynamics and evolution, and define conservation practices.

Keywords: coral triangle, fisheries management, mega biodiversity, coral reef fisheries, environmental DNA, genetic assessment, marine protected area.

Sustainable Challenge in Indonesia: Human Resources Development

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In his second term President Jokowi emphasized the importance of development of human resources. The President is well aware that infrastructure development that is not supported by human resource development will not provide the desired economic added value. If we look at the facts, Indonesia is the fourth most populous nation in the world, already 97% of the population in Indonesia are free from illiteracy, the government has a 12-year compulsory education program intended to provide equitable access to education throughout Indonesia. It means that as a nation, Indonesian human resources have a strong foundation. We only need to improve the quality of human resources that have been built to the next level. At least there are two things that make it difficult to raise the quality level of the human resources, namely:

1. The quality of our vocational education is still low; many graduates of vocational schools have difficulty gaining access to jobs that grow and develop their potential. The government must try seriously to build a link and match between vocational education and industry. Vocational education must be at the forefront of Indonesian human resources development going forward. Why? because better vocational education can improve the quality of products. Vocational education can significantly reduce unemployment, vocational education supported by access to capital, can foster startups in Indonesia. Vocational education must also be updated with the needs of the industrial world today and updated with industrial revolution 4.0. There must be new vocations such as programming, Internet of Things (IoT), comics or other things that make vocational interesting and up to date.

2. Low innovation growth. It is known that as a nation, we never stop innovating. Lots of talents in Indonesia are able to make products that have competitiveness with international products. Many talents in Indonesia are capable of making electric cars, DC powerhouses, biofuel efficiency technology and much more. The problem lays in the synergy and mapping of these innovations. We do not have a large data bank that can be accessed by the public about the many innovations. It is urgently required to have innovation bank of Indonesia. Our innovation ecosystem is still not maximized which makes bridges break from innovation into products in the market. This innovation ecosystem will encourage the potential of our human resources to be more actively working, because they know that the work created can provide added value both economically and socially.

International Symposium

Coral Bleaching in Manjuto Beach, West Sumatra, Indonesia: Geological and Oceanographical Perspectives

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In October 2019, locals reported that a colony of *acrophore sp.* at Manjuto Beach, Pesisir Selatan Regency experienced bleaching. The preliminary hypothesis discussed by the expert was about the influence of an extreme spring low tidal condition resulting in sunrays exposure during the midday. This study aimed to identify the cause of local coral bleaching in Manjuto Beach based on geological and oceanographical characteristics. We also analyzed the coastline changes and land morphology spatially. A time series of tidal data was also used to predict the sea level rise potential. We found that salinity and dissolved oxygen (DO) showed anomalies compared to the standard of water quality. During both flood and ebb tides, it ranges from 25-28 $^{o}/_{oo}$ and 6.12-10.56 mg/L, respectively. While the other parameters measured (temperature, pH, conductivity, turbidity, and density) tend to be feasible for marine biota. Besides the lowest ebb tides that took place at that time, we also considered some seepages as a channel of coastal groundwater discharge, which plays a role in triggering salinity and DO anomalies. It is recommended to control urban developments in the coastal area because it will impact on the surrounding environment.

Keywords: Coral bleaching, Manjuto Beach, water quality, sub-marine ground water discharge

Utilization of Semi-aerobic Bamboo Cover in an Effort Decrease Organic Matter

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Pond water that has been used to maintain Sangkuriang Catfish (*Clarias gariepinus*) for 3 months without being replaced, is known to contain total organic matter (total organic matter) of 73.31 mg /L. The level is too high because it should be less than 30 mg / L. In this study the levels of organic matter are to be reduced through experimental research with a Factorial Complete Randomized Design. The first treatment or factor is percent bamboo cover 25%, 50%, 75%, 100% and 0% without cover as a control. The second factor is the observation time which is 12 hours, 24 hours, 36 hours, 48 hours, 60 hours and 72 hours, so that the shortest time to obtain the lowest levels of organic matter can be known. During the study measured temperature, dissolved oxygen (DO), pH, carbon dioxide (CO_2) and total organic matter (TOM). The results showed that organic matter could decrease to 82.19% in the 75% semi aerobic cover treatment at 48 hours or from the initial organic matter level 73.31 mg / L to 13.06 mg / L. The chemical physics of water during research is in good condition for the life of freshwater organisms, except that the dissolved carbon dioxide (CO_2) is too high.

Keywords: Cultivation, Organic Matter, Catfish, Waste Water, Bamboo, Carbon dioxide

The Correlation between Salinity and the Extents of the and Types of Mangrove Vegetation on Brackish water Ponds in the Mahakam Delta, East Kalimantan

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Brackish water Ponds in the Mahakam delta are generally managed traditionally and the expansion for brackish water ponds is still based on farmers' ability. This study aims to analyze the correlation between salinity and the extents of the brackish water pond and types of mangrove vegetation on brackish water ponds in the Mahakam delta. The location of this research was in the local farmers' brackish water ponds in the Mahakam delta, East Kalimantan. Sampling collection was carried out on brackish water ponds that had different salinity, namely salinity of 0 – 10 ppt, 11 – 20 ppt, and 21 – 30 ppt. Each type of salinity was represented by 10 brackish water ponds. Furthermore, data were analyzed using descriptive qualitative and linear regression methods. The results indicated that there was a correlation between salinity differences and the extents of the pond where R = 0.556 meaning that they had a strong correlation. Therefore, the extents of the brackish water pond correlate with the salinity of mangrove types and the farmers' ability in opening brackish water ponds.

Keywords: Descriptive, qualitative, linear regression

Length based data of *Nemipterus japonicus* to Spawning Potential Ratio (SPR) Estimation on Small Scale Fisheries (SSF) in Sunda Strait

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Spawning potential ratio (SPR) is an important parameter to ensure fish stock reproduction and sustainability. This approach more efficient and effective applied at poor and limited information data to management. This reason, we used SPR approach in small scale fisheries, particularly on *Nemipterus japonicus* species in Labuan- Sunda Strait area. This research was conducted from 2013-2018 in Labuan landing port. The length data that were collected in each year, and then analyze by using basefoot ecologist toolbox application. The result has shown that SPR of *N. japonicus* range from 1-6%, and it's relatively low and potentially unsustainable. Fish length spawning at 50 percent (SL50) ranges from 139 mm-196,29 mm. And then fish length spawning at 95% (SL95) from 160,39-243,54 mm). At the 2013-2018 monitoring activity SPR relatively low and decrease every year, and first at breeding (50% and 95%) also decrease. It means the gonadal maturity of *N. japonicus* in Sunda Strait more quickly and could be used as an indicator of fishing pressure and adaptation process. To ensure the sustainability of reproduction and recruitment, it necessary to protect size capture in order to increase the spawning potential ratio.

Keywords: SPR (Spawning potential ratio), Length Data, Selat Sunda, Small Scale Fisheries, Sustainability.

Predicting and managing future Indonesian Reefs under multiple climate change scenarios

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Coral reefs worldwide are threatened by both local (e.g. overfishing) and global (e.g. ocean warming) pressures, which reduce biodiversity, compromise ecosystem functioning and jeopardise ecosystem services. We use Indonesian coral reefs as an example, parameterising all modeling scenarios based on empirical information, including, for example, fish grazing rates, algal growth, and Crown-Of-Thorns-Starfish (COTS) outbreaks. We then simulate local coral reef futures under climate scenarios RCP85, RCP45, and RCP26. Based on coral cover trajectories over the next 50 years, we find that the combination of global and local stressors under all climate scenarios is likely to lead to a decline of coral reef health, but that the rates of decline vary substantially with geographic location. Management of local stressors resulted in a greater increase of coral cover when two local stressors had different ecological roles and acted synergistically. Conversely, management of two local stressors with complementary ecological roles offered comparatively smaller benefits in lessening climate effects in RCP85. Our results demonstrate that predicting the response of local coral reefs and future climate scenarios presents a novel space to prioritise effective management actions.

Keywords: climate scenario, stressor, coral response, future reef, management action

Genetic diversity and phylogenetic Biola crab (*Uca* spp.) in Coastal Jailolo, West Halmahera Regency

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The research location in the villages of Payo (geothermal water area) and Tuada (tourist sites). Sampling was done purposively, namely the mangrove area that received the flow of geothermal water sources (Payo Village = 4 samples) and the mangrove area that did not get any influence (Tuada Village = 2 samples). Amplification of Biola crab DNA (*Uca* spp.) using primer jgLCO1490 and jgHCO2198 Sequences were analyzed with MEGA5 (Molecular Evolutionary Genetic Analysis) software, genetic distance, DnaSP 4.0 diversity of haplotype (Hd) and nucleotide diversity (π). and Network 4.6 haplotype distribution. Enviromental parameters collected include (temperature, pH land, pH water, salinity and substrate). The results environmental parameters show that differences values at two locations. Identification species crab found family Ocypodidae, genus *Uca* with species of *perplexa*, *annulipes*, *crassipes* and *lactea*. The results of genetic matching were found, similar to the results of morphological identification. Genetic diversity was found highly with nucleotides and haplotype varitions. Phylogenetic reconstruction of *Uca* spp. crabs shows the kinship that occurs between species, although there is a gap (gap) between different species of location. Genetic distance and Fixation Index (Fst) analysis which also shows genetic proximity between species and strong genetic flow between species, despite different locations.

Keywords: Fixation index analysis, genetic diversity, genetic distance

The application of different heat processing technique on eel (*Monopterus albus*) galantine

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Eel (*Monopterus albus*) is one of the fisheries commodities commonly used as food material in Indonesia. Different heat processing techniques can affect on galantine's quality. Therefore, this study investigated the effect of different eel composition and heat processing techniques, namely grilling and steaming, on the sensory, nutrient, and microbiology quality of the eel galantine. Four different eel galantine formulas were examined, viz. steaming + 5% eel (A), steaming + 10% eel (B), roasting + 5% eel (C), and roasting + 10% eel (D). The samples were then analyzed for their sensory quality, nutrient contents, and microbiology quality. The study indicated that sample C's appearance, aroma, and texture were preferred by the panelists, while the panelists preferred sample D's taste. The protein, moisture, ash, and fat content in all samples met the Indonesian National Standard (SNI) requirement. However, the carbohydrate content and microbiology parameter (Total Plate Count) did not meet the requirement. On the other hand, sample B had higher vitamin A (0.38 mg/kg) compared to sample D (0.17 mg/kg). This study shows that care must be taken during the processing of eel galantine, such as the heat treatment that applied, to make sure that the eel galantine meets the quality requirement.

Keywords: Galantine, heat processing technique, microbiology quality, nutrient content, sensory quality

The digestibility of improved sugar cane bagasse on *Barbonymus schwanenfeldii*

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The evaluation of fish capacity to digest an alternative ingredient is a critical aspect. The highly digestible ingredients will improve fish growth performance and reducing the production of wastes. This experiment was conducted to determine the digestibility of improved sugar cane bagasse as an ingredient on *Barbonymus schwanenfeldii diet*. The nutrient contents of improved sugar cane bagasse were crude protein, lipid, ash, crude fiber, carbohydrates (by difference) of 22.27%, 0.68%, 8.03%, 12.75%, and 55.23% (in dry weight), respectively. To measure the digestibility of improved sugar cane bagasse, a test diet in which 30% by weight of the reference diet was replaced with improved sugar cane bagasse. Chromic oxide was used as an inert marker and added 0.6% to both reference and test diets. Fifteen fishes with an average weight of 10.00±0.53 g were held in 110L aquaria and fed three times daily. Fecal samples were collected from three replications group of fish. The digestibility of improved sugar cane bagasse on *B. schwanenfeldii* were 66.08%, protein 84.35%, lipid 95.26% and energy 70.49%. The result showed that the nutritive value of improved sugar cane bagasse in this present study was fairly digestible by *B. schwanenfeldii* and it could be as an ingredient in its diet.

Keywords: Digestibility, improved, sugar cane bagasse

Some biological stock indicators of Red Bigeye (*Priacanthus macracanthus* Cuvier, 1829) in Palabuhanratu waters, Indonesia

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The potential of demersal fish resources in the waters of South Java is 7,902 tons with exploitation rates of 0.39. This low level of exploitation shows that increasing the utilization of this fish in South Banten can still possible. The Red Bigeye fish (*Priacanthus macracanthus*), or Swanggi as known by local name is one of the economically valuable demersal fish from Family Priacanthidae. This study aims to examine several indicators of Swanggi fish biology stock as a basis for the sustainable management of this species. The research was done in February-December 2019 at PPN Palabuhanratu, Indonesia. The results show that the spawning season takes place in May-July with the peak occurs in May. The sex ratio between male and female fish is unbalanced, and it has a carnivorous feeding habit. The growth pattern is negative allometric with a value of b = 2.7379. Distribution of length ranges from 11.8 to 36.0 cmTL (total length) with an average of 23.32 cmTL. The average length of the first catch (Lc) was 21.58 cm, and the average length at first maturity (Lm) was 19.87 cm. The growth equation of Von Bertalanffy is L (t) = 35.45 [1-e0.72 (t - 0.8143]. The fishing mortality rate is (F = 1.52), slightly greater than the natural mortality (M = 1.40), and the level of exploitation (E) is 0.52. The estimated spawning potential ratio (SPR) of this fish is 24%, which means still in the optimum exploitation rate.

Keywords: *Priacanthus macracanthus*, exploitation, Von Bertalanffy

Fishing ground mapping based on chloropyll-a distribution using aqua modis satelitte imagery in Fisheries Management Area (WPP) 712

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The fishing ground are identical and closely related to chlorophyll-a abundance in the waters which can be associated with its fisheries potential. This research was conducted to determine the concentration and distribution of chlorophyll-a in waters, especially in the Fisheries Management Area (FMA) 712 encompassing Java Sea. Data from satellite imagery taken through the ERDDAP website in the last 11 years, which is a monthly time-series data. Chlorophyll-a concentration in the study area FMA 712 in June 2013 had an average concentration of 1.13 mg/l. Based on 11 years of data processing, it can be concluded that the highest concentration of chlorophyll-a occurred in the west monsoon season from November to April, where high rainfall causing the nutrient washed from terrestrial to the open waters, while the lowest concentration of chlorophyll-a happened in the east monsoon season started from April to November where dry season arrives. The existence of pelagic fishes in FMA 712 such as lemuru and tembang fish in waters highly influenced by the chlorophyll-a concentration, while tuna and flying fish not affected significantly to the existence of chlorophyl-a concentration and its distribution.

Keywords: Chlorophyl-a, FMA 712, Jawa Sea, pelagic fish

Ecosystem approach applicability to sustain endemic fish in Lake Laut Tawar, Aceh

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Lake Laut Tawar is residence for two endemic cyprinids, i.e. *Rasbora tawarensis* and *Poropuntius tawarensis* of which both are economically important target species in supporting food security and livelihood of local inhabitants. The present research was aimed to formulate strategic planning in corroborating actions towards fisheries sustainability, in particular to these two species, based on ecosystem approach to fisheries management (EAFM) concept. Gap analysis was applied to contrast between recommended actions and current management practices so that EAFM model applicability to sustain endemic fish was assessed. The results showed that there were three outcomes to improve fishery management as follows: (1) augmenting habitat quality and quantity and sustainable utilization of fishery resources, (2) promoting higher socio-economic benefits, and (3) improving function and synergy among management institutions.

Keywords: EAFM, Endemic Fish, Sustainability, Lake Laut Tawar

Future climate change impact on oceanic states of the Indonesian waters based on CMIP5

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The purpose of the study is to describe and to analyze the spatial-temporal of the baseline and future physical and biogeochemical condition of the Indonesian Waters based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) under Coupled Model Inter-comparison Project Phase 5 (later known as CMIP5). Two radiative forcing scenarios are selected, i.e., RCP4.5 and RCP8.5 which are stable and high greenhouse gas emission, respectively. Ocean-physical variables include Sea-Surface Temperature, Salinity, Potential Temperature, Mixed layer depth, Heat Content, Static Stability while ocean biogeochemical variable consist of Sea-Surface pH, Oxygen, Chlorophyll, Primary Productivity, Alkalinity, and Dissolved Inorganic Carbon Concentration. Six global circulation models are chosen with one average of all models (resolutions of 1^0x1^0) provided by CMIP5. The depiction of physical and biogeochemical characteristics is carried out using statistical analysis of anomaly, standard anomaly (average historical and ensemble spread) including ensemble spread of future change. Time-series analysis span from 2006 to 2055 and 2050-2099 including its historical record as baseline. The analysis is done seasonally (i.e., Jan.-March, Apr.-June, July-Sept., and Oct.-Dec.). By providing future information of tropical oceanic states as obtained from the present study, it is expected that climate risks in the maritime sector could be minimized by performing appropriate options of mitigation and adaptation not only to maintain but to raise productivity in this sector.

Keywords: CMIP5, RCP4.5, RCP8.5, Indonesian Waters

Analysis of wave measurements in November 2018, January 2019 and March 2019 in the coastal waters of Leupung and Lhoong, Aceh Besar District, Indonesia

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The coastal waters of Leupung and Lhoong Aceh Besar District are directly adjacent to the Indian Ocean. They play a major role in fishing and tourism activities. Thus, the study of ocean waves is important to conduct. The research aims to describe the variations of waves, i.e., height and period. The research was carried out in Leupung at station 1 and Lhoong at station 2 in November 2018, January 2019 and March 2019. The height and period of the waves were collected from 2 station points located at Leupung and Lhoong beaches, using the direct measurement method, that is, a scale board to measure the wave height and a stopwatch to measure the wave period before the breaking wave. The results show that the wave height and period in November 2018, January 2019 and March 2019 in Leupung waters are 0.42 m, 12.34 s; 0.5m, 12.43 s; 0.49 m, 13.82 s, respectively. Meanwhile, wave height and period in Lhoong waters are 0.26 m, 12.31 s; 0.44 m, 13.97 s; 0.48 m, 12.22 s, respectively. It is concluded that the highest wave occurred in January and March 2019 at Leupung at Lhoong coastal waters, respectively. On average, the highest wave of the three months occurred in Lhoong coastal waters.

Keywords: wave height, wave period, coastal waters

Identification of Caridea cryptic organism (Crustacea) on the *Pocillopora* dead coral in Sabang Island

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Research on the composition of caridea cryptic organisms (crustasea) on dead corals of *pocillopora* in Sabang waters has been conducted on January 2017. The purpose of this study to identify the composition of Caridea cryptic organisms which found in dead coral *Pocillopora*. The location of research was decided by purposive sampling methods. The results showed that the three families of Alpheidae, Hippolythidae, and Palaemonidae were found at each station. Total number of individuals found as many as 109 individuals scattered into 3 stations. The most abundant families were from the Alpheidae family with a total of 79 individuals while the fewest families found were Palaemonidae with a total of 11 individuals. The largest value of dead coral volume was found at Seulako island station which was 3.2 liter as the highest abundance of Caride organisms 41 individuals. On the other hand, the station of Sumur Tiga was found the smallest coral volume of the two other stations of 1.2 liter with the lowest abundance of Caridea organisms 33 individuals.

Keywords: Identification, Caridea, cryptic organism, dead coral, Sabang waters

Growth estimates of Pelagic Thresher Shark (*Alopias pelagicus* Nakamura, 1935) in the Indian Ocean Southern Java waters

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Alopias pelagicus or Pelagic Thesher Shark was a species that migrates very high, oceanic and almost always found in tropical and temperate seas. This spesies was epipelagic and mesopelagic from the surface to depths of 300 m. This species was particularly vulnerable to exploitation of both targets and side catches. Research was conducted in May 2015 to November 2016 at the landing site of the Cilacap Fishing Port. This research aims to estimate the growth as the foundation for knowing the stock status utilization rate. The research method was used through observation and data collection by the enumerator. The 1410 individual shark was a catch of long line caught in the Indian Ocean Southern Java waters. The results showed that the size structure of the pelagic thresher shark in the waters of the South Indian Ocean of Java that was landed in Cilacap ranged between 60-270 cm FL with a mode ranging between the size of 140 cmFL. The length weight relationship of the male and female shark indicates the growth was allometric positif (b > 3). A comparison of male and female shark was not balance (1:2,82). The growth curve equation Von Bertalanffy for the shark as $L_{(t)}=278{,}52(1-e^{\wedge(-0{,}16(t+0{,}01285)})$. Mortality parameters for the covering the total mortality rate (Z), natural mortality rate (M) and the rate of fishing mortality (F), respectively at 0.796/year, 0.295/year and 0.50/year. The rate of exploitation (E) of pelagic thresher shark was 0.73/year. Thus the utilization rate of pelagic thresher shark was already on the level over fishing.

Keywords: growth parameter; pelagic thresher shark; indian ocean; southern java

Biological characteristics of Silver Sillago (*Sillago sihama* Forsskal) in Bombana water South East Sulawesi

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Silver Sillago is a demersal fish belong to family Sillaginidae. Sampling site held in district Bombana and conducted since April-December 2018. This research aimed to analyse some aspects regarding of its species. Some aspects are concerned in this observation, e.g., length-weight, sex composition, fecundity rate, length at first capture and length at first maturity, growth, mortality rate and utility rate. These sample were obtained from fisher using trawl. Number sample were observed 5.242 specimens with fork length (FL) between 6.16-28.9 cm and average of fork length around 18.13 cm. Growth pattern this species in this area is isometric, while growth of length equal with its weight. Length at first captured is 17.96 cm in fork length measurement. Also, length at first maturity is 22.66 cm. This condition show that this species cannot sustain and maintain stock equilibrium in this area due to they were captured in immature. Peak Season for spawning period of Silver sillago in this area being predicted in August. Natural Mortality (M) is 1.35, Mortality by capture is 1.45, total mortality is 2.80 while utility rate is 0.52.

Keywords: Mortality, Sillaginidae, season, stock

Strategy and facilitating model for small scale terasi business at the Camar Laut Small Enterprises

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The development of small and medium-size enterprises (SMEs) needs to be carried out considering their significant role in the economic growth of a region. Business legality is an important factor, especially for SMEs involved in food production which has important role in food safety assurance for consumers. business legality will simplify market access to expanding distribution and increasing demand for products. The aim of the development business legality guidance and facilitating it is to assist Camar Laut small enterprises involved in the shrimp paste processing industry to obtaining business legality and ensuring that production aspects are carried out properly resulting in continuity business legality. The activities performed an increasing in understanding, skills and turn over of human resources in Camar Laut small enterprises.

Keywords: legality, SMEs, shrimp paste

DNA barcode of *Belodontichthys dinema* from Indragiri and Tapung Rivers, Indonesia

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Belodontichthys dinema with the local name of sengarat fish, is one of freshwater fish in Riau Province of Indonesia. *B. dinema* distributed in some rivers of Riau Province were Indragiri and Tapung rivers. This study reports analysis of DNA barcode of *B. dinema* using cytochrome c oxidase subunit I (COI) gene. The muscle of *B. dinema* fish using for DNA extraction. In this study had been obtained 652 bp of COI gene from Polymerase Chain Reaction (PCR) product. The Basic Local Alignment Search Tool (BLAST) analysis based on COI gene sequences shows that *B. dinema* from the Indragiri and Tapung rivers has 100% similarity with *B. dinema* from the existing database in GenBank. There are 14 marker nucleotides can characterize the species *B. dinema* molecularly. The value of genetic distance between *B. dinema* from Indragiri and Tapung rivers with *B. dinema* from GenBank data is 0.00. The phylogenetic tree showed that *B. dinema* from Indragiri and Tapung rivers, formed one group with *B. dinema* from Genbank data with bootstrap value is 100%. These results confirmed that sengarat fish identified was *B. dinema* based on the COI gene as DNA barcode.

Keywords: *Belodontichthys dinema*, COI gene, DNA barcode, Indonesia, sengarat fish

Distribution of fishing vessels and its oceanography characteristic in the eastern Indian Ocean off Sumatera

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Fishing vessels locations extracted from remotely sensed data and satellite-based oceanographic data of chlorophyll-a concentration (chl-a), sea-surface temperature (SST), and salinity were used to describe the distribution of fishing vessels and evaluate the characteristic of oceanographic conditions on the fishing vessels in the eastern Indian Ocean of Sumatera. The data of fishing vessels derived vessels monitoring system (VMS) and visible infrared imaging radiometer suite (VIIRS) boat detection (VBD) data was provided by Ministry of Maritime Affairs and NOAA national centers for environmental information website, respectively. The results showed the number of fishing vessel that operated during southeast monsoon was higher than others monsoon. The results also showed that the spatial dispersion of VBD data was wider than VMS data. Most of the fishing vessels appeared in position of 95 °E – 100 °E and 2.30 °S - 2.30 °N. In addition, most of fishing vessels detected in oceanographic condition for SST of 29 – 31 °C, chl-a of 0.1 – 0.3 mg/m3, salinity of 32 – 33 psu.

Keywords: oceanography, fishing vessels, Indian Ocean off Sumatera

Similarity and genetic relationship analysis of 28 species of Pangasiidae (Siluriformes, Ostariophysi)

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Pangasiid catfishes have most diverse morphotype among members in the family. In the past, misidentification often occurred for the species definition. After numerical taxonomy developed, the level of similarity or phenetic analysis was used to distinguish different taxa. While relationship and evolutionary evidence within species in Pangasiidae was analyzed based on the genetic data. The aim of the present study was to understand the congruency between phenetic and genetic analysis in family Pangasiidae. Euclidean distance was applied on phenetic analysis to produce phenogram of similarity. Sequencing of 12s rDNA was conducted to illustrate the genetic relationship. Both analyses showed that species member in Pangasiidae supported the genera proposed in the previous study. Four genera are in Pangasiiidae. The both analysis also support to the hypothesis of geological history, palaentology and models of other family in the observed area. The results confirmed that Pangasiidae might occur 20 million years ago before separation of the islands with the mainland Asia.

Keywords: Catfish, genetic, Pangasiidae, biometric, phenetic, phylogeny

Study of the spread of White Feces Disease (WFD) on *Litopenaeus vannamei* in semi-intensive ponds in Aceh Besar District Aceh Province, Indonesia

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This study was aimed to determine the distribution and prevalence of *White Feces Disease* (WFD) infections in vannamei shrimp (*Litopenaeus vannamei*) in semi-intensive ponds in Aceh Besar District, Aceh Province. The study was conducted in August 2019 in the Subdistrict of Masjid Raya and Lhoong. The research was done by applying a direct sampling method. Ten shrimp samples were ramdomly selected from each location (Subdistrict of Masjid Raya and Lhoong). Observation of clinical symptoms of WFD infected shirmps was subjected to the intestines, hepatopancreas and shrimp feces. The results showed that the prevalence of WFD infected vannamei shrimp within Subdistrict of Masjid Raya and Lhoong was 20 – 40%.

Keywords: *Litopenaeus vannamei*, White Feces Disease, ponds

Profile of *Myxobolus* infection in Koi fish gill tissue (*Cyprinus carpio*) from land pond, Nglegok, Blitar Regency

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Abstract
This study aims to analyze the profile of *Myxobolus* infection through histological observations of koi (*C. carpio*) in gill tissue. The method used in this research is descriptive with a quantitative approach. The histological observation was used gills from koi fish (*C. carpio*) taken from a land pond in Nglegok, Blitar Regency with the type of lesion observed using a microscope with a magnification of 400x. Then, results in the assessment were carried out using the scoring method (Pantung, 2008) to determine the level of damage in each sample with a score of 0 defined as no damage (0%), a score of 2 minor (<30%), a score of 3 moderate (30-70%) and a score of 4 is severe (<70%). Based on the observations, it was seen that the lesion of gill tissue was found were as follows, edema, hemorrhage, the fusion of lamellae and vacuoles with each score and percentage (%) of tissue in infected koi fish are, 3 severe (72%), 2 moderate (33%), 3 severe (75%) and 2 moderate (52%).

Keyword: Koi Fish, *Cyprinus carpio*; *Myxobolus;* Histopathology.

Profile of *Myxobolus* infection in the gill tissue the gill tissue of Common Carp (*Cyprinus carpio* L.) strain Punten from concrete ponds, Punten, Batu Regency

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The purpose of this study was to report the infection profile of *Myxobolus* parasites by histological observation in gill tissue of common carp (*C. carpio* L.) Punten strain. The method used in this research is descriptive with a quantitative approach that aims to reveal the tissue condition of healthy fish and infected fish. The observation of tissue lesion was used gills from common carp (*C. carpio* L.) taken from The Unit of Freshwater Cultivation Management (UPBAT) Punten, Batu Regency. The visual observation was conducted by using a microscope with a magnification of 400x. then the tissue damage assessment was carried out using the scoring method of Pantung (2008) to each sample with the following conditions. A score of 0 is defined as no damage (0%), a score of 1 is minor damage (<30%), a score of 2 is classified as moderate damage (30-70%) and a score of 3 is severe damage (<70%). Based on the results of observations, the visible lesion in the gill tissue, among, edema, hemorrhage, the fusion of lamellae and vacuoles with scores and proportions of damage per field of view (%) in infected fish, respectively are, score 2 moderate (52%), 1 minor (25%), 1 minor (12%) and 2 moderate (18%). Based on the assessment, the scoring results show mild to moderate damage, so it is still classified as early-stage damage or it can also show the fish's ability to recover in a good environment.

Keyword: Common carp, *Cyprinus carpio* L., *Myxobolus,* Histopathology

Sub-surface identification of beach sands in Lamreh, Aceh Besar by using very low frequency method based on resistivity mode (VLF-R)

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This work was studied about 2D Sub-Surface Identification of iron sands (hereafter; "beach sands") in Lamreh, Aceh Besar by using Very Low Frequency method based on Resistivity mode (VLF-R). The aims of the research; (1) Predicting 2D sub-surface of iron sands resistivity in Lamreh based on VLF data. (2) Conducting 2D sub-surface identification measurement data of iron sands. VLF data were measured into 3 lines, by the first line was 250 meters and the second line was 120 meters and the third lines was 100 meters. 2D modelling in VLF-R was conducted by using 2LAYINV electromagnetic inversion program. Inversion process showed 2-iron sands-conductivity-zone, where the resistive layer in depth was covered by conductive layer on it. The conductive layer was expected as clay being rich of water content by resistivity rate at 10 – 100 Ωm. Resistive layer was expected as cap rock by resistivity rate at 20000 – 40000 Ωm.

Keywords: Iron sands, resistivity, VLF-R, electromagnetic, conductive layer.

Nano-hematite properties of Lampakuk iron ore identified by X-rays method

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Iron ore containing magnetic mineral is still the backbone of world economy, especially magnetic materials industry. Due to the lack of information related to its deposit. it is important to identify the mineral composition and the magnetic properties Aceh Province's iron ore. In this work, the sample was collected from Lampakuk, Aceh Besar District and obtained by pulverized the mineral rock using mechanical milling process to produce iron ore powder in nanometer-size. Planetary Ball Mill (Fritsch, P6) was used with the variation of milling time of 10 hours, 20 hours, and 60 hours with a rotation speed of 400 rpm and a ball and powder weight ratio of 1: 10. This process aims to see the effect of variation of milling time on the magnetic properties of iron ore. As the results, identification using XRD and XRF showed that the iron ore in the region containing predominantly Fe_2O_3 (hematite) as much as 86.81% with the smallest powder size of 26 nm on the milling time 60 hours. While the magnetic properties analyzed via the hysteresis loop curves showed that an increase in the value of remanence Br and Hc koersifitas but a decline in the value of the magnetic saturation of Ms with increasing milling time.

Keywords: Iron ore, mineral identification, mechanical milling, magnetic properties, x-rays.

Lengh-weight relationship of *Lingula* sp. on the beach of Ujong Pancu, Aceh Besar Regency and Syiah Kuala, Banda Aceh City

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The purpose of this study was to determine the growth pattern of *Lingula* sp. based on its morphometric analysis. The method used in this research is purposive sampling method. Based on the weight value of *Lingula* sp. in the Syiah Kuala area (5,861-7,786 g) it was higher than the Ujong Pancu area (0.082-2.007 g), and the length value was higher in the Syiah Kuala coastal area (39.6-49.4 mm) than the Ujong Pancu beach area (19.8-29.6 mm). Besides that, from the calculation of the value of length and body weight, it was found that the value of b at both stations was b> 3 (Ujung pancu, b = 1.9568 and Syiah Kuala, b = 2.896) so that the growth pattern of Lingula sp. classified as negative allometric.

Keywords: Lingula sp., Syiah Kuala, Ujong Pancu, Morphometric, Growth

The distribution of the macro-zoobenthos community based on the characteristics of the mangrove sediments in Aceh Besar

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The purpose of this study is to analyze the elements contained in the sediments in the mangrove area and to identify macro-zoobenthos species that dominate the mangrove area based on the characteristics of the sediment subtract in Peukan Bada and Baitussalam districts, Aceh Besar district. The method used in this research is the coring method for sediment sampling, while the sediment characteristics analysis is carried out by the sieve method. Meanwhile, macro-zoobenthos were collected based on mangrove density using hand grabs and sieved at a size of 0.5 mm. The results show that 89% of the substrate is a muddy fine sand sediment with the dominance of the mangrove species *Rhizopora mucronate* and *Sonneratia alba* species. The dominance level of macro-zoobenthos is in the low to high category with a dominance value of 0.47 - 0.88.

Key words: macro-zoobenthos, Aceh Besar mangrove area, sandy subtract

Diversity and abundance of phytoplankton in Lubuk Damar, AcehTamiang, Indonesia

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Sampling was done in Lubuk Damar, Aceh Tamiang Regency used planktonnet which has 30 micron mesh size. This study aim to invertigate the diversity and abundance phytoplankton in mangrove habitats at Lubuk Damar, Aceh Tamiang. The outcome could help to evaluate the contribution of phytoplankton in mangrove estuarine ecosystem. In March abudance higher than August but diversity in August higher than March. Index Diversity in March around 0.83 – 2.35 and in August around 1.24 – 2.74. Index Dominace in March around 0.17 – 0.73 and in August around 0.08 – 0.48. Index Evenness in March around 0.23 – 0.64 and in August around 0.11 – 0.87. In March species *Chaetoceros* sp. was dominated in water, following by *Bacillaria* sp, and *Biddulphia* sp. In August, *Leptocylindrus* sp. was dominated in diversity phytoplankton, following by *Biddulphia* sp. and *Chaetoceros* sp.

Keywords: diversity, abundance, phytoplankton, Lubuk Damar.

Spatial Distribution of Mangrove Using A Geographic Information System in Aceh Besar

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The method used in this research is the transect method and analysed based on the identification of mangrove species. Based on the analysis of the results of the study, it was identified that the mangrove species found in the research location of Peukan Bada sub-district (West Aceh Besar) consit of *Rhizopora mucronata* and *Sonneratia alba*, while the mangrove species found in Baitussalam (north Aceh Besar) were *Rhizopora mucronata* and *Sonneratia alba*. Meanwhile, based on observations with satellite imagery and location surveys, it was found that the mangroves in Baitussalam sub-district were denser and spread evenly than in the Peukan Bada area.

Keywords: mangrove Aceh Besar, mangrove forest ecosystem, Peukan Bada, Baitussalam

Three in one coastal ecosystem: mangrove, seagrass and coral reefs for coral reef fish communities

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Many studies have been undertaken to test and model this concept. The result of these studies showed that mangroves, seagrass beds, and coral reefs are interconnected by the ontogenetic migrations of coral reef fishes. Also, the mosaic structure comprising mangroves, seagrass beds, and coral reefs has a major impact on the community structures and biomass of coral reef fish. Here, we are going to test how long-term monitoring data in Indonesia can demonstrate empirically a similar phenomenon. We are combining field survey data for measuring the reef fish community and remote sensing data for landscape heterogeneity analysis. Thus, the results of the current study could provide solid evidence that coral reef conservations should be combined with mangrove protection or vice versa. Also, the study can locate the mangrove area which has relative importance for the community of coral reef fish. Therefore, this information could be considered for managers of marine protected area to optimize the landscape configuration combined with zonation system.

Keywords: Mangrove, coral reef, fish, landscape

Community Structure of Gastropods and Bivalves Associated in Mangrove Ecosystem at Pusung Cium Island, Seruway, Aceh Tamiang

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The purposes of the present study were to determine the community structure of Gastropods and Bivalves. The research was conducted in October to November 2019. The method used in determining the location of the research station was the Stratified Random Sampling based on the density of mangrove vegetation. There were 4.67 ind/m^2 consisted of 3 species for Bivalves class and 143.33 ind/m^2 species of Gastropods consisted of 41 species. The highest abundance was in station three, and the highest Gastropods species abundance was *Littorina angulifera* (51.33 ind/ m^2) and *Saccostrea cucculata* (1,33 ind/ m^2) for Bivalves class. Biologic indexes showed that the richness of Gastropods and Bivalves was High, and evenness and dominance index was ranged 0.44 to 0.79 and 0.20 to 0.21, respectively and the distribution pattern were uniform, random and clumped. The correlation between density of mangrove and abundance of gastropods-bivalves were weak and moderate and there was no significant correlation between the density of mangrove and abundance of biota aquatic (Gastropods and Bivalves) where Psig < 0.05. The community structure of Gastropods and Bivalves in present study was in stable condition.

Keywords: Mangrove, Gastropods, Bivalves, biological indexes, Aceh Tamiang.

Response of oceanographic conditions to the distribution of Skipjack tuna (*Katsuwonus pelamis*)

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Oceanographic data of chlorophyll (chl-*a*), sea-surface temperature (SST), sea-surface height (SSH) and salinity based on satellites were used to evaluate the response of oceanographic conditions to the distribution of Skipjack tuna. The oceanographic data were obtained from INDESO Project website and the fishing vessels location for Skipjack tuna were obtained from longline fishing logbooks provided by Pelabuhan Perikanan Samudera (PPS) Bungus, West Sumatera. Statistical significance (*p-value*) was used as the bases for significant oceanographic factor selection. Generalized additive model result (*p-value* < 2e-16***) showed all the oceanographic factors have significant impact to the distribution of Skipjack tuna. Further, the results indicated that the distribution of Skipjack tuna were mostly influenced by chl-*a* of 0 – 0.4 mg/m^3, SST of 30 – 34 °C, salinity of 30 – 34 psu and SSH of 0.5 – 0.7 m.

Keywords: Distribution, oceanography, Skipjack tuna.

Effect of Different Depth on Fish Catches in Hajoran Coast of Central Tapanuli District: Case on Bamboo Platform Lift Net

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The purpose of this study was to compare the catches of fish that were predominantly caught on bamboo platform lift net based on different depths. This research was conducted in February 2020 at Hajoran Village, Central Tapanuli regency in Sibolga City, by using a survey method. Data collection was carried out by directly recording the catches 3 units of bamboo platform lift net and then comparing the three results by using One Way ANOVA analysis. The results showed that the amount of catch per lift net varies, depending on the type of fish and its depth. For pony fishes species were more commonly found at a depth of 30 M with a total of 5.5 kg, while fringe scale sardine and anchovies were found at a depth of 36 M with a total of 10.6 kg and 64.4 kg, respectively. One Way ANOVA revealed tht there was no any significant difference in term of the number of combination all species caught at three depths ($p>0.05$) while a a significant different varied among its species ($p<0.05$)

Keywords: bamboo platform lift net, haul, catch, depth, hajoran coastal.

LB-SPR Model for Estimating Successful Adaptation of Invasive Crayfish (*Cherax quadricarinatus*, Morten) in Java

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The invasive crayfish data collect in 5 five location in Java island e.i Cirebon, Semarang, Surabaya, Yogyakarta and Cilacap. SPR analysis using application http://barefootecologist.com.au/lbspr after, maturity analysis, size capture selectivity and length frequency analysis. Result of these research show, average length in Cirebon (71 ±18,38) mm, in Semarang (53 ±0,00) mm, in Surabaya (83 ±3,54) mm, in Yogya (87,5 ±15,91) mm and Cilacap (65 ±6,36) mm. Spawning potential ratio in Cirebon 68%, in Semarang 37%, in Surabaya 100%, in Yogyakarat 81% and in Cilacap 0,62% with total average in five station is 62%. The first maturity at 50% population, Selectivity length (50%) in Cirebon 38,72 mm, Semarang 49,68 mm, Surabaya 37,96 mm, Yogya 37,68 mm and Cilacap 42,29 mm. SPR result that more than 40% shown that successfully of spawning in java relatively high and spread and adaptation also going well. The distribution in wild habitat potential influence to native species and it even causes extinction.

Keyword: LBSPR, Adaptation, Crayfish, Invasive, Management

Spatiotemporal of microplastic in surface water of Benoa Bay, Bali

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This research is aimed to investigate the spatiotemporal of microplastic in surface water of Benoa Bay, Bali. Microplastic samples were collected at 8 locations with 2 repetitions in the southeast and northwest monsoon. Spatially, it was found that the lowest abundance of microplastic was observed at the mouth of the Badung River, the middle and the inlet of Benoa Bay, while the highest abundance was found around the Suwung landfill. Based on the size, the smallest to the highest percentage of microplastics in Benoa Bay was <300 µm, 300-500 µm, >1000 µm, 500-1000 µm, whereas based on the shape was granule < fiber <foam <fragment, respectively. Statistically, it was found that the abundance of microplastic in the southeast and northwest monsoon was not significantly different, but significantly different based on size and shape. Based on random sampling, it was found that microplastic polymers in Benoa Bay were dominated by polyethylene, polypropylene, and polystyrene.

Keywords: Marine debris, Spatial, Temporal, Landfill, Tropical estuary

Study of the Suitability of Mooring Jetty Facilities to the Number of Mooring Vessels on Kutaraja Oceanic Fishing Port, Banda Aceh

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This research uses descriptive method which is survey in nature; the researcher makes direct observations of objects in the form of mooring jetty and mooring boats. Based on the calculation of the ideal length of the mooring jetty, the current requirement for the mooring jetty at the Kutaraja Ocean Fishing Port based on the calculation of the current number of fishing vessels is m2 and the need for a dock to accommodate moored fishing vessels is 1.177 m. The mooring jetty length of the Kutaraja Samudera Fishery Port which has been built at this time is not suitable, it is necessary to add a jetty of 836 m. Based on the results of this study; the researchers suggest that a mooring pattern is arranged at the mooring jetty so that no more ships moor in the river basin.

Key words: Suitability, mooring jetty, Kutaraja Oceanic Fishing Port, fishing vessels.

Breakdown of mangrove leaf litter in natural and rehabilitated mangrove forests of Perancak estuary, Bali, Indonesia

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This study aimed to investigate the decay kinetics of leaf litter in natural and rehabilitated mangrove forests of Perancak estuary, Bali, with historical mangrove land conversion to shrimp ponds in the 1990s. Six experimental sites were chosen to represents three natural and rehabilitated forest sites. Litterbag experiment was selected to study the breakdown of four major mangrove species in the selected area, Rhizophora apiculata, Bruguiera gymnorhiza, Avicennia marina and Sonneratia alba. The experiment lasted for 42 days, with intermediate sampling at 14 and 21 days. The decay kinetics measured were percentage of leaf mass remaining, decay rate, half-life ($t_{0.50}$), 95% and 99% lifespans ($t_{0.95}$ and $t_{0.99}$). In general, the pattern of leaf litter decay followed a negative exponential distribution. Our data showed that leaf mass loss was the fastest for B. gymnorhiza litter and the slowest for A. marina litter. From repeated-measures ANOVA results, the difference of leaf half-life between natural and rehabilitated forests was not significant. However, a significant difference was observed between natural forest sites, which is presumably related to surface elevation height. To conclude, the leaf litter decay of rehabilitated forests may return to that of natural forests after a certain time.

Keywords: Decay and decomposition, decay kinetics, leaf litter, mangrove conservation, mangrove rehabilitation

Mangrove Litter Productivity and in Relation to Environmental Properties of Water in Pusong Cium, Seruway, Aceh Tamiang

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The purposes of the present study were to obtain the litter production of mangrove ecosystem in Pusong Cium Island, Suruway, Aceh Tamiang, and to analyze the relationship between physical and chemical factors of water to the production of mangrove litter. The research was conducted from October until December 2019 in Mangrove ecosystem. The method used in determining the location of the research was Stratified Random Sampling. Litter bag was commonly method used to obtain mangrove production, the litter trap with transect size was 1m x 1m and the nest mesh size was 1 cm x 1 cm was placed under the mangrove vegetation with a height of 1.5 m above the soil surface. The results showed that the total amount of litter production at Pusung cium was 35.65 g/m²/day and the highest contributor obtained was at station 1 and followed by station 2 and 3 with the value 15.17 g/m²/day, 11.49 g/m²/day, and 8.99 g/m²/day, respectively. There were six mangrove species found in the research area, and the highest litter production was *Avicennia Alba* as much as 24.76 g/m²/day. The Pearson correlation explain that temperature and mangrove density had strong correlation with litter mangrove production, the value were 0.677 and 0.672, respectively.

Keywords: Litter production, mangroves, litter trap, *Avicennia alba*, Aceh Tamiang

Strategy for the Development of Local Fisheries Product Processing in Coastal Areas North Konawe Regency

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This study examines the strategies offered to develop local fishery product processing activities in Molawe Village, North Konawe Regency. The aim is to identify, identify and implement strategic steps that support the Minapolitan Area program in the coastal area which was proclaimed by the North Konawe Regency government. Data analysis using SWOT analysis. The results show that the appropriate development strategy is: (1) Capacity building for community empowerment through developing the quality of human resources, developing the quality of existing local processed products, diversifying healthy and hygienic processed products, developing markets, (2) increasing the capacity of government roles through infrastructure support and fostering protection of potential coastal areas, assistance to maintain the cleanliness and balance of the coastal environment (3) Establish partnerships and networks in developing fishery product processing businesses

Keywords: Development Strategy, Local Fisheries Product Processing, Coastal Areas, SWOT.

Identification and inventory of coral fish abundance in the regional waters conservation area (KKPD) of West Simeulee

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The marine conservation area in West Simeulue is one of the marine conservation areas that has been established by the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia in 2020. Identification and inventory of reef fish abundance in the marine conservation area in West Simeulue can be used as an initial reference to see the effectiveness of this area, so that it can give changes to the West Simeulue KKPD. This research was conducted in October 2019 with 9 observation locations. The method used is the underwater visual census (UVC) at 2 depths. From the observations it was found that as many as 30 families with 13,107 individuals from 163 species were found in the West Simeulue KKPD with coral fish abundance values of 1069 ind / ha in the Kkpd and 906 ind / ha outside the KKPD. Pomacentridae and Acanthuridae families were the families with the highest number of individuals found, namely 5550 individuals and 2226 individuals.

Keywords: coral reef, coral fish, KKPD, West Simeulue.

Waste Management Model in the Residential Environment of the Bajo Tribe, Torokeku Village, South Konawe Regency, Southeast Sulawesi Province

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This study aims to obtain an overview of waste management in the coastal area of the Bajo ethnic settlement of Torokeku Village, to inventory the problems in the waste management system and to provide recommendations for optimizing the waste management system independently and sustainably based on coastal communities. The research was conducted using descriptive qualitative analysis methods. Collecting data through structured interview techniques and observations. The results obtained by public awareness are still relatively low, lack of information and knowledge about the impact of environmental problems, there are no real examples that can be used as a reference in managing waste, and the government is less firm in addressing environmental problems.

Keywords: Environment, Solid Waste Management, Bajo Tribe Society, Torokeku Village.

Management of Environmentally Friendly Fishing Gears Based on the Code of Conduct for Responsible Fisheries in Pidie District

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The purpose of this study was to identify environmentally friendly fishing gear and management of environmentally friendly fishing gear based on the Code of Conduct for Responsible Fisheries in Pidie District. The data analysis method used in this research is descriptive, scoring, and SWOT analysis. The results showed that the fishing gear which was categorized as very environmentally friendly were; (1) hand line; (2) Longline, (3) gill nets, and (4) purse seine. Meanwhile, the fishing gear that is not environmentally friendly is; (1) Modified beach seine and (2) beach seine.

Keywords: Fishing gear, Environmentally friendly, Capture fisheries, Management, Pidie District

Does Transactional Leadership Style of *Pawang Laot* Matter for Enhancing Quality of Work Culture, Welfare, And Performance of Fishermen?

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This study empirically measures and explores the extent to which transactional leadership style of *Pawang Laot* (the local traditional fishing masters in Aceh Province, Indonesia) matter for enhancing the quality of work and its impact on improving welfare and performance of fishermen. Of 7,623 fishers in South Aceh District, Indonesia, 110 of them were selected as the sample of the study using a proportional stratified random sampling technique. To gather the data, questionnaires were distributed to the respondents and analyzed using the Structural Equation Modelling (SEM) approach. The study documented that transactional leadership style of *Pawang Laot* has directly and significantly improved quality of work culture and performance of the fishermen, but it has an insignificant effect on fishermen's welfare. In addition, indirectly, the quality of work culture has an insignificant positive influence on the welfare of fishers through their performance. Finally, the quality of work culture significantly and positively mediated the effect of the leadership style on improving both welfare and performance of fishers.

Keywords: Transactional Leadership, *Pawang Laot*, Marine capture fisheries, Fishermen work culture.

The characteristics of body-wave records between forearc and backarc region at the Sumatra subduction zone from deep regional earthquakes

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This study aims to identify the body-wave characteristics between the forearc and backarc regions at the Sumatra subduction zone. Several selected deep regional earthquake records with a depth greater than 100 km provided by the Agency for Meteorology, Climatology, and Geophysics of Indonesia (BMKG) were analyzed. The finding indicates that the body-waves recorded at the forearc region are significantly different, with the main characteristics are; 1. Arrival time: shows a delayed signal of P- and S-waves, 2. Amplitude: preserve high amplitude, 3. Spectral: conserve energy at low to high frequency and shows as a dispersion. These findings suggest that the signal recorded at the forearc region travel within the subducting slab, and the late arrival of the signal indicates that the seismic waves record at forearc travel at the top of the subducting slab, i.e. the oceanic crust which is having lower velocity to the surrounding mantle.

Keywords: subduction, oceanic crust, low velocity layer, wave dispersion, Sumatra

Analysis of Data Collection System of Fish Catches Landed at PPI Dumai

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Data collection system in Fish Landing Base of Dumai was very traditional. Data written manually using books and collected by agents. This is one of the weaknesses of the catch data collection system that occurs. The effect is low data accuracy and requires a longer time in reporting. A technology-based of data collection system will simplify the process and is important to do. The purpose of this study was to design a data collection system for fish catches landed at Fish Landing Base of Dumai. The method used observation, interviews and literature review. Data analysis is used the process of analyzing data, literature review, analysis of existing systems, analysis of new systems and system design using data flow diagrams (DFD), entity relationship diagrams (ERD) and HIPO. System design starts from input, output and database design. The data design inputted is fishermen data, fishing gear, fish production and price of day, fish distribution, customer data and data employees. The output data are reports of user data, fishing gear specifications, fish production and fish distribution. The database is structured and presented using a flow chart. A technology-based of catch data collection system designed to improve the efficiency of the presentation of the reports needed for agencies.

Keywords : Data, Dumai, System, Fish.

Socio - Economic Assessment of Brackishwater Aquaculture Business in Aceh Tamiang Regency

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Data and information about the brackish water business collected from selected villages in those regencies from April until August 2020. This research's main finding is: in 2019, the brackishwater farmers run their business 91.1% as the traditional type of aquaculture, 2.0% as semi-intensive, and 6.9% as intensive practices. Meanwhile, the last two types of businesses grow with the rent of the pond and sharing system. The brackish water activities only give limited benefits to the local community because they depend on other regions for seed, feed, pesticides, and labor—the local institution supports the brackish water business not yet created. This research recommended: the village's government should develop and implement the regulation for the involvement of local people in business activities, the brackish water institution create in the location for water management, control water pollution, and sources of various information regarding brackish water business.

Keywords: Brackishwater aquaculture, business, institution, local regulation.

The Growth Pattern of Sea Cucumber Acaudina sp From the Delta Wulan, Demak, Central of Java

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Sea cucumber Acaudina sp is one of the many benthic organisms found in the Wulan Delta ecosystem, Demak. Acaudina sp plays an important role in the Bentic ecosystem. Therefore, a study on the population of Acaudina sea cucumbers is necessary. The purpose of this study was to determine the effect of lunar synchronization on the growth pattern of sea cucumber *Acaudina* sp (New Moon and Full Moon). Sea cucumber samples were taken in May, June, July 2020 during the New Moon and Full Moon phases. Based on the statistical test, it was found that there is no significant different the mean of total weight (gram) between New Moon and Full Moon (t-test two paired; df= 2; t count = -1.481; df = 2; P= 0.05). Likewise, there is no difference in the average value of sea cucumber length in the full moon and new moon phases (t-test two paired, df=2, t count = 0.353; P = 0.05). The average total weight value of Acaudina sp sea cucumbers on full moon 15.21 – 27.50 gr) is lower than on New Moon (20.47 – 32.108 gr). The growth pattern of sea cucumber Acaudina sp on full moon and new moon is negative allometric.

Keywords: Full moon, new moon, Growth Pattern: sea cucumber, Acaudina sp, Demak.

Economic Analysis of Shrimp Aquaculture in Aceh Besar Regency Based on Different Land Areas

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This paper aims to conduct an analysis of shrimp farming in Aceh Besar District based on various land sizes, namely less than 1 Ha, 1 to 2 Ha and more than 2 Ha. The research was conducted in 2019 using a survey method. Data collection using interview techniques to 59 shrimp farmers. Descriptive statistical methods and financial analysis were used in this study. The results of the analysis show that most of the respondents have a cultivated land area of less than 1 Ha with a number of plots of 1 to 3 plots. Aquaculture investment is positively related to the land used. The land shrimp pond is the largest asset cost compared to other assets. The biggest operational costs are feed and shrimp seeds. Regarding business revenue, vanamei shrimp is the largest revenue in all land categories compared to tiger prawns. Based on the Pay Back Period indicator, shrimp farming on land less than 1 hectare provides the fastest return on business investment, which is around 3.3 years. Meanwhile, on land 1 - 2 Ha and more than 2 Ha, it is 5.89 years and 6.36 years, respectively.

Keywords: Shrimp, Aquaculture, Finansial Analysis, Land Category.

Does Pawang Laot Leadership Matter for Enhancing Fishermen's Work Culture and Welfare?

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Of 7,623 fishers in South Aceh District, Indonesia, 110 of them were selected as the sample of the study using a proportional stratified random sampling technique. To gather the data, questionnaires were distributed to the respondents and analyzed using the Structural Equation Modelling (SEM) approach. The study documented that transactional leadership style of Pawang Laot has directly and significantly improved quality of work culture and performance of the fishermen, but it has an insignificant effect on fishermen's welfare. In addition, indirectly, the quality of work culture has an insignificant positive influence on the welfare of fishers through their performance. Finally, the quality of work culture significantly and positively mediated the effect of the leadership style on improving both welfare and performance of fishers. These findings suggest that further to enhance the welfare and performance of the fishermen, Pawang Laot should enhance their transactional leadership style focusing on promoting the quality of fishermen' work culture.

Keywords: Transactional Leadership, Pawang Laot, Marine capture fisheries, Fishermen work culture.

What Determines Aquaculture Fish Production? Empirical Evidence from South Aceh Regency

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This study empirically assesses and analyzes the determinants of aquaculture fish production in South Aceh District. Based on multiple linear regression analysis, the study documented that, except for the number of fish seeds, the factors of land area, the number of workers, and capital had a significant positive effect on aquaculture production. These empirical findings indicate that in ensuring an increase in aquaculture production, fish farmers should possess adequate capital, land area, and the number of workers. The government must assist in providing soft loans by coordinating with provincial government-owned banking institutions, providing sufficient land areas by initiating conversion programs for vacant land into fish ponds. Various free of charges of the training program should be undertaken by the government to enhance the capacity of aquaculture farmers that are held regularly and continuously to produce professional fish farmers who enable to ensure an increase in aquaculture fish production throughout the years.

Keywords: Aquaculture production, Capital, Fish seeds, Fish farmers, Land area.

Title: Safety Risk Factors Research of the Operation Purse Seine Catching at Riau Islands

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Work safety on board in connection with capture fisheries specifically has the aim of preventing or reducing accidents and their consequences in the possibility of hazards and risks when carrying out activities on board. The purpose of this study is to describe the fishing operation activities using purse seine fishing gear that can pose risks and identify opportunities for failure and possible consequences that will occur when carrying out fishing activities and to determine the role of work safety on board. The research method uses Hierarchical Task Analysis (HTA) to examine every activity involved in the operation of the purse seine fishing gear by dividing each activity into sub-activities carried out in the plan and descriptively utilizing problem-solving procedures investigated by describing the condition of the subject or object. The operation of purse seine fishing gear in Batam City has the potential to cause fatigue, injury, drowning, injury consequences. There are 58 activities out of 8 activity stages in the operation of the purse seine fishing gear with a Total Work Intensity (IKT) value of 557 OA (Activity Person). The value of Primary Work Intensity (IKP) at the hauling stage is the highest (0.317) with a total work intensity of 154 OA.

Keywords: Work safety, Risk, Hierachical Task Analysis (HTA), Vessel

Current Observation by using ADCP in the Western Aceh Waters: 2017 R/V Baruna Jaya VIII Expedition

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The research was conducted as part of 2017 Widya Nusantara oceanographic survey by R/V Baruna Jaya VIII of Indonesian Institute of Sciences. It is a week and a half in line ship track measurement from December 03rd to 12th, 2017 representing the northeast monsoon by deploying Acoustic Doppler Current Profiler (ADCP) instrument. The data recording reach down to a depth of 500 meters with surface measurement was recorded at a depth of 13.39 meters. In the vertical level, the currents including zonal, meridional, and vertical velocity are divided into three main tracks. It is shown from the observation that during northeast monsoon the currents in the surface move northwestward where observed to a depth of 100 meters. The vertical velocity in the first track showed the raising of the water mass from a depth of 150 meters to 50 meters which is often identical to the emergence of upwelling. Similar condition appear in the third track where the same direction as the first track is noticed. Along with the presence of the upwelling, the region is believed to have high fisheries productivity and help the fishermen to find the fishing ground. Besides, the currents magnitude and direction is useful for a navigation to reduce lost traditional fishermen in their fishing trips.

Keywords: Ocean dynamics, Upwelling, Navigation

SOCIO-ECONOMIC STUDIES OF COASTAL COMMUNITIES AROUND KUTARAJA FISHING PORTS, BANDA ACEH, INDONESIA

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Kutaraja Fishing Port (KFP) has undergone significant development from small traditional-based fishing port (PPP, type C) to large modern-based fishing port (PPS, type A) in the past couple years. The rapid development of theKutaraja fishing Port has certainly had implications on socio-economic status of coastal communities around it. This study aimed to determine the socio-economic status of coastal communities around Kutaraja Fishing Port. Samples were taken from several respondents; fishermen (20 people), fish traders (15 people), food vendors (10 people) and management staff (2 people) to obtain primary data and secondary data. Data analysis wasconducted descriptively with a quantitative approach i.e. the data collected was subsequently tabulated in the form of tables and graphs by using excel application. The results showed that the highest level of education of coastal communities around KFP was high school level and the average ages of respondents was belong to the productive age atgroup of 27-50 years. Economic activity was seen from the number of dependents at most three people in each family and the rate of income averaged Rp.1.500.000-Rp.2.000.000 per month. The pattern of public adaptation of social activity was demonstrated by the presence of some fish traders and food vendors who are still using the jetty area to perform their activities and cooperate with each other in utilizing the facilities. It can be concluded that the socio-economic status of coastal communities around KFP is significantly influenced by activities in KFP. The existence of KFP showed a big impact on the socio-economic status of the coastal community around KFP.

Keywords: Social economic, coastal communities, PPS Kutaraja

Analysis of Management Performance Index and User Satisfaction Index in Kutaraja Fishing Port, Banda Aceh, Indonesia

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The problems faced by managers and being felt by fishing port users today are the problem of environmental cleanliness and the lack of port management efforts in serving fishermen's needs, this is due to the government's lack of attention in implementing the functions and roles of ports and existing facilities. This study aims to determine the level of performance of the Kutaraja fishing port management and the level of user satisfaction regarding the services of the Kutaraja fishing port. This research was conducted in February 2020. Located at the Kutaraja Fishing Port, Banda Aceh, Indonesia. The research method used is the survey method, namely by observing and collecting data directly on the performance of the Kutaraja fishing port management and user satisfaction regarding the services of the Kutaraja fishing port. Data collection was carried out by interview assisted by a list of questions / questionnaires. The results showed that the percentage value of the fishing port performance index was 78.2%. This value shows that the performance of the Kutaraja Fishing Port is already at a good level. The user decision index value obtained is 94.02%. This shows that the Samudera Kutaraja Fishing Port is still lacking in the provision of facilities, the utilization of the facilities is still low and the management of the facilities does not reflect that overall users are very satisfied with the service performance of Kutaraja fishing port, Banda Aceh, Indonesia

Keywords: Performance index, satisfaction index, Kutaraja Ocean Fishing Port

Biological Aspects of Sharks Landed in Kutaraja Fishing Port, Banda Aceh, Indonesia

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Shark fisheries in Banda Aceh are not supported by the availability of research-based data and information that needed to support the preservation and development of this resource. The purposes of the study were to assess the biological aspects including shark species identify and their status in IUCN, length distribution, sex ratio, and maturity stage of male shark. This study was conducted from August to October 2017 in Pelabuhan Perikanan Samudera (PPS) Kutaraja, Banda Aceh. The observation survey of fish landing sites was conducted to collect the catch species composition, total length of each individual, sex, and maturity stage of male genital of shark (clasper). The results showed there are 17 species of sharks that caught by some fishing gears (n = 318). Mean total length (TL), fork length (FL), and standard length (SL) are 122,90 cm, 110,77 cm, and 86,50 cm, respectively. The sex ratio of dominated species (Carcharhinus sorrah, Sphyrna lewini, and Alopias pelagicus) showed not significantly different between males and females, based on Chi-square test. Percentage of male shark maturity (n = 125) for each category (NC, NFC, FC) are 52%, 13%, and 35%, respectively. Percentage of the IUCN status (threatened rare, threatened with extinction, and almost threatened) of collected species are 12%, 29%, and 41%, respectively.

Keyword. Banda Aceh, biological aspects, shark, PPS Kutaraja

Spatial Analysis of Accretion, Abrasion and Shoreline Change in Banda Aceh Costal Area

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The coast of Banda Aceh City has a gentle sloping beach morphology, making it prone to changes in coastlines due to hydro-oceanographic dynamics. Areas that are particularly vulnerable are the mangrove areas and around the Krueng Aceh estuary and coastal area of Lampulo. Therefore, to determine the extent of shoreline changes, a spatial analysis of coastal vulnerability was carried out with the aim of knowing how much change had occurred at Lampulo beach in Banda Aceh City of Aceh Province. The research was conducted using Google Earth data technology and the use of Geographic Information System (GIS) software. The analysis was carried out over a period of 14 years starting from 2004 to 2017. Field data verification and georeferencing were also carried out to check the accuracy of mapping and calculations. The results showed that in 2004-2005 there was a large erosion that changed the shape of the coastal profile where the mangrove coastline turned into water without mangroves as a result of the tsunami on December 26, 2004. In 2008-2009, after the construction of the breakwater and the Port of Lampulo there was a large accretion occurred having the impact on the morphology of the coast. The results also concluded that the annual average accretion value was 20.48 ha and the annual abrasion was 19.28 ha. The value of shoreline reduction due to abrasion is around 217.25 ha and accretion of 166.56 ha over a period of 14 years.

Keywords: Coastline, accretion, abrasion, breakwater, Geographic Information System (GIS), Lampulo

Semi Natural Turtle Egg Hatching at Taman Kili Kili Beach, Trenggalek, East Java

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Turtle is one of the protected animals because its population is threatened for various reasons; Natural factors, such as predators that prey on turtle eggs, humans who steal turtle eggs, capture turtles for their own consumption or for economic purposes. The Taman Kili-Kili Turtle Conservation Watch Group (POKMASWAS), on its initiative, is trying to increase the turtle population by hatching turtle eggs semi-naturally. This research was conducted in semi-natural turtle egg hatcheries in Kili Kili Park, Trenggalek Regency with the aim of knowing the success rate of hatching semi-natural turtle eggs. The species of turtle in the research location is Lekang (*Lepidochelys olivacea*). Several environmental parameters that affect the success of turtle egg hatching are temperature, humidity and PH of the sand medium used as a hatchery for turtle eggs. Measurement parameters for the semi-natural turtle egg hatching media at the study site were temperature 28.2°-33.2°, humidity between 32.5% - 34.9% and PH between 6.9 - 7 with hatching depth of 20-35 cm. The success rate of semi-natural egg hatching is 78.2%. The success rate of this semi-natural egg hatching is claimed to be better by the turtle conservation group in Kili Kili Park compared to natural turtle egg hatching, which is very difficult to predict its success due to various causes of failure to hatch eggs naturally.

Keywords: Turtle, conservations, semi natural hatching

The Prospect of Fish Cold Storage Business in Aceh Amidst the Covid-19 Pandemic

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The economic potential of Aceh's sea and water has not been explored optimally due to the lack of modern fish processing technologies employed by the local fishery industry. The majority of catches by Aceh's fishermen are sold raw, directly to consumers, and in the local market. Efforts to preserve and add values into the ocean product are limited and thus, this condition contribute to low price and income of the fishermen. The Covid-19 outbreak even makes the situation worsened for the fishermen and their families. One solution to this problem is the establishment of a cold storage business in the area. This study aims to assess the financial feasibility of a 200 tons cold storage business in Banda Aceh, as the capital of Aceh province. Using secondary data collected from online sources, the most commonly used financial indicators of feasibility study were used, namely Net Present Value, Internal Rate of Return and Benefit-Cost Ratio. In addition, a sensitivity test was also performed to predict the feasibility of the cold storage business if the basic assumptions (storage capacity and capital cost) are changed. The results found that the cold storage business in Banda Aceh is financially feasible as the NPV is positive, the IRR is higher than the interest rate (discount rate) and the BCR is higher than 1. In addition, the sensitivity test also suggested that the cold storage business is still feasible even though there is 15% decline in storage capacity and a 15% increase in capital cost.

Keywords: Feasibility Study, Cold Storage, Fishery, Aceh

Fisheries Management Status in Weh Island East Coast Marine Protected Area Sabang

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This study aims to determine the status of fisheries management, formulate priority tactical steps for fisheries management in Weh Island East Coast Marine Protected Area. The types of data sources used in this study are primary data obtained through direct measurements and interviews, and desk study data. Data is processed and analyzed using the Ecosystem Approach to Fisheries Management (EAFM) indicator, and Flag modeling. Determination of priority improvement indicators and priority tactical steps using Analytical Hierarchy Process (AHP). The assessment of fisheries management status shows that fisheries management in the conservation area of the East Coast of Weh belongs to the good category. Determination of priority indicators on fisheries management and regional suitability is carried out to determine the priority of short-term indicators which are then needed to determine the priority of tactical steps in fisheries management and regional suitability for marine tourism.

Keywords: AHP, EAFM, Flag Modeling, Fisheries Management

Community Structure of Seagrass in Siantan Tengah, Anambas Islands National Marine Protected Area

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The seagrass community structure is the concept that must be known to determine the condition of the aquatic ecosystem. Seagrass beds have an important role in life in shallow sea waters, so it needs to be preserved. This study aims to determine the species composition, density and percentage of seagrass cover in Siantan Tengah, Anambas Islands National Marine Protected Area. This research hopefully will help possible repeated monitoring and provide information about seagrass in this location. Research was conducted in four stations; Air Asuk, Air Nanga, Tanjung and Muntai. All the data was retrieved using the quadratic transect method. The results of the study find 3 species of seagrasses, namely *Enhalus acoroides*, *Thalassia hemprichii*, and *Cymodocea rotundata*. The highest percentage of seagrass cover was found at Air Asuk station with a value of 27,89% which is in the medium category. The highest density was also found at Air Asuk station with a value of 66 ind/m^2 which is in the medium category. The highest Importance Value Index was found in *Enhalus acoroides* species with an average of 250,56%.

Keywords : Species composition*, Enhalus acoroides,* Air Asuk

The Effect of Ethanolic Extracts *Ulva lactuca* on Growth Performance and Survival Rate of Milk Fish (*Chanos chanos*)

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Ulva lactuca is an algae that is a source of protein for fish and can increase resistance to disease. The purpose of this study was to determine the effect of ethanolic extracts *Ulva lactuca* on growth and survival rate of milkfish (*Chanos chanos*). This research was conducted at Brackish Water Aquaculture Development Center, Ujung Batee, Aceh, Indonesia on April-March 2019. Data were analyzed using a completely randomized design with 6 treatments and 4 replication, namely A (0 ppm), B (100 ppm), C (200 ppm), D (300 ppm), E (400 ppm) , F (500 ppm). The parameters measured were absolute weight growth, absolute length growth, specific growth rate, survival rate and water quality. The ANOVA test results showed that the *Ulva lactuca* extract had a significant effect ($P<0.05$) on absolute weight growth, absolute length growth and specific growth rate but had no effect ($P>0.05$) on the survival rate of milkfish (*Chanos chanos*). The concentration of 500 ppm extract *Ulva lactuca* (treatment F) produced the highest on absolute weight growth (1.52 g), absolute length growth (1.96 mm), specific growth rate (0.30 %/day), and survival rate (96%).

Keyword: Ulva lactuca, Chanos chanos, Growth, survival rate

Distribution of TSS value at Northern Waters, Banda Aceh

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Coastal areas have conditions resulting from the sea-land interaction and then affect the ecological conditions in the area. One of the inputs that is carried from the land to the sea through river flow is suspended sediment. Suspended sediment studies have been carried out in the waters north of Banda Aceh City. Sampling has been carried out on the sea surface layer within 24 sampling points. The highest TSS value was recorded at 14 mg / l with an average of 7.42 mg / l. This value is still in accordance with the quality standards set by the Indonesian Ministry of Environment.

Keyword: TSS, banda aceh, water quality, sea-land interaction

Lobster Aquaculture Business in East Lombok Regency: Challenges and Prospects

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The activities of some farmers to on-grow lobster started in early 2000 at several sites in Lombok island, the wild catch of undersize lobsters was stocked in floating cages in the vicinity of the subtidal zone and fed with trash fish. The development of lobster aquaculture has begun to be seriously carried out since the support of government policy in the form of regulations in 2020. Data and information about lobster business collected from selected villages in East Lombok Regency from April until August 2020. Key informants are the critical source of all information regarding this research. This paper used a combination of the strengths, weaknesses, opportunities, and threats analysis and analytical hierarchy process to analyze the challenges and prospects for the lobster aquaculture business in Lombok Timur. This analysis was based on the participation of stakeholders including representatives such as government in central and district level, academics, and lobster farmers. The results show that stakeholders have a relatively positive perception about the development of lobster aquaculture business in East Lombok because they believe the strengths and opportunities outweigh the weaknesses and threats. The suitable natural conditions in East Lombok were considered as the most important strength, while the many untapped markets and the support of the government for the sector are key opportunities for further developing lobster aquaculture. Limitations of aquaculture technology, provision of feed, lobster seeds supply mortality, and disease rates of lobsters are weaknesses in the development of lobster cultivation business.

Keywords: lobster; business; challenge; prospect; East Lombok

Generation of Ocean Internal Wave with Vertical-Slice Hydrodynamic Simulation

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The instability of the density of seawater causes the formation of internal waves in the sea. This phenomenon is difficult to observe visually but can be studied with a hydrodynamic model approach. This study investigates the internal waves caused by underwater obstructions (seamounts) and the stratified density with a two-dimensional marine hydrodynamic model. Four scenarios are simulated in studying internal waves. Two scenarios used one barrier with uniform density and stratified density (based on the Brunt Vaisala stability frequency N^2= 5 x 10-4 s^{-2}). Meanwhile, the other two scenarios use two barriers with uniform density and stratified density (based on the Brunt Vaisala stability frequency N^2 = 5 x 10-4 s^{-2}). Based on the simulation results, it is known that the density conditions have a significant effect on the dynamics of ocean currents. In hydrodynamic simulations of one and two barriers with varying or stratified densities, current resonances and density resonances are formed underwater topography. Meanwhile, in uniform density, the currents formed the rotor, cavity, turbulence, and resonance with the underwater topography. Thus the current dynamics are stronger in the case of uniform density than in the stratified density. It has implications for differences in the mixing of suspended matter in the sea. So this study can be useful in the study of sediment transport, upwelling, the thermocline layer, energy from internal waves, and the distribution of plankton or fish larvae.

Keywords: Density, Brunt Vaisala frequency, internal wave, nonhydrostatic model, turbulence.

Effect of Monsoon on Ocean Productivity in Aceh waters

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Monsoon in Aceh waters is dominated by the northeast and southwest monsoons. Based on previous research, the monsoon affects oceanography and general hydrodynamics in Aceh's waters and its surroundings. This study aimed to see the effect of the monsoon on the abundance of chlorophyll-a in Aceh waters. The data used in this study consisted of wind, SST, and chlorophyll-a data obtained from remote sensing observation data. Wind data is obtained from Metop-B ASCAT (Advanced SCATterometer). SST and chlorophyll-a were obtained from Aqua MODIS (Moderate Resolution Imaging Spectroradiometer) level 3 with resolution 4 x 4 km. The results obtained, in February, chlorophyll-a concentrations were higher in the range of 0.7 mg/m^3 - 1.4 mg/m^3, compared to August with lower concentrations ranging from 0.2 mg/m^3 - 0.5 mg/m^3. It is due to low temperatures in February. Seasonal changes affect the productivity content of chlorophyll-a in the waters.

Keywords: Monsoon, wind circulation, chlorophyll-a, sea surface temperature, northern aceh waters.

Identification of M2 Tidal Velocity And Energy in The Eastern Waters of Aceh Based on Numerical Simulation

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The influence of the M2 harmonic component in the waters of East Aceh is more significant than the other components. It is due to the fluctuation in M2 amplitude, which affects the tides. This study aims to compare the model currents velocity simulation results with data from the Geospatial Information Agency and TPXO7.2 and find the tidal energy extraction value of M2. The modeling method used is the non-hydrostatic method. The research location is in Aceh's eastern waters by taking two research stations, namely Lhokseumawe waters and Langsa waters. The resulting tidal flow velocity in Lhokseumawe waters is 0.8344 m/s, while in Langsa waters, it is 0.8485 m/s. The tidal current strength in Lhokseumawe Waters is 1.2223 x 10^4 kW and Langsa Waters 1.2854 x 10^4 kW. Based on these results, Langsa waters have a tidal current speed higher than Lhokseumawe waters, which is 0.0241 m/s, with a tidal current strength of 6.31 x 10^2 kW. Due to differences in the depth layer or friction movement of the bottom of the waters and the characteristics of Lhokseumawe waters, which are wider than Langsa waters.

Keywords: Current velocity, M2 component, tidal current strength, ocean model, the eastern waters of Aceh.

The Influence of Monsoon on Mixed Layer Depth In The Northern Waters of Aceh in 2017

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Aceh waters are influenced by seasonal winds originating from Asia and the Indian Ocean. Previous research has shown that the monsoon affects the currents in the surface layer of these waters. The research was conducted by comparing the values of temperature, mixed layer depth (MLD) as a result of the analysis, and sea-level winds in the waters of North Aceh. MLD was analyzed from the results of the three-dimensional Copernicus marine environment monitoring service (CMEMS) model, which has been validated with sea surface temperature (SST) data from the monthly Aqua MODIS. The results show that SST CMEMS is relatively the same as SST Aqua MODIS with variations up to 2°C. The verification of SST CMEMS data for February, April, August and October showed quite good results with a correlation value of r = 0.8523. Analysis in February, August, and October shows MLD is deepest. MLD in Aceh's northern waters is 68-91 meters, and Sabang and Krueng Raya waters are 68-79 meters. However, MLD is at its most shallow in April. The waters of North Aceh is 49 meters, Sabang waters is 40 meters, and Krueng Raya is 9 meters. In February, the wind speed occurs in the northeast wind direction with a speed of 3.2 m/s. April and October occur in the direction of the transitional monsoon. The wind speed in April is 2.2 m/s, and October is 2.9 m/s. The southwest wind direction is 4.1 m/s in October. From these results, the influence of the Munson wind is enormous in the waters of northern Aceh.

Keywords: CMEMS, monsoon, wind velocity, mixed layer depth, the waters of northern Aceh.

Probiotic Enrichment of Commercial Feed to Improve Tilapia (*Oreochromis Niloticus*) Growout Performance

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The Nile tilapia (*Oreochromis niloticus*) is a naturally fast-growing and relatively hardy freshwater foodfish which has become a mainstay of aquaculture in many regions around the world, including Indonesia. Feed is often the main input in aquaculture systems, and the commercial feed market is a competitive one. Feed quality is not always optimal for fish health and growth. Probiotics are microorganisms which can help to break down complex compounds and make feed more digestible through fermentation. There is increasing evidence that probiotics can improve the growout performance of many cultured fish species. Benefits can include improved health and survival as well as faster growth and even improved flesh quality. This research studied the effect of feed enrichment with a probiotic on *O. niloticus* growout performance. The probiotic was added to commercial feed (HI-PRO-VITE 782) with eight fermentation time treatments (A = 0 days = control; B=1 day; C=2 days; D=3 days; E=4 days; F=5 days; G=6 days; H=7 days). Experimental fish were 400 *O. niloticus* fingerlings 4-5 cm total length (TL), weighing 0.90-1.25 g, obtained from the Kalawara Hatchery, Sigi District, Central Sulawesi Province. Twenty fingerlings were placed in each experimental unit (aerated aquaria with 20 L water) and fed 3 times/day (08:00, 12:00 and 17:00, GMT+8). Variables measured were growth (length and weight), survival rate and feed conversion ratio (FCR). Water quality was also monitored. The best results were obtained from the 2 days probiotik fermentation treatment.

Keywords: Tilapia, probiotics, fermentation time, growth, survival rate, feed conversion ratio

Genital Reversal of Betta Fish by Immersion Using Steroid Extract of Sea Urchins

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This study aimed to utilize steroid compounds of sea urchin gonad extracts in masculinization of betta fish larvae. In particular, it is to examine the steroid compounds by providing different doses and soaking times to the formation of male monosexes. The study was conducted using a completely randomized design method which was further classified into two stages. In first stage, the soaking dose was 0, 2, 4, 6 and 8 mg. L^{-1} for 12 hours, while in stage II, the immersion duration was 0, 12, 18, 24 and 30 h at a dose of 4 mg. L^{-1} in larvae aged 2 weeks. Also, each treatment was repeated 3 times, and data were analyzed using Anova as well as with the LSD test at the level of 5%. The results showed that on the immersion in dose of 4 mg. L^{-1}, the highest male individual of 84.10% was formed. Also, a dose of 4 mg. L^{-1} was significantly different from the control and the dose of 6 mg. L^{-1}. However, it was not significantly different from that of 2 and 8 mg. L^{-1}. The difference in immersion time significantly affected the success of male monosex formation and the duration of 12 hours in dose of 4 mg. L^{-1} sea urchin extracts showed the highest percentage of 80.40%.

Keywords: sea urchins, steroids, betta fish, masculinization

Biodiversity of Bivalves in the Mangrove Ecosystem in Kampung Jawa Banda Aceh

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Mangrove ecosystem as a feeding ground contributes to habitat complexity and diversity of the macrofauna, while bivalves are dominant in this ecosystem. This study aimed to assess diversity and species abundance of bivalve in Kampung Jawa. This research was conducted at five stations on March 2020 using purposive sampling method. It was obtained 8 species of Bivalvia in the area, namely; Nucula sulcata, Anadara granos, Glycymeris modesta, Anadara transversa, Brachidontes granulatus, Anadara nodifera, Cucullaea labiata dan Glycymeris glycymeris. The highest density was Anadara transversa with value 5.2 ind/m^2. Diversity values were 0.69 - 1.37 with a medium diversity category which indicates that the variation of Bivalve species is quite diverse.

Keywords : Bivalve, diversity, Mangrove ecosystem, Kampung jawa.

Study of Bivalvia Habitat in The Mangrove Area of Aceh Jaya District, Aceh Province

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One of the biota that utilizes the mangrove ecosystem as its habitat is a group of Bivalvia belonging to the Phylum Mollusca Class Pelecypoda (Bivalvia). Shellfish have relatively high economic and nutritional value, so that the collection of shellfish in Aceh Jaya District continues. The research was conducted to study the biological components, analyze the habitat preferences, and management patterns of shellfish in the mangrove area of Aceh Jaya Regency. The research was conducted by using purposive sampling method, by determining 12 stations in 6 districts. Shellfish samples were taken three times with an interval of 15 days. The results found 5 species of shellfish with a dominance index of 0.002 to 0.255 with a low dominance level. The frequency of the presence of shellfish species is very rare (accidental) to rare (constant). The lowest presence level was *Centrocardita rosulenta* with a value of 8.33% and the highest was *Anodonta woodiana* with a value of 58.33. Habitat preference *Anodonta woodiana* has a salinity range between 3-7 ‰ and clay soil texture class, while Geloina habitat preference likes salinity with a range of 12 to 25 ‰ with sand, loamy sand and sandy loam soil texture classes. The results of clustering analysis of the similarity level of aquatic biota at all stations have moderate to very high similarity levels with an index of 36.10% -100%.

Keywords: Mangrove ecosystem, Bivalvia, Aceh Jaya, texture of substrate

Response of Tilapia (*Oreochromis Niloticus*) Behaviour to Salinity Differences: A Laboratory Scale Study

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Tilapia is one of the important commodities of freshwater aquaculture in Indonesia which has good immunity and adaptability. One of the adaptations that can be made by tilapia is physiological adaptation to a high salinity range. Information on the resistance of red tilapia to different salinity on a laboratory scale provides basic information to test the use of red tilapia bait as an alternative bait in the tuna longline fishery. The purpose of this study was to determine the behaviour and mortality rate of red tilapia (Oreochromis niloticus) to differences in salinity. Comparative descriptive statistical analysis was used by comparing tilapia between various salinity treatments. The random design used in this study was a randomized block design, namely between salinity and the length of time the fish remained in the aquarium. The behaviour of tilapia during changes in salinity was light stress at salinity 10 and 20 ppt. However, when it rises to 30 ppt the fish are already experiencing severe stress, which is indicated by erratic swimming directions and the number of opercula that are getting slower.

Keywords: behaviour of tilapia, salinity different, laboratorium scale

The Effectiveness of Feeding Artemia Enriched with Vitamin C on The Growth Performance and Survival of Lemeduk Fish Larvae (*Barbonymus schwanenfeldii*)

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The culture of lemeduk fish (*Barbonymus schwanenfeldii*) still have several obstacles including lack of nutrients in fish diet which causes slow growth rate and low survival. The objective of this study was to analyze the effectiveness of feeding Artemia enriched with vitamin C at different doses on the growth performance and survival of lemeduk fish (*Barbonymus schwanenfeldii*). This research used completely randomized design method consisting 5 treatments and 3 replications. The treatments tested were Artemia enriched with vitamin C at different doses, namely A (Artemia without vitamin C enrichment), B (Artemia enriched with vitamin C 100 mg/l), C (Artemia enriched with vitamin C 200 mg/l), D (Artemia enriched with vitamin C 300 mg/l) and E (Artemia enriched with vitamin C 400 mg/l). The results showed that the addition of vitamin C in the Artemia had a significant effect ($P<0.05$) on absolute length growth, daily growth rate and survival of lemeduk fish larvae, but there were no significant effect ($P>0.05$) on the absolute weight and length variability coefficient. The research showed that the highest value of absolute length growth and daily growth rate were found in treatment D (Artemia enriched with vitamin C 300 mg/l) with an absolute length growth of 6.6±0,48 mm and daily growth rate of 0.330±0.026 mm/day, and the highest survival value was found in treatment C (Artemia enriched with vitamin C 200 mg/l) of 91.7±7.6%.

Keywords: *Barbonymus schwanenfeldii*, Lemeduk, Vitamin C, Artemia, Growth, Survival

The Assessment of Water Quality by STORET Method in Northern Waters of Banda Aceh

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The STORET method is one of the methods commonly used to determine water quality. Water quality can indicate a water source is in a polluted condition or not by comparing its value with the water quality standard. This study aims to obtain an overview of the status of water quality in the northern waters of Banda Aceh. Activities in its area such as the transportation route of ships, port activities, tourism, cultivation and disposal of household waste are cause of polluting these waters. Water sampling was carried out at 10 points (stations) around the waters of Ulee Lheu, Krueng Aceh and Alue Naga. The parameters used are six chemical parameters: ammonia content, sulfide, cyanide, phenol, surfactant, and fatty oil. The results showed that the water quality in Ulee Lheu classify into Class C (score –16), which was medium polluted, with ammonia and phenol content 1.1 mg/L and 0.014 mg/L. Meanwhile, the estuary of Krueng Aceh and the waters around of Alue Naga are categorized in Class A (score 0), that means both are still in accordance with water quality standards.

Keywords: Banda Aceh, chemicals parameters, pollution, water quality

The Variability of Potentially Harmful Algal Bloom (HABs) Species of Phytoplankton in Jakarta Bay

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Harmful algal blooms (HABs) are causing problems in many parts of the world, including in Indonesian coastal waters. The phenomena occur when there is an increase in phytoplankton abundances in the water environment. The occurrence of HABs in Jakarta Bay has been increased since several years ago and caused massive fish kills which lead to economic losses in local fisheries, decrease of water quality and even threat to people to consumed fish harvested from the bay. In connection with this condition, research had been conducted in Jakarta Bay to study the variability of phytoplankton that potentially as HABs species. The study was conducted in 2008, 2009, 2010, 2011, 2013 and 2015. The water samples were taken with a plankton net of 20 µm mesh size and deployed vertically to a certain depth between 7-10 meter at each station. The results showed the abundance of phytoplankton ranged from $20.20x10^6$ to $20.61x10^8$ cells.m^{-3}. The population of phytoplankton composed of 27 taxa, mostly belong to diatoms and dinoflagellates. The relative abundance of diatoms was 92.0 - 99.8% and dinoflagellate was 0.14 - 8.0%. In this study, we observed there are nine genera of phytoplankton which potentially as harmful algal bloom (HABs) species, occurring in Jakarta Bay. Three of them are known as the most frequently playing a significant role in the incidents of water discolouration or algal bloom phenomena in this bay, namely: *Skeletonema, Chaetoceros* and *Thalassiosira*. However, the rest of the potential species also playing a role in the tragedy of fish-killing due to oxygen depletion during blooms phenomena in Jakarta Bay.

Keywords: harmful algal blooms, variability, predominant species, fish kills

Identification of Fishing Ground Hotspot of Traditional Purse Seine Fisher at Northern Waters of Aceh – A Community-based Data Collection Approach

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Understanding the fishing ground locations are considered important as an evaluation of the fishing effort being reached by the fishermen as well as understanding the pressure being received to the fish stock at the surrounding water. This study aims to examine the fishing ground and its fishing hotspot of the traditional purse seine fisher in the northern waters of Aceh. The data collection was performed between June 2007 and May 2009 and gathered as many as 922 data sets consist of 6,170,648 data points, from the 45 purse seine boats. Through the data, we are able to identify the typical fishing activities of purse seiner and as many as 1,619 data points were being detected. The results indicate that there are three main regions of the fishing ground hotspot in the northern waters of Aceh, i.e. 1. Northern offshore of Ulee lheue, 2. Western offshore of Aceh Islands, and 3. Western offshore of Lhok Nga. Among the fishing ground hotspot analyzed, the Western offshore of Lhok Nga is the highest density of fishing ground with 20±2 counts, while the lowest is at the western offshore of Aceh Islands with 8±2 counts, both are within 555 m^2. These findings suggest that the western offshore of northern waters of Aceh are likely more fertile than its northern.

Keywords: fishing ground, fishing hotspot, purse seine, community based, Aceh

Effect of Enriching Feed with Fish Oil on The Growth and Survival of Climbing Perch (*Anabas testudineus*)

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The climbing perch (*Anabas testudineus*) is an economically valuable fish that lives in swamps and rivers. Major problems in the cultivation of this freshwater fish commodity include a tendency to slow growth and low survival. This is thought to be related to inappropriate feed that fails to meet climbing perch nutritional needs. This study examined the effect of enriching feed with fish oil on the growth and survival of climbing perch fingerlings. This research was carried out at the Water Quality and Aquatic Biology Laboratory, Faculty of Animal Husbandry and Fisheries, Tadulako University, Palu from 17 December to 18 January 2020. The experimental fish were 100 climbing perch fingerlings with a total length of 6-10 cm and a weight of 6-15 g, obtained from fish farmers in Maranata Village, Sigi Regency, Central Sulawesi. A completely randomized design (CRD) was used with 4 treatments and 5 replicates (20 experimental units). The fish oil feed enrichment treatments were: A (control, 0%); B (1%); C (2%) and D (3%). The experimental fish were measured and weighed before stocking (density 5 fish/10 L water) and after a period of one month. Feed (10% of fish total body weight) was given twice each day (08:00 and 17:00 WITA). Analysis of variance (ANOVA) was followed by Fisher's Least Significant Difference test at the 95% confidence level. The results indicate that the addition of fish oil to the feed had no significant effect on growth (absolute weight or length) or survival rate of climbing perch. Treatment D (3% fish oil) yielded the highest mean absolute growth in weight and length (3.4 g, 0.504 cm) and treatment A (control) the lowest (2.4 g, 0.404 cm). The survival rate of climbing perch was 100% under all treatments.

Keywords: Anabantidae, feed enrichment, growth, fish oil

The Occurrences of Algal Blooms Associated with Hydro-oceanography and Climatology

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Recently, algal blooms phenomena increased in frequency of occurrence, spatial extents and distribution in many coastal areas. Climate change pressures will influence marine planktonic systems globally, and it is conceivable that algal blooms may increase in frequency and severity. The pressures will be manifest as alterations in temperature, stratification, light, ocean acidification, precipitation-induced nutrient inputs, and grazing. There is an agreement among scientists that increasing run-off of nutrient pollution from land-based sources is a major cause of the global increase in algal bloom phenomena. The strength of the association and the source of the nutrients is highly variable and somewhat unique to each location, season, and the species. Research has conducted to study the connectivity of algal bloom occurrence with hydro-oceanography and climatology in the waters of Jakarta Bay. Water samples consist of phytoplankton were collected with a 20 µm canonical net phytoplankton which deployed vertically at a certain depth of each station. The result observation showed that mostly discolouration of surface waters would appear if the phytoplankton density were reaching to million cells per meter cubic (106 to 108 cells.m-3). Nutrients, such as phosphate and nitrogen, seemed to be the main factor as the driver of algal bloom events in the bay. It appeared that hydro-oceanography and climatology parameter has a significant role in the occurrence of bloom events in Jakarta Bay.

Keywords: algal bloom, hydro-oceanography, climate,occurrence

Business Sustainability of Fisheries Utilization in Padang

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Padang is one of the centers of economic growth in the West Coast of Sumatra. Its position in the coast makes Padang as the entrance of fish resources to fulfill the needs of fish in Padang and its surrounding areas. The purpose of this study is to analyze the level of utilization of fish resources in Padang, especially from the aspect of business sustainability. The data analysis was done descriptively describing the performance of the fishing business that landed fish in Padang. The results of the analysis show that various types of fishing gear that landed fish in Padang still provide business benefits so that business sustainability continues. The availability of fish landing facilities and better fishing needs is expected to increase the efficiency of fishing effort and improve the quality of the fish catch landed so that it has a higher selling value.

Keywords: fisheries, business, Padang, FMA 572

Strenghening Maritime Cultures as A Source of Creative Ideas for Maritime Tourism Development in Kuta, Lombok Tengah

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The mass tourism development often weakens the existence of people's culture that had been their identity in certain area. This paper aims to analyse how cultures can be a source of creative ideas in culture-based eco-tourism development. The research location was in Kuta, district of Lombok Tengah. We gathered primary data from field observation, in depth interviews, and focus group discussion. Then, the data was analysed using descriptive and qualitative method. This research finds that the development of tourism can bring both positive and negative impact, namely the economic growth for the local people and the distortion of people's local tradition and cultures. Strengthening the maritime culture as a source of creative ideas on tourism development can be carried out through: 1) raising awareness of all elements involved in tourism management. The socio-cultural values reflected in traditions, philosophy of life, legend, and distinctive architecture are components forming the identity of the community that need to be conserved; 2) Involvement of representatives from the community is required in planning, implementation, and supervision in the management of tourist areas; 3) Develop capacity of the public community on culture attraction such as packaging culture into a source of ideas for the development of creative products in the form of motifs in craft, fashion, interior design, documentary arts and performance attractions; 3) provide space for local cultures to express themselves by making cultural compromises. Thus, the tourism sector can develop creatively by not eliminating the identity of the society.

Keywords: Mandalika, Creative Economy, Maritime Culture

Biological Community Structure in Krueng Sarah River, Aceh Besar District

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Krueng Sarah, is a multifunctional river in Aceh Besar District. Its existence is very much needed by the local community for various activities as well as unique habitats for the fauna and flora around the river. This study aims to determine the structure of the biological community (plankton and macrozoobenthos) in the river from 2017 to 2019. This research method is purposive sampling with 3 observation stations. The results showed that there were 5 types of macrozoobenthos, namely Neritrodyas (2017) *Polinices hepaticus*, *Telebra gulata*, and *Telebralia sulcate* (2018), and *Tronchus concave* (2019). The highest abundance of macrozoobenthos in 2017 was Station 2, but overall the abundance was high and the same in the three stations. The diversity index (H') is classified as moderate, while the uniformity (E) and dominance (D) are classified as high. Plankton data shows that 15 species of biota were found, namely *Rhizoselenia stolterfazhii*, *Hemialus* sp. (2017), *Civutum hinnalinclla*, *Bulduehatae* sp., *Planctotturnix* sp., *Canccella* sp., *Cospidothrea* sp., *Rhizosolenia* sp., *Alana bullata* (2018) and *Isothrix* sp., *Fragila* sp., *Cylindrusperm raciborska*, *Cuspidothrix* sp., *Flagiloria* sp., *and Cosmarium sp. (Year 2019). The highest* plankton abundance in 2019 was at station 1 while the lowest was in 2018 at Station 3. The plankton diversity index is high each year, while the uniformity and dominance are low. The water quality data of Krueng Sarah shows that it is still within the tolerance limits for macrozoobenthos and plankton.

Keywords: macrozoobenthos, plankton, community structure, Krueng Sarah

Fisheries Processing Status Related to Ecosystem Approach Fisheries Management (EAFM) Implementation on Fishing Technique Domain at the Fishing Port of Lampulo, Banda Aceh

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Ecosystem Approach to Fisheries Management (EAFM) is a concept of how to balance management dimensions through an integrated and ecosystem-based approach. The purpose of this research is to describe the indicator of fishing technique domain to EAFM-based fishery management in Lampulo PPS and to assess EAFM-based fishery management on fishing technique indicator in PPS Lampulo. Assessment methods are based on the methods used by the National Working Group on EAFM and the Indonesian Ministry of Maritime Affairs and Fisheries.Data analysis using ordinal based likert score of 1, 2, 3 to 6 indicator that is destructive or illegal fishing method, modification of fishing equipment and fishing aids, fishery capacity and fishing effort, capture selectivity, capability suitability and size of fishing vessel with legal documents, and certification of fishing crew according to the regulations. Almost all indicators score 1 unless the indicator of capture selectivity and the indicator of the suitability of the function and size of fishing vessel with legal document obtained score 3. The management of fishery in PPS Lampulo in terms of fish catching techniques is moderate with the composite value of 50.

Keywords: EAFM, PPS Lampulo, fishing techniques, management

An Attempt of Digitalization Bali Strait Purse Seine Captured Fisheries Data

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Bali straits fisheries management plan, especially sardine fisheries, has been established since 2016. However, operational fisheries management still not yet in place; one of the crucial requirements of an operational fisheries management is a reliable time series captured data fisheries so policy recommendation could formulate accordingly. Attempts to collect time-series capture fisheries data has been initiate, fishing port information system and one data establishment are the examples. This study describes the result of digital data catch recorder initiation through electronic landing application, namely MICT-L combine with GPS tracker data collection to acquire catch and effort data faster and more reliable. GPS-trackers are installed on the fishing vessel and transmit the automatically every 2.5 minutes. Both data are electronically saved in the database system and could be query anytime and very useful to generate the report, display the results on a dedicated dashboard and analyze in near real-time. MICT-L application established since November 2018 has been successfully collected and store landing data from Muncar fishing port and Pengambengan fishing port and provide digital catch data. GPS Tracker established in November 2019 successfully collected fishing ground position data from 15 vessels until February 2020. Statistical analysis provides catch effort time-series data, fish price data and Spatial catch density in Bali strait. The MICT-L Application and GPS-Tracker are powerful tools to collect and visualized digital catch data and fishing ground for Bali purse seine fisheries and contribute to the digitalization of capture fisheries data.

Keywords: landing record, GPS Tracker, digital diary

Effectiveness Level of Implementation of Fishing Logbook Regulation On ≥ 60 GT Boat at Lampulo Fishing Port

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The level of understanding and compliance of fishermen when filling out the logbook form is a reference in determining the success and effectiveness of the application of logbook regulation in the Port of Fisheries of Ocean (PPS) Lampulo. This study aims to map the issues and assess the level of effectiveness in the implementation of logbook fishing regulation in Lampulo Fishing Port based on the PERMEN-KP. No.PER.48/MEN/2014. This research was conducted from February until June 2018 which was held in PPS Lampulo. Respondents in this study were 38 people, which consists of captain, ship skipper with size ≥ 60 GT, and logbook officer in PPS Lampulo. The method of data collection was census, and it was analyzed by measurement of effectiveness level and SWOT (strength, weakness, opportunity, threat) analysis. The result of the research showed that the problems found in fishing logbook regulations included: data filled by fishermen is incomplete e-logbook application is often error, filling in the logbook form is complicated, filling in the logbook form is not valid, fishermen consider the logbook regulation not important, and filling in the logbook form is not according to the procedure. The level of effectiveness of the application of fishing logbook regulations in PPS Lampulo is considered to be less effective with a value of 64%, so Strength-Opportunity strategy (S-O) should be applied to overcome the existing problems.

Keywords: fishing logbook, boat, Lampulo Fishing Port

Case Study of Eleminating Illegal Unreported Unregulated Fishing at Belawan Fishing Port

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Indonesia issued Regulation of the Minister of Marine Affairs and Fisheries No. 13 of 2012 concerning the Catch Certificate, which one of the goals is to eleminate the activities of Illegal Unregulated Unreported Fishing. This regulation is issued through applied Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate Illegal Unreported Unregulated Fishing. This study aims to identify problems and to develop strategy in eleminating Illegal Unregulated Unreported Fishing at Belawan fishing port. The method of data collection was through survey and interview. The result of the fishbone analysis showed that the causes of Illegal Unregulated Unreported Fishing at Belawan fishing port include human resources, fishery agencies, fishing operations, and surveillance fleets. The result of Strength, Weakness, Opportunity, Threat analysis showed that the elimination strategies of Illegal Unregulated Unreported Fishing at Belawan fishing port is in quadrant IV namely (Weakness-Opportunity) strategy or turn-around strategy. The strategy described Belawan fishing port faced big opportunities, but it is hampered by some obstacles and internal weakness.

Keywords: Catch Certificate, Illegal Unregulated Unreported Fishing, Fishbone Diagram, Elemination Strategies

Observation of Male and Female Seahorse Food Types in The Waters of Weh Island, Indonesia

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Sea horses have begun to be used as food and medicine and aquaculture efforts have begun. This study aims to observe the types of wild food consumed by each type of sea horse that lives on the waters of Simulue Island. The method is carried out by observation of the point VI of the station location. The results obtained were found 96 idv. Sea horses with 6 types of food (*Ephausiae, Isopoda, Herpacticoida, Mysidiacea, Amphipoda* and *Calanoida*). Both male and female sea horses. The most common type of food found in the intestine is *Amphipoda* (43%) and the least is *Isopoda* (0.05%).

Key words: Sea horse, food, Weh Island

Fisherman Obedient Level Toward Vessel Monitoring System (VMS) in the Fishing Port of Perikanan Samudera Belawan

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The Statistics report of PPS Belawan shows that in the 2011-2016 period fisheries production fell by an average of 12.96% per year due to the lack of supervision carried out by related parties, even though the KKP had implemented supervision, one of which was using the Vessel Monitoring System (VMS). The purpose of this study is to determine the level of compliance of fishermen to the application of VMS and analyze and provide solutions to problems that occur. Research method that is carried out is by conducting interviews with the parties involved, which in turn the SWOT analysis is made to assess the problems that occur. The results of the study identified the high level of compliance of fishermen in implementing VMS, but the results obtained contradicted the conditions in the field. Some problems were identified such as fishermen deliberately suppressing VMS when carrying out fishing operations. The SWOT analysis for this problem the main solution strategy generated is on the S-O strategy that utilizes internal strength with external utilization opportunities. Another strategy implemented is implementing regulations that have been issued expressly so that fishermen can apply VMS, make innovation changes to VMS, utilize all parties concerned to optimize the application of VMS, and affirmation legal sanctions for fishermen who do not activate VMS.

Keywords: VMS, fisherman, compliance stage, SWOT

Study of Length-Weight Relationship *Metapenaeopsis Mogiensis* in Pidie Sea Waters, Indonesia

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This study aims to determine the long-weight relationship of shrimp (*Metapenaeus mogiensis*) caught in the sea waters of Pidie Aceh, Indonesia. The results are expected to add information about the existence of Shrimp and sustainable resource management for fishermen. The method used is a simple random method by taking shrimp samples (10%) randomly from a fishing catch basket in one sail or trip. Next, the samples are measured in length and weighed. Sampling was carried out in July 2019 at fishing port Sigli. The results showed the carapace length of male shrimp ranged from 14.8 mm to 22.2 mm and females 13.9 mm to 22.1 mm. The weight of male shrimp ranges from 2.17 g to 6.73 g and the weight of female ranges from 2.01 g to 5.83 g. Growth patterns found in both males and females belong to allometric negatives and the ratio of sex ratio is 1: 0.47.

Keywords: Shrimp, length-weight, Aceh

Length-Weight Relationship (LWR) of Mud Crabs (*Scylla* sp.) in Mangrove Waters of Peukan Bada, Aceh Besar as The Basic for Waters Resources Development

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Mud crab (*Scylla* sp.) is one of the aquatic resources that has high economic value so that information on length-weight relationships as the basic for sustainable fisheries management. The objectives of this study were to determine the abundance of mud crab (*Scylla* sp.), sex ratio, and length-weight relationship of mud crab (*Scylla* sp.). This study was conducted in April 2019. Sampling of mud crabs (*Scylla* sp.) using a bubu crab trap with the random sampling method. Each station was repeated three times during low tide conditions. Sampling location was determined using the stratified random sampling method. The results of the analysis showed that mud crabs (*Scylla* sp.) in the mangrove waters of Peukan Bada were 90 individu, consisting of 50 ind female mud crabs and 40 ind male mud crabs. Therefore, sex-ratio in mud crabs (*Scylla* sp.) shows that the sex ratio between male and female individuals is still in a balanced state. The growth pattern were negative allometric ($b<3$), which means that the growth pattern of carapace length is faster than the body weight of mud crabs. The results also showed that the correlation coefficient (r) values for male and female mud crabs were 0.89 and 0.94, respectively. This indicates a close relationship between length and weight of mud crabs. Environmental parameter factors such as salinity and temperature greatly affect the growth pattern of mangrove crabs and sex ratio in the mangrove waters Peukan Bada, Aceh Besar.

Keywords: LWR, mud crab, Peukan Bada

The Effectiveness of *Katuk* Leaves Extract (*Sauropus androgynous*) as An Antibacterial *Vibrio* sp. on the Survival Rate and Growth of Vannamei Shrimp (*Litopenaeus vannamei*)

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Vibriosis disease caused by the *Vibrio* sp. bacteria is one of the problems faced by shrimp farmers, namely the decreased survival rate during the larval period. This study aimed to determine the effect of the ethanol extracts of katuk leaves (*Sauropus androgynous*) as an antibacterial material on the survival rate of vannamei shrimp larvae (*Litopenaeus vannamei*). This research was conducted at PT. Bibit Unggul Global Gen, Pantai Cermin, Serdang Bedagai North Sumatra, March - April 2019. The extraction evaporation process is carried out at the Unsyiah Faculty of Teacher Training and Education Chemistry Laboratory. Data were analyzed using the Completely Randomized Design (CRD) method with 5 treatment levels and 4 replications. The concentration treatment were is: 0 ppm, 600 ppm, 800 ppm, 1000 ppm and 1200 ppm. The sample used was vannamei shrimp larvae which had been infected with vibrio bacteria, then submerged with katuk leaf extract for 8 minutes. The parameters measured in this study were survival rate (SR%), absolute weight growth (g) and absolute length growth (mm), Total Vibrio Count (TVC Cfu/ml) and water quality. The ANOVA test results obtained that the katuk leaf extract (*Sauropus androgynous*) had a significant effect on survival (SR) and Total Vibrio Count (TVC) in vannamei shrimp larvae ($P < 0.05$) and had no a significant effect on absolute weight growth and absolute length growth ($P > 0.05$). In this study indicated that concentration 1200 ppm produced the highest the survival rate (93%) and the lowest amount of TVC (533 CFU/ml).

Keywords: *katuk* leaves, antibacterial, survival rate, growth

Analysis of The Existence of Epifauna Gastropode Based on the Substrates of Mangrove Ecosystem in Sampoinit, Aceh Jaya District, Aceh Province

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The research objectives were detecting Epifauna Gastropod species in each substrate of the mangrove ecosystem and assessing the presence level in each substrate of the mangrove ecosystem in Sampoinit, Aceh Jaya District, Aceh Province. Data was taken in the mangrove ecosystem in Sampoinit Aceh Jaya District from June to March 2020. Epifauna Gastopods data were collected on the substrate of no mangrove, Crakmoeng mangrove, and Meunasah Kulam mangrove in Sampoinit subdistrict. In each station, there were 3 plots. The analysis of Gastropod Epifauna species for each substrate was carried out descriptively, while the analysis of the presence level of each species of Gastropod Epifauna for each substrate was analyzed using the frequency formula of Barus 2004. The results obtained there are 3 species to 10 species of Epifauna Gastropod on each substrate of the mangrove ecosystem and the index for the presence of the Gastropod Epifauna species in the substrate of no mangrove ecosystem around 33.33%, the Crakmong mangrove ecosystem ranged from 33.33% to 66.67%, and on the substrate of the Meunasah Kulam ranging from 33.33% to 66.67%. It concludes that there are various species in each of the substrate of the mangrove ecosystem and the presence level of each species of epifauna Gastropod is rare to moderate.

Keywords: Existence, gastropods, epifauna, Sampoinit

Molecular Diversity of the Soft Coral Lobophytum in Sabang Island

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In our continuous concern of biodiversity relating to molecular structures in Sabang island, we found complex species of soft coral (genus *Lobophytum*). Molecular phylogenetic analysis on 82 specimens confirmed the presence of *Lobophytum crassum*, *Lobophytum verum*, and *Lobophytum rigidum*. On the other hand, the identification of chemical profiles was performed by spectroscopy analysis based on metabolomics approaches. As a result, we identified the chemical diversity of cembrane-type diterpenoids class from all specimens. Moreover, metabolomics analysis using feature-based molecular networking showed *L. crassum*, *L. verum*, and *L. rigidum* genes poses fundamental roles in the formation of chemical variations. Our results indicated that cembrane-type diterpenoids were found on all species related to genus *Lobophytum* in Sabang island, located in the western part of the Indonesian archipelago.

Keywords: Genus Sarcophyton, cembrane diterpenoids, metabolomics, molecular networking

Does Online Marketing Help in Promoting Fish? Case Study on Processed Fish Companies in Aceh, Indonesia

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This paper aims to analyse the use of online marketing, as additional to the existing offline marketing, which is expected to solve the problem of business losses. The current fish marketing business practice in Aceh, Indonesia is still using traditional methods and losses suffered due to quality degradation because of longer waiting times to be bought by buyers. The longer the fish are kept by the fishermen or traders, the more damage the fish will be. This problem can certainly be solved if fish is offered on a wider market by using online marketing, so it reach a wider market audience. This research uses descriptive qualitative research that produces descriptive data from respondents or observed behaviour. Data were collected through interviews and observations in 3 processed fish export companies in Banda Aceh. The sampling technique used was purposive sampling, based on certain objectives and considerations. The finding is by adding online communication marketing channel to promote the fish product such as Google Ads and also joining the online Market Place, the risk of loss suffered are able to be reduced.

Keywords: Conventional Marketing, Online Marketing, Fresh Fish, Online Market Place, Digital ads.

Effect of Addition of Fermented Restaurant Waste Meal on Feed to Growth of Nile Tilapia (*Oreochromis niloticus*)

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The increasing amount of waste from domestic activities has the potential to be used as a source of fish feed ingredients, and has a double impact on reducing environmental pollution. This research aims to determine the optimal probiotic concentration of fermented restaurant waste and to analyze the optimal amount of addition of fermented restaurant waste meal (FRWM) in feed formulations that support the growth of tilapia. The research was carried out from February to June 2019 at Ciparanje Hatchery, Faculty of Fisheries and Marine Sciences, and the Laboratory of Ruminant Nutrition and Feed Chemistry, Universitas Padjadjaran. This research used experimental method with a Completely Randomized Design (CRD) consisting of five treatments and three replications. The treatments given consisted of treatment A (control, without the addition of FRWM), treatment B (10% FRWM) , treatment C (20% FRWM), treatment D (30% FRWM), and treatment E (40% FRWM). The parameters observed included changes in the nutritional value of restaurant waste, daily growth rate, survival, feed conversion ratio, and water quality. Data were analyzed using analysis of variance (F test). The results showed that the addition of 8% probiotic concentration was able to provide the best change in the nutritional quality of restaurant waste by increasing feed protein by 50.83% and decreasing crude fiber by 30.74%. The use of 30% fermented restaurant waste meal in feed gave the highest daily growth rate of 1.57% and the best feed conversion ratio of 0.57 with a survival value ranging from 75-90%.

Keywords: Nile Tilapia, feed conversion, growth, probiotic, fermented restaurant waste flour

The Composition and Production of Fishes Landed in Fish Landing Site in the Eastern Coast of Aceh Region

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The information on fish species and its abundance that are originating from the fish landing is one of the data that essential in fisheries management. However, the data is limited, especially on the eastern coast of the Aceh region. The objective of the present study was to study the composition and abundance of fishes landed on the eastern coast of the Aceh region. The data collections were conducted on 24 November-24 December 2019 in seven fish landing sites (TPI) located in three districts on the eastern coast of the Aceh region (Aceh Utara, Bireuen, and Lhokseumawe district). The fishes were recorded daily in each TPI during the study period. This study recorded 32 fish categories that landed in the region. The pelagic fish dominated the catch in the area. Longtail tuna, Scad, Island mackerel, yellowfin tuna, Carangidae, Frigate tuna, Skipjack tuna, albacore, Kawakawa, and white snapper were the most landed fish during the survey period. In addition, the study showed the marine fishery production of 181,994 kg/month or an average of 7,000 kg/day. Bireuen was the district with the highest fishery production (122,683 kg), followed by Aceh Utara (35,092 kg). Meanwhile, Lhokseumawe was the district with the lowest fishery production (24,220 kg). This study is providing baseline data that will be valuable in developing an effective fisheries management strategy plan in the future in the region.

Keywords: Pelagic fish, fish production, fish, Aceh

Monitoring the Seagrass Ecosystem Using the Unmanned Aerial Vehicle (UAV) in Coastal Water of Jepara

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Seagrass ecosystem in the world are highly sensitive to environmental changes. They are also in global decline and under threat from a variety of anthropogenic factors and global climate change. There is now an urgency to established robust monitoring methodologies so that changes in seagrass abundance and distribution in these sensitive coastal environments can be understood. Typical monitoring approaches have included remote sensing from satellites and airborne platform, ground base ecological survey and snorkel surveys. The techniques can suffer from temporal and spatial inconsistency, or are very localised making it hard to assess seagrass meadows in a structurer manners. The aim of this research is present the technique using a lightweight drone and consumer grade cameras to produce very high spatial resolution mosaics of intertidal site in Prawean Bandengan, Jepara waters, Indonesia. The data collection methodologies followed by digitation methode techniques to produce coverage estimates, with ground check at location, with data drone analysis. This result show that digitation method, can show between the observed and classified low coverage seagrass 7-12% (<25%) compare to middle coverage seagrass 34-48% (between 25< and <50%), also can detect other biotic features, like colonies of macroalgae, massive coral, also the flat sand and coral rubble at the observation location.

Keywords: Seagrass, unmanned aerial vehicle (UAV), Jepara

Bioaccumulation of Heavy Metal of Lead (Pb) in White Shrimp (*Penaeus merguiensis*) on Sediments in Belawan Sea Waters, North Sumatra Province

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The water of Belawan Sea have a wealth of marine resources that are quite important in supporting the economy of Belawan and surrounding communities. Waters of Belawan Sea area is adjacent to the industrial area, the port and residential areas. Sources of pollution in coastal waters come from industrial waste, sewage, urban storm water, shipping, agriculture and aquaculture. This study aims to measure the content of heavy metals lead, Pb (sediment and white shrimp) and how much heavy metal of lead is accumulated by white shrimp (*Penaeus merguiensis*) from sediments. Lead, Pb of heavy metals in white shrimp and sediments were analyzed using Atomic Absorption Spectrophotometer (AAS). The results showed that the average concentration of Pb heavy metals in sediments was 5.90-6.78 mg/kg, when the average concentration range of Pb heavy metals in white shrimp was 0.014-0.089 mg/kg, while the average accumulation of heavy metals Pb in white shrimp from sediments is 0.0075. The bioaccumulation value is categorized as low because the value was lower than 1. *Penaeus merguiensis* as an indicator of useful organisms that can be used in measuring exposure to heavy metal Pb in water.

Keywords: Lead (Pb), *Penaeus merguiensis*, Belawan Sea Waters

Application of Geographic Information Systems in The Management of Small Islands (Case Study: Assessment of The Ideal Pier Spread in Derawan Islands)

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Derawan Island with an area of 35.99 Ha is one of the small islands in the Derawan Archipelago, located in Berau Regency, East Kalimantan Province. The waters and small islands in the archipelago have rich biodiversity and natural habitats, such as coral reefs, mangroves, sea grass beds and sandy beaches, so that they were designated as conservation areas in 2016. It is currently one of the priority marine tourism destinations in East Kalimantan which contributes to the local economy. Along with the development of tourism in the Derawan islands, there are beach buildings such as inns, restaurants and docks. One of the beach buildings is the pier which is generally one with lodging numbers increasing from 2003, 2011, 2015 and 2018. As a result of the unplanned growth of the pier, this condition is feared to disrupt the watres and decrease the number of tourist visits.The results of the spatial analysis of the building area from 2003 (6977.28 m2) continued to increase until 2018 (66011.21m2). The increase occurred on the west side because in this location the waters are relatively more stable than the east side. As a result of unplanned growth of the pier, this condition is feared to disrupt the waters and decrease the number of tourist visits. Based on this, spatial analysis of the pier spread assessment is carried out using GIS. The analysis results obtained for small islands, it is suggested that the number of piers is 5 units with a length of about 70 m. The results of this study are expected to provide an alternative to the placement of a pier on Derawan island in the future.

Keywords: Small Island, Pier Spread, GIS Analysis

Spatial Technology Applications on Banda Aceh Coastal Water Salinity Mapping for Settlement

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The availability of correct data on land is very useful in planning. The availability of spatial data and attributes will be very helpful in producing the information needed to make decisions. Banda Aceh is a residential area that was most severely affected by the earthquake and tsunami on 26 December 2004. As a disaster-prone area, an evaluation of the salinity level on the basis of residential areas in Banda Aceh needs to be evaluated. The focus of this study is centered on the application of geographic information systems in handling spatial data in accordance with the FAO land suitability concept. To ensure the application is suitable, geospatial analysis is compiled based on the observed water salinity variables measured as a requirement for residential development. The results showed that 86 percent (order S) were suitable for residential areas and 14 percent (order N) were unsuitable.

Keywords: GIS, Salinity, Mapping

LWRs and Blood glucose Three ornamental fish species from Bira Cot River, Aceh Besar, Indonesia

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Aceh Besar have a high diversity of fish, including small fish that have the potential to be ornamental fish such as Zebra fish, Checker barb and Rasbora. To date, information on the growth pattern and blood glucose of this species were not available. Hence, the objective of the present study was to examine the growth pattern and blood glucose of the Zebra fish, *Danio albolineatus*, Checker barb, *Puntius oligolepis* and Rasbora spp. The study of the length-weight relationship and glucose levels of the three ornamental fish has been conducted in Aceh Besar from February to July 2020. Data collection was conducted in a tributary in Bira Cot, Aceh Besar. Data analysis is performed using the Linear Allometric Model (LAM). The results of the LWRs show that the two species showed positive allometric and isometric growth patterns one species. The highest b value is shown in *Danio albolineatus* with a value of 3.36, followed by *Puntius oligolepis* (3.16) and *Rasbora* spp. (3.05). The value of the relative weight condition factor (Wr) of the three types of fish indicates a value of > 100, thus it can be concluded that the value of Wr indicates the environmental condition of the three types of fish in stable condition and glucose levels in all three types are still below <4.1 mmolL-1. It is concluded that the waters are still in good condition and supports the life of fish. Furthermore, the availability of food sources, low competitors, and low predators indicate that the aquatic environment is in a stable condition.

Keyword: Aceh Besar, ornamental fish, Zebra fish, Checker barb, Rasbora

Coral Reef and Reef Fishes of Core Zone MPAs Aceh Besar

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This research has been conducted in January 2018 in the core zone of the Marine Protected Areas Peukan Bada and Lhoknga, Aceh Besar. The purpose of this study was to determine the coral reef cover and the abundance of reef fish in the no take zone areas. The method of collecting coral reef cover data used the transect photo. Futher, we analyzed these data using CPCe 4.1 software with a uniform grid technique. Moreiver, the collection of coral fish abundance data using the Visual Census. The results of the study showed that the coral reef cover in the core zone of Lhoknga and Lampuuk water are 35.36% and 43.09% which are categorized as "moderate damage" with an abundance of reef fish value are 23900 Ind/Ha and 43600 Ind/Ha, respectively. On the other hand, the coral reef cover in the core zone of Bunta Island waters is 64.91% which is categorized as "good" with an abundance of reef fish value is 28600 Ind/Ha. However, The coral reef cover in the core zone of Batee Island waters is 23.68% which is categorized as "badly damaged" with an abundance of reef fish value is 29300 Ind/Ha. In addition, the coral reef cover in the core zone of Tuan Island waters is 25.87% which is categorized as "moderate damage" with an abundance of reef fish value is 58100 In/Ha. Based on the results, the data conclude that the condition of coral reefs in the conservation area in the Lhoknga, Lampuuk, and Batee Island water requires proper handling in improving natural resources in their core zone.

Keywords: Coral Reef, Reef Fishes, CPCe 4.1, Core Zone

Analysis of Chlorophyll-a and Phytoplankton Abundance in Ujung Pancu Waters, Aceh Besar Province, Indonesia

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Phytoplankton plays the important role as primary producers which determine the productivity of the waters. The purpose of the research was to determine the abundance of phytoplankton and the distribution of the chlorophyll-a at Ujong Pancu Waters, Aceh Besar, Indonesia. This research was conducted from November 2017 to January 2018. Samples were collected from five observation stations using purpossive sampling method. Samples then were identified to figure out the species of phytoplankton and the chlorophyll-a was analyzed using spectrophotometric method. It was obtained 17 spesies of phytoplankton from those sites, and Chaetoceros sp. was the most abundant spesies from class of Bacillariophyceae (0.469 ind/ml). The chlorophyll-a concentration was obtained ranged from 0.32 - 2.05 µg/l.

Keyword: Chlorophyll-a; Chaetoceros sp.; Ujung Pancu.

The effect of copepod enriched-vegetable based diet on Giant Tiger Prawn's (*Penaeus Monodon*) post -larvae

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Plankton is the primary food source for many fish larvae as well as other organisms during their early stage of development. Copepods play as a major role food source in freshwater and marine environment that offer great variety of sizes, species and nutritional. The aim of this study is to increase the nutritional value of copepod and its effect on Penaeus monodon post-larvae performance. The experiment was carried 30 days and comprised with four (4) different treatments of diets. The diets feed on copepods consisted of alga diet which is *Tetraselmis* sp. (CT) that acted as a control followed by three (3) type of vegetable-based diets which is carrot (CC), water spinach (CW), and lettuce (CL). The efficiency of the copepods enriched was further evaluate on its growth, survival and proximate composition. The outcome of the study have showed the highest specific growth rate (SGR) in *P. monodon* post-larvae was obtained when feed on copepods enriched water spinach (CW) (11.28±0.38%) and *P. monodon* achieved highest survival when feed on copepods enriched *Tetraselmis* sp. (CT) (91.67±0.29%). Proximate analysis of enriched copepods showed CW (89.18±0.95%) resulted the highest protein content and lipid content. The proximate composition of P. monodon when feed on CW (134.11±1.93%) highest in protein content and lipid content (60.09±6.80%). The current result showed that vegetable-based diet is able to replace the alga diet and at the same time can gave an advantage to the economy of aquaculture and higher the yields.

Keywords: Copepods, Penaeus monodon, enrichment, proximate analysis, specific growth rate

Growth of Oyster (*Crassostrea* sp.) With Different Density in Oyster Aqua Culture in Alue Naga Waters, Banda Aceh

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Oyster (Crassostrea sp.) is one of the potential bivalves that can be developed to increase economic income. The methods and process of aqua culture of oysters that will both affect the growth and survival of oysters. This study aims to determine the growth of oysters (Crassostrea sp.) With different densities, and to see the effect of different stocking densities on growth and survivl in the submerged raft method in oyster aqua culture. The method used is an experimental method using a completely randomized design model (CRD) model with 3 treatments each treatment 3 repetitions. The stocking densities used were 25, 30, and 35 ind/1500 cm2. The results showed that the average growth of oysters with a density of 25 ind/1500 cm² was an absolute display of 9.49 mm and an absolute weight growth of 10.60 grams. The density of 30 ind/1500 cm² that is an absolute display of 4.83 mm and a growth of an absolute weight of 9.13 grams. While the density of 35 ind / 1500 cm² is the absolute length of 4.62 mm and the absolute weight growth is 5.76 grams. The best growth of the average oyster in this study is at a density of 25 ind / 1500 cm².

Keywords: *Crassostrea* sp., Growth, Density, Survival, Raft Method

Impact of ENSO and IOD on Chlorophyll-a Concentration and Sea Surface Temperature in the Bali Strait

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ENSO and IOD are oceanographic phenomena that occur in the tropical Pacific Ocean and Indian Ocean due to the interaction between the sea and the atmosphere. ENSO and IOD caused disasters in most parts of Indonesia. The Bali Strait is an area of water located between the islands of Java and Bali, which is the route for sea water masses in the Indian Ocean to the Bali Sea and vice versa. Research on the impact of ENSO and IOD on the oceanographic characteristics of Indonesian waters is still limited, especially in the strait area. This study aims to determine the impact of ENSO and IOD on the abundance of chlorophyll-a concentrations and sea surface temperature in the waters of the Bali Strait. The data used are Ocean Nino Index (ONI), Indian Ocean Index (IOD), Sea Surface Chlorophyll (SSC) and monthly Sea Surface Temperature (SST). The method used in this study was the SSC and SST anomaly analysis during the ENSO and IOD periods of March 2000 to July 2020. The results showed that during the ENSO and IOD periods in the eastern monsoon, there were an increase in SSC concentrations and a decrease in SST in the waters of the Bali Strait. In the ENSO period, there were La Nina and El Nino phases, while IOD had positive and negative phases. During the observation, there were seven patterns of occurrence including four single phases (La Nina, El Nino, IOD Positive and IOD negative) and three combined phases. Single-phase incidence years include 2000, 2007 (La Nina), 2002, 2004, 2009 (El Nino), 2003, 2012 (IOD positive), 2001 and 2013 (IOD negative). Whereas in the years of combined events, they were 2006, 2015, 2018, 2019 (El Nino and IOD positive), 2011, 2017, (La Nina and IOD positive), 2010 and 2016 (La Nina and IOD negative). During the observation, it was known that the mean range of SSC concentrations (0.49 - 1.91 mg / m3) and SST values (25.32 - 29.30 0C). SSC anomaly during the observation period was between -0.04 - 0.62 and SST between -0.66 - 1.47. Therefore, it is known that the period that causes an increase in high chlorophyll-a concentrations and a decrease in sea surface temperature in the waters of the Bali Strait is during the El Niño period along with positive IOD phases in 2006, 2015, 2018 and 2019.

Keywords: ENSO, IOD, SSC, SST, Bali Strait

Biological aspects of the golden hind grouper (*Cephalopholis aurantia*) harvested in the northern coast of Aceh, Indonesia (a preliminary study)

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Cephalopholis aurantia is one of the grouper species considered as the least concern (LC) based on the IUCN category. However, the data related to its biological features is limited. The objective of the present study was to study some biological aspects of the golden hind grouper harvested in the northern coast of Aceh. The fishes were collected from June - August 2020 in several fish landing sites (TPI) and fish market located in Banda Aceh and Aceh Besar district. In total, 18 fish specimens were collected in this study. All samples were small and young (between 103.1-240.0 mm TL and 60.6-267.5 gr). In addition, all the collected fishes were female with the gonad maturity levels varied from one (1) to four (4) stage with the gonad weight ranged from 0.01-2.00 gr. This study is providing baseline data of some biological aspects of the golden hind grouper that will be valuable in developing a practical fisheries management of the species.

Keywords: Grouper, Banda Aceh, Fisheries, IUCN

A preliminary study on biological aspects of the orange-spotted grouper (*Epinephelus coioides*) harvested in the northern coast of Aceh, Indonesia

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Considered as the least concern (LC) based on the IUCN category, the biological information of *Epinephelus coioides* is limited. The objective of the present study was to study some biological aspects of the orange-spotted grouper harvested in the northern coast of Aceh. The fishes were collected from June - August 2020 in several fish landing sites (TPI) and fish market located in Banda Aceh and Aceh Besar district. In total, 30 fish specimens were collected in this study. The total length (TL) of the fishes ranged from 144.1-237.6 mm. In addition, the weight of the fishes ranged from 100.7-176.7 gr. All the collected fishes were female with the gonad maturity levels in level one (1), with the average gonad weight of 0.01 gr. This study is providing reference point of some biological aspects the orange-spotted grouper that will be valued in developing a practical fisheries management of the species.

Keywords: Grouper, Banda Aceh, Fisheries, IUCN

Effect of stocking density of the growth performance, survival rate and feed utilization of the eels *Anguilla bicolor* (Pisces: Anguillidae) larvae

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The objective of this study was to determine the optimum stocking density of *Anguilla bicolor* larva on growth performance, feed utilization, and survival rate. The study was conducted in the Laboratory of Ichthyology, Faculty of Marine and Fisheries, Syiah Kuala University. A Completely Randomized Design (CRD) was used in this study. The treatment included six different levels of stocking density (3 eels L^{-1}, 4 eels L^{-1}, 5 eels L^{-1}, 6 eels L^{-1}, 7 eels L^{-1} and 8 eels L^{-1}). The fish samples ranged between 7-9 cm in total length and 2-3 g in body weight. The fishes fed on a commercial diet twice a day at a feeding ration of 10% body weight a day for 60 days. The data was analyzed using One-way Analysis of Variance (One-way ANOVA) and followed by Duncan's multiple range test. The results showed that the stocking density had a significant effect on the weight gain, specific growth rate and survival rate ($P < 0.05$). However, it did not have a significant effect on feed conversion ratio and feed efficiency ($P > 0.05$). It is concluded that the best stocking density was found at 3 fish L^{-1}, it resulted in a weight gain of 1.43 g, specific growth rate of 1.62% day^{-1}, survival rate of 79.00%, a feed conversion ratio of 5.17 and a feed efficiency of 19.52%.

Keyword: *Anguilla bicolor*, Density, survival, growth rate

One-blotch grouper (*Epinephelus melanostigma*): a preliminary study on some biological aspects

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The groupers are among the fishes that are threatened globally due to their high economic value. However, their biological information is limited, including the one-blotch grouper (*Epinephelus melanostigma*). The fish is considered as the least concern (LC) based on the IUCN category. The objective of the present study was to study some biological aspects of the one-blotch grouper harvested in the northern coast of Aceh. The fishes were collected in several fish landing sites (TPI) and fish market located in Banda Aceh and Aceh Besar district from June - August 2020. Altogether, 19 fish specimens were collected in this study. The total length (TL) and weight (W) ranged between 147.1-272.6 mm and 50.0-386.1 gr, respectively. In addition, all the collected fishes were female with the gonad maturity levels varied from one (1) to four (4) stage with the gonad weight ranged from 0.01-9.00 gr. The result of this study will be valuable in developing fisheries management of the species.

Keywords: Grouper, Banda Aceh, Fisheries, IUCN

Morphometric Analysis of Three Species Gourami Group (Osphronemidae) From Aceh Waters, Indonesia

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The objective of the present study was to analyze the morphometric character of the three presumed taxa within Gourami group, namely *Trichopsis vittata*, *Trichopodus pectoralis* and *Trichopodus trichopterus*. The *T. vittata* samples were collected from Aceh Tamiang District, the *T. pectoralis* were collected from Aceh Besar District, and the *T. trichopterus* were collected from Aceh Jaya District, Indonesia. A total 150 individual of fish samples (50 individual of every taxon) were measured for traditional morphometric characters. The results of univariate (ANOVA) analysis showed that all morphometric characters measured in three fish species were significantly different ($P < 0.05$). Multivariate (Discriminant function analysis, DFA) analysis showed that *T. pectoralis* and *T. trichopterus* have more similar morphological characteristics, whereas *T. vittata* was discriminated distinctly. These results confirm that the level of relationship between *T. trichopterus* and *T. pectoralis* is closer than *T. vittata*.

Key words: Morphometric, Trichopsis, Trichopodus, vittata, pectoralis, trichopterus

Length at First Maturity of Three Reef Fish Species from Wakatobi Islands, Southeast Sulawesi, Indonesia

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Thumbprint emperor (*Lethrinus harak*), ornate emperor (*Lethrinus ornatus*) and white-spotted spinefoot (*Siganus canaliculatus*) are three dominant species of reef fish were caught in Wakatobi Islands, Southeast Sulawesi. The increasing number of fishermen catching reef fish in these waters, will threaten the resources if no management measures based on the biological aspects. The objective of this study was to analyze the length at first maturity (L50) of these species based on the reproduction biology aspects. Sampling was carried out in three islands (Wangi-Wangi, Kaledupa, and Tomia) located in Wakatobi Islands, from Agustus 2016 to December 2017. A total of 1029 fish samples were measured for the standard length and gonad maturity stage. Length at first maturity of these species were 174.6 mm, 183.9 mm and 166.8 mm for males, respectively and 179.7 mm, 194.7 mm and 176.6 mm for females, respectively. Implementation of length at first maturity needs to be implied to ensure the preservation of these species in the wild.

Keywords: Fish Population, Reproductive Biology, Coral Reef

Growth, Mortality, and Exploitation Rate Estimation of Indian Scad (Decapterus russelli) in the Northern and Western Waters of Aceh

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Indian scad (*Decapterus russelli*) is an important commercial species that landed at Fishing Port of Kutaradja, Banda Aceh. This research was conducted to investigate the impact of exploitation on D. russelli stock. The objective of this research is to study stock condition of D. russelli based on length-weight relationship, length distribution, length at first capture, Von Bertalanffy growth parameters, mortality parameters, and exploitation rate. The data collection was conducted in February-March 2020 at the Fishing Port of Kutaraja, Lampulo, Banda Aceh. A total of 170 samples were measured with stratified random sampling method. Analysis of population dynamics parameters used the FAOICLARM Stock Assessment Tools (FiSAT) program. The results showed that D. russelli has a positive allometric growth pattern, with a fork length (FL) ranging from 19.5-31.5 cm. The length of first capture was 23.1 cm. The asymptotic length (L°) of D. russelli was 31.50 cm with K value of 0.88/year and t0 of 0.178/year. The estimated natural mortality (M), fishing mortality (F), and total mortality (Z) were 1.63/year, 2.22/year, and 3.85/year respectively. The exploitation rate (E) of D. russelli was 0.58/year that indicated D. russelli in the Northern and Western waters of Aceh has been overfishing.

Keywords: Population, Length Frequency Analysis, Overfishing

Growth, Mortality, and Exploitation Rate Estimation of Skipjack Tuna (*Katsuwonus pelamis*) in the Northern and Western Waters of Aceh

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Skipjack tuna (*Katsuwonus pelamis*) is a pelagic fish species that have important economic value in the northern and western waters of Aceh. The dynamics population of skipjack tuna in the northern and western waters of Aceh need to be done to get information on the status of skipjack tuna in ocean. This research aims to determine the dynamic parameters of the population of skipjack tuna based on the growth parameters, length and weight relationship, length distribution, length at the first capture, mortality, and exploitation rate. The data collection was conducted in February to March 2020, located at the Fishing Port of Kutaraja Gampong Lampulo, Banda Aceh. A total of 166 samples were measured with stratified random sampling method. The FAO-ICLARM Stock Assessment Tools (FiSAT) program was used by analyze growth parameter, mortality parameters, and exploitation rate. The results showed that has a negative allometric growth pattern, with a fork length (FL) ranging from 25-51 cm. The length of first capture was 38,2 cm. The asymptotic length (L°) of skipjack tunawas 84,78 cm with K value of 0.22/year and. The estimated natural mortality (M), fishing mortality (F), and total mortality (Z) were 0,5/year, 1.55/year, and 2.99/year respectively. The exploitation rate (E) of skipjack tuna was 0.83/year that indicated skipjack tuna in the Northern and Western waters of Aceh has been over-exploited.

Keywords: Population, Length Frequency Analysis, Overfishing

Strategy for Strengthening Gender Mainstreaming (PUG) in the Marine and Fisheries Sector

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Gender mainstreaming (PUG) in the marine and fisheries sector requires a strategy to be able to realize equity and equality. This paper aims to describe the existing conditions of gender mainstreaming and strategies for strengthening it in the marine and fisheries sector. The writing is based on the results of research in 2018 and 2019 in several research locations including Cilincing, DKI Jakarta; Kendal, Central Java; Bogor, West Java; Tangerang, Banten; and East Lombok, West Nusa Tenggara. This research uses a qualitative approach. Data collection techniques are in-depth interviews with male and female entrepreneurs as well as beneficiaries of training programs that are included in gender mainstreaming activities in the marine and fisheries sector. The results showed that the women's empowerment program activities that have been carried out by the KKP (Ministry of Marine Affairs and Fisheries) which are tagged as gender mainstreaming are still weak in the creation of alternative livelihoods. The causes include (1) not having a map of program needs and beneficiaries; (2) Activities have not fully involved the participation of women and men; (3) The program is not planned in advance (tagging only); (4) The PUG SOP documents are not yet available, starting from planning to monitoring, in particular the monitoring evaluation guidelines and indicators of success (5) Human resource knowledge capacity. A strategy is needed to optimize gender mainstreaming in the marine and fisheries sector. Recommendations given are the improvement of the Program's work mechanism which is included in gender mainstreaming through the following strategies: (1) Mapping target groups into social classes with different problems and needs by involving the participation of women and men; (2) Initial program planning and budgeting, no longer in the form of activity tagging; (3) Creating PUG SOP documents starting from planning to monitoring, particularly guidelines for monitoring evaluation and indicators of success; (4) Improving the quality of mentors by including the working group team in the training needed to understand gender mainstreaming, in particular the concepts of gender justice and equality. The main actor that plays a role in improving the PUG working mechanism is the planning bureau by coordinating with the working group teams (pokja) in the relevant Technical Directorate.

Key words: Strategy, Strengthening, Gender mainstreaming, marine and fisheries sector

White-edged Lyretail (Variola albimarginata): A Preliminary Study on Some Biological Aspects

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The groupers are among the fishes that are threatened globally due to their high economic value. However, their biological information is limited, including the white-edged lyretail (*Variola albimarginata*). The fish is considered as the least concern (LC) based on the IUCN category. The objective of the present study was to study some biological aspects of the white-edged lyretail harvested in the northern coast of Aceh. The fishes were collected in several fish landing sites (TPI) and fish market located in Banda Aceh and Aceh Besar District from June to August 2020. A total of 25 fish samples were collected in this study. The total length (TL) and weight (W) ranged between 12.59-30.25 cm and 25.5-351 g, respectively. In addition, 20 of collected fishes were female with the gonad maturity levels varied from one (1) to four (4) stage with the gonad somatic index (GSI) ranged between 0.1758-2.4038. The result of this study will be valuable in developing fisheries management and conservation of the species.

Keywords: Grouper, Northern Coast of Aceh, Coral Reef

Analysis of differences in three types of natural bait and immersion time of folded traps against mud crabs (*Scylla serrata*): Laboratory scale

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Abstract. The use of appropriate bait provides an important role in the success of capturing mangrove crabs (*Scylla serrata*) using a traps, and the appropriate length of time gives an influence on the number and weight of catches. Research has been conducted on the analysis of the differences in the three types of natural bait and the time of immersion traps on mangrove crabs at a laboratory scale. The purpose of this study was to determine the effect of differences in the type of natural bait and immersion time of the traps that is effective on the catch of mangrove crabs (*Scylla serrata*). Natural bait used, is fresh fish, salted fish, and chicken head. The research method uses a laboratory experimental method using 30 mangrove crabs, which were conducted in February 2020. Testing of bait and time for soaking traps was carried out five times with a repetition time of 30 minutes and 60 minutes. The results obtained were 46 mangrove crabs, analysis results using ANOVA test showed that there were differences in catches from the use of three types of bait, that fresh fish was more in demand for mangrove crabs compared to salted fish and chicken head. The results of t-test analysis showed that the time of soaking traps of 30 minutes and 60 minutes showed a significant difference in the catch of mangrove crabs.

Keywords. Mangrove crabs, bait, soaking time, traps.

Gap Analysis of LPMUKP Business Financing Models: Lesson Learn the Implementation of LPMUKP Financing Programs in Several Locations in Indonesia

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The Marine and Fisheries Business Capital Management Institution (LPMUKP), which was established in 2009 by the Ministry of Marine Affairs and Fisheries (KKP), aims to increase access to capital for the marine and fisheries community. Since 2017, LPMUKP has received government investment allocations in the form of BLU Managed Funds with the main task of managing loans or financing revolving funds that are mentored for Micro, Small and Medium Enterprises in the Marine and Fisheries Sector (UMKM-KP). This paper aims to analyze the 'gap' or 'inequality' in the implementation of fisheries business financing programs. The research was conducted in 2018, including in Sukabumi Regency, West Java; Indramayu Regency, West Java; and Gresik Regency, East Java. The research method used is a qualitative method with in-depth interview data collection techniques to key informants at the research location, namely the Department of Marine Affairs and Fisheries, Sukabumi Regency, LPMUKP assistants and fisheries business actors. Data analysis using gap analysis to describe the 'inequality' between the ideal model level and the realization of its implementation. The results showed that the ideal model applied in LPMUKP is still a problem in the fisheries business community, namely in the process, time and collateral system. This is a barrier for fishery business actors, especially the micro scale, in accessing the LPMUKP financing program. A special policy is needed that is different from other models of formal capital financing institutions.

Keywords: Gap Analysis, Financing Model, LPMUKP, Sukabumi, Indramayu, Gresik

Physical and Chemical Characteristics of Soil in Mangrove Ecosystem Based on Differences Habitat in Banda Aceh and Aceh Besar

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Mangrove vegetation is a plant type that is influenced by tides type along the tropical and subtropical coastlines. This type of tide will affect the characteristics of the substrate (soil), the growth of soil microorganisms, mangrove growth and also the distribution of mangrove species. Soil quality can be characterized by the environment including the physical and chemical properties of the soil, which is one of the environmental factors that can affect the presence of bacteria which ultimately affects productivity in an ecosystem.The purpose of the present study were to analyze the characteristic of soil in different habitat type including physical and chemical properties and to analyze the relationship between the physical-chemical parameters of the substrate with the number and diversity of mangrove and bacteria. The research was conducted in non-rehabilitation and rehabilitation areas of mangroves on the coast of Banda Aceh and Aceh Besar. This research was conducted from February 2020 to November 2020. Analysis of the physico-chemical parameters of the substrate such as pH, salinity, C-organic, N-total, P-available, available base cations (Ca-dd, Mg-dd, Na-dd, and K-dd) and substrate texture carried out in Soil Laboratory, Faculty of Agriculture, Syiah Kuala University. Determining the location of the station was done by using random stratified sampling method. Data were collected at 6 stations divided into 3 stations in non-rehabilitation, and 3 stations in mangrove rehabilitation area. The criteria for each station was based on tidal action. Each station was sampled randomly at three depths, namely 0-15 cm, 15-30 cm, and 30-45 cm. The substrate texture of Station 1 has a sandy clay on the soil surface, and sandy loam on the middle and bottom layers. Meanwhile, station 3 has a dusty clay texture on the surface and bottom and was clay in the middle of the soil. The salinity values at each station (1, 2, and 3) with different depths indicate high and very high salinity, with a range of 3 to 11 μscm^{-1}. The N value in the rehabilitation mangrove area ranges from 0.02% to 0.13% with the very low to low category. While the P value ranged from 25.30% to 68.15% in the high and very high category. The elemental content of Ca is the highest element compared to other elements Ca> K> Mg> Na.

Keyword: Soil characteristics, Mangrove, Aceh Besar, Banda Aceh, different habitat

Simulation of Particle Tracking in Banda Aceh Waters

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Ocean dynamics have a direct impact on the distribution of mass or dissolved particles such as marine debris. Hydrodynamic studies into the pivotal study at the present time, one of which is to identify potential pollution in the region. Data collection was carried out from March to September 2019 in the northern waters of Banda Aceh. Wind data is obtained using AWS while single beam echo sounder is used to obtain bathymetry data. The results showed that the wind direction on the coast of Banda Aceh City was dominant towards the Northwest and Northeast with a maximum speed of up to 9 m / s. Wind direction will affect the dynamics of sea surface currents so that longshore currents and radiation currents occur in coastal areas.

Keyword: Simulation, Tracking, Ocean, pollution

Fucoxanthin: A Marine Carotenoid Has Anticancer Activities and Apoptosis-Inducing Effect (A Review)

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Fucoxanthin, a natural xanthophyll carotenoid, is generally found in brown seaweeds, such as *Sargassum duplicatum, Turbinaria turbinata, Padina australis, Undaria pinnatifida,* and *Laminaria japonica;* and microalga or diatom such as *Phaeodactylum tricornutum, Isochrysis galbana* and *Odontella sinensis.* Fucoxanthin is a marine xanthophyll exhibiting several anticancer activities, such as anticancer activities against leukemia, prostate, cervical, hepatoma, colon, and lung cancer. Cancer disease is frequently considered to be a disease of the cell cycle. Then, apoptosis is a dominant form of cell death with particular relevance to cancer, characterized initially by a series of stereotypic morphological changes, such as condensation and fragmentation of chromatin shrinking of cytoplasmic (cell shrinkage), a decrease in cell volume and alterations to the plasma membrane, mitochondrial depolarization, membrane blebbing, and cell packaging into apoptotic bodies or formation of apoptotic bodies. In general, there are four techniques for the detection of apoptosis, namely: (1). morphological changes analysis by using an inverted microscope, scanning electron microscope, fluorescent microscope, (2). gel electrophoresis, (3). histochemistry (*e.g.*, analysis of caspase-3), and (4). flow cytometry.

Keywords: fucoxanthin, brown seaweed, carotenoid, anticancer, apoptosis

Identification of Inorganic Debris at Mangrove Ecosystem, Gampong Jawa, Banda Aceh

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The objective of this research was to investigate the anorganic debris based on weight, type, and debris abundance in mangrove area at Gampong Jawa, Banda Aceh. Transect was installed along 6 m x 100 m at three sites. The debris collected was 128 items, with weight of 3.012 kg and abundance of 0.213 items /m^2. The debris found was grouped into plastic, glass, rubber, and others category. The most common type found at the three stations was plastic bags with an abundance of 0.053 items/m^2. Theglass category was the highest average weight with 0.275 kg. The high level of debris abundance at station 1 was suspected because station 1 has the highest mangrove density so that allows the debris trapped at the mangrove roots. Stations 2 and 3 have less debris abundance because the low density of mangroves.

Keywords: Waste, Plastic, Transect, *Rhizopora mucronata*.

The Assessment of Water Quality by STORET Method in Northern Waters of Banda Aceh

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The STORET method is one of the methods commonly used to determine water quality. Water quality can indicate a water source is in a polluted condition or not by comparing its value with the water quality standard. This study aims to obtain an overview of the status of water quality in the northern waters of Banda Aceh. Activities in its area such as the transportation route of ships, port activities, tourism, cultivation and disposal of household waste are cause of polluting these waters. Water sampling was carried out at 10 points (stations) around the waters of Ulee Lheu, Krueng Aceh and Alue Naga. The parameters used are six chemical parameters: ammonia content, sulfide, cyanide, phenol, surfactant, and fatty oil. The results showed that the water quality in Ulee Lheu classify into Class C (score –16), which was medium polluted, with ammonia and phenol content 1.1 mg/L and 0.014 mg/L. Meanwhile, the estuary of Krueng Aceh and the waters around of Alue Naga are categorized in Class A (score 0), that means both are still in accordance with water quality standards.

Keywords: Banda Aceh, chemicals parameters, pollution, water quality

Leading Commodities Analysis of Capture Fisheries in Belawan Fishing Port

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Leading commodities are goods or services that were produced the community through the process of selecting and developing, and have more value than other products. The purpose of this research is to analyze leading fish commodities in Belawan Fishing Port. This study was conducted in March-April 2019 in Belawan Fishing Port, Medan Belawan, North Sumatra. The collection of data collected include the observation, interview, and literature study. The Selection of leading fish products was conducted by implementing a comparative performance index (CPI). The criteria used in the research are production's location quotient (LQ) value of fish production, LQ value of price and the production of the exported catches through the issuance SHTI. The result showed that the leading fish commodity of capture fisheries in Belawan fishing Port are Squid with CPI analysis number at 2.173, shrimp at 786, cuttlefish at 530, and tuna fish at 325. It is recommended that the government and fisherman in Medan Belawan should priority to catch fish commodity, by developing environmantally friendly fishing gears to support the sustainability of fish resources and their habitat capture fisheries.

Analysis of Catch Composition in Gampong Deah Raya, Syiah Kuala Banda Aceh

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Gill nets are fishing tools that are commonly found in coastal areas, one of them located in Gampong Deah Raya. Various catches that caught by fishermen would most likely affect the aquatic ecosystem. Information on gillnet catches is insufficient yet the needs of the information is most needed. This study aims to determine the composition of the catch and the size of the catch based on fishbase literature and journals. The method used in this research a descriptive survey. The results of this study indicated that there were 31 species of fish caught using gill nets and the total samples obtained during the study were as many as 6048, there were 3 species that frequently captured namely *Leiognathus equulus*, *Nemipteru furcosus,* and *Selar crumenophthamus,* and proper catches as many as 3,381 or 56% and not fit to catch as many as 2,667 or as many as 44%.

Purse Seine Productivity in Lhok Pawoh Fishing Port, Sawang, South Aceh

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Utilization of pelagis fish was influenced by the capability of catching from fishing gear. The capability of catching from fishing gear can be known from the fishing productivity. The purpose of this study was to calculate the productivity of purse seine vessels in the Fishing Port of LhokPawoh, Sawang, South Aceh. This research was conducted from June 10th to July 10th 2019. The method used was a survei method. The data was analyzed descriptively based on the Ministry of Marine and Fisheries of the Republic of Indonesia Number 86 Year 2016 About Productivity of Fishing Vessel. The results showed that the highest productivity (production/GT) for large pelagic target was 2,458.8 kg/GT, and the lowest one was 209.3 kg/GT. The highest productivity (production/GT) for small pelagic target was 2,630.7 kg/GT and the lowest one was 418.3 kg/GT. The highest productivity (production/trip) for large pelagic target was 3,046.0 kg/trip, and the lowest one was 187.6 kg/trip. The highest productivity (production/trip) for small pelagic target was 2,067.3 kg/trip and the lowest one was 340.2 kg/trip.

Keywords: Productivity, purse seine, pelagic fish, Lhok Pawoh

Potential Empowerment of Women through the Development Business Group in Decorative Fish Culture Bojongsari Sub-District, Depok City

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Depok City has the potential for the development and cultivation of ornamental fish. The largest is in Bojongsari District with 12 groups of ornamental fish farmers from 35 groups in Depok City. This study aims to identify the potential for empowerment of women through the development of ornamental fish cultivator business groups, to determine the supporting factors and the inhibiting factors for empowering women through the development of ornamental fish cultivator's business groups. This research was conducted in Bojongsari District, Depok City. The method used in this research is a descriptive qualitative method. Sources of data in this study were obtained from members of the Pokdakan in Bojongsari District. Data collection techniques were carried out by observation and in-depth interviews. The sampling technique used was a purposive sample. The data validity used triangulation techniques. The form of data analysis used is the interactive analysis model of Miles and Huberman. The results of this study indicate that the empowerment of women through the development of ornamental fish farming in the District of Bojongsari has the potential to be developed because several ornamental fish business groups already have women as members. Supporting factors for women's empowerment include the existence of motivation for adequate business, facilities, and infrastructure. Inhibiting factors include business skills, and capital, technical factors (pests, quality seeds, and availability of feed). Therefore, the strategy is needed in empowering housewives through ornamental fish farming groups so that they can breed fish independently by providing training and coaching for women.

Keywords: empowerment, women, business group development, culture, ornamental fish

Study of grouper (Serranidae) landed in Tradisional Fishing Port, Kota Bawah Timur, Kecamatan Sukakarya, Sabang, Indonesia

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This study aims to determine the composition of the grouper catches (Serranidae) consisting of types of grouper, the number and size of individual groupers landed at the fish landing base of Kota Bawah Timur. Sampling was carried out as much as 10% of the total catch on 03 February to 03 March 2020. Data analysis by identifying the catch, the composition of the type of fish caught and the morphometric size of the catch. The results showed that there were eight types of grouper, namely the red sun grouper (Cephalopholis miniata), tomato grouper (Cephalopholis sonnerati), tiger grouper (Epinephelus spilotoceps), rubber sunu grouper (Epinephelus fasciatus), black mud grouper (Aethaloperca rogaa), scissor grouper (Variola albimarginata), black brinchek grouper (Cephalopholis argus), and branch grouper (Variola laouti), with a total catch of 1,038 individuals or 270,120 gr. The most common species caught were Cephalopholis miniata with 258 individuals or 51,140 gr and the most captured sizes of 22-25 cm were found in the Epinephelus fasciatus species using hand fishing rods and fish arrows.

Keywords : Grouper, tradisional fishing port, Sabang city.

Effect of Human Activities on Coastal Landform Recovery after the Large Tsunami of 26 December 2004 at Padang Seurahet Coastal Zone, Meulaboh, West Sumatera Island, Indonesia

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Padang Seurahet coastal zone was eroded by tsunami of 26 December 2004. As well as the other coastal zone that eroded by the tsunami, at the coastal zone immediately occur recovery processes after the event. But, until year of 2020, after 16 year, the coastal landform does not recovered to its initial condition as before attacked by the tsunami. This study depicts how a recovery process of the coastal zone has been hindered by human activity. Images from Google Earth were used to analyze coastal landform condition before and after the tsunami. Results of this study show that the process of restoring the coastal area in Padang Seurat is hampered by the existence of an old sea wall along the coastline that was built to protect the coastal zone from wave erosion before the tsunami, and new sea wall and jetty constructed for outlet arrangement.

Keywords: Coastal erosion, Coastal landform recovery, Human Activity, Meulaboh. Tsunami,

Identification of Black Tiger Shrimp (*Penaeus monodon*) Histopathology at Traditional Ponds Culture in Bireuen, Aceh Province

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The purpose of this study was to identify the tiger shrimp (*Penaeus monodon*) infected by viral pathogen in traditional ponds at Jangka District, Bireuen Regency. The sampling was carried out by purposively random method from seven ponds and two shrimps were sampled from each pond. Several water quality parameters were checked like temperature, pH, salinity and ammonia. Result showed that black tiger shrimp (*Penaeus monodon*) which were cultivated in traditional ponds in the Kecamatan jangka, Bireuen Regency were histopathologically suspected to be infected with Hepatopancreatica Parvovirus (HPV) and White Feces Disease (WFD). Ammonia concentrations were found higher in some ponds like Alu Buya Village, Jangka Keutapang Village, Jangka Mesjid Village, Alu Kuta Village and Punjot Village. The management of regular feeding and water quality control is highly recommended to anticipate the viral potential attack in traditional shrimp pond farming at Jangka District, Bireuen Regency.

Key Words : tiger shrimps, disease, water quality

Floral diversity and accumulation of above-ground carbon of abandoned shrimp pond in Muara Badak East Kalimantan

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Mangrove habitats play an important roles in economic and ecological system, and its ability to absorb carbon depends on the species diversity and the lifetime of its vegetation. The aim of this study is to analyze the variety of mangrove species and to compare carbon accumulation at three different locations of the abandoned shrimp ponds, by measuring the diameter at breast high, the height of the tree, and defining the mangrove species. And the study was conducted at three abandoned and age-old shrimp pond sites. Furthermore, its technique was used to construct a transect of six quadrant plots of 125 meters. The stratified size of the quadrants varies with a radius of 2, 5, 10, and 14 meters, respectively, for seedling, saplings, living trees, and necromass. The result was observed in 315 individuals with six species from four families of trees. Meanwhile, site 2 has the most massive carbon accumulation with an average diameter of 3.3-15.2 cm at 33,684 tones C. ha^{-1}, and site 3 has the lowest carbon stock, with 1,947 tones C. ha^{-1}. And the results showed that the period of mangrove regeneration does not impact the amount of above-ground carbon accumulation. However, the length of mangrove life has an effect on mangrove vegetation diversity.

Keywords: abandoned shrimp pond, mangrove ecosystem, floral diversity, carbon stock

Toxic Effect of Lead (Pb) Exposure on Hatching Rate and Larvae Abnormalities of Nile Tilapia (*Oreochromis niloticus*)

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Nile tilapia (*Oreochromis niloticus*) is one species of fish that is potentially exposed to pollutants, including lead (Pb). However, the impact of lead exposure on hatching rate and larvae abnormalities of Nile tilapia is still not investigated. Therefore, this study aimed to examine the toxic effect of lead exposure on hacthing rate and larvae abnormalities of Nile tilapia. A total of 2400 fertilized eggs of Nile tilapia was distributed to control and 3 treatment group (0.21, 0,42 and 0.63 mg/L $PbCl_2$) with triplicate. The exposure period lasts for ten days. Cumulative hatching rate, survival rate, malformation rate, heart rate, body length, total lead content and deformities of larvae were analyzed. The results showed that increasing lead concentration significantly increased malformation rate, heart rate, and total lead content in Nile tilapia larvae. The highest malformation rate, heart rate and total lead content observed in treatment C were 3.4%, 115.6 beats/minute and 4.80 mgPb/kg, respectively. Furthermore, Exposed to lead also affect several deformities of Nile tilapia larvae including lordosis, kyphosis, and curved tail. Otherwise, exposed to lead up to concentration 0.63 mg/L $PbCl_2$ have no significant effect on cumulative hatching rate, survival rate and body length in Nile tilapia.

Keywords: Nile Tilapia, Lead, Heavy Metal

Dealing with Predators: Morphologycal Defendse of Daphnia (*D. galeata and D. longispina*) against Cladoceran Predator

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The anti-predator response of herbivore cladoceran *daphnia* to kairomon of cladoceran predators *Bytrotrephes longimanus* and *Leptodora kindtii* has been studied. We used ten clones *Daphnia galeata* and five clones *Daphnia longispina* to see the the morphological change. *Daphnia galeata* clones were established from the egg bank that collected from Lake Constance sediment cores, while *D. longispina* clones were isolated from the water. We cultivated both Daphnia clones at the limnological institute, Universitat Konstanz, fed by *Scenedesmus* and they already reached more than five generation when used in the Experiment. We designed experiment into three treatment, which were *B. longimanus* treatment, *L. kindtii* treatment and without kairomone treatment. As kairomone source, we cached predator directly from the lake and put them inside a cage and reared with daphnia in the same medium. The result demonstrated that predator kairomone strongly affect daphnia morphology. We saw longer head length and spine length in *D. galeata* and *D. longsipina* clones which were exposed by kairomon. However only *D. galeata* exhibited helmet development under *B. longimanus* pressure. Eye width of both *D. galeata* and *D. longispina* were wider under both predator treatment. Meanwhile we did not see strong differences in body width of *D.galeata* and *D. longispina* in every treatment. We concluded that both *daphnia* species from Lake Constance respond the presence of specific kairomone with specific defends.

Keywords: Morphological Change, *Daphnia galeata, Daphnia longispina*, Kairomone, Cladoceran Predator

The Effect of Papain and Bromelain Enzymes on the Growth and Feed Utilization of Post Larva *Litopenaeus vannamei*

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The aims of this research was to evaluate the effect of papain and bromelain enzymes in feed on growth and feed utilization in post larvae *Litopenaeus vannamei* shrimp.The research was conducted for 42 days at the Fish Hatchery Laboratory, Faculty of Marine and Fisheries, Syiah Kuala University.The completely randomized design consisting of four treatments and three replications were used in this study. The tested treatment were treatment A (experimental feed without enzyme); B (experimental feed + 1% papain enzyme); C (experimental feed + 1% bromelain enzyme), and D (experimental feed + 1% papain enzyme + 1% bromelain enzyme).The fish was fed the tested feed five times on 07.00 AM, 11.00 AM, 03.00 PM, 07.00 PM and 11.00 PM for 42 days. The ANOVA test results showed the addition of papain and bromelain enzymes in the feed had a significant effect on weight gain, daily growth rate and specific growth rate of vaname shrimp ($P<0.05$). However, there was no significant effect on survival, feed conversion and feed efficiency ($P>0.05$).The best treatment was found in treatment D (a combination between of 1% papain enzyme + 1% bromelain enzyme) with the weight gain of 1.15 g of vaname shrimp, daily growth rate of 0.027 g day^{-1}, specific growth rate of 7.14%day^{-1}, feed conversion ratio of 1.85, and feed efficiency 54.15%, but the highest survival was found at treatment A. It is concluded that the best treatment is a combination between of 1% papain enzyme + 1% bromelain enzyme).

Keywords: *Litopenaeus vannamei*, papain enzyme and bromelain enzyme.

Marketing Strategies and Systems in Fish Fish Landing Base (PPI) Bawah Timur City, Sukakarya District, Sabang City

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Fish Landing Base (PPI) Pasiran is a landing place that has a fairly busy activity and always routinely conducts fish auctions every morning. The dominant fishing gears in this sandy PPI are the basic hand line and trolling line, fish that are landed are catches that have important economic value. The problem faced now is that the fisheries business system at the Fish Landing Base (PPI) in Pasiran is still simple, the marketing channels are still going through between regions and there are facilities that can support marketing such as an ice factory being damaged, therefore it is necessary to study the marketing system and strategies needed for Fish Landing Base (PPI) Pasiran in marketing capture fishery products. A good marketing system will show good marketing growth as well. This research was conducted in June 2020. The method used in this research is purposive sampling method and analysis method using SWOT analysis (Strengthen, Weakness, Opportunities, and Threats) where an effective strategy can be formulated systematically by comparing internal and external conditions, where internal conditions are related to fishery product business. fishing such as price, fish catch from dominant fishing gears, and facilities that help in the fishery business system. For externals, it is related to the demand from the production of capture fisheries products at the Fish Landing Base (PPI) in Pasiran. The results obtained are the Fish Landing Base (PPI) Pasiran has a marketing margin that is not too high, because the marketing channels at the Fish Landing Base (PPI) Pasiran are not too long. The Fish Landing Base (PPI) Pasiran also has an internal value of 0.43 and an external value of 0.28, of the two conditions factors have a positive value. These results indicate that the marketing growth at the Fish Landing Base (PPI) Pasiran has a strong performance and opportunities in its marketing.

Keywords: Strategy, marketing system, economical fish, internal and external conditions of the Fish Landing Base (PPI) in Pasiran.

Artemia sp. Enrichment with Vitamin C and Taurine to Support Growth and Survival Rate of Vaname (*Litopenaeus Vannamei*) Larvae

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The aim of study was to determine the effect of *Artemia* sp enrichment with vitamin C and taurine on the growth and survival rate of Vaname (*Litopenaeus vannamei*) post larvae. The study was conducted by using randomized design with 4 treatment groups, group A as control, group B *Artemia* sp enrichment with 50 mg vit C/L media, group C *Artemia* sp enrichment with 50 mg taurine/L media and group D *Artemia* sp enrichment with 25 mg vit C and 25 mg taurine/L media. Data were analyzed with ANOVA followed by LSD/Tukey at 5% level. Variable data were the growth and survival rate of the vaname post larvae as well as water quality.

Keywords: *Artemia* sp, Vitamin C, Taurine, enrichment, vaname post larva.

The Role of *Panglima Laot* Toward Fisheries Management Based on Ecosystem Approach in Banda Aceh City

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Panglima Laot was indigenous institutions of Aceh that hand to realize sustainable fisheries management particularly with an ecosystem approach. The objective of this study is to evaluated status of *Panglima Laot* on fisheries management based on ecosystem approach. This research was conducted in 2017 in Banda Aceh City. Data analysis used Composite index with multy criteria analysis and then visualized by flag modelling. The result of this study showed *Panglima Laot* status was in 'good' category. Composite value of Lhok Pasie Tibang Panglima Laot is 66,6, Lhok Kuala Aceh Panglima Laot 62,5 and Lhok Kuala Cangkoi Panglima Laot 72,6.

Keywords: Panglima Laot, Fisheries management, Ecosystem approach

Campaigning "Botak" (Bogor without Plastic Bags) as a Environmental Communication Model for Reducing Plastic Waste

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Plastic waste is one of the environmental problems facing Indonesia, which is called a plastic waste emergency country. Plastic waste has the potential to damage the ecosystem of living creatures in the sea and has a major impact on human life. Thus, special efforts are needed to reduce the dangers of plastic waste, including by switching to environmentally friendly shopping bags is one form of environmental innovation (eco-innovation) which aims to save the environment from plastic waste. This study aims to determine strategies to reduce the use of plastic bags carried out by the Bogor city government. This research is qualitative using the case study method. Data were collected through interviews, document analysis and literature study and observation. The results show that the campaign carried out by the government needs to be supported by a more comprehensive approach by raising public awareness of the dangers of plastic waste from upstream to downstream so that a plastic bag dumped in a river in Bogor might end up killing whales at sea.

Keywords: marine environment, eco-innovation, plastic bag, waste, hazardous

Substitution of Soybean Meal by Fermented Tofu Dregs in the Diet of Milkfish (*Chanos Chanos*)

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This study aims to investigate the effect of fermented tofu dregs as feed raw material to substitute soybean flour in the milkfish (*Chanos chanos*) formulated feed. The research was conducted from April to May 2019 at the Ujung Batee Brackish Water Aquaculture Center, Mesjid Raya District, Aceh Besar Indonesia. A total of 200 milkfish (*Chanos chanos*) fry from 1-2 cm total length were randomly put in a volume of 25 liters per container. Fish were fed at 3 % body weight daily to apparent satiation twice a day (9:00 and 16:00) for 40 days. A completely randomized design (CRD) with 5 treatments and 4 replications was used with different fermented dregs tofu substitution rate 0% (A), 5% (B), 10% (C), 15% (D) and 20% (E). ANOVA test results showed that the subtitution of soybean flour with different doses of fermented dregs flour showed significant different ($P<0.05$) in absolute weight gain, daily growth rate, specific growth rate, feed conversion rate and feed utilization rate. However there was no significant difference ($P>0.05$) in the survival rate of the fish in all the treatments. It is concluded that the increase concentration of fermented dregs tofu may decrease the growth of milkfish (*Chanos chanos*).

Keywords: fermentation, growth, milkfish, formulated feed

Adoption of Product Diversification Technology in Marginal Ponds

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Fishpond farmers cultivate their pond lands on marginal land conditions. This condition causes the income obtained by pond farmers to be relatively very small. However, a small proportion of pond farmers have implemented product diversification. The research objective was to analyze the income of the pond farmers, how to process the ponds and the subsistence pond business development model towards product diversification in Kendari City. This research was conducted in marginal ponds with a subsistence management pattern in Kendari City, using stratified random sampling method. This research uses census method for subsistence pond farmers and purposive sampling method for pond farmers who have implemented product diversification. The ponds are located along the Kendari Bay. This study uses an income analysis approach, descriptive analysis and a model of product diversification in marginal ponds. The main finding of this research is that pond farmers do not dare to take risks in managing their pond business towards a product diversification model. The main reason that pond farmers do not want to take risks is due to limited technology, capital, knowledge and skills. On the other hand, the pond land is already polluted. The results of this study show that subsistence pond farmers have very little income, only Rp. 10,680,000, - and fishpond farmers with product diversification have an income of 10 times the income of subsistence farmers. Pond farmers have limitations in technology, capital, knowledge and skills. On the other hand, the pond environment has also been polluted by household and industrial waste. Pond farmers cultivate their pond land subsistently, but have applied fertilization technology, pest eradication and water circulation. The recommended model for developing a pond business is product diversification. Pond farmers who have implemented product diversification have very high incomes, ten times the income of subsistence farmers.

Key words: Farm farmers, marginal land, income, product diversification

Food and Feeding Habits of Two Species Ornamental Fishes from Bira Cot, Aceh Besar, Indonesia

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Food and feeding habits of the 2 ornamental fish species confined to 2 genera, 1 families from Bira Cot River were studied and estimate between february, 2020 and July, 2020. A total of 20 fishes were randomly collected from Bira Cot River during the study period. Observation was made for the total length, standard length, body weight, relative length of alimentary canal and qualitative and quantitative analysis of stomach contents. The relative length of alimentary canal was described in relation to feeding habit. The stomach content analysis indicated that Danio albolineatus omnivores while Puntius oligolepis herbivores. In the present study, the determination of food composition and feeding habits of studied fish species may give some important information for culture of these freshwater fish species.

Key words: Bira Cot river, feeding habit, fish, food, stomach content,

Dynamic of Small-Scale Fishing Marketing Behavior in Kec. Cilincing, North Jakarta in the Face of Covid-19 Pandemic

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The covid-19 pandemic occurred in early 2020, precisely at the end of February. The covid-19 pandemic is a global problem, which encourages governments to implement large-scale Social Regulation (PSBB) policies. The policy certainly has an impact on the sustainability of the businesses. One of them is a community group of small-scale fishing businesses that feel the impact of the covid-19 pandemic in Indonesia. Small-scale fishing businesses are fishermen with boat fleet users under 10 GT. Although they have a normal marine routine or no changes, some problems are found when there is a decrease in sales and build-up of catch result. This problem supports the reason for the importance of research done. The research was conducted in July 2020, with the location of Kalibaru Village, Cilincing District, North Jakarta. The research aims to analyze the dynamics of small-scale fishing business behavior in the face of covid-19 pandemic. Data retrieval techniques are conducted in-depth interview, while data analysis is done qualitatively supported quantitatively data. The analysis shows that the dynamics of the behavior of small-scale fishing marketers in the face of covid-19 pandemic is a) Lowering the price of fresh fish and b) sellingfish that're not fresh to fishery processor.

Keywords: Dynamic, Small-Scale, Fishing, Pandemic- Covid-19

Ectoparasite Analysis on Mangrove Crabs (Scylla sp.) in Soft Shell Crab Aquaculture in Banda Aceh city, Indonesia

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Purposive sampling method was used within three aquaculture sites at Cot Langkeuweh, Gampoeng Blang, and Lamjabat village. The targeted organ was carapace, walk and swim leg and gill. Results showed that there were five parasites found from three family such as *Zoothamnium sp. Vorticella sp.,* and *Epistylis sp. Octolasmis sp*., and *Capepoda sp.* The highest prevalence rate *Epistylis* sp., with value of 50-60% whereas the lowest prevalence *Zoothamnium* sp. and *Octolasmis* sp. with its value of 20%. The highest intensity level was *Octolasmis* sp., and *Zoothamnium* sp. with value of 8-11.3 ind/species, whereas the lowest intensity was *Copepoda sp*. with value of 2 ind/species.

Keywords: *Scylla* sp.; Ectoparasit; Prevalence; Intensity

Species identification of *Rasbora sumatrana* through the cytochrome oxidase subunit I DNA barcoding marker

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Rasbora sumatrana or locally known as seluang in Malaysia is a benthopelagic fish. Unlike its other congeneric species is not categorized as an ornamental fish. Samples of the presumed *R. sumatrana* was obtained from an abandoned swamp in Hulu Langat, Selangor. Initial identification of the samples was conducted based on meristic and morphometric analyses which showed congruence with *R. sumatranus* when referenced to FishBase. To complement the analysis a molecular study was conducted based on the cytochrome oxidase subunit I (COI) DNA barcoding marker. Confirmation of the species identity was done by BLAST results with six voucher sequences of *R. sumatranus* and other *Rasbora* species from GenBank. The relationship of *Rasbora* spp. was analysed by phylogenetic and Automatic Barcode Gap Discovery (ABGD) analysis. Contradicting with morphological and meristic data analysis, both Maximum-Likelihood and Maximum Parsimony phylogenetic tree showed that the current studied samples did not cluster with *R. sumatranus.* We believe that they may represent cryptic diversity and are tentatively classified as *Rasbora* sp.

Evaluation of Molecular Biological Method for Water Pollution Monitoring Using *Allium Cepa* Model

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Allium cepa is widely used to evaluate the effects of water pollution based on the effects on the cells and gene expression of the plant since it is a very sensitive tool for prediction and recognition of environmental stresses. This study aimed to evaluate the potential use of *A. cepa* as a molecular biological indicator to detect the presence of water pollution. *Allium cepa* roots were exposed to water samples from Shah Alam Lake which was suspected to be polluted. *A. cepa* were subjected to different incubation time from 24 to 48 hours in the water samples with tap water and hydrogen peroxide solution as controls. The effects of water sample exposure on *A. cepa* were analysed based on the plant cytotoxicity, genotoxicity and expression of stress gene. Analyses on the root length, mitotic index, percentage of chromosomal abnormalities and expression of *allinase* gene were conducted between test samples and control sets. The findings showed no significant changes observed in mitotic index of *A. cepa* exposed to different levels of water sample pollution compared to the negative control. There is also no expression of *allinase* gene was detected. However, chromosomal abnormalities were observed in *A. cepa* exposed at varying times to water samples. The chromosomal abnormalities detected include lagging chromosome, c-mitosis, disrupted anaphase, disrupted metaphase, spindle disturbance and stickiness. Our study shows that molecular biological method could be a potential method to serve as an effective, sensitive and useful marker for water pollution determination.

Keywords: *Allium cepa,* water pollution, mitotic index, chromosomal abnormalities, *allinase* gene

Length-Weight Relationships and Condition Factors of Four Introduced Fish Species in Lake Aneuk Laot, Weh Island, Aceh Province, Indonesia

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Lake Aneuk Laot is situated in the northern tip of Sumatra Island, Indonesia. This lake is threatened by ecological perturbation, pollution, and the presence of introduced fish species. Several species of alien fish species have been introduced to the lake; However, no evaluation study was conducted to assess the growth pattern of this introduced species in Lake Aneuk Laot. Hence, the objectives of the present study were to assess the growth pattern and condition factors of the alien fish species harvested from Lake Aneuk Laot, Weh Island, Aceh Province. Sampling was done from December 2015 to January 2016. The fish samples were caught using gillnets and casting nets. A total of four alien fish species were caught during the sampling, namely, Nile tilapia (*Oreochromis niloticus*), Mozambique tilapia (*O. mossambicus*), giant gourami (*Osphronemus gourami*) and snakeskin gourami (*Trichopodus pectoralis*). The fish samples were analyzed using Linear Allometric Model (LAM) to calculate b value and the relative weight condition factor. The results showed that the Nile tilapia and Mozambique tilapia showed an isometric growth pattern, while snakeskin and giant gouramies have an allometric negative growth pattern. The condition factor that tends to 100 indicates a balance of predator and prey. It is concluded that tilapias most adaptable in this lake compared to gouramis.

Keywords: Weh Island, allometric, introduced fish, invasive fish, growth pattern

Maximum Economic Yield Estimation of the Pelagic Fish Resources in the Sea Area of Tojo Una-Una Regency

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The waters of Tojo Una-Una Regency have a wealth of marine resources and small islands which are used for fisheries and marine ecotourism activities. However, because of the discovery of the use of destructive fishing gear that threatens the sustainability of fish resources and the economy of local communities. This study aims to estimate the maximum economic catch for the sustainable potential of pelagic fish resources in the marine waters of Tojo Una-Una district. The research data combines fishing time series and fishing effort data from 2005 to 2015, and field survey data, and is analyzed using the Schaefer method of the Production Surplus Model. The results showed that the potential of pelagic fish resources in the waters of Tomini Bay Tojo Una-una is 6356.25 tons per year. The maximum economic catch for the small pelagic fish group shows a value of 5,234.33 tons per year and the large pelagic fish group is 940.17 tons per year. The economical effort to catch pelagic fish reaches 7,862 trips per year. The level of utilization of pelagic fisheries resources is generally below the Maximum Sustainable Yield (MSY) value.

Keywords : Maximum Economic Yield, Pelagic Fishery

Effect of Diet Combination of Avocado *Persea americana* m. and Pumpkin *cucurbita moschata* seed on the Growth performance, Feed Conversion, and Nutrient Content in Gouramy.

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Feed is one of the important components in fish farming as a source of material and energy. Therefore, to reduce feed production costs is to mix inexpensive and easily accessible natural feed with a high enough protein content. This study aims to determine the effect of a combination of avocado *Persea americana* M. and pumpkin *Cucurbita moschata* D seed on the growth and feed efficiency of *Osphronemus gouramy* Lac. The design used non-factorial Completely Randomed Design consisting of 4 treatments and 6 replications: P0 (control feed), P1 (40 grams of avocado seed feed + 40 grams of pumpkin seeds + 20 grams of mixed ingredients), P2 (20 grams of avocado seed feed + pumpkin seeds 60 grams + 20 grams of mixed ingredients) and P3 (60 grams of avocado seed feed + 20 grams of pumpkin seeds + 20 grams of mixed ingredients). Data analysis used Analysis of variance and Duncan's test using SAS 9.3.1 software. The results showed that giving a combination of avocado seeds and pumpkin seeds can increase the growth of gouramy. The highly effective growth was found in P2 feed of 11.86 grams with a growth rate of 2.69% / day, while low growth occurred in the P3 treatment of 9.46 grams with a growth rate of 2.11% per day. The proximate test of the test feed showed that the highest protein was found in P2 feed, namely 25.01%. The best feed efficiency was found in P2 feed which had 6.91% crude fiber, and the highest protein content in P2 was 18.36%. It concluded that there was an effect of a combination of avocado and pumpkin seed feed on the growth and feed efficiency of Gouramy. Avocado and pumpkin seeds supplementation can be used as ingredients of fish feed.

Keywords: Avacado, pumpkin, gouramy.

Application of Virgin Coconut Oil (VCO) in Feed in Efforts to Increase Growth and Survival Rate of Red Tilapia (*Oreochromis* sp.)

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The use of natural ingredients in commercial feed has been widely used in the field of cultivation. This natural ingredient is used as a feed additive to increase feed efficiency and promote growth. This study aimed to analyze whether VCO has an influence on the growth of red tilapia (*Orechromis sp.*). The research method used was the experimental method with 4 treatments and 3 replications (P¬0¬ = control; P¬1¬ = 5 ml VCO / 500 gr feed; P¬2¬ = 10 ml VCO / 500 gr feed; P¬3 ¬ = 15 ml VCO / 500 gr feed). The results showed that the addition of VCO to commercial feed had no effect on the growth in absolute weight, daily growth, survival rate and feed conversion ratio of red tilapia. This happens because the VCO dosage used was not suitable so that it was not effective against the maximum energy intake for red tilapia.

Keywords: Red tilapia (*Oreochromis* sp.), growth, survival rate, VCO (Virgin Coconut Oil), commercial feed

Truss-traditional Morphometric of Tropical Eel (*Anguilla* spp.) from Aceh Waters, Indonesia

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The objective of the present study was to analyze the morphometric character of the four presumed taxa within eel group, namely Anguilla marmorata SAL, A. bicolor SKL, *A. bicolor* TB and *A. bicolor* KJU. The A. marmorata SAL samples were collected from Aceh Tenggara District, the A. bicolor SKL were collected from Aceh Singkil District, the A. bicolor TB were collected from Banda Aceh District and the A. bicolor KJU were collected from Aceh Besar District, Indonesia. A total 24 individual of fish samples (6 individual of every taxon) were measured for truss-traditional morphometric characters. The results of univariate (ANOVA) analysis showed that truss-traditional morphometric characters measured in four fish population were significantly different ($P < 0.05$). Multivariate (Discriminant function analysis, DFA) analysis showed that A. bicolor SKL, A. bicolor TB and A. bicolor KJU were overlapping morphological characteristics, whereas Anguilla marmorata SAL was discriminated distinctly. These results confirm that Aceh Province have two valid species of eel, included A. marmorata and A. bicolor.

Keywords: Morphological, Anguilla, Marmorata, Bicolor

National Symposium

Penggunaan Hormon Giberellin Dan Auksin Dalam Budidaya Rumput Laut (*Eucheuma cottonii*) Dengan Sistem Longline Di Kabupaten Aceh Singkil

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Rumput laut merupakan salah satu jenis komoditas utama dalam sektor perikanan. Kendala yang muncul dari budidaya rumput laut antara lain yaitu kurangnya pemahaman pembudidaya tentang cara meningkatkan pertumbuhan rumput laut secara efektif dan efisien. Tujuan penelitian ini adalah untuk mengetahui pengaruh penggunaan hormon giberellin dan auksin dalam budidaya rumput laut (*Eucheuma cotonii*) dengan sistem longline di Kabupaten Aceh Singkil. Metode yang digunakan dalam penelitian ini adalah eksperimental lapangan. Penelitian ini menggunakan 16 perlakuan dengan 3 blok penelitian. Konsentrasi hormon giberellin yang digunakan dalam penelitian ini adalah 0.4 ml/L, 0.6 ml/L, 0.8 ml/L dan 1 ml/L, sedangkan konsentrasi hormon auksin 0.2 ml/L, 0.4 ml/L, 0.6 ml/L dan 0.8 ml/L. Parameter yang diamati dalam penelitian ini adalah panjang, bobot dan produksi rumput laut. Uji ANOVA menunjukkan bahwa pemberian hormon giberellin dan auksin tidak berpengaruh terhadap panjang, berat dan produksi rumput laut Hasil penelitian menunjukkan bahwa penambahan panjang terbaik terdapat pada perlakuan O (1 ml/L giberellin dan 0.6 ml/L auksin) yaitu 8.67 cm. Pertumbuhan berat terbaik pada perlakuan O (1 ml/L giberellin dan 0.6 ml/L auksin) yaitu 500 g. Produksi rumput laut selama penelitian terbaik terdapat pada perlakuan O (1 ml/L giberellin dan 0.6 ml/L auksin) dengan hasil 2000 g/m.

Kata kunci : *Eucheuma cottonii*, giberellin, auksin, *longline,* Aceh Singkil.

Restorasi Lamun *Enhalus acoroides* Dengan Metode Polybag Di Perairan Pantai Desa Waai Kabupaten Maluku Tengah

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Penelitian ini dilaksananakan pada bulan Mei – Juli 2019 di perairan pantai Desa Waai Kabupaten Maluku Tengah yang bertujuan untuk menganalisis tingkat kelangsungan hidup, laju pertumbuhan, biomassa, produksi dan kecepatan pulih daun serta faktor fisik kimia perairan yang mempengaruhi pertumbuhan Enhalus acoroides melalui tekhnik penandaan daun yang ditransplantasi dengan menggunakan metode polybag. Hasil penelitian menunjukkan bahwa Enhalus acoroides memiliki tingkat kelangsungan hidup sebesar 100%, laju pertumbuhan 0,31-0.69 cm/hari, biomassa 0,861 gbk/m2, produksi daun sebesar 0,041 gbk/m2/hari dengan kecepatan pulih daun sebesar 4,76%. Nilai parameter fisika kimia perairan pada lokasi transplantasi masih mendukung pertumbuhan Enhalus acoroides.

Kata Kunci : Restorasi, Lamun, Enhalus acoroides, Polybag.

Daya Serap Mangrove Jenis Avicennia alba dan Rhizophora mucronata Di Bee Jay Bakau Resort, Probolinggo

Mohammad Mahmudi[1,2], Difia Helsa Fitri[1], Aliyyil Adzim[1], Evellin Dewi Lusiana[1,2]*, Mohammad Musa[1,2], Sulastri Arsad[1,2]
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Mangrove memiliki kemampuan menyerap bahan-bahan organik dan non organik dari lingkungannya ke dalam tubuh melalui membrane sel. Perbedaan spesies mangrove menyebabkan terjadinya perbedaan tingkat akumulasi logam berat pada akar mangrove. Tujuan penelitian ini adalah untuk menganalisis tingkat penyerapan logam berat Pb pada mangrove jenis Avicennia alba dan Rhizophora mucronata di Bee Jay Bakau Resort, Probolinggo, Jawa Timur. Hasil penelitian menunjukkan bahwa konsentrasi logam berat Pb pada akar, batang dan daun Avicennia marina (0,70 - 0,80 ppm, 0,59 – 0,68 ppm dan 0,47 – 0,53 ppm) dan Rhizophora mucronata berkisar (0,78 -1,30 ppm, 0,60 - 0,68 ppm dan 0,47 - 0,50 ppm). Hasil dari perhitungan nilai BCF (<1) menunjukkan bahwa Avicennia marina dan Rhizophora mucronata termasuk ke dalam kategori excluder terhadap logam berat Pb karena konsentrasi logam berat Pb pada kedua akar mangrove ini lebih rendah dibandingkan dengan konsentrasi logam berat Pb di sedimen.

Keywords: Logam berat Pb, Avicennia alba, Rhizophora mucronata, Excluder

Daya Serap Mangrove Jenis *Avicennia alba* dan *Rhizophora mucronata* di Bee Jay Bakau Resort, Probolinggo

Mohammad Mahmudi[1,2], Difia Helsa Fitri[1], Aliyyil Adzim[1], Evellin Dewi Lusiana[1,2*], Mohammad Musa[1,2], Sulastri Arsad[1,2]

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Keywords: Logam berat Pb, *Avicennia alba*, *Rhizophora mucronata*, *excluder*

Kinerja Pertumbuhan dan Indeks Kompetisi Ikan Nila (*Oreochromis niloticus*) pada Sistem Polikultur dengan Ikan Spesies Asli (*Native Species*)

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Penelitian ini dilakukan dengan tujuan menganalisa kinerja pertumbuhan dan indeks kompetesi ikan nila (*Oreochromis niloticus*), ikan depik (*Rasbora tawarensis*), ikan lemeduk (*Barbonymus schwanenfeldii*) dan ikan peres (*Osteochilus kappenii*) yang dipelihara pada sistem budidaya polikultur. Penelitian ini menggunakan Rancangan Acak Lengkap yang terdiri atas empat perlakuan dan tiga ulangan. Perlakuan ditentukan berdasarkan jumlah ikan yaitu perlakuan A/kontrol;monokultur (ikan nila:150 ekor), perlakuan B (ikan nila: 112 ekor, ikan lemeduk: 38 ekor), perlakuan C (ikan nila: 112 ekor, ikan depik: 38 ekor), dan perlakuan D (ikan nila: 112 ekor, ikan peres: 38 ekor). Ikan dipelihara dalam wadah happa sistem keramba ukuran 0,5x0,5x1m. Pakan yang diberikan berupa pakan buatan dengan kandungan protein 40% dengan pemberian 7% dari bobot tubuh ikan selama 30 hari. Hasil penelitian menunjukkan bahwa ikan nila yang dipelihara dengan sistem polikulltur memberikan pengaruh nyata ($P<0,05$) terhadap kinerja pertumbuhan dibandingkan dengan perlakuan monokultur (perlakuan A). Indeks kompetisi menunjukkan nilai negative antar perlakuan. Penelitian ini menyimpulkan bahwa penerapan sistem polikultur ikan nila mampu meningkatkan nilai kinerja pertumbuhan dan tidak adanya kompetisi antar ikan perlakuan. Perlakuan terbaik untuk meningkatkan kinerja pertumbuhan yaitu polikultur ikan nila dengan ikan lemeduk dan ikan nila dengan ikan peres.

Kata penting: ikan nila, ikan spesies asli, indeks kompetesi, kinerja pertumbuhan, polikultur

ANALISIS KUALITATIF KEBIJAKAN LEGALISASI PENANGKAPAN BENIH LOBSTER DI INDONESIA

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Penelitian ini bertujuan untuk menganalisis dan mengkaji sentimen isu-isu utama di setiap berita di internet terkait legalisasi penangkapan benih lobster oleh Kementerian Kelautan dan Perikanan. Berita Daring diperoleh menggunakan mesin pencari Google Indonesia dengan menggunakan kata kunci "Benih Lobster". Dalam penelitian ini dianalisis 20 berita terpopuler terkait dengan kata kunci tersebut. Semua berita tersebut kemudian di lakukan pengkodean untuk mencari sentimen dari setiap berita dan juga topik utama yang terdapat dalam berita tersebut menggunakan software NVivo versi 12. Hasil analisis sentimen menunjukkan bahwa terdapat sentiment positif sejumlah 13 koding yang berasal dari 11 artikel dan 10 sentimen negative yang berasal dari 8 artikel. Hasil analisis topik utama juga terbagi dalam 6 cluster besar yaitu Akibat Legalisasi Penangkapan Benih Lobster sebanyak 46 Koding, Fakta, mengenai benih lobster sebanyak 10 koding, fakta tentang permen KP no 12 tahun 2020 sebanyak 8 koding, Permasalahan Permen KP no 12 tahun 2020 sebanyak 17 koding , Tujuan Permen KP no 12 tahun 2020 sebanyak 15 koding dan Solusi pasca legalisasi sebanyak 3 koding. Mayoritas topik utama yang keluar dari internal Kementerian Kelautan dan Perikanan sebagian besar positif sedangkan sentiment negative berasal dari Menteri KKP sebelumnya dan LSM yang bergerak dibidang lingkungan. Analisis lebih lanjut dapat disimpulkan bahwa pemberitaan-pemberitaan negative yang ada di media cenderung berlawanan dengan hasil kajian-kajian yang dilakukan oleh para peniliti dari berbagai universitas ternama di Indonesia, oleh karena itu dirasa perlu kementrian KKP dapat menggandeng stakeholder media untuk dapat menyampaikan fakta-fakta ilmiah terkait cantrang kepada masnyarakat.

Kata kunci: Benih lobster, Legalisasi, software NVivo

Pengembangan SOK Bintan untuk Monitoring Cuaca Pesisir dan Dinamika Muka Air Laut

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Pendekatan riset kedepan memiliki kecendrungan melalui perancangan sebuah sistem observasi data dan informasi yang diintegrasikan dengan internet. Internet of Things (IoT) merupakan salah satu kebutuhan bagi peneliti kelautan terkini dimana teknologi memegang peran penting dan strategis dalam penyediaan (availability) dan kelangsungan (continuity) data dan informasi. Penelitain ini menyediakan informasi pengembangan dan penerapan suatu sistem observasi dan pendataan dengan pendekatan IoT. Akuisisi dan pemetaan data cuaca pesisir dan muka air laut melibatkan aplikasi sistem observasi dengan instrumen Automatic Coastal Wheater Station dan pasang surut berbasis acoustic gauge. Kegiatan riset telah berlangsung sejak Juli 2018. Pada tahun pertama telah terbentuk sistem observasi yang operasional dan terkumpulnya data awal (baseline) yang komprehensif meliputi data temperature, kelembaban, kecepatan angin dan tinggi muka air laut di pesisir barat Pulau Bintan. Pengembangan saat ini adalah menyediakan suatu sistem observasi dan pendataan yang handal (reliable), mudah diakses dari mana pun melalui sambungan internet (real time). Implikasi dari aplikasi Sistem Observasi Kelautan (SOK) di Pulau Bintan dapat dikembangkan untuk kebutuhan penggunaan lain seperti; monitoring kualitas air, mamalia laut, mitigasi bencana dan sebagainya. Adopsi dan pengembangan sistem ini di tempat lain akan bermanfaat bagi peneliti di Indonesia bahkan dunia sebagai akses pertukaran (share) data dan informasi, guna memahami secara utuh atau membandingkan fluktuasi cuaca pesisir di Indonesia Bagian Barat dan Timur atau cuaca perairan tropis dan sub-tropis. Kami telah berhasil membangun SOK Bintan yang mampu menyediakan data informasi yang handal baik secara off-line maupun real time. Akses pada www.lamun-bintan.net (Instrumen SOK di lapangan under maintenance).

Keywords: Sistem Observasi Kelautan, Cuaca pesisir, Pasang surut, IoT, Pulau Bintan

Potensi Pengembangan Budidaya pada Kawasan Konservasi Perairan (Studi Kasus: KKPD Datok Bandar, Kabupaten Lingga)

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Pengembangan budidaya perikanan di Kawasan Konservasi Perairan (KKP) harus memperhatikan kelestarian dan keseimbanagan ekosistem pada kawasan tersebut. Hal ini menyebabkan adanya keterbatasan hak-hak pengguna yang ingin mengembangkan usahanya, dimana rencana pengelolaan kawasan dapat menjadi instrumen dalam penerbitan izin pengguna/pengusaha budidaya di wilayah KKP. Penelitian ini bertujuan untuk merumuskan arahan teknis dalam pengembangan potensi usaha budidaya perikanan pada Kawasan Konservasi Periran Daerah (KKPD) Datok Bandar, Kabupaten Lingga. Metode yang digunakan adalah deskriptif kuantitatif dengan menggunakan analisis daya dukung (carrying capacity) lingkungan untuk budidaya, parameter kualitas air, serta pendekatan partisipatoris. Hasil penelitian menunjukkan KKPD Datok Bandar berpotensi dikembangkan untuk pemanfaatan budidaya seluas 3.736,01 ha. Berdasarkan daya dukung lingkungan di KKPD Datok Bandar luas kawasan yang dapat dimanfaatkan untuk budidaya sebesar 268.420 ha (7.2% dari potensi yang ada). Selanjutnya berdasarkan hasil pengukuran parameter kualitas air, kami membagi wilayah perairan di KKPD Datok Bandar menjadi 3 kelompok peruntukkan, yaitu kawasan budidaya untuk KJT, KJA dan rumput laut. Jumlah unit usaha budidaya yang diperbolehkan di lokasi KKD Datok Bandar sebanyak 16.776 petak/unit, yang terdiri atas 10.066 unit untuk usaha kecil dan 6.710 unit untuk usaha menenngah dengan 7 jenis ikan unggulan budidaya. Pembatasan luas lahan dan jumlah unit usaha di kawasan konservasi penting untuk memastikan keberlanjutan pengelolaan di masa akan datang. Selain untuk memastikan eksistensi masyarakat lokal yang umumnya pembudidaya kecil, kawasan konsevasi sangat rentan terhadap perubahan lingkungan, sehingga faktor resiko dan dampak dari pemanfaatan usaha penting dipertimbangkan.

Keywords: Potensi budidaya, Kawasan konservasi perairan daerah, Daya dukung, Kabupaten Lingga