



BOOK of ABSTRACTS

11th INTERNATIONAL AND NATIONAL SEMINAR OF FISHERIES AND MARINE SCIENCE UNIVERSITAS RIAU 2022



UNGGUL
BERMARTABAT





**11th INTERNATIONAL AND NATIONAL SEMINAR
OF FISHERIES AND MARINE SCIENCE
UNIVERSITAS RIAU
2022**

***Innovation and Technologies
in Fisheries, Marine, and
Environmental Science to Ensure
Ecosystem Sustainability and Food
Security***

September 14-15, 2022

Welcoming Speech

Rector of Universitas Riau



Prof. Dr Ir Aras Mulyadi DEA

Assalamu'alaikum warahmatullahi wabarakatuh.

Peace be upon you, and Allah's mercy and blessings. In the name of Allah, the Most Beneficent and the Most Merciful. May peace, mercy, and blessings of Allah be upon you.

Dear colleagues, professors, lecturers, researchers, ladies and gentlemen, on behalf of Universitas Riau, I would like to express my sincere gratitude and welcome you to The 11th International and National Seminar of Fisheries and Marine Science Universitas Riau 2022. Foremore, I honorably welcome our keynote speakers Dr. Nor Qhairul Izzreen Mohd Noor from Universiti Malaysia Sabah, Christopher Marlowe A. Caipang, Ph.D from University of San Agustin Philippines, Noratat Prachom, Ph.D from Kasetsart University Thailand, Mr Shimizu Tomohito From Southeast Asian Fisheries Development Center, Nofrizal, S.Pi., M.Si from Universitas Riau, Dr. Ady Candra, S.Pi., M.Si from Bitung Ocean Fishing Port.

The 11th International Seminar on Fisheries and Marine is an annual activity as well in conjunction with the 60th Anniversary celebration of Riau University to achieve Excellence and Dignity. Riau University always strives to provide space for research development and community service to lecturers and researchers. One of these efforts is to hold scientific conferences, where lecturers and researchers share research results in various fields of science. ISFM is one of the international scientific conferences on the field of fisheries and marine which has been held for the last 10 years. This year is the second year of the conference which is held virtually.

It is my hope that The 11th ISFM 2022 could continue the success of previous ISFM and would be able to achieve its objective in providing an effective forum for academicians, researchers, and practitioners to advancing knowledge, research, and technology for humanity. By taking a theme "Innovation and Technologies in Fisheries, Marine, and Environmental Science to Ensure Ecosystem Sustainability and Food Security"

I believe that the 11th ISFM will allow 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.

Last but not least, my deepest gratitude goes to the Advisory Board, Organizing Committee, institutions, and volunteer who have directly and indirectly supported the success of this conference. The committee has organized a vibrant scientific program and is working hard to present highly respected and internationally notorious speakers. On behalf of Universitas Riau, please accept our sincere apologies should there be inconveniences that occur before, during, or after the event. I wish you a very productive conference with exciting and encouraging discussions and exchange of knowledge so that together we can anticipate a future of groundbreaking knowledge, research, and technology for humanities.

May God bless us all with good health to make this event a successful and enjoyable one!

Wassalamualaikum warahmatullahi wabarakatuh.

Welcoming Speech

Chairman of the Institute for Research and Community Service



Prof. Dr. Almasdi Syahza, SE, MP

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

The honorable Rector of Universitas Riau Prof. Dr. Aras Mulyadi, DEA. Welcome to the keynote speaker Dr. Nor Qhairul Izzreen Mohd Noor from Universiti Malaysia Sabah, Christopher Marlowe A. Caipang, Ph.D from University of San Agustin Philippines, Noratat Prachom, Ph.D from Kasetsart University Thailand, Mr Shimizu Tomohito From Southeast Asian Fisheries Development Center, Nofrizal, S.Pi., M.Si from Universitas Riau, Dr. Ady Candra, S.Pi., M.Si from Bitung Ocean Fishing Port. We give great appreciation for your willingness to attend this online seminar.

The Institute for Research and Community Service (LPPM) Universitas Riau continues to encourage the positive contribution of lecturers and researchers in producing research that is beneficial for the wide community. One form of this contribution is through the implementation of scientific seminars and conferences in various fields of science, both at the national and international levels. The 11th ISFM 2022 which is held by the Faculty of Fisheries and Marine Science, University of Riau is one of the seminars and scientific conferences which are routinely held at the University of Riau. This is a form of enthusiasm to keep contributing in the development of research on the field of fisheries and marine science.

We congratulate and succeed on the implementation of the 11th ISFM in 2022. Congratulations and success for the Faculty of Fisheries and Marine Science, University of Riau.

Wassalamualaikum warahmatullahi wabarakatuh.

Welcoming Speech

Dean of Faculty of Fisheries and Marine Sciences

Universitas Riau



Prof. Dr. Ir. Bintal Amin, M.Sc

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

The honorable Rector of Universitas Riau Prof. Dr. Aras Mulyadi, DEA, Chairman of the Institute for Research and Community Service Prof. Dr. Almasdi Syahza, SE, MP and Deputy Deans of the Faculty of Fisheries, and Marine Sciences Universitas Riau.

Welcome to the keynote speaker Dr. Nor Qhairul Izzreen Mohd Noor from Universiti Malaysia Sabah, Christopher Marlowe A. Caipang, Ph.D from University of San Agustin Philippines, Noratat Prachom, Ph.D from Kasetsart University Thailand, Mr Shimizu Tomohito From Southeast Asian Fisheries Development Center, Nofrizal, S.Pi., M.Si from Universitas Riau, Dr. Ady Candra, S.Pi., M.Si from Bitung Ocean Fishing Port. We give great appreciation for your willingness to attend this online seminar.

Indonesia has a national marine and fisheries goal to manage, conserve and develop sustainable fishery resources, contribute to and ensure community food security and socio-economic development to improve people's livelihoods and nation's prosperity. Faculty of Fisheries and Marine Sciences, Universitas Riau has a moral responsibility to support government programs.

On behalf of the Faculty of Fisheries and Marine Sciences, University of Riau, I am pleased to welcome leading international and national researchers to join the 10th International and National Seminar of Fisheries and Marine Science Universitas Riau 2021. We hope that through this seminar, we can share knowledge, research, and technology for humanity. The 11th ISFM will be organized by the Faculty of Fisheries and Marine Sciences. The 11th International Seminar on Fisheries and Marine is an annual activity as well in conjunction with the 60th Anniversary celebration of Riau University to achieve Excellence and Dignity. This year international speakers and participants came from several countries such as Malaysia, Japan, Thailand, Philippines and Indonesia.

The spirit to continue to collaborate in terms of research and publication is one of our goals. Hopefully, world problems, especially in the maritime and fisheries sector, can be resolved with our research innovations.

The last, I just want to apologize for any shortcomings and inconveniences during this activity.

Thank you.

Wassalamualaikum warahmatullahi wabarakatuh.

Welcoming Speech

Chairperson of the 11th ISFM



Dr. Sumarto, S.Pi., M.Si.

Assalamu'alaikum warahmatullahi wabarakatuh.

The committee of the international seminar on this occasion would like to thank the attendees for being willing to attend the 11th International Fisheries and Marine Seminar (ISFM XI) in a hybrid way (offline and online seminar). The current development of the COVID-19 pandemic is still ongoing even though it is in small numbers at the international and national levels.

On this very occasion, I would like to express my gratitude to The Honorable Prof. Aras Mulyadi as the Rector of Riau University and The Honorable Prof. Bintal Amin as the Dean of Faculty of Fisheries and Marine', for taking time out to attend this event. The honorable all Deans at the Riau University.

I'd also like to express my deepest gratitude to the keynote speaker in this seminar. The Honorable Mr. Shimizu Tomohito from Japan, Mr. Noratat Prachom, Ph.D. from Thailand, Dr. Nor Qhairul Izzreen Mohd Noor from Malaysia, Mr. Christopher MA Caipang, Ph.D. from the Philippines, Mr. Nofrizal, Ph.D. from Indonesia, and Mr. Dr. Ady Candra from Head Ocean Fishing Port Indonesia.

I'd also like to convey my gratitude to all of the guests, seminar speakers, sponsors, and all attendees who attended today, by offline and online.

On this occasion, I'll talk briefly about our event. Today, the 11th International Seminar on Fisheries and Marine was held with the theme: "Innovation and Technologies in Fisheries, Marine and Environmental Science to Ensure Ecosystem Sustainability and Food Security".

The 11th International Seminar on Fisheries and Marine is an annual activity as well in conjunction with the 60th Anniversary celebration of Riau University to achieve Excellence and Dignity. This international seminar aims to develop and apply the result of research and technology innovations in the field of sustainable fisheries and marine affairs.

The number of articles in the 11th International Seminar on Fisheries and Marine is 193 articles with details of 155 international articles and 38 national articles. International seminar participants came from Indonesia, Malaysia, the Philippines, Thailand, Japan, and the Republic of Ghana. A big thank you to the article writers and presenters who have contributed a lot to today's seminar activities.

It is hoped that in the future, the implementation of the 11th International Seminar on Fisheries and Marine will continue and be improved so that it can make a major contribution to cooperation in education, research, and social community in the sustainability of fisheries and marine affairs.

Finally, the success of the 11th International Seminar on Fisheries and Marine Affairs is the result of our support from all parties. We appreciate the commitment and contribution from all parties to this seminar. Congratulations and success in participating in the international seminar on fisheries and marine conducted by the Faculty of Fisheries and Marine, in conjunction with the 60th Anniversary celebration of Riau University. Thank you for all your support and attention.

Organizing Committee

Advisory Board

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Dr. Rahman Karnila, S.Pi, M.Si.
Dr. Ir. Mulyadi, M. Phil.
Dr. Ir. Sofyan Husein Siregar, M. Phil.

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Dian Iriani, S.Pi, M.P.

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Public Relation & Documentation

Masmuliana Putra
Supriyadi, S.Pi.

Keynote Speakers

Dr. Nor Qhairul Izzreen Mohd Noor

Islamic Science Universiti Malaysia Sabah, Malaysia

Christopher Marlowe A. Caipang, Ph.D.

University of San Agustin, The Philippines

Noratat Prachom, Ph.D.

Kasetsart University, Thailand

Mr. Shimizu Tomohito

Southeast Asian Fisheries Development Center

Nofrizal, S.Pi., M.Si., Ph.D.

Universitas Riau, Indonesia

Dr. Ady Candra, S.Pi, M.Si.

Bitung Ocean Fishing Port, Indonesia

Guidelines for Presenters

Dear all ISFM presenters, in aiming for an orderly virtual conference, we hugely appreciate your cooperation and support regarding several technical things specified below:

1. Parallel sessions will be clustered according to conference topics with each session chaired by one moderator assisted by one operator, and attended by presenters and participants.
2. Link of Zoom Webinar and Zoom Meeting will be sent by email a few days before the event
3. Each presenter is required to put their ISFM registration number as the Zoom username following the format: Registration No. Name of presenter. For example: ISFM-01_Mariana.
4. The time limit for oral presenters is 7 minutes. The moderator will strictly enforce these time limits.
5. The Questions and Answers (QnA) session will be guided by a moderator after three presenters finished presenting their papers.
6. Each presenter will make presentation after being welcomed by the moderator,
7. The material of presentation will be shared and controlled by the operator
8. All the presenters and participants are required to use the virtual background that we have sent a few days before the event
9. Avoid wearing clothes in bright colors or patterns to ensure good image quality, avoid excessive and fast movements (dark clothes with a solid color are preferred).
10. Always switch your microphone off when not in use,
11. It is recommended to use the headphone
12. The presenters are expected to be stand-by 10 minutes before their schedule in the parallel room
13. The presenters are required to submit the material presentation in PPT format to google form by link: <http://my.unri.ac.id/PPTISFMXI> before September 14, 2022.

Schedule

11th International and National Seminar of Fisheries and Marine Science Universitas Riau 2022

Time	Program	Person in Charge
September 14-15, 2022		
Plenary Session		
08.00-08.30 WIB 08.00-08.30 (Thailand Time) 09.00-09.30 (Malaysia Time) 09.00-09.30 (Phillipines Time)	Opening Zoom Meeting (Registration)	Official
08.30-08.35 WIB 08.30-08.35 (Thailand Time) 09.30-09.35 (Malaysia Time) 09.30-09.35 (Phillipines Time)	Opening MC	MC
08.35-08.40 WIB 08.35-08.40 (Thailand Time) 09.35-09.40 (Malaysia Time) 09.35-09.40 (Phillipines Time)	Singing National Anthem	Official
08.40-08.45 WIB 08.40-08.45 (Thailand Time) 09.40-09.45 (Malaysia Time) 09.40-09.45 (Phillipines Time)	Prayer	Official
08.45-08.55 WIB 08.45-08.55 (Thailand Time) 09.45-09.55 (Malaysia Time) 09.45-09.55 (Phillipines Time)	Speech and Opening The Seminar	Prof. Dr. Ir. Aras Mulyadi, DEA (Rector) Prof. Dr. Ir. Bintal Amin, M.Sc (Dean)
08.55-09.05 WIB 08.55-09.05 (Thailand Time) 09.55-10.05 (Malaysia Time) 09.55-10.05 (Phillipines Time)	Opening The International Seminar Session	Prof. Dr. Ir. Irwan Efendi, M.Sc
09.05-09.20 WIB 09.05-09.20 (Thailand Time) 10.05-10.20 (Malaysia Time) 10.05-10.20 (Phillipines Time)	Presentation by Speaker I	Dr. Nor Qhairul Izzreen Mohd Noor Islamic Science Universiti Malaysia Sabah, Malaysia
09.20-09.35 WIB 09.20-09.35 (Thailand Time) 10.20-10.35 (Malaysia Time) 10.20-10.35 (Phillipines Time)	Presentation by Speaker II	Christopher Marlowe A. Caipang, Ph.D. University of San Agustin, The Philippines

09.35-09.50 WIB 09.35-09.50 (Thailand Time) 10.35-10.50 (Malaysia Time) 10.35-10.50 (Phillipines Time)	Presentation by Speaker III	Noratat Prachom, Ph.D. Kasetsart University, Thailand
09.50-10.05 WIB 09.50-10.05 (Thailand Time) 10.50-11.05 (Malaysia Time) 10.50-11.05 (Phillipines Time)	Presentation by Speaker IV	Mr. Shimizu Tomohito Southeast Asian Fisheries Development Center / Inland Fishery Resources Development and Management Department
10.05-10.20 WIB 10.05-10.20 (Thailand Time) 11.05-11.20 (Malaysia Time) 11.05-11.20 (Phillipines Time)	Presentation by Speaker V	Nofrizal, S.Pi., M.Si., Ph.D. Universitas Riau, Indonesia
10.20-10.35 WIB 10.20-10.35 (Thailand Time) 11.20-11.35 (Malaysia Time) 11.20-11.35 (Phillipines Time)	Presentation by Speaker VI	Dr. Ady Candra, S.Pi, M.Si Bitung Ocean Fishing Port, Indonesia
10.35-11.35 WIB 10.35-11.35 (Thailand Time) 11.35-12.35 (Malaysia Time) 11.35-12.35 (Phillipines Time)	Discussion	Prof. Dr. Ir. Irwan Efendi, M.Sc
11.35-11.45 WIB 11.35-11.45 (Thailand Time) 12.35-12.45 (Malaysia Time) 12.35-12.45 (Phillipines Time)	Photo Session and Closing	Prof. Dr. Ir. Irwan Efendi, M.Sc
11.45-13.30 WIB 11.45-13.30 (Thailand Time) 12.45-14.30 (Malaysia Time) 12.45-14.30 (Phillipines Time)	Break	All Participants
Parallel Session		
13.30-16.00 WIB 13.30-16.00 (Thailand Time) 14.30-17.00 (Malaysia Time) 14.30-17.00 (Phillipines Time)	September 14, 2022 Paralel Presentations (International and National)	Moderator and Operator room
09.00-11.30 WIB 09.00-11.30 (Thailand Time) 10.00-12.30 (Malaysia Time) 10.00-12.30 (Phillipines Time)	September 15, 2022 Paralel Presentations ((International and National)	Moderator and Operator room

ROOM 1

Moderator : Dr. Indra Suharman, S. Pi., M.Sc.
Operator : Novreta Ersyi Darfia, ST., MT.

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.30 - 13.40				
1	13.40 - 13.47	ISFM-525	C M A Caipang, K M P Trebol, I Suharman, R V Pakingking Jr. and J E Deocampo Jr.	Department of Biology, College of Liberal Arts, Sciences, and Education, University of San Agustin, Iloilo City 5000, Philippines	Bulk Isolation of Potential Probiotics from Brackishwater Enriched with High Levels of Carbon Sources
2	13.47 - 13.54	ISFM-101	Waryanto, R Zulkarnain, D Mahabrur	Research Center for Appropriate Technology, Research Organization for Agriculture and Food, National Research and Innovation Agency, Subang, Indonesia	Automation Design for Lobster Floating Net Cage Shifting from Red Tide in Marine Waters
3	13.54 - 14.01	ISFM-102	Heri Ariadi, H Soeprapto, S Hidayati, B D, Madusari, M. B S, Syakirin	Departemen of Aquaculture, Pekalongan University, 51111, Pekalongan, Indonesia	The Fluctuation Effect by Dissolved of TAN (Total Ammonia Nitrogen) on Diatom Abundance in Intensive Shrimp Culture Ponds
4	14.01 - 14.08	ISFM-103	Evy Sholihah A, I Istiqomah, A Isnansetyo, Murwantoko, Rustadi	Aquaculture Study Program, Fisheries Departement, Faculty of Agriculture Universitas Gadjah Mada, 55281, Yogyakarta, Indonesia	Isolation and Ammonium Removal Characteristics Of Facultative Heterotrophic Nitrifying Bacteria from Shortfin Eel (<i>Anguilla bicolor</i>) Recirculation Aquaculture System
5	14.08 - 14.15	ISFM-128	A Adelina, F Feliatra, I Lesmana, I Suharman, Ahlun, M F Syakirin	Department of Aquaculture, Fisheries and Marine Sciences Faculty, University of Riau, Pekanbaru, Riau, Indonesia	Fermentation of chicken feather meal using <i>Bacillus</i> sp. from cow's rumen fluid and <i>Rhyzopus</i> sp. to improve its nutritional quality as a fish feed ingredient
Discussion					
6	14.15 - 14.25	ISFM-125	Niken A P, Mulyadi, I Lukistyowati	Departmet of Aquaculture, Fisheries and Marine Sciences Faculty, University of Riau, Pekanbaru, Riau, Indonesia	Culture of Climbing Perch (<i>Anabas testudineus</i>) with Different Stocking Density Using Booster System in Swamp Media
7	14.32 - 14.39	ISFM-127	Mulyadi, N A Pamukas, Adelina	Department of Aquaculture, Fisheries and Marine Sciences Faculty, University of Riau, Pekanbaru, Riau, Indonesia	Growth and Survival of Asian Redtail Catfish (<i>Mystus nemurus</i>) In Intensive Culture Using Different Micropore Pipe Designs
8	14.39 - 14.46	ISFM-129	Niken Ayu Pamukas, Mulyadi, Iskandar Putra, Nur Asiah dan Adelina	Department of Aquaculture, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, Indonesia	The Effect of Bromealin Enzymes on Digestive Enzymes Activity and Growth Performance of Asian Redtail Catfish (<i>Hemibragus Nemurus</i>)

9	14.46 - 14.53	ISFM-104	I Handayani, Y Aryati1, L Gardenia	Research Center for Applied Microbiology, National Research and Innovation Agency. Jl. Raya Jakarta-Bogor Km. 46, Cibinong, 16911 Bogor, Indonesia	The Role of Prebiotics for Diversity of Intestinal Microorganisms of Tilapia (<i>Oreochromis niloticus</i>)
10	14.53 - 15.00	ISFM-105	Mohammad Syaichudin, Jumriadi, A Gafur, Akmal, Sadat, N M Jumiyanto, S Sujaka	Research Centre of Fishery, Research Organization on Earth Sciences and Maritime, National Research and Innovation Agency, Cibinong, West Java, Indonesia	The Environmental Design With Low Salinity at the Beginning of Rearing as An Efforts to Improve The Robustness of White Shrimp (<i>Litopenaeus vannamei</i>) Culture by Biofloc System
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-106	Joel E Deocampo Jr, J T Fenol, G S Paguntalan, A Grace, M Jimenez, C M A Caipang	Departemen of Biology, College of Liberal Arts, Sciences, and Education University of San Agustin 5000 Iloilo City, Philippines.	Production of ornamental fish in a biofloc-based system using sweetpotato (<i>Ipomoea batatas</i>) waste as carbon source
12	15.17 - 15.24	ISFM-108	B W Prastowo, T Penataseputro, Y Evan	Researcher at National Research and Innovation Agency, Fisheries Research Center Cibinong, West Java, Indonesia	Necrosis Incidence on Sand Lobster (<i>Panulirus homarus</i>) Tail Fin Reared Using Recirculating Aquaculture System (RAS)
13	15.24 - 15.31	ISFM-109	Arlene L Avillanosa, A N Apgao, C M A. Caipang, M M G Plasus, R V Pakingking Jr	College of Fisheries and Aquatic Sciences, Western Philippines University, Puerto Princesa Campus, Puerto Princesa City 5300, Palawan, Philippines	Establishment of an Oyster Recruitment Area as an Sltternative and Sustainable Livelihood
14	15.31 - 15.38	ISFM-110	Rachmawati Rusydi, E Ayuzar, Khairunnisah, Salamah, M Khail	Aquaculture Department, Malikussaleh University, 24355 North Aceh, Indonesia	Effect of Adding Sweet Potato as Prebiotic in Feed to Increase The Growth of Freshwater Lobster (<i>Cherax quadricarinatus</i>)
	15.45 - 15.55	Discussion			
	15.55 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	09.00 - 09.10				
1	09.10 - 09.17	ISFM-111	Ikshan Khasani, A Junaeri, A Ekasanti, H Krettiawan	National Research and Innovation Agency, 16912 Bogor, West Java Indonesia	Growth, Survival and Feed Efficiency of The Giant Freshwater Prawns (<i>Macrobrachium rosenbergii</i> de Man) with Different Starvation Patterns
2	09.17 - 09.24	ISFM-112	Mojena M M G-Plasus, L N Plasus, S Magallanes, C M Caipang	College of Fisheries and Aquatic Science, Western Philippines University- Puerto Princesa Campus, Puerto Princesa City, Palawan, Philippines	Semi-quantitative Determination of Coloration in Betta Fish: A Trial on The Effect of Indian Almond (<i>Terminalia catappa</i>) and Banana (<i>Musa acuminata</i>) Leaves
3	09.24 - 09.31	ISFM-113	Benny Heltonika, S Afriani, D R Siagian, I Lesmana, O R Karsih	Department of Aquaculture, Faculty of Fisheries and Marine Science, University of Riau, 28293 Pekanbaru, Indonesia	Potential of Fermented Commercial Feed to Replacement for Silk Worms on Postlarva of Asian Redtail Catfish (<i>Hemibagrus nemurus</i>)
4	09.31 - 09.38	ISFM-114	Nursyahrhan, Jayadi, A Tamsil, Herlina	Postgraduate School, Fisheries Science Doctoral Program, Indonesia Muslim University, Makassar, Indonesia	Growth Patterns Analysis of Yellow-Finned Medaka (<i>Oryzias latipes</i>) as Endemic Fish in Lake Towuti
5	09.38 - 09.45	ISFM-115	Alit Hindri Yani, I Effendi, Nofrizal, Windarwati, R Fatmawati	Department of Fisheries Resources Utilization, Faculty of Fisheries and Sciences, University of Riau, 28293 Pekanbaru, Indonesia	Species Composition and Bycatch of Gombang in East and South Seasons in Bengkalis, Riau, Indonesia
Discussion					
6	09.45 - 09.55				
6	09.55 - 10.02	ISFM-116	Diana Arfiati, R K Pratiwi, Z N Inayah, A Khofifah, R Safara	Faculty of Fisheries and Marine Science, Universitas Brawijaya, 65145 Malang, Indonesia	Food Habits, Water and Stomachs Plankton of Milkfish from Cultivation Pond of Probolinggo City
7	10.02 - 10.09	ISFM-118	Indira Fitriyiani, S Aminah, A Murdjani, U Bijaksana, Fatmawati, E Redha, D Kusumawardani	Lecture of Aquaculture Departement Faculty of Fisheries and Marine Science, University of Lambung Mangkurat, Indonesia	Effects of Vitamin C and Squid Oil Supplementation on Gonad Maturation of Climbing Perch Broodstock (<i>Anabas testudineus</i> Bloch).
8	10.09 - 10.16	ISFM-119	Indra Lesmana, B Heltonika, N E Darfia, A Hendrizal, I Mulyani, D Fitra	Aquaculture Department Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru Indonesia	The Great Potential of Sengarat Fish (<i>Belodontichthys dinema</i> , Bleeker 1851) to Become an Aquaculture Commodity in Buluh Nipis Village, Siak Hulu District, Kampar Regency
9	10.16 - 10.23	ISFM-120	Khairani Laila, Rumondang, J P Batubara, Mustafa	Lecture of Aquaculture, Asahan University	The Effect of Different Substrates on The Growing of The Comet Gold Fish (<i>Carrasius Auratus</i>)
10	10.23 - 10.30	ISFM-121	Nur Asiah, M Riauwati, B Heltonika, N Aryani, Nuraini	Faculty of Fisheries and Marine, Riau University, 28293 Pekanbaru, Indonesia	Efficiency of Yolk Utilization at Incubation Temperature in <i>Osteochilus melanopleurus</i> , Bleeker 1852
Discussion					
11	10.30 - 10.40				
11	10.40 - 10.47	ISFM-122	Sukendi, Thamrin, Ridwan Manda Putra	Faculty of Fisheries and Marine, Riau University, 28293 Pekanbaru,	The Using of Pineapple Extract to Remove Egg Adhesiveness in The Production of Asian Redtail Catfish Fry (<i>Hemibagrus</i>

				Indonesia	nemurus CV)
12	10.47 - 10.54	ISFM-123	Windarti, S H Siregar, A H simarmata	Dept. of Aquatic Resource Management, Fisheries and Marine Science Faculty, Riau University, 28293 Pekanbaru, Indonesia	Survival and Growth of Pangasionodon hypophthalmus Fed with Moringa oleifera Enriched Pellets and Reared in Tank with Aquaponics System and Dark Condition
13	10.54 - 11.01	ISFM-124	Jacob L A U, D Puspita	Faculty of Biology, Satya Wacana Christian University, 50711 Salatiga, Indonesia	The Mixture of Herbal Extracts, Vitamins C and E Maintains Viability of Lactic Acid Bacterial Inoculum in High Lipid and Carotenoid of Broodstock Feed of Freshwater Shrimp (Macrobrachium idae)
14	11.01 - 11.08	ISFM-126	I Suharman, N Aryani, B Hasan2, A Adelina1, I Lukistyowati1, L Raysha1, R M Karo- Karo1, C M A Caipang3	Department of Aquaculture, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru 28293 Riau- Indonesia	Quality Evaluation of fermented Moringa (Moringa oleifera) leaves with different doses of Aspergillus niger as ingredients for fish feed
15	11.08 - 11.15	ISFM-130	A Kurnia, W H Muskiya, M Hamzah, Y Yusnaini, LOB Abidin	Lecturer at Department of Aquaculture, Faculty of Fisheries and Marine Science, Halu Oleo University, Kendari, Indonesia	Replacement of Soybean Meal with Kapok Seed Oil Waste Meal (Ceiba Petandra (L.) Gaertn.) in The Diet on Growth Performance, Survival Rate and Intestine Histology of Milk Fish (Chanos-Chanos Forsskal, 1775)
16	11.15 - 11.22	ISFM-131	Netti Aryani, Indra Suharman, Saberina Hasibuan and Nur Asiah	Department Aquaculture, Faculty of Fisheries and Marine Riau University Pekanbaru	Effect dosage of EPA and DHA fatty acid on the fatty acid composition of Asian redbtail catfish, Hemibagrus nemurus (Bagridae) feed
17	11.22 - 11.29	ISFM-132	Hafrijal Syandria and Azrita Undifineda	Department of Aquaculture, Faculty of Fisheries and Marine Science, Universitas Bung Hatta Padang, West Sumatera, Indonesia	Effects of newly products consist of water coconut, palm sap sugar and fungus on the amino acid composition of the diets and growth performance of giant gourami (Osphronemus gourami) juvenile
	11.15 - 11.25	Discussion			
	11.25 - 11.30	Photo Session and Closing			

ROOM 2

Moderator : Dr. Dra. Windarti, M.Sc.
Operator : Yudho Harjoyudanto, S.Si., M.Si.

Panel Session on September 14, 2022					
No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.30 - 13.40 13.40 - 13.47	ISFM-201	Efriyeldi, B Amin	Marine Science Department of Fisheries and Marine Science Faculty. Universitas Riau. 28293 Pekanbaru, Indonesia	The Community Structure and Diversity of Sungai Bersejarah Mangrove, Sungai Apit District, Siak Regency
2	13.47 - 13.54	ISFM-202	Nabil Zurba, Edwarsyah, Heriansyah, N Najmi, R A Munandar	Aquatic Resources Management Teuku Umar University, West Aceh, Indonesia	Management Of Mangrove Ecosystem Potential In Kuala Langsa Aceh For Carbon Sequestration And Natural Resource Sustainability
3	13.54 - 14.01	ISFM-203	Mary Lou C Arabaca, A Ilano, V Taunan	Biological Sciences, Faculty of the Department of Biology, University of San Agustin, Gen. Luna St, Iloilo City, Philippines	Diversity Of Marine Macro Molluscan Gastropods and Bivalves In The Intertidal Areas Of Ajuy, Iloilo, Western Visayas, Philippines
4	14.01 - 14.08	ISFM-204	Tuah Nanda M Wulandari	Pusat Riset Konservasi Sumber Daya Laut dan Perairan Darat, Badan Riset dan Inovasi Nasional	Population Dynamics of Lais (Phalacrotonotus Micronemus) in Musi Stream, South Sumatra
5	14.08 - 14.15	ISFM-205	Andri Hendrizal, M Fauzi, P E Plaimo, I L Wabang, A Y Persada, N E Darfia, N D Suprayogi, E Sumiasih	Aquatic Resources Management, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Morphometric Analysis of 5 Kampar River Fault Lakes By Using Geographic Information Systems
Discussion					
6	14.15 - 14.25 14.25 - 14.32	ISFM-206	Muhammad Fauzi, Andri Hendrizal, Bintal Amin	Aquatic Resources Management, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Morphometric Surface Dimension Analysis of Three Different Oxbow Lakes in Lubuk Siam Village
7	14.32 - 14.39	ISFM-207	F Y Yalindua, M P Rizky, R Huwae	Research Center for Oceanography – BRIN, 14439 Jakarta, Indonesia	Seagrass-fish association in East Bolaang Mongondow, North Sulawesi: Assessing seagrass cover status and evidence to support its conservation
8	14.39 - 14.46	ISFM-208	Budijono, E Kamaruddin, Y Harjoyudanto, Windarti, M. Fauzi, M Riau waty, R Alfinda	Aquatic Resources Management, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	First Report of Argulus Ectoparasite from Koto Panjang Reservoir, Riau Province, Indonesia
9	14.46 - 14.53	ISFM-209	Budijono, E Kamaruddin, E Purwanto, E Prianto, R Jhonnerie	Aquatic Resources Management, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Bathymetry Map in Fishing Zone and Damsite of Koto Panjang Reservoir, Indonesia
10	14.53 - 15.00	ISFM-210	Rusdianto, K Wibowo, GV Limmon	Research Center for Biosystematics and	First confirmed record of the rare scorpionfish <i>Scorpaenopsis obtusa</i>

				Evolution, National Research and Innovation Agency - BRIN, Bogor, Indonesia	(Actinopterygii, Scorpaeniformes, Scorpaenidae) from Alor Island, Indonesia
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-211	Agus Kusnadi, D Kurnianto, H Maddupa, N P Zamani, P S Ibrahim, U E Hernawan, R T Utami, T Triandiza	Research Center for Oceanography, National Research and Innovation Agency. Jl. Pasir Putih I, Ancol Timur, Jakarta Utara 14430, Jakarta, Indonesia	Genetic Diversity and Population Structure of The Boring Giant Clam (<i>Tridacna crocea</i>) in Kei Islands, Maluku, Indonesia
12	15.17 - 15.24	ISFM-212	Eko Prianto, P Suharsono Sulaiman, S Suryanto, K Kasim	Department of Aquatic Resource Management, Faculty of Fisheries and Marine Science, Riau University, Pekanbaru 28293-Indonesia	Utilization Status and Management Effort of Fisheries Resources in Kerinci Lake, Indonesia
13	15.24 - 15.31	ISFM-213	Mariska A Kusumaningtyas, T L Kepel, R N A Ati, H L Salim, A Rustam, D D Suryono, A Daulat, N Sudirman, Y P Rahayu, A A Hutahaeen	National Research and Innovation Agency (BRIN), Jakarta, Indonesia	Carbon Stock Potential of Mangrove Species from Different Geomorphic Settings
14	15.31 - 15.38	ISFM-215	Ayuningtyas Indrawati, Isa Nagib Edrus, Tri Aryono Hadi	Research Center for Oceanography – National Research and Innovation Agency (BRIN), Indonesia	Coral Reef Fishes Biodiversity in the Waters of Komodo National Park, East Nusa Tenggara
	15.38 - 15.48	Discussion			
	15.48 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	09.10 - 09.17	ISFM-216	Evi Deliana, M A Rauf, D Dasrol	Faculty of Law, Universitas Riau, 28131, Pekanbaru, Indonesia	Forest Fires in Indonesia After Ratification of the ASEAN Agreement on Transboundary Haze Pollution (AATHP)
2	09.17 - 09.24	ISFM-217	Evi Deliana, M A Rauf	Faculty of Law, Universitas Riau, 28131, Pekanbaru, Indonesia	How Indigenous Peoples Resolve Natural Resource Disputes (Study in Koto Gasib, Siak Regency)
3	09.24 - 09.31	ISFM-218	Harsanto Mursyid, K Abdallah K, S Setiawan, A Ghinda A U, T Titah D, A Dian Safira, C. Yolandika	Faculty of Agriculture, University of Riau, Pekanbaru	Mangrove Ecosystem Conservation Efforts: A Case Study of the Minajaladri Monitoring Community Group in the Pasir Putih Coastal Area. Cilamaya Kulon, Karawang
4	09.31 - 09.38	ISFM-219	Hendrini Renolafitri, C Yolandika	Faculty of Social Science and Political Science, University of Riau, Pekanbaru	Ukraine – Russia war in the black sea and its effects on marine life
5	09.38 - 09.45	ISFM-220	Isma Mulyani, E Sumiarsih, R M Putra, W Syahrian, D Ariyani, Rumondang	Aquatic Resources Management Department, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, Indonesia	The Ecological Analysis of the Habitat of Gadid Fish (Tor Tambroides Bleeker, 1854) in the Kampar Hulu Kanan River, Bandur Picak Village, Koto Kampar Hulu District, Kampar Regency, Riau Province
Discussion					
6	09.55 - 10.02	ISFM-221	Novalina Serdiati, S Ndobe, E Rosyida, A M Moore	Fisheries and Marine Science Department, Universitas Tadulako, 94118 Palu, Indonesia	Barcoding anguillid eels recruiting to the Palu River, Central Sulawesi, Indonesia
7	10.02 - 10.09	ISFM-222	Paulus Edison Plaimo, I L Wabang, E A Dollu, A Hendrizal, I F Alelang	Fisheries Study Program, Faculty of Agriculture and Fisheries, Universitas Tribuana Kalabahi, 85811 Kalabahi Indonesia	Observing Mollusca Benthic Diversity to Measure the Success of the Implementation of Mulung Culture as an Effort to Conserve Aquatics in the Waters of Lapang-Batang Island, Alor Regency, East Nusa Tenggara
8	10.09 - 10.16	ISFM-223	Roza Elvyra	Department of Biology, Faculty of Mathematics and Natural Sciences, University of Riau, 28293 Pekanbaru, Indonesia	Genetic characterization of Ceratoglanis scleronema
9	10.16 - 10.23	ISFM-224	Tri Fenny Widayanti, L M Syarif, M Aswan, R Ramli	International Law Department, Faculty of Law, Hasanuddin University, 90245 Makassar, Indonesia	Implementation of Biodiversity Conventions in Protecting and Conserving Indonesia's Marine Environment
10	10.23 - 10.30	ISFM-225	Erniaty, S Gumiri, A Ardianor, A Haryono, Y Yulintine	Doctoral Program in Environmental Sciences, University of Palangka Raya, Kampus UPR Tunjung Nyaho, Yos Sudarso Street, Kotak Pos 2/PLKUP 73111, Palangka Raya, Central Kalimantan, Indonesia	The dynamics of benthic invertebrates in different peat swamp forests converted to rice fields
Discussion					
11	10.40 - 10.47	ISFM-226	Melissa Justine	Marine	Development of Hoat Tamngil

			Renjaan, Ida I Dewa Ayu Raka Susanty, Marselus Hungan	Agrotourism, Tual Polytechnic Of Fisheries, 97612, Tual, Indonesia	Mangrove Ecotourism Area, Southeast Maluku Regency Based On Zoning System
12	10.47 - 10.54	ISFM-227	Fahrial Fahma, Sulistiono, M. Mukhlis Kamal	Study Program of Aquatic Resources Management, Graduate Program, IPB University, Bogor, 16680, Indonesia	Length frequency distribution, growth pattern and condition factor of the comrade (<i>Poropuntius</i> <i>tawarensis</i> : Cyprinidae), in Laut Tawar Lake of Central Aceh, Indonesia
13	10.54 - 11.01	ISFM-228	Endang Yuli Herawati, Cepuri Ayu Farah Dini, Vadia Cahyani, Rahmi Valina, Ruly Isfatul Khasanah	Faculty of Fisheries and Marine Sciences, Universitas Brawijaya, Jl. Veteran, Malang 65145, East Java, Indonesia	Analysis of Abundance and Composition of Dinoflagellates in Mayangan and Binor Waters, Probolinggo, East Java, Indonesia
	11.01 - 11.11	Discussion			
	11.11 - 11.30	Photo Session and Closing			

ROOM 3

Moderator : Dr. Ir. Joko Samiaji, M.Sc.
Operator : Mardalisa, B.Sc., M.Si.

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.40 - 13.47	ISFM-301	M Mubarak, R Rifardi, A Riyadi, A Sulaiman, D Yoswati, M A Wibowo	Departement of Marine Science, Universita Riau, 28293 Pekanbaru, Indonesia.	On the Salinity Distribution Induced Mixing at the Mouth of the Estuary
2	13.47 - 13.54	ISFM-302	Ayisi C L, K N'souvi, K Baidoo, B K Tagoe, P A Nuamah, I Larbi, T A Asiamah, E H Alhassan	Department of Water Resources Development and Sustainable Development, School of Sustainable Development, University of Environment and Sustainable Development, Somanya, Eastern Region, Ghana	Perception of Climate Change and Adoption of Climate Smart Fisheries Among Small Scale Fishermen at Teshie, Ghana
3	13.54 - 14.01	ISFM-303	Miftahul K K, E Y Herawati, D Arfiati, A M S Hertika	Doctoral Program Faculty of Fisheries and Marine Science, Universitas Brawijaya 65145 Malang, Indonesia	Macrozoobenthic Diversity and Heavy Metal Accumulation of Pb and Hg in Bone River, Gorontalo, Indonesia
4	14.01 - 14.08	ISFM-304	Wahyu P, O Z Arifin, J Subagja, Imron, F Anggraeni, D N A Palimirmo, H Marnis	Research Center for Fishery, National Research and Innovation Agency, Cibinong, West Java, Indonesia	Reproductive Performance of Osteochillus vittatus Outside of the Natural Environment
5	14.08 - 14.15	ISFM-305	Reni W, G R Pasma, A N Wijayanti, R A Rachman	Reseach Centre for Oceanography, National Reseach and Innovation Agency, 14430 Jakarta, Indonesia	Tsunami Numerical Modelling in Ujung Kulon National Park with the Earthquake Magnitude Scenario of 6.5 and 6.9 Mw
Discussion					
6	14.25 - 14.32	ISFM-306	Romadhoni, B Santoso, S Purwoko, Afriantoni, P Nasution	Departement Naval Architecture State, Polytechnic of Bengkalis, 28714 Bengkalis, Indonesia	Design and Cost Building Calculation of 5 Gt Fiberglas Material Fishing Vessel Riau Province
7	14.32 - 14.39	ISFM-307	Muhammad S P, B Santoso, Romadhoni	Departement Naval Architecture State, Polytechnic of Bengkalis, 28714 Bengkalis, Indonesia	Ship Resistance and Powering Prediction of A Fishing Vessel Fiberglass 5GT
8	14.39 - 14.46	ISFM-308	Cynthia H, D Rohaningsih, T Suryono, A B Santoso, A Waluyo	Research Center for Limnology and Water Resources, Research and Innovation Agency, Cibinong, Indonesia	Microplastic Pollution in Surface Water of Lake Singkarak, Indonesia
9	14.46 - 14.53	ISFM-309	Eddiwan	Faculty of Fisheries and Marine Affairs. Universitas Riau, 28293 Pekanbaru, Indonesia	Effect of Density of Microalgae Spirulina sp. on Chromium Metal Bioremediation in Palm Oil Liquid Waste
10	14.53 - 15.00	ISFM-310	Helfinalis, Edward	Reserach Centre for Oceanography, National Research	The Impact of Mining Activities on Sediment Quality in the Seafloor Around Southeast of Sulawesi

				and Innovation Agency, 14330, Jakarta, Indonesia	
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-311	Syahril N, I Effendi, A Tanjung, Elizal	Department of Marine Science, Faculty of Fisheries and Marine, University of Riau, Indonesia	The Abundance of Micro plastics (MPs) in the Sediment of Pantai Carocok in Pesisir Selatan Regency, West Sumatra
12	15.17 - 15.24	ISFM-314	Agus S, R Akhwady, D Mahabrur, S M Permana, R Zulkarnain	Research Center for Conservation of Marine and Inland Water Resources, National Research and Innovation Agency, Jakarta, Indonesia	Analysis of Physical and Chemical Conditions in Sidakarya Coastal Waters, Bali
13	15.24 - 15.31	ISFM-315	Aiman I, M S Syawal, A N Ardiwinata, E Supriyoni, G P Yoga	Research Center for Limnology & Water Resource, National Research and Innovation Agency of The Republic of Indonesia (BRIN), 16911 Bogor, Indonesia	Occurrence of organochlorine pesticide residues in surface water and mussel Corbicula sumatrana from Lake Singkarak, West Sumatera
14	15.31 - 15.38	ISFM-316	Asus M S H, S Andayani, E D Lusiana, R BDS Putra	Aquatic Resources Management, Faculty of Fisheries and Marine Sciences, Universitas Brawijaya, 65145 Malang, Indonesia	Acute Toxicity (LC50) Ethanol Extract of Caulerpa lentilifera and Blood Glucose Level Analysis in Cyprinus carpio
15	15.38 - 15.45	ISFM-317	Asus Maizar Suryanto Hertika	Aquatic Resources Management, Faculty of Fisheries and Marine Science, Universitas Brawijaya, 65145 Malang, Indonesia	Blood Glucose Level Analysis of Gambusia Fish (Gambusia Affinis) Relationship with Environmental Conditions of The Brantas River Downstream, Malang
	15.45 - 15.55	Discussion			
	15.55 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	09.00 - 09.10	Room Registration			
1	09.10 - 09.17	ISFM-312	Rifardi, Mubarak, M A Wibowo, A F Aminah	Department of Marine Sciences, Faculty of Fishery and Marine Sciences Riau University, 28293 Pekanbaru, Indonesia	Characteristics of Sediment and Physical Oceanography at Shoreline Movement of Rhu Bay Riau Province Indonesia
2	09.17 - 09.24	ISFM-313	Rifardi, Mubarak, M A Wibowo, A F Aminah	Department of Marine Sciences, Faculty of Fishery and Marine Sciences Riau University, 28293 Pekanbaru, Indonesia	The Influence of Sedimentation Processes and Oceanographic Conditions on the Accretion Rate on the Coast of Tanjung Kapal, Riau Province, Indonesia
3	09.24 - 09.31	ISFM-318	Bintal A, A Lestari, Nursyirwani, I Nurrachmi	Department of Marine Science, Faculty of Fisheries and Marine Science Universitas Riau, 28293 Pekanbaru, Indonesia	Relationships between Organic Matter in Seawater and Sediment in the East Coast of Bengkalis Island
4	09.31 - 09.38	ISFM-319	Muhammad Suhaemi	Research Center for Limnology and Water Resources, National Research and Innovation Agency of The Republic of Indonesia (BRIN), 16911 Bogor, Indonesia	Analysis of organophosphate pesticide residues in surface water and Bilih fish (<i>Mystacoleucus padangensis</i> Blkr.) in Lake Singkarak, West Sumatra
5	09.38 - 09.45	ISFM-320	Muhammad Panji Pangestu	Directorate General of Human Settlements, Ministry of Public Works and Housing, 12110 Jakarta Capital Special Region, Indonesia	Performance Effectiveness of Communal Wastewater Treatment Plant as an Effort to Control Pollution of the Gajah Wong River, Yogyakarta
	09.45 - 09.55	Discussion			
6	09.55 - 10.02	ISFM-321	Muhammad Arief Wibowo, Afrizal Tanjung, Rina Susanti, Faiz Rohman Fajary, Yuka Martlisda Anwika	Dept. of Marine Sciences, Faculty of Fishery and Marine Sciences, Riau University, 28293, Indonesia	Understanding The Mechanism of Currents Through The Malacca Strait Study Case 2020 – 2022 : Mean state, Seasonal and Monthly Variation
7	10.02 - 10.09	ISFM-322	Rumondang, F Feliatra, T Warningsih, D Yoswati	Postgraduate Student at the Marine Science Study Program, Faculty of Fishery and Marine, Universitas Riau, Pekanbaru, Indonesia	Detection of Coastline Changing by Using Remote Sensing Imagery (Case Study in Talawi District, Tanjung Tiram District, Lima Puluh Pesisir District Batu Bara Regency)
8	10.09 - 10.16	ISFM-323	Romie J, E Prianto, M Fauzi, Budiono, Y Oktorini	Fishing Technology Universitas Riau, 28293 Pekanbaru, Indonesia	Pajak Management Area Mapping at Batin Tambak, Pelalawan District, Riau
9	10.16 - 10.23	ISFM-324	Yudho H, A Hendrizal, R Junaidi, Budijono	Aquatic Resources Management, Universitas Riau, 28293 Pekanbaru, Indonesia. 2. Management, Universitas Riau, 28293 Pekanbaru, Indonesia	Monitoring the Ecotoxicology of the Kampar River by Determining the Levels of Heavy Metal

10	10.23 - 10.30	ISFM-325	Yustiawati, T R Mulyaningsih, S Yusuf, L Subehi, M F I Nugraha, A Julzarika, Imroatushshoolika h, H A Sofiyudin	Research Center for Limnology and Water Resources, National Research and Innovation Agency, 16911 Bogor, Indonesia	Assessment of Multi-Element Content in Sediment and River Water of the Citarum Watershed
11	10.30 - 10.37	ISFM-326	Yuliati, E Sumiarsih, Efawani, I Mulyani, M I Fareza	Aquatic Resources Management, Universitas Riau, 28293 Pekanbaru, Indonesia	The Pollution load on tide conditions in Air Hitam River, Pekanbaru City, Riau Province
	10.37 - 10.47	Discussion			
	10.47 - 11.00	Photo Session and Closing			

ROOM 4

Moderator : Dian Iriani, S.Pi., MP.
Operator : Anggi Anggraini

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	13.30 - 13.40	Room Registration			
1	13.40 - 13.47	ISFM-401	R Yanuarti, N Nurfitriyana, G Pratama, and I D Kurniawan	Pharmacy Department, Faculty of Science and Technology, Al-Kamal Science and Technology Institute, Jakarta, Indonesia	Evaluation of Body Scrub from <i>Boerghesia forbesii</i> and <i>Kaempferia galanga</i>
2	13.47 - 13.54	ISFM-402	M Ilza and A Diharmi	Departement of Fisheries Product Technology, Faculty of Fisheries and Marine Science Universitas Riau, 28293 Pekanbaru, Indonesia	Processing and Utilization of Natural Phospholipids from Fish Belly Fat Waste of Jambal Siam Fish (<i>Pangasius Hypophthalmus</i>)
3	13.54 - 14.01	ISFM-403	R Nurdiani, A A Prihanto, M Firdaus, R B Jashinta, M F Fadhlurrohman, S Salsabila, F Athariq, N Huda, R A Talib	Department of Fishery Product Technology, Faculty of Fisheries and Marine Science, Universitas Brawijaya, Malang, Indonesia	Antibacterial and Antioxidant Activities of Edible Film Incorporated with Silver Nanoparticles Synthesized using <i>Rhizophora mucronata</i> Extract
4	14.01 - 14.08	ISFM-405	S Sumarto, R Karnila	Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Bioactive Components of Meat Powder and Viscera-Gonad <i>Holothuria Scabra</i> from Terung Island Waters, Batam, Indonesia
5	14.08 - 14.15	ISFM-406	S Sumarto S Suparmi, A Hidayati	Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Utilization of <i>Biang Fish</i> (<i>Ilisha elongata</i>) as Raw Material for Flavoring Powder
	14.15 - 14.25	Discussion			
6	14.25 - 14.32	ISFM-408	E Sinurat, F R Dew, D Fransisk, R Nurbayasari	National Research and Innovation Agency, kode pos Jakarta, Indonesia	Synthesis and Characterization of Hydroxyapatite of Cockle Shells (<i>Anadara granosa</i>) Originated from Indonesia Through Precipitation Method
7	14.32 - 14.39	ISFM-409	S Suparmi, S Sumarto, E Hendro, R Isna	Departemen organisasi	Organoleptic Characteristics of Mangrove Fruit Flour Differented with Rebon Shrimp Protein Hydrolysis (<i>Acetes erythraeus</i>) Become Nutritional Food Product as A Leading Product of Local Wisdom in the Coastal Region of Riau Province
8	14.39 - 14.46	ISFM-410	N Dharmayanti, A Permadi, D A Natalia, F R Dewi	Jakarta Technical University of Fisheries, 12520 South Jakarta, Indonesia	Production of Water-Soluble Chitosan with a Pressurized Hydrolysis Method as an Active Ingredient of Hand Sanitizer
9	14.46 - 14.53	ISFM-411	A Diharmi, R Karnila, F E Putri	Departement Fisheries Processing Technology, Faculty Fisheries and Marine,	Identification of Secondary Metabolite Compounds in Brown Seaweed (<i>Sargassum plagyophyllum</i>)

				Universitas Riau, Kampus Bina Widya Km 12,5 Simpang Baru, Pekanbaru, Riau, 28293 Pekanbaru, Indonesia	
10	14.53 - 15.00	ISFM-412	A Agustina, B Hasan, M Sukmiwati	Student of Postgraduate Marine Science Study Program, Universitas Riau, 28293 Pekanbaru, Indonesia	Isolation and Characterization of Fish Scale Collagen from Pond Raised Snakehead Fish (<i>Channa striata</i>) and Wild Sources
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-413	D Desmelati, S Suparmi, T Leksono	Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Characteristics of Freshwater Lobster <i>Carpas</i> Flour (<i>Cherax quadricarinatus</i>)
12	15.17 - 15.24	ISFM-414	D Iriani, B Hasan, N I Sari, V Alfionita	Department of Fisheries Product Technology Faculty of Fisheries and Marine Science Universitas Riau Indonesia	Preparation of Antioxidant Mask from <i>Chlorella</i> sp. and Its Evaluation
13	15.24 - 15.31	ISFM-415	J P Batubara, K Laila, R Rumodang, D Kurniawan	Aquaculture, Faculty of Agriculture, Asahan University Indonesia	The Effect of Pasak Bumi (<i>Eurycoma Longifolia</i> Jack) Extract on Different Dosage onto The Betta Fish (<i>Betta Splendens</i>) Embrio
	15.31 - 15.41	Discussion			
	15.41 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	09.00 - 09.10	Room Registration			
1	09.10 - 09.17	ISFM-416	M Sukmiwati, N I Sari and E Edison	Department of Fisheries Product Processing, Faculty of Fisheries and Marine Science. University Riau, 28293, Pekanbaru, Riau, Indonesia	Total Amino Acids and Protein Concentrate of Sea Cucumber (<i>Stichopus vastus</i>) From Natuna Waters, Riau Islands
2	09.17 - 09.24	ISFM-417	R Karnila A A Yunus, R Salma	Dept. of Fishery Products Technology, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Nutritional Characteristics of Sea Urchin (<i>Diadema setosum</i>) in Bungus Province Sumatera Barat
3	09.24 - 09.31	ISFM-418	R Karnila and A A Yunus	Dept. of Fishery Products Technology, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Carotenoid Pigments in Vanname Shrimp Carapace (<i>Litopenaeus vannamei</i>) as Natural Antioxidants
4	09.31 - 09.38	ISFM-419	Latif Sahubawa	Departement of Fisheries, Faculty of Agriculture, Gadjah Mada University Jl. Flora No. 01, Kampus UGM Bulaksumur Yogyakarta – Indonesia, 55281	Study of Nutritional Composition and Consumer Preference Level from Hanpen Fish Cake Based on African Catfish Surimi and Cassava Flour
5	09.38 - 09.45	ISFM-420	D Dewita, S W Sidauruk, D Desmelati	Dept. of Fishery Products Technology, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Amino Acid and Mineral Profiles of Fresh Snakehead (<i>Channa striata</i>) Meat to Potential as an Immune System
	09.45 - 09.55	Discussion			
6	09.55 - 10.02	ISFM-518	N Ira Sari, S W Sidauruk, D Dewita, N T Ananda	Dept. of Fishery Products Technology, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Characteristics of Mangrove (<i>Sonneratia alba</i>) Leaf Extract as A Biosalt Preparation
7	10.02 - 10.09	ISFM-422	R W Fuah, N Nursamsi, J Samiaji, W Windarti, B P Silalahi	Matauli College for Fishery and Marine Science, Pandan, Tapanuli Tengah, Indonesia	Analysis of the Application of MSC Ecolabeling in Tuna Products Processing Industry in Sibolga
8	10.09 - 10.16	ISFM-421	S W Sidauruk, D Iriani, A Diharmi, A Anggraini	Dept. of Fishery Products Technology, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Physicochemical Characterization of Calcium Oxide from Freshwater Mussel (<i>Pilsbryconcha</i> sp.) Shell
	10.16 - 10.26	Discussion			
	10.26 - 11.00	Photo Session and Closing			

ROOM 5

Moderator : Prof. Dr. Ir. Nursyirwani, M.Sc
 Operator : Chicka Willy Yanti, S.P., M.Si

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.30 - 13.40 13.40 - 13.47	ISFM-501	Feliatra, M Hendra, U M Batubara, I Effendi, A Adelina and V A Feliatra	Marine Microbiology Lab. Dept of Marine Sciences, Fisheries and Marine Sciences Faculty, University of Riau, Pekanbaru, Riau, 28293, Indonesia	Potential of Single Cell Protein Production Using Waste as Growth Medium
2	13.47 - 13.54	ISFM-502	Ayisi Christian Larbi	Department of Water Resources Development and Sustainable Development, School of Sustainable Development, University of Environment and Sustainable Development, Somanya, Eastern Region, Ghana	Comparative Profiling of Growth, Feed Utilization and Proximate Composition of African Bony Tongue (<i>Heterotis niloticus</i>) Fed <i>Bacillus subtilis</i> 200 and <i>Saccharomyces cerevisiae</i> .
3	13.54 - 14.01	ISFM-503	Prama Hartami, L Nurjannah, O Carman, M Zairin Jr. , A Alimuddin, R Rahman, W Pamungkas	Department of Aquaculture, Faculty of Agriculture, Malikussaleh University, Kampus Utama Reuleut, Jl. Cot Tgk. Nie Muara Batu, Indonesia	<i>Aeromonas Hydrophila</i> Motile Disease (MAS) Resistance Test by <i>Aeromonas hydrophila</i> Bacteria on Triploid Striped Catfish
4	14.01 - 14.08	ISFM-504	Lisa Ruliaty, I R Amalia, R I Sari, R Aulia	Research center for Fishery, National Research and Innovation Agency, Indonesia	Different Nitrogen Sources to Improve the Quality of <i>Spirulina platensis</i> Culture in Mass Scale
5	14.08 - 14.15	ISFM-505	Salamah, M Mainisa, S Safriani, M Muliani, E Ayuzar	Departement of Aquaculture, Malikussaleh University, 24355, North Aceh	Application of Azolla (<i>Azolla pinnata</i>) Liquid Fertilizer to the Density of <i>Chlorella</i> sp
Discussion					
6	14.25 - 14.32	ISFM-506	Arlene Avillanosa, R G Dolorosa, C M A Caipang	College of Fisheries and Aquatic Sciences, Western Philippines University, Puerto Princesa Campus, Puerto Princesa City 5300, Palawan, Philippines	Giant Freshwater Prawn (<i>Macrobrachium rosenbergii</i>) Fishery in Palawan, Philippines: Catch Trends and Implications to Fisheries Management
7	14.32 - 14.39	ISFM-508	Emily Cataluña, M L C Arabaca, J A Tornalejo, E B S Yerro, J E Deocampo, Jr., C M A Caipang	Department of Biology, College of Liberal Arts, Sciences, and Education, University of San Agustin, 5000, Iloilo City, Philippines	Bioplastics From Freshwater Bacteria: A Rapid Screening Approach
8	14.39 - 14.46	ISFM-509	Eva Ayuzar, I Erniati, M Khalil, R Rusydi	Aquaculture Department, Malikussaleh University, 24355 North Aceh, Indonesia	Effectiveness of Adding Soursop Leaves Flour (<i>Annona muricata</i>) in Feed to Handle <i>Vibrio</i> <i>Harveyi</i> Infection on Vaname Shrimp (<i>Litopenaeus vannamei</i>)

9	14.46 - 14.53	ISFM-510	Dedi Noviendri, R F Hasrini, Subaryono, E Maraskuranto	Research Center for Pharmaceutical Ingredients and Traditional Medicine. National Research and Innovation Agency. Cibinong, West Java, Indonesia	Biopigments (Phycocerythrin, Fucoxanthin and Siphonaxanthin) from Seaweeds and Their Potential Applications as Ingredients in Cosmeceutical Industries: A Review
10	14.53 - 15.00	ISFM-511	Arief Taslihan, M Reantaso, S Tavornpanich, B Hanggono	Indonesia Research Innovation Agency	Study on prevalence and risk factors for EHP (Enterocytozoon hepatopenaei) in shrimp aquaculture Indonesia
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-512	Agussyarif Hanafie, S Aisiah, E Rezkiyani, E Kartiani	Dept. Aquaculture, Faculty of Fisheries and Marine, Lambung Mangkurat University, Jl. A. Yani Km 36.Banjarbaru, Kalimantan Selatan, 70714, Indonesia	Isolation And Identification of Bacteria in Climbing Perch (Anabas testudineus Bloch) Digestion Channel As a Probiotic Candidate
12	15.17 - 15.24	ISFM-513	Dessy Yoswati, E Efriyeldi, U M Batubara, W Windarti, T M Ghazali, E Saputra, R S Jaya	Faculty of Fisheries and Marine, University of Riau, Pekanbaru, Indonesia	Gastric Contents Analysis of Gulamah Fish (Johnius belangerii) In West Dumai and East Dumai Sea Waters
13	15.24 - 15.31	ISFM-514	Idin Sahidin, A Fristiody, B Sadarun, N S Rahmatika, A W M Yodha, Nur Upik En Masrika, Andini Sundowo, Sofa Fajriah	faculty Of Pharmacy, Universitas Halu Oleo, Kendari, Indonesia	Antioxidant, Toxicity and Secondary Metabolites Contents of Ethylacetate Fraction from Soft Coral Lobophytum Sp. Growing in South East Sulawesi
14	15.31 - 15.38	ISFM-515	Jarod Setiaji, J Hariwitonang	Department of Aquaculture, Faculty of Agriculture, Universitas Islam Riau, Pekanbaru 28284, Indonesia	The Potential of Jeringau (Acorus calamus) Extract as An Antibacterial in Fish
	15.38 - 15.48	Discussion			
	15.48 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	09.00 - 09.10	Room Registration			
1	09.10 - 09.17	ISFM-516	Morina Riau waty and Windarti	Department of Aquaculture, Fisheries and Marine Science Faculty, Universitas Riau, 28293 Pekanbaru, Indonesia	Kidney Stucture of Pangasianodon hypophthalmus Fed with Fermented Red Ginger and Infected With Aeromonas hydrophila
2	09.17 - 09.24	ISFM-517	Mulyasari, R Samsudin, S Subaryono	Research Center for Marine and Inland Water Bioindustry, National Research and Innovation Agency of the Republic of Indonesia, 83352, Mataram, Indonesia	Fermentation of Formulated Feed using Bacillus subtilis TS2b for Giant Freshwater Prawn (Macrobrachium rosenbergii) Feed
3	09.24 - 09.31	ISFM-519	Nanda R. Prasetiawan, Nasir Sudirman, Hadiwijaya L. Salim, Restu Nur Afi Ati, Terry Louise Kepel, August Daulat, Mariska A. Kusumaningtyas, Sofyan Muji Permana, Agus Setiawan, Widodo S. Pranowo, Agustin Rustam, Devi Dwiyantri Suryono, S.S. Sukoraharjo	Research Center for Food Technology and Processing, National Research and Innovation Agency, Republic of Indonesia	Preliminary Study Of Marine Debris Composition From Fisherman Activities : A Case Study On Cikidang Fishing Port, Pangandaran
4	09.31 - 09.38	ISFM-520	Nursyirwani, M Mardalisa, U M Batubara, N Nurhayati, R F Putri	Lecturer at the Marine Science Department, Faculty of Fishery and Marine, Universitas Riau, Pekanbaru 28293, Indonesia	Microbiological Quality of Vannamei Shrimp Pond Waters in Rupat Island, Bengkalis District, Riau.
5	09.38 - 09.45	ISFM-521	Rumondang, Juliwati Putri Batubara, Khairani Laila, Dhea Gustira	Lecturer of Aquaculture, Asahan University	Identification of Ectoparasites Infecting Mangrove Crabs (Scylla serrata) in Asahan Regency
	09.45 - 09.55	Discussion			
6	09.55 - 10.02	ISFM-522	Wini Trilaksani, Bambang Riyanto, Nur Maghfiroh Apriliani Tunggal Dewi	Department of Aquatic Products Technology, Faculty of Fisheries and Marine Science, Bogor Agricultural University, Jalan Agatis, Bogor 16680 West Java, Indonesia.	Profiling Bioactive Peptide Extracted From Dried Arabushi Protein of Bonito, Baby Tuna and Deho
7	10.02 - 10.09	ISFM-523	U M Batubara, R D Sibagariang, S S Siregar, T Maelina, T Y Ginting, M R Pratama and M R Jaboro	Marine Science Department, Faculty of Fisheries and Marine Science, Riau University, Pekanbaru, Indonesia	Determination of Photosynthetic Anoxygenic Bacteria from Water and Sediment in Dumai Coastal Waters, Indonesia
8	10.09 - 10.16	ISFM-524	M Mardalisa, Y Zalfiatri, R Rahmayuni	Dept. of Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	The Effect of Culture Media Types on the Growth of Marine Microalgae <i>Chlorella vulgaris</i>
	10.16 - 10.26	Discussion			
	10.26 - 11.00	Photo Session and Closing			

ROOM 6

Moderator : Dr. Trisla Warningsih, S.Pi., M.Si.
Operator : Rindi Metalisa, S.P., M.Si.

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.40 - 13.47	ISFM-601	S Suharto, N Noprizal, E Eddiwan	The Department of Archives of Pelalawan Regency. Riau Province	The Effect of Marine Tourism on Community Income in Teluk Meranti District, Pelalawan Regency, Riau
2	13.47 - 13.54	ISFM-602	L Zamzami, A Azwar, M I Kabullah, H D Moenir	Department of Anthropology, Faculty of Social and Political Sciences, Universitas Andalas, 25162, Padang, Indonesia	Collective Tourism Social Entrepreneurship and Social Assets: A Combining Capital for Innovative Village Development at Fisherman Community in West Sumatra Province
3	13.54 - 14.01	ISFM-603	M A Limi, S R Ningsih, S A Fyka, P Syarni, H S Dewi, U Attamimi	Department of Agribusiness, Faculty of Agriculture, University of Halu Oleo Kendari 93232 Southeast Sulawesi Indonesia	Analysis of crab fisherman's household structure and livelihood strategy after the Kendari Bay revitalization
4	14.01 - 14.08	ISFM-604	R Novianti, A Y Afandi, A Rahmadya, D Rohaningsih, B I Tampubolon	Research Centre for Limnology and Water Resources, National Research and Innovation Agency (BRIN), Cibinong 16911, West Java, Indonesia	Water Quality and Financial Feasibility Analysis of Milkfish Cultivation in Karangsang Village, Indramayu Regency, West Java
5	14.08 - 14.15	ISFM-605	E Yulinda, R Hendri, C Yolandika	Faculty of Fisheries and Marine Science, University of Riau, Pekanbaru	Supply chain pattern analysis of cinctot (Cerithidea obtusa) in Indragiri Hilir, Riau
Discussion					
6	14.15 - 14.25	ISFM-606	D Darwis, T Ramadana, F Septya, R Metalisa	Social Economic Fisheries, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Gap Analysis on Marine Tourism Development in North Rupat Region
7	14.25 - 14.32	ISFM-607	K Kusai, T Warningsih, Z Zulkarnain, D Deviasari, EK Gea and Y Yusriyanti	Social Economic Fisheries, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	The patron-client relationship between Senangin fish fishermen and tauke (capital owners) in Rokan Hilir Regency, Riau
8	14.32 - 14.39	ISFM-608	R Hendri, E Yulinda, Z Zulkarnain	Dept. of Fisheries Socio-economics, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	The Ideal Fishing Cyber-Extension Content Model at MFCE Website for Fishermen in Indragiri Hilir Regency, Riau
9	14.39 - 14.46	ISFM-610	C Yolandika, E Yulinda, R Hendri	Faculty of Fisheries and Marine Science, University of Riau, Pekanbaru	Marketing efficiency of mantis shrimp (Harpiosquilla raphidea) in Tanah Merah, Indragiri Hilir, Riau Province
10	14.46 - 14.53	ISFM-611	H Hendrik, Z Zulkarnaini, C Yolandika	Department of Socio-Economic, Faculty of Marine and Fisheries, Riau University, Indonesia	Business Of Floating Net Cages (FNC) Cultivation After Covid-19 Pandemic Decreased In Koto Panjang Hydropower Reservoir
Discussion					
	15.00 - 15.10				

11	15.10 - 15.17	ISFM-609	T Warningsih, D Efizon, N Aulia	Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Economic value of carbon in mangrove ecosystem of Cawan Island, Indonesia
12	15.17 - 15.24	ISFM-612	C Yolandika, H Renolafitri, H Mursyid	Faculty of Fisheries and Marine Science, University of Riau, Pekanbaru	The competitiveness of Indonesia's frozen shrimp exports in international market
13	15.24 - 15.31	ISFM-613	A Mahary, I Effendi, U M Tang, D Darwis	Faculty of Agriculture, University of Asahan, Kisaran, Indonesia	Pantai Sejarah Mangrove Park, Kabupaten Batubara, North Sumatera Province, Indonesia: Ecotourism, Conservation and Aquaculture.
14	15.31 - 15.38	ISFM-615	L Bathara, I Effendi, U M Tang, S E Kornita	Faculty of Fisheries and Marine Sciences, University of Riau, Pekanbaru, Indonesia	Social Capital of Duano Tribe Fishermen in Sharia Economic Perspective in Tanjung Pasir and Sungai Belah Village, Indragiri Hilir Regency, Riau Province
	15.38 - 15.48	Discussion			
	15.48 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	09.00 - 09.10	Room Registration			
1	09.10 - 09.17	ISFM-616	A Pramana, H Mursyid, A Sutikno, Y Zamaya, M H Daulay, M Jayalaksamana, D Kurnia	Agricultural Technology Industry Study Program, Riau University, Kampus Bina Widya KM 12,5 Pekanbaru Riau	The Potential of Pineapple Products as a Strategy for Community Economic Revitalization in Peatlands
2	09.17 - 09.24	ISFM-617	H Arief, U R Pradini, F Nugroho, C W Yanti, M P Putra	Social Economic Fisheries, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Analysis Of Income And Risk Of Cultivation Business Vannam Shrimp Foods In Bantan District Bengkalis District Riau Province
3	09.24 - 09.31	ISFM-618	N R. Prasetyawan, N Sudirman, H L. Salim, R N A Ati, T L Kepel, A Daulat, M A. Kusumaningtyas, S M Permana, A Setiawan, W S. Pranowo, A Rustam, D D Suryono, S.S. Sukoraharjo	Research Center for Food Technology and Processing, National Research and Innovation Agency, Republic of Indonesia	Preliminary Study To Estimate The Potential Input Of Solid Waste To The Area Of Fishing Port, Case Study: Karangantu Fishing Port
4	09.31 - 09.38	ISFM-619	T Ramadana, F Septya, S. H. Siregar, S. W. Wildah, M. M. M. Lumbanraja, K Anam	Social Economic Fisheries, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Key Factors for the Sustainability of Mangrove Crab Cultivation Business in Panipahan Indonesia
5	09.38 - 09.45	ISFM-620	V Amrifo, D Murni, R Fikri, D Darwis	Riau University, Kampus Binawidya Km 12,5 Panam, Pekanbaru, Riau Province, 28293, Indonesia	Money, Livelihood, or Coral Reef Ecosystem Sustainability: Learning From Ecotourism Management in Mapur Islands, Indonesia
	09.45 - 09.55	Discussion			
6	09.55 - 10.02	ISFM-621	Y Yasir, N Nurjanah, N Yohana, S Samsir	Communication Science, Faculty of Sosial and Political Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Environmental Communication Based on Mangrove Ecotourism Management for Abrasion Prevention on Bengkalis Island
7	10.02 - 10.09	ISFM-622	C W Yanti, R Metalisa, L Bathara, V B Saragih	Faculty of Fisheries and Marine, University of Riau, Pekanbaru	Income Contribution Based on Fishing Gear of The Duano Tribe, Indragiri Hilir, Riau
8	10.09 - 10.16	ISFM-623	U R Pradini, H. Arief	Doctoral Student of Marine Science Study Program, Faculty of Fishery and Marine, Universitas Riau, Pekanbaru, Indonesia	Sustainability Status of Baung Fish in Public Waters, Kampar Regency, Riau Province
9	10.16 - 10.23	ISFM-624	Rindi Metalisa	Social Economic Fisheries, Faculty of Fisheries and Marine, Universitas Riau, 28293 Pekanbaru, Indonesia	Analysis of the Fisheries Business Orientation of the Duano tribe based on Socio-Culturalism in Tanah Merah Subdistrict, Indragiri Hilir
10	10.23 - 10.30	ISFM-626	Adi Tiaraputri, Ledy Diana, Evi Deliana HZ	Faculty of Law, Universitas Riau, 28127 Pekanbaru, Indonesia	Can Geographical Indication Protect Kuansing Kunyit Catfish?
11	10.30 - 10.37	ISFM-627	Masrizal	Faculty Of Fisheries And	The Effect of Trust and Commitment Through Communication on the

				Marine. University Riau	Performance of Marine Fish Supply Chain Management in Bangliau, West Bagan Village, Bangko District, Rokan Hilir Regency, Riau Province
	10.37 - 10.47	Discussion			
	10.47 - 11.00	Photo Session and Closing			

ROOM 7

Moderator : Dr. Iskandar Putra, S.Pi., M.Si.
Operator : Santhy Wisuda Sidauruk, S.Pi., M.Si

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
Room Registration					
1	13.30 - 13.40	ISFM-N101	Safran Makmur, K.Fatah	National Research and Innovation Agency	Population Dynamics of Snakehead Fish and Marble Goby Fish in Bili Bili Reservoir, South Sulawesi
2	13.40 - 13.47	ISFM-N102	Ratih Nurjayati, D Marganingrum	Research Center for Environmental and Clean Technology, National Research and Innovation Agency (BRIN), Indonesia	Typical Solid Waste Management in Southeast Asia Coastal Area
3	13.47 - 13.54	ISFM-N103	La Ode Alifatri, Sigid Hariyadi, Handoko Adi Susanto	Pusat Riset Oseanografi, Badan Riset dan Inovasi Nasional, Jalan Pasir Putih 1 Ancol Jakarta Utara 14430	Analisis Daya Dukung Lahan Untuk Pengembangan Budidaya Kerapu Di Perairan Tambak
4	13.54 - 14.01	ISFM-N104	Fismatman Ruli, Nining Betawati Prihantini, Sem Likumahua, Ahmad Romdon, Marsya J Rugebregt, Rafidha Dh Ahmad Opier, Tri Widodo, Malik Sudin Abdul and Iskandar Abd Hamid Pelupesy	Graduate Program in Marine Science, Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Indonesia, UI Campus, Depok 16424	Holoplankton Abundance And Biovolume In Inner Ambon Bay
5	14.01 - 14.08	ISFM-N105	Tamrin, A Rumpa, M Maskur	Lectur at Polytechnic of Marine and Fisheries Bone, 92718, Bone Regency, South Sulawesi, Indonesia	Fish Caller Attraction Engineering (Sound and Light Combination) That Is Effective And Efficient In Fisheries In Fixed Lift-Net
Discussion					
6	14.08 - 14.15	ISFM-N106	Selfi Anidal Febbyolla, Sofyan Husein Siregar1, Irvina Nurrachmi	Marine Science, Faculty of Fisheries and Marine University of Riau, 28293 Pekanbaru, Indonesia	Plankton Community Structure At Kasiak Island Water Pariaman City West Sumatera Province
7	14.15 - 14.25	ISFM-N107	E Erniaty, S Gumiri, A Ardianor, A Haryono, Y Yulintine	Doctoral Program in Environmental Sciences, University of Palangka Raya, Kampus UPR Tunjung Nyaho, Yos Sudarso Street, Kotak Pos 2/PLKUP 73111, Palangka Raya, Central Kalimantan, Indonesia	The Dynamics Of Benthic Invertebrates In Different Peat Swamp Forests Converted To Rice Fields
8	14.25 - 14.32	ISFM-N108	Asep Awaludin Prihanto, Happy Nursyam	Dept. Fishery Product Technology, Faculty of Fisheries and Marine Science, Brawijaya University. Jl. Veteran, Malang, East Java, Indonesia	Modeling, Binding Site, and Immunogenicity Analysis Of Genes Encoding L-Asparaginase From Spirulina platensis
9	14.32 - 14.39	ISFM-N109	Y Aguswan, S Gumiri, R M Sukarna, I Permana	Department of Forestry, Faculty of Agriculture, University of	Mapping Indicative Location for Beje Pond as Fish Source

				Palangka Raya, Kampus UPR Tunjung Nyaho, Yos Sudarso Street, Kotak Pos 2/PLKUP 73111, Palangka Raya, Central Kalimantan, Indonesia	
10	14.53 - 15.00	ISFM-N110	Tutik Handayani, Aradea Bujana Kusuma	Diploma III Aquaculture Faculty of Fisheries and Marine Science, Universitas Papua, 98314 Manokwari, Indonesia	PERBEDAAN KARAKTER MORFOLOGI, MORFOMETRIK DAN MERISTIK IKAN JULUNG- JULUNG Hemiramphus Lutkey Dan Hemirampus Far
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-N111	Muhammad Arief Wibowo, Rifardi, Mubarak, Elizal, Yuka Martlisda Anwika	Dept. of Marine Sciences, Faculty of Fishery and Marine Sciences, Riau University, 28293, Indonesia	Analisis Perubahan Garis Pantai Menggunakan Digital Shoreline Analysis System di Pulau Rangsang, Kabupaten Meranti, Riau
12	15.17 - 15.24	ISFM-N112	Melissa Justine Renjaan, Ida I Dewa Ayu Raka Susanty, Marselus Hungan	Marine Agrotourism, Tual Polytechnic Of Fisheries, 97612, Tual, Indonesia	Development of Hoat Tamngil Mangrove Ecotourism Area, Southeast Maluku Regency Based On Zoning System
13	15.24 - 15.31	ISFM-N113	Samliok Ndobe, Rahman Dako, Yeldi S. Adel, Nurain Lapolo, Christopel Paino, Moh. Sayuti Djau, Indah Rufiati, Rayhan Dudayev, Faridz Rizal Fachri, Wahyu Dita Septiani	urusan Perikanan dan Kelautan, Fakultas Peternakan dan Perikanan Universitas Tadulako, Palu 94118, Indonesia	Pemanfaatan Sumberdaya Perikanan Gurita di Sulawesi Tengah
14	15.31 - 15.38	ISFM-N114	Irvina Nurrachmi, Bintal Amin dan Sofyan Husein	Ilmu Kelautan, Fakultas Perikanan dan Kelautan, Universitas Riau, Indonesia	Truktur Komunitas Plankton Dan Kondisi Lingkungan Perairan Di Kawasan Industri Pelintung, Dum
15	15.38 - 15.45	ISFM-N115	M Fauzi, Tirtadanu, ARP Pane, H Widyastuti, dan S Mardlijah	Pusat Riset Perikanan, Organisasi Riset Kebumian dan Maritim, Badan Riset dan Inovasi Nasional	Introduksi Kohor, Pertumbuhan Dan Laju Eksploitasi Ikan Siro (Amblygaster sirm, Walbaum, 1792) Di Laut Natuna Utara
	15.45 - 15.55	Discussion			
	15.55 - 16.00	Photo Session and Closing			

Panel Session on September 15, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	09.00 - 09.10	Room Registration			
1	09.10 - 09.17	ISFM-N116	S Sumarto, S Suparmi, U J Siregar	Lecturer of Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, 28293, Indonesia	Characteristics of Biscuit Quality With the Addition of Different Fish Flour (<i>Ilisha elongata</i>)
2	09.17 - 09.24	ISFM-N117	Nur El Fajri, M. Fauzi, dan Winda Utary Nalurita Gultom	Fakultas Perikanan dan Kelautan Universitas Riau	Strategi Pengelolaan Ekosistem Mangrove Sebagai Kawasan Ekowisata Berbasis Kearifan Lokal di Kampung Rawa Mekar Jaya
3	09.24 - 09.31	ISFM-N118	Eni Sumiarsih, Nadya, Rahma Putri Andita ,Wan Wawan Wahyu Illahi	Universitas Riau	Strategi Pengembangan Wisata Bahari Sebagai Daya Tarik Wisata Di Pulau Sedanau Kecamatan Bunguran Barat Kabupaten Natuna
4	09.31 - 09.38	ISFM-N119	Eni Sumiarsih, Adriman, Reza Gunawan	Universitas Riau	Diversitas Gastropoda Pada Ekosistem Lamun
5	09.38 - 09.45	ISFM-N120	Adriman, Eko Prianto, Romie Jhonnerie, Nur El Fajri	Aquatic Resources Management Department, Faculty of Fisheries and Marine Science, Universitas Riau-Indonesia	Kapasitas Adaptasi Ekosistem Mangrove Di Kecamatan Sungai Apit Kabupaten Siak Provinsi Riau
	09.45 - 09.55	Discussion			
6	09.55 - 10.02	ISFM-N121	Enita Dabutar, Izza Ahyani Harahap, Muhammad Rizki, Octa Risandes, Simson Marvicardo Sipayung, Yoshua Satria Yudha Prawira, Alifa Khansa Sofian , Amelia Nur Rizki, dan Romie Jhonnerie	Mahasiswa Jurusan Pemanfaatan Sumberdaya Perikanan, Fakultas Perikanan dan Kelautan, Universitas Riau, Pekanbaru	Pemetaan Daerah Penangkapan Ikan Tongkol (<i>Euthynnus Affinis</i>) Di Perairan Selat Malaka Menggunakan Model Maximum Entropy
7	10.02 - 10.09	ISFM-N216	Desniar ,Ella Salamah, Suci Lestari	Departemen Teknologi Hasil Perairan, Fakultas Perikanan dan Ilmu Kelautan, Institut Pertanian Bogor	Penapisan Antibakteri Dari <i>Lactococcus Lactis</i> Spp. <i>Lactis</i> Bi(2) Yang Diisolasi Dari Bekasam Ikan Bandeng
8	10.09 - 10.16	ISFM-N217	D Dahlia, S Suparmi, S Sahrul	Fishery Products Technology, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Effect of The Addition of <i>Chlorella</i> sp Flour on Chemical Quality Boba
	10.16 - 10.26	Discussion			
	10.26 - 11.00	Photo Session and Closing			

ROOM 8

Moderator : Dr. Muhammad Fauzi, S.Pi, M.Si
 Operator : Ummi Mardhiah Batubara, S.Si., M.Si

Panel Session on September 14, 2022

No	Time (WIB)	Registrasi No	Presenters	Affiliation	Title
	13.30 - 13.40		Room Registration		
1	13.40 - 13.47	ISFM-N201	Syahril Nedi, Elizal and Luthfia Aini Mulyadi	Department of Marine Science, Faculty of Fisheries and Marine, University of Riau, Indonesia	Pemetaan Daerah Penangkapan Ikan Tongkol (<i>Euthynnus Affinis</i>) Di Perairan Selat Malaka Menggunakan Model Maximum Entropy
2	13.47 - 13.54	ISFM-N202	Awaldi R, Sumaryanto H, Santoso J	Aquatic Product Technology, Faculty of Fisheries and Marine Science, IPB University, 16680 Bogor, Indonesia	Characteristics of Agar from <i>Gracilaria</i> sp. Ultrasonic Extraction with Alkali Pretreatment
3	13.54 - 14.01	ISFM-N203	Rizki Putra, Henni Syawal, Iesje Lukistyowati	Program Studi Magister Ilmu Kelautan, Fakultas Perikanan dan Kelautan, Universitas Riau, 28293 Pekanbaru, Indonesia	Pengaruh Salinitas Berbeda terhadap Pertumbuhan dan Sintasan Ikan Mas (<i>Cyprinus carpio</i>) dengan Pemberian Pakan Jamu Fermentasi
4	14.01 - 14.08	ISFM-N204	J Santoso, J B Berliana, Natania	Department of Aquatic Products Technology, Faculty of Fisheries and Marine Sciences, IPB University (Bogor Agricultural University), Campus IPB Darmaga Bogor 16680, Indonesia	Tilapia Fish Scales as a Source of Halal Gelatin: Extraction and Characterization
5	14.08 - 14.15	ISFM-N205	Hazmi Arief	Universitas Riau	Strategi Pengembangan Agroindustri Perikanan Laut di Kabupaten Rokan Hilir
	14.15 - 14.25		Discussion		
6	14.25 - 14.32	ISFM-N206	D Noviendri, R F Hasrini, Subaryono, E Maraskuranto	Research Center for Pharmaceutical Ingredients and Traditional Medicine. National Research and Innovation Agency. Cibinong West Java, Indonesia	Biopigments (R-Phycocerythrin, Trans-Fucoaxanthin and Siphonaxanthin) from Seaweeds and Its Potential Application as Ingredients in Cosmeceutical Industries: A Review
7	14.32 - 14.39	ISFM-N207	Khusnul Aini, Iriani Setyaningsih, Rizfi Faris Pari	Departemen Teknologi Hasil Perairan, Fakultas Perikanan dan Ilmu Kelautan, Institut Pertanian Bogor	Pigmen Fikosianin Dan Komponen Aktif Spirulina Platensis Yang Dikultivasi Menggunakan Media Garam Berbeda
8	14.39 - 14.46	ISFM-N208	Jernihtayanti, Iesje Lukistyowati, Morina Riau waty	Fisheries and Marine Science Faculty, Universitas Riau, 28293 Pekanbaru, Indonesia	Identifikasi Bakteri Asam Laktat (Bal) Dari Media Air Budidaya Ikan Nila Srikandi (<i>Oreochromis Aureus</i> X <i>Oreochromis Niloticus</i>) Dengan Sistem Boster
9	14.46 - 14.53	ISFM-N209	Fitri Rahmayani Tambunan, Netti Aryani, Hamdan Alawi	Fish Hatchery and Breeding Laboratory, Faculty of Fisheries and Marine Science, Universitas Riau, 28293 Pekanbaru, Indonesia	Pengaruh Hormon Oodev Terhadap Pematangan Akhir Gonad Ikan Selais (<i>Ompok Rhadinurus</i> Ng)
10	14.53 - 15.00	ISFM-N210	Tumpak Sidabutar, Endang	Research Centre for Oceanography,	A case study of nutrient enrichment (N and P) in connection

			S. Srimariana, Hendrik Cappenberg, Yoga	National Research and Innovation Agency (BRIN), Jl. Pasir Putih I, Jakarta 14430, Indonesia	with the tragedy of phytoplankton blooms in Lampung Bay
	15.00 - 15.10	Discussion			
11	15.10 - 15.17	ISFM-N211	Asriyana Asriyana, Halili Halili, Muis Balubi, Asnawati Asrari	Jurusan Manajemen Sumberdaya Perairan, Universitas Halu Oleo, Kendari, Indonesia	Kinerja Pertumbuhan dan Kelulushidupan Benih Ikan Lele Laut (<i>Plotosus lineatus</i>) pada Mikrohabitat Berbeda
12	15.17 - 15.24	ISFM-N212	Dahlia, Sumarto, dan Desti Maharani	Lecturer of Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, 28293, Indonesia	'The Evaluation of Sago Crackers' Chemical Quality Characteristics After the Addition of Various Fish Flour
13	15.24 - 15.31	ISFM-N213	Gesang Nur Ikhlas, Sumarto, and Dewita	Department of Fisheries Processing Technology, Faculty of Fisheries and Marine Science, Universitas Riau, Pekanbaru, 28293, Indonesia	Nutrient Content of Shredded Biang Fish (<i>Ilisha elongata</i>) Using Different Packaging During Storage
14	15.31 - 15.38	ISFM-N214	Bambang Widyo Prastowo, Tanjung Penataseputro dan Yan Evan	Badan Riset dan Inovasi Nasional, Pusat Riset Perikanan Cibinong	Necrosis Incidence on Sand Lobster (<i>Panulirus homarus</i>) Tail Fin Reared Using Recirculating Aquaculture System (RAS)
15	15.38 - 15.45	ISFM-N215	R. L. Hayati, L Hakim, A. A. Prihanto, Nurjannah	Doctoral program of Environmental Science, Graduate School Program, Universitas Brawijaya, East Java, Indonesia	Isolation, and Identification of enzymes-producing Lactic acid Bacteria isolated from intestine of Nile Tilapia (<i>Oreochromis niloticus</i>)
	15.45 - 15.55	Discussion			
	15.55 - 16.00	Photo Session and Closing			

Keynote Speakers Abstracts

Christopher Marlowe A. Caipang, Ph.D.
University of San Agustin, The Philippines

Innovative Biofloc Technology During the Nursery Production of Shrimp in Tanks: An Approach Towards A Sustainable Shrimp Culture Industry

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Abstract. Shrimp farming is an important sector in aquaculture because shrimps are major contributors to the national economy through export revenues. This resulted in rapid intensification of the shrimp culture industry, which created negative impacts on sustainability and the environment. Hence, there is an urgent need to develop aquaculture production systems that are highly productive and profitable, yet possess a low carbon footprint. Biofloc technology (BFT) fits into these criteria because this technology allows intensive culture of aquatic species, lower utilization of resources, and improvement in water quality by manipulating the production and activity of beneficial microbial biomass, which, at the same time, can be utilized as a source of feed for the growing shrimp. BFT has been proven to be viable on a commercial scale in shrimp grow-out, and recent studies have shown that this technology is further refined and optimized for the production of shrimp during the nursery phase. Nursery systems are valuable production tools that ensure the sustainability of shrimp aquaculture. If carefully designed and properly implemented, nurseries are also effective biosecurity facilities for the high-density culture of shrimp postlarvae (PL), resulting in healthy juveniles that are stocked in the grow-out compartments. Shrimp juveniles are capable of compensatory growth once they are transferred to the grow-out ponds. Nursery production of shrimp is usually done in small ponds; however, the use of small and circular tanks with plastic liners is gaining popularity. From an industry standpoint, the use of small circular tanks coupled with the incorporation of biofloc technology was assessed in terms of its viability during the nursery production of the Pacific whiteleg shrimp, *Litopenaeus vannamei*. Smaller bioflocs were produced and maintained throughout the 30-day nursery phase using brown sugar as carbon source at a carbon to nitrogen (C:N) ratio of 10. Physico-chemical parameters and presumptive *Vibrios* were monitored in the

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water. Sampling for growth was done at the 14th day post-stocking and weekly until harvest on the 30th day. The different water quality parameters were within optimum levels required for shrimp growth. Presumptive *Vibrios* were dominated by the yellow colonies. By the end of the nursery phase, there was high survival of the shrimp juveniles and low feed conversion ratio with minimal water exchange. These findings showed that small circular tanks with biofloc is feasible for the nursery production of whiteleg shrimp and ensures a sustainable approach in shrimp culture by reducing the negative impacts to the environment.

Keywords: aquaculture, BFT, heterotrophic bacteria, water quality, whiteleg shrimp

Bio-Circular-Green Economic Model for Sustainable Aquaculture and Aquafeed Manufacturing, A Case Study in Thailand

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Abstract. BCG model (Bio-Circular-Green Economic Model) has been conceptualized by the research community and promoted by the Thai government to underpin Thailand 4.0 policy as a strategy to drive the economic and social development. BCG is an integrated activity among three economies: (1) bioeconomy (i.e. production of renewable resources and value-added products) , (2) circular economy (i.e. reusing bioresources), and (3) green economy (i.e. optimizing and reducing wastes). The presentation aims at sharing the case study on BCG application in aquafeed mill, pilot plant for sustainable aquaculture in Thailand.

Keywords: BCG, Aquafeed, Feed mill, Aquaculture, Thailand

Technical Development of Recycle Water System for the Salmon Culture

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Southeast Asian Fisheries Development Center

Abstract. Global aquaculture production was growing over the past 20 years and it will continue to grow in the future. In Indonesia, fisheries production and aquaculture production increased recently. Aquaculture production exceeds fishery production in Indonesia too. Due to the situation, we are studying aquaculture technique. We studied technologies for disease control and methods that have less impact on the environment, that applied the recycle water system for salmon seed production. A total of 22,600 alevins were kept in the 1200-L fish-rearing tank. Ammonia nitrogen, nitrite nitrogen, and nitrate nitrogen concentrations were controlled in the water-circulation system, and the minimum water temperature was kept at 9 °C. The alevins stayed healthy, and fry were fed without water exchange in the rearing tank. Fish were reared for 100 days, and their mean body weight reached 1 g. No diseases occurred in the test fish, which tolerated seawater challenge test. These results suggest that the closed water-recycling system may be effective for salmon hatcheries affected by water shortages and disease. The use of this system is considered can improve the survival of chum salmon fry released into the wild.

By-catch and discard in artisanal fisheries in Indonesia and Thailand

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Abstract. Fishers mainly operate traditional fishing gear in developing countries. The production of this traditional fishing gear contributes significantly to production in these countries. Production of catches from traditional fishing gear in artisanal fisheries also produces bycatch. So the opinion so far that traditional fishing gear does not affect changes in biodiversity in the waters is questionable. Therefore, surveys were conducted to calculate and analyze the catch composition of six fishing gear types: filter net, fyke net, gillnet for mantis shrimp, collapsible trap, bottom trap, and mini trawler. Much fishing gear used in this study to obtain samples of fish catches was fishing gear owned by fishers in the study location. Using fishing gear owned by fishermen is intended, so the catch of each type of fishing gear represents the actual fishing catches by local fishers. The results showed that at least 6-24 species were caught as bycatch, and 3-25 species were caught as discards from the six types of fishing gear. The most bycatch catches on filter net fishing gear. Meanwhile, the most discarded catch is the mini trawler. Three of the six fishing gears yielded catches of endangered species. Filter net caught seahorses (*Hippocampus dense*), and mini trawl caught sting ray fish (*Aetoplatea zonura*) and horseshoe crab (*Tachypleus tridentatus*). Meanwhile gillnet was caught sting ray fish (*Aetoplatea zonura*), horseshoe crab (*Tachypleus tridentatus*), and sea horse (*Hippocampus dense*). These fishing gear dominantly caught the immature size in bycatch. The fishing gear catches the dominant size of immature fish as a bycatch. The composition and size of species caught as main catch, bycatch, and discard by traditional fishing gear widely operated in coastal areas will be discussed in this paper.

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Automation Design for Lobster Floating Net Cage Shifting from Red Tide in Marine Waters

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Abstract. Floating Net Cages are a medium for lobsters rearing and at certain times, red tide caused mortality for lobsters. One solution is to shift the floating net cages in marine waters to safe waters which are controlled using a microcontroller. Water quality monitoring will be input for the microcontroller to give orders to the mooring line extension station and to command the foot station to perform tasks according to the function of each station. Field observations of the use of water quality monitoring to indicate the threat of red tide to the floating net cage location, as an order for the microcontroller to carry out; literature study includes water quality monitoring and sensor systems; the command flow in the form of a chart in the form of step by step logic from input in the form of results from monitoring water quality to avoid the threat of red tide automatically; design of the hardware that will be used and creation of the software in the form of a command flow chart. The result of automation design is realized in the form of a chart which is a flow of commands from input in the form of water quality monitoring results to the process of shifting the floating net cage to avoid the threat of red tide. Information about red tide in the floating net cage environment used as input for the microcontroller commanding an automatic mooring rope length increaser and automatic floating net cage legs. Two things that are important in the design of the automation of shifting floating net cages for lobster rearing from red tide in marine waters: identify the presence of red tide in seawater currents leading to floating net cages for lobster rearing and action process in shifting floating net cages by two tools.

The Fluctuation Effect by Dissolved of TAN (Total Ammonia Nitrogen) on Diatom Abundance in Intensive Shrimp Culture Ponds

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Abstract. TAN (Total Ammonia Nitrogen) is the accumulation of nutrient elements needed by plankton to grow in intensive shrimp farming ponds. The purpose of this study was to determine the relationship effect of TAN concentration fluctuations on diatom abundance in the intensive shrimp culture cycle. This research was conducted during one intensive shrimp culture cycle at PT. Menjangan Mas Nusantara, Pandeglang, with its research variables is the dominance percentage of plankton abundance and the level of TAN solubility in ponds. The results showed that during the shrimp culture period the abundance of plankton was dominated by predominant diatom, chlorophyceae, and chyanophyceae classes. The percentage of diatom dominance during cultivation has a graph similarity with the level dissolved of TAN fluctuation in the pond. The dissolved of TAN itself is described continue to increase with shrimp farming age. Statically, the relationship between the dissolved effect of TAN concentration on diatom abundance in ponds was modeled by the regression equation $y = 2.210 + 32.411 (R^2 = 0.88; \alpha 0.00)$. The conclusion obtained from the results of this study, the level of dominance by diatom abundance during shrimp culture period is strongly influenced by the fluctuation of TAN concentration as the main nutrient element in ponds with a significance level of 88%.

Isolation and Ammonium Removal Characteristics of Facultative Heterotrophic Nitrifying Bacteria from Shortfin Eel (*Anguilla bicolor*) Recirculation Aquaculture System

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Abstract. The purpose of this study was to isolate, characterize, and identify nitrifying bacteria from shortfin eel (*Anguilla bicolor*) recirculation aquaculture system. The selective anorganic nitrifying medium was used to isolate the bacteria, followed by cultivation of the bacterium in the organic medium (Tryptone soya agar). Bacterial characterization was carried out for nine days using a nitrification activity test. A safety test was conducted by intraperitoneal injection of bacteria in healthy eels (*Anguilla bicolor*). Bacterial identification was conducted based on the phenotypic characterizations and molecular analysis of the 16S rRNA and gyrB genes. This study resulted in the successful isolation of five isolates. The three isolates (ENS2, ENS4, and ENS5) were non-pathogenic and exhibited high nitrifying activities. The isolates reduced 40-50% of ammonium concentration in three days, resulting a 2-5 mg/L of nitrate concentration in the medium. The 16S rRNA and gyrase B genes sequences of ENS5 were closes to *Klebsiella quasipneumoniae*, but with the low similarity (97.9% and 99.3%, respectively). It is concluded that resirculation aquaculture system of shortfin eel (*Angulla bicolor*) harbour of facultative heterotrophic nitrifying bacteria potential for further application in shorfin eel aquaculture waste treatment facilities.

Keywords: Eel; Facultative; Heterotrophs; Nitrifying; Resirculation; Nitrifying

The Role of Prebiotics for Diversity of Intestinal Microorganisms of Tilapia (*Oreochromis niloticus*)

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Abstract. Prebiotics are undigested food ingredients that can be utilized by intestinal microorganisms. The provision of prebiotics will improve growth performance, inhibit the growth of pathogens, and increase fish immunity. Several previous aquaculture studies have used single prebiotics as prebiotics, such as FOS, GOS, and inulin. We need a material that is multi prebiotics which is expected to give better results. Honey is a material that includes multi prebiotics. The purpose of this study was to evaluate the administration of prebiotic honey with different doses (0%, 0.5%, and 1% doses) through feeding on the diversity of microbiota in the digestive tract of tilapia (*Oreochromis niloticus*). The method used in this study was to take samples of tilapia intestines, then analyzed them using Next Generation Sequencing (NGS). The results showed that the most unique OTU were in the treatment of prebiotic honey with a dose of 1%. The treatment of prebiotic honey in the feed gave a higher OTU compared to the control. This is because the oligosaccharide content of honey can be utilized by the gut microbiota. The high unique OTUs in the treatment of adding honey, both 0.5% and 1%, presumably because these unique OTUs can grow well in that environment so that there is an equilibrium between species that together can utilize nutrients from honey oligosaccharides. so that all components of the microbiota can grow optimally. Prebiotic honey given to tilapia also triggers the emergence of the genus *Lactobacillus*, *Cetobacterium*, and *Clostridium sensu stricto* which are probiotic bacteria in the fisheries sector.

The Environmental Design with Low Salinity at the Beginning of Rearing as An Efforts to Improve The Robustness of White Shrimp (*Litopenaeus vannamei*) Culture by Biofloc System

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Abstract. Extreme time for the failure of white shrimp culture, often occurs at the beginning of rearing, especially disease attacks and environmental degradation, where high salinity is also as trigger. The aim of this research was to examine the robustness of shrimp culture with environmental design at low salinity at the beginning of rearing. Methodology : this study was conducted in two plastic ponds (900 m²), each with a seed stocking density (PL-8) of 250 indv/m² where treatment A (control/initial salinity 27 ppt), while treatment B (low initial salinity 15 ppt) with rearing for 80 days. Based on the results from both treatments, there were fluctuations of salinity at the beginning of stocking up to day of 43 (27-28 ppt), then there began to be similarities, where the addition of water always used normal seawater (33 ppt) until the end. *Vibrio harveyi* disease attack in DOC 41 occurred in treatment A (control) which was marked by luminescence light from the water rearing, this was different in treatment B which was clean from the luminescence light of pond water. This is also thought to cause the survival rate of control to be lower. It appears, the calculation of Survival Rate (SR) are different, where in treatment A (control) it is only 86%, while treatment B is 98%. The average body weight on treatment A averaged 8.19±1,36 g/indv while treatment B averaged 8.69±1,55 g/indv. The results of the FCR calculation in treatment A (control) was around 1.57, while treatment B was 1.42 with a total biomass on A 1.402 kg and for treatment B 1.624 kg. The final conclusion can be drawn that the application of an environmental design with low salinity at the beginning of rearing can increase the robustness of the white shrimp culture biofloc system.

Production of ornamental fish in a biofloc-based system using sweetpotato (*Ipomoea batatas*) waste as carbon source

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Abstract. Biofloc technology is a minimal or zero water exchange technology that exerts beneficial effects on water quality and improves feed conversion ratio by recycling microbial protein in the culture of commercially important finfishes and shellfishes. This culture technology can also be used in the rearing of ornamental fish to address limitations on land space and water use as well to minimize the impacts of wastewater discharge. Therefore, the present study evaluated the use of plant wastes in the production of biofloc for the culture of ornamental fish. A 30-day trial was conducted to evaluate the effects of using sweetpotato, *Ipomoea batatas* wastes in biofloc production for the rearing of molly, *Poecilia* sp. The effects on growth, water quality and bacterial population in the water were evaluated. Triplicate tanks of water supplemented with dried sweetpotato wastes (biofloc treatment) at a carbon-to-nitrogen (C:N) ratio of 10 and the non-biofloc group were stocked with mixed-sex juveniles of molly at a density of 3 fish per liter and reared for 30 days. Significant differences were observed in water quality parameters particularly lower concentrations of ammonia and nitrate in the biofloc group. Growth parameters showed better growth and lower feed conversion rate in the biofloc group. Higher bacterial counts were also observed in the biofloc group than in the control. The present study demonstrated that sweetpotato wastes can be used in the production of biofloc during the rearing of ornamental fish and the presence of bioflocs can increase bacterial population in the water resulting in the recycling of nutrients that could lead towards improving water quality and enhancing fish growth.

Necrosis Incidence on Sand Lobster (*Panulirus homarus*) Tail Fin Reared Using Recirculating Aquaculture System (RAS)

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Abstract. Lobster rearing has been widely carried out in Indonesia, especially to prevent a decrease in stocks in nature due to fishing that does not pay attention to the aspect of resource sustainability. However, in the effort to reared lobster, there are obstacles, namely necrosis to the tail fins of sand lobsters reared with recirculation system (RAS) caused by infectious diseases. This research was carried out at the Field Test Facility of Fish Health and Environmental Assessment Center (BPKIL) Serang in June-November 2021. The sand lobsters used had an initial size of 50-100 grams which were reared in fiber glass tanks with a volume of 1000-L with a density of 25 individuals per tank. Sand lobsters were reared with a recirculation system (RAS) for 176 days. Samples of sand lobster with symptoms of disease were obtained from the rearing tanks of the sand lobster. From the results of observations in the field, it can be seen that there is a necrosis (red color and damage) to the tail fins of sand lobsters reared with the RAS. From the results of laboratory tests, it was found that there were parasitic infections of the types of ciliates, protozoa and vorticella. The results of further testing at the Microbiology Laboratory found that there was an infestation of vibriosis disease caused by the bacteria *Vibrio alginolyticus* and *Vibrio parahaemolyticus*. Diseases caused by parasitic and bacterial attacks do not actually affect mass death in sand lobsters, even these symptoms can disappear if sand lobsters can replace their skin (molting) perfectly. Observations also show that the most deaths occurred in sand lobsters with smaller sizes (weight \leq 100 grams). This disease infection is thought to have occurred due to a decrease in the water quality of the sand lobster rearing media in the RAS, mainly due to the high concentration of organic matter in the water.

Keywords: lobster, diseases; parasite; RAS; red tail fins; vibriosis.

Establishment of an Oyster Recruitment Area as an Alternative and Sustainable Livelihood

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Abstract. This study aimed to determine if establishing an oyster recruitment area result in a sustainable and viable source of livelihood for a coastal community. A coastal community in Roxas, Palawan, Philippines was identified and used as a model for establishing an oyster recruitment area. An earlier survey showed the abundance of oyster spats at certain times of the year. Three different substrates (empty shells, coconut shells, bamboo strips) were tested for recruitment and survival of oyster spats. The recruitment potential of the three-oyster spat deployed at 0.5 m, 1.0 m, and 1.5 m. depth was determined within a 120-day period. Higher recruitment was observed in all substrates at 1.0m from the water surface. Significantly higher recruitment of oyster spats was observed when empty shells were used as substrates. A potential oyster recruitment site was established and showed that the recruitment of oyster spats was substrate-specific, making empty shells the best spat collectors. The spat collectors should be placed in depth not less than 1.0 m from the water surface.

Keywords: bamboo strips; coconut shell; empty shell; oyster; spats.

Effect of Adding Sweet Potato as Prebiotic in Feed to Increase The Growth of Freshwater Lobster (*Cherax quadricarinatus*)

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Abstract. Freshwater lobster (*Cherax quadricarinatus*) is one of freshwater invertebrates having a pair of red claws and become ornamental lobster beside as consumed food stuff. As economic commodity, freshwater lobster growth should be supported by good digestion to gain its optimal productivity during cultivation. Adding sweet potato as prebiotic in freshwater lobster feed becomes expected one way to optimize the nutrients absorption inside its digestive tract. This research aims to evaluate the effect of adding sweet potato as prebiotic in feed to increase the growth of freshwater lobster (*Cherax quadricarinatus*). The research was conducted on March to April 2021 in Laboratory of Hatchery and Cultivation Technology, Agriculture Faculty, Malikussaleh University. The experimental design was non-factorial completely randomized design (CRD) with four treatments and three replications. The treatments were A: Control (without sweet potato), B: Adding sweet potato 1%, C: Adding sweet potato 2%, D: Adding sweet potato 3%. Some parameters observed were weight growth, feed efficiency, survival rate, and water quality. The results of this research showed that adding sweet potato as prebiotic in freshwater lobster feed gave significantly effect ($p < 0.05$) on growth and feed efficiency of freshwater lobster. The best result was shown by treatment D, namely adding sweet potato 3% in feed with the value of weight growth 3.155 ± 0.078 grams, while the feed efficiency value $69.023 \pm 7.118\%$. The water quality parameters during the research were in optimal condition for lobster cultivation.

Keywords: *Cherax quadricarinatus*; feed; growth; prebiotic; sweet potato.

Growth, Survival and Feed Efficiency of The Giant Freshwater Prawns (*Macrobrachium rosenbergii* de Man) with Different Starvation Patterns

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Abstract. The purpose of a recent study was to evaluate the effectiveness of starvation on the growth, survival, and feed efficiency of the giant freshwater prawn (GFP) juveniles. This study used a completely randomized design with four treatments, in both of individual and communal rearing patterns. The treatments consist of the different period of starvation (0, 1, 2, and 3 days) followed by re-feeding. The GFP seeds (30 ± 1.1 mm of the total length; 0.3 ± 0.07 g of the body weight) were reared for 30 days individually in an aquarium (2 L) and communally in a net cage measuring $2 \times 1 \times 1$ m³ (600 prawns/cage). The starvation had a significant effect ($P < 0.05$) on the survival of the prawns, with the best results obtained on the 1 day of starvation ($91.67 \pm 6.79\%$) and the lowest on the 0 days of starvation ($83.94 \pm 4.48\%$). The starvation also had a significant effect ($P < 0.05$) on the feed efficiency (FCR), with the best results in the treatment of 2 days of starvation (1.8 ± 0.39) and the lowest in the treatment of 0 days of starvation ($4.6 \pm 1.48\%$). The data suggested that starvation for 1 to 2 days followed by re-feeding was an effective method to increase the production performance and reduce the production cost of the GFP farming.

Semi-quantitative Determination of Coloration in Betta Fish: A Trial on The Effect of Indian Almond (*Terminalia catappa*) and Banana (*Musa acuminata*) Leaves

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Abstract. The relationship of the water parameters, anti-microbial property of Indian almond and banana leaves, and the light penetration in water to the coloration of fish specifically in betta fish is still undisclosed. This study aimed to correlate the water parameters (temperature and pH), microbial count (total bacteria and gram negative bacteria) and absorbance of light by the water to the coloration of betta fish and to develop quantitative way of measuring the coloration in fish using available free software. The addition of Indian almond and banana leaves did not significantly affect the temperature of the water, total bacterial count and gram negative bacteria. The pH and absorbance in water on the other hand were significantly affected by the presence of Indian almond and banana leaves in water. This study able to demonstrate that Indian almond and banana leaves affects the pH and absorbance in water where Betta fish was being groomed. The amount of tannins present in Indian almond and/ or banana leaves significant affect the pH and absorbance in water. Black coloration in Betta fish can be improved if we used 30% Indian almond and 70% banana leaves. Absorbance or light penetration positively correlates to iridescence or amount of iridophores present in Betta fish.

Keywords: candy koi betta; color cover; irridophores; melatonin; organic colorant.

Potential of Fermented Commercial Feed to Replacement for Silk Worms on Postlarva of Asian Redtail Catfish (*Hemibagrus nemurus*)

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Abstract. Asian redbtail catfish (*Hemibagrus nemurus*) is an economically fish on Malay community. On its breeding requires silk worms as natural food that has the best for growth and survival in the post larvae phase. On the other hand, the availability of silk worms is very dependent on natural conditions. During the rainy season, the availability of silk worms becomes very rare, and this becomes a separate problem for general fish breeders. Based on this, the aimed of this study was to examine the effect of alternative feeds, in the form of fermented commercial feeds, on the growth and survival rate of Asian redbtail catfish post larvae. This study used a completely randomized design with 3 treatments and 3 replications, namely reared of Asian redbtail catfish post larvae with silkworm feed (A), fermented commercial feed (B), non-fermented commercial feed (C), the size of post larvae used was 11.00 ± 0.00 mm, with a stocking density of 4 fish/L. The best results from this study were found in treatment A, which resulted in absolute weight growth of 0.77 ± 0.00 g, absolute length growth of 23.33 ± 0.36 mm, but the highest survival rate was obtained in treatment B ($81.33 \pm 4.51\%$), although not significantly different from treatment A. Based on the observation of feed structure, fermented commercial feed was structurally softer. The behavior of the feed response, treatment B was not different from treatment A, while the behavior of the feeding pattern showed that fermented feed (B) was better than non-fermented commercial feed (C). The results of the proximate test, the fermented feed decreased in protein, fat and crude fiber content, while the ash content increased slightly.

Growth Patterns Analysis of Yellow-Finned Medaka (*Oryzias profundicola*) as Endemic Fish in Lake Towuti

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Abstract. Lake Towuti has the potential biological resource and a wide diversity of endemic fish that has ecological and economical value. Lake Towuti is also known as a biodiversity hotspot that needs attention to conservation because of the number of threads increasing. Fisheries resources in Lake Towuti has a significant role to increase income, expanding job opportunity, and as a nutritional source for the community. Lake Towuti is also known as rich in endemic fisheries that have economic and ecological value. One of them is known as Yellow-Finned Medaka (*Oryzias profundicola*). Yellow-Finned Medaka is a biological native resource and endemic fish in Lake Towuti, South Sulawesi. A study about this fish has never been conducted before so it needs research to analysis of growth pattern in Lake Towuti. This study aims to determine the length-weight relationship of Yellow-Finned Medaka in Lake Towuti. Samples were collected from January to July 2022 every month and measured their length and weight. During the study were found 2949 fish, consisting of 1202 males and 1747 females. The length-weight relationship was $W = 1.3366L^{0.0041}$ for males and $W = 0.9127L^{0.0187}$ for females. These results indicate that the growth pattern for both male and female of yellow-finned Medaka is negative allometric.

Species Composition and Bycatch of Gombang in East and South Seasons in Bengkalis, Riau, Indonesia

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Abstract. Gombang is one of the stationary fishing gear used in the coastal waters of Bengkalis. The gear is grouped as trap fishing gear and operated based on the fishing seasons, namely east, west and south seasons. This study at to determine the composition of the main catch, bycatch, and discards of this filtering net gear. The survey was conducted directly in the field, to identify of composition catches during April – September 2019. The catches were classified as main catch, bycatch, and discard . The results of this study showed that the total catch consisted of 35 species. The highest percentage of catch was scored as bycatch during east season (77.7%) with 27 species and during the south season (73.3%) with 26 species. The main catch percentage was 17.1% with six species' during the east and south seasons. The rest was the discard (5.7%) consisting of 2 species during the east season, and 3 species (8.6%) during the south season. The present study revealed that quantities of bycatch during the west season were relatively higher than the main catch and discard.

Keywords: Bycatch; Discard; Gombang; Main Catch; Species Somposition.

Food Habits, Water and Stomachs Plankton of Milkfish from Cultivation Pond of Probolinggo City

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Abstract. The residual water from semi-biofloc vannamei shrimp ponds has been used as a water source for aquaculture ponds because it is suspected that it can grow milkfish without feeding. The water contains high organic matter, phytoplankton, and zooplankton. The purpose of this study was to determine the diversity of water plankton and the stomach of milkfish and to obtain the food habits of this pond milkfish. The study was conducted in March – April 2022 when milkfish were 2 to 3.5 months old, using a survey method. Water and milkfish samples were taken from milkfish ponds in Probolinggo City. The abundance of phytoplankton in the water ranged from 1750.09 – 5930.00 cells/l, while zooplankton was 75.09 – 120.69 ind/l, with the phytoplankton found consisting of the divisions Bacillariophyta, Cyanophyta, Chlorophyta, Dinoflagellates, Myzozoa, Euglenozoa, and Charophyta, while zooplankton are Rotifers, Arthropods, and Ciliophora. Only the phyla Dinoflagellate, Myzozoa, and Charophyta were not found in the milkfish stomach, while the zooplankton in the milkfish stomach was only the Rotifera phylum. The highest presence of phytoplankton was Bacillariophyta with percentage in the water of 50% and the stomach of milkfish is 51%, while zooplankton is Rotifera with a percentage in the water of 50% and the stomach of of milkfish is 100%. The diversity of plankton in milkfish ponds is moderate. Plankton found in the stomach of milkfish consists of 99% phytoplankton and 1% zooplankton. Milkfish eat most of the phytoplankton so it is a herbivorous fish. The water quality in milkfish ponds with the remaining water source of vanname shrimp rearing is relatively stable and classified as good for the growth of plankton and milkfish during the cultivation period. It is necessary to monitor water quality regularly so that the pond can still be utilized for the growth of plankton and milkfish optimally.

Keywords: Milkfish; Phytoplankton; Semi-Biofloc; Zooplankton

Effects of Vitamin C and Squid Oil Supplementation on Gonad Maturation of Climbing Perch Broodstock (*Anabas testudineus* Bloch).

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Abstract. This study aims to determine the effectiveness of adding vitamin C and squid oil to commercial feed for broodstock fish (*Anabas testudineus* Bloch) on the speed of gonadal maturation and growth. The study was conducted for three months using a completely randomized design with 4 treatments and 3 replications. The test fish were 10 each in each treatment hapa, the treatment of feed A (Commercial feed =CF); B (CF + Vit c 2gr/kg; C (CF+ squid oil 3 ml/kg) and D (CF+ Vitamin C 2 g/kg + Squid oil 3 ml/kg). Feed was given in the morning and evening satiation for 30 days. The results showed that the commercial feed added with a combination of vitamin C 2000mg/kg feed and squid oil as much as 3mg/kg feed (Treatmen D) gave the best gonadal maturity level. This is indicated by the average IGS (Somatic Gonadosomatic Index) of 4.20% and the average HepatoSomatic Index (IHS) of 3.91%, higher than other treatments. Supported by statistical test results showed very significant differences in somatic gonadal index, hepatosomatic index, egg diameter and absolute fecundity. Meanwhile, growth and condition factors did not show significant differences. There is a tendency that if the dose of vitamin C and squid oil is increased again, it will be able to increase the gonad maturity of the broodstock of climbing perch.

The Great Potential of Sengarat Fish (*Belodontichthys dinema*, Bleeker 1851) to Become an Aquaculture Commodity in Buluh Nipis Village, Siak Hulu District, Kampar Regency

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Abstract. Sengarat fish, with the Latin name *Belodontichthys dinema*, Bleeker 1851, is a fishery commodity with high economic value and became a proud species of the community and was used as an icon of Riau Province. The current condition is that the existence of Sengarat Fish continues to decline due to overfishing, the use of fishing gear that is not environmentally friendly, and habitat destruction. Therefore, it is necessary to domesticate as an effort to develop sengarat fish into one of the aquaculture commodities. This study aims to determine the ecological value and economic status from the angle of fishing fishers and collecting traders, as well as the public's interest in sengarat fish farming. The research was conducted in Buluh Nipis Village, Siak Hulu District, Kampar Regency, in July 2022. The method used is a description analysis obtained from literature, interviews, and surveys. The respondents used for interviews and surveys were ten people with the status of capture fishers and one gathering merchant. The Kampar river environment, which is used as a sengarat fishing ground, has a reasonably good condition but has experienced siltation due to the conversion of land into oil palm plantations along the watershed. The catch of sengarat fish by fishers based on interviews has continued to decline over the past five years, and this is characterized by not every day sengarat fish are caught and even only existing in certain months or seasons. The economic status of sengarat fish is a high economic fish, characterized by a reasonably high selling price in the market, which ranges from Rp.130,000 to Rp.150,000- per kilogram. The status of sengarat fish farming is that wild fish are still being caught in the country, and there is no technology and effort to cultivate them.

The Effect of Different Substrates on The Growing of The Comet Gold Fish (*Carrasius Auratus*)

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Abstract. One of the ornamental fish with a high market shares from local to global is the comet goldfish (*Carrasius Auratus*). The purposes of this study were to determine the substrate that can affect the ovulation rate of comet goldfish, and to determine the effect of different substrates on egg hatchability and survival of comet goldfish larvae. The success of fish spawning is strongly influenced by several factors including parent handling, spawning technology, especially in stimulating broodstock, incubating eggs and handling larvae. The way that can be done to stimulate comet goldfish broodstock is to provide a substrate for laying eggs. Choosing the right substrate when spawning comet goldfish is one of the problems currently faced by ornamental fish cultivators, especially comet goldfish, in the absence of fish farmers' knowledge about the choice of substrate, the number of eggs produced from comet goldfish decreases / is not optimal in this greatly affects the hatchability of eggs produced by comet goldfish. This study used an experimental method, namely spawning male and female parents who had matured gonads in one spawning container in the form of an aquarium and the design in this study was a Completely Randomized Design (CRD) consisting of 4 treatments and 4 replications. The highest number of eggs produced by comet goldfish was found in water hyacinth treatment, which was 273.25 eggs. The highest hatching rate of comet goldfish eggs was found in water hyacinth treatment with a value of 90.82%. The highest survival rate of comet goldfish larvae was located in water hyacinth treatment with a percentage value of 92.33%. Water quality measurements during the study were in the temperature range of 27–280 C, DO 5.6–6.6 mg/L and pH ranged from 7.14-8.4.

Efficiency of Yolk Utilization at Incubation Temperature in *Osteochilus melanopleurus*, Bleeker 1852

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Abstract. Kelabau fish (*Osteochilus melanopleurus*) is a freshwater fish that is widely found in Riau rivers, has high economic value and has prospects as a farmed fish. The number of deaths on the endogeneous feeding phase of larvae in kelabau fish maintenance led to low production rates. The aim of the study is to determine the effect of different temperatures on the absorption rate of the yolk of *Osteochilus melanopleurus* fish eggs. The method used is an experimental method at the laboratories scale using 4 (four) temperature treatments, namely 27, 28, 29 and 30°C and 3 (three) tests using the Complete Randomized Design performed in June-August 2022 at the Fisheries Biology Laboratory, Faculty of Fisheries and Marine Affairs, Riau. The monitoring parameters carried out are to measure the yolk absorption rate, length growth, and yolk utilization efficiency. The results of the study obtained the fastest egg yolk absorption time was a temperature treatment of 30°C (102 hours) with a percentage of the yolk absorption rate of 2.93%, a long growth rate of 0.679% and an egg yolk utilization efficiency of 23.174%. From the results of observations, it can be concluded that different temperatures affect the rate of absorption of the yolk of *Osteochilus melanopleurus* larvae. The more the temperature increases, the metabolism also increases, thereby accelerating the absorption rate of the yolk of *Osteochilus melanopleurus* eggs.

The Using of Pineapple Extract to Remove Egg Adhesiveness in The Production of Asian Redtail Catfish Fry (*Hemibagrus nemurus* CV)

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Abstract. Asian redbtail catfish (*Hemibagrus nemurus*) is one of the freshwater fish commodities that have high economic value and are popular with the public. To meet the consumption needs of the community, this fish farming business has started to be carried out, but the provision for the cultivation needs is still an obstacle that is always encountered. This is because of the high adhesion of the eggs in the hatching that is carried out so it will affect the fertilization and hatching values obtained. The purpose of this study was to analyze the use of pineapple extract with different doses on egg adhesion, fertilization, hatching, growth, and survival of Asian redbtail catfish larvae. This research was conducted from April to June 2022 at the Laboratory of Fish Hatchery and Breeding, Faculty of Fisheries and Marine Science, Riau University. The design used was a completely randomized design with a dose of pineapple extract consisting of a P0 dose of 0% (control treatment without soaking pineapple solution), P1 dose of 0.75% (immersion treatment with a dose of 0.75 ml pineapple solution/liter of water). P2 at a dose of 1.00% (immersion treatment with a dose of 1.00 ml of pineapple solution/liter of water) and P3 at a dose of 1.25% (immersion treatment with a dose of 25 ml of pineapple solution/liter of water). The results showed that the best treatment was obtained at P2 treatment at a dose of 1.00% (immersion treatment with a dose of 1.00 ml pineapple solution/liter of water) with a fertilization value of 89.50%, hatching value of 82.37%, egg adhesion value 26, 16%, absolute weight growth of 1.3151 g, absolute length growth of 4.74 cm, a daily weight growth rate of 5.7984% and survival rate of 72%.

Keywords: Absolute Weight Growth; Absolute Length Growth; Asian Redtail Catfish; Daily Weight Growth Rate; Egg Adhesion Value.

Survival and Growth of *Pangasionodon hypophthalmus* Fed with *Moringa oleifera* Enriched Pellets and Reared in Tank with Aquaponics System and Dark Condition

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Abstract. *Pangasionodon hypophthalmus* grew well in dark tank completed with aquaponic system. To improve the growth, feed supplement made from *Moringa oleifera* might be used as it is rich in protein, vitamin A,B,C and mineral. To understand the effect of *M. oleifera* addition in the feed of fish, a research has been conducted in June-July 2022. *M. oleifera* leaves were dried and powdered and then mixed with commercial fish feed pellets. There were 4 treatments of *M. oleifera* dosages, namely P0 (no *M. oleifera*), P1 (10 gr/kg), p2 (15 gr/kg) and P3 (20 gr/kg). The fish was reared in 100L container (30 fishes/tank, around 4 gr BW and 8 cm TL), covered with dark colored tarp and completed with aquaponic system using *Ipomoea aquatica*. The feed was given 2 times/day, *ad libitum*. Samplings were conducted once/10 days, for 40 days. Results shown that the survival of fish in all treatments were 100%. The growth of fish, however, was different. There was no difference in fish body weight (BW), total length (TL) and specific growth rate (SGR) in *Moringa* fed fish, they were around 23.5 gr BW, 5.8 cm TL and 4.3 cm SGR respectively. While those of the control fish was 13.0 gr BW, 4.23 cm TL and 3.19 cm SGR respectively. The FCR of the *Moringa* fed fish was lower than that of the control fish, they were 0.87 and 1.35 respectively. Data obtained indicate that *Moringa* positively improve the growth of fish as well as improving the feed efficiency.

Keywords: FCR; Moringa Powder; Supplement; Specific Growth Rate.

The Mixture of Herbal Extracts, Vitamins C and E Maintains Viability of Lactic Acid Bacterial Inoculum in High Lipid and Carotenoid of Broodstock Feed of Freshwater Shrimp (*Macrobrachium idae*)

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Abstract. Lactic acid bacteria (LAB) given through feed can be useful in maintaining the health of freshwater shrimp (*Macrobrachium idae*) broodstock. This study aimed to evaluate the viability of LAB inoculum in freshwater shrimp (*Macrobrachium idae*) broodstock feed contained high lipid and carotenoids with antioxidants composed of mixed herbal extracts from ginger (*Zingiber officinalis*) rhizome, guava (*Psidium guajava*) leaves, and green tea (*Camelia sinensis*) leaves; and vitamins C and E for one year of frozen storage. There were five types of feed based on the combination of herbal extracts and vitamins as antioxidants. Antioxidants in feed II were composed of extracts of ginger rhizome, guava leaves, green tea leaves; and vitamins C and E; in feed III were composed of only the third herbal extracts; in feed IV were composed of vitamins C and E, in feed V was butylated hydroxytoluene (BHT); feed I was without antioxidants as a control. The research unit was repeated three times with the completely randomized design. The results show that the LAB viability (mean±standard deviation) of feed II ($5.25 \pm 0.90 \times 10^6$ CFU/g) was significantly ($P < 0.05$) higher than the viability of LAB in the other feeds; and was not significantly different than that of LAB feed II at the beginning of the study. LAB viability among feeds I, III, IV, and V were not significantly different ($P > 0.05$); with the grand average of $1.73 \pm 0.47 \times 10^6$ CFU/g; and decreased significantly ($P < 0.05$) about twice the grand average viability of their initial feeds. In conclusion, the antioxidants in freshwater shrimp broodstock feed contained high lipid and carotenoids in the form of the mixture of extract of ginger rhizome, guava leaves, and green tea leaves; and vitamins C and E can maintain the viability of LAB inoculum in the feed for a year of frozen storage..

Keywords: Antioxidants; Broodstock Feed; Herbs; Lactic Acid Bacteria; Lipid; *Macrobrachium idae*

Culture of Climbing Perch (*Anabas testudineus*) with Different Stocking Density Using Boster System in Swamp Media

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Abstract. Fish seed growth is closely related to stocking density, feed and environment. The increase in stocking density will be followed by an increase in the amount of feed, the rest of the body's metabolism, oxygen consumption and can reduce water quality. The application of the booster system and the optimum stocking density can increase the growth and survival rates of fish fry. The purpose of this study was to investigate the best stocking density of climbing perch fish culture in swamp media using a booster system. The test fish used were climbing perch (*Anabas testudineus*) with a weight of 24.08 ± 3.96 g and a length of 78 ± 14.2 cm, commercial pelleted test feed with a protein content of 38%. Fish rearing was carried out in round buckets with a booster system using aquaponic recirculation for 56 days, and vegetables as the filter substrate. The research method used is the experimental method of Completely Randomized Design (CRD) with 1 factor, 4 treatment levels and 3 replications. The treatment levels in this study were: stocking density of 450 fish m^{-3} (P₁), 550 fish m^{-3} (P₂), 650 fish m^{-3} (P₃) and 750 fish m^{-3} (P₄) respectively. To determine the effect of treatment, variance analysis (ANOVA) was performed using SPSS software version 13.0. Water quality data were analyzed descriptively. The results showed that the stocking density affected the absolute growth weight and absolute growth length. The best treatment was found at a stocking density of 750 fish m^{-3} which gave an average growth weight of 44.47 ± 2.35 g, an average growth length of 120.70 ± 2.41 g, an absolute growth weight of 13.67 ± 2.22 g, absolute growth length 18.50 ± 2.71 g and 100% survival. Temperature range during rearing period 27.5 - 31.7 °C, DO 3.98 - 6.7 mg/L, pH 5 - 7.3, CO₂ 3-5 mg/L, ammonia 0.047 - 0.156 mg/L, nitrite 0.865 - 4.011 mg/L and nitrate 0.065 - 4.158 mg/L

Keywords: *Anabas testudineus*, growth, survival rate, boster system, swamp media

Quality Evaluation of fermented *Moringa oleifera* leaves with different doses of *Aspergillus niger* as ingredients for fish feed

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Abstract. The *Moringa oleifera* leaf is a potential alternative plant protein source for fish feeds because of its high crude protein content, varying from 21% to 32%. However, due to its high crude fiber content, it can reduce the digestibility of the nutrients. Therefore, there is a need to provide intervention in improving the quality of *M. oleifera* leaves. The present study was conducted to evaluate the nutrient quality of *M. oleifera* leaf meal (MOLM) following fermentation with *Aspergillus niger* at different doses as alternative feed ingredients for fish. Completely randomized design (CRD) with four treatments and two replications was used in this study. The treatments were as follows: F0 = Fermentation of MOLM without *A. niger* (control), F1 = Fermentation of MOLM with *A. niger* at 2% (w/w) of MOLM, F2 = Fermentation of MOLM with *A. niger* at 4% (w/w) of MOLM and F3 = Fermentation of MOLM with *A. niger* at 6% (w/w) of MOLM. Results showed that MOLM fermented with *A. niger* had a significant effect on crude fiber and crude protein. It can be concluded that MOLM supplemented with 6% *A. niger* could improve crude protein and crude fiber quality of *Moringa oleifera* leaves.

Growth and Survival of Asian Redtail Catfish (*Mystus nemurus*) In Intensive Culture Using Different Micropore Pipe Designs

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Abstract. Aeration in fish farming containers can increase the solubility of oxygen in the water to remove organic matter, remove harmful gases such as ammonia, nitrite and CO₂ in the water. The use of the microporous pipe method can increase the oxygen content (DO), reduce the levels of ammonia, nitrite, CO₂ and organic matter, thereby increasing the growth and survival performance of catfish fish. The purpose of this study was to obtain the best microporous pipe design to improve water quality, growth and survival of asian retdail catchfish (*Mystus murus*). The test fish used were asian retdail catchfish with a weight of 0.54±0.51 g and a length of 3.96±0.95 cm, commercial pelleted test feed with a protein content of 38%. Fish rearing was carried out in round buckets with a recirculation system for 56 days. The research method used is the experimental method of Completely Randomized Design (CRD) with 1 factor, 4 treatment levels and 3 replications. The treatment levels in this study were: the use of T-shaped aerated stone (P₁), circular microporous pipe (P₂), linear shape (P₃), and parallel shape (P₄) respectively. To determine the effect of treatment, a diversity analysis (ANOVA) was performed using SPSS software version 13.0. The results showed that different microporous pipe designs affected DO, absolute growth weight and absolute growth length of catchfish fish. The best treatment was found in the use of linear microporous pipes, which gave an increase in DO 3.35±0.38 mg L⁻¹, average growth weight of asian retdail catchfish 1.62±0.07 g, average growth length 5.87±0.26 cm, absolute growth weight 1.087±0.121 g, absolute growth length 1.833±0.306 cm and 100% survival rates. Temperatures during the study ranged from 26.1 – 29.7 °C, pH 5.1 – 7.9, DO 3.53 – 6.55 mg L⁻¹, CO₂ 0.5 – 4.5 mg L⁻¹, ammonia 0.058 – 0.037 mg L⁻¹, nitrite 0.1287-9.2848 mg L⁻¹, nitrate 0.075-10.4083 mg L⁻¹ and organic matter content of 32.785-29.23 mg L⁻¹.

Fermentation of Chicken Feather Meal Using *Bacillus* sp. from Cow's Rumen Fluid and *Rhyzopus* sp. to Improve Its Nutritional Quality as A Fish Feed Ingredient

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Abstract. Chicken feathers have the potential as fish feed ingredients because they are high in protein (80-90%), rich in essential amino acids, contain minerals, and abundant in availability. However, chicken feather protein is relatively difficult to digest because the protein is composed of keratin. To reduce and eliminate keratin can be done through fermentation techniques using microbes. This study aims to improve the quality of chicken feather meal through a fermentation process, so that it is suitable as fish feed ingredient. Fermentation of chicken feather meal was carried out using *Bacillus* sp. bacteria from cow rumen fluid and *Rhyzopus* sp. The results showed that the fermentation of chicken feather meal using *Bacillus* sp. from cow rumen fluid increased the protein content (85.05% to 93.87%), but decreased the lipid content (7.22% to 4.55%), reduced the NFE content (1,68% to 1,57%), and improved the crude fiber content (2.47% to 0 ,65%), while the fermentation of chicken feather meal using *Rhyzopus* sp. resulted in less protein increase (85.05% to 90.85%), the decreased of lipid content (7.22% to 4.51%), reduced the NFE content (1,68% to 1,59%), and lessened the crude fiber content (2.47% to 0.35%). Fermented chicken feather meal of both types of microbes also underwent changes in physical properties, namely the color changed from white to brown, the texture changed from fibrous into soft, and it shifted from no sting to very stinging.

The Effect of Bromealin Enzymes on Digestive Enzymes Activity and Growth Performance of Asian Redtail Catfish (*Hemibragus Nemurus*)

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Abstract. The problem encountered in the culture of asian redbtail catfish is its slow growth. The increase in growth can be accelerated by the addition of bromealin enzymes found in pineapple processing industrial waste. The purpose of this study was to analyze: the optimal dose of bromealin enzyme added to feed in increasing the activity of digestive enzymes and growth performance of asian redbtail catchfish. The main ingredients used were asian redbtail catchfish (*Hemibagrus nemurus*) measuring 5-7 cm, pakcoy plants, boster, bromealin enzymes, commercial pellets with 38% protein content, round tubs and gutters as test containers. The research method used is the experimental method of Completely Randomized Design (CRD) with 1 factor, 5 treatment levels and 3 replications. The treatment levels in this study were: without bromealin enzyme (P₀), 2.5% kg⁻¹ feed (P₁), 3.5% kg⁻¹ feed (P₂), 4.5% kg⁻¹ feed (P₃) and 5.5% kg⁻¹ feed (P₄) respectively. To determine the effect of treatment, variance analysis (ANOVA) was performed using SPSS software version 13.0. The results showed that bromelin enzymes with different doses had an effect on digestive enzyme activity and growth performance of asian redbtail catfish. The best treatment was found in the treatment of bromealin enzyme at 5.5 g kg⁻¹ feed, which increased the protease enzyme by 95.56%, lipase 612.12%, amylase 338.12%, average growth weight of 13.85 grams, average growth length of 12.03 cm, absolute growth weight of 33.47 grams, absolute growth length 6.17 cm, specific growth rate of 2.92 %, Feed Efficiency of 69.33%, FCR of 1.45% and survival rates of 92.86% with water quality parameters such as temperature 24.33-29.73 °C, pH 6.17-7.67, dissolved oxygen (DO) 3.53-7.57 mg L⁻¹, and ammonia 0.00537 mg L⁻¹.

Replacement of Soybean Meal with Kapok Seed Oil Waste Meal (*Ceiba Petandra* (L.) Gaertn.) in The Diet on Growth Performance, Survival Rate and Intestine Histology of Milk Fish (*Chanos-Chanos* Forsskal, 1775)

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Abstract. The requirement for replacement of highly priced soybean meal (SBM) in fish diets with local potentially vegetable protein as become imperative for the sustainability of aquaculture production. This study addressed the effect of replacing SBM with kapok seed oil waste meal (KSWOM) in the diet on the performance and histology in milkfish (*Chanos chanos*). Four experimental diets were formulated to contain KSOWM as substitution of SBM in the diet, with inclusion level of 0%, 25%, 50% and 75%. Total 120 juveniles (initial weight: 1.14 ± 0.09 g) were distributed into twelve glass tanks (10 juveniles/tank) and the juvenile were reared with using water recirculating system. Fish were fed twice daily (8:00 a.m. and 4:00 p.m.) at 5% body weight for 60 days. The histology of intestine were also assessed. The results indicated that weight gain of the fish was significantly different with replacing of 25% , 50% and 75% dietary SBM with KSWOM in the diet. Moreover this feeding trial, survival rate, feed efficiency, and feed conversion ratio (FCR) of the fish fed the KSOWM diet were significantly lower than the fish fed without replacement of SMB dietary in the diet. Photomicrograph of intestine of 25% KSOWM fed fish showed normal histo-morphological features, while moderate to severe histological distortions were observed in intestine 50% and 75% KSOWM fed fish. The findings of the present study showed that replacement up to 25% SBM with KSOWM in the diet can perform well and had no distortion histo-morphological of the intestine of milkfish.

Effect Dosage Of EPA and DHA Fatty Acid on The Fatty Acid Composition of Asian Redtail Catfish, *Hemibagrus Nemurus* (Bagridae) Feed

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Abstract. The nutrients in fish carcasses, especially the PUFA group of fatty acids, are perfect for human health. Meanwhile, in freshwater fish, ω -6 PUFAs are more dominant, and slightly 3- ω PUFAs. For the safety of food sourced from freshwater fish, optimally ω -3 PUFAs are needed. The first aim of this study is to determine the effect of EPA and DHA dosage on the fatty acid composition of the diet of Asian redbtail catfish. **Method:** Treatments and design: This study consisted of four treatments of feed enriched with fish oil type EPA and DHA; were 0 g/kg diet (called P1), 5 g EPA and DHA/kg diet (called P2), 10 g EPA and DHA /kg of diet (called P3), and 15 g of EPA and DHA/kg of diet (called P4). Each treatment was triplicate. The fatty acid composition of each treatment was analyzed at the PT. Saraswanti Indo Genetec Bogor. **Results:** The results supported our hypothesis that different fish oil types EPA and DHA dosage have a significant effect ($p < 0.05$) on the fatty acid composition of diets. The Σ SFAs, Σ MUPAs and Σ PUFAs of P1 were 32.06%, 31.17%, and 30.73%; P2 was 34.515, 29.92%, and 31.47%; P3 was 37.95%, 30.48%, and 29.60%, and P4 was 38.93%, 29.37% and 29.28%, respectively. Meanwhile, fish oil's Σ SFAs, Σ MUPAs, and Σ PUFAs were 18.08%, 33.57%, and 48.68%, respectively. **Conclusion:** Diet P3 contains a higher concentration of fatty acids.

Keywords: Commercial diets, fatty acid, Asian catfish, food security

Effects of Newly Products Consist of Water Coconut, Palm Sap Sugar and Fungus on The Amino Acid Composition of the Diets and Growth Performance of Giant Gourami (*Osphronemus Gourami*) Juvenile.

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Abstract. The giant gourami, *Osphronemus gourami*, is a freshwater species of Indonesia's most important commercial fish because of the higher market price, and most of the giant gourami is produced by aquaculture. Research on the nutrition of feeds for giant gourami has garnered increasing interest in recent decades. This study aims to determine the effect of different newly formulated products on the amino acid composition of the diet and the growth of giant gourami. **Method:** We prepared 100 g of palm sap sugar and cooked it in 1.0 litre of fresh water for fifteen minutes at 60 °C. Furthermore, we also prepared 2.0 litres of mature coconut water (*Cocos nucifera* L.) and mixed it with 1.0 litres of palm sap sugar solution. A total of 3.0 litres of the formulated product was part into three of 1.0 litre each. We added 2 g of *Aspergillus niger* (called CP2 product) to the first part of the formulated product solution, 2 g of *Rhizopus oligosporus* (called CP3 product) to the second part, and 2 g of *Saccharomyces cerevisiae* (called CP4 product) to the third part. The CP2, CP3, and CP4 products were fermented in an aeration process for 48 hours. The products of CP2, CP3, and CP4 were used to enrich the nutrition of aquafeed (781-2) called KP2, KP3, and KP4 diets. The aquafeed supplemented with freshwater was called the KP1 diet (placebo). **Results:** The total essential amino acid of KP1, KP2, KP3, and KP4 diets was 7.56%, 8.70%, 9.30%, and 8.04%. At the same time, the non-essential amino acid was 7.51%, 8.88%, 8.88%, and 8.84%. The specific growth rate (%/day) of fish from KP1, KP2, KP3, and KP4 diets were 0.87, 1.02, 1.20, and 0.96, respectively. **Conclusion:** The different newly formulated products have a significant effect ($P < 0.05$) on total amino acid and growth performance. Diet KP3 contains higher total amino acids and gives the better growth of giant gourami.

Keywords: Aquaculture; giant gourami; amino acids; growth performance

The Community Structure and Diversity of Sungai Bersejarah Mangrove, Sungai Apit District, Siak Regency

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Abstract. Mangroves are plants that live in the intertidal zone of the tropics and some sub-tropics. Mangrove ecosystems have ecological and economic functions. The Sungai Bersejarah mangrove ecosystem is currently designated as an educational tourism area managed by the conservation group Laskar Mandiri. This study aims to reveal the diversity and community structure of the Sungai Bersejarah mangrove ecosystem Sungai Apit District, Siak Regency, which includes species, density, frequency, coverage, and importance value index. The environmental parameters measured were temperature, salinity and pH. The research was carried out from June to August 2021 using the quadrant line transect method. Five transects were assigned with three plots of 10 m x 10 m in size each for the tree group and 5 m x 5 m for the sapling group. The results showed that there were 11 species of mangrove for the tree group and 9 species for the sapling group. The highest values of density, frequency, cover and Important Value Index were found for the species *Rhizophora apiculata*, both for the tree group and the sapling group. The index values obtained are diversity (H') 2.8626 and 2.1821, dominance index (C) 0.1835 and 0.3416 and evenness index (E) 0.8275 and 0.6884 for trees and saplings, respectively.

Management Of Mangrove Ecosystem Potential In Kuala Langsa Aceh For Carbon Sequestration And Natural Resource Sustainability

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Abstract. The potential of mangrove ecosystems for humans can be in the form of providing economic resources, maintaining the ecological environment and providing environmental services. So it is important to assess the potential for the existence of mangrove ecosystems, the study includes the potential for carbon dioxide absorption in the air and converted into body mass from mangrove trees. The ability to absorb carbon is up to 5 times better than terrestrial forests, making this area very important to maintain its existence. People's understanding of the benefits of mangrove forests as wood producers must be replaced by exploring other economic benefits. The procedure for measuring the carbon content of trees is carried out in a non-destructive way (not damaging the plant) with the allometric formula being known for the type of plant being measured. Mangrove biomass estimation model can be built based on the equation of biomass value with diameter. Carbon sequestration from biomass has a contribution of 101.275.tons/year, with an economic value of carbon trading of Rp. 7.089.250.000/year, to manage this potential, a conservation strategy is needed, improving the performance of traditional institutions and the existence of management institutions as they are today must be continuously strengthened. The results of the research can be used as input and consideration for decision makers in setting policies for developing the potential of mangrove forests with environmental carrying capacity.

Diversity Of Marine Macro Molluscan Gastropods and Bivalves In The Intertidal Areas Of Ajuy, Iloilo, Western Visayas, Philippines

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Abstract. The Philippines has rich marine resources but are threatened by the impacts of climate change and other activities made by humans. Very little or scarce literature is available on projecting impacts of climate change on the country's rich biodiversity, specifically on marine ecosystem, thus this study aimed to determine the diversity of marine macro molluscan gastropods and bivalves on the intertidal areas of Ajuy, Iloilo, Western Visayas, Philippines. Marine macro gastropods and bivalves were surveyed monthly from October 2015 to March 2016 and transect method was carried out to assess species composition, abundance and occurrence. Shannon-Wiener index (H') was utilized to determine the diversity of marine macro molluscan gastropods and bivalves in the area. Coefficient of correlation was used to determine correlation between physico-chemical properties of sea water with the diversity index value. There were a total of 8,705 individual mollusks sampled and classified up to 43 species of gastropods having 28 genera belonging to 20 families and 29 species of bivalves belonging to 22 genera out of 14 families. Muricidae was the best represented family in species richness among the gastropods and Veneridae among the bivalves. In family wise landing among the gastropods, the maximum number recorded was Batillariidae having a relative abundance of 46%. In bivalves, the most abundant family was Veneridae with 20.25% relative abundance. The Shannon-Wiener index value revealed that the area was still normal in terms of species diversity. Temperature and DO of sea water were positively correlated with the H' , whereas pH and salinity were negatively correlated. This study provided baseline information as to the status of marine macro molluscan gastropods and bivalves in the intertidal area of Ajuy, Iloilo, Western Visayas, Philippines.

Population Dynamics of Lais (*Phalacronotus Micronemus*) in Musi Stream, South Sumatra

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Abstract. Lais fish (*Phalacronotus micronemus*) that lives in the Musi watershed is part of the diversity of biological resources, therefore its population needs to be maintained. the exploitation of lais fish due to high market demand and consumption levels that trigger overfishing by fishermen. Data and information regarding Lais stocks in the Musi Stream are not yet known. This research aims to analyze the Lais stock in the Musi Stream as a policy material for fisheries management. The research was carried out in March - July 2018, located in the Musi Stream, South Sumatra Province. Fish samples are the catches of fishermen using fishing gear commonly used in the form of nets and gill nets of various sizes. Various data were collected including length and weight as well as analysis length-weight relationship that obtained from the equation $W = 0.0043L^{3.01}$, indicating growth pattern of Lais is isometric. Total mortality rate (Z) is 0.78, natural mortality (M) is 0.63, fishing mortality rate (F) is 0.15 and exploitation rate (E) is 0.19 per year.

Morphometric Analysis of 5 Kampar River Fault Lakes By Using Geographic Information Systems

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Abstract. Oxbow lake is a lake formed from the results of a river fault. The Kampar River is one of the rivers with many faults and forms a lake. In this study, the lakes to be studied are Bakuok, Baru, Lubuk Siam, Pinang Dalam, Pinang Luar and Raya. Lake morphometry data was collected by using geographical information system (GIS). It was then analyzed using GIS data processing software. The results showed that the six lakes' shoreline development index (SDI) value is more than 1. This SDI value shows that the shape of the lake is irregular. The lake's irregular shape indicates the lake's high productivity as a result of a large number of nutrient inputs.

Keywords: geographical information system; oxbow lake; river fault.

Morphometric Surface Dimension Analysis of Three Different Oxbow Lakes in Lubuk Siam Village

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Abstract. Oxbow lake is usually formed in a meandering river. Lubuk Siam village is one of the places passed by the Kampar River, which has a meander shape. In this study, there are three oxbow lakes to be studied: Lubuk Siam, Selat Panjang, and Putus. Morphometric Surface Dimension data was collected by using geographical information system (GIS). It was then analyzed using GIS data processing software. The results showed that Lake Putus has the most significant area compared to the other two lakes adjacent to each other. The size of Lake Putus is 22.99 Ha. The results showed that three of these lakes' shoreline development index (SDI) value is less than 1. This SDI value shows that the shape of the lake is regular. The lake's regular shape indicates the lake's low productivity as a result of a low number of nutrient inputs

Seagrass-fish association in East Bolaang Mongondow, North Sulawesi: Assessing seagrass cover status and evidence to support its conservation

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Abstract. Seagrass meadows have a very significant role in coastal ecosystems that provides ecosystem services for diversity, food availability and shelter for marine life and also contributes to reducing ocean carbon. In this study, we assess the current status of seagrass meadows and the fish association in East Bolaang Mongondow, North Sulawesi across six sites using linear transect method to collect seagrass data and swept area for fish assemblage. In total, eight species of seagrass were identified. *Enhalus acroides* and *Thalassia hemprichii* were found in all stations with the highest cover relative to other seagrass species. The seagrass cover ranged from 12.59%-38.26% therefore in general the status was categorized as poor and unhealthy. Fifty-three fish species belonging to 22 families were collected using beach seine with *Siganus canaliculatus* dan *Atherinomorus endractus* became the most abundant fish species. The analysis results show that the species diversity index ranges from 1.38-2.39 placing it in the low-medium category. The cluster analysis results based on species similarity indicate that the seagrass site with a location directly adjacent to mangrove vegetation has a different species composition from sites that are distant or not directly associated with mangrove vegetation. Overall, the low seagrass cover in East Bolaang Mongondow highlights the necessity for monitoring and conservation of seagrass in this area, notwithstanding the importance of this area as a nursery ground.

Keywords: conservation; east bolaang mongondow; fish; seagrass

First Report of Argulus Ectoparasite from Koto Panjang Reservoir, Riau Province, Indonesia

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Abstract. Carp cultivation has been going on for a long time in the Koto Panjang Reservoir and the type of ectoparasite Argulus in this fish culture has not been reported. This initial research study aims to identify the morphology and characterize the DNA of the Argulus species in this reservoir. This research can be used as initial information material for the management of aquaculture fish health and early warning against water quality degradation. Argulus surveys were carried out on carp parent cages with coordinate positions 0°16'46.7" N and 100°51'26.2" E. Argulus specimens were collected from live and dead carp bodies (body surface, gills, operculum, caudal fin, pectoral fin, anal fin, pelvic fin, base of tail, and abdomen) using a spatula and stored in 96% ethanol for identification using standard literature and DNA barcoding techniques. The research results obtained 115 specimens of the genus Argulus from 49 live goldfish (2800-4900 mm and 200-1800 g) and 3 goldfish that died \pm 3-4 days which were characterized by white gills and white mucus lumps between the scales. . DNA characterization revealed that the name of this fish lice species (Argulus) could not be determined and had a close relationship with Argulus japonicus Shizuoka-2019 with an identity value of 79.22%.

Bathymetry Map in Fishing Zone and Damsite of Koto Panjang Reservoir, Indonesia

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Abstract. The main function of constructing the Koto Panjang Reservoir is to provide electricity, followed by other functions such as fishing activities (catching and aquaculture), tourism, and others, which will tend to increase over time. The reservoir zoning map is the basis for the sustainability of the reservoir function to accommodate various interests in its utilization, consisting of fishing zones, water tourism zones, fisheries resource conservation zones, aquaculture zones, safety zones (hazards), and emerging islands zones. Since inundation, reservoir water quality surveys have been carried out repeatedly, except for bathymetry. Bathymetric surveys in many parts of the world are used to monitor sedimentation rates, evaluate long-term changes in storage capacity, control water quality, and assess potential reductions in the benefits of reservoirs, especially for fisheries. This study aims to develop a contour map base and water depth using an echosounder. Bathymetric surveys were carried out in the fishing zone and dam site of the Koto Panjang Reservoir from May – July 2022. The methodology used is a survey and measurements into the waters using an echosounder with a ship speed average of 2 knots. The depth scanning method uses a zigzag system with an area covering 1/3 of the lacustrine zone. The results of the study, which represented one-third of the reservoir inundation area, showed that the depth of the reservoir waters in the fishing zone ranged from 20.24 meters to 93.35 meters, and at The section of the dam site which is the location of floating net cages ranges from 35.79 meters to 98.55 meters. The bathymetric profile continues to decrease with increasing distance.

Keywords: bathymetric survey; capture and aquaculture; contour map; water depth; zonation map.

First confirmed record of the rare scorpionfish *Scorpaenopsis obtusa* (Actinopterygii, Scorpaeniformes, Scorpaenidae) from Alor Island, Indonesia

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Abstract. A single specimen of a shortsnout scorpionfish *Scorpaenopsis obtusa* (Teleostei: Scorpaenidae) was collected from the south coast of Ampera, Alor Barat Laut, Alor Island, Indonesia at 5 m depth. The specimen represents the first record of the species on the basis of a voucher specimen from Indonesia water (the previous records being on the basis of an underwater photograph from Nusa Penida and northern Sulawesi). An Alor specimen (91.1 mm in standard length) was the largest recorded individual of the species.

Keywords: distribution; largest specimen; ontogenetic change; variation; voucher specimen.

Genetic Diversity and Population Structure of The Boring Giant Clam (*Tridacna crocea*) in Kei Islands, Maluku, Indonesia

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Abstract. Giant clams (*Tridacninae*) are ecologically important species in the coral reef ecosystems. They provide valuable functions to traditional fisheries in Kei Islands, Maluku. However, their population is under great pressure due to anthropogenic threats, such as overfishing and habitat degradation. To provide important data for devising effective conservation management strategies for giant clams, we investigated genetic diversity and population structure of the boring giant clams *Tridacna crocea* in Kei Islands based on partial mitochondrial COI gene sequence. Tissue samples were collected from six sites: Kur, Dullah Laut, Tanimbar Kei, Dar, Labetawi, and Difur. We sequenced 477 base pairs of COI gene and identified 42 haplotypes and 52 polymorphic sites. Analysis of genetic diversity showed Dullah Laut and Dar had the highest genetic diversity. Population structure and genetic distance analysis showed unstructured populations with high genetic closeness among sites. This finding was also confirmed by the mixture pattern of the haplotype network. Further analysis using Bayesian models on gene flow revealed high genetic exchange among sites and that Dullah Population predominantly served as a source site for the other sites. This indicated a high probability of successful larval dispersal among sites. Based on these findings, we predict that the boring giant clams likely form a single population in Kei Islands. Our study warrants conservation priority for Dullah population as the main source of gene flow.

Keywords: bayesian model, coi gene, conservation priority, gene flow, kei islands.

Utilization Status and Management Effort of Fisheries Resources in Kerinci Lake, Indonesia

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Abstract. Lake Kerinci plays an essential role in the local community. Roughly 51,5% of locals' consumed fish were caught from the lake. Meanwhile, other external disturbances like deforestation in its surrounding waters and aquaculture activity become a concern and may exacerbate the resources. The lack of information regarding the management strategies to conserve native species but allowing fishing in the lake has become a concern of the authority. Proper management measures should be addressed to optimize catch while ensuring the sustainability of the whole fish population. This paper aims to determine the utilization status of the fishery in Lake Kerinci as important information for management purposes and suggest proper management strategies. Extensive literature reviews combined with data gathered from field surveys have been used in the analysis. Based on our findings, the exploitation level is about 162 tons/year but can be adjusted to 192 tons/year to achieve the optimal level. Allowing the fishing presence while maintaining the healthy fish stock might eventually require a proper management approach. We suggest possible management actions can be considered, such as i) rehabilitating the water catchment area in the adjacent of the lake; ii) constructing drainage and sanitation facilities; iii) limiting the number of floating cages based on the carrying capacity; iv) restocking native fish and v) establishing fish sanctuary. The local government may establish a fish sanctuary for utilization and conservation zones..

Carbon Stock Potential of Mangrove Species from Different Geomorphic Settings

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Abstract. Mangroves ecosystems provide various services, including carbon sequestration. They store large amounts of organic carbon both in biomass and in sediment. This study analyzes aboveground carbon potentials from different mangrove species measured from several areas in Indonesia that were taken during 2013 - 2016 surveys. The areas cover different geomorphic settings, from river delta and estuarine to marine/carbonate mangroves ecosystems. The aboveground biomass was calculated by using published allometric equations. *Sonneratia alba* provided the highest aboveground carbon stock (63.3 Mg C ha⁻¹), as in some areas, they can grow up to 150 cm in diameter. Following *S. alba*, there were *Rhizophora mucronata* (48.9 Mg C ha⁻¹), *Bruguiera cylindrica* (46.0 Mg C ha⁻¹), *Avicennia alba* (43.8 Mg C ha⁻¹), *Avicennia marina* (38.3 Mg C ha⁻¹), *Rhizophora stylosa* (26.2 Mg C ha⁻¹), *Bruguiera gymnorrhiza* (15.8 Mg C ha⁻¹), and *Rhizophora apiculata* (9.9 Mg C ha⁻¹). This result provides knowledge about species preference in order to enhance better mangrove rehabilitation practice to maximize carbon sequestration gains, since Indonesian government is committed to rehabilitate up to 600.000 ha degraded mangrove ecosystems to deal with climate change.

Keywords: aboveground biomass, carbon stock, mangrove ecosystems

Coral Reef Fishes Biodiversity in the Waters of Komodo National Park, East Nusa Tenggara

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Abstract. Biodiversity of coral reef fishes was studied in Komodo National Park waters from twelve selected stations on June 2019. Underwater Visual Census method was used to collect data of target and indicator fish biodiversity. A total of 79 species belonging to target reef fishes (carnivore, herbivore groups) and 30 indicator fishes species of Chaetodontidae (corallivore group) have been recorded during the study. *Ctenochaetus striatus*, *Scarus flavipectoralis*, *Chlorurus sordidus* are the most common species of target reef fishes. The highest composition species of indicator fishes are *Chaetodon kleinii*, *Chaetodon melannotus*, and *Chaetodon lunulatus*. The density mean of target and indicator fishes are 98 ± 35 individual/350m² and 35 ± 15 individual/350m², respectively. The biomass mean of target fishes are 731 ± 396 kg/ha.

Keywords: biodiversity; indicator reef fishes; komodo national park; target reef fishes.

Forest Fires in Indonesia After Ratification of the ASEAN Agreement on Transboundary Haze Pollution (AATHP)

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Abstract. Smog pollution from forest and land fires in Indonesia is a matter of concern for other countries in the ASEAN region and several countries are also affected by the smoke pollution that occurs. ASEAN Trans boundary Haze Pollution (AATHP) is here to overcome this. However, in reality this agreement has not been able to control the fires and haze pollution that occurred in Indonesia. Severe forest fires have hit Sumatra in 2015 and 2019, several years after the AATHP was agreed in 2002. The impact of these forest and land fires is that smoke pollution occurs not only in Sumatra but also in Singapore and Malaysia. The purpose of this study is to determine the effectiveness of the AATHP in the ASEAN region and how Indonesia implements these provisions in order to control forest and land fires that occur. The research method used is sociological legal research, which is to determine the effectiveness of the AATHP and provisions in other positive laws in Indonesia. This study found that the cause of the ineffectiveness of AATHP is that the legal provisions in Indonesia are not yet fully in harmony with AATHP, and the regulation is still weak in AATHP. Efforts that can be made by Indonesia are to implement the provisions contained in the AATHP as a whole and to harmonize the existing laws and regulations.

How Indigenous Peoples Resolve Natural Resource Disputes (Study in Koto Gasib, Siak Regency)

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Abstract. Government policies in controlling the management of natural resources do not always run smoothly. This is indicated by the fact that there are still many conflicts over land tenure in the regions that involve the interests of the community to control the available natural resources. In this study, the researchers focused on resolving natural resource disputes on the management of forest areas between the Koto Gasib community, Siak Regency and the private sector (palm plantation companies) where the company's Cultivation Rights overlapped with the rights of indigenous peoples on their ulayat lands which of course led to conflicts and conflicts. potential for prolonged conflict between the company and the community. Of course, it is necessary to find a solution as soon as possible so that this problem does not drag on. The purpose of this study was to find a pattern of dispute resolution over the use of natural resources in the Koto Gasib customary law community, Siak Regency. This research is sociological legal research, namely research in the form of an empirical study that is to see the effectiveness of the implementation of the rule of law in society. From the results of the study it can be concluded that the dispute over the management of natural resources in the Koto Gasib customary law community is the main factor caused by the inequality of control and management through the HGU granted by the government to oil palm plantation companies and Industrial Plantation Forests (HTI) operating in Koto Gasib, where The HGU permit issued is claimed to be part of the community area of the Gasib and Pandan inner community. The resolution of natural resource disputes in the Koto Gasib customary law community tends to be pursued through a non-litigation process by involving various stakeholder roles, local governments and encouraging the role of traditional leaders in the region to obtain an effective solution to defend the rights of the Koto Gasib community. This policy is also in line with the obligation of natural resource management companies to build partnerships with local communities.

Keywords: customary law community, Koto Gasib, disputes, natural resources, ulayat land

Mangrove Ecosystem Conservation Efforts: A Case Study of the Minajaladri Monitoring Community Group in the Pasir Putih Coastal Area. Cilamaya Kulon, Karawang

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Abstract. Recovery of coastal areas by seawater erosion can be performed in various ways, one of which is revegetation. The Pasir Putih Coastal Area, Cilamaya Kulon, Karawang is an area that is experiencing sea water erosion because the absent of mangrove forest due to illegal logging and sand mining. Community groups who are members of the Minajaladri Monitoring Group revegetating coastal areas to cope with sea water erosion have been running for 6 years. The purpose of this study is to ensure the success of the revegetation process for overcoming seawater erosion that has been carried out. This study uses convergent parallel mixed methods data collection, which includes observation, mapping with Google Earth and Landsat 8 satellite imagery, semi-structured interviews with relevant key informants, and literature review. After that, descriptive technique was performed to analyse the data. The findings of this study show that community-led mangrove revegetation initiatives have been successful in reducing seawater abrasion. An area of roughly 5.6 ha with a high-density level makes up the mangrove forest that has been successfully revegetated. It has also evolved into a habitat for numerous mangrove species. Additionally, the community practices ecotourism by using the mangrove vegetation. On the other hand, the community's revegetation efforts are highly distinctive, notably by adding sand from sedimentation to generate additional land that is used by the community to build buildings, which may lead to future land ownership rights issues.

Keywords: mangrove, erosion, revegetation

Ukraine – Russia War in the Black Sea and Its Effects on Marine Life

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Abstract. One of the international issues that must be highlighted is the condition of biodiversity, marine ecosystem, fisheries, and environmental security in the Black Sea, as the costs of Russia – Ukraine war which has escalated since March 3rd, 2022. Unfortunately, the damage and negative effect of the biodiversity, marine life, and environmental security in the Black Sea are not being discussed as much as they deserve. Therefore, this study aims to accomplish the issue and made public awareness. The data used is secondary data with the analytical method used is maritime security in international relations study. The results of this study identify the issues as a marked of critical turning point where the new spirit of cooperation should suggest, especially for regional cooperation to protect Black Sea environment. The author identified 7 major problems facing the Black Sea environment during Russia's blockades: 1) dozens of military maneuverer and caught fire in the sea polluting the feeding grounds of coastal fish species and dolphins; 2) it also causes destruction of protected red algae beds which provide a habitat for many marine species; 3) the noise of the ships and low frequency sonars adding to the concerns of marine life; 4) the amount of oil leaked from the ships that were destroyed in the sea; 5) the ballistic missiles fired not only polluted the air with the toxic gases but could also have upset the atmospheric cycle; 6) *Bystroe Canal* (120 meters wide and 8 meters deep) which is made by Ukraine can be also added to all of these ecological disasters.; and 7) The war has not only ravaged the sea but also the river; the longest river of water on Ukraine which was used as a front line during the war.

Russia – Ukraine War, The Cost of War, Marine Ecosystem, Black Sea, Warlike Zone

Ecological Analysis of Gadih Fish Habitat (Tor Tambroides Blekeer, 1854) in Kampar Hulu Kanan River, Bandur Picak Village, Koto Kampar Hulu District, Kampar Regency, Riau Province

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Abstract. Gadih fish is one of the endemic fish species that has high economic value. Living from this gadih fish inhabits the upper reaches of the river, one of which is the upper reaches of the right upper kampar river which is located in Bandur Picak Village, Koto Kampar Hulu District, Kampar Regency, Riau Province. From the data and information obtained, the presence of the number of gadih fish in the Kampar river continues to experience a decrease in population. The decline in the population in this gadih fish is thought to be due to changes in the ecological conditions of this gadih fish habitat. This study aims to analyze ecological aspects, namely in the form of physico-chemical factors of water quality of the upper-right Kampar River in bandur picak village as a habitat for gadih fish. Water sampling was carried out in the waters of the Kampar Hulu Kanan River, Bandur Picak Village, Koto Kampar Hulu District, Kampar Regency, Riau Province. This study used a survey method where data was taken directly to the location using in situ and oak situ analysis to explain the characteristics of the gadih fish habitat. Data analysis was carried out descriptively. The results of this study showed in measuring water quality with the results of physical parameters, including: temperature of 24—26 °C, current speed of 0,44—0.5 seconds / m, depth of 0.95—2.3 m, and brightness of 0,44—0.5 m, TSS 6—11 ppm, TDS 28.2—37.6 ppm. As for the chemical parameters, the water quality is as follows: DO 7,2—8 ppm, pH 6, CO₂ 7.99 ppm, Total Posphat 0.15—0.17 ppm, Total Nitrogen 1.28—1.46 and NH₃ 0.11—0.14 ppm.

Barcoding anguillid eels recruiting to the Palu River, Central Sulawesi, Indonesia

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Abstract. Eels of the genus *Anguilla* are high value food fish with a catadromous life cycle. As tropical eels migrate from coastal waters to freshwater in multi-species schools, effective management of glass eel resources requires reliable data on recruitment. Previous research using two morphological methods, ano-dorsal vertebrae (ADV) and tail spot patterns, concluded that at least three and possibly four or five species of anguillid eels recruit to the Palu River in Central Sulawesi, Indonesia. There were interannual and seasonal variations in species composition and size structure. However, some glass eels could not be identified based on external morphology. DNA barcoding is a powerful molecular biology tool for species identification. The application of DNA barcoding using the Cytochrome Oxidase I (COI) mitochondrial DNA (mtDNA) molecular marker to glass eels recruiting to the Palu River estuary aims to clarify the taxonomic uncertainty regarding species recruiting to the Palu River, specifically taxa with similar ADC counts and/or tail spot patterns. The results presented will contribute to the management of this priority fish genus, add to Indonesian anguillid eel sequences in the GenBank repository, and can also to support the use of environmental DNA (eDNA) methods for monitoring Indonesian anguillid eels, especially in the Palu River.

Keywords: *Anguilla*, diadromy, Cytochrome Oxidase I, DNA barcoding, glass eels, species identification

Observing Mollusca Benthic Diversity to Measure the Success of the Implementation of Mulung Culture as an Effort to Conserve Aquatics in the Waters of Lapang-Batang Island, Alor Regency, East Nusa Tenggara.

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Abstract. Mulung culture is a customary process, from the closure of water areas to the extraction of aquatic resources. From an ecological perspective, the environment is allowed to recover. The impact of Mulung, the resource population increases. The purpose of the study was to determine the benthic mollusk community in the waters of Mulung to measure the success rate of the application of Mulung. This information is important as a strategy for sustainable fisheries development. The research method uses the quadratic transect method and free collection. In addition, community structure indices were calculated using the diversity index, species evenness index, species richness index, and species density value, then continued by observing the quantitative similarity between locations calculated by the similarity index. The results showed that the composition of the benthic Mollusca species found in the Mulung area was 32 species, with a total of 261 individuals, the diversity index value (H') 3.12 in the high category, the wealth index value (R) 5.75 was high, the evenness index value was high. species (E) 0.90 is high and stable, the dominance index value (C) is 0.1, and there are no dominant species. Relative abundance, the highest with a value of 46.15% by *Ornopsis glanni* species and the lowest relative abundance, namely *Cypraea moneta*, *Conus tarbellianus*, *Basterotia corbuloides*, *Struthiolaria spinosa*, *Cerithium chipolanum*, and *Conus consors* with each value of 6.90%, the value of The highest species density was 2.53 ind/m², namely *Ornopsis glanni* and the lowest species density value were *Cypraea subovum*, *Fulvia mutica*, *Macrocallista nimbosa*, *Littorina irrorata*, *Thais luteostoma*, *Morula margaritcola*, *Rissoina chipolana*, *Xenophora burdigalensis*, *Diodora bristleostoma*, and *Chippans* with values 0.13 ind/m². While the overall density value obtained during the study was 17.40 ind/m².

Genetic characterization of *Ceratoglanis scleronema*

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Abstract. *Ceratoglanis scleronema* is one of important fish species in the Riau Province, Indonesia. The fish of *C. scleronema* distributed in several rivers of Riau Province. Research on the genetic characterization of *C. scleronema* is needed to complete its morphological data. Very little research has been done on the genetic characteristics of *C. scleronema*. This study analyzed the genetic characterization based on the cytochrome b gene of *C. scleronema* fish. The cytochrome b gene of *C. scleronema* fish from Riau Province have been successfully amplified. The result of the research showed that nucleotide transition substitutions were more common than transversion substitutions in the cytochrome b gene of *C. scleronema*. The range of genetic distance between *C. scleronema* from Kampar and Tapung rivers are 0.00-0.01. The genetic distance between *C. scleronema* from Riau Province and *C. scleronema* from GenBank data are 0.01-0.02. The phylogenetic tree showed the closest relationship *C. scleronema* from Riau Province with *C. scleronema* from Genbank data with 100% bootstrap value. The conclude of the research that cytochrome b gene can be used to differentiate species of *C. scleronema* with other fish species. The genetic characteristics of these fish are basic data that can be used for the development of fishery genetic resources in the future.

Implementation of Biodiversity Conventions in Protecting and Conserving Indonesia's Marine Environment

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Abstract. The characteristic of Indonesia as a coastal country is that it has three main ecosystems, mangroves, coral reefs and sea grass bed ecosystems. However, the three ecosystems are getting more and more damaged day by day. This is caused by human activities such as the rapid development of coastal areas, marine debris and over fishing, as well as other consequences. To overcome this, the government has issued various policies, especially in terms of protecting biodiversity in the three ecosystems. One of the actions taken by the government is to ratify the biodiversity convention (CBD) through Law Number 5 of 1994 and since the agenda for the Sustainable Development Goals (SDGs) as a global development established, the implementation of the biodiversity convention must be aligned with the SDGs, in order to create equitable development and ensure human welfare. Subsequently a conflict emerge, was how to align policies in order to provide effective protection for the conservation of the three marine ecosystems while continuing to develop globally so that the preservation of the marine environment was maintained and development for the community, especially in coastal areas continued to develop. This study uses a normative approach by analyzing international conventions and related national regulations and then be written down by descriptive analysis. This research have purposes to find the perfect concept of policy for the implementation of CBD in order to protect and conserve marine environment in Indonesia. Research shows that, it is necessary to make legal regulations that contain strict sanctions against perpetrators of destroying marine ecosystems, because so far there have been no strict sanctions given by law enforcement officers against those who violate these rules.

The dynamics of benthic invertebrates in different peat swamp forests converted to rice fields

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Abstract. Indonesian government plans to turn Central Kalimantan province into a national food barn by planting rice paddies in several places, including in shallow peatlands. Tropical peatlands actually have limited potential to be used as agricultural land since the growing medium, in some cases, are not conducive to root development, saturated-water soil that poisoning the plants. Aquatic invertebrates can be used as indicators to determine whether water quality in a field is safe for plants. The objective of this study is to evaluate the dynamics of benthic in different aquatic ecosystems on peat swamp forest. This study was conducted in Peat Techno Park (PTP) of the University of Palangka Raya, Central Kalimantan. Samples were collected from 9 observation stations with different forms of land use for agricultural activities, namely unplowed paddy fields, plowed fields, swamps, connecting ditches, beje, natural peat swamp forests, breeding ponds, and irrigation ponds. Data were collected over a 6-month period and coincided with the peak of dry and wet seasons. The abundance and species of aquatic invertebrates were then analyzed by observing the parameters measured directly at the station, namely pH, temperature, dissolved oxygen (DO), and depth. The results showed that there were only 2 (two) macrozoobenthos groups at PTP, namely the Annelida and insect groups, with the insect group of the order Diptheria and the family Chironomidae with the most abundant genus Chironomus being the dominant group. Stations with high abundance were unplowed rice fields, plowed fields, swamps, breeding ponds and beje, respectively..

Development of Hoat Tamngil Mangrove Ecotourism Area, Southeast Maluku Regency Based On Zoning System

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Abstract. The Hoat Tamngil mangrove ecotourism area has been managed since 2019, but its utilization has not been optimal. The Hoat Tamngil mangrove ecotourism area is not collected as an ecotourism area. Currently, the management of the mangrove ecotourism area of Hoat Tamngil is less than optimal in land use, so it is still often found people are cutting mangrove trees in ecotourism areas. Furthermore, to reduce conflicts of land use in the mangrove forest area, it is necessary to regulate a zoning system that will protect natural resources, protect the interests of local communities, and is also optimal for ecotourism activities. Conceptualizing a zoning system based on the density level of mangroves and the development of ecotourism in the Hoat Tamngil Rumadian Village are the aim of this study. This research was conducted from June to October 2021. Analysis of the mangrove vegetation index with NDVI and spatial analysis were the analyzes used in this study. The results obtained from the research are the density of mangrove hoat tamngil varies but is dominated by high density. Mangrove density is a reference in the zoning division into a core zone with an area of 19.45 ha, a buffer zone of 16.27 ha, and a utilization zone of 10.8 ha. Each zoning has criteria for permitted activities to ensure sustainability in the use of mangrove ecotourism areas.

Length frequency distribution, growth pattern and condition factor of the comrade (*Poropuntius tawarensis*: Cyprinidae), in Laut Tawar Lake of Central Aceh, Indonesia

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Abstract. The comrade fish (*Poropuntius tawarensis*) is an endemic fish of the family Cyprinidae found in Fresh Sea Lakes, and has been listed on the Red List. This study aims to reveal the frequency of long distribution, growth patterns and factors of the condition of peer fish in the lake as basic information for conservation. The research was conducted from January to May 2022 in the Fresh Sea Lake of Central Aceh. Sampling was carried out at four sampling sites based on representative activities on the lake. The location of the study was determined based on differences in environmental characteristics, namely Station 1 (Teluk One-One), Station 2 (Bewang), Station 3 (Gegarang) and Station 4 (Kebayakan). The results showed that the long distribution of fish at Bewang Station was relatively higher in terms of the frequency of the long distribution. The growth pattern of male and female fish is negative allometric ($b < 3$). The condition factor of the three stations is relatively the same ranging from 0.94 to 1.39, but it is different from the one-one station which has a condition factor of 0.01. The value of the condition factor that can be obtained has insignificant differences every month, namely 1.12 ± 0.38 (January), 1.00 ± 0.49 (February), 0.93 ± 0.55 (March), 0.85 ± 0.59 (April), and 1.17 ± 0.32 (May).

Keywords: Growth patterns, Biology, Comrade Fish

Analysis of Abundance and Composition of Dinoflagellates in Mayangan and Binor Waters, Probolinggo, East Java, Indonesia

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Abstract. Dinoflagellates are one of the phytoplankton groups that an important role as primary producers in waters. However, in very abundant conditions (blooming) it can be dangerous for ecosystems and aquatic biota because it can produce toxic substances. This study aims to determine the composition and abundance of harmful dinoflagellates and environmental factors that influence the presence of dinoflagellates in coastal waters of Mayangan and Binor, Probolinggo Regency, East Java. The method used in this study is a survey method by determining the sample point by purposive sampling. The research was conducted in March 2022. The result showed that the abundance of dinoflagellates in Mayangan waters 255 – 1511 cells/ml consisting of 10 genera namely Alexandrium, Ceratium, Dinophysis, Gambierdiscus, Glenodinium, Gymnodinium, Ostreopsis, Peridinium, Phyrodinium dan Prorocentrum. The abundance of dinoflagellates in Binor waters 716 – 2536 cells/ml consisting of 10 genera namely Alexandrium, Amphydinium, Bysmatrum, Cochlodinium, Gambierdiscus, Glenodinium, Gymnodinium, Peridinium, Protoperidinium dan Scrippsiella. The highest genus in Mayangan waters Ceratium 18% and Binor waters Protoperidinium 21%. The abundance of dinoflagellates in the Mayangan and Binor waters has no potential for blooming, but the presence of the dinoflagellate genus in the waters can still endanger coastal ecosystems because it can produce toxins. The presence of dinoflagellates is influenced by environmental factors such as salinity, nitrate and phosphate. Suggestions need to be done a management to minimize nutrient enrichment in the coastal waters of Mayangan and Binor, Probolinggo, East Java to reduce the adverse effects of the high abundance of dinoflagellates.

On the Salinity Distribution Induced Mixing at the Mouth of the Estuary

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Abstract. Salinity is an essential parameter in estuaries because it determines the mixing process and distribution of biota in the estuary ecosystem. In the paper, we investigate the dynamics of salinity distribution in the Dumai estuary. Salinity and tidal data observation were carried out during the transitional season around the mouth of the estuary. We get the salinity time series data in a tidal cycle. We observed that the Formzhal number is about 0.239, indicating that the tidal type in Dumai estuary waters is mixed directional, tending to double a day, with the highest and lowest tides in the Dumai estuary being 1.26 and 0.47 m, respectively. The salinity variability due to tides was studied by harmonic analysis, while the spatiotemporal distribution was studied using an analytical solution developed by previous researchers. The results show the presence of time lag between tidal elevation and salinity variation. Low tide and salinity, which indicate the effect of river discharge, are significant. This study further indicated that high salinity occurs during strong mixing conditions. It implied that the high salinity from the offshore entrance to shallower waters allowed for mixing processes. This paper ends with a comprehensive discussion of the vertical distribution of salinity at the mouth of the estuary.

Keyword:

Perception of Climate Change and Adoption of Climate Smart Fisheries Among Small Scale Fishermen at Teshie, Ghana

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Abstract. This study was conducted to examine the perception of 120 fisher folks to climate change and the relationship between socio-economic characteristics and adoption of climate smart fisheries using questionnaires. Demographic characteristics, perception towards climate change and adoption of climate-smart fisheries were analyzed using statistical inference and descriptive statistics. An ordered logistic regression model was performed to explore the possible effects of each predictor variable on the need to implement co-management as mitigative measure for climate change in fisheries. The result showed that 111 respondents have formal education. The majority of respondents 118 have no access to storage facilities whilst 116 have access to market. Thirty eight respondents have access to information on weather and climatic conditions. Fifty seven respondents perceived decrease in amount of rainfall whilst eighty respondents perceived decrease in sea level. Seven, twelve and seventeen respondents perceived an increase in humidity, change in temperature and wind-storm or sea breeze respectively. Fiftyeight of the respondents agree to reduction of fleet's carbon emission whilst 40 respondents disagreed to diversifying sources of household income as an adoption to climate-smart fisheries. Sixty respondents agree that additional cost in the beginning of adoption of climate smart fisheries is a constraint. The likelihood Chi-squared test ratio value was 18.35 ($P<0.05$). The results of the ordered logit regression show that age, education, having a second source of income and an increase of fuel subsidy are statistically significant to fishermen's perception of the extent to which co-management could contribute to address climate change was detected.

Keywords: Adaptation Strategies; Climate Change; Food Security; Co-Management; Small Scale Fisheries.

Macrozoobenthic Diversity and Heavy Metal Accumulation of Pb and Hg in Bone River, Gorontalo, Indonesia

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Abstract. The heavy metal pollution on benthic macroinvertebrate communities in Bone River has not been explored. The present study aimed to study the diversity of the macrozoobenthic along the Bone River in relation to the heavy metals leads and mercury at eight sampling stations. The samples were taken in July 2021. A sample of four representative macro zoobenthic families (Hydropsychidae, Baetidae and Elmidae) was also used to analyse metal bioaccumulation. The fauna recorded in this work consists of 3146 individuals corresponding to 35 families and ten orders. The benthic population size showed that Diptera, Ephemeroptera, Coleoptera, and Trichoptera are dominant. The diversity indices show the low and medium categories but favour a better macrozoobenthic development. Monitoring studies show that the concentration of Pb in the sediments is much higher than that of mercury. Metal accumulation in sediments showed fluctuations but did not reflect macrozoobenthic metal concentrations. In general, the bioconcentration factor (BCF) value indicates that the three taxa are included in the low accumulative category.

Keywords: Accumulation; Bone River; Diversity; Heavy Metal; Macrozoobenthic.

Reproductive Performance of *Osteochillus vittatus* Outside of the Natural Environment

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Abstract. *Osteochilus vittatus* is a species of bonylip barb in the Cyprinidae family of freshwater fish. Reproductive performance of *O. vittatus* outside of the natural environment is one of the important aspects to be observed. The objective of this study was to evaluate the reproductive activity of *O. vittatus* outside of its natural habitat. The study was conducted from August to December 2021 at the Research Institute for Fish Breeding, Subang, West Java. Fifty females and thirty males were kept in concrete ponds. The fish were fed a 38 percent protein diet, and their gonad development was monitored monthly. Fish that had matured gonads were spawned and their reproductive performance was observed. Sperm motility and velocity of *O. vittatus* males were analyzed using a sperm analyzer (CASA). The ovi somatic index was 29.671 ± 98.14 percent, total fecundity was $167,167 \pm 7371,11$ eggs/100 g female, fertilization rate was 43.97 ± 31.70 percent and hatching rate was 57.50 ± 38.62 percent. The sperm volume was 12.42 ± 4.19 mL, with a percent motility and velocity of 93.50 ± 4.36 and 84.00 ± 3.83 respectively. The percentages of static, non-progressive motile, and progressive motile of fish sperm were 4.075 ± 3.88 , 103.28 ± 19.02 , and 29.85 ± 16.32 percent respectively. Based on the study, we can conclude that *O. vittatus* has the ability to reproduce outside of its natural habitat.

Keywords: Gonad; *Osteochillus Vittatus*; Outside of The Natural Environment; Reproductive; Performance.

Tsunami Numerical Modelling in Ujung Kulon National Park with the Earthquake Magnitude Scenario of 6.5 and 6.9 Mw

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Abstract. Tsunami modeling was conducted to simulate tsunami events based on earthquake data previously occurring around Ujung Kulon National Park (TNUK), Banten Province using Tunami-F1 and Tunami-N3. Tunami-F1 is a modeling method to get the wave height and tsunami arrival time with a grid spacing of 0.00167°. While the Tunami-N3 is a model that applies the theory of wave propagation linearly in a grid variation to get a high output of tsunami inundation. The tsunami source data was used from historical earthquake generation on January 14, 2022 (6.5 Mw) and August 2, 2019 (6.9Mw). The reverse fault type scenario from Wells & Coppersmith (1994) is used to calculate the scaling law with length, width, and the focal mechanism value obtained from the United States Geological Survey (USGS) to generate initial waves based on the multideform model. The Tunami-N3 model applies a nested model with variations in grid spacing and the most detailed value is 68,556 m. The tsunami wave height based on the magnitude 6.5 Mw scenario is around 0.001 m to 0.05 m with the highest wave height found on the southern coast of TNUK and the southern coastal area of Peucang Island (0.03-0.05m). The inundation produced is only visible in the E1 domain reaching 96-192 m in areas A, B, C. Then, the maximum inundation area is the south coast of TNUK (0.01-0.03m). Based on the second scenario, the height of the tsunami waves generated is in the range of 0.001 – 0.3 m. The maximum tsunami height was in the Rancecet Beach area, south of Tinjil Island, the south, east, and north coasts of TNUK (0.03-0.3m). The run-up distance resulting from scenario 1 is less than 1 km. Based on Tunami-F1 model results, wave height maximum caused by 6.5 Mw magnitude is higher than 6.9 Mw.

Keywords: Inundation; Numerical Modelling; Tsunami Height; Tsunami Arrival Time.

Design and Cost Building Calculation of 5 Gt Fiberglas Material Fishing Vessel Riau Province

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Abstract. The development of capture fisheries is essentially aimed at improving the welfare of the community, especially fishermen, and at the same time preserving fish resources and the environment. This goal is currently being expanded in scope, so that it is not only to improve people's welfare and preserve fish resources, but also to increase the contribution of the capture fisheries sub-sector to national economic development. One of the problems that are still an obstacle in efforts to improve and develop the fishery sector, especially in the field of fisheries, is the fishing facilities and infrastructure owned by fishermen in their fishing business, it is clear that the ability of fishermen is very limited. This causes the fishing effort to be carried out is also very limited so that the level of fishing effort is very limited. fishermen income is also insufficient. This research aims to design a boat made of fiberglass with a capacity of 5 GT standard Indonesian classification bureau BKI which is a reference in the capture fisheries development program in Riau province. The results of this study resulted in a 5 GT ship design according to the Indonesian Classification Bureau (BKI) FRP Fishing Vessel Less than 12 M. The main dimension of the 5 GT fishing vessel has a length of 12.5 m, a width of 2.6 m, a height of 1.2 m, a draft of 0.6 m with an operating speed of 12 Knots, the estimated cost to make this vessel is Rp 445,864,800 including tax value added.

Keywords: Building; Cost; Design; Fiberglass; Fishing Vessel.

Ship Resistance and Powering Prediction of a Fishing Vessel Fiberglass 5GT

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Abstract. The potential of marine fish resources in Indonesia is very large, reaching 12.01 million tons per year spread over the territorial waters of Indonesia and the waters of the Indonesian Exclusive Economic Zone (ZEEI) which is divided into nine Indonesian waters, especially in the Riau Province area of 46 tons/year. However, with the potential for large fish resources in Indonesia, which is still not supported by the number of proper and standard fishing vessels, this condition creates quite a problem, namely how to calculate the motor power of the designed vessel and also take into account the smallest possible obstacles so that we can determine the power of the vessel. ships with a payload size of 5GT. For this purpose, it is necessary to analyze the ship's performance here the author predicts the ship's resistance using the Maxsurf software using the Holtrop, Fung and van Oortmerssen methods. In the experiment with the Holtrop method with the ship speed reaching 12 Knots the resistance value produced by the 5GT fishing boat was 4.1 Kn with a power requirement of 41.44Hp, the Fung method with the ship speed reaching 12 Knots the resistance value produced by the 5GT fishing boat was 4, 6 Kn with a power requirement of 46.66 Hp, while in the experiment with the van Oortmerssen method with a boat speed of 12 Knots the resistance value produced by a 5GT fishing boat is 4.8Kn with a power requirement of 48.88 Hp.

Keywords: Fiberglass; Fishing Vessel; Power; Resistance.

Microplastic Pollution in Surface Water of Lake Singkarak, Indonesia

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Abstract. Microplastic pollution is already at an “alarming” level in Indonesia's marine and freshwater ecosystems. However, to the best of our knowledge, no study has reported the microplastic occurrence in the lake ecosystem in Indonesia. Lake Singkarak, a big tectonic lake, has been considered one of the priority lakes to be restored. The lake receives a high influx of plastic waste from rivers and catchment runoff. Controlling the outflow through the hydropower dam and the sluice in the main lake outlet may prevent the microplastic's outflux. The study's objective was to determine the first occurrence and the abundance of microplastics in the lake's surface water. Water samples were collected from three sites in the lake inlet area, one in the intake area of the hydropower dam and one in the outlet area, by performing four parallel trawls in each site using a modified plankton net. The highest abundance of microplastics in the lake's surface water was 9 particles/m³ in the lake inlet area, which received a high plastic waste input from the river. The lowest abundance was 2 particles/m³ in the main lake outlet area. Foams and fragments, white and clear in color, size of 300 µm, were the dominant types of microplastics observed. Our preliminary study suggests that the lake could act as a sink of microplastics. Therefore, ceasing the input sources of plastic waste from the river should be prioritized to prevent further microplastic pollution of Lake Singkarak.

Keywords: Microplastics; Plastics; Lake Singkarak; Surface Water.

Effect of Density of Microalgae *Spirulina* sp. on Chromium Metal Bioremediation in Palm Oil Liquid Waste

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Abstract. The problem of environmental damage caused by the waste produced by the palm oil mill is liquid waste containing Cr (chrome). One technique that can be used to restore the condition of waters contaminated with chromium metal is bioremediation using microalgae. This study aims to determine the potential of *Spirulina* sp. as an alternative to reducing Cr metal levels in palm oil mill wastewater (biological treatment) by testing the ability of *Spirulina* sp. in different cell densities. The results showed that the temperature of the liquid waste during the first 7 days fluctuated and was followed by temperature conditions which tended to be stable until the 11th day. *Spirulina* sp. cell density increased until the 7th day, after which the number of cell densities decreased in the low and high-density treatments until the 11th day. The decrease in the total chromium content of wastewater is directly proportional to the time of observation, on the 3rd day there was a decrease of 2.4587-4.1299 mg/L, on the 7th day of 0.0074-1.6713 mg/L, and 11th day of 0.0333-0.1213 mg/L. The decrease in total chromium content in wastewater has an inverse relationship with an increase in cell density, seen on day 3 of the low cell density treatment having the smallest total chromium content of liquid waste with a value of 0.0204 mg/L, followed by medium and high-density treatments of 0, 1277 mg/L and 0.4560 mg/L, and control of 1.6917 mg/L. Keywords: Bioremediation, *Spirulina* sp., Density, Total Chromium.

Keywords: Bioremediation; Destiny; *Spirulina* Sp; Total Chromium.

The Impact of Mining Activities on Sediment Quality in the Seafloor Around Southeast of Sulawesi

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Abstract: Research of heavy metals content in sediments was carried out in April 2006 on the bottom sea of Buton, Kabaena, and Muna islands. This study was aimed to determine the content of heavy metals Cd, Cu, Ni, Pb, and Zn and to predict the quality of the sediments by employing indices analysis. Sediment samples were taken using a grab at 8 stations. Heavy metal content was analyzed using AAS. Three indices were exercised to analyze the metal content in the sediment, that are contamination factors, geoaccumulation index, and pollution load index. The computation of contamination factors showed an average value of less than 1, namely Pb 0.236, Cd 0.269, Cu 0.048, Zn 0.346, and Ni 0.986. Meanwhile, the geoaccumulation index values were less than 1, the value for Pb -3.836, Cd -2.878, Cu -5.061, Zn -2.430, and Ni -1.002. The pollution load index value is 0.201. These values which were less than 1 implied low level of pollution in the area. Thus, according to the analysis, the sediments in these three waters are still natural and not polluted.

Keyword:

The Abundance of Micro plastics (MPs) in the Sediment of Pantai Carocok in Pesisir Selatan Regency, West Sumatra

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Abstract. Micro plastics (MPs) are small fractions of plastid compound, which takes a long time to decompose in waters. The MPs can accumulate in seawaters, and in aquatic biota's gut; and it harmful to human health. This study was done to know the abundance of MPs in the sediment in Pantai Carocok beach; it was in Pesisir Selatan regency, West Sumatra Province. Samples were collected from three stations, at HWL and LWL with two different depths. The findings showed that fragment type of MPs more dominant than fibre and film types; these figures were $\pm 70\%$, $\pm 16\%$, and $\pm 13\%$ consecutively. The abundance of MPs was higher at station 3 than the other two stations; the lowest was at station 1. The abundance of MPs ranged from 70.84-109.16 particles/kg of sediment. The abundance of MPs was varied between zone 1 in HWL and in the zone 2 in LWL for each station, and it was tended increase to deeper depth of samples; however, the different were not significant.

Keywords: Abundance, MPs, Pantai Carocok, Sediments, Tourist Beach

Characteristics of Sediment and Physical Oceanography at Shoreline Movement of Rhu Bay Riau Province Indonesia

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Abstract. Rhu Bay is located in Rupat Island, Bengkalis Regency, Riau Province, Indonesia, under influence of the Malacca Strait. The purpose of this research is to analyze shoreline changes in the Rhu Bay Coastal Area for 18 years, from 2012 to 2022 based on characteristics of sediment and physical Oceanography. Analysis of shoreline changes using Google Earth (Landsat Copernicus) covering the entire Rhu Bay area in 2002, 2008, 2014 and 2020. This research was carried out in Rhu Bay in June 2022 through two research stages: 1) processing of secondary data in using Landsat Imagery Data and 2) the sediment samples were collected using sediment grab and oceanographic observation (currents, tides and waves) was also carried out at the coast. Digital Shoreline Analysis System (DSAS) is empowered in processing spatial data to calculate the rate of abrasion and accretion in Rhu Bay, using the methods applied of Net Shoreline Movement (NSM) and End Point Rate (EPR). The results of the study show that the coastline changes dominantly in Rhu Bay experiencing abrasion of 7.87 - 11.24 meters/year in a period of 18 years. The oceanographic parameters in Rhu Bay showed that the waves had a height of 0.2 m with a period of 3 second, current velocity of 0.36 m/s to the northwest. The change in shoreline is thought to be due to changes in the current system that flows from the Malacca Strait at high and low tide, as well as the transport of coastal sediment (dominated by medium sand fraction) towards the Malacca Strait by the currents.

Keywords: Abrasion; Current Velocity; Sediment; Shoreline; Wave Height.

The Influence of Sedimentation Processes and Oceanographic Conditions on the Accretion Rate on the Coast of Tanjung Kapal, Riau Province, Indonesia

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Abstract. Tanjung Kapal is an bay area located on the Rupat Island and is influenced by the oceanographic characteristics of the Rupat Strait. This research was conducted in June 2022 to provide information about the level of accretion on the coast of Tanjung Kapal from 2002 to 2020. This research was carried out in Rhu Bay in June 2022 through two research stages: 1) processing of secondary data in using Lansat Imagery Data and 2) the sediment samples were collected using sediment grab and oceanographic observation (currents, tides and waves) was also carried out at the coast. Statistical calculations used in calculating the accretion rate at Tanjung Kapal are EPR (End Point Rate) and NSM (Net Shoreline Movement) which are features of the DSAS (Digital Shoreline Analysis System). The results showed that the accretion rate on the coast of Tanjung Kapal ranged from 5.5 to 21.36 meters/year within 18 years. Tanjung Kapal shows that the waves have a height of 0.12 m with a period of 2 s, current velocity 0.16 m/s to the northwest. Accretion is thought to be due to a system of currents and waves flowing along the Tanjung Kapal beach which carries sediment and then accumulates along the coast. In addition to, the coastal sediments (dominated by the gravel sand fraction with a sand percentage of 57.97%) are derived from the Rupat Strait by the current system.

Keywords: Accretion; Coastal Area; Current; Sedimentation; Wave.

Analysis of Physical and Chemical Conditions in Sidakarya Coastal Waters, Bali

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Abstract. Sidakarya Coast is one of the developing ecotourism and fisheries areas in Denpasar City, Bali Province. This area has ecotourism and fishery potential that needs to be maintained so that ecotourism and fishery activities that depend on this area can enjoy economic prosperity. Activities around the coast of Sidakarya, such as ecotourism, housing areas, traditional fisheries, and agriculture, have indirectly affected the quality of coastal waters. This research was one of the efforts to identify the physical and chemical parameters of the coastal waters, including temperature, water transparency, salinity, DO (Dissolved oxygen), and pH. This research was conducted in April 2021 with five measurement points of water quality parameters. Determination of the measurement location using the purposive sampling method. Water quality analysis was carried out by comparing the measurement results with values of water quality standards based on KEPMEN-LH No. 51 Tahun 2004 for marine tourism and marine biotas and based on KEPMEN-LH No. 115 Tahun 2003 concerning Guidelines for Determining the Status of Water Quality. The measurement results showed the value of Sidakarya water quality parameters ranging from 30.2-30.6 °C for temperature, 0.6-5 meter for water transparency, 29.7-33.7‰ for salinity, 4.94-7.04 mg/l for DO and 6.9-7.4 for pH. The results obtained that the condition of Sidakarya waters in general still meets the water quality; only the water transparency parameter at the location near the estuary was below the quality standard. The results of the calculation of the pollution index (PI) at each sampling station show the PI value <1 or meets the quality standards for marine biota (stations 1 and 2) and meet the quality standards for marine tourism (stations 3,4 and 5). The results indicated that Sidakarya waters can still be developed for ecotourism areas and limited fisheries.

Keywords: Coastal; Ecotourism; Sidakarya; Water Quality.

Occurrence of Organochlorine Pesticide Residues in Surface Water and Mussel *Corbicula Sumatrana* From Lake Singkarak, West Sumatera

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Abstract. Organochlorine is a synthetic pesticide that has been banned in many countries because of its high persistence in the environment and can accumulate in animals. The objective of this study was to assess the level of organochlorine residues in surface water and in the mussel *Corbicula sumatrana* of Lake Singkarak. In the present study, seven selected organochlorine pesticide compounds such as Lindan, Aldrin, Heptachlor, Dieldrin, DDT, Endrin, and Endosulfan were determined. Water and mussel samples were collected from 10 sampling sites of Lake Singkarak, Batu Taba, Sumpur, Guguk Malalo, Ombilin, Tikalak, Sumani, Saniang Baka, Muaro Pingai, Paninggahan, and Pincuran Gadang, respectively in June 2021. Water and mussel samples were extracted and analyzed with gas chromatography. The result of this study revealed the occurrence of Lindan (7 ppb) in the surface water of Tikalak, and also Aldrin (3 ppb) in the surface water of Tikalak, Sumani, and Ombilin. Organochlorine residue compounds were also detected in mussels of five sampling sites (Tikalak, Sumani, Muaro Pingai, Paninggahan, and Pincuran Gadang). Mussels of Tikalak contain compounds namely Dieldrin, Dichlorodiphenyltrichloroethane (DDT), and Endosulfan with levels of 2 µg/kg, 6 µg/kg, and 3 µg/kg, respectively. Dieldrin was also detected at Sumani, Muaro Pingai, and Paninggahan with levels of 2 µg/kg, 4 µg/kg, and 10 µg/kg, respectively. DDT was also detected at Pincuran Gadang at a level of 3 µg/kg. Other compounds such as Heptachlor and Endrin were not detected both in surface water and in mussel from all sampling sites studied. The results indicate that organochlorine residue can still be found in the environment, with its level in mussels being higher than in surface water.

Keywords: Adaptation Strategies; Climate Change; Food Security; Co-Management; Small Scale Fisheries.

Acute Toxicity (LC₅₀) Ethanol Extract of *Caulerpa lentilifera* and Blood Glucose Level Analysis in *Cyprinus carpio*

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Abstract. The purpose of this study was to analyze the acute toxicity the ethanolic extract of sea grape (*Caulerpa lentilifera*) on *Cyprinus carpio* fish and analyze the effect on blood glucose, as well as analyze the results of water quality measurements. The method in this study is an experimental method which to obtain information about the effect of treatment (independent variable) on the results (dependent variable) under controlled conditions. The procedures carried out in the study included extract preparation, acute toxicity test, calculation of blood glucose levels, water quality measurement and data analysis. The concentrations used were 0 ppm, 0.24 ppm, 0.36 ppm, 0.42 ppm, 0.65 ppm, and 0.87 ppm, the determination of these concentrations using the rand scale table. The results of this study include the value of LC50-96 hours of ethanol extract of *Caulerpa lentilifera* against *Cyprinus carpio* is 0.565 ppm, which means to get a mortality or fish mortality rate of 50%, it requires exposure to a concentration of 0.565 ppm. The LC50 value of the *Caulerpa lentilifera* ethanol extract was included in the category of very high toxicity because it had an LC50 value of < 1 mg/l. The results of measuring blood glucose levels ranged from 41 to 90 mg/dL. The results of the ANOVA test obtained a significance value of 0.000 < 0.05. Thus, it can be concluded that the ethanol extract of *Caulerpa lentilifera* had a significant effect on blood glucose of *Cyprinus carpio* fish. Water quality parameters measured in this study include temperature, pH and DO. Temperature values obtained ranged from 20 – 23°C, pH values ranged from 7.73 – 8.29, and DO values ranged from 5.2 – 7.0 mg/L. It can be concluded that the main factor of mortality in fish does not come from water quality but from the ethanol extract of *Caulerpa lentilifera*.

Keywords: Acute Toxicity, Blood Glucose Level; Ethanol Extract of *Caulerpa Lentilifera*.

Blood Glucose Level Analysis of *Gambusia Affinis* Relationship with Environmental Conditions of The Brantas River Downstream, Malang

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Abstrak. Blood glucose is a source of energy and has a major role as a major supplier of fuel and essential substrates for metabolism. Blood glucose can also be used as a biological bioindicator because involved in stress levels of fish caused by pollution. This study aims to analyze blood glucose levels in gambusia fish (*Gambusia affinis*) in the Downstream of the Brantas-Malang river, Malang, and analyze its relationship to water quality to determine the Index of Pollution (IP) of water quality. In this study, 90 sample fish with size 3.5-5 cm (*Gambusia affinis*) measuring were taken from 10 each sampling station triplicate in each sub station. Then blood glucose levels were measured to determine the water pollution index level. The results of blood glucose level measurements showed that fish at sampling station 1-10 respectively about 92, 92, 93, 93,78, 103, 79, 85, 82, and 115 mg/dL. According to the results of blood glucose indicate that all fish were taken from each sampling stations showed were in stress condition. The results of water quality show that the ammonia, BOD, and Phenol are in above the quality standard. The relationship between water quality parameters and blood glucose levels has a strong relationship, namely the correlation is more than 0.05. The estimation results of the Index of Pollution (IP) calculation are obtained at each station in the heavily polluted category. The results of the Index Pollution (IP) at each station state in the heavily polluted category. Based on all results, this study concludes that the downstream of the Brantas-Malang river, Malang heavily polluted. The results of this research can be used as material for evaluation and actions can be taken to manage and utilize river water and further research is needed.

Keywords: Blood Glucose Level; Downstream Brantas-Malang River; *Gambusia Affinis*; Index Of Pollution.

Relationships Between Organic Matter in Seawater and Sediment in the East Coast of Bengkalis Island

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Abstract. Organic matter is one of indicators of environmental fertility in both land and aquatic ecosystem. In the coastal area, the content of organic matter in a certain amount can be useful for aquatic biota, but it can also cause a disturbance if the amount exceeds the assimilation capacity of the waters. This study aims to determine the organic matter content in the water column and sediment at high and low tide conditions in the waters of the East coast of Bengkalis Island as well as to determine their relationships. The study was carried out by survey method where samples and data were collected directly in the field and then were taken to the laboratory for further analysis. The results showed that the mean organic matter content in the seawater was lower at high tide (17.38 mg/L – 25.28 mg/L) than at low tide (29.63 mg/L – 35.55 mg/L), whilst in sediments the organic matter content at high tide conditions was also lower (2.28% - 5.37%) compared to low tide (3.46% - 8.62%). The sediment of the east coast of Bengkalis Island was dominated by mud type (53.62 - 93.94 %). The organic matter content in seawater and sediment showed a strong correlation with r value of 0.730 both during high tide ($Y = -1,433 + 0,271X$) and also during low tide ($Y = -14,906 + 0,615X$ with r value of 0.844), respectively. Further study is still needed to provide a comprehensive understanding on the sustainable environmental condition of the east coast of Bengkalis Island as it is one of the important fishing ground.

Keywords: Bengkalis Island; Organic Matter; Sediment; Tide.

Analysis of Organophosphate Pesticide Residues in Surface Water and Bilih Fish (*Mystacoleucus Padangensis* Blkr.) in Lake Singkarak, West Sumatra

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Abstract. Organophosphate pesticide is the derivate of a pesticide that is commonly used by farmers because it has strong killing power to kill insects and easily disappear from plants, as well as being recommended by the Ministry of Agriculture. However, organophosphate pesticide residues may accumulate in the environment; additionally, organophosphate pesticide residues can cause acute and chronic poisoning in humans. Some insects, such as mites and aphids that attack cotton plants, sugar cane, peanuts, tobacco, vegetables, fruits, and ornamental plants, could be controlled by applying organophosphate pesticides to the plants. The aim of the study is to assess the levels of organophosphate pesticide residues in the lake water and the Bilih fish (*Mystacoleucus padangensis*) in Singkarak Lake. Seven compounds of organophosphate pesticides such as Diazinon, Fenitrothion, Medetothion, Malathion, Chlorpyrifos, Parathion, and Profenofos were analyzed in this study. Bilih fish and surface water samples were collected from 10 sampling locations in Singkarak Lake in June 2021. Gas Chromatography was used to determine the organophosphate pesticide in the samples. The results showed that the residues of organophosphate pesticides were detected in water samples from 4 locations (Ombilin, Tikalak, Sumani, and Paninggahan), whereas in the other 6 locations (Batu Taba, Sumpur, Guguak Malalo, Saniang Baka, Muaro Pingai, and Tanjung Mutih), the organophosphate pesticides were not detected (below 1 ppb). The organophosphate pesticide compounds that were detected in the lake water were Medetothion, Malathion, Chlorpyrifos, and Parathion within a concentration of 2–8 ppb. Most of the collected fish samples contained organophosphate residues, except for the Bilih fish sample from Ombilin. The derivatives of organophosphates that were detected in the fish samples consisted of Diazinon, Fenitrothion, Medetothion, Chlorpyrifos, Parathion, and Profenofos, however, Malathion compound was not detected. The concentration of organophosphate residues in Bilih fish was in the range of 2 to 70 ppb.

Keywords: Lake Singkarak; *Mystacoleucus Padangensis* Blkr; Organophosphate; Water.

Performance Effectiveness of Communal Wastewater Treatment Plant as an Effort to Control Pollution of the Gajah Wong River, Yogyakarta

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Abstract. The Gajah Wong River receives wastewater from the high population of Sleman Regency, including agricultural activities and home industries that contain organic pollutants. High organic pollutants are the cause of dissolved oxygen depletion in waters that can threaten the lives of various aquatic biota in them. The construction of a communal wastewater treatment plant (WWTP) for handling domestic wastewater is an effort to control river pollution and the effectiveness of WWTP performance based on key parameters is continuously monitored, which is the purpose of this research. Surveys on 4 (four) communal WWTPs (Ngudi Mulyo, Wahana Bina Lingkungan, Tirto Mili, and Karya Asri Ambarukmo) were carried out in February – April 2021 with the key parameters observed were pH, BOD₅, COD and NH₃. Sampling of wastewater by grab sampling at each inlet and outlet of the WWTP using ABR (Anaerobic Baffled Reactor) and RBC (Rotating Biological Contactor) technology 6 times. The results provide an overview of the quality characteristics of wastewater that has been treated (outlet) at the Ngundi Mulyo WWTP (NH₃ 16.55 mg/L, BOD₅ 32.53 mg/L, COD 213.52 mg/L, pH 5) Wahana Bina Lingkungan (NH₃ 29.85 mg/L, BOD₅ 262.36 mg/L, pH 6-7), Tirto Mulyo (NH₃ 20.42 mg/L, BOD₅ 66.67 mg/L, COD 248.7 mg/L, pH 6-7) and Karya Asri Ambarukmo (NH₃ 21.60 mg/L, BOD₅ 252.64 mg/L, pH 6-7). These results reveal that the performance of the four WWTPs is still low and has not been effective in reducing COD and NH₃ parameters, except that BOD₅ reaches the required quality standard and the processed wastewater still has the potential to reduce the water quality of the Gajah Wong River. This result is also a signal for WWTP managers to improve the processing process in each of these WWTPs.

Understanding The Mechanism of Currents Through the Malacca Strait Study Case 2020 – 2022: Mean state, Seasonal and Monthly Variation

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Abstract. The Malacca Strait is one of the waters that is very important in regulating the marine climate system and the mixing of water masses in Indonesia. There are three current systems that work in these waters, namely the Indian Ocean Current System, the South China Ocean Current System and the Java Ocean Current System which are influenced by the ITF. Driving force from those current systems is dominated by monsoon winds. As we know the monsoon blows from the Southwest (SW) to northeast (NE) at June to September (we called Southwest monsoon) and monsoon blows from Northeast (NE) and North (N) to Southwest (SW) at December to February (we called Northeast monsoon). In these research the marine cofernicus data was used and analysed to understand the mechanism of current system in Malacca Strait. Generally, the pattern of surface current during SW and NE monsoon are more than complex than inter-monsoon (during March to May is first inter-monsoon and October to November is second inter-monsoon). Numbers eddies phenomenon were found at the Malacca Strait each season. During the first inter-monsoon, anti-Cyclonic eddies occur in eastern part of Malacca strait centered in 3.5 N, 100.5 E. Meanwhile, cyclonic eddies formed near the northern part of Sumatra centered in 0.5 N, 104.5 E during SW Monsoon and the eddies still existed during second inter-monsoon but weaker than previous monsoon.

Keywords: Eddy Formed; Indian Ocean; Inter Monsoon; Northeast Monsoon; Southwest Monsoon.

Detection of Coastline Changing by Using Remote Sensing Imagery (Case Study in Talawi District, Tanjung Tiram Distrtict, Lima Puluh Pesisir District Batu Bara Regency)

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Abstract. The high pressure in utilizing coastal areas and oceans caused in coastal damage. The coastline is the confluence of land areas and sea areas, where the existence of the line and the position of the coastline can change and undergo changes over time, and the position of the existence of the line is not fixed. The purpose of this study is to find out the changes in the coastline of the Coal District, Talawi District, Tanjung Tiram District and Lima Puluh Pesisir District in 2017-2022. The data analysis technique was used in this study is quantitative descriptive analysis. The data processing includes: Data Acquisition using Satellite Imagery (*Raster*) data. The data is used by Sentinel 2 satellite imagery data was selected based on 2017 and 2022 coverage representatives, the lowest percentage of cloud cover in the study area. Supporting Spatial Data (vectors). The Digital Shoreline Analysis System (DSAS) is *a plug in* for esri ArcGIS 10.4 - 10.6 desktops to calculate historical coastline change rate statistics. Based on the results of coastline delianiation, it can be seen that the length of coastal gasis in 2017 in The Lima Puluh Pesisir District is 10.48 Km, in 2022 there was a decrease to 10.42 Km while based on RBI data on a scale of 1:50,000 in the 2014 update year was 17.37 Km. The length of the coastline of Tanjung Tiram District in 2017 was 24.31 Km, there was a decrease in 2022 to 23.44 Km and based on RBI data of 16.90 Km. Talawi District has a the length of the coastline was 3.16 Km in 2017, experienced an increase in 2022 to 3.22 Km while the coastline on the RBI map was 3.23 Kilometers in length.

Pajak Management Area Mapping at Batin Tambak, Pelalawan District, Riau

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Abstract. 'Pajak' is one of the remaining traditional wisdoms in Batin Tambak, Pelalawan Regency, Riau, Indonesia. The utilization of the Pajak area is based on abstinence that the grandchildren, nieces, and nephews have agreed upon with the elders to maintain fish resources and other related ecosystems. Efforts to sustain this wisdom are needed. This research is the initial stage of this effort, mapping the Pajak management area to determine the spatial distribution and quantitative derivation that can be estimated from the mapping results. The mapping of this managed area utilizes online map services provided by Google as the primary data and is followed by a site survey with local indigenous peoples. Field trips were recorded using a navigation-type Global Positioning System (GPS). Redraw the Pajak area as dead lakes (oxbows) and streams and tributaries using the ArcGIS version 10.8.1 geographic information system application. And all data is saved in shapefile format (.shp). The Batin Tambak Pajak management area consists of: i) Three areas located along the Segati River (Suak Baingin, Kubang River and Lubuk Selais), ii) Seven areas located along the Terusan River (Palumpung, Biayo, Kilang River, Ompang Bodonguong, Lilipan and Canal River), iii) The rest is in Kampar River (Poultry Nest Lake) and Kampar Kiri River (Tolukkong Lake, Pelapakan Lake, Soluk Lake, Telukpinggan Lake, Awu River, Moon Protection Lake, Tandu River, Long Hilir Lake and Long Hulu Lake). All Pajak management areas are located in the remaining swamp forest area; this indicates that the activity of using the Pajak area is highly dependent on the existence of the swamp forest. The seriousness of all relevant parties is essential for preserving existing customs and resources because current efforts only slow down the damage and loss of resources.

Keywords: Batin Tambak; Google Earth Pro; Mapping; Pajak Management Area.

Monitoring the Ecotoxicology of the Kampar River by Determining the Levels of Heavy Metals

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Abstract. Water quality monitoring activities are important to be carried out regularly. This activity is intended as an effort to create sustainable cultivation activities. The Koto Panjang PLTA Reservoir is one of the reservoirs used for aquaculture activities, so monitoring activities at this location are important things to do. This activity was carried out using a survey method at two observation locations. Location 1 is the floating net caged area, and Location 2 is the upstream or non-KJA area. Direct water quality measurements were carried out in both locations: temperature, pH, and DO. In addition, water samples were taken to see the content of heavy metals, namely Cd and Pb. Water samples were carried out to see the heavy metal content at the Basic Chemistry Laboratory, Faculty of Engineering, Riau University. The results showed that overall, the physicochemical quality of water at the Koto Panjang hydropower plant, both Locations 1 and 2, namely temperature, dissolved oxygen, and pH, still met the requirements for fish farming. While the value of Cd in all observation locations at the Koto Panjang hydropower plant exceeds the quality standard, it can be said to be polluted. Unlike Cd, there is a difference in the value of Pb at Location I and II, namely Pb at Location I; the Pb value is outside the quality standard threshold or is said to be polluted, while Location II still has not exceeded the quality standard. The high Pb value at Location I was due to many fishing boat activities with engines.

Keywords: Cadmium; Plumbum; Water Quality.

Assessment of Multi-Element Content in Sediment and River Water of the Citarum Watershed

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Abstract. Citarum River and its tributary rivers flows through Bandung Regency, with the watershed area about 6080 km². These rivers play important role for local people in various field. Numerous industries and settlements have been developing near the rivers. Unfortunately, these anthropogenic activities have caused some environmental problems such as erosion, sedimentation, and water quality deterioration. Many different elements and heavy metals enter into the river from industrial and domestic waste, where they will be distributed to aquatic ecosystem components such as sediment and aquatic biota. The purpose of this research is to determine the distribution of multi-elements caused by anthropogenic activities in the Citarum River's sediment and water. Multi-element, including heavy metals were measured using neutron activation analysis technique, that can determine many elements simultaneously. The samples were collected from 10 sampling points of the river, from Situ Cisanti to Saguling Reservoir inlet in March 2022. The result indicates that there are 17 elements in river water that consist of Na, K, Ca, Cr, Co, Zn, As, Br, Rb, Sb, Cs, La, Al, Ti, V, Mg, Cl. Concentration of Cr was found exceed the maximum tolerable value (> 0.05 mg/L) in all sampling points. High concentration of As was found in Kahuripan, Marga Asih, and Kampung Kandang. Whereas in sediment samples, 28 elements were detected, which are Na, K, Ca, Sc, Cr, Fe, Co, Zn, As, Br, Rb, Sb, Cs, Ba, La, Ce, Sm, Eu, Yb, Hf, Ta, Th, U, Al, Ti, V, Mg, Mn.

Keywords: Citarum River; Heavy Metals; Elements; Sediment; Neutron Activation Analysis.

The Pollution load on tide conditions in Air Hitam River, Pekanbaru City, Riau Province

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Abstract. The Air Hitam River is one of the 13 tributaries of the Siak River that flows in the Pekanbaru City area. The watershed area of Air Hitam River is a peat swamp that has been converted into oil palm plantations, residential areas, and industrial warehousing. This study aims to calculate the pollution load of the Air Hitam Riiver in tidal conditions with the parameters TSS, BOD, COD, nitrite and total phosphate. The research was conducted from January to March 2022. The results of the analysis of the pollution load at high tide were TSS 18163.2 kg/day (TSS), 10.982.4 kg/day (BOD), 15.415 kg/day (COD), 249.22 (nitrate), 234.432 and 240.768, (total phosphate). While at low tide the pollution load was 26379.648 kg/day for TSS, 5.354,36 kg/day BOD, 12.818 kg/day COD, 253.70 kg/day nitrate and 238.61 kg/day total phosphate.

Keyword:

Evaluation of Body Scrub from *Boergesenia forbesii* and *Kaempferia galanga*

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Abstract. The use of cosmetics at this time prioritizes natural ingredients over synthetic materials. The materials that are often used and become potential are green seaweed and rhizomes. *Boergesenia forbesii* and *Kaempferia galanga* are two natural ingredients with bioactive content that is good for human skin. The combination of these two natural materials has never been studied. This study aims to evaluate the best formulation of body scrub preparations from these two natural ingredients. In this study, the ratio of *B. forbesii* and *K. galanga* was 1:1 (cream R1), 1:2 (cream R2), 2:1 (cream R3), and control (no added natural ingredients) (cream R0). The cream preparations were evaluated by viscosity, emulsion type, stability (emulsion), skin moisture, and irritation test. Viscosity values in cream preparations ranged from 22,500 cPs to 34,600 cPs. All the treatment belongs to the type of water-soluble oil (O/W). Cream R3 was the best for the stability of emulsion (88.89%). The skin moisture parameter for R0, R1, R2, and R3 were 40.44%, 52.75%, 54.34%, and 57.55%, respectively. Based on the results of the irritation test on the skin (for all treatments), there were no volunteers who experienced signs of irritation such as rash, itching, and edema. So, the best formulation was cream R3, based on the evaluation of all parameters.

Keywords: Cosmetics; Green Seaweed; Rhizome; Skin.

Processing and Utilization of Natural Phospholipids from Fish Belly Fat Waste of Jambal Siam Fish (*Pangasius Hypophthalmus*)

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Abstract. Phospholipids are used for food products, drug formulas, stabilizers, lubricants, cosmetics, pharmaceuticals, and emulsifiers. Synthetic phospholipids can be used for food and medicinal purposes, but now consumer interest has shifted to phospholipids from natural ingredients. Phospholipids have functional properties towards health, market demand often requires phospholipids containing certain fatty acids such as omega 3. The purpose of this research is to process the belly fat waste of jambal siam fish into phospholipids and purify the phospholipids that's already obtained. The results showed that the highest saturated fatty acid content in jambal siam fish belly oil was palmitic acid which was expected to dominate the formation of phosphatidylglycerol (PG), phosphatidic acid (PA), and cardiolipin (DPG). The highest content of unsaturated fatty acids is oleic acid which was expected to dominate the formation of phosphatidylinositol (PI), phosphatidyl ethanolamine (PE), and phosphatidylcholine (PC). The highest phospholipid content was phosphotidylcholine, followed by phosphatidylglycerol (PG), diphosphatidylglycerol (DPG), phosphatidylethanolamine (PE), and phosphatidylinositol (PI). The hexane solvent produced a higher soluble hexane unsaturated fatty acid fraction than the insoluble hexane fraction, especially omega 6 and omega 9. While acetone produced higher levels of unsaturated fatty acids, especially oleic acid and omega 3 soluble acetone, which was higher than the insoluble acetone. The higher the level of purity of phospholipids, the higher the content of oleic acid and omega 3.

Keywords: Belly; Fat; Natural; Phospholipid; Waste.

Antibacterial and Antioxidant Activities of Edible Film Incorporated with Silver Nanoparticles Synthesized using *Rhizophora mucronata* Extract

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Abstract. The edible film is an alternative packaging material to replace plastic. Some of their functions are protecting the product from oxidation processes and microbiological activities. One of the biopolymers used for the base of the edible film is fish gelatine from *Pangasius* sp. skin. Silver nanoparticles from *Rhizophora mucronata* were added to increase the antioxidant and antibacterial ability of edible film. This study aims to determine the effect of silver nanoparticles from *Rhizophora mucronata* addition on the antioxidant and antibacterial activity of the edible film. The method used in the research was the experimental method with five treatments of silver nanoparticles from *Rhizophora mucronata* concentration (0%, 2%, 4%, 6%, 8%). A statistical approach used was Simplex Lattice Design. Antioxidants and antibacterial (*Escherichia coli*, *Salmonella* sp. *Staphylococcus aureus*) of edible films were analyzed. The results showed that the different concentrations of silver nanoparticles from *Rhizophora mucronata* significantly affected edible films' antioxidant and antibacterial activity. The antioxidant activities of enriched edible film ranged from 41,085% to 66,815%. Low antibacterial activities of edible film are recorded (*Salmonella* sp. 0,07mm-0,26mm; *Escherichia coli* 0,215mm-0,575mm; *Staphylococcus aureus* 0,33mm-0,44mm). The optimum concentration of silver nanoparticles from *Rhizophora mucronata* was 5,96%.

Keywords: Edible Film; Gelatin; *Rhizophora mucronata*; Silver Nanoparticles; Simplex Lattice Design.

Bioactive Components of Meat Powder and Viscera-Gonad *Holothuria Scabra* from Terung Island Waters, Batam, Indonesia

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Abstract. *Holothuria scabra* contains a number of bioactive components that are highly needed by humans in functional and healthy food. This study aims to determine differences in chemical content and bioactive components, the amount of water-soluble protein, salt-soluble protein, amino acid profile, and fatty acid profile from meat powder ingredients and viscera-gonad. The research stages include the weeding process and sample preparation, making meat powder and sea cucumber viscera-gonad, and testing the chemical and bioactive composition. Yields of sea cucumber meat powder and viscera-gonads were 95.45% and 95.92%, respectively. Sea cucumber meat powder has a slightly grayish creamy white color (69.32% white degree), while the sea cucumber gonad powder has a slightly brownish grayish-white color (63.09% white degree). The chemical contents of meat powder and edible gonad of sea cucumber are water content 9.12% and 16.12%, protein 79.50% (dw) and 51.83% (dw), fat 2.14% (dw) and 20.09% (dw), ash 4.14% (dw) and 9.52% (dw), carbohydrates 13.88% (dw) and 18.57% (dw), respectively. Components of bioactive in sea cucumber extract generally contain flavonoid components, saponins, alkaloids and steroids, and specifically, the meat is not identified flavonoid compounds. Water-soluble protein and salt-soluble protein in the sea cucumber powder decreased compared to the fresh sea cucumber. Essential amino acids in sea cucumber amino were most abundant in meat of 74.09% and in viscera-gonads of 49.95%. The dominant essential amino acids in sea cucumber meat included lysine (6.78%) and leucine (7.11%), in the viscera-gonad of leucine amino acid types (3.81%) and arginine (4.16%). The amount of total fatty acids in sea cucumber meat (1.71%) was smaller than that of sea cucumber gonads (18.49%). The types of fatty acids identified in the meat and the sea cucumber viscera-gonad were saturated fatty acids of 1.08% and 8.97%; saturated fatty acids of 0.63% and 4.96%; while compounds saturated fatty acids in meat were not identified and in viscera-gonads by 4.56%.

Keywords: Amino Acids; Bioactive; Fatty Acids; *Holothuria scabra*.

Utilization of Biang Fish (*Ilisha elongata*) as Raw Material for Flavoring Powder

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Abstract. The biang fish (*Ilisha elongata*) is a saltwater fish with a flat body, numerous fine spines, and a flavorful and savory texture. The purpose of the study was to analyze several fish meat formulations in order to ascertain the chemical composition of the fish-based flavoring powder. The research approach involved creating a fish flavored powder with a variety of treatments, including a control treatment (without fish, F0), 60 % biang fish (F1), 70 % biang fish (F2), and 80 % biang fish (F3) (F3). Based on the results, it was determined that the formulation with 70% biang fish was the best formulation. The quality characteristics of the flavoring powder have a moisture content of 3.61%, protein content of 38.49%, fat 3.75%, ash 20.72%, carbohydrates 33.43%, and salt content (NaCl) 31.43%. Research has shown that biang fish has the potential to be used as a product for flavoring ingredients.

Keywords: Biang Fish; Flavoring; *Ilisha elongata*; Powder.

Synthesis and Characterization of Hydroxyapatite of Cockle Shells (*Anadara granosa*) Originated from Indonesia Through Precipitation Method

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Abstract. The precipitation method successfully synthesized cockle shells into a highly valuable biomaterial in the present investigation. The present work aimed to determine the effect of the technical approach; (1) calcination temperatures of calcium oxide preparation and (2) sintering time of HA synthesis. Thermogravimetric-differential thermal analysis revealed that the cockle shells were calcined at 600 – 1000 °C for 3 hours and had a fine CaO powder. Thus, those sintering temperature is used as the starting point for the calcination of cockle shells. The calcinated CaO powder was then analyzed. The analysis conducted includes yield, functional group analysis using FT-IR, morphological analysis using SEM, and analysis of the composition of Carbon (C), Calcium (Ca), Oxygen (O), and Phosphor (P). Furthermore, hydroxyapatite synthesis (HA) was done with three different sintering times (2, 4, and 6 hours) at 800 °C. The characterized HA was functional group morphology, major elemental in the apatite constituents, and the crystallinity degree. Obtained the optimum temperature result for calcinated at a temperature of 800 °C. The results of HA synthesis obtained by HA quality have approached commercial HA products judging from the composition of Ca, O, and P, but the quality still includes type B of commercial HA. The HA particles obtained are micro-sized, which is 304 nm at a temperature sintering of 800 °C for 4 hours. The micro-sized allows a by-product of cockle shells as raw material HA to be applied as a futuristic biomaterial in bone/teeth implants.

Keywords: A By-Product; Cockle Shells; Hydroxyapatite; Sintering; Wet Chemical Precipitate.

Organoleptic Characteristics of Mangrove Fruit Flour Differented with Rebon Shrimp Protein Hydrolysis (*Acetes erythraeus*) Become Nutritional Food Product as A Leading Product of Local Wisdom in the Coastal Region of Riau Province

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Abstract. Riau Province is one of the areas that has mangrove forests that can be utilized by local communities to provide benefits both as a fulfillment of daily needs and can also provide economic benefits. At this time the use of mangrove forests by coastal communities. Types of mangroves whose fruit can be used as a source of food, including nipah fruit (*Nypa fruticans*). The high carbohydrate content has the potential to be used as a substitute for staple foods such as rice, corn and sago or can be used as a substitute, fortification and food diversification. The purpose of this research is to provide a solution for providing food ingredients. The research method used is an experimental method, namely processing mangrove fruit flour (nipah) with fortified rebon shrimp protein hydrolyzate at different concentrations, namely: control (M0), 20% (M1), 40 % (M2), 60% (M3). Modified flour processing using the Modified Heat Treatment (HMT) method. Parameters observed were organo-leptic characteristics. The results obtained are the 40% concentration treatment of protein hydrolyzate (M2) is the best result, namely with. organoleptic value based on the percentage of consumer acceptance test that likes color 88.50%, taste 96.2%, aroma 93.2%, and texture 95%, with characteristics of bright yellowish color whiteness 98,90%, savory taste, not too fishy aroma, and dry texture and smooth. From these data, it can be concluded that nipah fruit flour is favored by consumers because it can be used as food.

Keywords: Flour; Food; Mangrove; Protein Hydrolyzatein; Rebon Shrimp.

Production of Water-Soluble Chitosan with a Pressurized Hydrolysis Method as an Active Ingredient of Hand Sanitizer

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Abstract. The low solubility of chitosan at a neutral pH limits its applications. Using pressure hydrolysis procedures, chitosan can be hydrolyzed into water-soluble chitosan (WSC), which is soluble in neutral pH. The combination between the technique and a low concentration of acid able to produce WSC. WSC can be utilized as a natural antibacterial agent in the production of hand sanitizers. The study aims to make WSC using the pressurized hydrolysis method and utilized it as an active substance in hand sanitizer. Chitosan was depolymerized into WSC using hydrochloric acids (HCl) at low concentrations (2, 3, and 4%) and hydrolyzed for 1 hour in a pressure cooker at 0.8 - 1 bar at 110°C. The filtrate was treated with isopropyl alcohol (2:1) before being filtered, neutralized and dried at room temperature (30 °C). The yielded WSC was stored at room temperature prior to use. The result showed that using HCl 3% gave the highest solubility and degree of deacetylation (DD), 93,57±0,33 and 78.4%, respectively. Thus, WSC (3% HCl) was utilized to produce hand sanitizer. 200 mg/ml of WSC (HS3) is the best concentration to be employ in hand sanitizer due to its highest acceptance from the panelists for texture compare to other formulas. However, the HS3 formula has a weak inhibitory power against *S. aureus* and *E. coli* with a clear zone value of 5.35 ± 0.57 and 4.70 ± 0.07mm, respectively. The study concluded that the combination of pressure hydrolysis procedures and a low concentration of acid can produce WSC.

Keywords: Active Ingredient; Chitosan; Hand Sanitizer; Hydrolysis; Water-Soluble.

Identification of Secondary Metabolite Compounds in Brown Seaweed (*Sargassum plagyophyllum*)

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Abstract. Seaweed has potential as a source of bioactive compounds, food and medicine. *Sargassum plagyophyllum*, one of the brown seaweeds, contains bioactive components. Fractionation is a technique of separating and grouping the bioactive compound of extracts based on their polarity. This study was aimed to determine the bioactive components (secondary metabolites) of flavonoids, alkaloids, steroids/terpenoids, saponins and phenols qualitatively and quantitatively from the extract of *S. plagyophyllum*. The research method used was an experiment by extracting *S. plagyophyllum* by maceration and fractionation with different polarity solvents. The treatments used were solvents with different polarity levels consisting of methanol, n-hexane, ethyl acetate, and butanol. The first sample was extracted using methanol, after that the methanol extract was separated by fractionation with n-hexane, ethyl acetate and butanol as solvents. Parameter analysis consisted of phytochemical test (qualitative analysis) and quantitative analysis of the total content of phenols, flavonoids, and saponins. The results showed that the secondary metabolites of *S. plagyophyllum* extracted with methanol were steroids/terpenoids, saponins and phenols. The fraction using hexane as a solvent contains steroids/terpenoids, saponins, ethyl acetate fraction contains alkaloids, flavonoids, steroids/terpenoids, and saponins. and phenol while the butanol fraction contains steroids/terpenoids, saponins. The results of quantitative analysis showed that the saponin content of the fraction with n-hexane, ethyl acetate, and butanol was 0.18, 0, 11, and 0.05%, respectively. The levels of flavonoids and phenolic in the ethyl acetate fraction were 95,25 mgQE/100 g and 122,45mgGAE/100.

Keywords: Flavonoid; Phenolic; Polarity of Solvents; Qualitative Quantitative; Saponin.

Isolation and Characterization of Fish Scale Collagen from Pond Raised Snakehead Fish (*Channa striata*) and Wild Sources

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Abstract. Utilization of snakehead *C. striata* flesh for nutraceutical industries has led to increasing the production of the fish, either from wild or pond cultures. As the fish collagen characteristics are affected by the environment in which the fish lives, the study therefore was conducted to characterise collagen from scales of snakehead and to investigate the difference of collagen properties between wild and farmed raised fish. The collagen was extracted from fish scales by acid using HCl 0,5M. The Scales from pond raised fish (PRF) were slimy, brownish and pale in color, while scales from wild fish (WF) were grey and shiny in color. The scales from PRF contained higher moisture, protein and lipid than scale from WF, but ash and carbohydrate were lower for PRF than WF. The yield of collagen from PRF was 0,64%, higher than WF (0,31%). Morphologically scale collagen from PRF was smooth, close and dense in surface, and scale collagen from WF was hollow lump in surface. The scale collagen from PRF was higher in protein and ash but lower in lipid and carbohydrate as compared with that of WF. Amino acid composition of scale collagen from PRF were higher in leusine and glycine but lower in lysine as compared with scale collagen from WF. Analysis of functional groups showed that both scale collagen contained amide A, amide B, amide I, amide II, and amide III which indicated as a type 1 collagen. Peptida of scale collagen from PRF was Arg-Pro (RP) with molecular weight of 276,181 Da, but peptida of scale collagen from WF was Arg-Gly-Ser (RGS) with molecular weight 300,154 Da. Based on the physicochemical characteristics, both extracted collagens could have promising applications in the food, medical, and cosmetic industries, and scale collagens from PRF were better than that from WF.

Keywords: Isolation; Pond Raised Fish; Scale Collagen; Snakehead Fish; Wild Sources.

Characteristics of Freshwater Lobster Carpas Flour (*Cherax quadricarinatus*)

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Abstract. This study aims to determine the organoleptic and chemical characteristics of freshwater crayfish carapace flour. The treatment was drying in an oven at a temperature of 800C for 24 hours. The parameters analyzed were the amount of yield, organoleptic value and proximate value. Based on the results of the study, the yield was 92.45%. The organoleptic value is based on the percentage of consumer acceptance test that likes color 98.25%, taste 95%, aroma 90%, and texture 95%, with the characteristics of bright reddish color, savory taste, not too fishy aroma, and dry and smooth texture. The chemical characteristics are: water content (4.24%), protein (35.37.7%), fat (2.07%), ash (4.2%), non-nitrogen extract material 1.63% and crude fiber 19.86%. From these data it can be concluded that freshwater carapace flour can be used as a fortification material in processed products.

Keywords: Carapace; Characteristics; Consumer; Organoleptic; Lobster.

Preparation of Antioxidant Mask from *Chlorella* sp. and Its Evaluation

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Abstract. The mask with natural extracts is more acceptable by consumers at present. The *Chlorella* sp. is one of the microalgae which contain the antioxidant compound. The research aimed to obtain the best concentration of *Chlorella* sp. in the manufacturing of masks and to evaluate the sensory, physical properties, and its antioxidant compound. Non-factorial Completely Randomized Design with 4 level treatments was used in this study with different concentrations of *Chlorella* sp. powder whereas CM0 (without chlorella powder), CM1 (0.4% chlorella powder), CM2 (0.5% chlorella powder), CM3 (0.6% chlorella powder), triplicated. The parameter assay was observed for sensory (color, texture, and odor), physical properties (homogeneity, pH, spreadability, drying time), and antioxidant activity. Based on the result of this study shows that the CM3 with 0.6% of chlorella powder was the best treatment with sensory value (8.28, 7.08, 7.37); physical properties (homogenous, 5.3, 7.5 cm, 24-30 minutes), respectively. Meanwhile, the antioxidant activity of *Chlorella* sp. mask was 246.70 mg/L. Therefore, the present study suggested that the *Chlorella* sp. mask could be used in cosmeceutical products, and potentially as an antiaging.

Keywords: Antiaging; Antioxidant Activity; *Chlorella* sp; Face Mask.

The Effect of Pasak Bumi (*Eurycoma Longifolia* Jack) Extract on Different Dosage onto The Betta Fish (*Betta Splendens*) Embrio

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Abstract. Betta fish (*Betta splendens*) is one of the ornamental fish that is in demand by the public because it has aesthetic value and high economic value. The attractive body color of male betta fish with long fins causes this fish to be more attractive to the public compared to female betta fish. Male betta fish have the prospect of being monosexually cultured which can be done by masculinization method. The purpose of the study was to determine the effect of pasak bumi extract on the percentage of male sex ratio, hatchability and survival rate of larvae. The masculinization method is an engineering technique of administering steroid hormones that can increase the male sex ratio with using natural materials that are environmentally friendly such as pasak bumi (*Eurycoma longifolia*). Pasak Bumi contains phytosterol compounds so it can be used as a natural ingredient in masculinization applications. The research was conducted at the Laboratory of Aquaculture Study Program, Faculty of Agriculture, Asahan University using Completely Randomized Design 5 (five) treatments and 5 (five) replications with dose pasak bumi extract is 0 mg/L; 1 mg/L; 2 mg/L; 3 mg/L and 4 mg/L. The treatment was given by soaking betta fish embryos in the Morula phase, which is about 2 (two) hours after fertilization. The results of the study show that concentration pasak bumi 3 mg/L resulted in the highest percentage of males from all treatments, which was 76.50%. The percentage of hatchability for all treatments is 100% However, the highest survival rate was found in dose 4 mg/L by 65%. The research results also show found fish intersex in the treatment of 2 mg/L of 0,40% and 4 mg/L by 0,25%. Water quality during the study in the form of temperature ranged from 24.5-26.7°C; pH 5.8 – 7.1 and DO 3.5 – 4.7 mg/l.

Keywords: Hatchability; Intersex; Masculinization; Percentage Of Males.

Total Amino Acids and Protein Concentrate of Sea Cucumber (*Stichopus vastus*) From Natuna Waters, Riau Islands

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Abstract. Sea cucumbers haven't been utilized optimally, and have a high economic value, due to high protein content of meat. This research aims to know the proximate content and total amino acids of sea cucumber flour, and total amino acids of protein concentrate of sea cucumber. The result showed that different ratios of flour and solvent have a significant effect on protein concentrate. Proximate content and protein concentrate with the ratio of flour and solvents (1:3) are protein 74.25%, moisture 10.58%, ash 7.25%, carbohydrate 6.47%, crude fiber 2.66%, and fat 0.16%. Total amino acids protein concentrate (1:3) is 53.59%. The major amino acids protein concentrate are glutamic acid, glycine, alanine, and aspartic acid. Ratios of flour and solvent (1:4) are protein content 76.13%, moisture 10.35%, ash 7.17%, carbohydrate 6.03%, crude fiber 2.51% and fat 0.13%. Total amino acids protein concentrate (1:4) is 56.74%. The major amino acids in protein concentrate are glycine, glutamic acid, alanine, and arginine. Ratios of flour and solvent (1:5) are protein 77.35%, moisture 9.14%, ash 6.67%, carbohydrate 6.00%, crude fiber 2.45%, and fat 0.10% respectively. Total amino acids protein concentrate (1:5) is 61.63%. The major amino acids protein concentrate are glycine, glutamic acid, aspartic acid, and alanine.

Keywords:

Nutritional Characteristics of Sea Urchin (*Diadema setosum*) in Bungus Province Sumatera Barat

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Abstract. Sea urchin is a food that has high nutrition for consumption and sale. Utilization of the gonads *Diadema setosum* as a food ingredient because it has high nutritional value, such as food additives, fermented products, and body health. Sea urchin gonad components consist of amino acids that are beneficial in various fields of health, especially in increasing the immune system. This study aims to obtain the value of the proportion and chemical composition of sea urchins gonads. The research method consisted of two stages, namely: 1) Preparation of sea urchin gonadal flour and 2) Proximate analysis of sea urchins gonads. Parameters observed consisted of morphology, proportion of sea urchins, and proximate sea urchins. The results showed that 7 cm diameter sea urchins had a proportion value of 11.11% shell and 4.44% gonad. The chemical composition of sea urchins gonads is moisture content 74.54%, ash content 4.44% (bb), protein content 15.01% (bb), fat content 5.17% (bb), and carbohydrates 0.84% (bb).

Keywords: Gonad; Health; Hydrolyzate; Sea Urchin.

Carotenoid Pigments in Vanname Shrimp Carapace (*Litopenaeus vannamei*) as Natural Antioxidants

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Abstract. The by-product of vanname shrimp in the form of carapace that is not used can pollute the environment. The carapace has the potential of carotenoid pigments as natural antioxidants capable of reducing free radicals. The purpose of this study was to obtain the best papain enzyme concentration and to determine the antioxidant activity of the carotenoid extract of vanname shrimp carapace. This research was conducted using an experimental method according with the modified Simpson and Haard research. The research treatments were different concentrations of papain enzymes (3, 6, and 9%) with Completely Randomized Design (CRD). The research consisted of three stages: (1) the manufacture of carapace powder for vannamei shrimp, (2) the extraction of carotenoids, (3) the identification of carotenoids by spectrophotometry. The results of the study of 3 kg of vannamei shrimp obtained a flour yield of 42.36% and the yield of carotenoid extracts, namely the concentration of 3% (3.77%), 6% (2.97%), and 9% (3.98%).

Keywords: Antioxidants, Carotenoids, Papain Enzymes, Vannamei Shrimp Waste.

Study of Nutritional Composition and Consumer Preference Level from Hanpen Fish Cake Based on African Catfish Surimi and Cassava Flour

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Abstract. Fish surimi is mashed meat that undergoes a gradual washing process as an intermediate product that can be used as raw material for various commercially processed products. This study aims to determine the effect of substitution of African catfish surimi and cassava flour on the nutritional composition and consumer preferences of Hanpen fish cake. The study used a single factor Completely Randomized Design (CRD) with 3 treatments, namely substitution of 100 grams of African catfish surimi and 200 grams of cassava flour (**a1**); 150 grams of surimi and 150 grams of cassava flour (**a2**), as well as 200 grams of African catfish surimi and 100 grams of cassava flour (**a3**). The results showed that the substitution ratio of African catfish surimi and cassava flour had a significant effect on increasing ash, protein, and fat content, on the other hand, decreasing water and carbohydrate content at a significance level of 95%. Consumers prefer hanpen fish cake from treatment **a3**, with nutritional composition, namely water content (71.01%); protein (9.73%); fat (1.49%); minerals/ash (2.39%) and carbohydrates (14.53%). The highest average level of consumer preference for each hedonic attribute is appearance (2.75); aroma/smell (2.97); taste (2.87) and texture (2.93), which are at the “like” level.

Keywords: african catfish, cassava flour, *hanpen fish cake*, hedonic, preference, surimi

Amino Acid and Mineral Profiles of Fresh Snakehead (*Channa striata*) Meat to Potential as an Immune System

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Abstract. During the COVID19 pandemic, Riau Province experienced an increase in fish consumption as an effort to improve the immune system in preventing the transmission of COVID19. The increase in fish consumption is in line with the increase in production of snakehead fish commodity fisheries in Riau Province. However, research on the chemical nutritional content of snakehead fish from Riau waters has not been reported. So, this study aimed to characterize the amino acid and mineral profiles of the snakehead fish meat. Snakehead fish was obtained from Bengkuang Lake, Riau Province, then analyzed physically (fish freshness detectin, morphometrics, and fish body proportions) and chemically (proximate, amino acids, and minerals). The results showed that the snakehead fish meat obtained from Riau waters was in fresh condition with a body length of 30.33 cm and a body weight of 252 g, which was dominated by the proportion of the body part of the meat of 37.38%. Based on chemical characteristics, snakehead fish meat contained 16.99% protein and 1.96% ash. Snakehead fish meat also had dominant amino acids, namely leucine 0.539% and glutamic acid 1.446%. Furthermore, snakehead fish meat minerals were dominated by Fe 6.217% and Zn 2.235%. The presence of amino acids leucine and glutamic acid, as well as Fe and Zn minerals play an important role in the wound healing process and immune system.

Keyword:

Physicochemical Characterization of Calcium Oxide from Freshwater Mussel (*Pilsbryconcha* sp.) Shell

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Abstract. Freshwater mussel (*Pilsbryconcha* sp.) shells have a proportion of 51.93% which is included in the solid waste resulting from the processing of mussels. In fact, mussel shells are rich in minerals, especially high with a calcium content of 39.55%. So that an innovation is needed so that the utilization of mussel shells is maximized, one way is through the valorization of mussel shells into products with high added value. The purpose of this study was to determine the physicochemical characteristics of the CaO (calcium oxide) extract of fresh water mussel shells. Valorization of mussel shells into calcium oxide (CaO) flour by calcination method at 1000°C temperature. The test parameters carried out were yield, functional groups using the FTIR instrument, macro (calcium, magnesium, potassium, phosphorus) and micro minerals (Manganese, iron, zinc, and sodium) using the AAS instrument. The results showed that the physicochemical characteristics of calcium oxide (CaO) flour from the shell of the fresh water mussel (*Pilsbryconcha* sp.) included: the proportion of shell 51.90%, the proportion of meat and viscera 48.10%; CaO yield of 56.47%; identified the Ca-O group at a wavelength of 1 661, 1 409, 1 116, and 875 cm⁻¹ ; and dominated by calcium content of 76.27% to potential as a calcium precursor in the synthesis of hydroxyapatite.

Keywords: Calcination; calcium oxide; carbonate; minerals; mussel.

Analysis of the Application of MSC Ecolabeling in Tuna Products Processing Industry in Sibolga

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Abstract. The need for fishery products that are healthy, safe, legal, sustainable, and democratic from time to time continues to increase. This makes the export destination country require a certificate issued by an institution. One of the standards used by such countries is the MSC ecolabel. MSC ecolabel is an endorsement of a product that meets the criteria of environmental sustainability procedures and has been well managed. Ecolabel identifies fisheries governance properly based on established criteria, relating to the utilization of fishery resources and marine ecosystems. Therefore, it is necessary to conduct an assessment related to the application of MSC ecolabels in the Sibolga tuna processing industry. The purpose of this study is to analyze the level of gap (gap analysis) and the suitability of the application of the MSC ecolabel and examine various inhibiting factors. This research was conducted using survey methods and Focus Group Discussion (FGD) with industry and the government. The analysis used was qualitative descriptive analysis, gap analysis, and conformity level analysis. The results showed that the level of conformity in the MSC CoC still has two criteria that have not reached the standard, namely 83% and 57%, respectively. While the level of conformity on MSC Fisheries consists of three criteria, no one fulfills the standard. The results of the assessment of the inhibiting factors were obtained from fishermen, processing industries, and government support.

Keywords: Madidihang, Sustainable fisheries, traceability

Characteristics of Mangrove (*Sonneratia alba*) Leaf Extract as A Biosalt Preparation

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Abstract. Mangrove (*Sonneratia alba*) leaves contain bioactive compounds, macro and micro minerals, and NaCl contents. However, the potential of the mangrove leaves has not been exploited. This research aimed to determine the characteristics of mangrove leaf extract as a biosalt preparation. The sample used in this research was young mangrove leaves which are extracted using aquadest. The test parameters were testing for yield, moisture content, ash content, mineral content of Natrium and Kalium, and NaCl content. The results showed that the biosalt characteristics of the mangrove leaf extract consisted of a brown appearance with a salty flavour, 6.96% yield, 5.07% moisture, 36.59% ash, and 19.53% NaCl. Based on the NaCl content, the resulting biosalt required the dietary salt quality standard according to Standard National Indonesia about dietary salt.

Keywords: Biosalt; Dietary Salt; Mangrove Leaf; NaCl.

Bulk Isolation of Potential Probiotics from Brackishwater Enriched with High Levels of Carbon Sources

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Abstract. Most shrimp farmers use probiotics that are of terrestrial origins as component of aquaculture management. Because there are differences between the environment of the cultured species with the source of the probiotics, the beneficial effects of terrestrial probiotics to the shrimp may be affected. It is therefore important to use host-derived probiotics or from the environment of the cultured organism to ensure the maximum effects on the host. Hence, this study aimed to isolate and characterize potential probiotics from brackishwater that is used in shrimp culture by enriching the water with organic sources with high carbon to nitrogen (C:N) ratio. Using a mesocosm study, brackishwater was collected from the mouth of a river and placed in six 10-li containers. Water was enriched with either molasses or brown sugar to stimulate bacterial growth at a C:N ratio of 15. After twenty days, total heterotrophic bacteria were counted from the enriched water. Distinct bacterial colonies were re-streaked onto fresh Nutrient Agar plates with 1% sodium chloride and tested of their in-vitro antagonistic activities against *Vibrio harveyi*, a shrimp pathogen. There were ten bacterial isolates that exhibited *in-vitro* antibacterial activity. These bacterial isolates are classified under the putative genera: *Acinetobacter*, *Pseudomonas*, *Sphingobium* and *Rheinheimera*. The implications of the study indicate that enrichment of brackishwater with high C:N load may increase the possibility of isolating and developing potential probiotics that can be used for shrimp aquaculture.

Potential of Single Cell Protein Production Using Waste as Growth Medium

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Abstract. Feed is an important factor affecting the growth of cultured fish. Around 86.5% of the production cost of aquaculture is allocated for the purchase of feed. Good quality and efficient feed is a determinant of the success of aquaculture business. Single Cell Protein (SCP) is a dry cell product of single cell microorganisms. SCP production is generally not only protein but also free amino acids, lipids, carbohydrates, vitamins and minerals. The purpose of this study was to analyze the growth media of *Bacillus Cereus* which will be used as a source of PST by using some easy-to-use waste. The method used in this study is an experimental method using 2 isolates of *Bacillus cereus*, namely *B. cereus* strain SN7 and a consortium of bacterial isolates. Both isolates were grown in tofu liquid waste media, sago liquid waste media, and molasses waste media as a carbon source added with egg white as a nitrogen source with 3 replications in each treatment. The results showed that the most optimal growth medium for *B. cereus* strain SN7 and the consortium was molasses waste modified media which was incubated for 24 hours, compared to modified media for sago waste and tofu waste. For comparison, the isolates of *B. cereus* and consortium still had a higher growth potential than the isolates of strain SN7 which had been incubated for 24 hours.

Keywords: Protein; Bacteria; *Bacillus cereus*; Aquaculture.

Comparative Profiling of Growth, Feed Utilization and Proximate Composition of African Bony Tongue (*Heterotis niloticus*) Fed *Bacillus subtilis* 200 and *Saccharomyces cerevisiae*.

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Abstract: This study evaluated the effects of *Bacillus subtilis* 200 (BS) and *Saccaromyces cerevisiae* (SC) on growth, feed utilization and proximate composition of African bony tongue (*Heterotis niloticus*). Four diets (control diet (Ctrl), 4g/kg BS (BS), 4g/kg SC (SC) and 2g/kg BS plus 2g/kg SC (BS+SC)) were fed to *H. niloticus* for 8 weeks. The results showed that final weight (FW), weight gain (WG), percentage weight gain (WG%) and specific growth rate (SGR) were significantly different amongst treatments ($P < 0.05$). The results obtained in this study showed that growth performance (FW, WG, WG% and SGR) were increased significantly in group fed diet BS+SC. There was no significant difference in condition factor and feed intake amongst groups ($P > 0.05$). Group fed diet Ctrl recorded the highest FCR (1.04 ± 0.17) and was significantly higher than all other groups ($P < 0.05$). Groups fed Ctrl, BS, SC and BS+SC recorded protein efficiency ratio of 2.86 ± 0.21 , 3.24 ± 0.19 , 3.25 ± 0.21 and 3.39 ± 0.11 , respectively, and were significantly different ($P < 0.05$). The results revealed significant difference in whole body crude lipid and moisture contents ($P < 0.05$). Crude lipid content ranged between 6.52 ± 0.59 and 9.94 ± 0.19 whilst moisture content ranged between 70.26 ± 6.52 and 75.33 ± 2.15 . This study concludes that, dietary synbiotic of *Bacillus subtilis* 200 and *Saccaromyces cerevisiae* could promote growth performance and feed utilization without negatively altering proximate composition of whole body.

Keywords: *Heterotis niloticus*, *Bacillus subtilis* 200, *Saccaromyces cerevisiae*, growth performance, feed utilization

Aeromonas Hydrophila Motile Disease (MAS) Resistance Test by *Aeromonas hydrophila* Bacteria on Triploid Striped Catfish

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Abstract. Motile *Aeromonas Hydrophila* (MAS) disease caused by *Aeromonas hydrophila* is a common pathogen that attacks freshwater fish commodities, including triploid as the new strain of striped catfish. The purpose of this study was to test the resistance of triploid catfish to MAS infection before being released to cultivators as a new commodity to increase national striped catfish production. The test was carried out for 2 months at the Sukamandi Fish Breeding Research Institute, Subang by injecting *A. hydrophila* bacteria into triploid and diploid catfish. The challenge test was carried out by injecting the cultured *A. hydrophila* bacteria with a density of 107 CFU.mL⁻¹ as much as 0.1 mL. Tail-1 at fish intramuscularly in all treatments, while in the Control (-) treatment, 0.1 mL of PBS solution was injected.tail-1. The test striped catfish used for each treatment were 10 tails measuring 9.23 – 9.65 cm, and weighing 7.1 – 9.23 g. Survival parameter data and blood picture were analysed quantitatively using Microsoft Excel 2010 and SPSS version 16.0 software with analysis of variance (ANOVA) at 95% confidence interval. The results of re-characterization with biochemical tests showed that *A. hydrophila* bacteria were gram negative, oxidase and catalase positive, motile, could fermentative convert sugar and could grow in blood media. The survival of triploid striped catfish after the test was 95%, total erythrocytes on day 7, and total leukocytes on the first day were significantly different from diploid striped catfish. Thus, it can be concluded that striped triploid catfish are more resistant to infection with *A. hydrophila* bacteria than diploid.

Keywords: Motil *Aeromonas Hydrophila* (MAS); Pathogen; Resistance; Striped Catfish.

Different Nitrogen Sources to Improve the Quality of *Spirulina platensis* Culture in Mass Scale

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Abstract. The research aimed to determine the effect of adding different sources of nitrogen to mass culture of *Spirulina platensis*. Materials needed for this test were culture media volume 1000 m³, fertilizer were SP-36 (40 ppm), ZA (10 ppm), EDTA (5 ppm) dan FeCl₃ (1 ppm), Vitamin B-12 (0,001 ppm) with initial density of *S.platensis* was 10x10³ sinusoid/ml. The test was carried out in two steps, firstly was the addition of nitrogen from urea with doses of 80 ppm, 150 ppm and 200 ppm. Secondly, the addition of potassium nitrate with doses of 50 ppm, 100 ppm and 150 ppm. *Spirulina platensis* was cultured on mass scale for 5 days until harvest. The first test showed that the dose of urea 80 ppm gave the highest growth rate (1,15 sin/day) and the fastest generation time (0,60 hours) compared to 150 ppm and 200 ppm. Protein content of *Spirulina platensis* added with 80 ppm of urea was also the highest (58,04%) compared to 150 ppm and 200 ppm. The results from second test showed the addition of potassium nitrate at 100 ppm to *Spirulina platensis*'s culture gave the highest growth rate (0,45 sin/day), and the fastest generation time (1,54 hours) compared to 100 ppm and 50 ppm. Protein content of *S.platensis* added with 100 ppm of potassium nitrate was also the highest at 67,30%.

Keywords: Cell Denstiny; Mass Scale; Pottasium Nitrate; Urea; *Spirulina platensis*.

Application of Azolla (*Azolla pinnata*) Liquid Fertilizer to the Density of *Chlorella* sp

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Abstract. This study aims to determine the effect of Azolla (*Azolla pinnata*) liquid fertilizer on the density, daily growth rate, and water quality in the batch culture of *Chlorella* sp. This research used a nonfactorial completely randomized design (CRD) with 4 treatments in 3 replications. Treatment by giving *Azolla pinnata* liquid fertilizer with different doses, treatment A (18 ml/l Azolla fertilizer and 100 mg/l urea fertilizer), treatment B (20 ml Azolla fertilizer. /l and 100 mg/l urea), treatment C (22 ml/l Azolla fertilizer and 100 mg/l urea fertilizer) and treatment D (24 ml/l Azolla fertilizer and 100 mg/l urea fertilizer). The results showed that different doses of Azolla fertilizer affect the density and have a significant effect on the daily growth rate of *Chlorella* sp. Higher cell density was observed in treatment C (882,4x10⁴ cells/ml) compared to other treatments. The daily growth rate of *Chlorella* sp showed very significant differences, the highest in treatment C (5.65 cells/ml/day), treatment B (5.44 cells/ml/day), treatment A (5.16 cells/ml/day), and treatment D (4.64 cells/ml/day). The population peak was also found in treatment C (1496.7 cells/ml). The water quality parameter in this study was temperature 27.4–27.6 °C, salinity 10 ppt, pH 7.3–7.6, and dissolved oxygen 6.18–6.23 ppm. Based on the results above, it can be concluded that Azolla liquid fertilizer can raise the population growth of *Chlorella* sp.

Keywords: Azolla Liquid Fertilizer; *Chlorella* sp; Density.

Giant Freshwater Prawn (*Macrobrachium Rosenbergii*) Fishery in Palawan, Philippines: Catch Trends and Implications to Fisheries Management

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Abstract. The production and productivity of giant freshwater prawn *Macrobrachium rosenbergii* fisheries and aquaculture in Palawan, Philippines can potentially augment the seafood supply for local and international consumers. The purpose of this paper is to explore the trends related to the exploitation of the natural stocks of *Macrobrachium* in Palawan; the catching method and practices employed by the locals; and the present management status of giant freshwater prawns. Purposive interviews of local fishers from 11 municipalities of Palawan (n=69) were done. The result of the study established a declining volume of catch (kg) from 1960-2020 and the fishing gears used in capturing the giant freshwater prawn. Capturing- by hand and various gears were recorded mainly for family nourishment. Local fishers of freshwater prawns have relatively low involvement in the protection of the river system environment. The promising potential of freshwater prawns' fishery and aquaculture needs focused local government interventions to augment the food supply in the province.

Keywords: Freshwater Prawns; Food Supply; Local Fishers; Palawan; River Systems.

Bioplastics From Freshwater Bacteria: A Rapid Screening Approach

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Abstract. In the light of the recent problems on plastic pollution that is prevalent in both the aquatic and terrestrial environments in the Philippines, there have been research initiatives on developing biodegradable alternatives to synthetic plastics. Polyhydroxyl butyrate (PHB) can be used as an effective thermoplastic, and it possesses many characteristics that are similar to standard commercial synthetic plastics. Although Polyhydroxybutyrate-based plastic substitutes are less flexible than traditional synthetic plastics, the former is completely biodegradable, making it an environment-friendly alternative to traditional synthetic plastics. In the present study Polyhydroxybutyrate-producing bacterial strains were isolated from water samples obtained from a freshwater creek that exhibits high level of eutrophication using a bulk screening approach. Serial dilutions of the water samples were prepared and plated onto Eosin Methylene Blue (EMB) and De Man, Rogosa and Sharpe (MRS) agar to isolate individual bacterial colonies. After an incubation for 24 hours at 27°C, individual bacterial colonies were re-streaked onto fresh Nutrient agar to obtain pure bacterial cultures. One hundred bacterial colonies were re-streaked and stained with 3% Sudan Black B to detect the presence of Polyhydroxybutyrate granules. A total of six (6) bacterial isolates stained deeply following addition of the Sudan Black and further characterized for their morphological, biochemical and molecular characteristics. Though the results are preliminary, the bulk screening approach that we used enabled us to identify putative Polyhydroxybutyrate-producing bacteria from a freshwater creek. This could open avenues for further research on the optimization of Polyhydroxybutyrate production from these bacteria and the products will serve as raw materials for the industrial production of bioplastics.

Keywords: Biodegradable Plastics; Bioplastics; Polyhydroxybutyrate; Sudan Black; Synthetic Plastics; Thermoplastic.

Effectiveness of Adding Soursop Leaves Flour (*Annona Muricata*) in Feed to Handle *Vibrio Harveyi* Infection on Vaname Shrimp (*Litopenaeus Vannamei*)

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Abstract. Vaname shrimp is one of economic fisheries commodities that has been cultivated globally, included Indonesia. However, bacterial diseases always cause high mortality and low productivity on vaname shrimp then it impacts to the farmers suffering loss. Vibriosis becomes the harmful disease infecting oftenly to vaname shrimp which is caused by *Vibrio harveyi*. Soursop leaves is expected to cure the infection on vaname shrimp depending on its bioactive compounds such as acetogenin. This study purposed to evaluate the effectiveness of adding soursop leaves flour in feed to handle *Vibrio harveyi* infection on vaname shrimp. The experimental design used was a non-factorial completely randomized design (CRD) with four treatments replicated three times. The experimental treatments were consisted of A: Control/without soursop leaves flour, B: Adding soursop leaves flour 55 gram/kg of feed, C: Adding soursop leaves flour 60 gram/kg of feed, D: Adding soursop leaves flour 65gram/kg of feed. The observed parameters were clinical symptoms, prevalency, growth, survival rate, and water quality. The result of this research showed that the adding soursop leaves flour into feed significantly effective to handle *Vibrio harveyi* infection on vaname shrimp. The best treatment was obtained at treatment D, namely adding soursop leaves flour 65gram/kg of feed. The treatment D gave the best result on prevalency value, growth value, and survival rate, which were 9.6%, weight growth 2.38 gram, length growth 2.03 cm, and 68.3%. The water quality during experiment was in optimal condition to grow vaname shrimp.

Keywords: Feed; Flour; Soursop Leaves; Vaname Shrimp; Vibriosis.

Biopigments (Phycoerythrin, Fucoxanthin and Siphonaxanthin) from Seaweeds and Their Potential Applications as Ingredients in Cosmeceutical Industries: A Review

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Abstract. Seaweeds are macroscopic marine algae classified into three major classes according to their accessory pigments, namely green seaweed, red seaweed, and brown seaweed. Photosynthetic pigments (biopigments) are chemical substances divided into three groups: carotenoids, chlorophylls, and phycobiliproteins. This review is focused on three biopigments, such as phycoerythrin (PE), fucoxanthin (FX), siphonaxanthin (SX), and their potential application as ingredients in cosmeceuticals industries. PE is a type of phycobiliprotein, a marine bioactive protein, mainly found in red seaweed, such as *Halymenia* sp., *Euchema* sp., *Gelidium pusillum*, *Gracilaria verrucosa*, etc. FX compound is a major xanthophyll carotenoid in brown seaweed, namely *Padina australis*, *Sargassum horneri*, *Undaria pinnatifida*, etc. Then, SX is a rare xanthophyll carotenoid abundant in green seaweed, such as *Codium fragile*, *Halimeda* sp., etc. FX has epoxide and an allenic bond in its structure, whereas SPX does not contain either of those functional groups. Generally, there are two main techniques to extract these biopigments, namely the conventional method (liquid solvent extraction), and the non-conventional. Furthermore, PE, FX, and SX showed high potential as cosmetic activities due to their activities as antioxidant, antiaging, anti-inflammatory, anti-tyrosinase, etc. The biological activities of these biopigments of interest in cosmeceuticals. These biopigments are considered potential ingredients for innovative cosmeceuticals. Despite the complications of establishing extraction methods environmentally safer, there is still a need for further investigations to evaluate safety, efficacy, and real potential alternatives of using biopigments from seaweeds in the cosmeceutical industry.

Keywords: Biopigment; Cosmeceutical; R-phycoerythrin; Seaweed; Siphonaxanthin; Trans-Fucoxanthin.

Study on Prevalence and Risk Factors for EHP (*Enterocytozoon hepatopenaei*) in Shrimp Aquaculture Indonesia

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Abstract. Indonesian shrimp aquaculture production was projected to reach 1.1 million tonnes in 2020, due to disease problems achievement is less than 400 tonnes. Several diseases have affected shrimp, cause mass mortality. the disease is cause by *Enterocytozoon hepatopenaei* (EHP). EHP is an intracellular spore-forming parasite that replicates within the cytoplasmic area of the tubule epithelial cells in the hepatopancreas. In recent years, severe EHP infections have become commonplace, resulting in substantial economic losses in shrimp farms. Shrimp farmers often report WFS resulting in mortality, emergency harvests have been conducted to mitigate against further losses. Both intensive and extensive ponds were affected. A 12-point checklist in the design and practical application of active surveillance of diseases in aquatic organisms (farmed and wild) developed by FAO is adopted to serve as a methodological approach and guidance to conduct surveillance. Result of surveillance found that EHP prevalence in shrimp pond in Jembrana is 25%, and the highest are for EHP prevalence is Jembrana subdistrict. Factors considered as risk factors were type culture, semiintensive (P value 0.013), stocking density (P value 0.15), testing PL prior stock (P value 0.1), Biosecurity (P value 0.1). Multivariate analysis found that parameters have influence in EHP were Pond age, Production system, Stocking density and Testing postlarvae.

Keywords: EHP; Shrimp Aquaculture; Surveillance.

Isolation and Identification of Bacteria in Climbing Perch (*Anabas testudineus* Bloch) Digestion Channel as a Probiotic Candidate

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Abstract. Factors that become obstacles to climbing perch (*Anabas testudineus* Bloch) farming include slow growth, easy injury and illness, so that fish health needs to be maintained, growth needs to be spurred, maintaining the quality of broodstock and seeds. To help its growth and improve the quality of the environment in which climbing perch live, probiotics containing good bacteria are needed. This study aims to obtain probiotic bacteria from the digestive tract of climbing perch, isolate, select, and identify the bacteria obtained. The stages carried out in this research were started by grinding the digestive tract of the climbing perch and diluting it, then culturing it. Colonies obtained were purified and selected by metabolic test, antagonistic test and identified biochemically and tested for temperature resistance and acid resistance (pH). The isolation stage obtained 9 isolates, the antagonist test stage obtained 4 isolates, then the biochemical test was obtained the bacteria suspected of being the genus *Bacillus* sp. Most of the members of *Bacillus* sp. is a fish probiotic, therefore the results of isolation from this study are potential candidates for probiotics.

Keywords: Bacteria Probiotics; Climbing Perch; Digestive Tract; Isolation; Identification.

Gastric Contents Analysis of Gulamah Fish (*Argyrosomus japonicus*) In West Dumai and East Dumai Sea Waters

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Abstract. Gulamah fish (*Argyrosomus japonicus*) is one type of marine fish found in Dumai sea waters. The study aimed to analyze the composition of natural feed on the stomach contents of gulamah fish in Dumai sea waters. Research methods are survey methods, sampling is done by purposive sampling. The study was conducted in April-June 2022. Gulamah fish samples collected were 60 fish (West Dumai sea waters 30 fish and East Dumai sea waters 30 fish). Fish samples were divided into 3 size classes, namely 3.1-8.3 cm; 8.4-13.5 cm and 13.6-18.7 cm. The results showed that the composition of food in the stomach contents of gulamah fish in the waters of the West Dumai Sea is the size of class I (detritus IP 50%; and fish IP 50%), Class II (detritus IP 64%; fish IP 17.8%; shrimp IP 13.4%; and shellfish IP 4.8%) and Class III (detritus IP 5.6%; fish IP 83%; shrimp IP 5.6%; and shellfish IP 5.9%). The composition of food on the stomach contents of fish in the waters of the East Dumai sea consists of class I Size (detritus IP 57%; fish IP 10%; and shrimp IP 33%); Class II (empty stomach contents); and Class III (shrimp IP 100%). This indicates that gulamah fish is classified as a carnivorous fish.

Keywords: Carnivore; Food; Gulamah Fish; Sea; Stomach Contents.

Antioxidant, Toxicity and Secondary Metabolites Contents of Ethylacetate Fraction from Soft Coral *Lobophytum* Sp. Growing in South East Sulawesi

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Abstract. Soft coral *Lobophytum* sp is widely distributed in the waters of South East Sulawesi, Indonesia. However, no research data on the chemical and medicinal aspects of this genus from this region have been published. Therefore, this article aims to describe the findings of those aspects of *Lobophytum* sp. from this region. Ethyl acetate was used to extract the sample, and Vacuum liquid chromatography (VLC) was used to fractionate the ethyl acetate extract. The DPPH radicals and ABTS methods were used to assess antioxidant potency, the BSLT method was used to evaluate toxicity, and the Phytochemical test and LCMSMS method were used to determine the chemical composition. The results showed that the ethyl acetate extract was produced in seven fractions namely Fraction A-G. The weight of each extract was A (12.8% w/w), B (9.7%), C (10.1%), D (2.0%), E (7.0%), F (25, 3%) and G (11.5%). Further studies were carried out on the fraction F which was the fraction with the highest weight. Based on the level of antioxidant power proposed by Blois, the antioxidant potential of fraction F is a strong category with an IC₅₀ value (µg/mL) 99.13 (DPPH) and 79.30 (ABTS). Fraction F is also not toxic with LC₅₀ 198.21 µg/mL. Those activities were supported by the qualitative phytochemical screening that exhibited the extract contains phenolic compounds. LCMSMS data indicated that fraction F of ethyl acetate extract contains frangosol D, liriorensinol A, neociwujiaphenol, phillygenin, pluviatelol, saurufuran B, β-

hydroxyisovalerylshikonin and some unidentified compounds with molecular formulas $C_{21}H_{26}O_8$, $C_{23}H_{26}O_8$, $C_{19}H_{24}O_6$.

Keywords: Antioxidant; Ethyl Acetate Fraction; *Lobophytum* sp; Secondary Metabolites; Toxicity.

The Potential of Jeringau (*Acorus calamus*) Extract as An Antibacterial in Fish

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Abstract. Increased resistance of pathogenic bacteria due to the use of antibiotics has become a major concern in the aquaculture industry. Environmentally friendly products are urgently needed to replace antibiotics for the treatments of fish diseases. This study aims to determine the activity of extract of Jeringau (*Acorus calamus*) as an antibacterial towards *Aeromonas hydrophila*, *Pseudomonas aeruginosa* and *Vibrio alginolyticus*. The *A. calamus* extract was obtained by maceration using ethanol as a solvent. This extract was tested for its phytochemical content and its antibacterial activity was tested using the agar diffusion method. The treatments used were concentrations of *A. calamus* extract 20%, 30%, 40%, 50% and 60%. Phytochemical test results of *A. calamus* extract produced alkaloids, phenolic compounds, saponins, terpenoids and flavonoids. The results of the inhibition test showed that *A. calamus* extract with a concentration of 20% was able to inhibit the growth of *Aeromonas hydrophila* bacteria by 13.8 mm, 30% (14.4 mm), 40% (14.8 mm), 50% (16.2 mm), 60% (16.5 mm). On *Pseudomonas aeruginosa*, the concentrations were 20% (13.9 mm), 30% (14.5 mm), 40% (15.2 mm), 50% (15.5 mm), 60% (16.2 mm). On *Vibrio alginolyticus*, the concentrations were 20% (15.5 mm), 30% (15.7 mm), 40% (16.4 mm), 50% (18.7 mm), 60% (19.1 mm). In conclusion, *A. calamus* extract can be used to inhibit the growth of pathogenic bacteria in fish.

Keywords: Acarus Calamus; Antibacterial; Extract; Fish Pathogens; Jeringau.

Kidney Structure of *Pangasianodon hypophthalmus* Fed with Fermented Red Ginger and Infected with *Aeromonas hydrophila*

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Abstract. Red ginger contain antioxidant that can be use to improve the immune system of fish. A study aims to understand the kidney structure of *Pangasianodon hypophthalmus* fed with fermented red ginger juice and infected with *Aeromonas hydrophila* has been conducted from September to 3L water, boiled and mixed with 175 ml molasses, 65 ml yogurt and 50 mg yeast and then was fermented for seven December 2021. The fermented red ginger juice was obtained by juicing 500 g of red ginger in days. The fermented red ginger juice was mixed with fish feed pellets, namely T1 (150 mL/Kg), T2 (175 mL/Kg), T3 (200 mL/Kg), Cn (no red ginger juice and no infection), Cp (no red ginger juice and infected with *A. hydrophila*). The fish were reared in 30L aquaria. Fish sample was *P. hypophthalmus* fingerling (10-12 cm and 5-7 g), 10 fishes/aquarium. The fish were fed 3 times, *adlibitum*. In the 30th day the fish were infected with *A. hydrophila* (0.1.ml of 10⁶ cells/ml, subcutan injection). In the 14th after the infection kidney sample was collected and processed for histological study. Result shown that there were differences in kidney tissue of fish in each treatment. The worst condition was obtain in Cp, while the best was in T2. The kidney structure of Cp showing abnormalities such as haemorrhage, necrotic cell, enlarged Bowman's capsule and degeneration of renal tubules while the kidney of T2 shown light damage namely hemorrhage. This fact indicate that the fermented red ginger is able to improve the fish immunity toward *A. hydrophila* infection.

Keyword: Antibacterial; *Aeromonas hydrophila*; *Pangasiandon hypothalmus*; kidney; fermenterd red ginger.

Fermentation of Formulated Feed using *Bacillus subtilis* TS2b for Giant Freshwater Prawn (*Macrobrachium rosenbergii*) Feed

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Abstract. The giant freshwater prawn *Macrobrachium rosenbergii* is a promising local fisheries commodity that requires further development. The high cost of commercial feed, however, is one of the challenges in growing giant prawns. One approach to addressing this issue is to use local feedstuff as an alternative feed ingredient. The main obstacle to using local feedstuff is the limitation (anti-nutrition, crude fiber, etc.) that fermentation technology can overcome. The goal of this study was to create an efficient feed for giant prawns by fermenting formulated feed (contains local feedstuff) using *B. subtilis* TS2b. A completely randomized design with three treatments and three replications was used in this study with the following treatments: Treatment A consisted of commercial feed (as a positive control). Treatment B consisted of formulated feed (negative control), and Treatment C is a formulated feed that fermented using *Bacillus subtilis* TS2b. The giant freshwater prawns used were 0.47 ± 0.02 g in weight and were randomly stocked into 9 aquarium units (60 x 50 x 45 cm) with a stocking density of 20 individu/aquarium. Giant freshwater prawns were fed three times a day for 51 days of rearing period. Absolute and relative weight growth, specific growth rate, survival rate, feed conversion, protein and fat retention were all measured. The results showed that absolute growth for all treatments were: 1.41 ± 0.22 g (A), 1.37 ± 1.37 g (B), 1.51 ± 0.04 g (C), feed conversion were 1,82% (A), 1,83%(B), 1,66%(C) and survival rate were: $72 \pm 2,5\%$ (A), $88 \pm 4,7\%$ (B) and $87 \pm 2,4\%$ (C).

Keyword: Fermentation; Feed; Giant Prawns; Local Feedstuff; *Macrobrachium rosenbergii*; *Bacillus* TS2b.

Preliminary Study of Marine Debris Composition from Fisherman Activities: A Case Study on Cikidang Fishing Port, Pangandaran

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Abstract. Marine debris pollution has become an important issue in recent years. It impacts to the marine environment and marine life and also effected human health. The objective of this study was to identify the composition of waste that generated by fisherman activities. The research was conducted in Cikidang Fishing Port, Pangandaran. The data of waste type from fishing vessel were grouped based on their dimension. The result show that plastics dominated the waste composition and based on the vessel dimension when compared the amount of waste generated, the amount of one day fishing (small vessel) is greater than ten days fishing (big vessel). The amount of waste generated from small vessel is 0,009 tons/vessel/year, meanwhile from big vessel is 0,09 tons/vessel/years. This indicates that the fishers habit to dispose waste not in the right place and it becomes a potential marine debris pollution. Maintaining the quality of fishery products is very important starting from

improving the fisherman behaviour to the fishing port facilities to achieve the sustainability fishery product.

Keywords: Fisherman; Marine Debris; Pollution.

Microbiological Quality of Vannamei Shrimp Pond Waters in Rupert Island, Bengkalis District, Riau.

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Abstract. The presence of pathogenic bacteria in shrimp culture water could influence the shrimp growth and production. The objective of this research was to quantify total coliform, *Escherichia coli* and total *Vibrio* in pond water of Vannamei shrimp (*Litopenaeus vannamei*) culture in Rupert Island. Water samples from inlet water (IW), water from three ponds (PW2, PW3, PW6) and outlet water (OW) were collected for the quantification of total coliform and *Escherichia coli* by the MPN technique and total *Vibrio* count on TCBS agar. Coliforms was found in all water samples, the lowest count was in inlet water sample (20 MPN/100 mL), and the highest was contained in outlet water (>2400 MPN/100 mL), however *E. coli* was not detected in all water samples. Meanwhile, the lowest total *Vibrio* count was found in PW3 (6.35×10^3), and the highest was in the PW6 (3.10×10^3). In addition to the microbiological quality, some water quality parameters were also observed, those were water temperature in the range of 27.5-29.4°C, salinity of 18.7-21.5 ppt, pH of 7.17-7.89, DO of 1.3-7.6 mg/L, NH₃ content of 0.96-1.26 mg/L and DOM of 26.2–27.6 mg/L. The data indicated that pathogenic bacteria were present in all pond waters which should be decreased for the safety shrimp production.

Keywords: Coliform; *Escherichia coli*; Pond Waters; Vannamei; *Vibrio*.

Profiling Bioactive Peptide Extracted from Dried Arabushi Protein of Bonito, Baby Tuna and Deho

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Abstract. *Ikan kayu (Katsuobushi)* originally prepared from bonito *arabushi* has been known as the main ingredient of Japanese food seasoning. This product also has a great potency as a precursor of marine bioactive which can be developed as a major component in the formulation of marine peptide-based functional food and supplement. Indonesia exports arabushi in significant amounts every year, therefore it is necessity to explore the potency of the bioactive peptide of this product. Most research exposed that enzymatic hydrolysis was commonly used in the production of marine bioactive such as AC-inhibitor, antioxidative, anticoagulant peptide. The objectives of research were to characterize the dried arabushi; to produce marine bioactive peptide through protein hydrolysis of dried bonito and to portray the AC-inhibitor and antioxidative peptide. Hydrolysis of dried bonito protein conducted using papain enzyme 1% (29,274.04 U/mg.sec) (w/w) for 15, 30, 45 and 60 minutes. Peptide characteristics were determined by degree of hydrolysis, Liquid Chromatography-Mass Spectrometry (LC-MS) and antioxidant activity. AC-inhibitor, anticoagulant and antioxidative peptide was identified in bonito and baby tuna dried arabushi. Peptides extracted from 15 minutes enzymatic hydrolysis represent the highest antioxidant activity (IC_{50}) at 0.159 ± 0.013 mg/mL and degree of hydrolysis 3.322 ± 0.342 %. Identification of peptides using LC-MS showed the suitability of dried bonito peptides with anserine and carnosine having a type of antioxidant function coming from tuna and skipjack.

Keyword: AC-inhibitor; Anticoagulant; Antioxidant; Dried Arabushi; Peptide; Protein Hidrolysate.

Determination of Photosynthetic Anoxygenic Bacteria from Water and Sediment in Dumai Coastal Waters, Indonesia

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Abstract. Dumai is one of the coastal waters of Indonesia that has the potential for the biodiversity of microorganisms including anoxygenic photosynthetic bacteria (APB). Anoxygenic photosynthetic bacteria are bacteria that carry out decomposition activities even though oxygen levels in water and sediment are very little or even absent. This study aims to determine anoxygenic photosynthetic bacteria from aquatic and sedimentary ecosystems in the coastal waters of Dumai, Indonesia. This research was conducted by an experimental method using modified mineral media. Furthermore, APB was isolated from six different places in sequence, namely Dumai sea station, river prayer room, harbor, shrimp pond area, fish auction place, and, Purnama tour. All bacteria obtained were then characterized by their morphological and physiological characteristics. The isolation results showed that 15 different bacterial isolates were obtained after being determined based on Bergey's Manual of Determinative Bacteriology. All isolates contained different pigments such as carotenoids, xanthophylls, and, chlorophylls. Thus, further utilization of APB bacteria can be carried out in various microbiological applications such as bioremediation, aquaculture, biofuel, food, and medicines.

Keywords: anoxygenic photosynthetic bacteria, Dumai, pigment, sediment, water

The Effect of Culture Media Types on the Growth of Marine Microalgae *Chlorella vulgaris*

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Abstract. *Chlorella vulgaris* is one of the marine microalgae that has the potential to be developed, one of which is the renewable energy sector, biodiesel. The growth media used in the biomass production of microalgae are very varied, such as Walne, Guillard, and Urea. This study aims to determine the effect of the type of growth media on population density, absolute growth, relative growth rate, and specific growth rate of *C. vulgaris*. The study on 3 media types of microalgae growth shows the density of *C. vulgaris* cultured on a laboratory scale experienced the highest peak density in the Guillard media on the 3rd day around 7430×10^4 cells/mL. However, the lowest density peak was in the Urea media about 2520×10^4 cells/mL, followed by Walne media around 3335×10^4 cells/mL. The highest absolute growth average was found in the Guillard media about 6311×10^4 cells/mL and the lowest was in the Urea and Walne media about 1401×10^4 cells/mL and 2216×10^4 cells/mL, respectively. Meanwhile, in *C. vulgaris* culture, it was found that Guillard and Walne media produced the highest relative growth of 564% and 198% and the lowest was at 125% for Urea media. In the process of culturing *C. vulgaris* for 6 days, it was found that Guillard media showed the highest average specific growth rate of 58% per day and the lowest was on Urea media as much as 27% per day, followed by Walne media about 36%.

Keywords: Biomass, *Chlorella vulgaris*, Media Culture, Microalgae.

The Effect of Marine Tourism on Community Income in Teluk Meranti District, Pelalawan Regency, Riau

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Abstract. Teluk Meranti Village is one of the most popular tourist areas in Pelalawan Regency which is developing towards marine tourism. This Bono Waves tourism activity has had an economic impact on the local community such as increased income, increased job opportunities, and business opportunities. The purpose of this study is to analyze the economic impact caused by marine tourism activities on the income of the community in Teluk Meranti village. In analyzing the economic impact of marine tourism activities in Teluk Meranti village, the Keynesian Income Multiplier approach is used by looking at the direct impact, indirect impact, and follow-up impact. The results of the analysis show that the existence of Bono Waves marine tourism in Teluk Meranti has had an economic impact on the local community's economy, although the impact felt at this time is still relatively small. This is evident from the Keynesian Income Multiplier value of 0.28, the Ratio of Income Multiplier I value of 1.35, and the Type II Ratio of Income Multiplier value of 1.59.

Keywords: Economic Impact; Kabupaten Pelalawan; Teluk Meranti; The Multiplier Effect; Tourism Activities.

Collective Tourism Social Entrepreneurship and Social Assets: A Combining Capital for Innovative Village Development at Fisherman Community in West Sumatra Province

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Abstract. Despite the widespread understanding of the value of entrepreneurship in poverty alleviation, studies on entrepreneurship for fishermen engaged in the manufacturing of fishery products are limited. Socio-economic integration is becoming more widely recognized as a critical factor of entrepreneurship. This study examines the collective tourism social entrepreneurship and social assets status of fishers involved in producing fisheries industry products, focusing on those involved in marine resource conservation areas and innovative village development in Indonesia, especially in West Sumatra Province. In the case of West Sumatra, the methodology used was a descriptive design of capitals through interviews, a questionnaire survey, and a literature review, which might apply to village development in Indonesia. This article aims to provide an alternative model of village development recognized as innovative in Indonesia. The findings of this study showed that it contributes to strengthening the capacity of a group of fishermen in the socio-economic, cultural, and social skills. They contribute positively by opening insights and ways of thinking to make use of by catching products into marketable products, which supports the quality of the product to be accepted in the market and creates jobs in the village. The ability of a group of fishermen to entrepreneur independently can improve the economics of fishing households and assist the government in constructing coastal villages. We concluded that implementing social entrepreneurship-oriented tourism could improve entrepreneurial attitudes and community awareness environment for innovative village development.

Keywords: Entrepreneurial Attitudes; Ecotourism; Marine Conservation Area; Fishermen Community; Innovative Village Development.

Analysis of crab fisherman's household structure and livelihood strategy after the Kendari Bay revitalization

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Abstract. The study determines the structure and strategy of livelihood and household welfare of crab fishermen after the revitalization of Kendari Bay. Determination of the research area is done purposively. The population and sample in this study were fishermen who persisted in using Kendari Bay as a location for catching crabs after sedimentation and reclamation of Kendari Bay to meet family needs. The data analysis used is qualitative analysis to determine the strategy and structure of fishermen's livelihood and quantitative research to assess household welfare by calculating fishermen's income which will be compared with the regional minimum wage. The results showed that the livelihood structure of crab fishermen consisted of on-farm (fishery sector) as mud crab fishermen and non-farm (non-fishery sector) as construction workers, company workers, and the wages for ship work that were carried out erratically every month. The crab fisherman's livelihood strategy is a double income pattern where the fisherman and his wife work in the non-fishery sector to meet their household needs and migrate by mobility or moving to other areas outside the Kendari Bay coast. The income of crab fishermen from catching crabs in Kendari Bay (fishery sector) is IDR2.379.859 and working in the non-fishery sector is IDR1.319.375. Hence, the total household income of crab fishermen is IDR3.699.234, higher than the minimum wage of Kendari City in 2022, IDR2.823.315, so the crab fishing households are still categorized as prosperous.

Keywords: Crab Fisherman's Household; Income; Livelihood Strategy; Livelihood Structure; Well-Being.

Water Quality and Financial Feasibility Analysis of Milkfish Cultivation in Karangsong Village, Indramayu Regency, West Java

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Abstract. Coastal areas are a supporting factor for the economic success of coastal communities because they have been used as settlements, fisheries, agriculture, and tourism. In the management of coastal areas, conflicts were often found between economic and conservation interest. Indramayu is one of the cities in West Java that has a Mangrove Learning Restoration Center (PRPM) located in Karangsong Village and commonly called Karangsong Ecotourism. This mangrove rehabilitation was initially initiated by Pantai Lestari Group. Pantai Lestari Group consist of fish farmers who felt the impact of the conversion of mangrove land on the sustainability of the surrounding pond cultivation. However, water quality and profitability in milkfish ponds need to be studied for the sustainability of the economy of farmers in Karangsong Village. This study assessed the water quality at several sample points around the pond using the standard method (APHA). The economic and financial feasibility of milkfish aquaculture assessed using cost-benefit analysis (CBA) through interview using a structured questionnaire and focus group discussions with fish farmers individually. In addition, the sensitivity analysis is carried out changes in the amount of production and feed price. This paper gives detailed information on water quality parameters such as water temperature, pH, dissolved oxygen, Total Nitrogen, Total Phosphate, nitrite, nitrate, ammonia. Then, the feasibility of milkfish aquaculture for 10 periods was determined by the value of NPV, BCR, and IRR. As the result, the positive NPV, $BCR > 1$, and $IRR > \text{interest rate}$ indicates that the aquaculture enterprise is feasible and profitable.

Keywords: Aquaculture; Cost-Benefit Analysis; Financial Feasibility; Milk Fish; Water Quality.

Supply Chain Pattern Analysis of Cincinot (*Cerithidea obtusa*) in Indragiri Hilir, Riau

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Abstract. This study aims to analyze: (1) the entities involved in the Cincinot supply chain system; (2) Cincinot supply chain patterns; and (3) factors influencing SCM Cincinot in Inhil. This research was conducted in June 2022 in two sub-districts that are the main centres of Indragiri Hilir (Inhil) marine fishing in Inhil. Survey method with quantitative descriptive approach is used in this research. The research informants consisted of 20 fishermen, six collectors, four wholesalers, and an exporter. They are taken proportionally from each of the production centres of Cincinot, namely Tanah Merah, and Concong. Data collection was carried out by interview using open questionnaires, thus allowing the informants to freely answer the questions asked. Furthermore, the data was processed using descriptive statistical methods. There results of this research showed that there are six entities involved in the *Cincinot* supply chain system at Inhil, namely fishermen, collectors, local retailers, wholesalers and exporters. The six entities, except exporters, are evenly distributed in all sub-districts in Inhil. Meanwhile, exporters are only found in three locations (Tanah Merah, Enok and Concong), while the export destinations are Malaysia and Singapore. With this condition, the pattern of the *Cincinot* supply chain between entities that occurs is also three, namely: (i) Mandah/Kuala Indragiri/Concong Entities–Concong exporters–Malaysian/Singaporean importers; (ii) Tanah Merah Entities – Tanah Merah exporter – Malaysia/Singapore importers; (iii) Reteh/Sei.Batang/Enok Entities–Enok exportersMalaysian/Singaporean importers.

Keywords: Energy; Fisherman Household; Food Security; Protein.

Gap Analysis on Marine Tourism Development in North Rupat Region

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Abstract. Coastal areas in North Rupat District, especially the area that stretches 17 km from Rhu Bay to Tanjung Punak, have nautical potential, namely the charm of white sand beaches so that they are worthy of being a tourist icon in Riau Province. This potential is also supported by the location directly adjacent to Malaysia. Rupat Island has been included in the National Tourism Strategic Area (KSPN) since 2010. However, northern Rupat marine tourism is still not widely known. This study analyzes the gap between perceptions and expectations of marine tourism development in the North Rupat Region. This study uses a qualitative approach with purposive sampling techniques on key informants: tourism managers, lodging managers, restaurant business owners, micro and small-scale businesses, traders, community leaders, village officials, and tourists. The data validity technique uses a triangulation test. Data analysis used qualitative descriptive analysis. Based on the results of the study, it is known that there is a gap between perceptions and expectations on accessibility, comfort, and activity in the North Rupat marine tourism area. The gap analysis results on the development of marine tourism in North Sumatra can be considered in formulating regional strategic programs.

Keywords: Gap Analysis; Accessibility; Expectations; Comfort; Perception.

The patron-client relationship between *Senangin* fish fishermen and *tauke* (capital owners) in Rokan Hilir Regency, Riau

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Abstract The pattern of client-patron relationships shared between *Senangin* fish fishermen and the *Tauke* in Rokan Hilir Regency occurs as *Tauke* provides fishing necessities, including operational costs to *Senangin* fish fishermen. This interdependent relationship attaches both parties within social and economic relationship. This study was conducted to analyze the pattern of client-patron relationship between *Senangin* fish fishermen and the *tauke*. Primary and secondary data obtained through direct interviews were regarded. The economic relationship between both parties occurs in the form of financial assistance given by *Tauke* to fishermen that is exchanged with the obligation to sell the fish catches to the *Tauke* (capital owner).

Keywords: Patron-client relationship; *Senangin* fish fishermen; Rokan Hilir Regency.

Develop an Ideal Fishing Cyber-Extension Content Model for Fishermen in Indragiri Hilir, Riau

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Abstract. This research was carried out from June to July 2022 in Indragiri Hilir (Inhil), Riau province, Indonesia. The objectives are to: (i) analyze the utilization of the fisheries cyber-extension (Marine and Fisheries Cyber Extension/MFCE website) by fishermen in Indragiri Hilir (Inhil), and (ii) develop an ideal fishing cyber-extension content model for fishermen in Inhil. This study uses a survey method. The sample size calculator method is used to determination of respondents. Respondents were determined as 95 fishermen respondents spread across five fishing centers: Kuala Indragiri, Tanah Merah, Sungai Batang, Mandah, and Reteh. Determination of respondents using the purposive sampling method, while data collection using a closed questionnaire. Data analysis was based on two methods: descriptive statistical analysis, and factor analysis. The results showed that most fishermen are 25-60 years old (70%), were business owners (60%), had 4-8 family members (65%), and had an average junior high school education (55%). They had a fishing business investment value of <USD3,345 and an average income of USD235 per month. Only 20% of fishermen own a smartphone. Most use social media 6-8 hours a day (80%), but only half an hour to visit fishing cyber-extension websites. The results of the factor analysis show that the ideal fishing cyber extension content model, according to the needs of fishermen in Inhil, is: (i) Extension materials should discuss business documents, financial management, and business capital assistance; (ii) The material should be problem-solving; (iii) packaged in digital poster format; and (iv) must be big size (as broad as the device screen). Additionally, (v) the content must be updated at least four times every month.

Keywords: Cyber-Extension; Extension-Model; Fisherman; Fishing Industry; Riau.

Economic Value of Carbon in Mangrove Ecosystem of Cawan Island, Indonesia

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Abstract. This study aimed to calculate the economic value of carbon in the mangrove ecosystem of Cawan Island. Mangrove data retrieval was carried out at three stations using the 10 x 10 m quadratic transect method. Tree biomass estimation was carried out using a non-destructive sampling method, by measuring all diameters at breast height (DBH=1.3 m) of mangroves, then calculating using an allometric model while the economic value using benefit transfer. The types of mangroves found on Cawan Island are *Rhizophora mucronata*, *Rhizophora apiculata*, *Xylocarpus granatum*, *Sonneratia alba*, *Sonneratia ovata*, *Lumnitzera racemosa*, *Bruguiera gymnorrhiza* and *Nypa fruticans*. *Rhizophora apiculata* has the highest biomass of 2,207.48 tons.ha⁻¹ with a carbon potential of 1,015.43 tons-C.ha⁻¹ and carbon absorption of 3,723.24 tons-CO₂.ha⁻¹, in general, Cawan Island mangroves have a biomass value of 4,838.40 tons.ha⁻¹ with a carbon potential of 2,199.54 tons-CO₂.ha⁻¹ and carbon absorption of 8,064.98 tons-CO₂.ha⁻¹. The total value of carbon sequestration produced by mangroves on Cawan Island is IDR.598,566,978,912. year⁻¹.

Keywords: Allometric; Benefit Transfer; Carbon; Economic Value.

Marketing Efficiency of Mantis Shrimp (*Harpiosquilla raphidea*) in Tanah Merah, Indragiri Hilir, Riau Province

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Abstract. Mantis shrimp (*Harpiosquilla raphidea*) is one of the marine animal commodities that has high economic value. Mantis shrimp is a type of marine crustacean with high nutritional value, with a protein content of up to 87.09%. Several species of mantis shrimp are known as exotic foodstuffs and as export commodities. The types of mantis shrimp that have high economic value are from the families of Harpiosquillidae and Squillidae. In a state of life, mantis shrimp are sold per head based on length, with a range of Rp. 10,000 to Rp. 80.000,00. In a state of death, mantis shrimp is sold at a price of Rp. 45.000,00/kg. This research aims to analyze marketing efficiency of mantis shrimp in Tanah Merah Sub-District, Indragiri Hilir. It conducted in Kuala Enok and Tanah Merah Village, Tanah merah Sub-District, Indragiri Hilir Distruct, Riau Province. The data was collected by primary data and secondary data with survey methods. The method was analyzed descriptively with quantitative methods. The results showed that there are 2 marketing channels of mantis shrimp in Tanah Merah Sub-district. The first marketing channel that was fishermen to intermediary traders and then to agent traders. Then, the second marketing channel that was fishermen to agent traders. Total margin of the first channel was Rp 39.861,00/head and the marketing efficiency was inefficient (8,17%). The total margin of the second channel was Rp. 33.187,00/head and the marketing efficiency was inefficienct (8,92%).

Keywords: Efficiency; Mantis Shrimp; Margin; Marketing.

Business of Floating Net Cages (FNC) Cultivation After Covid-19 Pandemic Decreased in Koto Panjang Hydropower Reservoir

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Abstract. The decline in COVID-19 has led to improvements in the Indonesian economic sector, what about the aquaculture sector? Is it also experiencing improvement. This study aims to look at the economic condition of the aquaculture sector in terms of changes in income and profits of caIDR cultivation in floating net cages (FNC) after the decline in Covid-19. The method used in this research is a survey method. Data were collected on 20 Fish cultivators, three fish traders and two fish feed traders. Data analysis was carried out quantitatively and qualitatively. The results show that the decline in Covid-19 has increased the price of fish compared to before Covid-19 and during Covid-19. This situation causes a change in the profit rate of fish cultivators by 28% compared to 2019 before Covid-19 and 45% compared to 2021 when Covid-19 increases. However, as many as 10% of cultivators have not carried out cultivation activities due to various reasons such as difficulties in obtaining business capital.

Keyword: Aquaculture; Fish Cultivator; Income; Profit.

The Competitiveness of Indonesia's Frozen Shrimp Exports in International Market

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Abstract. Shrimp is the first Indonesia's leading fishery export commodity, above tuna, squid, crab, and seaweed. The categories of shrimp that are exported are frozen shrimp, fresh shrimp, and processed shrimp, where the largest quantity for the shrimp export category is frozen shrimp. However, Indonesia's export value growth for frozen shrimp is still lower than its competitors. This study aims to analyze the level of competitiveness of frozen shrimp exports in Indonesia among competing countries in international market. The data used was secondary data obtained from related agencies. The analytical method used to analyze competitiveness is Revealed Comparative Advantage (RCA). This method was used to analyze changes in the level of competition for 1 years, namely 2007 – 2021. The results showed that in the period 2007-2021, Indonesia's frozen shrimp and processed shrimp exports had a strong competitiveness in the international market. The competitiveness of Indonesian processed shrimp has an increasing trend, while the competitiveness of Indonesian frozen shrimp has a trend that tends to decline within 11 years. Based on the results of the analysis using RCA, the competitiveness of Indonesian frozen shrimp in the 2007-2021 period was seen to decrease until 2012 and began to increase in 2013, while other competing countries, namely Argentina, Ecuador and India, showed an increase in competitiveness. Meanwhile, several other competing countries such as Bangladesh, Belgium, Denmark, Mexico, Thailand, and Vietnam experienced a decline in competitiveness as well as the value of RCA decreased.

Keywords: Competitiveness; Frozen Shrimp; RCA (Revealed Comparative Advantages).

Mangrove Park at Sejarah Beach, Batubara Regency, North Sumatera, Indonesia: Ecotourism, Conservation and Aquaculture

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Abstract. Mangrove Park of Sejarah Beach is in Perupuk Village, Lima Puluh Pesisir District, Batubara Regency, North Sumatra Province, Indonesia. The park is one of the mangrove forest ecotourism areas that has the potential to develop. This study aims to analyze the potential and formulate a development strategy in the future. Data were collected through observations at ecotourism sites, interviews with managers, visitors and community leaders, government, and other stakeholders. This area is located about 20 kilometers from the City of Batubara which can be easily reached by road. This beach presents some interesting tourist objects. The local government has invested some ecotourism facilities such as playground and waterpark in the beach area. On the beach, there are several food stalls where tourists can eat the typical local culinary, such as boiled clams, mussels, crabs, and other seafood. In some places around the beach, there are also places to sell handicrafts from the local community. This area continuously will to be developed and has even functioned as a mangrove forest conservation area and a limited area for the cultivation of shellfish and other fauna. With the potential for visitors on weekends around 1500-2000 visitors, this area also improves the economy of surrounding communities.

Keyword:

Social Capital of Duano Tribe Fishermen in Sharia Economic Perspective in Tanjung Pasir and Sungai Belah Village. Indragiri Hilir Regency, Riau Province

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Abstract. The Duano or Duanu tribe is one of the natives in Inderagiri Hilir Regency, Riau Province, Indonesia who has a special familiarity with the sea. This tribe relatively spends their life as fishermen in the sea. They tend to move from one place to another, according to the seasons at sea. Islamic economics or sharia is a concept of economic development based on Islamic values. This study aims to determine the social capital of the Duano tribe fishermen in Tanjung Pasir and Sungai Belah Village viewed from a sharia economic perspective. This research uses a survey method, namely by conducting field observations, reviewing, observing, and by using previously prepared questionnaires. A total of 117 people have been interviewed, Tanjung Pasir (77 people) and Sungai Belah (40 people). There are 3 forms of social capital, namely trust, cooperation and participation. The form of trust of the Duano fishing community lies in the way they trust and accept foreigners to speak openly. Mostly Duano fishermen prefer to run their own business rather than join other tribes. The second is cooperation, the Duano fishermen in catching and selling fish, they prefer to catch and sell fish in the area or around their residence without a system of cooperation with other parties. The third is participation, the Duano fishermen participate in associations with other fishermen from other regions. However, the Duano Tribe community prefers not to join the association which in the end has an impact on their economic level.

Keyword: Duano; Sharia Economic; Sosial Capital.

The Potential of Pineapple Products as a Strategy for Community Economic Revitalization in Peatlands

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Abstract. The market potential of pineapple in Riau Province is entirely developed along with the development of local food products supported by a qualified pineapple production capacity of up to 354,878 tons/year, especially on peatlands. This study aimed to analyze practical steps in the community as an opportunity to improve the welfare of pineapple farmers and protect peatlands in Riau Province. This study uses a survey method through interviews and direct observation of respondents regarding the raw materials and processing methods of pineapple products that have been carried out. As support, secondary data is used through documents and reports related to the pineapple plant in Riau Province, peat land, community and farmer empowerment, and increasing the added value of products as supporting economic aspects. The economic aspect of the pineapple plant is analyzed by comparing the increase in population with the potential of pineapple. Pineapple food products from the existing pineapple diversification have good palatability and consumer acceptance from the sensory and physical aspects of the processed products produced. Pineapple farmers' social and welfare aspects are seen by applying appropriate technology in product processing and providing incentives for the community to fulfil production facilities.

Keywords: Agroforestry; Farmer's Welfare; Peatland; Pineapple.

Analysis of Income and Risk of Cultivation Business Vanname Shrimp Foods in Bantan District Bengkalis District Riau Province

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Abstract. The Bantan sub-district is one of the Bengkalis sub-districts which has a large enough fishery production with 1,813.81 tons of capture fishery production and 416.44 tons of cultivation compared to other sub-districts. Vanname shrimp aquaculture production in Bengkalis Regency has increased by 6% where Vanname shrimp production in 2019 was 895,962 kg and in 2020 it increased by 1.000.870 kg. The magnitude of the increase in production is 104,908 kg from 2019 to 2020. The size of the Vanname shrimp pond cultivation business in the Bantan District will have an impact on the risks that will be experienced by cultivators in the future. Therefore, the purpose of this research is to analyze the income and risk level of Vanname shrimp aquaculture business in the Bantan District. The method used in this study is a survey method and data analysis used income analysis and business risk analysis. The results of the income analysis show that the income from Vanname shrimp cultivators in Bantan District is greater than the total production costs incurred during the cultivation process. This means that the Vanname shrimp farming business has been profitable. The value of the coefficient of price variation obtained is less than 0.5 and the income obtained is more than 0 and the lower limit value of production and income obtained is greater than 1, but see the overall value of $CV < 0.5$ and $L \text{ value} > 0$, which indicates that shrimp farmers will avoid production risks and the business will avoid losses.

Keywords: Income; Production; Price; Risk; Vanname Shrimp Farm.

Preliminary Study to Estimate the Potential Input of Solid Waste to The Area Of Fishing Port, Case Study: Karangantu Fishing Port

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Abstract. Fishing port is an important supporting facilities to achieve high quality of fishery production. Maintaining the quality of fishery products needs to optimize the function of fishing ports as they are the cutting edge and a prime mover in the management and utilization of fish resources and port environment ranging from preproduction, production, processing, and marketing. On the other hand, fishing port has various environmental problems such as waste management, water quality degradation and liquid waste management. The objective of this study is to identify the solid waste input by using remote sensing approach. The research conducting in Karangantu Fishing port using remote sensing approach. The result show that that high-resolution satellite imagery has proven to be able to estimate the solid waste input to the fishing port area. It is estimated solid waste input around 142.95 tons in 2020 from office activities, shipping activities, and tourist

activities surrounding fishing port area. This method approach is expected to support environmental management in the fishing port area.

Key words: Estimate; Fishing port; Pollution; Remote Sensing.

Key Factors for the Sustainability of Mangrove Crab Cultivation Business in Panipahan Indonesia

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Abstract. Mangrove Crab (*Scylla serrata*) is one of the marine commodities that have high economic value. The problem of mangrove crabs is the limited availability in nature, so this condition requires cultivation efforts to maintain the population in nature. Panipahan is one of the mangrove crab cultivation sites in Riau Province, which has been going on since 2013. This study aims to analyze the critical factors for the sustainability of mangrove crab farming businesses in the ecological, economic, social, institutional and technological dimensions. Data collection techniques are carried out by observation, in-depth interviews and literature studies. The data analysis technique used is Multi-Dimensional Scaling (MDS) through the Rapfish approach. Informants in this study are experts consisting of cultivators, fisheries services and academics. The results of the analysis of the sustainability of the mangrove crab farming business on an MDS basis are in a less sustainable status with a score of 48.13. In the ecological dimension, the critical factor that affects sustainability is the source/availability of seeds. In the economic dimension, sustainability is influenced by business profit factors. In the institutional social dimension, the dominant key factors are the involvement of family members in the mangrove crab business and the potential for conflict. The dimension of technology that affects sustainability is technical assistance from the government and post-harvest handling. Operational steps that can be taken to obtain optimal results for mangrove crab cultivation business management in Panipahan are to carry out policies /programs related to key factors.

Keywords: Aquaculture; MDS; Policy; Rapfish; Strategy.

Money, Livelihood, or Coral Reef Ecosystem Sustainability: Learning from Ecotourism Management in Mapur Islands, Indonesia

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Abstrak. This paper based on the result of field study that conducted on July 2019 in Mapur Island, Indonesia. Some data has been updated on Desember 2021. We will discuss about dilemmatic management of small island tourism that as a part of marine protecting area. There are 3 typical management of ecotourism in Mapur Island that we found used triangulation data collection technic. The first was corporation based management type, the second was co-management between NGO and local community, and the last type was government based management. The weakness of these management model were (1) land area of Mapur which only 44 km² and 442 km² sea area will be divided up by 3 type of ecotourism development that was not synergistic, (2) each party tended to negate each other, (3) tended to ocean grabbing, and (4) local livelihood and coral reef ecosystem tend to unsustain. We suggested a new model of small island ecotourism management called quadrant helix synergistic of ecotourism management. This collaborative management aims to achieve livelihood and ecological sustainability of small island environment.

Keywords: Livelihood and ecological sustainability; Ocean grabbing; Quadrant helix synergistic of ecotourism management.

Environmental Communication Based on Mangrove Ecotourism Management for Abrasion Prevention on Bengkalis Island

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Abstract. This study aims to explain environmental communication based on mangrove ecotourism management in preventing abrasion on Bengkalis Island. This study uses an environmental communication approach and a community-based tourism perspective. The research method used is a qualitative approach with case studies. The results show that the central government's through the Peat and Mangrove Restoration Agency (BRGM) has an important role in changing the views and behavior of the community in overcoming abrasion. This agency is under the coordination of the President of the Republic of Indonesia which involves many government agencies and experts. This agency involves the community in solving abrasion, as was done at Raja Kecik Beach. This marine tourism was built as a means of communication by the government to rehabilitate mangroves. The tourist facilities were built as a media to invite people to care about eroding beaches by planting, maintaining and conserving mangroves. This mangrove rehabilitation activity went viral on social media and attracted the attention of the mass media through its reporting, especially with the arrival of Joko Widodo as President of Indonesia. The development of marine tourism that is integrated with the prevention of environmental damage will not only contribute to the economy and the welfare of the community but also contribute to environmental sustainability. The weakness of communication based on mangrove ecotourism management is that it has not been well managed and coordinated with other stakeholders. Therefore, BRGM must involve other stakeholders for the implementation and campaigning of mangrove conservation messages.

Keywords: Abrasion; Environmental Communication; Mangrove Ecotourism; Mangrove Rehabilitation; Marine Tourism.

Income Contribution Based on Fishing Gear of The Duano Tribe, Indragiri Hilir, Riau

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Abstract. The Duano Tribe are fishermen that run fishing businesses traditionally. Generally, they use longlines and drift gill nets equipment for fishing. The purpose of this research is to analyze the income of fishermen that use longlines and drift gill nets based on the main catch of Belanak and Senangin fish and also to analyze the contribution of fishing business income to the total fisherman income. The descriptive method that the author used to analyze where data were collected from 29 fishermen of Duano Tribe. The result shows that the average fishing income of Duano Tribe that use longlines is IDR 51.782.948,-/ year and the average fishing income of Duano Tribe that uses drift gill nets is IDR 26.931.235,-/ year. The income of the Duano tribe using longlines is bigger than drift gill nets even with the same average duration of fishing. The contribution of income using longlines to the income of the Duano Tribe fishermen is 85% and the contribution of income using drift gill nets to the income of the Duano Tribe fishermen is 78%. The income contribution using longline is higher than the income contribution using drift gill nets. Based on the contribution criteria, income from fishing with drift gill nets and longlines both provide a high contribution.

Keyword:

Sustainability Status of Baung Fish in Public Waters, Kampar Regency, Riau Province

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Abstract. The sustainable use of fish resources is a management goal that ensures the use of resources to meet the needs of present and future generations without destroying or exceeding their recovery capacity. The results showed that the effort to utilize the Baung Fish (*Mystus murus*) to capture fisheries resources in Kampar Regency consisted of five dimensions such as economic, social, institutional, and technological, already in an unsustainable condition. In contrast, the ecological dimension is in a reasonably sustainable condition. In improving the sustainability status, policymakers should consider the main attributes that have high leverage, including the contribution of the fishery sector to GRDP, length of fishing trips, knowledge of fishermen about sustainable resource use, location of fishing areas, and government policies in improving/empowering fishermen's economy.

Keyword:

Analysis of the Fisheries Business Orientation of the Duano tribe based on Socio-Culturalism in Tanah Merah Subdistrict, Indragiri Hilir

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Abstract. Business in the fisheries sector is a hereditary business carried out from predecessors of the duano tribe. Initially, the Duano Tribe was a cultural community whose life moved according to the direction of the sea breeze and schooling fish. As the duano tribal community developed, they began to occupy an area to live permanently and build a family, as well as carry out business to meet the necessities of life. The business run by the duano tribe is still centered on the fisheries sector. The purpose of this study was to analyze the orientation of the fishery business carried out by the duano tribe based on social and culture. Methods The research uses a survey method with an explanatory research approach. The analysis technique uses quantitative descriptive with the number of respondents as many as 54 people. The fishery business carried out by the duano tribe is still oriented to the subsystem, namely fishery products produced only to meet the daily needs of the family so the category of duano fishermen is still classified as traditional fishermen. The categorization of duano fishermen is based on the use of fishing gear such as sondong, tongkah, sukur sandung, gumbang, nets, and longlines. In addition, the investment value spent on fishery businesses averages around Rp. 5 million- Rp. 10 million. Duano fishermen also use family labor. The use of labor in the family is since fishermen from the Duano tribe do not trust fishermen from other tribes, so they interact less with fishermen from outside the Duano tribe.

Keywords: Duano tribe; Investation; Orientation Business.

Can Geographical Indication Protect Kuansing Kunyit Catfish?

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Abstract. A geographical indication is a sign used for products with a specific geographic origin and quality or reputation related to their source. Geographical indication provides legal protection for characters that identify an area of a country or region as the origin of the goods, where the reputation, quality, and characteristics of the goods are primarily determined by the geographical factors concerned. A geographical indication is one type of intellectual property that aims to provide legal protection for the origin of a product which is generally labelled as the region of origin, which implies that the quality of the product can only be created from an area that has uniqueness or particular advantages from its natural resources, human resources, or a combination of both. kunyit catfish is a type of catfish that lives in the waters of Riau Province. Based on data compiled from the Indonesian Communal Intellectual Property National Data Centre, kunyit catfish is recorded as a potential geographic indication of The Kuantan Singingi Regency. The purpose of this study is whether kunyit catfish can be protected as a geographical indication and the efforts of the Regional Government to support the benefits of kunyit catfish through geographical indications. The legal sciences approach used in this study; the research is descriptive-analytical specifications. The type of data is primary data and secondary data. This study uses empirical legal research methods. This research shows the potential for legal protection of the geographical indication of kunyit catfish, as well as the efforts of the local government to support the benefits of kunyit catfish as a geographical indication.

Keywords: Communal Intellectual Property; Fish of Patin Kunyit; Geographical Indication.

The Effect of Trust and Commitment Through Communication on the Performance of Marine Fish Supply Chain Management in Bangliau, West Bagan Village, Bangko District, Rokan Hilir Regency, Riau Province

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Abstract. This study aims to determine how the influence of trust and commitment through communication on supply chain management performance in Bangliau, Baganbarat Village, Bangko District, Rokan Hilir Regency, Riau Province. This research was conducted in July 2019. Supply chain management (SCM) is a cycle chain management that includes procurement, production, inventory and delivery of a product or service from customers to suppliers. SCM performance can be said to run well if there are three constant streams namely the flow of goods, money and information. To support the flow of these streams, the fishermen and the bangliau must have a close relationship based on strong trust and high commitment so that the desired needs of the fishermen in the form of sea fish are met. The variables used in this study are trust and commitment as independent variables, supply chain management performance as the dependent variable and communication as a moderating variable. This study uses a survey method using causal relationship research. Data from the four variables were analyzed using Structural Equation Model (SEM) with the help of Smart PLS. The number of samples used in this study were 40 respondents. Based on the results of data analysis, it can be concluded that the influence of trust and commitment has a positive and significant influence on the performance of SCM. While trust does not have a positive and not significant relationship to SCM performance if mediated by communication and communication does not have a positive and significant effect on SCM performance.

Keyword: fisherman; fishing industry; SCM; stakeholder; tauke

Population Dynamics of Snakehead Fish and Marble Goby Fish in Bili Bili Reservoir, South Sulawesi

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Abstract. The Bili Bili Reservoir in Goa Regency, South Sulawesi, has a multipurpose function, one of which is for fisheries. Research related to capture fisheries, including population dynamics, is rarely conducted in the Bili Bili Reservoir. Types of fish that live in reservoir waters are generally introduced fish such as Nile tilapia, tilapia fish, bonylip barb fish and Java barb fish. In addition, there are also snakehead fish and marble goby fish. Snakehead fish (*Channa striata*) and marble goby fish (*Oxyeleotris marmorata*) are carnivorous fish for consumption, in Bili Bili Reservoir, snakehead fish are collected for albumin. Both types of fish are caught using various fishing gear such as fishing rods, longlines and gill nets. Fish population dynamics research studies movement (basic changes that occur in populations such as mortality, recruitment and growth rates). The aim of the study was to estimate the parameters of the population dynamics of snakehead fish and betutu fish. Research and data collection were carried out from March to August 2020. The study used a descriptive method. Fish samples were obtained from the catch of fishermen, then length measurements were taken every month. Analysis using Microsoft Excel data processing application and FISAT program. The results for snakehead fish, infinity length (L_{∞}) 41.16 cm, growth coefficient (K) 0.6 per year and theoretical age (t_0) 0.24 years. the natural mortality rate (M) is 1.188 per year while the total mortality (Z) is 2.51 per year. The mortality due to fishing is 1.322 per year and the exploitation rate is 0.52. As for the marble goby fish, the infinity length (L_{∞}) is 33.91 cm, the growth coefficient (K) is 0.64 per year and the theoretical age (t_0) is 0.24 years. Natural mortality rate (M) 1.308 per year. Total mortality (Z) 2.63 per year. The mortality due to fishing is 1.322 per year and the exploitation rate is 0.50. Based on the value of the exploitation rate of snakehead fish and betutu fish, it shows that the level of utilization in the Bili-Bili Reservoir has reached its optimum point.

Keywords: Population Dynamics; Snakehead Fish; Marble Goby Fish; Bili Bili Reservoir.

Typical Solid Waste Management in Southeast Asia Coastal Area

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Abstract. Solid waste management activities are a series of activities that begin with sorting or reducing waste at the source and end with landfilling or processing waste. Waste management activities in the coastal areas of Southeast Asian countries are generally still centered on collecting and throwing away. Even worse, there are still many people who litter. Coastal regions are essential because they are directly in contact with the ocean as one of the sources of life that dominate 2/3 of the earth's contents. This review aims to describe the waste management condition in communities in coastal areas of Southeast Asia. The literature review is obtained from various search pages ranging from Springer, Science Direct, ResearchGate, Academia etc. Based on the literature, people on the coast generally have a similar solid waste management pattern. Starting from the lack of awareness and knowledge of coastal communities about good waste management, lack of infrastructure, the absence of government waste management services, and the lack of attention from the central government on waste management on the coast. In conclusion, most countries in Southeast Asia have poor coastal waste management patterns such as the accumulation of garbage on the beach, poor waste disposal in rivers and coastal areas and quite challenging for the local government to monitor and treat the waste.

Keywords: Coastal area; poor management; solid waste management; Southeast Asia.

Analisis Daya Dukung Lahan Untuk Pengembangan Budidaya Kerapu di Perairan Tambak

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Abstract. Budidaya perikanan kerapu yang dilaksanakan di perairan tambak menuntut kriteria parameter lahan tertentu, karena tidak semua area lahan perairan tambak cocok untuk dijadikan tempat kegiatan budidaya kerapu. Oleh karena itu, untuk menjaga kegiatan pengembangan budidaya kerapu di perairan tambak dapat berlangsung secara berkelanjutan maka harus disesuaikan dengan parameter yang dapat menunjang pertumbuhan organisme (kerapu) yang akan dipelihara. Tujuan penelitian ini adalah menganalisis kesesuaian dan daya dukung lahan suatu perairan tambak untuk kegiatan budidaya ikan kerapu. Metode yang digunakan, yaitu analisis kesesuaian lahan dan analisis daya dukung lahan. Hasil analisis kesesuaian lahan menunjukkan bahwa lahan tambak di lokasi penelitian termasuk kriteria sangat sesuai sebesar 38,16 ha (17,13%), cukup sesuai sebesar 118,27 ha (53,11%), dan sesuai bersyarat sebesar 66,26 ha (29,75%). Hasil analisis daya dukung lahan perairan tambak dengan luas 156,43 ha sangat sesuai dan cukup sesuai dapat digunakan untuk pengembangan budidaya kerapu sistem KJT sebanyak 313 petak tambak yang setara dengan 626 unit atau 6.257 kotak keramba.

Keywords: Daya Dukung Lahan; Kesesuaian Lahan; Pengembangan Kerapu.

Holoplankton Abundance and Biovolume in Inner Ambon Bay

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Abstract. Holoplankton is a group of zooplankton that spend their entire life as plankton. This study aims to determine the abundance and biovolume of Holoplankton in the waters of the inner Ambon Bay. The study was conducted in February and March 2022. The number of samplings was 8 locations. Zooplankton samples were collected using a plankton net (mesh size: 300 microns and diameter: 30cm diameter) and preserved using formalin (final concentration 4%). The abundance and biovolume of zooplankton in Ambon Bay ranged between 56.62 – 137.30 ind.m⁻³ and 2.815 – 7.1731 mm³.m⁻³. Based on the abundance, the copepod group was dominated in these waters while based on the biovolume was dominated by the Chaetognath group.

Keywords: Abundance; Ambon Bay; Biovolume; Holoplankton.

Fish Caller Attraction Engineering (Sound and Light Combination) That Is Effective and Efficient in Fisheries in Fixed Lift-Net

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Abstract. Sound wave -based attractions at certain frequencies with a combination of lighting as a medium of fishing aids can attract the attention of fish to approach the fishing area. The use of a fixed lift-net fishing gear requires innovation that can help small-scale fishermen to increase the catch. The purpose of the study was to design fish-caller model with optimal sound waves when operated. The type of research was experimental fishing with an acoustic approach. The results showed that the design of the attractor which then named “APILBAG” was efficient enough to use because it could save the operational costs of light fishing and could be operated for 34 hours. The sound wave used was recording and imitating the sound model of the sea water bubbles released by the fish species under the fixed lift-net, with sound frequency ranged from 40 Hz -1800 Hz and the frequency peak was 753 Hz with relative amplitude ranges from 40 dB to 60 dB at a distance of 1-5 meters in the air. The frequency of the sound affected attractor was the fish to approach the attractor and combination of red-colored light on the attractor was quite effective to attract fish collected under the fixed lift-net. In the development of sound-fishing devices (sound-fish aggregating devices), especially for collecting pelagic and domersal fish, frequency range should be used. The sound model of sea water bubbles and the frequency value of this sound could be used as a database (audio) in making attractors to collect fish associated in fishing areas.

Keywords: Attractor, Sound frequency, Light-fishing, Lift-net.

Plankton Community Structure at Kasiak Island Water Pariaman City West Sumatera Province

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Abstract. This research was conducted in February 2022 in Kasiak Island Water, Pariaman City, West Sumatra Province. This study aims to analyze the community structure of phytoplankton, zooplankton, and the relationship between the abundance of phytoplankton and zooplankton in the waters of Kasiak Island. Sampling of plankton is done by filtering method. The results showed that there were 20 phytoplankton species consisting of 5 classes, namely Bacillariophyceae (11 species), Coscinodiscophyceae (3 species), Cyanophyceae (1 species), Dynophyceae (4 species), and Flagellariophyceae (1 species) and there were 14 zooplankton species which consists of 5 classes, namely Maxillopoda (8 species), Hexanauplia (3 species), Foraminefera (1 species), Bivalvia (1 species), and Thecostraca (1 species). The abundance of phytoplankton and zooplankton in the waters of Kasiak Island belongs to the category of waters with high fertility. The average abundance of phytoplankton ranged from 20,770.85-27,417.53 ind/L with the highest abundance found at station 3, namely 27,417.53 ind/L and the lowest was at station 4, which was 20,493.91 ind/L. The average abundance of zooplankton ranged from 6,369.73-10,800.84 ind/L with the highest abundance found at station 4, namely 10,800.84 ind/L and the lowest was at station 1, at 6,369.73 ind/L. The values of the biological indices of phytoplankton, namely the diversity index (H') ranged from 2.5321-3.3086, the uniformity index (E) ranged from 0.7319-0.8690, and the dominance index (D) ranged from 0.1333-0.2712. While the value of the range of zooplankton biological indices, namely the diversity index (H') ranged from 3.0805-3.5285, the uniformity index (E) ranged from 0.9075-1.0200, and the dominance index (D) ranged from 0.1191 – 0.1363. The relationship between the abundance of phytoplankton and zooplankton has a weak (negative) relationship with the regression line equation $Y = 10,570 - 0.0695x_1$, the coefficient of determination (R^2) = 0.013, and the correlation coefficient (r) = 0.1141.

Keywords: Phytoplankton; Zooplankton; Community Structure; Kasiak Island.

The Dynamics of Benthic Invertebrates in Different Peat Swamp Forests Converted to Rice Fields

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Abstract. Indonesian government plans to turn Central Kalimantan province into a national food barn by planting rice paddies in several places, including in shallow peatlands. Tropical peatlands actually have limited potential to be used as agricultural land since the growing medium, in some cases, are not conducive to root development, saturated-water soil that poisoning the plants. Aquatic invertebrates can be used as indicators to determine whether water quality in a field is safe for plants. The objective of this study is to evaluate the dynamics of benthic in different aquatic ecosystems on peat swamp forest. This study was conducted in Peat Techno Park (PTP) of the University of Palangka Raya, Central Kalimantan. Samples were collected from 9 observation stations with different forms of land use for agricultural activities, namely unplowed paddy fields, plowed fields, swamps, connecting ditches, beje, natural peat swamp forests, breeding ponds, and irrigation ponds. Data were collected over a 6-month period and coincided with the peak of dry and wet seasons. The abundance and species of aquatic invertebrates were then analyzed by observing the parameters measured directly at the station, namely pH, temperature, dissolved oxygen (DO), and depth. The results showed that there were only 2 (two) macrozoobenthos groups at PTP, namely the Annelida and insect groups, with the insect group of the order Diptera and the family Chironomidae with the most abundant genus *Chironomus* being the dominant group. Stations with high abundance were unplowed rice fields, plowed fields, swamps, breeding ponds and beje.

Keywords: macrozoobenthos; benthic; rice field; peat swamp; Peat Techno Park.

Modeling, Binding Site, and Immunogenicity Analysis of Genes Encoding L-Asparaginase from *Spirulina platensis*

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Abstract. The objective of this work was to study the modelling, binding site, and immunogenicity analysis using genes encoding L-asparaginase from *Arthrospira platensis* NIES 39. The result showed that the protein had an aliphatic index of 94.46. It was dominated by strands, helix, and coil groups. The best template for building the model was the malonate-bound human L-asparaginase protein. The amino acid at 173,191,193, 201, 204, 205, 223, 225 positions served as a binding site. The best substrate for *A. platensis* NIES 39 asparaginase was L-asparagine. There is no substantial evidence that the protein is highly allergenic. In conclusion, this is the first report on the characters of ASNase from microalgae, *A. platensis* where the enzyme has the potential to be applied for health applications because of its low allergenicity.

Keywords: Asparaginase; *Spirulina platensis*; microalgae; modeling.

Mapping Indicative Location for Beje Pond as Fish Source in Tropical Peat Swamp Using Landsat 8 OLI-TIRS

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Abstract. Tropical peatlands in Indonesia are severely degraded due to unsustainable logging, conversion to plantations, poor drainage, and repeated fires. In peat swamp areas, agricultural and crop activities are carried out on the banks of rivers with alluvial soils or on thin peat soils that are not continuously flooded by water. Serious efforts must be taken to restore the original functions of peatlands and to increase the income of communities living around the forest. In this regards, the community in Peat Hydrological Unit (PHU) Mentaya-Katingan, Central Kalimantan province, has positively responded to the activities to revitalise the community's livelihood in the context of peat ecosystem restoration. The improvement of people's livelihoods around PHU includes a) agricultural crops (rice, upland rice, vegetables, fruits, horticulture), b) gardens (coconut, rubber), c) fisheries (rivers, ponds), and d) livestock (cattle, goats, poultry). In peat swamp areas, agricultural and crop activities are carried out on thin peat soils that are not continuously flooded by water. Traditional communities in Central Kalimantan used to build "beje" ponds for fishing and paludiculture farming system (agrosilvo fishery) in deep peatlands area that are frequently flooded. However, hardly reached spot in peat swamp makes areas suitable for beje difficult to find. This study aims to map the location suitable for beje using Normalized Difference Water Index (NDWI) from Landsat 8 OLI imagery. Results from the NDWI were used as a reference for field investigations at nine sites from each NDWI class. The classification test results show that NDWI is able to distinguish dry and wet areas in tropical

peatlands, with a manufacturer accuracy of 83.3% and user accuracy of 84.9%. As a result, the area suitable for beje ponds development is $\pm 9,616$ ha, or 6.2% of the total area studied.

Keywords: Landsat 8 OLI-TIRS; NDWI; Beje; Peat Swamp.

Perbedaan Karakter Morfologi, Morfometrik dan Meristik Ikan Julung-Julung *Hemiramphus lutkey* Dan *Hemiramphus far*

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Abstrak. Penelitian ini bertujuan untuk mengetahui perbedaan secara morfologi, morfometrik dan meristik dari ikan julung-julung (*Hemiramphus lutkey* dan *Hemiramphus far*). Penelitian dilakukan pada bulan Mei-Juni 2022, bertempat di Laboratorium Sumberdaya Perikanan Fakultas perikanan dan Ilmu Kelautan Universitas Papua. Metode penelitian bersifat descriptive dengan teknik observasi langsung. Pengambilan sampel ikan dilakukan secara random sebanyak 122 ekor. Sampel ikan diperoleh dari beberapa pedagang ikan di Pasar Sanggeng, Borobudur dan Wosi. Hasil analisis terhadap ikan julung-julung (*Hemiramphus lutkey* dan *Hemiramphus far*) menunjukkan bahwa secara morfologi diantara kedua spesies tersebut terdapat perbedaan yang cukup jelas dari pola perwarnaan dari bagian tubuh dan ekornya, serta ukuran sisik nya. Secara morfometrik untuk spesies *Hemiramphus lutkey* memiliki ukuran rata-rata panjang total 259,0 mm dengan standar deviasi 0,97 untuk jenis kelamin jantan dan betina memiliki ukuran panjang total rata-rata 266,7 mm dengan standar deviasi 1.19. Untuk spesies *Hemiramphus far* hanya jantan yang berhasil teridentifikasi, dengan ukuran rata-rata panjang 235,1 mm dengan standar deviasi 2,42. Berdasarkan analisis meristik diperoleh bahwa untuk jumlah jari jari sirip, punggung, sirip perut, sirip ekor, jumlah sisik di depan sirip punggung, disekeliling badan, sisik di batang ekor, sisik dilinea lateralis, sisik di bagian atas linea lateralis dan bagian bawah line lateralis untuk spesies *Hemiramphus lutkey* dan *Hemiramphus far* berbeda. Kesimpulan dari penelitian ini adalah karakter morfologi, morfometrik dan meristik tiap spesies ikan berbeda meskipun masih dalam family yang sama.

Kata kunci: Morfologi; Morfometrik; Meristik; *Hemiramphus lutkey*; *Hemiramphus far*.

Analisis Perubahan Garis Pantai Menggunakan Digital Shoreline Analysis System di Pulau Rangsang, Kabupaten Meranti, Riau

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Abstract. Rangsang Island is one of the outer islands in Riau Province which is directly adjacent to the Malacca Strait, so that it gets direct currents both by waves and ocean currents. This causes the coastline on this island to be very dynamic to changes, be it accretion or sedimentation. Therefore, this study aims to examine the changes in the coastline of this island for 10 years and its relationship with natural factors (currents and waves) and anthropogenic factors. The method used in this research is the thresholding method to separate the land from the ocean and the application of the Digital Shoreline Analysis System (DSAS). The results obtained are that over a period of 10 years from 2011 to 2021 the coastal area of Rangsang Island experienced a maximum accretion of 41.19%, while the maximum abrasion occurred at 44.19%.

Keywords: Rangsang Island, Malacca Strait, DSAS, Shoreline, Accretion, Abrasion.

Development of Hoat Tamngil Mangrove Ecotourism Area, Southeast Maluku Regency Based on Zoning System

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Abstract. The Hoat Tamngil mangrove ecotourism area has been managed since 2019, but its utilization has not been optimal. The Hoat Tamngil mangrove ecotourism area is not collected as an ecotourism area. Currently, the management of the mangrove ecotourism area of Hoat Tamngil is less than optimal in land use, so it is still often found people are cutting mangrove trees in ecotourism areas. Furthermore, to reduce conflicts of land use in the mangrove forest area, it is necessary to regulate a zoning system that will protect natural resources, protect the interests of local communities, and is also optimal for ecotourism activities. Conceptualizing a zoning system for the Hoat Tamngil mangrove ecotourism area is the aim of this study. This research was conducted from June to October 2021. Analysis of the mangrove vegetation index with NDVI and spatial analysis were the analyzes used in this study. The results obtained from the research are the density of mangrove hoat tamngil varies but is dominated by high density. Mangrove density is a reference in the zoning division into a core zone with an area of 19.45 ha, a buffer zone of 16.27 ha, and a utilization zone of 10.8 ha. Each zoning has criteria for permitted activities to ensure sustainability in the use of mangrove ecotourism areas.

Keywords: Ecotourism, Mangrove, Zoning, Hoat Tamngil, Spatial Analysis.

Pemanfaatan Sumberdaya Perikanan Gurita di Sulawesi Tengah

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Abstract. Gurita adalah Moluska dari Kelas Cephalopoda dan merupakan komoditas perikanan global bernilai tinggi. Sebagai komoditas ekspor, gurita merupakan komoditas strategis Indonesia namun data dan informasi untuk mendukung pengelolaan lestari sumberdaya perikanan gurita masih kurang. Studi ini bertujuan mengumpulkan dan menganalisis data terkait perikanan gurita di Provinsi Sulawesi Tengah, khususnya pada empat kabupaten: Banggai, Banggai Kepulauan, Banggai Laut dan Tojo Unauna. Data primer dari lima desa yang telah didampingi dalam proses pengelolaan sumberdaya gurita sejak satu sampai lima tahun, dilengkapi dengan data sekunder. Spesies utama gurita yang ditangkap di Sulawesi Tengah adalah *Octopus cyanea*. Nelayan gurita di lima desa berjumlah 548 (termasuk 10 perempuan), menggunakan kapal kecil dan alat sederhana, dengan berbagai kearifan lokal. Volume ekspor dari Luwuk sejak 2016-April 2022 sebesar 2.855ton dengan nilai hampir Rp. 200 miliar. Volume dan nilai tangkapan gurita dipengaruhi antara lain oleh kondisi pasar global, cuaca/musim dan pandemi Covid-19. Volume tangkapan (berat) didominasi oleh kelas A (1-2 kg/ekor dan B (0.5-0.9 kg), namun sejumlah besar gurita kelas C (0.3-0.4 kg) juga tertangkap. Oleh karena gurita berkembangbiak satu kali seumur hidup kemudian mati, oleh sebab itu seluruh ukuran hasil tangkapan belum bereproduksi. Untuk menjamin kelangsungan sumberdaya gurita disarankan pola pengelolaan *co-management*, termasuk penutupan temporal (untuk memberikan kesempatan perkawinan dan rekrutmen) yang telah diujicoba dan terindikasi berhasil meningkatkan ukuran dan kelimpahan gurita, selektivitas ukuran, program monitoring dan upaya penjagaan/pemulihan habitat gurita. Kebijakan pengelolaan gurita skala desa perlu didukung oleh aturan tingkat pemerintah provinsi/kabupaten, dan keterlibatan stakeholder termasuk nelayan, pelaku usaha dan instansi terkait pada rantai pasar, LSM dan akademisi.

Keywords: *Octopus cyanea*; pengelolaan partisipatif; penutupan temporal; peraturan desa; peraturan daerah; perikanan skala kecil.

Struktur Komunitas Plankton dan Kondisi Lingkungan Perairan di Kawasan Industri Pelintung, Dumai

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Abstrak. Penelitian ini dilaksanakan pada bulan Juli 2020 di Perairan Kawasan Industri Pelintung, Kota Dumai Provinsi Riau. Tujuan dari penelitian ini adalah untuk mengetahui struktur komunitas fitoplankton dan zooplankton serta kondisi lingkungan perairannya. Metode yang digunakan pada penelitian ini adalah metode survei. Struktur komunitas fitoplankton menunjukkan nilai H' berkisar 0,5436 -1,6577 ind/L, nilai E berkisar 0,1636 - 0,5268 ind/L dan nilai C berkisar 0,3438-0,7813 ind/L sedangkan nilai struktur komunitas zooplankton untuk nilai H' berkisar 0,9183-2,2140 ind/L, nilai E berkisar 0,2764-0,6665 ind/L, dan nilai C berkisar 0,2727-0,5556 ind/L. Untuk kelimpahan fitoplankton 13,8889 - 27,7778 ind/L dan zooplankton 6,9444 - 38,1944 ind/L, dari nilai ini menunjukkan kawasan perairan ini tergolong ke dalam tingkat pencemaran yang tinggi. Konsentrasi Nitrat di perairan ini berkisar 0,054-0,179 ppm sedangkan Fosfat berkisar 0,081-0,106 ppm. Hasil uji regresi diperoleh persamaan $y=14,46 + 0,1939x$.

Kata Kunci: Stuktur Komunitas; Plankton; Pelintung.

Introduksi Kohor, Pertumbuhan dan Laju Eksploitasi Ikan Siro (*Amblygaster sirm*, Walbaum, 1792) di Laut Natuna Utara

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Abstrak. Populasi ikan pelagis kecil sudah sejak lama dieksploitasi oleh berbagai alat tangkap di Laut Natuna Utara. Sejak alat tangkap pukat cincin diperkenalkan tahun 1970, eksploitasi berkembang ke daerah penangkapan lepas pantai. Salah satu sumberdaya ikan pelagis kecil yang dieksploitasi di perairan Laut Natuna Utara adalah ikan siro (*Amblygaster sirm*). Penelitian ini dilakukan selama 22 bulan mulai Maret 2019 sampai dengan Desember 2020. Sampel ikan siro berasal dari hasil tangkapan armada pukat cincin yang beroperasi di WPP 711 Laut Natuna Utara dan Selat Karimata yang berbasis di PPN Pemangkat Kabupaten Sambas Provinsi Kalimantan Barat. Tulisan ini bertujuan untuk mengetahui umur, pertumbuhan dan laju eksploitasi ikan siro (*Amblygaster sirm*) di laut Natuna Utara sebagai bahan rekomendasi dalam penyusunan kebijakan pengelolannya. Hasil menunjukkan bahwa terdapat 3 kohor utama ikan siro di Laut Natuna Utara dengan kisaran umur antara 9 bulan hingga 3,1 tahun dan umur maksimal yang dapat dicapai (*longevity*) sebesar 4,3 tahun. Nilai asimptotis/infinity pada panjang 21,79 cmFL dengan kecepatan pertumbuhan mencapai 0,65 per tahun. Laju kematian alami (M) sebesar 1,19, sedangkan laju kematian total sebesar 2,19 dan laju kematian akibat penangkapan (F) sebesar 0,99. Meskipun nilai laju eksploitasi masih dibawah angka optimumnya (*moderate*) namun dilihat dari interaksi predasi dan interaksi dengan spesies ikan pelagis kecil lainnya maka tidak disarankan untuk menaikkan upaya penangkapan.

Keyword:

Characteristics of Biscuit Quality with the Addition of Different Fish Flour (*Ilisha elongata*)

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Abstract. Biscuits are a type of food that is rich in nutrients and is consumed by people of all ages. This study aims to determine the characteristics of the nutritional quality of biscuits with the addition of biang fish flour. The study used an experimental method with the addition of different biang fish flour, namely 0%, 2%, 4%, 6%, and 8%. The results showed that biscuits with the addition of 4% fish flour had the best nutritional content with 3.91% moisture, 17.31% protein, 19.53% fat, 2.43% ash, and 56.81% carbohydrates. The calcium content in biscuits is 438 mg/kg. Biscuits with the addition of fish flour can be used as a nutritious supplement for all people in the community in order to support health.

Keywords: Biang Fish; Biscuits; Fish Flour; *Ilhisa elongata*.

Strategi Pengelolaan Ekosistem Mangrove Sebagai Kawasan Ekowisata Berbasis Kearifan Lokal di Kampung Rawa Mekar Jaya Kecamatan Sungai Apit Kabupaten Siak

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Abstrak. Ekosistem mangrove Desa Rawa Mekar Jaya merupakan sebuah kawasan ekowisata yang berbasis kepada kearifan lokal. Agar ekosistem mangrove tersebut dapat memberikan manfaat bagi ekologi dan lingkungan, dan social ekonomi masyarakat, maka perlu disusun strategi pengelolaannya. Penelitian bertujuan untuk menyusun strategi pengelolaan ekosistem mangrove berbasiskan keraifan lokal di Desa Rawa Mrekar jaya. Informasi yang diperoleh dalam penelitian ini seperti kondisi lingkungan ekosistem mangrove sebagai kawasan ekowisata, nilai kelayakan sebagai kawasan ekowisata, dan strategi pengelolaannya. Data primer dan data sekunder dikumpulkan melalui kegiatan sampling, wawancara, dan kuesioner. Hasil penelitian menunjukkan bahwa kondisi lingkungan seperti kualitas perairan mangrove masih mampu mendukung untuk kehidupan makhluk hidup di perairan, ekosistem mangrove memiliki kelayakan sebagai kawasan ekowisata dengan nilai indeks kelayakan yaitu: daya tarik 1.11, Aksesibilitas 500, Akomodasi 75, infrastruktur pengunjung 150, total skor nilai 1.84. Dan kawasan ekosistem mangrove Desa Rawa Mekar Jaya sesuai sebagai kawasan ekowisata. Strategi pengelolaan ekosistem mangrove yang dapat dilakukan adalah: masyarakat Desa Rawa Mekar Jaya harus mampu memelihara ekosistem mangrove dengan menerapkan aturan berbasis kearifan lokal seperti tidak menebang pohon mangrove, menjaga kebersihan dan fasilitas umum penunjang ekowisata.

Kata Kunci: Ekosistem; Ekowisata; Kearifan Lokal.

Strategi Pengembangan Wisata Bahari Sebagai Daya Tarik Wisata di Pulau Sedanau Kecamatan Bunguran Barat Kabupaten Natuna

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Abstrak. Berkembangnya pariwisata disuatu daerah akan memberikan dampak yang positif baik dari segi ekonomi, sosial dan budaya. Industri pariwisata sebagai salah satu sektor utama yang dikembangkan di Indonesia dengan tujuan mengoptimalkan daya tarik wisata yang ada di suatu daerah. Penelitian ini bertujuan untuk mengetahui potensi wisata bahari, untuk mengetahui strategi pengembangan potensi wisata bahari sebagai daya tarik wisata di Pulau Sedanau, Kecamatan Bunguran Barat, Kabupaten Natuna. Penelitian ini menggunakan metode deskriptif kualitatif yaitu penelitian yang menggunakan suatu keadaan sebagaimana adanya. Sumber data yang diperoleh dari responden, informan, observasi, dan dokumentasi. Kemudian di analisis menggunakan analisis SWOT. Hasil penelitian menunjukkan bahwa Potensi wisata bahari Pulau Sedanau adalah adanya aktivitas Bagan Terapung, Ekosistem Terumbu karang yang masih alami, dan pemandangan alam yang begitu indah, Pulau Sedanau sudah dikatakan layak menjadi salah satu destinasi wisata bahari Kabupaten Natuna. Strategi Pengembangan potensi wisata bahari sebagai daya tarik wisata di Pulau Sedanau adalah membentuk kelompok sadar wisata serta memberikan pembinaan dan pelatihan tentang kepariwisataan, menjadikan Bagan Terapung sebagai objek wisata bahari, Menjaga kelestarian Ekosistem Terumbu karang, Membangun pusat oleh oleh atau toko souvenir dan Memaksimalkan serta meningkatkan sarana dan prasarana penunjang wisata yang telah tersedia di Pulau Sedanau.

Kata Kunci: Wisata bahari; Bagan terapung; Pulau Sedanau.

Diversitas Gastropoda pada Ekosistem Lamun di Pantai Teluk Bakau Kabupaten Bintan Kepulauan Riau

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Abstrak. Teluk Bakau merupakan kawasan pesisir yang dimanfaatkan untuk aktifitas perikanan dan pariwisata, yang berdampak terhadap ekosistem lamun dan biota yang berasosiasi seperti gastropoda. Penelitian ini bertujuan untuk mengetahui keanekaragaman jenis gastropoda di Pantai Teluk Bakau Kabupaten Bintan Kepulauan Riau. Penelitian ini dilaksanakan pada bulan April-Mei 2022. Penelitian ini menggunakan metode survey, dengan menetapkan tiga stasiun, yaitu Stasiun 1, terdapat pemukiman dan aktifitas pasar, Stasiun 2, merupakan kawasan pariwisata dan terdapat *resort*, Stasiun 3, merupakan kawasan yang masih alami dan terdapat lamun yang relatif padat. Pengambilan sampel gastropoda menggunakan metode transek kuadrat. Pada setiap Stasiun direntangkan 3 transek garis menggunakan tali dari arah darat ke titik terakhir ditemukan lamun. Jarak antar transek garis 50 m, tiap transek garis diletakkan 3 plot (petak kuadrat) ukuran 1x1 m². Hasil penelitian terdapat 10 jenis gastropoda dengan ciri dan bentuk yang berbeda, terdiri dari 7 familia dan 10 genus. Nilai indeks ekologi menunjukkan nilai kepadatan berkisar 14,44 – 80,67 ind/m², Indeks keanekaragaman (H') berkisar 2,071 - 2,735, nilai indeks keseragaman (E) berkisar berkisar 0,690 - 0,862 dan nilai indeks dominansi (C) berkisar 0,163 – 0,315.

Kata kunci: diversitas gastropoda; lamun; Teluk Bakau.

Kapasitas Adaptasi Ekosistem Mangrove di Kecamatan Sungai

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Abstrak. This research was conducted for five months from May to September 2022 in Sungai Apit District by taking six (6) villages as sampling locations from eight (8) existing villages. The aim of the study is to calculate and assess the adaptive capacity of the mangrove ecosystem in Siak District, Siak Regency. The adaptive capacity of mangrove ecosystems is measured by analyzing six parameters, namely the Mangrove Dimension Index (IDMg), Dominant Mangrove Species, Mangrove Density, Number of Mangrove Species, Substrate Type, and Ecosystem Distance from Settlement. The value of the adaptive capacity of mangrove ecosystems is in the range between 0.0-1.0, with five categories, namely "very low, low, medium, high, and very high". The results showed that the number of mangrove species found on the coast of Sungai Apit District were 19 species belonging to 10 families and 12 genera, distributed in the "low" category with the value of the mangrove dimension index (IDMg) 0.6 ($0.4 < \text{IDMg} < 0.8$). The dominant species is the Rhizophoraceae family with a density classified as "high". The adaptive capacity of the mangrove ecosystem in the study area is classified as "high" with an adaptation capacity value of 0.65 ($0.6 < \text{KPMg} < 0.8$).

Keywords: ecosystem; mangrove; the adaptive capacity.

Pemetaan Daerah Penangkapan Ikan Tongkol (*Euthynnus Affinis*) di Perairan Selat Malaka Menggunakan Model *Maximum Entropy*

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Abstrak. Ikan tongkol (*Euthynnus affinis*) merupakan salah satu jenis ikan pelagis kecil dari famili Scombridae yang memiliki nilai ekonomi penting di Indonesia. Selat Malaka sebagai salah satu daerah sebaran dan habitat ikan tenggiri. Variabilitas hasil tangkapan ikan di suatu perairan dipengaruhi oleh parameter oseanografi yaitu suhu permukaan laut dan klorofil-a yang mempunyai pengaruh terhadap distribusi ikan tongkol. Model *maximum entropy* digunakan untuk pemetaan daerah penangkapan ikan yang akurat terhadap nelayan dengan menggabungkan variabel lingkungan dan titik munculnya spesies. Penelitian ini bertujuan untuk memetakan daerah penangkapan ikan tenggiri berdasarkan data suhu permukaan laut dan klorofil-a di perairan Selat Malaka menggunakan model maximum entropy. Data lingkungan menggunakan data citra dari sensor MODIS yang terpasang pada satelit Aqua berupa citra suhu permukaan laut dan konsentrasi klorofil-a level 3 SMI musiman 2018 di perairan Selat Malaka yang diunduh dari *platform Google Earth Engine*. Data sebaran habitat ikan tongkol menggunakan data logbook penangkapan ikan Pelabuhan Perikanan Samudera Belawan musiman 2018. Hasil penelitian menunjukkan nilai AUC pada kurva ROC berada pada kisaran 0.666 yang berarti hasil dari model data uji mempunyai kriteria rendah. Hasil uji *jackknife* menyimpulkan bahwa suhu permukaan laut lebih berpengaruh dibandingkan klorofil-a terhadap spasial penangkapan ikan tongkol. Hasil kurva respon untuk parameter suhu permukaan laut terkait dengan nilai indeks probabilitas keberadaan ikan tongkol tertinggi adalah 31.7°C-31.9°C dan parameter klorofil-a adalah 3 mg/m³ pada musim timur. Keberadaan ikan tongkol berada pada nilai HSI berkisar antara 0.5 hingga 1 dan dapat dikatakan bahwa akurasi model cukup baik hingga sangat baik. Hasil model *maximum entropy* menjelaskan bahwa area wilayah penangkapan ikan tongkol banyak ditemukan di dekat pantai timur Sumatera dan perairan Aceh Timur hingga wilayah tengah Selat Malaka.

Kata kunci: Ikan tongkol; klorofil-a; maximum entropy; Selat Malaka; suhu permukaan laut.

Abundance of Microplastic in Sediment at Carocok Beach Tourism Area, Pesisir Selatan Regency West Sumatra Province, Indonesia

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Abstrak. Plastic material is a type of compound that is difficult to decompose in water and takes a long time. After a few years, the plastic material will degrade in the water into small particles called microplastics. Microplastics can accumulate in seawater, sediments and aquatic biota. This research was carried out in the Carocok Beach Tourism Area, Pesisir Selatan Regency, West Sumatra Province, Indonesia in September 2021. Determination of the abundance of microplastics in sediment using a microscope with the Broom Method. In the Carocok beach tourism area, 3 types of microplastic were found in the sediment, namely fragments ($\pm 70\%$), fiber ($\pm 16\%$) and film ($\pm 13\%$). The type of fragment is the dominant type of microplastic found. The abundance of microplastics in sediments in the Carocok Beach Tourism Area ranges 70-109 particles/kg. The highest abundance of microplastics was found in the waters bordering the Muara, followed by residential areas. The Carocok Beach tourist area found the lowest abundance of microplastics. The presence of microplastics was more dominant at a depth of 10-20 cm compared to 0-10 cm.

Keywords: Microplastics; sediments; tourist beaches; types and abundance; Pantai Carocok.

Characteristics of Agar from *Gracilaria* sp. Ultrasonic Extraction with Alkali Pretreatment

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Abstract. Agar is one of the aquatic products obtained from the extraction of seaweed such as *Gracilaria* sp. The extraction process for seaweed agar is generally carried out by conventional methods using high temperatures up to 100°C. Extraction using ultrasonic waves is known to be an alternative as an extraction method for *Gracilaria* sp. This study aims to determine the effect of ultrasonic time on the characteristics of seaweed agar pretreated with different concentrations of alkali, and compare it with the conventional methods. The treatments used were concentrations of 3% and 5% NaOH and extraction time of 45 and 60 minutes. The treatment results were analyzed for yield, viscosity and white degree, then the selected treatment was taken. The characteristics of the selected treatment agar were compared to the conventional one. The selected treatment was a combination of 5% NaOH and the extraction time was 60 minutes. The characteristics of the selected treatment agar obtained a yield value of 31,31%, viscosity 34,98 cP, white degree 71,12%, water content 5,03%, ash content 9,12%, sulfate content 2,57% and gel strength 92,11 g/cm². Agar ultrasonic treatment has higher yield, whiteness and gel strength than agar without ultrasonic, and has yield and water content that meets FAO and SNI standards.

Keywords: Agar; Alkali; Gel Strength; *Gracilaria* sp; Ultrasonic.

Pengaruh Salinitas Berbeda terhadap Pertumbuhan dan Sintasan Ikan Mas (*Cyprinus carpio*) dengan Pemberian Pakan Jamu Fermentasi

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Abstrak. Pemberian pakan jamu fermentasi dapat meningkatkan nafsu makan, daya cerna pakan, pertumbuhan, dan kesehatan ikan. Pemeliharaan ikan pada media bersalinitas bertujuan untuk mencari kadar salinitas yang terbaik untuk pertumbuhan dan Sintasan ikan, sehingga ikan air tawar juga dapat dipelihara pada perairan bersalinitas. Penelitian ini menggunakan metode eksperimen dengan rancangan acak lengkap (RAL), 5 taraf perlakuan, yaitu P₀(0 ppt), P₁(3 ppt), P₂(6 ppt), P₃(9 ppt), dan P₄(12 ppt). Salinitas perlakuan dibuat dengan cara pengenceran air laut (35‰) dengan air tawar. Ikan uji yang digunakan adalah ikan mas berukuran 6-8 cm, dipelihara dalam akuarium berukuran 60x40x40cm dengan padat tebar 1ekor/ 3liter air. Pakan yang diberikan berupa pelet komersil ditambah jamu fermentasi dengan dosis 200 mL/kg pakan dilarutkan dalam 500 mL air bersih. Penelitian ini dilakukan selama 30 hari. Hasil penelitian menunjukkan pertumbuhan panjang mutlak tertinggi diperoleh dari P₁ dengan nilai (1.73 cm) dan terendah pada perlakuan P₄ (0.80 cm). Pertumbuhan bobot mutlak tertinggi pada P₀ dengan nilai (4.37g) dan terendah pada P₄ (2.31g), Laju pertumbuhan spesifik tertinggi pada perlakuan P₀ dengan nilai (0.16%) dan terendah pada P₄ (0.06%). Sintasan ikan mas tertinggi pada perlakuan P₀, P₁ dan P₂ dengan nilai (100%), sedangkan pada P₃(98,33%) dan P₄(0%). Ikan mas mampu mentolerir kadar salinitas sampai 9 ppt.

Kata Kunci: *Cyprinus carpio*; Jamu Fermentasi; Pertumbuhan; Salinitas; Sintasan.

Tilapia Fish Scales as a Source of Halal Gelatin: Extraction and Characterization

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Abstract. Gelatin on the market mostly comes from cows and pigs which are constrained in their use in relation to religion and food safety aspects. In this study we used a source of gelatin originating from fish scale of tilapia that fulfills aspects of halal and food safety. The effect of hydrochloric acid concentrations (3, 4, and 5%) and different time (24 and 48 h) of demineralization process and temperature of extraction for producing gelatin from fish scale (60, 70 and 80 °C) were investigated. Demineralization processed using 4% hydrochloric acid for 24 h produced the highest and the lowest contents of protein and ash which values were 89.04% and 0.21% respectively. Temperature extraction of 60°C performed the good quality of gelatin. Those gelatin had characteristics of protein, viscosity, and gel strength were 83.62%, 83.54 cP, and 349.82 Bloom respectively. Generally, selected fish scales gelatin had a quality equivalent to commercial gelatin.

Keywords: Demineralization; Extraction; Fish Scale; Gelatin.

Strategi Pengembangan Agroindustri Perikanan Laut di Kabupaten Rokan Hilir

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Abstrak. Sektor perikanan mengambil peran yang krusial terhadap masyarakat yang berada di Kabupaten Rokan Hilir dalam menjalankan sektor perekonomian masyarakat. Potensi perikanan yang dimiliki harus dimanfaatkan semaksimal mungkin untuk kepentingan masyarakat. Tujuan dari penelitian ini adalah untuk menganalisis produk agroindustri perikanan laut yang diunggulkan di Kabupaten Rokan Hilir dan mengetahui faktor internal & faktor eksternal agroindustri perikanan tangkap laut serta alternatif pengembangan agroindustri perikanan laut di Kabupaten Rokan Hilir. Berdasarkan hasil penelitian menggunakan analisis AHP bahwa, produk perikanan laut Kabupaten Rokan Hilir yang dominan adalah produk olahan udang. Hal ini didasarkan pada hasil pembobotan dan skoring komoditas serta teknik pasca panen yang digunakan. Hasil dari analisis SWOT diperoleh kesimpulan bahwa posisi agroindustri perikanan laut Kabupaten Rokan Hilir yang didasarkan pada matriks IE terdapat di sel V yaitu pertumbuhan dan stabilitas, artinya posisi agroindustri perikanan laut di Kabupaten Rokan Hilir dalam kondisi yang seimbang. Implementasi yang dapat dijadikan sebagai alternatif pengembangan agroindustri perikanan yang ada di Kabupaten Rokan Hilir adalah memanfaatkan ketersediaan bahan baku ikan dari alam, meningkatkan dukungan dan perhatian terhadap usaha agroindustri perikanan laut, meningkatkan & mempertahankan mutu produk agroindustri perikanan laut, mengusulkan pelatihan terkait tentang kemampuan manajerial keuangan, mendirikan kelembagaan / koperasi perikanan pemasar hasil agroindustri perikanan laut, membuat pelatihan terkait penanggulangan hama dan penyakit yang lebih intensif, menjamin tingkat harga dalam pemasaran agroindustri perikanan dengan cara melakukan hubungan kerjasama dengan pengumpul/agen/pedagang, mendirikan tempat pengolahan modern berbasis penanganan bahan baku agar ketersediaan bahan baku dapat di stok atau disimpan sehingga dapat meminimalkan biaya produksi.

Kata kunci: AHP; SWOT; Agroindustri Perikanan Laut; Strategi Pengembangan; Rokan Hilir.

Biopigments (R-Phycoerythrin, Trans-Fucoxanthin and Siphonaxanthin) from Seaweeds and Its Potential Application as Ingredients in Cosmeceutical Industries: A Review

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Abstract. Seaweeds are macroscopic marine algae classified into three major classes according to their accessory pigments, namely green seaweed (Chlorophyceae), red seaweed (Rhodophyceae), and brown seaweed (Phaeophyceae). Photosynthetic pigments (biopigments) are chemical substances divided into three groups: carotenoids, chlorophylls, and phycobiliproteins. This review is focused on three biopigments, such as R-phycoerythrin (R-PE), fucoxanthin (FX), Siphonaxanthin (SPX), and their potential application as ingredients in cosmeceuticals industries. R-PE is a type of phycobiliprotein that plays a role in collecting light for the photosynthesis process in red seaweed. This compound is a marine bioactive protein, mainly found in red seaweed, such as *Halymenia* sp., *Euchema* sp., *Gelidium pusillum*, *Gracilaria verrucosa*, *Callithamnion rubosum*, *Pyropia haitanensis*, *Porphyra yezoensis*, etc. Then, FX compound is a major xanthophyll carotenoid in the chloroplast of brown seaweed, namely *Padina australis*, *Sargassum horneri*, *Undaria pinnatifida*, *Laminaria japonica*, etc. SPX is a rare xanthophyll carotenoid abundant in green seaweed, such as *Halimeda* sp., *Codium fragile*, *Umbraulva japonica*, *Caulerpa lentillifera*. SPX is a specific keto-carotenoid of siphonaceous green seaweed, which helps in absorbing available green and blue-green light underwater. FX has epoxide and an allenic bond in its structure, whereas SPX does not contain either of those functional groups. R-PE, FX, and SPX showed high potential as cosmetic activities due to their activities as antioxidant, antiaging, anti-inflammatory, anti-tyrosinase, antiobesity, etc. The biological activities of these seaweed biopigments of interest in cosmeceuticals. These biopigments are considered potential ingredients for innovative cosmeceuticals. Generally, there are two main techniques to extract biopigments, namely the conventional method (liquid solvent extraction), and the non-conventional. Despite the complications of establishing extraction methods environmentally safer, there is still a need for further

investigations to evaluate safety, efficacy, and real potential alternatives of using biopigments from seaweeds in the cosmeceutical industry.

Keywords: R-phycoerythrin; Trans-Fucoxanthin; Siphonaxanthin; Biopigment; Seaweed; Cosmeceutical.

Pigmen Fikosianin dan Komponen Aktif *Spirulina platensis* yang Dikultivasi Menggunakan Media Garam Berbeda

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Abstrak. *Spirulina platensis* merupakan mikroalga berwarna hijau-biru yang digolongkan ke dalam *cyanobacteria*, bersel satu dan berbentuk spiral. Kultivasi spirulina dapat dilakukan menggunakan air laut maupun air tawar. Air laut dapat dimodifikasi dengan air garam. Tujuan penelitian ini membedakan pengaruh garam berbeda pada media pertumbuhan *S. platensis* terhadap kurva pertumbuhan, kandungan pigmen fikosianin, total fenol serta komponen aktifnya. Penelitian ini terdiri dari dua tahap yaitu, 1) kultivasi *S. platensis* dengan media garam berbeda; dan 2) ekstraksi komponen aktif, uji konsentrasi fikosianin serta total fenol. Penggunaan media garam yang berbeda pada kultivasi spirulina tidak berpengaruh nyata terhadap rendemen hasil kultivasi ($p > 0,05$). Kandungan total fenol dan konsentrasi fikosianin menunjukkan hasil yang berbeda nyata ($p < 0,05$). Kandungan total fenol tertinggi 24,11 mgGAE/g diperoleh pada kultivasi menggunakan air laut. Konsentrasi fikosianin tertinggi terdapat pada perlakuan garam ASW sebesar 3,64 %.

Kata kunci: Air Laut; Fenol; Konsentrasi; Pertumbuhan; Spirulina.

Identifikasi Bakteri Asam Laktat (BAL) Dari Media Air Budidaya Ikan Nila Srikandi (*Oreochromis Aureus X Oreochromis Niloticus*) Dengan Sistem Boster

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Abstrak. Ikan nila merupakan komoditas budidaya andalan di Indonesia yang memiliki potensi besar dan sangat berpeluang untuk dikembangkan karena rasa daging yang enak dan mudah dipelihara. Tujuan penelitian ini untuk mengidentifikasi jenis bakteri asam laktat (BAL) pada media air budidaya ikan nila srikandi (*Oreochromis aureus x Oreochromis niloticus*) dengan sistem boster. Penelitian ini dilakukan pada bulan April sampai Juni 2019, bertempat di Laboratorium Parasit dan Penyakit Ikan Jurusan Budidaya Perairan Fakultas Perikanan dan Kelautan, Universitas Riau. Metode yang digunakan dalam penelitian ini adalah metode survei dengan cara mengambil sampel air dari wadah pemeliharaan dengan cara memasukkan botol sampel volume 10 mL yang dimiringkan 45 derajat ke air pada kedalaman 10 cm. Bakteri air diisolasi pada pH 2, pH 4 dan pH 6, lalu diidentifikasi sesuai dengan buku petunjuk identifikasi. Hasil penelitian menunjukkan bahwa jenis bakteri asam laktat pada media air budidaya sistem boster yaitu genus *Bacillus*. Parameter kualitas air selama penelitian tergolong baik yaitu, suhu berkisar antara 27-28°C, pH berkisar antara 7-7,3, DO berkisar antara 5-6,8 mg/L dan amonia (NH₃) berkisar antara 0,003-0,067 mg/L.

Keywords: Ikan Nila Srikandi; Bakteri Asam Laktat; Boster; Kualitas Air; Budidaya Perairan.

Pengaruh Hormon Oodev Terhadap Pematangan Akhir Gonad Ikan Selais (*Ompok Rhadinurus* Ng)

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Abstrak, Pengaruh hormon Oodev dengan dosis berbeda terhadap pematangan akhir gonad ikan Selais (*Ompok rhadinurus* Ng), penelitian ini telah dilaksanakan pada bulan Juli-Oktobre 2019 di Waduk Fakultas Perikanan dan Kelautan Universitas Riau. Induk yang digunakan dengan berat rata-rata 35 – 42 gram, dosis Oodev yang disuntikkan berbeda-beda: P₀ (0 ml/kg bobot induk); P₁ (0,5 ml/kg), P₂ (1 ml/kg) and P₃ (1,5 ml/kg). Penyuntikan Oodev dilakukan setiap 7 hari sekali. Hasil penelitian pengaruh dosis Oodev terhadap pematangan gonad ikan Selais bahwa perlakuan terbaik yaitu dosis 1,5 ml/kg bobot induk: dengan waktu pencapaian matang gonad selama 24 hari, jumlah telur hasil striping 109 butir/g induk, nilai indeks ovi somatik 14,14%, diameter telur 1,27 mm, derajat pembuahan sebesar 89,30%, derajat penetasan sebesar 90,67%, dan tingkat kelulushidupan larva sebesar 95,10%. Parameter kualitas air selama penelitian tergolong optimal yaitu suhu 26,5-27,4 °C, pH 6,0-7,2 dan oksigen terlarut 4,5-5,6 mg/l.

Keyword: Sheat Fish; Hormon Oodev; Dosis; Pematangan Akhir Gonad.

A Case Study of Nutrient Enrichment (N and P) in Connection with The Tragedy of Phytoplankton Blooms in Lampung Bay

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Abstract. Mass mortalities of fish had occurred in the waters of Lampung Bay in 2012, 2013, 2014, and 2018, which has become the local government's attention, scientists, and stakeholders as well as the mass media. Fish mass mortalities occur simultaneously in the bay coinciding with surface water discoloration due to the occurrences of phytoplankton bloom in the waters. Therefore, this research has been conducted in 2012, 2017, and 2018 to study the condition of water quality, hydro-oceanography parameters, and phytoplankton abundance, including the presence of toxic phytoplankton species. Besides field study, an assessment of water quality was also conducted through desk study of the existing literature from 2000 to 2018. Sampling was conducted with standard procedures for water quality monitoring such as nutrient concentration and other pollutants. Samples of phytoplankton were collected with net phytoplankton, mesh size of 20 μ m, while hydro-oceanography parameters by using CTD and current meter. The results of the study showed that generally, the water quality of Lampung Bay has been degraded continuously since 2000 until this study was conducted. Nutrient levels, especially nitrate and phosphate, were also recorded to have increased from the previous years. The high ratio of N/P was suspected as the primary triggering factor for phytoplankton bloom in this bay. From these studies, it was observed the presence of several toxic phytoplankton in the samples which are known to have ever bloom and caused the discoloration in the surface water.

Keywords: Water Quality; Algal Bloom; Fish Mortality; Nutrient Enrichment.

Kinerja Pertumbuhan dan Kelulushidupan Benih Ikan Lele Laut (*Plotosus lineatus*) pada Mikrohabitat Berbeda

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Abstract. Ikan lele laut karang (*Plotosus lineatus*) merupakan salah satu jenis ikan ekonomis penting yang mempunyai peluang untuk didomestikasi dalam memenuhi kebutuhan protein hewani. Penelitian ini bertujuan untuk mengetahui kinerja pertumbuhan dan kelulushidupan ikan lele laut pada mikrohabitat berbeda. Pengambilan data pertumbuhan panjang dan bobot serta kelulushidupan benih dilakukan setiap 14 hari selama 56 hari pengamatan. Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) yang terdiri dari tiga perlakuan dan lima kali pengulangan yaitu perlakuan A (media kontrol, tanpa substrat), perlakuan B (media bersubstrat pasir), dan perlakuan C (media bersubstrat campuran pasir dan karang) dengan padat tebar 5 ekor per ulangan. Hasil penelitian ini mengindikasikan benih lele laut dapat hidup pada kolam budidaya air laut. Benih lele laut pada media bersubstrat campuran pasir dan karang menunjukkan pertumbuhan yang paling baik daripada media kontrol dan media bersubstrat pasir dengan nilai pertumbuhan panjang absolut (Lm), laju pertumbuhan panjang harian (DGRL), laju pertumbuhan relatif (RGR), dan laju pertumbuhan spesifik (SGR) berturut-turut $1,72 \pm 0,70$ cm; $0,04 \pm 0,05$ cm/hari; $0,04 \pm 0,06$ %/hari; dan $1,74\% \pm 2,77$ %/hari. Demikian pula benih pada media bersubstrat campuran pasir dan karang menunjukkan memiliki laju kelulushidupan tertinggi ($88,00\% \pm 21,42$) daripada media substrat pasir ($53,33\% \pm 32,33$) dan media tanpa substrat ($41,33\% \pm 27,23$).

Keywords: Domestikasi; Lele Laut; Laju Pertumbuhan Spesifik; Mikrohabitat.

The Evaluation of Sago Crackers' Chemical Quality Characteristics After the Addition of Various Fish Flour (*Ilisha elongata*)

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Abstract. Sago crackers, which are nutrient-rich, are one functional food product that may be made with fish flour (*Ilisha elongata*). The purpose of this study is to identify the chemical quality traits of sago crackers made with various beginning fish flours. The research approach was carried out experimentally with the inclusion of several sago flours, including without fish flour (control, C₀), with fish flour added at a rate of 2.5% (C₁), 5% (C₂), and 7.5% (C₃). The results showed that the addition of fish flour (*Ilisha elongata*) had an effect on the nutritional quality of sago crackers (after frying) by containing moisture, protein, fat, ash, carbohydrates, and calcium content. The best research was obtained in the addition of fish flour at 7.5% (C₃) with the characteristics of moisture 3.47%, protein 10.19%, fat 4.58%, ash 2.73%, carbohydrates 78.68%, and calcium content 0.92%. The fish flour (*Ilisha elongata*) addition has the potential to be a useful food (functional).

Keyword: Characteristics; Fish Flour; *Ilisha elongata*; Sago Crackers.

Nutrient Content of Shredded Biang Fish (*Ilisha elongata*) Using Different Packaging During Storage

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Abstract. Shredded fish is one of the processed fishery products made from fish meat or processed fish, which are added with some additional ingredients. Shredded fish is one of the processed fishery products made from fish meat or processed fish, which are added with some additional ingredients. The aim of this study was to determine the effect of using different packaging on the nutritional quality of shredded fish (*Ilisha elongata*) during storage at room temperature. The results of the study using all types of packaging during 28 days of storage gave the characteristics of the nutritional quality of shredded fish that were still good according to the quality standard of SNI (Indonesian National Standard). The use of packaging type Polypropylene (PP) is the best packaging for the storage of shredded prickly fish with nutritional characteristics, namely 5.60% moisture; protein of 30.71%; ash of 5.26%; and 20.56% fat. Shredded fish fillet with Polypropylene (PP) packaging according to changes in the nutrition of the abon is estimated to be in good condition for up to 3 months of storage.

Kata kunci: Biang Fish; *Ilisha elongata*; Packaging; Shredded.

Necrosis Incidence on Sand Lobster (*Panulirus homarus*) Tail Fin Reared Using Recirculating Aquaculture System (RAS)

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Abstract. Lobster cultivation has been widely carried out in Indonesia, especially to prevent a decrease in stocks in nature due to fishing that does not pay attention to the aspect of resource sustainability. However, in the effort to cultivate lobster, there are obstacles, namely the high mortality caused by infectious diseases. The test was carried out at the Field Test Facility of Fish Health and Environmental Assessment Center (BPKIL) Serang in June-November 2021. The sand lobsters used had an initial size of ≤ 50 grams and ≥ 100 grams which were reared in fiber glass tanks with a volume of 1000-L with a density of 25 individuals per tank. Sand lobsters were reared with a recirculation system (RAS) for 176 days. Samples of sand lobster with symptoms of disease were obtained from the grow-out tanks of the sand lobster. From the results of observations in the field, it can be seen that there is a necrosis (red color and damage) to the tail fins of sand lobsters reared with the RAS. From the results of laboratory tests, it was found that there were parasitic infections of the types of ciliates, protozoa and vorticella. The results of further testing at the Microbiology Laboratory found that there was an infestation of vibriosis disease caused by the bacteria *Vibrio alginolyticus* and *Vibrio parahaemolyticus*. Diseases caused by parasitic and bacterial attacks do not actually affect mass death in sand lobsters, even these symptoms can disappear if sand lobsters can replace their skin (molting) perfectly. Observations also show that the most deaths occurred in sand lobsters with smaller sizes (weight 50-100 grams). This disease infection is thought to have occurred due to a decrease in the water quality of the sand lobster rearing media in the RAS, mainly due to the high concentration of organic matter in the water.

Keywords: Lobster; Diseases; Parasite; RAS; Red Tail Fins; Vibriosis.

Isolation, and Identification of Enzymes-Producing Lactic Acid Bacteria Isolated from Intestine of Nile Tilapia (*Oreochromis niloticus*)

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Abstract. Lactic acid bacteria is a common probiotic bacteria. The objectives of this research is to isolate, identify and characterize the lactic acid bacteria from Nile Tilapia (*Oreochromis niloticus*) intestine which has a potential application for probiotic bacteria. The intestine of bacteria was isolate using de Man Rogosa Sharpe Agar incorporated with calcium chloride. The colonies bacteria were investigated their capabilities to produce enzymes. The enzyme-producing lactic acid bacteria was further identified by using molecular analysis. Three isolates were confirmed to produce high We have reported that the four isolates, namely I1, I2, I3, and I4 were confirmed to have protease and amylase enzymes. Among those four isolates, *Leuconostoc* sp. is the highest producer of the enzyme. It can be concluded that the intestine of Nile tilapia (*Oreochromis niloticus*) is the good source of potential probiotic.

Keywords: Enzyme; Lactic Acid Bacteria; Nile Tilapia; Probiotic.

Penapisan Antibakteri dari *Lactococcus lactis* spp. *lactis* BI (2) yang Diisolasi dari Bekasam Ikan Bandeng

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Abstract. *Lactococcus lactis* spp. *lactis* BI(2) is one of the lactic acid bacteria isolated from milkfish bekasam from Indramayu (Central Java). This study aims to screen for antibacterial from *L. lactis* spp. *lactis* BI(2) and determine the antibacterial activity during 24 hours of growth in the selected treatment. This study consisted of 2 stages, namely, (1) determining whether the antibacterial activity was acidic or not and (2) determining the antibacterial production during 24 hours of growth in the selected treatment. The treatments in the first stage were cell-free supernatant (SBS), SBS5, SBS6, SBS7 (SBS with pH 5, 6 and 7), as well as SBSS and ESBS (supernatant and precipitate after deposition of SBS with 50% ammonium sulfate). Antibacterial activity was tested against *Escherichia coli*, *Bacillus cereus*, and *Staphylococcus aureus*. Selected treatments was re-cultivated for antibacterial production for 24 hours of incubation. Observations were made every 3 hours on pH, total titrated acid (TAT), bacterial growth, and antibacterial activity. The results showed that the SBS, SBS5 and SBSS treatments produced antibacterial activity while SBS6, SBS7 and ESBS did not produce antibacterial activity on the test bacteria. Based on these results, it is suspected that the dominant antibacterial compound produced by *L. lactis* spp. *lactis* BI(2) were organic acids. Antibacterial production by *L. lactis* spp. *lactis* BI(2) showed that antibacterial activity against *B. cereus*, *E. coli* and *S. aureus* was produced at 6, 18 and 21 hours of incubation, respectively. The highest antibacterial activity against *S. aureus* with an inhibition zone of 3.5 mm was produced at 24 hours of incubation. Antibacterial activity and organic acid production increased along with bacterial growth, otherwise the pH of the medium decreased.

Keywords: Antibacterial; Organic Acid; Lactic Acid Bacteria; Cell-Free Supernatant.

Effect of The Addition of *Chlorella* sp Flour on Chemical Quality Boba

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Abstract. Boba is one of the toppings in milk tea and chocolate drinks in the form of small chewy black balls commonly 1 cm in diameter made from ubikayu starch. This study used *Chlorella* sp. flour, rich in nutrients as an additive in the processing of boba. The purpose of this study is to determine the effect of the addition of *Chlorella* sp flour on the chemical quality of boba. This study used an experimental method, namely strengthening boba with the addition of *Chlorella* sp flour, which consists of 4 levels of treatment, namely: BC⁰ (control), BC¹ (1%), BC² (2%), BC³ (3%) The treatment was repeated 3 times with the parameters tested being proximate. From there search based on proximate test parameters, the best treatment was obtained in BC³, the chemical quality was water content of 12.78%, protein 3.54%, ash 0.98%, fat 0.22% and carbohydrates 82.47%.

Keywords: Boba; *Chlorella* sp; Proximate.

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