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Posters

Adam Mytlewski et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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The extensive carp aquaculture in Central Europe: Typical strategies of the Polish carp farms identified in the EU SUCCESS project

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Globalized seafood market changes the European traditional aquaculture production. One of the most exposed aquaculture sector in Central Europe is extensive regional fish farming especially of such species as carp, perch or pike. The extensive fish production has also lower competitiveness in relation to other imported or farmed fish products in Europe. It has also more technological problems with processing, fish bones, meat efficiency factor and discard factor. On the other side this sector produces still in sustainably and traditionally way. That tradition of carp consumption (especially during Christmas time) is one of the strongest attribute keeping this farming in Poland still in good economic condition. Neither, the grooving supply coming from global seafood markets degraded the position of domestic producers and changes the value chains. According to growing demand for cost-attractive and convinced product, carp farms are looking for effective strategies better adopting them to current market challenges. The survey of this problem has been undertaken in the EU project by acronym SUCCESS ("Strategic Use of Competitiveness towards Consolidating the Economic Sustainability of the European Seafood sector"). The project aims at establishing the synthetic competitiveness factors describing the fish and seafood species farmed and exploited in Europe. One of the searched sectors was traditional farming represented by carp. The method used in carp case studies was Agri Benchmark approach which focuses on typical farm surveys and typical behavior. The survey has been conducted at three farms in Poland representing typical farm sizes: 300, 150 and 20 hectares of water surface. The farm owners/managers were asked details about typical functional mechanisms used in operational, marketing, human resources and financial decisions. Identification of the mechanisms let the authors structure typical long term strategies in carp business and its economic efficiency. The most important variables affecting the strategies were: Farm size, position in value chain, productivity, distribution channels.

Biography

Marcin Rakowski is working as a Senior Scientist at National Institute of Marine. He has completed his specialization in maritime fishery and business related to impact of fishery on local economy at the National Marine Fisheries Research Institute. He is extending his valuable service as in fishery research allowing assessed multiplier effects of expenditure and revenue of fishermen in coastal region. His research interests reflect in his wide range of publications in various national and international journals.

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Notes:

Che Zulkifli Che Ismail et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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The effect of preserved and shipped cryopreserved semen of giant grouper (*Epinephelus lanceolatus*) in dry ice (-79° Celsius) on the total protein in semen and spermatozoa

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Protein is a macromolecule that plays an important role in the living organism. The role of protein is catalysing the metabolic reaction, DNA replication, responding to stimuli and shipping the molecule from point to point. The level of protein in spermatozoa is very important because it contains DNA information which can be transmitted from paternal to the next generation. The study was conducted to determine the level of total protein in cryopreserved semen and in spermatozoa of giant grouper ((*Epinephelus lanceolatus*) which is preserved in dry ice (-79° Celsius) and shipped with Styrofoam box and dry ice as a refrigerant. The purpose of shipping is to use the cryopreserved spermatozoa in artificial insemination to produce hybrid grouper. The level of total protein also determined after the frozen semen are immersed back to liquid nitrogen after 24 hours and 48 hours in dry ice. The treatment in this study was 24 hours in dry ice, immersed back to liquid nitrogen after 24 hours in dry ice; 48 hours in dry ice, immersed back to liquid nitrogen after 48 hours in dry ice; and 72 hours in dry ice. The other factor in the experiment is the container for the semen are loaded: Straw and cryotube. Positive control for the experiment was the post thaw semen from liquid nitrogen, and negative control for the experiment was fresh semen. The experiment also compared the level of total protein in semen before and after adding extender and cryoprotectant and also before and after cryopreservation procedure. The level of protein is determined using Bradford method. The result of the study shows there are no significant differences ($P<0.05$) on the total protein from the semen and spermatozoa were loaded with straw and cryotube. There are significant differences ($P<0.05$) on the level of total protein in semen before and after adding with extender and cryoprotectant. However, there is no significant difference ($P>0.05$) on the level of total protein before and after adding the extender and cryoprotectant in spermatozoa. There are no significant differences ($P>0.05$) on the level of total protein in semen for all treatment and control groups. Thus, preservation and shipping the cryopreserved semen does not affect the level of total protein either in semen or spermatozoa.

Biography

Che Zulkifli Che Ismail served as a Research Officer at Fisheries Research Institute of Malaysia since 1995. He has expertise in marine finfish breeding including broodstocks management, larval rearing, nursing of fry and grow out. The past project that he had already done was breeding of Cobia, Asian Sea bass, Tiger Grouper and Red Snappers. Beside the marine finfish, he also has experience in breeding of tropical abalone, green muscle and giant freshwater prawn. Besides aquaculture field, he also has experience in ecological study especially on the pollution of pesticide in the water, sediment and aquatic animals. Currently, he is studying PhD in the University Malaysia Terengganu, Kuala Terengganu, Malaysia. His current study is the cryopreservation of Giant Grouper spermatozoa in order to produce the hybrid grouper fry.

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Chien-Hui Wu et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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Evaluation of chromium-binding activity of collagen peptides prepared from tilapia scale

Chien-Hui Wu, Yu-An Chen and Jen-Min Kuo
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Thousands of tilapia fish scales are wasted without valuable utilization. Tilapia scale is rich in collagen that is hydrolyzed by enzyme digestion. The hydrolysate collagen peptides has antioxidant, anti-cancer, anti-anemia, immune regulation, anti-bacterial, hormonal regulation, inhibition of angiotensin transferase activity, prevention of arthritis, osteoporosis and other bioactive functions. Studies indicated that fish scale collagen protein hydrolysates has a well-binding capacity for calcium, iron, and copper, enhancing the biological activity of the fish scale collagen protein. The chromium content in human body significantly reduces as age increases. There have been studies indicated that trivalent chromium can regulate insulin function and maintain homeostasis of blood glucose, and improve the glucose tolerances of type II diabetes patients. Therefore, the aim of this study is to exploit the metal chelating ability of collagen hydrolysates by mixing low molecule weight fraction of collagen hydrolysates from tilapia scale with trivalent chromium (referred as C-Cr). The data showed that low molecule weight fraction of tilapia scale collagen hydrolysates can bind with 123 ppm trivalent chromium ions, forming collagen-organic chromium complex at pH 3 and 60°C maintained for 1 hr. Then addition of 50%, 100% and 200% of 750 mM chromium chloride to the collagen peptide hydrolysates was done respectively. The optimized condition was when 100% 750 mM chromium chloride was added to collagen peptide hydrolysates which can bind to 175 ppm chromium ions. In the feature, we hope to develop a functional food material with hypoglycemic activity by C-Cr components.

Biography

Chien-Hui Wu has his expertise in evaluation and development in function food material. Recently, his research were focusing on 2 ways, one is evaluating the metal-binding activity of collagen peptides from fish scale by enzyme digestion. On the other hand, the development of fermented food with gama-aminobutyric acid (GABA) by lactic acid bacteria isolated from aquatic animals. Now, he is teaching at the Department of Seafood Science, National Kaohsiung Marine University in Taiwan.

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Notes:

Chin-Chang Hung, J Fisheries Livest Prod 2017, 5:2 (Suppl)
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A highly sensitive underwater video system for use in turbid aquaculture ponds

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The turbid, low-light waters characteristic of aquaculture ponds have made it difficult or impossible for previous video cameras to provide clear imagery of the ponds' benthic habitat. We developed a highly sensitive, underwater video system (UVS) for this particular application and tested it in shrimp ponds having turbidities typical of those in southern Taiwan. The system's high-quality video stream and images, together with its camera capacity (up to nine cameras), permit *in situ* observations of shrimp feeding behavior, shrimp size and internal anatomy, and organic matter residues on pond sediments. The UVS can operate continuously and be focused remotely, a convenience to shrimp farmers. The observations possible with the UVS provide aquaculturists with information critical to provision of feed with minimal waste; determining whether the accumulation of organic-matter residues dictates exchange of pond water; and management decisions concerning shrimp health.

Biography

Chin-Chang Hung is currently a Professor of the Department of Oceanography at National Sun Yat-sen University, Taiwan. He completed his PhD at Old Dominion University, Virginia, USA. His research interests are to better understand mechanisms affecting marine carbon biogeochemical cycling in the ocean and to study extreme atmospheric events, dust storms, typhoons and extreme cold event, affecting nutrient dynamics, plankton community composition, biological pump and particulate organic carbon export flux in the ocean. Currently, he also works on application of aquaculture technology to monitor marine plankton, shrimp behavior and aquatic environment management.

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Notes:

Hei-Nin Kwong et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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The comparison on reproduction and growth of the giant clams of *Tridacna noae* and *Tridacna maxima* in Taiwan

Hei-Nin Kwong, Bo-Wei Su and Li-Lian Liu
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Tridacna maxima are a widely distributed giant clam species in the world. Recently, several studies have shown that a cryptic species, i.e. *Tridacna noae* is similar to *T. maxima* based on morphological and molecular sequence evidences. The aim of this study was to compare the reproduction and growth of the two giant clams. Based on field monitoring on eggs, the spawning peak of *T. maxima* was from May to August in Kenting, and March to June in Dongsha. In *T. noae*, it was through May to July in Kenting, and April to June in Dongsha. Artificial fertilization was successfully conducted in *T. maxima* and *T. noae*. By comparison, the growth of juvenile *T. maxima* was faster than that of *T. noae* under cultural conditions. And, the growth of both species was faster at higher temperature (27-29°C) than the lower ones (24°C). Based on the cultural records, the growth ring on shell and hinge plate of the giant clams from cultural and wild populations were also compared and contrasted.

Biography

Hei-Nin Kwong works on giant clams especially the growth comparison between field and cultural environments. He had the first attempts to apply alizarin red staining method on giant clam shells which is commonly used in coral studies.

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Notes:

Tung-Shi Huang et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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Microbial quality of tilapia tank water for produce production

Tung-Shi Huang and Jean Weese
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The microbiological quality of the water is important since the waste water from tilapia production tank will be used for produce production. The USFDA Food Safety Modernization Act (FSMA) requirement of monitoring microbiological quality of produce irrigation water, *Escherichia coli* and coliforms were analyzed. The water effluents from tilapia fish tank and greenhouse were monitored twice a month. Since these vegetables, cucumbers and tomatoes, are used in ready-to-eat foods, there is a zero tolerance of *Salmonella* and *Listeria monocytogenes*. Therefore these two bacterial contents were examined. Membrane filtration and 3M Petrifilm® were used to isolate *E. coli* and coliform in water samples. *E. coli* and coliform were also isolated from soil in green house for growing produce using 3M Petrifilm and pour-plate methods. Enrichment protocol was used for *Salmonella* and *Listeria monocytogenes* detection for the cucumber and tomatoes. The population of *E. coli* from the effluent of tilapia tank in November, 2016 was higher, then it decreased and the average population is 68 CFU/mL. The population of coliform has the same trend as in *E. coli* and the average population is 1.2×10^3 CFU/mL. While the populations of *E. coli* and coliform from the effluent of greenhouse had the same trend and the population of *E. coli* and coliform were 17 CFU/mL and 3.0×10^2 CFU/mL, respectively. The populations of *E. coli* and coliform in the soil were 91 CFU/mL and 1.70×10^3 CFU/mL, respectively. For *Listeria monocytogenes* and *Salmonella* detection, one positive of *Listeria monocytogenes* in presumptive test in cucumber has been found. The acquired data can provide information as to whether further disinfection is needed before water is discharged into the environment.

Biography

He is awarded PhD in Food Science and Human Nutrition from University of Florida in the 1993. He holds a Master Degree (MSc) in Plant Pathology from National Chung-Hsing University, Taiwan in the 1981, followed by a Bachelor's Degree (BSc) in Plant pathology from National Chung-Hsing University, Taiwan 1978. He has extended his/her valuable service as a **Professor** in Poultry Science, Auburn University for 6 years and has been a recipient of many award and grants. His international experience includes various programs, contributions and participation in different countries for diverse fields of study. His research interests as a **Professor** reflect in his wide range of publications in various national and international journals.

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Evaluation of the effectiveness of mangrove rehabilitation sites using commercial and non-commercially important crab species

Jean R Calapuan and Yoshikazu Kanesaka
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Statement of the Problem: Mangrove rehabilitation projects in the Philippines serve as coastal protection and restore ecological functions. Thus mangrove planting activities of mono- genus stands in the tropical cyclone prone area are increasing, however, this may not warranty as formerly diverse mangrove forests. Considering the vast ecological services the mangrove forest that has to offer, few studies were conducted on the effectivity of mangrove rehabilitated sites using indicator species. The abundance of commercially important blue swimming crab, *Portunus pelagicus* was used as an indicator of ecological function of mangrove rehabilitated site. To represent the non-commercially important species, the relative abundance of *Thallamita crenata* was used as in the present study.

Methodology & Theoretical Orientation: This study was conducted along the coastal areas of Olango Island and Banacon Island, part of central Visayas. Total of four sites (two sites in each island) were selected to represent the rehabilitated sites in Olango Island and Banacon Island. These sites were predominantly mangrove replanted of *Rhizophora* spp. Catch per unit effort (CPUE) was used to estimate the abundance and relative abundance gathered from the traditional crab pot used by the locals to catch crabs. The soft substrata in the mangroves serve as ideal habitat and spaces between its roots supports as shelter and food for crabs, prawns and fishes.

Findings: The mangrove rehabilitated site in Banacon Island showed a higher abundance of *P. pelagicus* as compared to Olango Island. The relative abundance of this commercially important species revealed to be equal in both Olango and Banacon. Low densities of *P. pelagicus* were also showed in both mangrove rehabilitated sites due to limited recruitment and higher abundance of non-commercially important species.

Conclusion & Significance: The present study suggests mono-genus planting is still an effective method of restoring commercially important species such as the blue swimming crab *P. pelagicus*. This will provide baseline information to policy makers for sustainable mangrove ecosystem management.

Biography

Jean R Calapuan completed her Bachelor's degree in Zamboanga State College of Marine Sciences and Technology in Marine Biology majoring in Phycology. She worked as a Research Assistant at Department of Environment and Natural Resources (DENR) R9, Philippines. She also became Research Assistant in different projects while studying in University of the Philippines, Visayas until she became a Graduate Scholar of Department of Science and Technology-Accelerated Science and Technology, Human Resources Department Program (DOST-ASTHRDP). She finished her Master of Science in Fisheries majoring in Fisheries Biology in last June 11, 2014 at the University of the Philippines - Visayas. She is currently working as a Junior Project Coordinator in Corporate Social Responsibility (CSR) Department in Japanese Company. She is also a part-time Dive Instructor and Research Consultant. She took opportunity to travel in different places while successfully attending and presenting research papers. Currently, she's doing mangrove rehabilitation projects in partnership with local government units in Central Visayas.

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D Syahidah et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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Vero cell lines expressing nuclear location signals of *Penaeus merguiensis* hepandensovirus: An early study

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James Cook University, Australia

Statement of the Problem: Parvoviral diseases are emerging as a constant threat to penaeid culture due to their ability to cause slow growth and mass mortality of infected prawns. *Penaeus merguiensis hepandensovirus* (PmeHDV) (GenBank Accession No. DQ458781) is a shrimp hepatopancreatic parvovirus (HPV), an Australian strain of the species *Decapod* hepandensovirus *1*, in the genus *Hepandensovirus*, subfamily *Densovirinae*. *Densovirinae* are intranuclear and require S-cells in their S-phase for all or most of all their replication and assembly. Transportation into and out from nucleus is allowed by the binding of nuclear location signals (NLSs) to Importins (Imp). A bioinformatical study on PmeHDV supported that the virus has putative NLSs that need to be tested. The present study aims to determine if of the three putative NLSs of PmeHDV are functioning by transfecting NLS-inserted-plasmid DNAs into mammalian cell culture (Vero) using a transfection reagent.

Methodology & Theoretical Orientations: Each plasmid has been synthetically constructed and inserted with each sequence of the putative NLSs and a fluorescent protein. The presence of the NLS in the cell nucleus and cytoplasm was screened under a fluorescent microscope.

Findings: All transfected cells in our study demonstrate no noticeable differences within transfected-Vero cell cultures with desired NLSs genes. The overlay of visualization of transfected plasmids with sequential fluorochrome sets is presented in Figure 1. It appears that NLSs are not functioning well as that the proteins are blocked at the nuclear membrane and not going across.

Conclusion & Significance: Our fluorescent study was not sensitive enough to detect differences in NLS-transfected-cells under different filters. The method used was ineffective in identifying the location of NLSs. In the future, the study of virus-host interaction using cell cultures as models remains a major challenge.

Biography

D Syahidah is a PhD student at JCU Australia (2013-2017). She completed her BSc in Fisheries Science from Brawijaya University in 1997 and MAppSc from JCU Australia in 2010. Her current research focuses on investigating nuclear location signals (NLSs) of *Penaeus merguiensis* hepandensovirus. During her PhD study, she has received JCU Student Sustainability award in 2014, completed 3 modules of JCU professional (2013-2014), participated in the On-awards Enrichment program in 2015, and received the Hadi Soesastro Prize in 2016.

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Notes:

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Enhanced anti-inflammatory activity of brown seaweed *Laminaria japonica* by fermentation using *Bacillus subtilis*

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Most studies on the anti-inflammatory effects of *Laminaria japonica* have investigated bioactive ingredients that have been extracted from *Laminaria* using organic solvents. However, to avoid the toxicity and environmental issues caused by the solvent used for extraction, increasing attention has focused on fermentation using microorganisms as a green bioconversion process for producing bioactive compounds. In this study, fermentation with *Bacillus subtilis*, where the cultivation parameters and nutrient additives were optimized to achieve the greatest inhibition of lipopolysaccharide (LPS)-induced nitric oxide (NO) production was found to enhance the anti-inflammatory effects of *L. japonica*. Fermentation by *B. subtilis* using a 5% (w/v) *L. japonica* suspension as the sole carbon source, 2% additional nitrogen source, a starting pH of 6, and incubation at 150 rpm at 37°C for 72 h yielded the best anti-inflammatory effects, as LPS-induced NO production decreased to 27.6% ± 5.2%. The macrophages treated with the fermented *L. japonica* product inhibited the LPS-induced production of reactive oxygen species (ROS) and NF-κB (p65) phosphorylation in a concentration-dependent manner. Thus, our results show that *L. japonica* products generated by an optimized fermentation process designed to enhance anti-inflammatory effects by decreasing ROS production, NF-κB (p65) phosphorylation, prostaglandin E2, and NO production in macrophages.

Biography

Wen Jung Lu is a PhD student of National Taiwan Ocean University, Taiwan. Her topic is about the antibiotic resistance of microorganisms, and also doing the bioactive compounds in algae. She has obtained the scholarship from National Science Council, Taiwan; the topic is 'Bioactivity of beta-1, 3-xylan extracted from seaweed by using beta-1, 3-xylanase express from E. coli. Moreover, she is working on the phycobiliproteins and also obtained the scholarship from the Haiden Foundation, Taiwan. She is a competent researcher and she can work well with teams.

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Hemoglobin from the blood clam *Tegillarca granosa* (Tg-HbIIA, Tg-HbIIB): Expression and antibacterial activity of recombinant proteins

Yongbo Bao and Danli Song
Zhejiang Wanli University, China

The hemoglobins produced by *Tegillarca granosa* have antibacterial activity toward some Gram-positive and Gram-negative bacteria. In this study, the genes encoding the recombinant proteins Tg-HbIIA and Tg-HbIIB were cloned from *T. granosa* hemocytes by RT-PCR, and the proteins were expressed in *Escherichia coli* Transetta (DE3). The proteins were purified using a HisTrap FF affinity chromatography column under denaturing conditions and refolded at 4 °C by urea gradient dialysis, and the antibacterial activity of the recombinant proteins was determined. The Tg-HbIIA protein had antibacterial activity toward *Vibrio harveyi* and *Pseudomonas putida*, with the minimum inhibition concentration (MIC) values of 6.58×10^{-2} mg/ml and 4.11×10^{-3} mg/ml, respectively. The Tg-HbIIB protein had antibacterial activity toward *V. harveyi, P. putida* and *Acinetobacter baumanii*, with MIC values of 1.58×10^{-1} mg/ml, 3.95×10^{-2} mg/ml and 7.90×10^{-2} mg/ml, respectively. They had no antibacterial activity against *Staphylococcus aureus, E. coli, Bacillus firmus, B. subtilis, S. epidermidis* or *V. parahaemolyticus*. This study provides a basis for further research on the antibacterial function and mechanism of hemoglobin.

Biography

Yongbo Bao has expertise in three field of his research: (1) Immune mechanism of molluscs: Molluscan immune and disease-resistant gene function, immune mechanism, antibacterial peptides and antibacterial mechanism etc. (2) Mollucan genetics and molecular assistant breeding: Population genetic structure, genetic linkage map, SNP and GWAS and phenotype association analysis. (3) Gene and molecular phylogeny and evolution: Immunity and development related gene function study and molecular evolution analysis.

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Rajesh D P et al., J Fisheries Livest Prod 2017, 5:2 (Suppl)
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A study on length–weight relationship and relative condition factor of *Atropus atropos* (Bloch & Schneider, 1801) from Mangalore coast, India

Rajesh D P, Anjanayappa H N, Nayana P and S Benakappa
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The present study deals with length-weight relationship of *Atropus atropos* for which no information is available on this aspect from Mangalore coast. Therefore the present investigation was undertaken. Fish samples were collected from fish landing center (Mangalore) and fish market. The regression coefficient of male was found to be lower than female. From this observation, it may be opined that female gained more weight with increase in length compared to male. Data on seasonal variation in condition factor (K_n) showed that K_n values were more or less similar in both the sexes, indicating almost identical metabolic activity. Gonadal development and high feeding intensity are the factors which influenced the condition factor. The seasonal fluctuations in the relative condition factor of both the sexes could be attributed to the sexual cycle, food intake and environmental factors. From the present study, it can be inferred that the variation in the condition of *Atropus atropos* was due to feeding activity and gonadal maturity.

Biography

Rajesh D P is a PhD Scholar at the Department of Fisheries Resources and Management, College of Fisheries, Mangalore, India.

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Notes:

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Studies on biodiversity of pelagic fishes of Mangalore coast, Karnataka, India

Nayana P, Anjanayappa H N, Rajesh D P, Rajanna K B and Pramodraj P
College of Fisheries, Mangalore, India

The present investigation was taken up to assess the status of pelagic fish biodiversity of Mangalore coast (Lat. 12°50'54"N; Long. 74°50'11"E). The data for the present study was collected from the trawlers and purse seiners operating from Mangalore fishing harbour over a period from September-2012 to April-2013 and sampling was done once in fortnight. A total 69 species belonging to 49 genera, 20 families and 6 orders were recorded during the study period. Oil sardine contributed 26.97% of total landing followed by Indian mackerel (26.30%). The family *Carangidae* contributed 21.74% of total number of species, followed by *Clupeidae* 17.39%. Diversity indices such as Margalef's richness index, Shannon-Wiener index (H'), Simpson index (λ), Hill diversity number (N_1) and (N_2) and Evenness (J') were calculated. The values of Shannon-Wiener index (H') (at $\log_{10}$) ranged between 1.1553 and 1.2679. The average value recorded was 1.20, whereas highest value was recorded during month of October 2012. The Simpson index (λ) ranged from 0.0650 to 0.0979, the average value was 0.0836. Highest values for Hill diversity number (N_1) and (N_2) were recorded during the month October 2012 and lowest during the month of November 2012. The value of evenness (J') ranged from 0.8134 to 0.9311. It was found to be lowest during the month of October 2012 and highest during January 2013. Hierarchical cluster analysis technique showed the similarity in species composition and abundance was observed between the month of October and December 2012 (97.92%) and minimum inter-relationship was between September and December 2012 (64.27%). The same pattern was also evident in the Non-metric Multi Dimensional Scaling plot where samples from Monsoon fell on one side and those from post-monsoon and pre-monsoon on the other side of the map demonstrating the close similarity with (80%) in species composition and abundance during different seasons. The stress value, which was overlying on the MDS plot (0.01), showed an excellent ordination of the samples collected. Studies have indicated that the Mangalore coast is one of the major fishing harbours and having rich biodiversity; during the study period, there was good recruitment to the fishery immediately after the ban period, but the increased recruitment did not last for more than 2 to 3 months; a good deal of pelagic biodiversity was observed.

Biography

Nayana P is a PhD Scholar at the Department of Fisheries Resources and Management, College of Fisheries, Mangalore, India.

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Reproductive biology of fringe-lipped carp, *Labeo fimbriatus* (Bloch) from Vani Vilasa Sagara, of Karnataka, India

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The 'fringe-lipped' peninsula carp *Labeo fimbriatus* (Bloch) is a potential and an abundant fish species of rivers and reservoirs of peninsular India. It contributes a part of inland fish production and also plays a role in rural economy in major carp deficient regions of India. The fish is locally called as "Kemmeenu" in Karnataka. Month wise samples were collected from the Vanivilasa Sagar Reservoir fish landing centre and fishing villages around the reservoir. For this study, a total of 1,126 specimens were examined during March, 2013 – February, 2014. Studies on the reproductive biology showed the occurrence of ripe gonads more during October, November, December and January. Thus it may be concluded that spawning season coinciding with monsoon season and the size at maturity was found to be 36 and 37 cm total length (M and F). Fecundity ranged from 63,897 to 5, 10,824 with an average of 2, 43,304 eggs and the predominance of female was reported. The pooled sex ratio (M: F) was found to be 1:1.09. This study will throw light on reproductive biology of fish for captive brood stock development, breeding and rearing of *Labeo fimbriatus*. Since this fish is commercially important, the study would help to take up hatchery production.

Biography

Rajanna K B is an Assistant Professor at Fisheries Research and Information Centre (Inland), Hebbal, Nataka Veterinary, Animal and Fisheries Sciences University. He has 8 years of service in the field of Fisheries and Aquaculture. Besides research, he is also involved in imparting training to the scientific and farming communities.

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Distribution of cryptic species as a specific response to environmental effects at large scale: The freshwater shrimp *Caridina indistinct* Calman, 1926 in the southeast Queensland

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Recent research suggests that morphologically cryptic species may differ notably in their ecological requirements and their tolerance to environmental conditions. However, it is still unclear what effect environmental stress has on the relative abundance of cryptic species, and whether broad differences among cryptic species in their distribution reflect differences in their tolerances to various environmental variables, specifically water quality requirements. There is much genetic study showing that many of freshwater species are harboring a number of cryptic species, which may occasionally occur in sympatry. In this study, we focused specifically on freshwater shrimp belonging to the *Caridina indistincta* complex in southeast Qld. Two hypotheses have been suggested in this study: 1) As the taxa have different distributions, their tolerance to water quality and elevation parameters also differ, 2) As the different cryptic species of *Caridina indistincta* rarely exist sympatrically, their responses to environmental variables and preference to the specific habitats will differ between species. Molecular work has been conducted for 147 shrimp specimens from 47 sites in 15 catchments across southeast Qld, by sequencing a fragment of the mitochondrial cytochrome c oxidase subunit I gene (*COI*). The molecular approach identified three cryptic species of *Caridina indistincta* (Sp. A, B & D) and showed that these cryptic species seldom exist together, with only three sites containing more than one species. Based on a multivariate analysis of water quality variables at each site, Sp. A could be differentiated from Sp. B and Sp. D, but Sp. B and Sp. D overlapped substantially.

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Hilsa (*Tenualosa ilisha*) sanctuaries and the governance of coastal ecosystem of Bangladesh

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Sanctuaries are an important management tool for conservation and management of fisheries resources. This study analyze the socio-economic and ecological benefits of hilsa sanctuaries that were declared in the Meghna, Padma and Andharmanik river to protect single most important hilsa species. Both qualitative and quantitative data were collected from six communities located in five hilsa sanctuaries. Livelihood status of the fishers' was studied and their perceptions regarding the performances of the hilsa sanctuaries were analyzed. Majority of the fishers believe that sanctuaries are important for hilsa conservation and enhanced production but closure of fishing during ban period have stopped their income and enhance sufferings for the community due to extreme poverty, inappropriate fisher's list, inadequate incentive, corruption, nepotism and poor infrastructural development. To achieve the goals, conservation of hilsa fisheries without undermining the sustainability of dependent livelihood - wide ranges of issues need to be taken into consideration. The compensation scheme needs to be sufficient, more transparent, inclusive and equitable for further conservation success along with the access of alternative income generating activities (AIGAs). Thus, a challenge for policy makers is to find a solution that benefits both the fishery conservation and poverty reduction. Involving local fishers and sharing responsibilities among different stakeholders for managing hilsa sanctuaries by introducing co-management approach successfully could be an effective solution.

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Habitat distribution, breeding biology and hatchery management of golden (*Tor putitora*) and chocolate mahseer (*Neolissochilus hexagonolepis*): Present scenario & future challenge in India

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Mahseer, the king of freshwater scaly fish belong to the important genus *Tor* and *Neolissochilus* are distributed in the entire IHR (Indian Himalayan region) and peninsular region. The importance of mahseer as a world famous game and sport fish is well known. Considering the importance of this fish in IHR and peninsular rivers, streams and lakes, mahseer has got all the qualities to become the national fresh water fish of India. However, the population of this magnificent fish is declining in natural water bodies and it is considered as an endangered fish as per IUCN status due to various natural and anthropogenic factors. Therefore, knowledge information regarding habitat distribution and its sustainable management, standard protocol for breeding and hatchery management is necessary for improving the status of the fish. ICAR-DCFR has been continuously working in this direction and protocol for breeding and hatchery management of golden and chocolate mahseer has been developed which will be discussed in detail in this paper. The breeding biology in terms of ultrastructural and histological changes in the embryonic and larval surface during organogenesis of the endangered golden mahseer has been studied and will be presented. Significant success stories will be highlighted in the presentation in terms of establishment of fish sanctuaries, mahseer watching and eco-tourism centre in different parts of India. The study embodies the present status of mahseer diversity in IHR, its breeding biology and hatchery management practices, so as to take appropriate steps to mitigate the challenges for its rehabilitation and conservation.

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Toxic effects of sulfide on the energy metabolism and gut health in the Pacific white shrimp, *Litopenaeus vannamei*

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Sulfide is a natural and widely distributed toxicant. It can be commonly found on the interface between water and sediment in the aquatic environment. The Pacific white shrimp *Litopenaeus vannamei* starts life in the benthic zone soon after the mysis stage, an early stage of post larvae. Therefore, *L. vannamei* is inevitably affected by exposure to sulfide released from pond sediment. The toxicity and poisoning mechanisms of sulfide were studied in *Litopenaeus vannamei* from the perspective of energy metabolism, metabolomics, gut health and microbiota. The lethal concentrations of sulfide in *L. vannamei* (LC50) at 24 h, 48 h, 72 h, and 96 h were determined. Sulfide at a concentration of 0, 1/10 (425.5 μg/L), and 1/5 (851 μg/L) of the LC50 at 96 h was used to test the responses of *L. vannamei* for 21 days. The results of the study showed that chronic sub-lethal sulfide exposure could lead to the dysfunction of mitochondrial respiration, as evidenced by the change of cytochrome C oxidase activity, disturbed protein synthesis, enhanced gluconeogenesis, and increased substrate consumption for ATP synthesis. The accelerated tricarboxylic acid cycles could provide extra energy for dealing with sulfide stress. Chronic sulfide exposure could adversely affect the health status of shrimp and therefore lower *L. vannamei* survival. Dose-dependent relationships were found in L. vannamei exposed to sulfide. Also chronic exposure to sub-lethal sulfide could lead to damage of the gut structure, stimulate the response of the inflammatory and immune systems, and shape the microbiota structure in the gut of *L. vannamei*. The microbiota structure includes three aspects. First, the abundance of pathogenic bacteria increased significantly with the increasing concentration of sulfide. Next, the abundance of some anti-stress bacteria decreased. Last, adaptation of sulfide-stimulated bacteria was commonly found and down-regulated.

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The situation of aquaculture in Africa

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In northern and northeastern Africa, Egypt ranks first with 92% of the region's total production and has now become the second largest producer of Tilapias after China and the world's largest producer of Big Head Mule (*Mugil cephalus*). Meanwhile, output from sub-Saharan Africa remains negligible despite its natural potential. Nigeria leads the region, producing some 44,000 tons of catfish, tilapia and other freshwater fish. The encouraging signs observed, however, make it possible to expect production to increase in the future: The production of giant tiger prawns (*Penaeus monodon*) in Madagascar and *Eucheuma* algae in the United Republic of Tanzania is booming, while the production of niche species such as abalone (*Haliotis spp*.) in South Africa is also increasing. In Senegal, national production has not yet exceeded 150 tons of all species. At the same time, the fisheries sector is faced with enormous difficulties. Overexploitation of certain fish stocks, poses serious risks of disturbances in supply to the local market due to the deferral of fishing effort from species of current consumption to those destined for the external market. These difficulties are aggravated by the decline in the landings of inland fisheries due to the negative impacts of the drought and the failure to take account of the aspects related to fisheries in the hydroelectric development on the Senegal River. By 2020, with a projection of 17 million inhabitants, the growing deficit between supply and demand for fishery products would exceed 50% of domestic trade and would constitute a major food security challenge for the country. The only alternative available to the country is the development of aquaculture.

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Performance characteristics of Nile tilapia (*Oreochromis niloticus*) fed diet containing selected antioxidants following ammonia stress

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The study evaluated the growth, haematology, glucose and resistance to ammonia stress of Nile tilapia (*Oreochromis niloticus*) fed diets supplemented with different antioxidants. The fish were fed with diet containing 80 mg kg^{-1} astaxanthin (AX80), 50 g kg^{-1} malunggay Moringa oleifera (MO50) and 5 g kg^{-1} nutrafito plus (NP5) or basal diet (C) for 42 d. Weight sampling was conducted every 14 d while survival was monitored daily. Blood was collected to determine the haematological parameters and blood glucose level of fish before and after ammonia stress test. Wf, WG and SGR of NP5-fish were significantly higher than C-fish but comparable to AX80- and MO50-fish. However, other parameters such as PER and FCR were not significantly different among all treatments. There were significant results in some haematological parameters, glucose level and survival before and after ammonia stress. Before ammonia stress, RBC of NP5-fish was significantly higher among treatments while HCT of NP5-fish was significantly higher than MO50-fish. After ammonia stress, HGB of AX80-fish was significantly higher than C-fish but comparable to MO50- and NP5-fish. On the other hand, RBC of NP5-fish was significantly higher than MO50- and C-fish. Moreover, HCT of NP5-fish was significantly higher than C-fish. Glucose level of NP5 was the lowest among treatments. In addition, AX80- and NP5-fish showed significantly higher survival than the C-fish. These results indicated that fish fed diet supplemented with nutrafito plus improved growth performance, stabilize some haematological parameters and glucose level and improved survival of *O. niloticus* exposed to ammonia stress.

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Eggyolk antibodies and its application in aquatic animal health management

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Although, aquaculture has developed significantly, management of diseases needs more emphasis. Specific antibodies for designing and use of different immunodiagnostics are necessary. Secondly, there is a great scope for integration of passive immunization i.e., IgY immunotherapy, the concept in health management needs to be tapped. Specific antibodies produced in chickens offer several important advantages over producing antibodies in other mammals. A single egg contains as much antibody as an average 20 ml bleed from a rabbit. This simple, non-invasive approach presents an appealing alternative to conventional polyclonal antibodies production methods. Purification of chicken egg yolk immunoglobulin Y (IgY), does not require animal bleeding. In addition, the eggs from immunized chickens provide a continual, daily source of polyclonal antibody, and this convenient approach offers greater compatibility with animal protection regulations. These IgY antibodies could be used for either developing immunodiagnostic kits or in passive immunotherapy against diseases. This will reduce the use of chemicals/antibiotics in the aquatic environment and also help in controlling viral infections. The development, characterization, use and control of diseases are discussed in the light of the available literature.

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Effects of acute inbreeding on the growth performance and yield of Mozambique Tilapia, *Oreochromis mossambicus*

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Tilapia species plays an important food security role in developing countries and in Africa. However, it is often farmed by small/medium scale farmers characterized by low efficiency and yield with poor technical knowledge of basic genetics and breeding principles. When animals are kept in captivity and in groups that depend on artificial mating, inbreeding is inevitable. Large amounts of inbreeding in these farming communities with small effective breeding population may reduce production efficiency. In as much as inbreeding is unavoidable, understanding its effects may aid in the decision making processes of breeding programmes, especially within small/medium scale hatcheries in developing countries including Africa. Therefore, the objective of this study was to evaluate tilapia's (*Oreochromis mossambicus*) productivity under the maximum possible inbreeding conditions. Full-sib mating was conducted on *O. mossambicus* over three generations of repeated mating at Welgevallen experimental farm at the University of Stellenbosch. A total of 25 males and 25 females were used as the parental stock, where a 14-day spawning period was followed by three generations of full-sib mating. Measurements of body weight (BW), standard length (SL) and specific growth rate (SGR) were recorded for each of the sixteen randomly sampled fish per replicate, at two weeks growth intervals for the period of 90 days at each generation. Regression analysis was used to determine the rate of phenotypic depression per unit increase in F and analysis of variance used to establish the difference between the means. The effect of acute inbreeding on growth performance, yield and occurrence of deformity traits studied in this experiment on Mozambique tilapia, *Oreochromis mossambicus* at two levels of inbreeding coefficients, namely F=0.250 and F=0.375 showed the following results. The base population with F=0.000 was established through the crossing of two geographically separated and genetically unrelated farm stocks. At each generation, the inbreeding depression for body weight (BW), standard length (SL), specific growth rate (SGR) and yield were highly significant, but no linear relationship was found between level of inbreeding and inbreeding depression. Both condition factor (K) and the number of observed deformities appears not to be significantly affected by inbreeding at all levels of inbreeding studied. Over all, the average inbreeding depression at F=0.250 and F=0.375 was found to be 46.5 percent and 46.6 percent for body weight (BW); 18.2 percent and 18.0 percent for standard length (SL); 21.8 percent and 20.3 percent for specific growth rate (SGR) and 5.752 percent and 8.940 percent for flesh yield. The outbred Control group differed significantly ($P<0.05$) from the six inbred family groups in terms of body weight (BW), standard length (SL), specific growth rate (SGR) and yield at all levels of inbreeding studied (F=0.250 and F=0.375). This study demonstrates that inbreeding has a significant negative effect on production traits of *Oreochromis mossambicus*, especially on growth. These results emphasize the need to create awareness amongst small scale farmers of the importance of preventing uncontrolled inbreeding in production systems, as well as to monitor inbreeding levels during the process of dissemination of improved fish strains to small/medium scale fish growers in developing countries, including Africa.

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Effects of enzymatic hydrolysis and probiotic fermentation on anti-inflammatory ability of *Chlorella*

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The rigid cell wall of *Chlorella* cannot be easily digested and consequently lowered its nutritional value. Hydrolysis with cellulase and protease at 50oC promote the releasing of reducing sugar, lutein, chlorophyll, and peptides or free amino acid, suggesting the lysis of cell walls occurred. *Chlorella* hydrolysate was further fermented with *L. plantarum* subsp. BCRC 10069 at 37°C for 24 hr. The inhibition of LPS-induced nitric oxide (NO) and O^{2-} production in RAW264.7 cells were used to investigate the anti-inflammatory activity of the hydrolysates and their fermented samples. About 78.30% of NO and 76.72% of O^{2-} productions in LPS-RAW 264.7 cells were inhibited by *L. plantarum* subsp. BCRC 10069 fermented *Chlorella* hydrolysate. Probiotic fermented hydrolysates could inhibit 55.30% of interleukin 6 (IL-6) production and depress the tumor necrosis factor (TNF-α) from 364.80 ng/mL to 161.75 ng/mL, respectively. Further, the *Chlorella* hydrolysate and fermentation could increase interleukin 10 (IL-10) production. These phenomena suggested that hydrolysis and fermentation substantially facilitate the release of nutrients and decrease of ROS production. According to the data obtained, probiotic fermented *Chlorella* hydrolysates have higher potential to process into functional foods with anti-inflammatory ability.

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